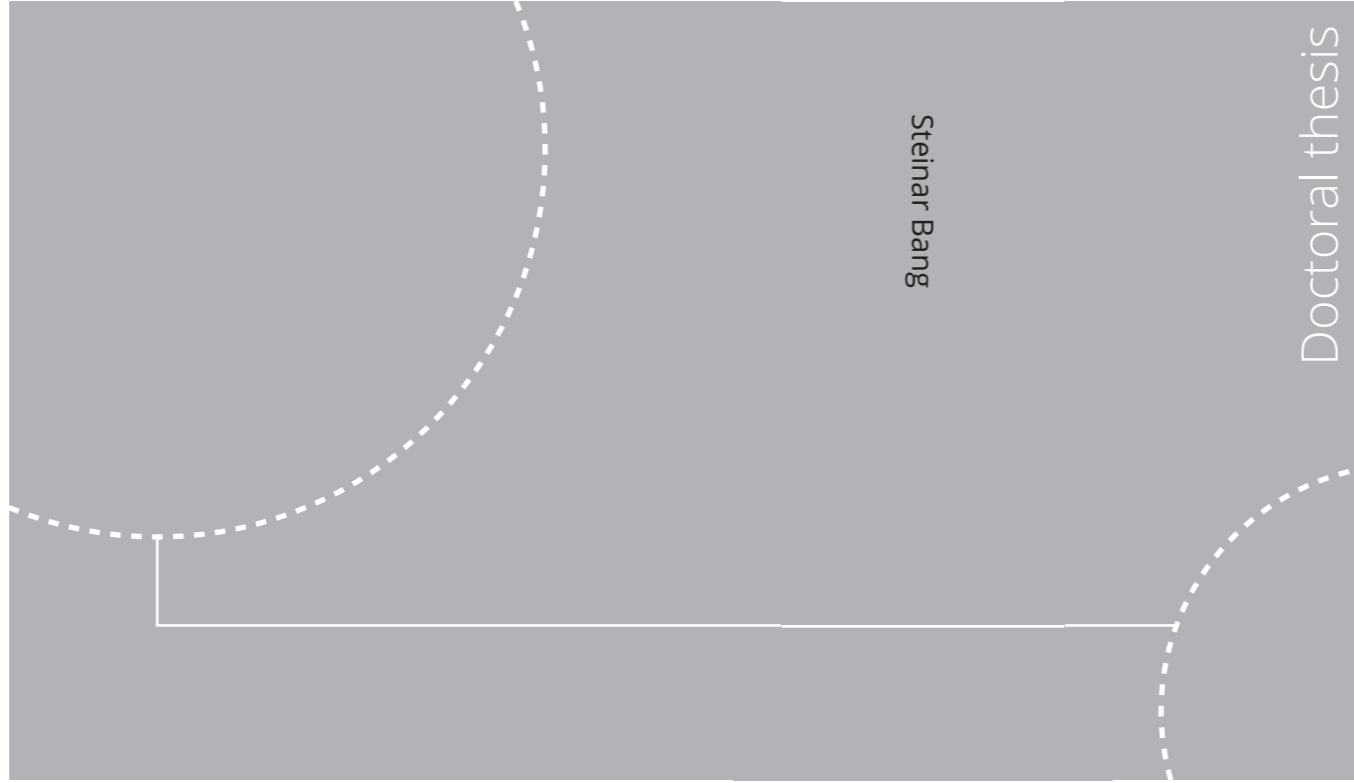


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A Neurophenomenology

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Thesis for the degree of
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Abstract

In a study which was first of all aiming for an understanding of musical behaviour, a hierarchy of ego-dynamic functions and processes became so apparent that a much more general question was inevitably suggesting itself: whether the status of the self should also be upgraded, from the idea of a body into which the 'reality' is streaming to a reality of its own, that is to say: a hierarchy of relatively autonomous dynamic structures, much like a musical composition.

More precisely this treatise is focussing on an aspect of consciousness which has been little theorised since the time of William James and Wilhelm Wundt: the experience of agency in the stream of thought, as manifested in kinaesthetic and auditory sensations. A necessary but often neglected part of this dynamic is its *gestalt properties*, what Wundt called 'psychische Gebilde'. While the first and last chapters discuss the importance of such dynamic gestalts to general consciousness, the main part of the treatise is consisting of a phenomenological analysis of affective vocalisation and its development into human level prosody and melodrama. Especially at a socio-emotional evolutionary stage the explicit properties of sound become central features of communication and the experience of harmonious communion.

On the background of recent neuroscience, like Etienne Koechlin's discovery of an 'action-chunking' hierarchy in the lateral prefrontal cortex, the hypothesis of a neuroanatomical co-location of melody, conation, and articulated emotional behaviour is investigated with recourse to neuroimaging and lesion studies. Especially the right inferior frontal gyrus (rIFG) in alliance with the medial pre-supplementary motor area (pre-SMA) is found to be central to the melodic and autonomous dynamic of the mind.

Sammendrag

I et studium som i første omgang siktet mot en forståelse av musikalsk adferd, ble et hierarki av ego-dynamiske funksjoner og prosesser så åpenbart at et mye mer generelt spørsmål uunngåelig meldte seg: i hvilken grad selvets status også skulle oppgraderes, fra ideen om en kropp hvor 'virkeligheten' strømmer inn, til en egen virkelighet, det vil si: et hierarki av relativt autonome dynamiske strukturer, som i en musikalsk komposisjon.

Mer presist fokuserer denne avhandlingen på et aspekt av bevisstheten som har vært lite teoretisert siden William James og Wilhelm Wundt: opplevelsen av å være en agent i tankestrømmen, manifestert i kinestetiske og lydlige sansninger. En nødvendig, men ofte oversett del av denne dynamikken er dens gestalt-egenskaper, hva Wundt kalte 'psychische Gebilde'. Mens de første og siste kapitlene drøfter viktigheten av slike dynamiske gestalter for generell bevissthet, utgjør hoveddelen av avhandlingen en fenomenologisk analyse av vokale følelsesuttrykk og disses utvikling til menneskelig prosodi og melodrama. Særlig på et sosio-emosjonelt evolusjonært stadium blir lydets eksplisitte egenskaper sentrale for kommunikasjon og opplevelsen av harmonisk samhörighet.

På bakgrunn av ny nevrovitenskap, som Etienne Koechlin's oppdagelse av et handlings-hierarki i den laterale prefrontale cortex, blir hypotesen om en nevroanatomisk samlokalisering av melodi, vilje, og artikulert emosjonell adferd undersøkt med referanse til skanning- og lesjonstudier. Særlig blir høyre VLPFC, i tilknytning til det mediale pre-supplementariske motor område (pre-SMA), funnet å være sentral for melodi og sinnets autonome dynamikk.

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Epistemological introduction

What is conscious existence? Often it is envisaged as a body or vantage point, into which 'reality' is streaming, so to speak. But we would have no consciousness of a stone if we had not *interacted* with it in some manner, by *turning* it, *lifting* it, *throwing* it, *thinking* about it, or at least: *looking* at it with a certain attention and interest. Similarly, we would have no consciousness of this throwing, looking, and thinking without a sense of *agency* and *organised movement* going into the acts of throwing, looking, and thinking.

The self has a kinaesthetic feel and structure, it seems, which is commensurate with the complexity and integrity of consciousness. It is a realm of reality that might even be richer than that of external 'inanimate' things, yet it is often neglected. This is what this treatise is seeking to remedy, and it is focussing especially on the role of sound and melody as a dynamic substrate for the self in thought and emotional communication. It is a 'neurophenomenology' or a 'neuromusicological' investigation - which may sound pretentious - but it would be very ignorant to go on speculating about these matters without making an attempt, at least, to draw upon the vast amounts of neuropsychological evidence that keep emerging now.

Examples of this are fields of research into what has come to be labeled 'embodied cognition' and 'affective neuroscience'. By providing new and experimentally verifiable insights into the embodied and 'outer' aspects of our 'inner' lives, this research might also create a better understanding of the connection between sound and emotion; or, as will be a central hypothesis in this treatise: a blurring or *removal* of this distinction, rendering sound itself *a medium for feeling and mental dynamics*.

If this is really the case - and it is the mission of this treatise to explore it - the connection between music and emotion is more than metaphorical, it is a common field. Certain core constituents of what we call 'the self' - its melodic modulations and autonomous dynamic processes - are hardly better studied elsewhere. It is easy to neglect this part of reality while dealing with our spatial surroundings. Not only because 'the hints are often half guessed,' as Antonio Damasio put it,¹ but because it constitutes such an overwhelming and entirely familiar

¹ Antonio Damasio, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness* (San Diego: Harcourt, 1999): 172.

part of what we are, making us 'miss the wood for the trees'. Especially this seems to be the case with our own voices and intonations, and it is very much thanks to the field of neuroscience that we can observe with increasing clarity now, how the auditory and kinaesthetic sensations are central not only to the apperception of an outer world,² but just as important, to the experience of mental *agency*, *character*, and the kinds of emotional-behavioural gestalts upon which self-consciousness, and even consciousness in general, might be seen to depend.

Except for the emphasis on emotional *gestalt formation* perhaps, there is little revolutionary about such a view. Similar sensualist conceptions of psyche were advanced by Epicurus (341-271 BCE) and by enlightenment empiricists like Locke, Hume, and Condillac. Arthur Schopenhauer's *voluntarism*, positing music and melody as the 'highest and most direct manifestation' of a personal and cosmic 'Will' should be well known.³ Similarly, the conception of a 'stream of consciousness' emphasising the importance of sensorimotor and auditory feedback to the consciousness of intellectual tension and release, was central to William James' fame at the end of the 19th century. It is related in different ways both to Wilhelm Wundt's 'voluntaristic psychology' and to Sigmund Freud's conception of 'the pleasure-unpleasure series' regulating the activity of 'even the most highly developed mental apparatus.'⁴ Even a relatively modern philosopher like Maurice Merleau-Ponty is talking about 'kinetic melody', 'the melodic character of a gesture', 'the melodic whole of a story', and so on.⁵

Nonetheless, the focus in twentieth century philosophy and psychology was going somewhere else. It is difficult to sum up the intellectual history of that century in one paragraph; the period exemplified both extreme reductionistic and positivistic conceptions of science as well as equally extreme relativistic and skeptical views within the humanities and social sciences. It might even be argued that these polarisations did often rely on and imply each other in so called *false dilemmas*, a manner of reasoning which was in reality common to both camps: if not totally objective, they thought, it must be totally subjective; if not native and arbitrarily

² For a survey of research into the importance of sensorimotor engagement for the conceptualisation even of material objects see for instance Raymond W. Jr. Gibbs, *Embodiment and Cognitive Science* (New York: Cambridge University Press, 2006), 86-88; or Damasio, *The Feeling of What Happens*, 147-148.

³ Arthur Schopenhauer, *Die Welt als Wille und Vorstellung I* [1819] (Zürich: Diogenes Verlag, 1977), §52.

⁴ Sigmund Freud, 'Instincts and Their Vicissitudes' [1915], in *On Metapsychology: the Theory of Psychoanalysis*, The Penguin Freud Library, Volume 11, ed. Angela Richards, trans. James Strachey (London: Penguin Books, 1984), 117.

⁵ M. Merleau-Ponty, *Phenomenology of Perception* [1945], trans. Colin Smith (London: Routledge, 1992), 134, 105, and 132.

fixed by evolution, then purely relative and arbitrarily determined by language; if not spatial and mechanical, then purely mental, 'illusory', and 'unscientific'. Even within the humanities, under regimes like behaviourism and musicological formalism, the whole realm of mental life and emotion was very much a taboo.

Especially popular music and the human rights movement was incapable of yielding to such thinking. Luckily, these matters were probably too powerful, important, and universally potent to be deconstructed neither in terms of reductionism nor poststructuralist semiotics. Certainly these isms were dominant within academia, but not in the culture at large. In many ways one could say that the academic fashions, even more so in musicology than in art history, were developing in incongruity with the performative field, tending in different ways to downgrade or disavow a realm of aesthetic experience which in reality had become more central to people than ever before.

So deep was the schism between academic fashions, traditions, and living realities that several generations of scholars might have missed out on some of the most central literature on music and the mind. It was first towards the end of the century that the preoccupation with emotions started to return to mainstream psychology, along with a reinvigoration of more integrative perspectives, like in holism, chaos theory, and the revitalisation of positions like Hegel's *dialectics* or William James' 'neutral monism,' *pluralism*, and *pragmatism*.⁶

An important catalyst, especially for the return of emotion, has been the advances in neuroimaging - the inventions of *electroencephalography* (EEG), *magnetoencephalography* (MEG), *functional magnetic resonance imaging* (fMRI), and *positron emission tomography* (PET) - but also the quantum physics involved in the very construction of some of these machines; in positron emission tomography measuring the gamma rays which are emitted when electrons in neurones are colliding with and 'annihilating' their antiparticles. Paradoxical as it may seem, it is the leading physicists of today who are also at the forefront of metaphysical speculation, often at the interface between quantum physics and consciousness research. One

⁶ It might be argued, though, that the emphasis on *flux*, *contingency* and the shying away from categorial structure which tends to go along with James' idea of pluralism is not compatible with actual pluralism. A reality without categories as produced by contrary dimensions would be practically undifferentiated and devoid of content. The circumstance that something 'fleets' or changes direction does not imply that the dimensions are indistinct. Reading his *A Pluralistic Universe*, or its 'Appendix A', one gets the impression that James is caught up in the false dilemma between something God-given and something amorphous and lawless. See William James, *A pluralistic Universe* [1909], ed. H. G. Callaway (Newcastle upon Tyne: Cambridge Scholars Publishing, 2008)

example of this is David Bohm and Karl Pribram's concept of an 'implicate order' in nature, which conscious integration is thought to be brought about in the dendritic trees of neurones.⁷ A related approach is provided by Roger Penrose and Stuart Hameroff's 'orchOR' theory, positing consciousness as a stream of 'orchestrated reductions' of quantum superpositions within the microtubules in the cytoskeletons of neurones; also here within the context of dendritic trees.⁸

This is not to say that the mentioned false dilemmas could not be refuted by logical argumentation, or that certain levels of reality could not be described and classified by phenomenological reflection, combining facts which are verifiable by normal perception. On the contrary, this is exactly the method which will be employed here; to the extent, in fact, that there would be drawn no conclusions in this treatise which are not also coherent and defensible from a 'purely phenomenological' point of view. If there is a lesson to learn from history, however, it must be that reasoning alone is seldom enough. To attain a sense of consensus and scientific progress, it seems to be necessary to connect to some 'harder', quantitative, and experimentally verifiable facts as well; and a tradition where the idea of progress is still intact and cultivated; which is precisely the reason for the references to neuroscience here. Without claiming specialist competence within this field, it is hardly possible to ignore it. Especially when productive of a veritable flood of empirical findings that may potentially falsify, confirm, or otherwise put the theories under discussion in a new light, it is impossible to avoid such evidence while maintaining a scientific objective.

It is important to stress though, that references to such research will not be uncritically applied. On the contrary, it will be a central point in some of the following chapters to try to pinpoint, or at least be pre-cautious about, the methodological and even technical limitations which are often lurking behind the positivist guise of such studies. It is not yet obvious, for instance, how the relatively slow changes in cerebral blood-flow measured by fMRI should be interpreted in terms of the activation and timing of excitatory versus inhibitory neural mechanisms. Especially the relation of these mechanisms to positive versus negative 'blood oxygenation level dependent signals' (BOLD) has been insufficiently clarified, and data might well have been neglected or misinterpreted in many studies.

⁷ David Bohm, *Wholeness and the Implicate Order* [1980] (London and New York: Ark Paperbacks, 1983), 207.

⁸ Roger Penrose, *Shadows of the Mind: A Search for the Missing Science of Consciousness* [1994] (London: Vintage, 2005) 367-371.

It is also essential to stress that there is not a one-to-one connection between the amount of neuronal activation in a cortical region and its significance for the *core function* of a certain activity. An anomalous chord or melodic turn may cause a lot of neuronal stir in a certain region of the brain; yet such anomalies may be neither necessary nor sufficient for the experience of *normal* music, which may even go under the radar, or merge with baseline activity in certain studies.

There is always a danger that what is considered significant in some studies might be filtered out or de-emphasised in others.⁹ Even biologists have preconceptions and agendas, and it is often easy to design studies which confirm them. The researcher might for instance have a notion of 'a similarity between music and language,' and seek to confirm it by focussing on aspects of musicianship that are concerned less with music as such than the handling of instruments, notation, and other technical tasks, typically activating regions in the left hemisphere of the brain. It is a general problem that if an experiment is focussing too much on isolated features, failing to activate a genuine experience of musical involvement and meaning, the picture of neural activity will also be skewed.

The pitfalls are as multifarious as the conclusions which are often produced by such studies, which is exactly why a theoretical and phenomenological clarification is more important than ever. Even the idea of philosophy as being opposed to 'hard science' may be a false dichotomy, often resulting in myopia and categorial confusion on the part of many researchers: a failure to problematise and contextualise their own assumptions. Especially we will see how some musically oriented researchers are talking about *melody* in terms of *syntax*, *contour*, or *arbitrary rules*, seemingly without the slightest suspicion that these may be contrasting categories.¹⁰ It will be a central concern then, especially towards the end of this treatise, to discuss whether these are not actually opposed and even mutually contradictory principles. Indeed, the principles of melodic organisation that will be detailed in this treatise are related neither with syntax, contour, nor arbitrary rules. They are behavioural functions, whose content is identical with its own

⁹ These are just some of the possible pitfalls pointed out by Stephan Schleim and Jonathan P. Roiser, 'fMRI in Transition: The Challenges Facing Real-World Applications', *Frontiers in Human Neuroscience* (23 December 2009) <https://doi.org/10.3389/neuro.09.063.2009>

¹⁰ This is a critique which in some of the following chapters will be directed towards researchers like Aniruddh Patel, Steven Brown, and Stefan Koelsch.

constitution: affirmations of harmony functioning as affirmations of harmony, suspensions and deflections functioning as suspensions and deflections, and so on.

As much as some researchers are inclined to confuse these fundamental categories, it is even more in tune with the so called 'natural consciousness' to distinguish between them, and owing to the sheer multitude of studies that are appearing now, a general and more objective picture of the brain-psyche interface is inevitably starting to emerge. Curiously enough, the make-up of the brain resembles in many ways the hierarchical organisation of philosophical systems, consisting, as it is, of *neurones*, *local circuits* of neurones, *cortical regions* or *nuclei*, going into *systems*, and *systems of systems*.¹¹ More importantly, these regions have been found to be differentiated from and connected with each other according to large networks of axes, dichotomies, and perpendicular pathways, many of which have already proven instrumental in the confirmation or falsification of dichotomies that are also existing at the phenomenal level. A one-dimensional semiotic conception of reality, for instance, might be thrown into doubt by demonstrating how concept formation, melody, and the expression of emotion in general, can exist even in isolation from left hemisphere language functions, like in animals or in 'global aphasia'.¹²

The potential for enlightenment is truly amazing, and it is no wonder that many philosophers and thinkers from other fields have taken interest in it. Even to the field of neuroscience this is a necessary alliance. 'If, as neuroscientists, we are looking in the brain to find precisely what schemas of neural activation are doing what', says Shaun Gallagher, 'we need to have some kind of precise phenomenological map of what we are conscious of in any particular situation.'¹³ Typical of many neuropsychological studies, a certain region of the brain is associated with a stockpile of vaguely defined concepts, many of which are also employed to describe the function of associated regions. Yet these regions are hardly functionally equivalent, so we are dealing with different subordinate aspects here, going into higher level functions at different levels of

¹¹ Damasio, *The Feeling of What Happens*, 325.

¹² 'In every instance I know', says Antonio Damasio, 'patients with major language impairments remain awake and attentive and can behave purposefully. More importantly, they are quite capable of signalling that they are experiencing a particular object, or detecting the humour or tragedy of a situation, or picturing an outcome that the observer anticipates.' Damasio, *The Feeling of What Happens*, 108-112.

For a discussion of such domain specificity and the different neural correlates for language, speech melody, and song, see for instance Isabelle Peretz, 'Music, Language and Modularity framed in Action', *Psychologica Belgica*, 49-2&3 (2009): 157-175, <https://doi.org/10.5334/pb-49-2-3-157>.

¹³ Shaun Gallagher, 'Neurophilosophy and neurophenomenology', in *Phenomenology*, Volume 5, ed. L. Embree and T. Nenon T. (Bucharest: Zeta Press, 2005), 293-316.

integration; and it goes without saying that without an endeavour to determine the core function or 'essence' of a certain region - what Edmund Husserl called an 'eidetic reduction' - it will be difficult to get a better picture of the musical brain.

This is an ontological endeavour, which is relying just as much on the conceptual categorisation of these functions as on their experimental verification. Especially the different aspects of emotion are subserved by so many regions and hierarchical levels within the brain that without a systematic endeavour to differentiate between them, acknowledging also the behavioural, conceptual, and aesthetic dimensions of emotional experience, the field will continue to be muddled. There is little chance of defining the neural substrates of uncharted phenomena; and some of the emergent properties of mental dynamics - like the entities which will be labeled here as 'ego-dynamic gestalts', 'nonsocial emotions', and 'specifically musical emotions' - have hardly even entered the consciousness of many psychologists. Certainly neuroanatomical research is also informing phenomenology, by making us aware of dark spots and mysterious axonal projections that must also have a correlate at a functional level; yet there is little hope of elucidating these matters with a reductionist attitude.

Even the traditional field of 'music psychology' has been suffering from such reductionism; often limiting its research to rudimentary topics like musicality, absolute pitch, just intonation, or to checklists of workaday emotional adjectives which are often so irrelevant to musical experience, and so badly theorised, that the experiments are practically worthless.¹⁴ This skepticism towards theory, and isolation from disciplines like phenomenology and social psychology, has obviously been due to a misconstrued physicalism or even materialist eliminativism on the part of many psychologists; a paradox that was particularly apparent in several dominant schools of psychology in the twentieth century, first and foremost in *behaviourism*, but also in so called 'first generation cognitive science,' which was based on the dubious analogy between the mind and a digital computer.

It was a paradox, because these researchers, being psychologists or musicologists by trade, were necessarily speaking of, and relying on, the phenomena they were seeking to eliminate. Whether one likes it or not, the musical, emotional, and existential concepts are real and

¹⁴ For a thorough discussion of the problem of applying everyday emotion words to music, and the development of a more 'domain-specific' approach, see Marcel Zentner et al., 'Emotions Evoked by the sound of Music: Characterization, Classification, and Measurement', *Emotion*, Vol. 8, No. 4 (September 2008): 494-521, <https://doi.org/10.1037/1528-3542.8.4.494>.

operative, and whether one opts for materialism, idealism, or Hegelian dialectics, they could never be replaced by the concepts of atoms or mechanical parts. This is the ‘vertical’ aspect of ontological pluralism.¹⁵

It is true, although it is seldom recognised by classically oriented physicists, that even the physical realm might be considered emergent or ‘conscious’ in the sense of mysteriously transcending the point and the moment in duration, gravitation, entanglement etc. Yet the mental sphere displays more and other moments. These moments and wholes might well be decomposed into immediate sensations and phylogenetically elementary functions like retraction, repulsion, and homeostatic regulation, but there is nevertheless the circumstance that behavioural wholes, like other wholes, are often more than, or different from, the sum of their parts. It is a view which was defended most ardently perhaps by Wilhelm Wundt, by the long forgotten 'Ganzheit psychologie' of his students, and more notoriously by the Gestalt psychologists. Especially Wolfgang Köhler has been pointing to a realm of uniquely temporal and behavioural gestalts.¹⁶

While the discoveries of gestalt psychology are to a large extent integrated into mainstream psychology by now, the understanding of emotional and behavioural gestalts is still lagging behind more visually and spatially oriented research. Yet the irreducibility of this realm is recognised by many; like in the below formulation by the psychologist and cognitive linguist Raymond W. Gibbs:

My running across a field cannot be explained simply in terms of the physiological activity of my body (Gallagher, 1995). Instead, the pragmatic aim behind my movement (e.g., run to catch a ball in a game of baseball) explains my action, at the same time that the physical environment, my previous experience at catching balls, and even the rules of baseball shape the way I move my body. Thus, a person’s individual experience, and the personal and cultural reasons for them, give rise to different body schemas that cannot be explained solely in biological terms.¹⁷

¹⁵ See P. W. Anderson, 'More is different', *Science*, Vol.177, No. 4047 (4 August 1972): 293-316, <https://doi.org/10.1126/science.177.4047.393>

¹⁶ Wolfgang Köhler, *Gestalt psychology: An Introduction to New Concepts in Modern Psychology* [1947] (New York: Liveright, 1992), 179.

¹⁷ Raymond W. Gibbs Jr., *Embodiment and Cognitive Science* (New York: Cambridge University Press, 2006), 32.

The reference to 'rules' does hardly provide any examples of ontologically new or independent entities though; at least not beyond the principally arbitrary prescriptions of a *game*. Nor does the concept of 'body schemas' catch the conceptual and integrative character of conscious mental functions. The concept of *play*, on the other hand, is undoubtedly contributing to this realm. It is an emergent entity, which does not exist below the level of psyche. Similarly, the less social but nevertheless integrative concepts of *having a goal*, of *struggling*, of struggling with a certain *style*, experiencing *setbacks*, *uncertainty and suspense*, *renewed struggle*, *triumph*, *jubilation* etc., are all real and operative, and there is little doubt that they are often involved in musical play as well.

Such entities are emergent not only in the sense of involving motor awareness and agency, they are incorporating ideas of the past and the future as well, enacting in different ways the different stages and functions of teleological processes, which are implying the preceding and succeeding functions of these processes, but never in the sense of making these stages into simultaneous or temporally indifferent elements in a shape. On the contrary, the concept of a *stage* or a *dynamic function* is negating such simultaneousness.

And the farther we remove from this immediate realm, the farther we move into the realm of different humanistic disciplines. A biologist or psychologist might favourably discuss the importance of harmony and rhythmical regularity to social bonding, coordinated labour, or to religious experience and motivation in general, but hardly its detailed principles. This is not to say that the empirical status of these entities and processes is unclear. Quite the reverse, the notational apparatus of music, and the discrete and mathematically founded nature of tonal relations, is probably making these phenomena more accessible to precise description than any other realm of human behaviour.

When the opposite impression is often given, it might be seen to derive from a set of illusory problems which are intrinsic to the monistic attitude of many scholars: confusing the concept of organisation with spatial organisation and struggling to manipulate the analyses in this direction; confusing meaning with semantic representation and failing to find such representation; failing to notice the music because it is so familiar and easy to perceive, noticing only the memories and reactions that are occasionally *associated with* the music; confusing the field of emotion with a limited and fixed set of workaday functions and struggling to obtain reports about this from listeners; discrediting parts of reality as 'unreal' because they are considered too new and

harmonious, too multifarious to be lawful, too physical to be mental, or too mental to be physical. And it is paramount to point to a line of thinkers who are making it their central concern to diagnose and resolve such confusions, focussing more on the functional and qualitative *identity* of phenomena than their status as inner, outer, native or new.

While it is a fundamental error both in materialist and relativist scholarship to confuse the laws of nature with a concrete set of objects or even 'platonian forms' - discrediting other parts of reality as 'unreal', 'subjective', and isolated from scientific inquiry - it is the mission of these thinkers to deny it. Hegel's *conceptual realism* and Husserl's 'epoché' are to a large extent identical projects in this respect; so is Wundt's 'monistic perspectivism', his 'concept of actuality', and Köhler's emphasis on the identity of certain emotions with 'the dynamics of the perceptual event'.¹⁸ Such entities, these thinkers emphasise, are never purely 'inner' nor 'outer', nor do they have to be old and primeval, yet they are real and 'universal' in terms of their idiosyncratic properties and functions.

The question whether this is philosophy, psychology, or musicology has not been given any special importance in this connection, nor did these labels carry much weight in the nineteenth century. There are aspects of Hegel's music aesthetic that are arguably more perspectival than any later music aesthetic; and his *Philosophie des Geistes*, while drawing on previous literature on these matters, might well have provided an important foundation for the occasionally dialectical psychology of Wundt.¹⁹ As formative as it was misunderstood by later times, Wundt's 'physiological psychology' might even be repackaged as 'neurophenomenology' today, and it would not be lacking in radicalness. Especially his idea of music being emotion in its own right, and his extensive use of music and rhythm to exemplify the 'creative synthesis' of emotional *gestalts* is remarkable. It is a practice that penetrates his whole production, also in the shape of music notation and occasional analyses. More specifically it is tempting to speculate that if Wundt's 'law of the heterogony of ends' governing behavioural processes had been better known, we might have rescued the development of classical and atonal music from the alienating absurdities of formalist composition and musicology that were emerging especially in the nineteenth fifties.

¹⁸ Köhler, *Gestalt Psychology*, 241-242.

¹⁹ Hroar Klempe, *Fra opplysning til eksperiment: Om psykologiens oppkomst fra Wolff til Wundt* (Bergen: Fagbokforlaget, 2008), 182.

It is the broadness of outlook that distinguishes these thinkers, and a multidisciplinary approach which is also reflected in much modern neuroscience: philosophers contributing to neurobiology, and biologists contributing to philosophy in many cases. Especially in the chapters on 'ego-dynamic gestalts' and neurobiological evidence we will see how some neurologists have started to throw in fresh concepts and philosophical perspectives on the mind, talking about the 'top down' activation of 'action repertoires', different levels of 'action chunking,' 'metacognition'; and not to forget: the so called 'mirror neurones', which are located to the selfsame regions. There are even indications that the right hemisphere of the brain might play an important role in this regard, specialising in the kind of *autonomous emotional narratives* which are so central both to musical organisation and the self.²⁰

Certainly the musicologists are also making contributions, but their research seem to be suffering in many cases, from a lack of ontological perspective, and an attachment to formalistic and semiotic fads which have dominated humanistic scholarship for a some decades. It is a problem that many of the aspects of music and mind that have been historically important, and which are re-actualised by modern neuroscience, are still ignored. Especially this is true for the study of *music rhetoric*, that played such a central role during the formative centuries of Western music; but also for the interpenetration of *conation*, *will* and *melody*, so important to the enlightenment philosophers and the following romantic era. In many ways one might say that the understanding of many researchers is still at a materialistic level, reducing music to some kind of arbitrary construct with only indirect recourse to meaning.

Rather than connecting to the emerging field of *neurodynamics* - which may be granting sound a privileged access to the rhythmical oscillations of neural networks so essential to all conscious experience - the tendency to downgrade the sensations of sound is still strong in many quarters, and it is an attitude which will be subjected to systematic critique in this treatise. But the treatise has also a more productive aim, concerned with entities which have seldom or never been charted in a systematic manner. As indicated above, the self has also a content of its own,

²⁰ A pronounced right hemisphere dominance during 'event segmentation' under 'natural listening conditions' is evinced for instance by Devarajan Sridharan, Daniel J. Levitin, Chris H. Chafe, Jonathan Berger, and Vinod Menon, 'Neural Dynamics of Event Segmentation in Music: Converging Evidence for Dissociable Ventral and Dorsal Networks,' *Neuron*, 55 (2 August 2007): 521-532, <https://doi.org/10.1016/j.neuron.2007.07.003>.

As for the location of higher self-awareness to the right hemisphere, see for instance Julian P. Keenan and Jamie Gorman's 'Reply to commentary on "The causal role of the right hemisphere in self-awareness: it is the brain that is selective"'. *Cortex*, 43 (2007): 1074-1082.

which is seldom as explicit and complex as in music. This is the opportunity that is seized here: to sketch out a taxonomy of 'egodynamic gestalts', which may also serve as a repertoire of musical figures and analytic terms.

The collection of these entities, and several of the phenomenological evaluations that are going into their classification, are based on an earlier *analytic* work - *Psychologizing Music: a Psychodynamic Explication of Beethoven's Piano Sonata Op 54*²¹ - but it is given a much more systematic presentation here, and a justification that should also be viable on an independent basis.

²¹ Steinar Bang, 'Psychologizing Music' (Cand. Philol. thesis in musicology, University of Oslo, 2004)

Part One

The Melody of Thought and Self-Consciousness

Chapter 1

Core Consciousness and the Core Self

1.1 The sensations of self in the stream of thought

It is not difficult to validate the centrality of our own voices. The idea of tone and voice as a 'conative' and autonomous dynamic substrate, saturating both our inner lives and our dealings with other people, is little more than an objective description of prosody, song, and animal vocal expression. It is a stream of very subtle sensations which are substantiating even the consciousness of *ourselves* in these processes; like in the process of *questioning*, raising the pitch, and *answering*, cadencing tentatively, falteringly, or conclusively. 'The awareness that our *definite* thought has come to a stop', says William James, 'is an entirely different thing from the awareness that our thought is definitely completed. The expression of the latter state of mind is the falling inflection which betokens that the sentence is ended, and silence. The expression of the former state is 'hemming and hawing', or else such phrases as "*et cetera*", or "and so forth."¹ And it is not implausible what Helen Barbas and colleagues have indicated, that this auditory stream is also contributing to the *organisation* of these processes. The auditory modality is found to be so dominant both in cingulate and frontopolar cortices that she is speculating whether Brodmann area 10 'may use auditory signals as internal representations for organised thought sequences.'²

Certainly it would not be correct to say that all thought and mental dynamics is auditory. There is also the kinaesthetic stream of feelings, which is also 'musical' in the sense that it is dynamic and rhythmical, but its gestalts or 'melodies' are not tonal. Nevertheless, the auditory sensations, and the role of inner speech and song, may still be crucial in many ways, both to the explicitness and subtlety of feeling as well as its richness. Especially when it comes to the

¹ William James: *The Principles of Psychology*, Vol. 1, Chapter 9 (London: Macmillan, 1891), under 'feelings of tendency', 256.

² Helen Barbas, Jamie G. Bunce, and Maria Medalla, 'Prefrontal pathways that control attention', Chapter 3. in *Principles of Frontal Lobe Function*, ed. Donald T. Stuss and Robert T Knight, (New York: Oxford University Press, 2013), 38 and 32.

harmonious modalities of intonation - what we call song and tonal music - the medium of sound is unique.

As central as this may seem - or perhaps exactly *because* of its overwhelming familiarity - these articulated aspects of mental dynamics did not receive much attention from researchers in the twentieth century - at least not beyond the grey zones between body language and language proper: the circumstance that in some cases such intonations and gestures are rather serving as *signs*. Typically the research on emotion was often restricted to some rudimentary and easily studied instincts like *fright* and *disgust* - often rendering thought as some kind of insentient computational process dealing indifferently with incoming data, or with a language mysteriously detached from its sensorimotor and perceptual content.

As indicated above, this was not always so. Especially in the writings of Wilhelm Wundt and William James the melodic, 'mimic,' and 'pantomimic' aspects of thought were described in great detail, and integrated even in the study of logic.³ And the neglect of these pioneers in psychology, and their gradual reentry on the scene now, is highly symptomatic of the shifting currents within psychology and the philosophy of mind in the twentieth and twenty-first centuries. The researcher who comes closest to Wundt and James today is probably the neurologist Antonio Damasio. At least this is *seemingly* the case. He is undoubtedly among those who have received most attention, with blockbusters like *Descartes' Error* or the more substantial *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*.

Before going into detail about the ideas of these writers, and some of the differences between them, it is well worth noticing that there is already two aspects of sensualism in play here: first and foremost there is the recognition of the necessity of *sensory embodiment* for the constitution of emotion and mental presence; secondly there is the recognition that this sensory awareness has also to penetrate our consciousness of *intellectual* acts, as a kinaesthetic, melodic, or at least a *voluntary* sensory dynamic. If the intellectual process is not actually *felt* and differentiated within some sensory modality, there is no chance that we could be aware of what is going on.

As for the idea of a necessary sensory constitution or embodiment of emotion, it is in important respects coincidental with the so called 'James and Lange theory of the emotions'; although we will later see how James' emphasis on sensory feedback - in some cases even from

³ See for instance Wilhelm Wundt, *Grundzüge der physiologischen Psychologie*, Kapitel 18 'Bewusstsein und Vorstellungsverlauf' (Leipzig: Verlag von Wilhelm Engelmann, 1911), 354-355.

the most 'peripheral' sensations - is much more radical than Damasio's accounts of these matters. And it is exactly this bridging of the inner-outer divide, the rejection of Descartes' idea of a purely *inner* dwelling place for psyche, which is so central to the discussion of sound as a medium for feeling: the recognition that the emotions are not constituted by some kind of inner 'mind-stuff', but rather by 'those bodily changes we ordinarily call their expression or consequence'. 'The vital point of my whole theory', says James, 'is this:

*If we fancy some strong emotion, and then try to abstract from our consciousness of it all the feelings of its bodily symptoms, we find we have nothing left behind, no "mind-stuff" out of which the emotion can be constituted,...Can one fancy the state of rage and picture no ebullition in the chest, no flushing of the face, no dilatation of the nostrils, no clenching of the teeth, no impulse to vigorous action, but in their stead limp muscles, calm breathing, and a placid face? The present writer, for one, certainly cannot. The rage is as completely evaporated as the sensation of its so-called manifestations, and the only thing that can possibly be supposed to take its place is some cold-blooded and dispassionate judicial sentence, confined entirely to the intellectual realm, to the effect that a certain person or persons merit chastisement for their sins. In like manner of grief: what would it be without its tears, its sobs, its suffocation of the heart, its pang in the breast-bone? A feelingless cognition that certain circumstances are deplorable, and nothing more. Every passion in turn tells the same story. A purely disembodied human emotion is a nonentity. I do not say that it is a contradiction in the nature of things, or that pure spirits are necessarily condemned to cold intellectual lives; but I say that for us, emotion dissociated from all bodily feeling is inconceivable. The more closely I scrutinize my states, the more persuaded I become that whatever moods, affections, and passions I have are in very truth constituted by, and made up of, those bodily changes which we ordinarily call their expression or consequence;*⁴

This conviction, that all experience, and emotion in particular, is necessarily *sensorial* of nature, reducing the idea of something purely inner to an empty pole, is by no means unique to James. It is shared by empiricists and phenomenologists alike. And one might even argue that it is self-evident, since it seems to be impossible to imagine the consciousness of something which is not at all felt or located to some sensory medium, if only as some kind of faint subconscious representation. If the above passage is considered in isolation, however, it still seems like James is

⁴ William James, *The Principles of Psychology*, Vol. 2, Chapter 25, 451-452.

operating with the idea of something 'purely cognitive' here: 'a feelingless cognition that certain circumstances are deplorable, and nothing more.'

Shouldn't James have gone much further in his sensationalism here? Are not even the ideas of *chastisement*, *sin*, and *deplorableness* constituted by emotions - of *anger*, *pain*, *guilt*, *distress*, *lamentation*, *rejection*, as well as the host of composite feelings which are going into these entities? Do not even these feelings have to be located to some sensory media to gain existence, even as ideas? Not to speak of the visual and kinaesthetic sensations constituting the mental conceptions of the persons and acts involved in such situations - as well as the awareness of ones own self, and the mental efforts and adjustments going into the activity of reflecting upon these problems.

It is true that some pages below James is devoting a separate section to what he calls 'the subtler emotions', which include 'the moral, intellectual, and aesthetic feelings'; but here James is dealing primarily with the idea of some kind of 'formalistic' pleasures: the experience of *neatness*, *rightness*, etc; not with the dynamics of thinking as such. And according to some contemporary psychologists, at least, there is little doubt about the existence or necessity of this dimension of psyche. 'I claim', declares Raymond Gibbs, 'that the regularities in people's kinesthetic-tactile experience not only constitute the core of their self-conceptions as persons, but form the foundation for higher-order cognition'.⁵

The implications of this recognition are so vast that our familiar metaphysical models might have to be totally redrawn. But let it suffice for now to point to Kalina Christoff and colleagues, talking of the self as an agent in a 'self-specifying process', which is both a requirement and a consequence of the self/non-self distinction in perception, action, cognition and emotion.⁶ 'Even when we "merely" think about an object', says Damasio, 'we tend to reconstruct memories not just of a shape or color but also of the perceptual engagement the object required and of the accompanying emotional reactions, regardless of how slight'.⁷ And Damasio's statement is more than a claim; it is something that can now be measured.⁸

⁵ Raymond Gibbs Jr., *Embodiment and Cognitive Science* (New York: Cambridge University Press 2006). 15.

⁶ Kalina Christoff, Diego Cosmelli, Dorothée Lebrand, and Evan Thompson, 'Specifying the Self for Cognitive Neuroscience', in *Trends in Cognitive Sciences*, Volume 15, Issue 3 (March 2011), 105, <https://doi.org/10.1016/j.tics.2011.01.001>.

⁷ Antonio Damasio, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness* (San Diego: Harcourt, 1999): 148.

⁸ A survey of such research is given for instance in Gibbs, *Embodiment and Cognitive Science*, 87-88.

However, if other parts of '*The Principles of Psychology*' are also considered, it quickly becomes obvious that James has been aware of these feelings all along. There is also the possibility that a certain inconsistency may be due to the fact that the chapter on emotion is basically an exact replica of his famous article in *Mind* five years earlier.⁹ In any case; those aspects of feeling involved in mental activity, so neglected by later psychologists, are treated in detail in the chapter on 'The consciousness of self' in the first volume of the same work. Since music and melody are *articulated processes*, this chapter is probably even more relevant than the one on emotion. And, as noted above, it is not the sensations constituting the *conceptual content* of thought we are dealing with here, but the ones involved in the *activity of thinking* as such. It is the kind of feelings which constituted what Schopenhauer referred to as 'the Will's secret history', objectified at its highest level in the melody,¹⁰ and which James is ascribing now the consciousness of 'a central active self' in 'the stream of consciousness'.¹¹

'First of all', James says, 'I am aware of a constant play of furtherances and hindrances in my thinking, of checks and releases, tendencies which run with desire, and tendencies which run the other way.' When trying, by means of an 'introspective glance', to describe these activities, however, he finds himself unable to detect any purely spiritual elements at all; '*all it can ever feel distinctly*', he says, '*is some bodily process, for the most part taking place within the head.*' Then he goes on explicating how mental acts like for instance *consenting, negating, and making a mental effort*, seems to be constituted by different combinations of muscular and other sensations. 'My glottis is like a sensitive valve', he says for instance, 'intercepting my breath instantaneously at every mental hesitation or felt aversion to the objects of my thought, and as quickly opening, to let the air pass through my throat and nose, the moment the repugnance is overcome...In *effort* of any sort, contractions of the jaw-muscles and of those of respiration are added to those of the brow and glottis.'¹²

What is characterising this category of feelings, says James, is not only the fact that they represent 'the active element in consciousness', but that they are 'constant amid great fluctuations

⁹ William James, 'What is an Emotion', in *Mind: a quarterly review of psychology and philosophy*, Vol. 9, No. 34 (1 April 1884), 188-205. <https://www.jstor.org/stable/2246769>

¹⁰ Arthur Schopenhauer, *Die Welt als Wille und Vorstellung I* [1819] (Zürich: Diogenes Verlag, 1977), §52, 326.

¹¹ James, *The Principles of Psychology*, Vol. 1, Chapter 10., 299.

¹² James, *The Principles of Psychology*, Vol. 1, Chapter 10, 299- 301.

in the rest of the mind's content'. Many of these acts may consist of 'minimal reflexes' or 'adjustments', which keeps us from paying much attention to them; nonetheless, he says, it is our awareness of these acts as a 'coherent group of processes' strongly contrasted with all the other things consciousness contains, which distinguishes them from other sensations and constitute what we call our *self*. Especially he is referring to what he calls the 'central nucleus of the self' in this connection, the 'sanctuary within the citadel, constituted by the subjective life as a whole.' As a matter of fact, James is operating with several spheres of selfhood, including the material, social, and spiritual selves, incorporating even such more or less permanent ingredients as our clothes and other possessions, which are also *belonging to us*, only in a more peripheral manner.¹³

It is appropriate in this connection to point to a parallel passage from Wilhelm Wundt's *Grundzüge der Physiologischen Psychologie*. Wundt's project is both prefiguring, and in some respects probably even surpassing that of James. In fact, the citation below is a loosely translated and abridged version of this passage, rendered by James himself in a footnote; and although Wundt is talking less about the composite *ingredients* of self-consciousness here, than its medium, the passage captures several of his most central ideas about these matters.

The images of feelings we get from our own body, and the representations of our own movements distinguish themselves from all others by forming a *permanent* group. As there are always some muscles in a state either of tension or of activity it follows that we never lack a sense, either dim or clear, of the positions or movements of our body... This permanent sense, moreover, has this peculiarity, that we are aware of our power at any moment voluntarily to arouse any one of its ingredients. We excite the sensations of movement immediately by such impulses of the will as shall arouse the movements themselves; and we excite the visual and tactile feelings of our body by the voluntary movement of our organs of sense. So we come to conceive this permanent mass of feeling as immediately or remotely subject to our will, and call it the *consciousness of ourself*. This self-consciousness is, at the outset, thoroughly sensational, ... only gradually the second-named of its characters, its subjection to our will, attains predominance. In proportion as the apperception of all our mental objects appears to us as an inward exercise of will, does our self-consciousness begin both to widen itself and to narrow itself at the same time. It widens itself in that every mental act, whatever comes to stand in relation to our will; and it narrows itself in that it concentrates itself more and more upon the inner activity of apperception, over against which our own body and all the representations connected with it appear as external objects, different from our proper self. This

¹³ James, *The Principles of Psychology*, Vol. 1, Chapter 10, 292.

consciousness, contracted down to the process of apperception, we call our Ego; and the apperception of mental objects in general, may thus, after Leibnitz, be designated as the raising of them into our self-consciousness. Thus the natural development of self-consciousness implicitly involves the most abstract forms in which this faculty has been described in philosophy; only philosophy is fond of placing the abstract ego at the outset, and so reversing the process of development. Nor should we overlook the fact that the completely abstract ego (as pure activity), although suggested by the natural development of our consciousness, is never actually found therein. The most speculative of philosophers is incapable of disjoining his ego from those bodily feelings and images which form the incessant background of his awareness of himself. The notion of his ego as such is, like every notion, derived from sensibility, for the process of apperception itself comes to our knowledge chiefly through those feelings of tension which accompany it.¹⁴

So central was this sensorimotor aspect of consciousness to Wundt that he adopted the concept of *Voluntarism* or *voluntaristic psychology*, which evokes associations both with the English enlightenment empiricists as well as Schopenhauer. Wundt was careful to point out, however, that he rejected both the metaphysical excesses of the latter (the idea of a hidden World-will is obviously an example of this) as well as the so called *associationalism* of the former: the conception of psyche as mere bundles or streams of sensations.¹⁵ The fact is that Wundt has more in common with the tradition that came to be called *gestalt psychology*, operating with the idea of *psychical elements* arranging themselves, by 'creative synthesis' [schöpferische Synthese] into *psychical compounds* and *interconnections of compounds*, going into *psychical developments*, governed by *causality and laws*; which concepts are also providing the chapter headings of his *Outlines of Psychology*. And it is precisely this consciousness of psyche as a relatively autonomous and even lawful sphere, allowing a hierarchy of dynamic *gestalts* and functions - what we are usually referring to as acts, attitudes, emotions, emotional dramas and strategies, etc. - which distinguishes him from James in such a radical manner.¹⁶

¹⁴ Wilhelm Wundt, *Grundzüge der physiologischen Psychologie*, Band 3, Kapitel 18, 353-354; paraphrased in a footnote by James, *The Principles of Psychology*, Vol. 1, Chapter 10, 302-303.

¹⁵ The position of *Voluntarism* is defined by Wundt in the 'Introduction' (section 2) of his *Outlines of Psychology* [1897], trans. C. H. Judd (Bristol: Thoemmes press, 1999), 18.

¹⁶ The limits of James' understanding of the content and *gestalt* character of behavioural comprehension might be gleaned from the sub-chapters on 'The Pure Ego', and 'The Transcendentalist Theory' in *The Principles of Psychology*, volume I, Chapter 10. The idea of 'personal identity' is very much reduced to a sensation of 'warmth' in a 'succession of perishing thoughts, endowed with the functions of appropriation and rejection.' He discusses Thomas Hill Green's emphasis on the importance of an active and integrated self to the apprehension of reality, to which he is partially sympathetic, but he does not reckon it a part of psychology or 'the naturalist view'. The self is a mere 'stream of thought', says James, and 'our thought is not composed of parts', 363- 368.

Also when it comes to more immediate aspects of this 'stream' there is some disagreement between the two. The contention is best illustrated by James' discussion of Wundt's concept of *innervation* in the chapter on 'Will' in *The Principles of Psychology*. According to James, both Bain, Mach, Helmholtz, and Wundt are operating with the idea of acts being triggered not only by imaginations based on earlier experiences with kinaesthetic and more exteroceptive feedback, but by a feeling somehow prefiguring and coming in addition to these sensations: a 'feeling of innervation' or 'discharge into the motor nerves'.

In James' view, however, this is in contradiction both with introspective findings as well as the law of parsimony in logic; 'It is a general principle in Psychology', says James, 'that consciousness deserts all processes where it can no longer be of use'; like when a 'marksman ends by thinking only of the exact position of the goal, the singer only of the perfect sound'. These 'peripheral effects', says James, are not only better targeted and 'sharper' cues to the control of our movements, they should better operate alone, since the intervention of other sensations would only complicate the situation.

Now if we analyze the nervous mechanism of voluntary action, we shall see that by virtue of this principle of parsimony in consciousness the motor discharge *ought* to be devoid of sentience. If we call this immediate psychic antecedent of a movement the latter's *mental cue*, all that is needed for invariability of sequence on the movement's part is a *fixed connection* between each several mental cue, and one particular movement. For a movement to be produced with perfect precision, it suffices that it obey instantly its own mental cue and nothing else, and that this mental cue be incapable of awakening any other movement. Now the *simplest* possible arrangement for producing voluntary movements would be that the memory-images of the movement's distinctive peripheral effects, whether resident or remote, themselves should severally constitute the mental cues, and that no other psychic facts should intervene or be mixed up with them.¹⁷

What makes James' claim so interesting, especially from a musical point of view, is that it tends to put sound on a par with kinaesthetic sensations as a medium for mental dynamics and the control, at least of vocal behaviour.

It is easy to think that the feelings of muscular activity, since they are so closely associated with the movements of our limbs, are physically *driving* it as well, even when the movements

¹⁷ James, *The Principles of Psychology*, volume II, Chapter 26, 497.

are purely imaginary, or when we are merely thinking or singing internally. Certainly the kinaesthetic sensations are concerned with physical force. Like auditory sensations and the feelings of tactile friction they are largely *mechanoreceptive*, registering the vibrations of so called 'muscle spindles'¹⁸; yet these sensations are not necessarily initiating or controlling the movements. This is most obvious in reflex and routine actions, of course, or the control of melodic aspects that are not paralleled by kinaesthetic feeling at all, like the interplay of tonal intervals in song; but there are also cases where almost all volitional control seems to be taken over by other sensory modalities.

The situation is best illustrated by a set of relatively recent case studies into various forms of akinesia or proprioceptive loss. Most famous perhaps, at least in the academic literature, is the case of Ian Waterman, who, getting paralysed from the neck down, lost all kinaesthetic feelings - except in his head. Even if it took a long time to master it, he learned how to initiate and control his body movements by means of visual imagination and feedback alone.¹⁹ As can be observed in various video recordings, his gait is not perfect, which is detracting somewhat from James' conception; but it is functional.

More relevant to the issue of auditory feeling and egodynamic agency are some of Oliver Sack's case studies, like the one rendered in the film 'Awakenings', where a group of patients with Parkinson's disease were able to regain a sense of motor control and personal identity when being entrained to or just imagining music, at a time when proper medication was not yet developed. It is 'like suddenly remembering myself, my own living tune' one of these patients put it; which is wonderfully illustrating the connection between melody and the core self. Yet the problems with Parkinson's disease are probably concerned more with the *initiation* of movement, normally subserved by the basal ganglia, than with a lack of proprioception per se.²⁰

The possibility that auditory sensations might serve as a substitute for kinaesthetic feelings, and a primary medium for mental agency and dynamic selfhood, is better illustrated by his description of 'the disembodied lady' in the book *The Man Who Mistook his Wife for a hat*. Suffering from a rare condition of polyneuritis, affecting only the proprioceptive fibres, this

¹⁸ Uwe Proske and Simon C. Gandevia, 'The kinaesthetic senses,' in *The Journal of Physiology*, Volume 587, Issue 17 (27 August 2009): 4139-4146, <https://doi.org/10.1113/jphysiol.2009.175372>

¹⁹ Jonathan Cole and Ian Waterman, with a foreword by Oliver Sacks, *Pride and a Daily Marathon* (Cambridge, MA: MIT Press, 1995).

²⁰ Oliver Sacks, *Musophililia: Tales of Music and the Brain* (London: Picador, 2007), 253.

young woman had lost practically all proprioception, even in the face and the vocal organs. Like Waterman she gradually learned how to use visual feedback and feed forward mechanisms to control walking and other bodily movements. As for vocalisation, however, she had to rely entirely on auditory feedback.²¹ This gave her a 'stagey, theatrical voice' at first - which is illustrating the importance of proprioception, or kinaesthetic-auditory integration even in vocalisation - but also the possibility of managing without it.

According to herself it was like her body had lost its 'sense of itself'; a most disturbing condition to be in. Yet one can only wonder what would happen to her self if she had lost her hearing as well. Would she have lost her sense of mental agency and articulated selfhood altogether? Would she have relapsed into some kind of vegetative state? Certainly her outward voice would be lost; and it is open to question whether the bleak memory of kinaesthetic or melodic fluctuations, to the extent that these sensations would be available then, would be sufficient to uphold a sense of inner life. If her auditory cortex had also been defect this might be impossible.

The point of these examples is not necessarily to prove that sound is a sufficient substrate for the sensations of self in the stream of thought. Certainly deaf people manage without it, so it is not an absolute precondition. It is difficult to know what goes on at the level of neurones. For all we know, sound might play an even more important role there. According to Stuart Hameroff at least, there are levels of mechanical vibration in neurones, which might be conducive of quantum superposition and phonon-entanglement and serve as a correlate of conscious experience.²² Nevertheless, this is a phenomenon that would have to be 'orchestrated' by the brain, where multisensory integration is probably more the rule than the exception. The point in this connection then, is rather to emphasise how sound is contributing on equal footing to this dynamic.

Certainly some qualia, especially some aspects of pain, which may be prominent in proprioception, are not equally prominent in sound; except for extreme degrees of loudness and dissonance perhaps. On the other hand, there are also many auditory qualia and parameters that are not present in kinaesthetic feelings. Pitch, as distinguished from intensity and timbre, may be

²¹ Oliver Sacks, *The Man Who Mistook his Wife for a Hat* (London: Picador, 1986), 47-62.

²² Stuart R. Hameroff and Roger Penrose, 'Consciousness in the Universe, an Updated Review of the "Orch Or" Theory', in *Biophysics of Consciousness: A foundational Approach*, ed. R. R. Plznanski, J.A. Tuszynski, and T. E. Reinberg (Singapore: World Scientific, 2016): 517-599.

more important than we think, constituting the field of prosody, affective tone, a personal voice, and not to forget: our *inner* voice. Even more unique and powerful are the sensations of tone and harmony, opening up the field of song, music, the emotional subtleties of chordal tones, harmonic progressions, and so on. And none of these phenomena are really paralleled or controlled by kinaesthetic feedback alone.

But how precisely could our conscious movements be generated then, if not by a sense of muscular effort?

As was indicated by some famous experiments by Benjamin Libet in the 1980ties, our consciousness of intending to move seems to occur about 350 milliseconds after some relevant cortical activity is already started.²³ At least some activity was measured by scalp electrodes around the supplementary motor area (SMA) at the top of the frontal cortex, even before the intention to move was reportedly conscious. And it has become relatively clear by now, that the brain is not only constructing our 'present' experiences on the basis of preceding input, it is predicting the immediate future as well, and preparing relevant actions in advance, a so called 'readiness potential'.

So the volitional process is not simply 'voluntary', as if conjured out of some kind of supernatural realm; rather it is automatic in many ways, and generated by an intricate system of feedback and feed forward loops, to which automatism and random generation the basal ganglia seem to play an important role. These loops are involving as a central relay station the thalamus in the middle of the brain, but also 'executive' regions like the pre-supplementary motor cortex (pre-SMA) and the dorsolateral prefrontal cortex.²⁴

As a self-conscious person and improvising musician one quickly becomes aware of these loops. Unlike what some people believe, an improvisation is not made up entirely on the spot. There is much too little time for that. Not unlike the development of a personality, it takes years of practice to select and refine a repertoire of alternative melodic formulations of the typical harmonic or melodic rhetoric constituting different idioms and keys. To be coherent and expressive, these elements would have to be integrated into a hierarchy of higher level emotional

²³ Benjamin Libet et al., 'Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential): the unconscious initiation of a freely voluntary act', in *Brain* 106 (Pt 3) (October 1983): 623-642. <https://doi.org/10.1093/brain/106.3.623>. See also Benjamin Libet, 'Unconscious cerebral initiative and the role of conscious will in voluntary action', in *Behavioral and Brain Sciences*, 8, (1985): 529-566.

²⁴ Patrick Haggard, 'Human volition: towards a neuroscience of will', in *Nature reviews, Neuroscience*, vol. 9, Macmillian Publishers Limited (December 2008): 940.

and dramaturgical functions as well, which might also be subconscious and automatic to some extent. Or to be more precise: it is not automatic in the beginning, since it takes years to develop and personalise it; but it gets rather automatic after a while.

It is often astounding what the basal ganglia - or rather: the fronto-striatal circuits as a totality - are able to come up with in terms of contextually relevant and seemingly fresh ideas. Sometimes, when 'in the flow', one almost gets the feeling that they have a consciousness of their own - which might well be the case. Other times the ideas are more conventional or banal; and luckily, in a fraction of a second right before a new phrase is expected to start, it is possible to block it or counteract it.

Without going into the debate about *free will* now, a sense of freedom is ingrained in the very concept of volition, and it is precisely this possibility of a last moment 'vetoing' or 'response inhibition' which is often thought to be saving it. It is a model that was suggested already by William James;²⁵ and even Benjamin Libet found it compatible with his experiments.²⁶

Patrick Haggard, one of Libet's collaborators, sketches out a model of the different stages of human volition in an article in *Nature Reviews*. On the basis of functional resonance imaging (fMRI) he even points to an area of the brain where he believes the mentioned vetoing or 'late moment whether-decision' to take place. It is in the *dorsomedial prefrontal cortex*, he says: rostral to the pre-SMA.²⁷ Which, if it is correct, seems like an important finding. If this is really where the crucial decisions are taken, one might think that it would have to be a very informed and integrated region, if not the most integrated in the whole brain. There would be little reason to have any higher areas if they did not have any causal influence on our behaviour.

What is still a possibility is that other and more important decisions, like the development of overarching values, general plans and alternatives, have been worked out in advance, so that the process is now narrowed down to less important ones, concerning timing and execution. Indeed, this is very much how Haggard's model is laid out, locating what he calls 'whether-, what-, and when-decisions' to the dorsomedial prefrontal cortex, the pre-supplementary motor area, and the supplementary motor area respectively, before it is implemented by the primary motor cortex. As for more long-range deliberations he points to the frontopolar cortex - the most frontal region of

²⁵ James, *The principles of Psychology*, Vol II, 493.

²⁶ Libet, 'Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential)', 641.

²⁷ Haggard, 'Human volition: towards a neuroscience of will', Figure 3, 939-940.

the brain, which, as we will come back to in later chapters, is also dominant during jazz improvisation.²⁸ Nevertheless; it is the dorsomedial prefrontal cortex that has been given the last word here, in the sense of being capable of down-regulating the pre-SMA in a last moment instance of vetoing.

It is important to note that the element of automatism in volitional processes does not detract from the importance of sensorimotor and auditory feelings for the conscious understanding and control of thought and action. It is just that many experiments have indicated that our sense of agency might be constructed by the brain in advance, during the milliseconds when the act is prepared, or in retrospect, even when a person is merely fooled to believe that he has acted.²⁹

As Haggard specifically points out, he does not go into detail about agency in the mentioned article; its main concern is intention and effort. But what he does say about agency is already somewhat restricting. 'Agency necessarily involves the experience of external sensory consequences', he says for instance, 'whereas intention relates more closely to preparation and effort'.³⁰ Certainly thinking and internal singing has agency as well, even without such 'external' consequences. Given the amount of time we spend thinking or enjoying our inner playlist of melodies we would be zombies without it.

A more common omission, but no less consequential, is the neglect of the *autonomous* aspects of behaviour. Even when we are dealing with practical matters there is also a personal narrative going on, if only in the background: a sense of preparing, approaching, trying, failing, getting frustrated, trying again with another approach, failing better, getting tired, considering giving up, making a final effort, giving up, relaxing, re-focussing etc. It is largely this autonomous process that William James is referring to as the nucleus of the self. Furthermore, it is the mission of this treatise to try to describe how this elementary stream of attitudes is going into a hierarchy of higher functions as well, stretching all the way from rhetorical functions to social emotions and ethical systems. Large parts of our existence, perhaps the largest part, is constituted by such entities. It is a type of content that might not be pinpointed in most psychological experiments,

²⁸ Charles J. Limb and Allan R. Braun, 'Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation', *PLoS One*, 3(2): e1679 (27 February 2008): Figure 3., <https://doi.org/10.1371/journal.pone.0001679>.

²⁹ See for instance Michel Desmurget and Angela Sirigu, 'A parietal-premotor network for movement intention and motor awareness', *Trends in Cognitive Sciences*, Vol. 13, No 10 (2009): 415, <https://doi.org/10.1016/j.tics.2009.08.001>.

³⁰ Haggard, 'Human volition: towards a neuroscience of will', 942.

often focusing on very simple tasks; yet it is constructed in the brain, and one can only speculate how much of agency and human consciousness would be left without it. This is where Wundt's phenomenology is so important. It may serve as a starting point, at least, for a heightened awareness of this our reality.

But if we concentrate on the immediate aspects of the stream now, and the discussion whether a sense of effort or 'innervation' is nevertheless a necessary component of volition; can we conclude that Wundt was wrong in this regard?

Not really. This still seems to be an ongoing discussion in the academic literature. As a matter of fact, even in Haggard's article there are references to experiments showing that when the pre-SMA is stimulated by electrodes, it does produce a feeling of 'urge';³¹ which connotations of freedom are somehow strengthened, says Haggard, by the fact that this urge did not always result in any action. The mentioned urge may not be involved in routine actions, which, according to Haggard, takes a faster route between the parietal cortex and the premotor areas; yet it might be a constituent part of more deliberate decisions.

It is also logical that this is how it has to be. If, during the last moment of hesitation there is not actually a concrete feeling of arrest, suspense, or urge, which is resolved when letting go, it is questionable if we would have been conscious of it. It is a recognition that seems to be shared by Haggard when pointing to Wittgenstein questioning 'what is left over if I subtract from the fact that my arm goes up the fact that I raise my arm.' Without such feelings - and, it is tempting to add: the composite attitudes that are also involved - there would hardly be any agency there, or an I that could grasp what is going on.

But this is not all; even Haggard's own experiment, focussing on response inhibition, was indicative of such feeling. It was not only the medial prefrontal cortex that lit up in this experiment. The *anterior insula* was just as active.

The insular cortex is located underneath the opercular 'lid' at the sides of the brain, bordering on the auditory cortex posteriorly, and the ventrolateral prefrontal cortex anteriorly. Functionally it is held to be dealing with different aspects of interoceptive and visceromotor sensation, such as pain, temperature, voluntary respiration, craving, and in its anterior parts: the integration of such

³¹ Itzhak Fried et al., 'Functional organization of human supplementary motor cortex studied by electrical stimulation'. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, 11 (11) (November 1991): 3656-3666, <https://doi.org/10.1523/JNEUROSCI.11-11-03656.1991>.

feelings, also with auditory sensation.³² Perhaps there is also an integration of opposite tendencies here, like in craving, which seems to contain an element both of pleasure and frustration.

Anyhow, the functions ascribed to the anterior insula are strongly reminiscent of James' description of the sensations of self in the stream of thought, where sensations from the respiratory and vocal apparatuses are integrated with intonation in the experience of mental tension and release. According to some studies even the adjacent *claustrum* might be involved in such integration, or in other types of binding, if not necessarily to the extent of being the chief 'conductor' of the brain orchestra - which was the function that Francis Crick's attributed to the *claustrum*.³³

Another cortical region, which is often found to operate in close alliance with the anterior insula both in vocalisation and volition in general, is the *anterior cingulate cortex*. The cingulate cortex is a so called paralimbic structure, stretching through the brain above the corpus callosum. Its anterior part, more specifically the dorsal anterior cingulate cortex, is actually bordering on the parts of the dorsomedial prefrontal cortex which Haggard found to be so important for response inhibition. Together with the insula it constitutes what is sometimes referred to as the 'salience network'. But it is also operating together with executive areas in the prefrontal cortex, to which it is connected with large 'spindle neurones'.³⁴

The role of the anterior cingulate cortex is not completely defined yet, but it is often held to be dealing with our attention to surprising and conflicting matters, as well as pain and effort. Its function is probably more 'cognitive' than the insula, since it is monitoring conflicting alternatives as well as the volitional 'cathexis' that is going into it. It might even be seen to play a constitutive role in the kind of basic attitudes we call *attentional focussing*, *will* and *willpower*. At least these are concepts that Marcel Brass, another colleague of Haggard, attaches to it.

The anterior cingulate cortex is not given much attention in the mentioned article by Haggard, beyond him mentioning that it is part of 'the frontal cognitive-motor network'.³⁵ It is featuring

³² See for instance Xiaosi Gu et al., 'Anterior Insular Cortex and Emotional Awareness', *The Journal of comparative neurology* 521 (2013): 3371-3388.

³³ John Smythies et al., 'Hypotheses relating to the function of the claustrum', *Frontiers in Integrative Neuroscience*, 6: 53 (2. August 2012), <https://doi.org/10.3389/fnint.2012.00053>.

³⁴ Marcel Brass et al., 'Imaging volition: What the brain can tell us about the will', *Experimental Brain Research*, 229(3) (February 2013), <https://doi.org/10.1007/s00221-013-3472-x>.

³⁵ Haggard, 'Human volition: towards a neuroscience of will', 936.

much more prominently in Brass' 'expanded model'. More specifically Brass is operating with a 'rostral cingulate zone', which is stretching up towards the pre-SMA and connecting with the function of what they call 'what decisions'. Which is plausible, since the anterior cingulate is often thought to be dealing with conflicting options. The 'RCZ determines the level of effort that is invested in pursuing a specific behavior', says Brass, 'and thus regulates the willpower'.³⁶

The details of these processes are by no means clarified yet, but it is obviously relevant to the study of music and vocalisation that in research on monkeys, a part of this 'rostral cingulate zone' is actually referred to as '*the cingulate vocalization area*'. Like the periaqueductal grey in the midbrain, the anterior cingulate cortex generates vocalisations when artificially stimulated.³⁷ Which is a very strong indication that there is really something to Schopenhauer's idea of an intimate connection between will, voice, and melody. But is this true for humans as well?

This was the question that Michel Belyk and Steven Brown set out to investigate. And the results were positive. These researchers even talk about 'a basic vocal network', with the anterior cingulate and supplementary motor area featuring prominently both during listening and active vocalisation, at least when pitch is involved. Experiments by GERALYN M. SCHULZ and colleagues have indicated that the anterior cingulate and the medial prefrontal cortex are much less involved during whispering;³⁸ so it is apparently not the linguistic functions of sounds that are mediated by these regions, but something emotional and tone-related.

Several of the other regions mentioned above, like the periaqueductal grey, the thalamus, the anterior insula, and the basal ganglia were also mentioned by Belyk as taking part of the 'vocal network'. The ventrolateral prefrontal cortex, especially Brodmann areas 44 and 45, were also active, but only when making judgements about the vocalised emotions and what they call 'pitch contours', which is a misnomer. As we will later see, melody is not really about spatial perception.

However, it is these latter areas, on the side of the prefrontal cortex, that will play such an important role in some of the following chapters, as they are likely candidates for the 'nesting' of acts and melodies into higher level gestalts and functions; that is to say: the kind of 'dynamic

³⁶ Marcel Brass, 'Imaging volition', see the section called 'The funnel model of intentional action'.

³⁷ Michel Belyk and Steven Brown, 'Pitch underlies activation of the vocal system during affective vocalization', *Social Cognitive and Affective Neuroscience*, 11(7) (July 2016): Figure 1, 1078-1080, <https://doi.org/10.1093/scan/nsv074>.

³⁸ GERALYN M. SCHULZ et al., 'Functional neuroanatomy of human vocalization: An H215O PET study'. *Cerebral Cortex*, 15(12) (January 2006), 1835-47. <https://doi.org/10.1093/cercor/bhi061>.

structures' which may be constituting the articulated content of emotions and the self. When these areas were not so prominent in Belyk's study it may be due to the fact that it focussed only on short exclamations like Eww, yay, damn, etc. which are obviously closer to primitive animal shrieks than anything that resembles song or prosody.

What Belyk's study might confirm, however, is the emotive properties of tone, and the idea that our voices are central to our core self. Some might think that this connection between emotion and tone is merely associative or symbolic. Indeed it is the habit of the postmodern camp to explain away both qualia and organised content by referring it to something else. But even this is gainsaid by this study, operating with two sets of measurements. In the first setting the sounds were typical emotional exclamations, and the participants were instructed to act the emotions out, or describe what they heard. In the other setting, the sounds were nonsense-words with no emotional connotations at all, except that they were produced by a human being perhaps. To the researcher's surprise, however, the anterior cingulate cortex was equally active during 'mere' tone production. In fact, it was active during listening as well. So perhaps these things are not so different as we tend to think. As we have already seen: agency and feelings are also percepts, of which sound is one of many possible ingredients. So the vocal sounds might simply have been experienced as emotional in their own right, even without any extrinsic associations or symbolism.

It is a general problem, which will be treated especially in the chapter on the difference between dynamic and spatial organisation, that many music theoreticians tend to confuse tones with notes, that is to say, with small black dots on a piece of paper. But tones are sensations of an entirely different kind, with valence, energy, tension, and timbre. These qualia are not 'attached to' the tones. They *are* the tones. And it is this identity of the feelings with their physical 'expression' that is so central both to the conception of embodied emotion and to the understanding of music. Given the presence of the voice in the anterior insula and the anterior cingulate cortex, the voicing of our urges and wants might even be a component of the wanting as such. At least there is nothing in Belyk's study that negates it.

When this is said, there is obviously more to urges and motivation than auditory or kinaesthetic feeling. Especially some words should be said about dopamine, and the role it plays both in the cingulate cortex and the rest of the action network. According to some researchers, the anterior cingulate is particularly eager in the case of new and surprising experiences - what

they like to call 'reward prediction errors'. It is also logical that such events are grabbing our attention, as it first when something changes in a dramatic way that our responses must also be changed. The priorities of the automated action loops would also have to be reset, and it turns out that the anterior cingulate cortex serves an important mission in this regard, sending signals to the basal ganglia, which in turn alter the automatic priorities. A central component of this signalling to and 'reprogramming' of the basal ganglia is the neurotransmitter dopamine.³⁹ Dopamine is also fuelling the executive regions in the prefrontal cortex. So is this yet another evidence that effort and innervation are necessary aspects of volition; and that some kind of powerful, interoceptive sensations have also to be involved?

It is difficult to tell. Studies on dopamine are often vague when it comes to what it concretely adds to the feelings. While dopamine is clearly connected with strong emotions, wanting, and drug induced ecstasy, most researchers - to the extent that they are even recognising these problems - seem to be of the opinion that dopamine is not a feeling in its own right. So perhaps it is merely facilitating or reinforcing other feelings, or their integration with each other, like the interpenetration of pleasure and frustration in craving, or, as Kent C. Berridge has suggested: the 'integration of costs, benefits, and the decision to expend effort and to implement an action.'⁴⁰

According to Stuart Hameroff, dopamine has a molecular structure that is particularly conducive of quantum superposition through the formation of so called 'pi resonance groups', which might have played a foundational role even in the very first sparks of life.⁴¹ But this is obviously at a speculative level. The operation of dopamine would also have to be differentiated from all the other neurotransmitters and hormones, like the opioids or oxytocin - the so called 'love hormone' - which is also involved in vocalisation and musical experience.⁴²

What should be sufficiently illustrated, however, is the amount of levels and sensory channels involved, and thus the difficulty of falsifying James' theories of embodied emotion and selfhood. The kind of research which drove James in the background in the twentieth century

³⁹ Irma Triasih Kurniawan et al., 'Dopamine and effort-based decision making', *Frontiers in Neuroscience* (21. June 2011), <https://doi.org/10.3389/fnins.2011.00081>

⁴⁰ Kent C. Berridge. 'The debate over dopamine's role in reward: the case for incentive salience', *Psychopharmacology*, 191 (2007):391-431, <https://doi.org/10.1007/s00213-006-0578-x>.

⁴¹ Stuart R. Hameroff and Roger Penrose, 'Consciousness in the Universe, an Updated Review of the "Orch Or" Theory', *Biophysics of Consciousness: A foundational Approach*, ed. R. R. Plznanski et al. (Singapore: World Scientific, 2016).

⁴² Mona Lisa Chanda and Daniel J. Levitin, 'The neurochemistry of music', *Trends in Cognitive Sciences*, Vol. 17, No. 4 (April 2013): 188-189, <https://doi.org/10.1016/j.tics.2013.02.007>.

was obviously operating with a far to limited definition of emotion, often identifying the body with the torso and emotion with visceral feelings, focussing merely on what James refers to as 'the coarser emotions' and the rout via the spinal chord.

But even in cases of spinal chord transection, says Antonio Damasio, there is still a significant part of bodily input arriving via the bloodstream; not to forget the vast supply of sensations mediated by *cranial nerves*, originating in the face, the skull, or in the oral cavity, tongue, pharynx and larynx, constituting the vocal system. And to make the picture even more complex: there is also what Damasio calls the 'as if feelings', that is to say, the mere *imaginary* feelings, which may be produced in the brain even without any input or feedback from the body or the surroundings at all, as is the case with so called 'phantom limbs'. These sensations are often bleaker than the more manifest ones, and the emotional lives of patients depending on them are probably reduced, all of which is indicating the importance of bodily feedback, says Damasio; but they might still be sufficient to create a consciousness of mental activity and the self. The so called 'locked-in syndrome' may be an example of this.⁴³

It is difficult to falsify such an account. Removing all the sensory modalities is hardly an option. It may be easier to block some of the above mentioned hubs, like the anterior cingulate cortex or the anterior insula. It was presented as a sensation in the media when a spot between the left claustrum and anterior-dorsal insula had been stimulated electrically in an epilepsy patient, reproducibly disrupting consciousness for a while.⁴⁴ But it is not clear if anything was confirmed by this finding - Crick, James, or something else. Damasio is describing a case of bilateral insula and claustrum lesions that did not have such consequences at all.⁴⁵ So the insula, with its visceromotor integrations, may not be as crucial as some thinks; and Damasio is pointing to possible contributions from the brain stem, the basal ganglia, and the somatosensory cortices in this patient.

Moreover; Damasio was also participating in a study led by Carissa L. Phillippi, where both the bilateral insula and the medial prefrontal cortices, including the anterior cingulate cortices,

⁴³ Damasio, *The Feeling of What Happens*, 289-294.

⁴⁴ Mohamad Z. Koubeissi et al., 'Electrical stimulation of a small brain area reversibly disrupts consciousness', *Epilepsy & Behavior*, 37C (August 2014): 32-35. <https://doi.org/10.1016/j.yebeh.2014.05.027>.

⁴⁵ Antonio Damasio, Hanna Damasio, and Daniel Tranel, 'Persistence of Feelings and Sentience after Bilateral Damage of the Insula', *Cerebral Cortex*, Volume 23, Issue 4, (1 April 2013): 833-846. <https://doi.org/10.1093/cercor/bhs077>.

were almost totally absent;⁴⁶ even here sparing most aspects of consciousness and the self. However: the patient did have some problems with conscientiousness and self-recognition in photos. He also suffered from amnesia and deficient autobiographical memory, which are functions often attributed to the medial prefrontal cortex in cooperation with the hippocampus.⁴⁷

These findings are not necessarily in conflict with this treatise, which tend to give more importance to the sensorimotor and melodic aspects of the self: the generation of agency and behavioural gestalts in the premotor cortex and the ventrolateral prefrontal cortex,⁴⁸ as well as the contextualisations and conceptualisations of the dorsolateral prefrontal cortex and the fronto-parietal networks, all of which were spared in the mentioned patient.

The midline structures, like the anterior cingulate cortex, may be concerned more with mood, motivation, attention to pain, and in the orbitofrontal regions: the somatic marking of ethical concepts and other values. Surgical and other treatment of the ACC have proven effective in cases of severe pain. Not by removing the pain, but dissociating it from emotions and the self, as it were.⁴⁹ It might not be a coincidence then, that when asked to describe 'immense suffering', all the above mentioned patient could think of was 'sore muscles'. Besides his lacking sense of smell, his visceral feelings may also have been blunted. But, like the questions of motivation, drive, and moral functioning, this was not included among the criteria of self-consciousness that were evaluated in this study.

Nevertheless, the study may be falsifying some of Damasio's earlier hypotheses regarding the importance of the anterior cingulate cortex to the sense of self. In *The Feeling of What Happens* the ACC is presented as a likely substrate for what he calls 'second order mapping', 'the feeling of knowing', and the generation of a 'core-self'.⁵⁰ Which is understandable, since similar lesions in other patients have been seen to cause akinetic mutism; at least temporary so. But

⁴⁶ Carissa L. Phillippi et al., 'Preserved Self-Awareness following Extensive Bilateral Brain Damage to the Insula, Anterior cingulate, and Medial Prefrontal Cortices', *Plos One*, 7(8): e38413 (August 22, 2012). <https://doi.org/10.1371/journal.pone.0038413>.

⁴⁷ Alison R. Preston and Howard Eichenbaum, 'Interplay of hippocampus and prefrontal cortex in memory', *Current biology*, Vol. 23, Issue 17 (9 September 2013): R764-R773. <https://doi.org/10.1016/j.cub.2013.05.041>.

⁴⁸ Simone Kühn, Marcel Brass, and Patrick Haggard, 'Feeling in control: Neural correlates of experience of agency', *Cortex*, Vol 49, Issue 7 (July-August 2013): 1935-1942, <https://doi.org/10.1016/j.cortex.2012.09.002>.

See also Christian J. Fiebach and Ricarda I. Schubotz, 'Dynamic anticipatory processing of hierarchical sequential events: a common role for Broca's area and ventral premotor cortex across domains?', *Cortex* 42 (4) (May 2006): 499-502. [https://doi.org/10.1016/s0010-9452\(08\)70386-1](https://doi.org/10.1016/s0010-9452(08)70386-1).

⁴⁹ Perry N. Fuchs et al., 'The anterior cingulate cortex and pain processing', *Frontiers in Integrative Neuroscience* 8: 35 (5 May 2014), <https://doi.org/10.3389/fnint.2014.00035>.

⁵⁰ Damasio, *The Feeling of what Happens*, 260-266.

again, this may be related more to a lack of motivation; and, as is pointed out by Damasio as well: the brain has a remarkable ability to rewire or transfer such functions to related regions.

In any case; it might have been disillusionments like these that made Damasio focus his attention more on subcortical structures and a lower-level account of consciousness centred around the concept of the brain as a mechanism for the maintenance of homeostasis. Reading parts of his *Looking for Spinoza*, or some of the above mentioned articles, it strikes one that some of the descriptions in *The Feeling of What Happens* are rather high-level, and poetic in comparison, introducing concepts like 'extended consciousness', 'autobiographical consciousness', and 'storytelling'. Especially the below citation comes close to the view that will be developed in this treatise. Unlike other parts of his writing - some of which will be discussed in the next chapter - his reference to Elliot's saying that 'you are the music while the music lasts' also seems to include the sphere of auditory and musical feeling into this realm.

You know it is *you* seeing because the story depicts a character - you - doing the seeing. The first basis for the conscious *you* is a feeling which arises in the re-representation of the *nonconscious proto-self in the process of being modified* within an account which establishes the cause of the modification. The first trick behind consciousness is the creation of this account, and its first result is the feeling of knowing (...) T.S. Eliot might as well have been thinking of the process I just described when he wrote, in the *Four Quartets*, of 'music heard so deeply that it is not heard at all,' and when he said 'you are the music while the music lasts.' He was at least thinking of the fleeting moment in which a deep knowledge can emerge - a union, or incarnation, as he called it.⁵¹

The idea sketched out here, of a 'fleeting moment' of 'knowledge', produced by the '*nonconscious proto-self in the process of being modified*', is obviously strongly inspired by William James' conception of the core self in the 'stream of thought'. The question, however, is whether Damasio would have been better off by taking the theories of Wundt as his point of departure; or at least a more thorough reading of James, incorporating also James' more peripheral remarks about 'a native wealth of inner forms shrouded in mystery' and not merely 'impressed from without',⁵² which sometimes seems to be the picture which Damasio want to give of mental processes. 'Consciousness consists of constructing knowledge about two facts', says Damasio: 'that the

⁵¹ Damasio, *The Feeling of What Happens*, 172.

⁵² James, *The Principles of Psychology*; Vol. II, subchapter on 'the genesis of the elementary mental categories' in chapter 28, 632.

organism is involved in relating to some object, and that the object in the relation causes a change in the organism',⁵³ and it is a description that is repeated again and again throughout this book.

If we take a closer look at this conception, however, a problem seems to be that it is not sufficient to account neither for the more immediate aspects of *qualia*, *duration*, and *extension*, nor the content of a *self*. As a matter of fact: there is little about this picture of interacting bodies which is different from let's say *the trajectory of a ball*, or any other mechanical chains of events. Not even the 're-representation' of such a trajectory is sufficient to produce a sense of self. There also has to be an the element of integrative *gestalt formation*, and *transcendence* of immediate matters, like the interpenetration of the past and present in temporal comprehension; which is precisely why people like Hameroff are turning to quantum physics.

It is not that Damasio denies the existence of a mental and cultural sphere, like some of his colleagues. As is observable in the above passage, he is talking even of *stories* and *personal character* here, which are central aspects of selfhood. The problem is just that his own description of consciousness does not account for such emergent entities, but rather takes them for granted; merely 'multiplying levels' as Aldo Mosca puts it;⁵⁴ talking of 'you confronting an object', discovering that the object is formed in 'your' perspective, and that 'you can even act on it';⁵⁵ as if entities like 'you', 'object', 'act', and 'discover' were already there from the outset, monitoring the interaction so to speak. They certainly are not; and it redounds to Wundt's credit that he has started to describe how the self is a product of a much more complex and gradual process of contextualisation and ego-dynamic gestalt formation.

A prerequisite for such formations is precisely the *voluntary* acts, which by definition are not entirely bound up neither in the trajectory of the body nor any external objects, but rather constitutes a relatively free region *between* these bodies. And it is first after the process of *apperception*: the unconscious, and sometimes conscious, process of *comparing*, *relating*, and

⁵³ Damasio, *The Feeling of What Happens*, 20.

⁵⁴ Aldo Mosca, 'A Review Essay of Antonio Damasio's *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*', *PSYCHE*, 6 (10) (October 2000): section 5, <http://psyche.cs.monash.edu.au/v6/psyche-6-10-mosca.html>.

⁵⁵ Damasio, *The Feeling of What Happens*, 126.

synthesising percepts, that the concepts of an autonomous self, a body of our own, and a sphere of external objects and beings are starting to enter the scene.⁵⁶ Or as Sigmund Freud put it:

On the one hand, it will be aware of stimuli which can be avoided by muscular action (flight); these it ascribes to an external world. On the other hand, it will also be aware of stimuli against which such action is of no avail and whose character of constant pressure persists in spite of it; these stimuli are the signs of an internal world, the evidence of instinctual needs. The perceptual substance of the living organism will thus have found in the efficacy of its muscular activity a basis for distinguishing between an 'outside' and an 'inside.'⁵⁷

It might not be entirely in line with Freud's view of these matters, but it is deducible from his description of it, that it is first of all this consciousness of 'muscular activity' which is constituting the self and 'the internal world,' not the *organismic pressures* as such, although they are central constituents of life. Curiously enough, both the physical environment and the instinctual and bodily needs are external to the self in this view, and it is a circumstance that was wonderfully illustrated by another of Oliver Sacks' case studies. In chapter five of *The man who mistook his wife for a hat* he describes the case of a blind woman who was so thoroughly cared for that she never developed - at least not until being treated by Sacks - a sense of ownership of her own hands. Even her own body was external to this woman, and the sense of self and agency was apparently limited entirely to those parts of her that were active and under voluntary control.⁵⁸ In other words: the consciousness of this activity could not be reduced to an awareness of the static physical bodies involved, which is the error Damasio sometimes seems to make. Rather it is the characteristic of consciousness to implement even in the most local acts and thoughts, an awareness of both the past, the present, and the future, creating the experience of an overarching *process* as well as the sense of being at a particular *stage* of this process; a stage which is neither simultaneous or symmetrical with, but nevertheless penetrated by the past and the future.

⁵⁶ Wundt, *Grundzüge der physiologischen Psychologie*, Band 2, 217.

⁵⁷ Sigmund Freud, 'Instincts and Their Vicissitudes' [1915], in *On Metapsychology: the Theory of Psychoanalysis*, The Penguin Freud Library, Volume 11, ed. Angela Richards, trans. James Strachey (London: Penguin Books, 1984), 115.

⁵⁸ Oliver Sacks, *The Man Who Mistook his Wife for a Hat*, 63-68.

It is important to stress that we are encountering a completely different realm of 'structure' here: something that Wundt has described as 'psychical gestalts' [psychische Gebilde] and 'creative synthesis' [schöpferische Synthese]. It is a process which is productive not only of our sense of elementary actions, attitudes, and social relations, but when the complexity increases, also such intellectual entities as *belief, doubt, question, answer, introduction, conclusion* etc. In fact, even the sphere of concepts often referred to as 'emotions' can be seen to incorporate such sensorimotor gestalts.

What is characteristic of these entities is that they are *composite wholes*, and that they are pertaining more to the life and activity of the self than any specific objects involved in the process. They are neither external objects nor trapped in a 'fleeting moment' between the body and objects - which is a self-contradiction in its own right, since the *fleeting* is never a *moment*. At least it will be the mission of the following chapters to discuss whether there is not actually a certain *freedom* and *autonomy* in mental activity, a sense of *intrinsic organisation* which is manifested even in such 'abstract' dynamic processes as music, dance, and pantomime. It is true that Damasio is occasionally approaching such an understanding, for instance when he speaks of emotions as somehow 'being their own objects';⁵⁹ but he is still talking about isolated organic conditions, which is not only a materialistic approach to emotion, it is restricting itself to all those static *objects* which life and music is not primarily about.

1.2 Melody as ego-dynamic manifestation

It would not be an exaggeration to say that the connection between mind and music has been a recurrent theme throughout the history of the West. Suffice it to mention the 6th century Roman philosopher Boetius' concept of 'musica humana', as opposed to 'musica instrumentalis' and 'musica mundana': the music of the universe. A more recent and voluntaristic conception is exemplified by Arthur Schopenhauer's idea of an all-encompassing cosmic energy or 'Will', with music and melody constituting its 'highest level of objectification, the conscious life and struggle of man.'⁶⁰

Historically this extolment of music has been more the rule than the exception, and it seems to have gotten a renaissance recently, which might already have clarified some of the metaphysical

⁵⁹ Damasio, *The Feeling of What Happens*, 280.

⁶⁰ Arthur Schopenhauer [1819], *Die Welt als Wille und Vorstellung*, Band 1 (Zürich, 1977), § 52, .326.

obscurities of earlier models, but also opened up for obscurities of another kind. Not only the field of neuroscience but also many physics papers are teeming now with musical metaphors and references to microcosmical 'strings', 'quantum harmonic oscillations', and mechanisms which are 'orchestrating' experience by the 'superposition' of rhythmical oscillations at the quantum level of neurones.⁶¹ Rather than reducing music to a bleak symbol of other things, as is still the habit of some musicologists, it is these other fields which are drawing on music for explanatory power now, and a framework for understanding where music might also be seen to tap into more large scale modes of brain dynamics. 'Recent empirical and theoretical results,' says Edward W. Large, 'suggest that, unlike linguistic communication, musical behaviour may not require postulation of abstract computational mechanisms, but may be explainable directly in terms of neurodynamics.'⁶²

The picture may not be as simple as Large indicates. And as we will come back to in later chapters, even music and emotional behaviour in general has levels of abstraction and integration which are 'conceptual', if not in a linguistic sense. But at least we can observe the emergence of a vast field of empirical findings now, which may give the medium of sound a much more powerful and concrete presence in the emotional economy than has previously been the case. Large's discovery of bursts of activity at the so called beta and gamma frequency bands of neuronal oscillation, which are also entraining to the rhythmical patterns of music, is only one example of this. His description of simple numerical ratios serving as 'attractors' in 'nonlinear resonance', is also important, in the sense that it may explain the experience of *tonal attractions*, of which earlier accounts have been little more than phenomenological.

It is a problem that may be attacked from many angles. Charting the rhythmical oscillations and harmonisations of neural circuits is just one of several approaches; the mapping of the co-activation or *wiring* of these circuits, are other and complementary ones. If it is true that sound and vocalisation is connected with the centres for will and higher reasoning in the brain - areas like the anterior cingulate and the lateral prefrontal cortex - the theories of Schopenhauer and others might already have been confirmed. According to the neuroanatomist Helen Barbas, these

⁶¹ Roger Penrose's and Stuart Hameroff's 'orchestrated objective reduction'-model of consciousness, and Hameroff's idea of a fractal-like hierarchy of oscillations within the brain, is only one example of this.

⁶² Edward W. Large, 'Chapter 7: Neurodynamics of Music', in *Music Perception*, Springer Handbook of Auditory Research, eds. M. R. Jones et al., 36, (New York: Springer, 2010), 225, https://doi.org/10.1007/978-1-4419-6114-3_7.

circuits are not only connected to sound, they might be seen to *favour* it. Especially the rostrrolateral prefrontal cortex, says Barbas, is so thoroughly connected both with the anterior cingulate cortex and the auditory association cortices, that she is suspecting that we 'use auditory signals as internal representations for organized thought sequences'.⁶³

Before addressing the principles of such organisation - the hierarchy of dynamic gestalts which the gestalt psychologist Wolfgang Köhler was referring to as 'unitary processes', 'functional wholes', and 'coherent developments'⁶⁴ - it might be useful to get some more perspective on the unique role of voice and melody in such processes. Also it would be pertinent to say some words about the reason for focussing on it. As will be thoroughly argued throughout this treatise, there are several benefits of focussing on melody in this connection; not only is it important in its own right, it is also highlighting some general aspects of the self. Especially three such aspects stand out as central.

1. The explicit vibrational and numerical basis of music - highlighted by Edward W. Large, and earlier by groundbreaking thinkers like Pythagoras - is obviously a benefit, which is also manifesting itself in the precise notational apparatus of music. Nowhere is the mathematical and physical constitution of qualia more accessible to precise analysis.

2. A second main advantage of melody is its *autonomy*, which is obviously central to the discussion of the self. The fluctuations of tension and release in mental processes are very much stripped naked in intonation and melody. When isolated from linguistic meanings and the visual realm this dynamic relies entirely on its intrinsic autonomy for comprehension. Especially in tonal music this autonomy becomes very apparent, as even the values to be asserted, questioned, and confirmed - the experiences of harmony - are contained within the dynamic process itself.

3. The overall enrichment of human existence by harmony and rhythmical regularity has gotten far less attention than it deserves. While a discussion of melody would be covering the dynamic principles that are also applying to kinaesthetic feeling and gesture, the realm of intonation and music is actually much larger, encompassing categories of being that do not exist, at least not to the same extent, in other sensory modalities. As we will come back to especially in

⁶³ Helen Barbas, Jamie G. Bunce, and Maria Medalla, 'Prefrontal pathways that control attention', Chapter 3. in *Principles of Frontal Lobe Function*, second edition, ed. Donald T. Stuss and Robert T. Knight (New York: Oxford, 2013), 38.

⁶⁴ Wolfgang Köhler, *Gestalt psychology: An Introduction to New Concepts in Modern Psychology* [1947] (New York: Liveright, 1992), 103.

the chapter on dramaturgy, these musical categories are neither peripheral nor inessential. They are central features of homo sapiens life, enabling an alternation between workaday emotions, recreational entertainment and ecstasy, ritual preparations and celebrations, religious sentiment and worship, as well as the cultivation of individual identities and styles.

In other words: the organising capability of melody and music is comprising both the rhetorical and large scale dramaturgical aspects of our lives. And the freedom and emotional pluralism it contributes is obviously a substantial component of culture and selfhood. In fact, it is a *prerequisite* for selfhood as contrasted with purely automated and mechanical processes. It is a freedom that stretches from the option to receive or repel in cells and plants to the realm of self-expression in fine art. And most people would probably agree that it is first in these latter products that the self is fully developed and realised. At the same time these higher level products of human consciousness are further removed from the basic instincts of foraging and reproduction, which is challenging the nativist leaning of many researchers.

It is a general tendency of such reductionism to try to explain the phenomena in terms of more primitive functions and constituents; as if naturalness is located somewhere in the distant past. Yet the process of evolution has no favoured period, and many reductionists are not comfortable neither with animal sentience nor the entanglement of fundamental particles. Certainly the kinaesthetic and proprioceptive senses are more basic than melody in the sense of dealing with primary needs. But social communion, and the monitoring of our voices in thought and emotional interaction, are also important to many animals. It is even integrated in the vocal apparatuses and instinctual behaviour of these animals. One would have to travel very far back in our evolutionary past to arrive at a time where thinking, socialising, and vocal communication did not matter.

Also the previous section has indicated that the role of kinaesthetic feeling is not that of *propelling* or *motivating* actions. It is probably more about *guiding* it, by providing a narrative of the self in action and thought; a narrative that can be repeated and planned in advance. The actual *production* of behavioural ideas - which is manifested in the so called 'readiness potential' - is automated and even random to some extent; although it is controlled by the perpetual loop of signals circulating between the basal ganglia and the frontal cortex. It is a system which - at least according to researchers like Haggard and Brass - is enabling dorsomedial frontal regions like

the anterior cingulate cortex and the supplementary motor areas to control the process by accepting or rejecting the inclinations that spring to mind.

As we will come back to in separate chapters, these regions of the frontal cortex are also areas for vocalisation both in animals and humans, so there is little doubt that even sound and melody are features of volition and self-consciousness. As indicated by Ricarda Schubots in the quotation below: the sounds and melodies may have a similar function as kinaesthetic feeling in the guiding and organisation of mental activity. Especially in cases of musical imagination and thinking - when the vocal apparatus or a musical instrument does not have to be operated by our muscles - the kinaesthetic component is not as necessary, and the processes may just as well be guided by the sounds themselves.

Sound by sound, the lateral premotor cortex establishes an internal model of the melody, which can in many ways be termed a forward model, equivalent to those described in the context of motor control. This forward model can, after learning (Figure 1b), be used for melody prediction in a simulation mode in the same sense that forward models are used in motor imagery.⁶⁵

In cases of 'disembodiment', like the examples of *akinesia* described by Oliver Sacks, the feelings of muscular activity are not even accessible to the person, so the melodies, as well as the visual impression of moving, would have to serve as a replacement for kinaesthetic feelings in the control even of walking and talking. The melody might well be the only remaining source of agency and articulated selfhood in some of these people. Which is not to say that melody is not also contributing to our normal sense of self and thought. Our voices are obviously central features of our per-sona, and many of its aspects do not have a parallel in kinaesthetic sensations. The rich field of intonation and dialect is only one evidence of this; and it would not be sufficient to think of muscular tensions when trying to imitate a foreign dialect. The melodies would have to be controlled by a 'forward modelling' of the sounds themselves. In singing, or course, this is even more obvious, as the intervallic relations, according to which it is operating, do not even exist in the field of kinaesthesia.

As was pointed out by William James: the singer is thinking 'only on the perfect sound'. This example may not be the best, since there are hardly any people that are more aware of their

⁶⁵ Ricarda I. Schubots, 'Prediction of external events with our motor system: towards a new framework', *Trends in Cognitive Sciences*, vol.11, no. 5 (May 2007): 213, <https://doi.org/10.1016/j.tics.2007.02.006>.

muscular tensions than professional singers. At least this is often the case during practice periods. When performing the music, the focus must be on the tones and emotions. Everything else is automated then; making it more similar to ordinary vocalisation. It is just going into the subconscious dynamic of communicating and thinking, which is such a central part of us that it is not even noticed in many cases. So ingrained in our minds are our voices, that the modulations we call prosody and melody are almost always there, as a continuous sensory substrate for both our overt and introvert reflections;⁶⁶ or as Wundt might have put it: the vocalisations may be providing a relatively 'permanent mass of feeling'. Being controlled by our 'free will' they also satisfy the second of Wundt's main requirements for the core self.

As mentioned above, this *freedom* of sound from more primitive bodily pressures might be seen to pose a problem in relation to its integration in motivational circuits, but it is also a precondition and advantage. To the extent that the self is defined by its freedom and autonomy in relation to an 'external' sphere that is not susceptible of such control, it has to be liberated even from reflexes and other bodily processes beyond our control, often impinging on our conscious lives in a rather arbitrary and even unwanted manner. Hunger, sleepiness, and the spasms of cerebral palsy are just some examples of this 'internal externality', so is lust and pain. Being purely dynamic phenomena, the energy-fluctuations produced by our vocal cords are mere manifestations of the human will, says Hermann Helmholtz.

Every motion is an expression of the power which produces it, and we instinctively measure the motive force by the amount of motion which it produces. This holds equally and perhaps more for the motions due to the exertion of power by the human will and human impulses, than for the mechanical motions of external nature. In this way melodic progression can become the expression of the most diverse conditions of human disposition!⁶⁷

There are no residual 'extrinsic' elements in such progressions. Perhaps one could say that the dynamic fluctuations of our voices are *transparent to* or *penetrated by* the self in these cases, or even *identical with* it, since there is no better place for it to reside. Essential parts of this free and

⁶⁶ According to Christoph S. Herrmann and colleagues, the brain even fills out missing prosody by 'generating its own melody': 'The brain generates its own sentence melody: A Gestalt phenomenon in speech perception, *Brain and Language*, Vol. 85, Issue 3 (June 2003): 396-401, [https://doi.org/10.1016/s0093-934x\(03\)00054-3](https://doi.org/10.1016/s0093-934x(03)00054-3).

⁶⁷ Hermann Helmholtz, *On the Sensations of Tone: as a Physiological Basis for the theory of Music* [1863], trans. Alexander J. Ellis (New York: Dover Publications, Inc., 1954), 250.

autonomous sphere is also produced by kinaesthetic sensations, of course, and our moving about in a manner which is infinitely more complex than the stimulus and response sequences of let us say a plant. Yet the freedom may be even higher in vocalisation. Both the timbre and tone of our voices may be subjected to intimate control; a control that is extended even into the art of instrument making, and an abundance of timbral qualities which is going far beyond our voices. 'What alone is fitted for expression in music,' said Hegel, is 'the object-free inner life, abstract subjectivity as such.' Hegel even went so far as to identify emotional vocalisation with 'our entirely empty self, the self without any further content,'⁶⁸ and he did not fail to extend it to the handling of musical instruments.

Since Antonio Damasio is often referring to 'the continuous musical line of our minds', the tone and prosody of 'background feelings', and the adage 'you are the music while the music lasts,'⁶⁹ there is reason to believe that he shares this view. On closer inspection, however, this does not seem to be the case; on the contrary, he says: 'We do not see consciousness or hear consciousness. Consciousness does not smell or taste. Consciousness feels like some kind of pattern built with the nonverbal signs of body states.'⁷⁰ And when speaking of 'nonverbal signs' here, he is obviously referring to his own bodily sensations, since, in other chapters, when talking of the ways in which feelings are 'observable to others', the 'tone of our voices' is also included.⁷¹

But even his conception of the *kinds* of 'body states' involved in self-consciousness is somewhat vague. When talking about 'core consciousness' in *The Feeling of What Happens*, he tends to identify this with 'background feelings': 'They are so closely tied,' he says, 'that they are not easily separable'. As examples of such background feelings he mentions *fatigue, energy, excitement, wellness, sickness, tension, relaxation, surging, dragging, stability, instability, balance, imbalance, harmony, and discord*; some of which, at least, may count as examples of the kind of articulate and *voluntary* feeling treated above. However, in a later book, *Looking for*

⁶⁸ G. W. F. Hegel, *Aesthetics: Lectures on Fine Art* [eighteen twenties], vol. 2, trans. T. M. Knox, (New York: Oxford University Press 1998), 891.

⁶⁹ Damasio, *The Feeling of What Happens*, 87, 93, 101, 111, 172, 191, 286.

⁷⁰ Damasio, *The Feeling of What Happens*, 312 and 93.

⁷¹ See for instance Damasio, *The Feeling of What Happens*, 92 and 286.

Spinoza, he seems to restrict his definition of feeling to 'the basic regulatory reactions', which are not voluntary at all, but pertaining rather to the autonomous nervous system.

In reference to the dominant use of the term feeling, as agreed at the outset, I would say that *all* feelings are feelings of some of the basic regulatory reactions we discussed earlier, or of appetites, or of emotions-proper, from straight pain to beatitude. When we talk of the "feeling" of a certain shade of blue or of the "feeling" of a certain musical note, we actually are referring to the affective feeling that accompanies our seeing that shade of blue or hearing the sound of that note, regardless of how subtle the aesthetic perturbation may be.⁷²

Damasio's retreat to 'the basic regulatory reactions' here, and the concomitant downgrading of more peripheral and voluntary sensations, is obviously connected with the already critiqued, tendency to conceive of psyche as the trajectory of a *physical body* continuously adjusting to other physical bodies confronting it, without really accounting for how the consciousness, continuous 'melodiousness', or any further content and characteristics of the self comes into play.⁷³ And they certainly have to come into play, if the concepts of self and psyche are going to have any meaning beyond the definition of objects proper. The voluntary and articulated region of feeling, not to speak of the emergent properties of this life, so central to James and Wundt's definition of self and thought, sometimes seems to be left out of account, or taken for granted in Damasio's thinking.

This bodily focus in Damasio's conception of emotion and consciousness is explicitly rooted in his recognition of the centrality of *homeostatic regulation*: the automatic regulation of temperature, oxygen concentration, or pH in the body; and in the idea of emotions as a kind of signalling system between the internal states of the body and the mind. Which is neither revolutionary nor wrong. It is basically a variant of the classical instinct theory or the 'drive reduction theory' of motivation, which is supported by James and Freud as well. And the intention here is not to question whether such instincts and bodily urges are essential to the maintenance of mental and melodic activity as such. At a deep and subconscious level they probably always are. What is questionable about such reasoning - at least when given a dogmatic

⁷² Antonio Damasio, *Looking for Spinoza: Joy, Sorrow and the Feeling Brain* (London: Vintage, 2004), 92-93.

⁷³ For an outright identification of self and body see for instance Antonio Damasio, *The Feeling of What Happens*, 134, or *Descartes' Error: Emotion, Reason and the Human Brain* [1994] (New York: Vintage Books, 2006), Chapter 10 and Introduction.

physicalistic slant - is that it tends to reduce the human being to a thermostat, leaving out of account, or setting up an unnecessary opposition between the direct regulation of homeostasis in the body and all those sensations and activities which are only *indirectly* related to these mechanisms; activities which may nevertheless play a crucial role for the constitution of a self, a sense of identity, and for the maintenance of life and homeostasis in the long run.

The uniquely musical activity of affirming harmony and rhythmical regularity through singing and dancing, for instance, may not be necessary for the maintenance of homeostatic balance; but it is still felt, and it is still a central aspect of human behaviour. It may also provide huge benefits in the form of social bonding, social identity, religious sentiment, ecstatic or cathartic outlet, etc.; factors which may play an important role for the wellbeing and even survival of a community in the long run. Once these possibilities for communication and enjoyment are developed, there is also the possibility that they might be enjoyed without any further benefits at all; or even with detrimental consequences for the body; which is sometimes the case with drug addicts, or artists sacrificing their health for their art.

But this holds true for more than music. The case might well be that most of what we call self, identity, culture, and even *thought*, is only connected with the fundamental needs in this indirect manner. The content produced by these faculties should all be excluded from Damasio's definition of feeling and consciousness; which make for some truly absurd scenarios if the thought of it is carried to its extreme. Let us imagine Damasio deprived of his own voice, and equipped for instance with the voice of a tree year old lisping girl; would not this alter his self-consciousness or way of feeling in any way? The alteration is inferring neither with his homeostatic regulation nor his muscular tensions, so the change in feeling could hardly be explained as product of any 'affective feeling that accompanies the hearing of the sound'. Such feelings might well be *triggered* by the sound; but they would never come about if the sound of his new and girlish voice was not contributing to the 'feeling' in the first place.

Similarly: would not his self-consciousness and way of feeling be affected in any way if the melody of his speaking and thinking was replaced by the intonations of a stuttering adolescent with Norwegian accent; or if it were to be removed entirely, making him speak with a completely monotonous and flat voice? Some of these aspects of his character might well be covered by other media, such as gestures or mimicry; but not entirely; and not in the same manner. The motor aspects of speech might well be mastered even by deaf people, but their

reaction to getting a cochlear implant and hearing voices for the first time is often soul-stirring. The self is getting tone and timbre then, and it is not a metaphor for other things. At least there are few direct parallels between mimicry and the rich field of dialect and intonation serving as distinctive features of thousands of regions, styles, and melodies. As is already argued: the unique, explicit, and less instinctual character of vocalisation might just as well prove to be an advantage here than a drawback; making for an even freer and richer self.

Since neither of these manifestations are really necessary from a homeostatic point of view, they might just as well be omitted altogether. And the same could be said about the visual appearance of his body, his admirable style of writing, and his clothes. All these things might just as well be deprived of him. In fact; he might just as well lead his life within the solitary confines of his laboratory, or in a dark and silent cave; or reduce himself to one of the bacteria thriving there. If homeostatic balance, reflex action, and the continued existence of the species was all that mattered, this might even turn out to be an advantage.

These are the consequences of the above quoted definitions of consciousness and feeling; but as we have already seen: Damasio is not always as physicalistic. One place, in *The Feeling of What Happens*, he is even echoing Wundt's 'principle of actuality', the recognition that 'the conscious mind and its constituent properties are real entities, not illusions, and they must be investigated as the personal, private, subjective experiences they are.'⁷⁴ And in connection with 'background feelings', he talks about 'broadening our notion of the source of feelings.'⁷⁵

This 'broadening' is by no means as radical as that of James, though. James' treatment of the emergency and autonomy of psychical processes may not be as comprehensive as one should wish, but at least he has noticed the existence of a voluntary and sensorimotor level of consciousness - an ability to 'think of subjectivity as such, *to think our selves as thinkers.*' And the behavioural entities going into such processes are neither slighted nor taken for granted but explained as sets of composite *feelings*, providing the content of mental acts like for instance 'welcoming or opposing, appropriating or disowning, striving with or against, saying yes or no;'⁷⁶ all of which is obviously both more articulate, more free, and more substantial than Damasio's

⁷⁴ Damasio, *The Feeling of What Happens*, 308.

⁷⁵ Damasio, *The Feeling of What Happens*, 286.

⁷⁶ James, *The Principles of Psychology*, Volume 1, Chapter 10, 299.

notions of some 'background feelings' or 'fleeting moments of knowledge' at the interface between interacting physical bodies.

There is a crucial difference between 'the *feeling* of what happens' and the 'the *music* of what happens', as conceptualised in Celtic spiritual traditions and in Seamus Heaney's poem *Song*. It was Heaney's poem which was the source of inspiration for the title of Damasio's book, and Damasio's 'adaptation' is not only speaking of a more physicalistic approach to consciousness, it is threatening with obliterating the whole realm of psyche.

The fact is that already the notion of what James calls 'the spiritual self' could be seen to be related to 'the basic regulatory reactions' in an *indirect* manner only, since our thinking is not limited to these basic needs, but rather roaming freely over our lives and the higher level values of which it is also consisting. Whether James is recognising sound as a *primary medium* for the feelings constituting this life, going beyond the function of merely *expressing* them, is not so clear. Quite unlike Hegel, James does not really seem to have considered the possibility. He certainly considers sound a 'primary medium' for the 'aesthetic feelings' - this we will come back to below - the problem is just that he lacks a concept of how these 'aesthetic' and auditory feelings may be integrated in our general life of feeling.

These more peripheral sensations are nevertheless given a certain role when it comes to the constitution of a self in a more comprehensive sense. At least this seems to be the implication of his concepts of 'the social self' and 'the material self', comprising ingredients as different as our fame, our children, and those parts of our wealth 'saturated by labour.' Especially his comments on clothes is amusing, since he tends to reckon this a more important part of our selves than both the visual appearance of our bodies and 'our wife and babes'.

The body is the innermost part of *the material Self* in each of us; and certain parts of the body seem more intimately ours than the rest. The clothes come next. The old saying that the human person is composed of three parts - soul, body and clothes - is more than a joke. We so appropriate our clothes and identify ourselves with them that there are few of us who, if asked to choose between having a beautiful body clad in raiment perpetually shabby and unclean, and having an ugly and blemished form always spotlessly attired, would not hesitate a moment before making a decisive reply. Next, our immediate family is a part of ourselves. Our father and mother, our wife and babes, are bone of our bone and flesh of our flesh.⁷⁷

⁷⁷ James, *The Principles of Psychology*, Vol. 1, Chapter 10, 292.

It is undoubtedly a more inclusive and humanistic concept of self-consciousness which James is sketching out here. It is also in line with a blurred and much more interactive conception of the self and its environment in much modern cognitive science; whether this goes under the label of 'embodiment theory', 'dynamical systems theory', or 'the situativity theory of cognition'.

The example of clothes is good because it tends to incorporate into our self-awareness a range of sensations and other visual elements which are obviously unique to the media of colour and spatial proportions, and therefore could not be entirely reduced to any preexisting inner states accompanying them. Especially this would be the case if these sensations are integrated in a more or less conscious design or style, which is very much a catch-22 situation today, at least in the affluent societies of the western world. Even the 'shabbiness', 'uncleanliness', and 'bodily beauty', mentioned by James, is incorporating so called 'exteroceptive' sensation to some extent. As for colour and sound, the contributions of these factors to the self are given more attention by John Dewey and Charles Hartshorne. Especially Hartshorne is known for his 'identity theory of immanence', placing all sensations on an affective continuum. Of particular interest here is his famous saying that 'the gaiety of yellow is the yellowness of yellow', and the observation that 'the emotional tonality is a part or aspect of the colour or sound quality.'⁷⁸

What brings our clothes in such close contact with our selves is obviously both their being attached to us on a relatively permanent basis, as well as the element of choice and control. We do not choose our bodies, but we do choose our clothes. And there is always an element of *expression* in these choices, whether one likes it or not. In the visual arts this element of control is even more pronounced, which is probably partly what entitles it the designation of *fine art* in the first place; besides the factor of being liberated from any mundane or practical concerns, that is; which, if it is really a criterium of 'spirituality', would reverse the priorities of Damasio altogether.

Still we are dealing merely with material and dead objects. Not so in intonation and melody. These are pure manifestations of force and movement, which are intimately connected with, or perhaps one should rather say that they are *identical with*, the active living core of the self; the

⁷⁸ Charles Hartshorne, *The Philosophy and Psychology of Sensation* (Eugene, Oregon: University of Chicago Press, 1934), 176-177.

level of our consciousness which produces a sense of articulate motivity, agency, and self in thought. In fact, there are few, if any, things that are more *us* than our own voices.

This is also the realm of gesticulation, posture, dance, and mimicry; all of which are incorporating examples of so called 'mechanoreception', that is to say: a variety of sensations registering things like pressure, stretching, gravity, vibration, muscle tone, or pain. The medium of sound is probably the most subtle and 'ethereal' of these media, registering pressure fluctuations at the size of a single atom. And, as have been so emphatically pointed out by Oliver Sacks recently: the parts of our character and identity which are produced by these sensations are by no means to be regarded as unessential or redundant. On the contrary, he says, - and he is basing his conclusions on a whole life of experience with patients with various types of dementia - 'it is as if identity has such a robust, widespread neural basis, as if personal style is so deeply ingrained in the nervous system, that it is never wholly lost, at least while there is still any mental life present at all.' 'In particular the response to music is preserved,' he says, and it can 'serve to orient and anchor a patient when almost nothing else can'.⁷⁹

The expressive and emotive power of music is indisputable. It really makes a difference, both to healthy and demented people. And there is hardly any other way of explaining it than by pointing to the properties of sound as such. Even if there is sometimes an automatic link between auditory experience and 'chemoreceptive' and other feedback from the body, there is no indication that such reflexes are stronger in melody than in any other products of mechanoreception, at least not than in mimicry. What is still in need of some clarification is the question whether the differences between these media come down to some *qualitative* differences, or a mere difference in *explicitness*. It goes without saying that the medium of sound is much more explicit than the sensations deriving merely from bodily tissue. It is true that even the sensations of *vibration* might be seen as deriving from bodily tissue, even if the tissue producing the vibrations and the tissue perceiving them as tones are located to different organs in the body. Anyhow, it is precisely this feedback loop, and the fact that vibration is a purely *dynamic* phenomenon, which creates the possibility of *transcending* the body as well; the possibility of occupying the space *between* people, so to speak.

⁷⁹ Oliver Sacks, *Musicophilia*. 336-337.

Whereas the sensations of skin, tendons, joints, and muscle tone in kinaesthetic feelings are only *indirectly* accessible to other people - producing visual clues with which people can identify, or make inferences from - the powerful sensations of loudness, vibration, tone, and timbre, are all immediately present both to the person producing them and the ones who are listening. This is an important point, which alone may go a long way towards explaining the power of vocalisation and music. Even if these sensations had merely been paralleling some other sensations, their auditory explicitness would nevertheless make for a sphere of *collective and culturally refined feeling* which would hardly be possible in any other media.

According to some thinkers, this is all that vocalisation and music is about: the mere expression or paralleling of some 'inner' feelings; perhaps enabling some idiosyncratic combinations, but hardly anything substantially unique. The opinion may seem like a corollary of the concept of ex-pression, but it is not a likely explanation. It is not likely, because if reduced to something else, the concepts of sound, harmony, tone, and song would simply be meaningless. If these phenomena were not experienced as something qualitatively unique, they would not even be distinguishable from the kinaesthetic feelings they are supposed to reflect.

It may well be that in some animals, at least when they are not engaged in singing, their vocalisations are occurring basically as mere symptoms of some kinaesthetic and respiratory tensions. It suffices to open the window and observe a flock of seagulls or a group of magpies to understand how their voices are serving as fluctuating manifestations of fright, aggression, or their more or less turbulent states of mind; which, of course, is highly valuable from a social point of view, and probably the reason why we have developed voices in the first place. The point here is just that there is no opposition between this fact, and the circumstance that the unique qualities of such sounds are also contributing to the experience. The mental states of a roaring tiger, a howling dog, or a screaming and shouting person, are hardly identical with the mental states of individuals who are deaf and unable to hear or do these things themselves.

At least the shocking impression of being subjected to such roaring or shouting is hardly due to a symbolic representation of some inner and hidden states. Sure enough, there are mechanisms both in the ear and in other parts of the brain, which are triggered only by abrupt sounds, or by the shrillness of certain frequencies, making them even shriller and much more

overwhelming.⁸⁰ In certain cases, as in the pathological condition of 'hyperacusia', even ordinary sounds might be unbearably and excruciatingly shrill and loud; yet this overwhelming character of sounds is difficult to disentangle from the experience of sound as such. There is no one-to-one relationship between the experience of loudness, shrillness, and the experience of muscular and visceral pain.

Even the purely vibratory impact of sound on our bodies may uniquely contribute to the experience. Its calming effect on the musculature of spastic patients is well documented.⁸¹ There is even a case for the theory that a cat's purr is promoting the healing of wounds and bone fractures, at frequencies which are optimal for such healing;⁸² a circumstance which would in this case group the vocalisations among 'the regulatory reactions' and sensations, rather than the manifestations of a 'central active self', which is where they usually belong.

A circumstance which is sometimes put forward as evidence against the contributions of sound to feeling and consciousness is the fact that we seem to be vocalising less when we are alone than in the company of others. 'Tone of voice scarcely applies', says Michael Argyle, 'since people do not talk much to themselves, and babies cry less when there is no one to hear.'⁸³ The pronouncement, coming from a nineteenth century authority on non-verbal communication, is almost shockingly rash, and it probably tells more about role of social contact as a motivating factor in our lives than about the role of voice and intonation. It is not unlikely, at least, that we might feel differently, and more, in the presence of others than when alone. If left totally alone in the world, one might not feel like doing much at all; except perhaps, from crying and talking to oneself. But this is a possibility which is not at all taken into consideration by Argyle. Moreover, the premiss of his conclusion is not even correct, since people *do* 'talk much to themselves' all the time, only silently; engaging the so called 'as if' auditory sensations.

Perhaps we do not cry so loud alone, because the loudness is not a necessary part of the pain. The amount of energy involved in loud crying might even be contradictory to the depressive

⁸⁰ Catherine Weisz, Elisabeth Glowatzki, and Paul Fuchs, 'The postsynaptic function of type II cochlear afferents', *Nature* 461, 1126-1129 (22 October 2009)

⁸¹ See for instance Olav Skille, Tony Wigram and Lyn Weekes, *Vibroacoustic Therapy: The Therapeutic Effect of Low Frequency Sound on Specific Physical Disorders and Disabilities*, *British Journal of Music Therapy* (1 December 1989): <https://doi.org/10.1177/135945758900300202>.

⁸² Elizabeth von Muggenthaler, 'The felid purr: A healing mechanism?', *The Journal of the Acoustical Society of America*, Volume 110, Issue 5 (November 2001): 2666, <https://doi.org/10.1121/1.4777098>.

⁸³ Michael Argyle, *Bodily Communication* [1975] (London and New York: Routledge, 1988), 77.

aspect of sadness, manifesting instead an element of desperation, a need for reaching out, or perhaps rather: an assertive manipulative impulse. In joy the situation is different, and we do seem to 'laugh out loud' even to ourselves. Some or most of us even spend much of our time humming or singing to ourselves, either silently, or loudly in the shower. The feelings of harmony and jubilation involved in such activities are certainly better enjoyed in company with others; at least one would hardly sit down and write a symphony if there were 'no one to hear'; but this does not detract from the status of sound as a medium for these activities. Quite the reverse: it is precisely this element of harmony and jubilation which makes the medium of sound so important.

The fact is that if sound and tone of voice did not 'apply', as Argyle put it, the phenomena of song and music would hardly exist at all. Especially this peculiar fixation and sustaining of *specific tones* seems to be a central ingredient of these modes of being, establishing not only a feeling of restfulness or 'tonality', but a *point of reference* as well, making for a whole world of unique sensations and exact relations, as well as a large range of behaviour dealing with this restfulness in different ways. Needless to say, it is precisely these unique experiences which are providing the strongest evidence in favour of the theory of sound as a medium for feeling. Since in the cases of song, harmony, polyphony, harmonic progressions etc., there are no kinaesthetic, or purely 'inner' parallels at all - except perhaps, for the evocations of muscular tensions in pitch and timbre, which are common to all modes of intonation - it would be impossible in these cases to reduce the former phenomena to the latter. Nor would there be any reason for doing so.

It is a paradox then, that it is precisely this *uniqueness* of music which has also been turned *against* it, as something alien to feeling. As if the conception of feeling as something purely interoceptive, primeval, and fixed, was an established fact, and as if everything which speaks against it should automatically be regarded alien or *unreal*, because it is not interoceptive, primeval, and fixed. This is circular reasoning.

There is no denying that this unique fixation of tone and rhythm, and the considerably more complex dialectic of *affirming* it, was discovered or developed at a relatively late stage of evolution. But this it has in common with most other traits which distinguishes us from apes. Indeed, it might touch on some central characteristics of what makes us human in the first place. If it is not our strongest region of feeling in terms of sensory intensity, it is certainly our most complex and manifold, or as Hegel would have put it: the most free and self-reflective. One

might call it unnatural, or try to explain it away as a symbol of something else; but it is still there. It is real; it is thoroughly incorporated into our emotional lives; and, unlike signs or symbols, it could not be replaced by something else. The link between celebration, jubilation, trance, religious worship, song, and rhythmically regular movement, is the same in every culture on this earth, and it is constituting such a pleasurable sphere of being that many people, even people who are oblivious to other arts, are only reluctantly detached from its spell.

The question whether a phenomenon should be granted the label of 'feeling' or 'consciousness' is very much up to the definition of these concepts, which is certainly wide enough. So wide, in fact, that they may include all of experience. More interesting are the concepts of self-consciousness, emotion, and a *life of feeling*, which might even be a necessary aspect of emotion. At least it is still a matter of contention in psychological circles whether the concept of emotion should incorporate some social and temporal contexts as well. The sensations of hunger, pain, and the sometimes merely unconscious regulatory mechanisms to which Damasio is pointing, are hardly emotional at all. In as far as they are not integrated in the voluntary and autonomous self, they may not even qualify as feelings. Even amoebas and comatose people have reflexes, but hardly emotions. And it is an open question whether it would be better to follow Wundt's example here, and reserve the concept of emotion for the kinds of conditions which are also referred to as *states of mind*. The purely visceral, vascular, or hormonal urges and evocations, and especially the somatic conditions somewhat more liberated from the basic needs, might well be necessary aspects of emotion, but they are not the whole picture.

As for the articulate sensory inflections in voice, intonation and melody, the situation is very much the opposite. Whether the concepts of self and feeling are taken in their widest or their narrowest sense, there is little doubt that these inflections are integrated parts of our *lives of feeling*. They might even be constituting some of the most subtle and idiosyncratic manifestations of these lives, at the level of experience where the sense of a 'central active self' is first emerging. What is less clear is the manner, and extent to which these feelings are integrated with the rest of our motivational apparatus, and linked to the more visceral aspects of emotional states. There is also a need for clarifying the exact logic of melodic and musical processes, and the possibility of integrating them into the general science of behaviour and psyche.

1.3 The purpose and motivation of melody

The core self is composed of a distinct sphere of content, which is both melodic and autonomous. But it also needs something that intrudes into this sphere, motivating and impelling it. It is a sad fact of life, lamented by Schopenhauer and the Buddhists alike, that the self has to be in perpetual motion; and it would hardly move if it was not *dissatisfied* to some extent.

If existence had a purpose, and if this purpose was merely to prolong itself - which is the reasoning that Damasio sometimes seems to entertain - the elimination of frustrations like hunger or suffocation would be the only urges that mattered. But this is just the bottom level of Abraham Maslow's famous 'hierarchy of needs'. Nevertheless, from the point of view of eliminative reductionism, even this sentient existence is unreal and 'epiphenomenal', since the processes are preferentially explained in a mechanistic manner. A mechanical conception of reality may not be in tune with findings of quantum physics, which are questioning the material and temporal 'solidity' even of fundamental particles; yet it seems to be difficult to give up the materialist notion that such constituents are somehow more 'real' and long-lived.

Conversely, and no less congruent with the findings of quantum physics: the level of 'reality' might be associated with the level of integrated complexity and the capacity for *self-reflection*. Then there is ultimately a range of human level urges that would also have to be satisfied: a hunger for action, novelty, and challenges, fostering curiosity, courage, as well as territorial and technological discoveries; a hunger for social communion, love, and respect, fostering mutual cooperation and care; a hunger for complexity, depth, and intensity, fostering romantic captivation, and a reassuring sense of meaning and purpose.⁸⁴ There even seems to be a need for maintaining the *illusion* of insight and clarity in cases where insight and clarity is difficult to attain.⁸⁵ Human existence would hardly be bearable without it.

Some might think that the neocortical contributions to consciousness are somehow 'unreal' or mere derivatives of basic needs, like Sigmund Freud's sexually oriented conception of 'libido'. But even Freud acknowledged that there is more to life and motivation than sex-drive. Some of these urges may not be 'basic', but their contributions have been extremely beneficial to the safety and safeguarding of existence in the long run. As we will come back to below, Oliver

⁸⁴ Abraham Maslow [1954], *Motivation and personality*, Chapter 7 (New York: Harper & Row Publishers Inc., 1970), 101.

⁸⁵ Arthur M. Glenberg, Alex Cherry Wilkinson, and William Epstein, 'The illusion of knowing: Failure in the self-assessment of comprehension'. *Memory and Cognition*, Vol.10(6) (1982): 597-602.

Sacks has even suggested that the heightened sense of social communion provided by *harmony* and *rhythmical synchronisation* is one of the main advantages of homo sapiens. Certainly it has contributed to our unprecedented power and dominance.

Also one should not forget that the brain is largely governed by *top down* processing. Some people do go into hunger strikes on behalf of ideals like democracy and freedom. Some people do not find a boring and meaningless life worthwhile. The processes that are causing the articulation of voluntary acts are complex, engaging often our highest faculties of reason and feeling. As was pointed out by Wundt; we are confronted with an 'infinite succession' here;⁸⁶ which, it is tempting to add, may just as well be the *essence* of consciousness as a problem of explaining it. The fact that we are to some extent able to grasp and letting our behaviour be influenced by ideas of paradox, infinity, and death is precisely what might save it from a reduction to something finite and mechanistic. Even Maslow, in his later years, was talking about 'transcendence', 'metamotivation', and a desire to reach the infinite.⁸⁷

It is partly the recognition of these higher level functions and motivations that distinguishes this treatise from a Freudian account of 'psychodynamics'. It is also a reason why the concept of 'ego-dynamics' is preferred. The focus of this treatise is primarily on the *articulated* and somehow *autonomous* dynamic of thought and song. Which is not in opposition to the fact that basic needs must also be met. Sexuality is obviously central to procreation and the motivational economy at large. In some cases, sex might even be a hidden motive for performing music. To a poor street musician, even hunger might serve as such a motivation. But this is not always the case. Even children and asexual people sing and play; and people whose basic urges are eliminated by respirators and intravenous feeding do live on. What is probably harder to lose for these people is the experience of having an active and social life. When life becomes lonesome, empty, and excruciatingly dull, people do tend to fall into paralysis: the paralysis of depression.

There is little doubt that the experience of music provides a central component of such motivation, communion, and pleasurable content to modern day humans; components that few people are willing to lose. Traditionally the role of *work songs* has also been an important motivational factor, like in the Afro-American 'spirituals' or the 'sea shanties', which were synchronising and motivating much of the work on board. Speaking of *pull*, the so called

⁸⁶ Wundt, *Outlines of Psychology*, §14, 196.

⁸⁷ Abraham H. Maslow, *The farther reaches of human nature* [1971], Part 7 (New York: Penguin Books, 1976)

'shanty-man', operating as a cantor or precentor, was, by some, said to have the same worth as 'ten men by the rope'.⁸⁸

The question whether such aesthetic motivation is hardwired and 'instinctual' is something we will come back to below. Especially the midline structures of the frontal cortex have often been connected with various forms of higher level motivation. Whereas the underside walls of the frontal cortex, the so called 'orbitofrontal cortex', has been found to be dealing with *outcomes* and *conditioning* - like in monetary rewards and the valuation and 'somatic marking' of different types of moral or immoral behaviour,⁸⁹ the walls between the right and left hemispheres may be monitoring the temporal meandering of *mood* and *effort*. At least this is a reasonable supposition in as far as these *medial* regions are functionally differentiated from the behaviourally articulated aspects of emotion in the lateral prefrontal cortex.

In a lesion study by Hornak and Rolls, focussing on the orbitofrontal and ventromedial regions of the prefrontal cortex, they are especially pointing to a region stretching from the so called 'affective' anterior cingulate cortex (BA 32) to Brodmann area 9 as central both to vocal and facial expression.⁹⁰ Even in cases of unilateral lesions here, there were deficits in the identification of voice expression; that is to say: the subjects were less likely to notice when the vocalisations were sad, angry, or disgusted. As Edmund Rolls has formulated it: the vocal and facial expressions may be acting here as 'primary reinforcers'.⁹¹ Similarly, Fannin and Braud's study of the perception of dissonance and consonance by albino rats is concluding that the 'degree of consonance should be added to the list of variables determining the reinforcing value of stimuli with sensory reinforcing properties'.⁹²

Richard E. Passingham and Steven P. Wise even go as far as to suggest that the medial prefrontal cortex is 'internally prompted', while the orbitofrontal cortex is 'externally

⁸⁸ Haakon Vatle: 'Sjømannsangar og Segelskute-historikk', Master thesis, University of South-Eastern Norway. 2005.

⁸⁹ Andrew Pears et al., 'Lesions of the orbitofrontal but not the medial prefrontal cortex disrupt conditioned reinforcement in primates', *The Journal of Neuroscience: the official journal of the Society for Neuroscience*, 23(35) (3 December 2003): 11189-111201, <https://doi.org/10.1523/JNEUROSCI.23-35-11189.2003>.

See also: Rudolf N. Cardinal et al., 'Emotion and motivation: the role of the amygdala, ventral striatum, and prefrontal cortex,' *Neuroscience and Biobehavioral Reviews*, 26 (2002): 340.

⁹⁰ J.Hornak et al., 'Changes in emotion after circumscribed surgical lesions of the orbitofrontal and cingulate cortices'. *Brain*, Volume 126, Issue 7 (1 July 2003): 1699, <https://doi.org/10.1093/brain/awg168>.

⁹¹ Edmund T. Rolls: *The Orbitofrontal Cortex* (New York: Oxford University Press, 2019), 142.

⁹² Henry A. Fannin, W. F. Braud, 'Preference for Consonant over Dissonant Tones in the Albino Rat,' *Perceptual and Motor Skills*, 32 (1) (1 February 1971): 191-193. <https://doi.org/10.2466/pms.1971.32.1.191>.

prompted'.⁹³ It is a circumstance that seems to confirm the curious phenomenon that our own vocalisations are perceived as being relatively softer than the sounds impinging from the outside world. To create this effect, the auditory cortex must know what it self-generated, and according to research by Nadia Müller (2014), the 'MPFC prepares auditory cortex for self-generated sounds via alpha power modulations'.

It is precisely this 'freedom' of self-generated feeling that makes melody so central to the self. It is the strength of such feeling that it can participate not only in the continuous *self-production* of the self, but even in the *self-stimulation* and *self-motivation* of people. In contrast to over-eating or drinking, such self-stimulation is not even harmful. Certainly our voices may be prompting in a *threatening* manner as well, but the sensations of tone have also opened up for a field of *encouragement*. Especially its role in different rituals, producing *ecstasy* and strengthening religious *conviction*, has been crucial. Related to this are more mundane examples of motivation like *cheering* and *clapping*. No less important is its ability provide *solace* in cases of sorrow and despair, or *entertainment* in the case of boredom. Also, its ability to strengthen our sense of national *unity* and *communion* in cases of catastrophic events or disasters should not be underestimated. In Alzheimer patients, whose medial pre-supplementary frontal cortex is largely intact, there is nothing that vitalises their personality and social connectedness more than hearing their favourite music. Central aspects of their humanity and memory, which otherwise seems to be lost, is brought to life then. This we will come back to in Chapter 12.2.

According to William James, however, this 'pleasure principle' of motivation, though necessary, is not sufficient to explain motivated behaviour. There also have to be some kind of instinctual or external components in these processes, something which makes us aware of these pleasures in the first place. 'When a particular movement, having once occurred in a random, reflex, or involuntary way, has left an image of itself in the memory,' says James, 'then the movement can be desired again, proposed as an end, and deliberately willed. But it is impossible to see how it could be willed before.'⁹⁴

It is a recognition that might have to be restated in an even more radical manner. First of all: it is a precondition for such desire that the sensations can be felt; and as far as the sensations are

⁹³ Richard E. Passingham and Steven P. Wise, 'The neurobiology of the prefrontal cortex; Anatomy, Evolution, and the Origin of Insight' (Oxford: Oxford University Press, 2012), 97.

⁹⁴ James, *The Principles of Psychology*, Vol 2, Chapter 26, 487.

differentiated by valence and intensity, they are already integrated parts of our motivational economy. There is little reason why the organism should endow them with such valence if their pleasurable or un-pleasurable aspects were not motivating our behaviour. There are studies indicating that deaf children are babbling less, since they get no feedback from their own babbling. In fact, it is integrated already in the brain stem 'reticular activating system', of which Damasio and others are focussing, that animals produce and react to pleasurable sounds. A bitch may be trembling with pleasure when hearing the squeak of a plastic toy. The mere sound of it evokes all her motherly instincts; yet this would not happen if she could not hear it.

Even what James is talking about as 'deliberate' recall or willing involves components that are more 'organismic' than we tend to think. As earlier mentioned, it is difficult to imagine how the mind could be conjuring ideas and even pleasurable memories out of nothing. Some of these experiences, like purring or laughter may be evoked by brain stem *reflexes*, in alliance with hormones like oxytocin, the so called 'love-hormone'. Other vocal inclinations are conditioned, like the *action tendencies* governed by the amygdala, also triggering cascades of visceral feeling that are so difficult to control that they often seem external to our selves. Higher up in the system is the 'deliberate willing' that James is talking about; but even the elements of articulated vocalisation might have to be regurgitated by frontostriatal circuits, and reinforced by different hormones: dopaminergic, serotonergic, noradrenergic, or cholinergic.⁹⁵

Once installed, however, the voices of our selves and others seem to be swirling around in our minds as thoughts, memory fragments, intuitions, and ideas. If paying attention to what is going on, we can hear the melodies and tones of our inner voices, sometimes soothing and sighing, other times commanding, questioning, or crying. Especially the sounds that are almost impossible to get out of our minds, like tinnitus, vocal hallucinations, and musical 'brain-worms', have been the subject of much popular attention. In other cases, when the brain is functioning properly, the melodies and songs may often go under the radar. But one should not underestimate the fact that they are often infusing into the core dynamic of our selves a concrete source both of inspiration and pleasure.

One must not forget that in normal cases, this automatically generated dynamic is susceptible of conscious control and inhibition by various executive areas, of which the ACC, the pre SMA,

⁹⁵ Chandana Buddhala et al., 'Dopaminergic, serotonergic, and noradrenergic deficits in Parkinson disease', *Annals of Clinical and Translational Neurology*, 2(10) (September 2015):949-59, <https://doi.org/10.1002/acn3.246>.

and the vocal regions of these areas, have already been mentioned. There would be no reason to feel it if we had no choice at all. The faculties of articulate volition and conscious choosing may be much more vulnerable and dependent on unconscious processes than we think; but at least it puts the vocal and melodic sensations on a par with kinaesthetic and other sensations in the narrative of the core self.

Even the threatening or questioning voices of other people, or the thought of our own mistakes and wrong-doings, might be seen to swirl around in our heads on a relatively independent basis. When the basal ganglia, the amygdala, and the hippocampus are exposed to emotionally salient experiences they seem to regurgitate them to remind us to deal with it, which is often beneficial. In other cases, like the post-traumatic syndrome, it is totally devastating.

These are the 'negative' or *unpleasant* aspects of motivation, and even the urges for pleasurable feelings might be seen to require it. It is somehow implicit in concepts like *willing*, *desiring*, and *craving* for more, that a certain *frustration* and *effort* must also be felt. Even in harmonious and rhythmically regular music there is a considerable amount of conflict that has to be introduced for the experience of *release* to come across. Conversely, the experience of unpleasure is often implying a positive component: the idea of escape, harmony, safety, or other kinds of release. Like in the case of time perception, or integrated perception in general, we seem to be confronted by a paradoxical interpenetration of opposites here; which is confirming the relevance of a dialectical outlook.

In both cases there is also a certain 'freedom' involved, which is implying that the brain is engaged in the evaluation and choice between of different rewards and conflicts and the level of *effort* that has also to be invested. This is precisely the function that is usually ascribed to the anterior cingulate cortex. In an article by Fei Wang and colleagues, the dorsal anterior cingulate cortex is even identified with 'dialectical self-thinking'.⁹⁶

An overly simplistic model, which was favoured by the 20th century behaviourists, is that of external stimuli triggering a response, quasi-mechanically driving the individual from moment to moment as it were. And sure enough, even auditory motivation is often quite immediate. When someone is disturbing us, startling us, or yelling and screaming, or when something is exploding

⁹⁶ Fei Wang et al., 'The Dorsal Anterior cingulate Cortex Modulates Dialectical Self-Thinking', *Frontiers in Psychology* (11 February 2016): <https://doi.org/10.3389/fpsyg.2016.00152>.

or cracking, our reactions are often prompt, and sometimes automatic. In proprioceptive and vestibular sensation the tensions and problems are even inflicted on us by the friction of the surroundings, and the constant gravity and resistance of our body; which may provide a more constant factor in our lives than sound. The importance of feeling this friction to our self-consciousness and vice versa was described already by John Locke,⁹⁷ and if not exactly *governing* our behaviour, it is enforcing a much more continuous sense of volition than do the noises of our surroundings, the scraping or cracking of objects which are also involved in this interaction. As far as a solitary and basic existence is concerned, at least, the role of sound as a medium for ego-dynamics is probably less important than the proprioceptive sensations.

It is just that animals and humans are not solitary beings. On the contrary, the type of selfhood observable in humans and other mammals is arising first in dialogue with other selves, which is also why faculties like gesture, facial expression, and vocalisation have become so integrated in these processes. Vocal perception is not only concerned with the monitoring of other people, it is also monitoring the interaction, and the role of our selves in this interaction, which is where the self grows. By the same mechanisms that it monitors others, it also monitors itself. The so called 'mirror neurones' in the pre-motor areas of the brain are active both when comprehending our own activity and that of others,⁹⁸ and it is not so strange that the dialogues are internalised as inner voices and dialogues even when we are alone. The advantage of tone in this connection is not only the fact that it is explicit and liberated from visual attention; it also has some dynamic characteristics and potentials, which, owing to its tonal character, are both continuous and very rich.

Even animals are speaking to themselves, so to speak. Even when alone, animals may grunt and growl. When left alone, a dog may cry for hours. The implicit harmony of tone is constantly negated by the gliding pitch, and much of the tension may be deriving from this negation. At the same time there is a lot of dissonance and harshness in the timbral qualities and the trembling of its voice. It is often *loud* too, presumably even to the dog itself; all of which might be the reason why it has such a strong presence in the ACC.

⁹⁷ John Locke, *An Essay Concerning Human Understanding* [1689], ed. Roger Woolhouse (London: Penguin Books, 2004), 276.

⁹⁸ Michael A. Arbib and Mihail Bota, '5 - Neural homologies and the grounding of neurolinguistics', in *From Action to Language via the Mirror Neuron System*, ed. Michael A. Arbib (New York: Cambridge University Press, 2006), 156 and 162.

All this *voluntary* tension and effort at the core of the self may seem like a problem from the point of view of behaviourists, but it is a feature even of relatively simple behaviour - like jumping over branches and stretching for a fruit - that we have to fight some obstacles before the goal is reached. When the reward is smelled, or within sight, it is possible to understand how this effort may be overpowered and energised by the thought of the reward. Even in some examples of musically harmonious activity, like cat purring, rhythmical rocking, or other self-stimulation, the pleasurable sensations may not require more than the slight effort of prolonging a movement that is already started.

In other cases the rewards are more indirect. In speech and harmonically dialectical music, the moments of release are postponed by complex rhetorical processes; which may be the reason why human song and vocalisation is located more to the pre-SMA than to the ACC right below it.⁹⁹ But even here the craving of rewards may be kept resounding in the mind. It just takes more mental resources to juggle it with alternative options and rewards.

Listening to a symphony or reading a book often involves long periods of boredom before the effort pays off; but when it pays off, the rewards may be higher. Such pleasures may seem detached from fundamental needs, but it would not be entirely correct to say that they are less 'physical' or 'psychodynamic'. On the contrary, if the pleasures are stronger, and if it takes more brain power to experience them, more nervous tissue, more energy, more integrated circuitry and entanglement, they might even be *more* physical. Even the benefits for the individual and the species are large, as mistakes and death could be avoided by anticipating failures, learning from history, and from the morals and ideals of stories and other artwork.

Yet even in humans there are individual differences. Some people are spontaneous and dogmatic, while others are prone to doubt and questioning, tending to postpone the release for the sake of maximising reward; which is just one way of formulating it. In experiments arranged by Svenja Caspers and colleagues, people with individualistic or 'egocentric' moral attitudes employed a simpler decision strategy, involving only the left amygdala and the 'flight and flight' response, while more 'collectivistic' people applied a 'balancing and weighing strategy', recruiting brain regions of rostral inferior and intraparietal, and midcingulate and frontal

⁹⁹ Uwe Jürgens, 'Neural pathways underlying vocal control,' *Neuroscience & Biobehavioral Reviews*, Volume 26, Issue 2 (March 2002): 235-258.

cortex.¹⁰⁰ As we will come back to in connection with the frontopolar cortex, the 'cognitive styles' of different people may also be influenced by the amount of dopamine supplied to the cingulate and frontopolar cortices. The size and capacity of areas like the amygdala, the cingulate cortex, the basal ganglia, and the ability of the fronto-striatal circuit to select the most relevant ideas and intuitions may also vary. Many creative people have used drugs to try regulate the energy and suffering that is also involved in learning and creative work.

This emphasis on creativity, patience, and doubt is not necessarily in tune with more conventional models of intelligence, focussing on agility and visuospatial imagination. Given the automatic generation of the 'readiness potential' it is hard to understand how it is even possible to create something new. The element of randomness in these circuits may not be sufficient. A certain hesitancy and fright of error may be necessary to inhibit the easiest solutions, but it does not answer the question how new ideas are generated. If they are not already programmed into the brain, it would not help to bang ones head into the wall to get them out. So how does it happen?

Even here the answer may come from music. The enrichment of this field has been tremendous during the previous centuries, not only with respect to its results, but also the methods of reaching them. Especially improvising jazz musicians are constantly concerned with the business of programming new motor schemes into their own brains; and it is a widespread notion that one should not be shy to absorb and incorporate as much as possible of what other musicians are doing. Not only is this requiring a certain access to the milieus and recordings where new music is performed, it is a laborious and painful process, involving extensive listening, transcription, imitation, and the practicing of bits and pieces. It is much more tempting to repeat and enjoy the patterns one have already learned; and it is only those musicians that are willing to expose themselves to pain and chaos during years of practicing that evolve to be innovative musicians. A secret, successfully employed by the Japanese after the second world war, is to reduce the pain by taking *many small steps*.

After a while the new motor patterns will be part of us, and we can start to draw on them in our own improvisations. The pioneering jazz saxophonist Eric Dolphy might have sounded outlandish to many people, yet he had just performed and internalised all the avant-garde

¹⁰⁰ Svenja Caspers et al, 'Moral Concepts Set Decision Strategies to Abstract Values', PLoS ONE, 6(4): e18451 (April 2011): <https://doi.org/10.1371/journal.pone.0018451>.

composers, from Claude Debussy to Edgard Varese. Claude Debussy on his part, got much of his inspiration from exotic influences like Edvard Grieg and Indonesian Gamelan music. Other composers and musicians, like Oliver Messiaen and John Coltrane, were drawing extensively on bird song.

But not all people are satisfied with copying others, merely prolonging existence as it is. There is also an existential quest to 'make a difference', to seek to make an original imprint on the world; to be more than a mere copy or mechanical prolongation of what has been. But it is difficult to understand how it might come about. Certainly the individual characteristics of our bodies and brains would always put a certain 'personal' stamp on what we do. But our styles and tones of voice are usually copied from other people - especially our parents.

Yet it might be possible to circumvent these limitations. Some methods have been crystallised out in the practice both of classical composers and jazz musicians. The secret is very much concerned with systematic technical experimentation, often involving elements of chance and so called 'aleatoric' techniques. By systematically breaking the rules or exploring theories of how music might function - stacking intervals or superimposing scales and chords in various ways - new effects could be discovered by listening to the feedback from ones own playing. Then, when the feeling tone of the newly experienced combinations are thoroughly familiarised, the musician can start to integrate these feelings as elements in rhetorical and dramaturgical processes, gradually building a new vocabulary of ego-dynamic functions. Finally, after a long process of habituation and experimentation, a certain rhetorical context might automatically call to mind what has earlier been perceived as relevant or attractive ideas of continuation, and it is these ideas that are activated or inhibited during improvisation.

All the technical considerations must be forgotten then. Our attention is limited, and it should not get in the way of coherent emotional expression. One study of the improvisation of professional musicians has revealed that the *frontopolar cortex* is dominant then; while the rest of the frontal cortex is silenced¹⁰¹. Still it is not entirely clear what is measured here, since even jazz improvisations are sometimes lacking in soul and coherence. It is only the best musicians who are able to realise the full potential of their art. Some musicians, like the jazz trumpeter Chet Baker, are operating entirely on the basis of the feeling tones. They do not know what the

¹⁰¹ Charles J. Limb and Allan R. Braun, 'Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation', *PLoS One*, Vol. 3, Issue 2 (27 February 2008), <https://doi.org/10.1371/journal.pone.0001679>.

scales are called, or the fact that they are playing a minor ninth or a tritone; which, at least is securing an emotional focus, and a potential for public appeal and captivation. The rhetorical and technical aspects of musical organisation are figured out by the subconscious parts of their brains, much like the acquisition of grammar by children. According to Kenji Doya and others, even the *cerebellum* might play a role here; at least it is involved in the fine tuning of movements; but the precise division of labour between the basal ganglia, the cerebellum, the thalamus, and the frontal cortex is not entirely clarified.¹⁰²

The relevance of free experimentation, theoretical exploration, and even play, may not be obvious to all, but it has dramatically expanded the structure of the self. Even the expansion of general consciousness and knowledge depends on it to a large extent. The openness to outlandish theories and fresh ideas may be less prevalent in academia, which is often governed by a different kind of totalitarian power structures. And many people, most notably Thomas Kuhn, have pointed to the repression of alternative voices in academia and the academic press as a serious impediment to scientific development.¹⁰³

Creative thinking may be motivated by the mentioned benefits to understanding and music making, but also by a disgust of error, or the hate of stubborn and destructive regimes. Other times, when this hate is not so strong, it might be necessary to try to induce oneself with conflict to get the thinking process going. It is a phenomenon that is not much researched,¹⁰⁴ but a possible way of going about is to utilise the energy one might get from more mundane problems and pains. Typically, it is easier to do something hard, when it is experienced as an escape from something even harder. When the goal is also more sublime or fulfilling at a deeper level, it might be possible to convert, in a manner of Freudian psychotherapy, the energy and restlessness of basic urges into more constructive endeavours.

The attempt to build a new understanding on independent and purely scientific grounds is a complex and painful endeavour, which is often in conflict with established norms, the demands of carrier building, and even family life in many cases. According to Hegel, the earmark of

¹⁰² Kenji Doya, 'Complementary roles of basal ganglia and cerebellum in learning and motor control', *Current Opinion in Neurobiology*, 10(6) (December 2000): 732-739, [https://doi.org/10.1016/s0959-4388\(00\)00153-7](https://doi.org/10.1016/s0959-4388(00)00153-7).

¹⁰³ Thomas Kuhn, *The Structure of Scientific Revolutions* [1962] (Chicago and London: University of Chicago Press, 1970).

¹⁰⁴ See for instance Arthur G. Bills & James C. Stauffacher, 'The Influence of Voluntarily Induced Tension on Problem Solving', *The Journal of Psychology*, Vol. 4, Issue 2 (1937): 261, <https://doi.org/10.1080/00223980.1937.9917536>.

science is that it is *systematic*;¹⁰⁵ and it is a fact - which dogmatically upheld research does not have to deal with - that for a definition to be *ontologically definite*, it has to be differentiated from all bordering realms to prevent it from collapsing into or being confused with these realms. Especially when going against the grain, such thoroughness and solidity may be necessary to withstand critique and social pressure. At the same time this systematic attitude is not in tune neither with postmodern scepticism nor reductionist ideas of specialisation, which is very much a catch-22 situation today.

Regardless of the quality of their products, it is a sad fact that for most scholars and artists, the chances of getting any widespread recognition or success are faint. Some people might seek comfort in half religious hopes of a better fortune in parallel universes, or the concept of ideas leaking into the community by 'morphic resonance', which is how Rupert Sheldrake sees it. But the realism of such theories is dubious to say the least. So how it is possible to motivate oneself in such a world.

A major reason not to give up may be that the alternative to intellectual and creative activity, the experience of *inactivity* and *boredom*, is worse. Our brains are built for a certain level of complexity, curiosity, and intellectual challenge, and to satisfy it and maintain it, it has to be used. Like the rest of the body, it deteriorates when inactive. First when using our mental capacities in an optimal manner the sense of 'flow' is occurring, which is about as happy it is possible to get. To some people such self-realisation may be more satisfying than conventional chores, like the upbringing of children.

This is called 'intrinsic motivation', and it is not always so tense. It is a dialectic, which is also involving moments of insight, excitement, and aesthetic pleasure. Trowing harmony and social music making into this economy might be what balances the stimulating challenges with pure enjoyment. Indeed, the pleasures of listening to music and socialising may be the most important means for modern humans to regulate their emotional and motivational economy, even in the absence of family and career. Even Albert Einstein, who was a superstar with mistresses and a struggling ex wife with children, might have sought a safe haven in the string quartet. It is clearly visible in photographs of his post mortem brain, that in addition to some atypical extra

¹⁰⁵ Hegel, G. W. F. *Hegel's Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences* [1830]. translated by. William Wallace (Oxford: Clarendon Press, 1975), §14 and §15.

gyri in the right inferior and dorsolateral prefrontal cortex, the parts of his right hemisphere motor cortex dealing with left hand fingering had a big and unusual 'knob', all of which is confirming his obsession with music and thinking and the large amounts of time practicing his violin.¹⁰⁶

The experience of music might not be the first priority of the organism, yet it might have become so important by now, that if deprived of it for longer periods of time, the brain sometimes starts to produce it on its own. At least Oliver Sacks is talking of the generation of *musical hallucinations* in such cases.¹⁰⁷ Perhaps one might even speak of a hunger for sound - 'a hunger of the ear', to paraphrase the artist Avigdor Arikha¹⁰⁸ - at least the general concepts of boredom, under-stimulation, and self-stimulation do also apply to the absence of sound and music.

A related circumstance, which may also explain the voluntary introduction of tension and dissonance in melody, is the fact that dissonance is not always unpleasant. 'Man sollen die Dissonansen *geniessen*' - the dissonances should be *enjoyed*. The emphatic proclamation of the American-German big band composer Ed Partyka at a concert in Berlin some decades ago is difficult to forget. It is also in tune with current research on these matters, indicating that the brain is really tuned to a certain level of stimulation, challenge, and complexity. The idea of an 'optimal level of arousal' was developed already in Donald Hebb's classical article on drives from 1955, and is confirmed especially by the popular concepts of 'sensation seeking' and 'flow', of which the latter concept is defined not as a maximal level of harmony, but a heightened level both of challenge and ability.¹⁰⁹ 'This taste for excitement *must* not be forgotten when we are dealing with human motivation', said Donald Hebb, 'it appears that, up to a certain point, threat and puzzle have positive motivating value, beyond that point negative value.'¹¹⁰

¹⁰⁶ Dean Falk, Frederick E. Lepore, and Andrienne Noe, 'The cerebral cortex of Albert Einstein: a description and preliminary analysis of unpublished photographs', *Brain*, Vol. 136, Issue 4 (April 2013): Figures 2 and 10, 1304-1327, <https://doi.org/10.1093/brain/aws295>.

¹⁰⁷ Oliver Sacks gives many examples of such cases in a separate chapter on musical hallucinations in *Musicophilia*, 49-86.

¹⁰⁸ Samuel Beckett et al: *Arikha* (Paris and New York: Thames and Hudson, 1978)

¹⁰⁹ Mihál Csikszentmihályi, *Creativity: Flow and the Psychology of Discovery and Invention* (New York: Harper Perennial, 1996)

¹¹⁰ Donald Olding Hebb, 'Drives and the C.N.S. (Conceptual Nervous System)', *The Psychological Review*, Vol. 62, No. 4 (July 1955): 250.

Like in the case of decision making and planning, the individual experience of what is 'exciting' would vary somewhat with regard to conflict level and complexity. To some people, pop music is all too simple. To other people, classical music, and especially some 'modernist' experiments, may be much too painful, complex, or chaotic. It is interesting, from a psychological point of view, to observe how popular music, like the so called 'jazz standards', are balancing and calibrating the levels of conflict, pleasure, and complexity. Something like pure joy would be all too boring and empty, it seems. Rather, these songs might be seen to constitute a catalogue, or even phenomenology, of misfortune and trouble. Like in blues or country music, even the most popular tunes, like 'All the things you are', 'All of me', 'Body and soul', 'Summertime', and 'Autumn leaves', are dealing with unrequited love, loss, and death on the horizon. Yet the simple, repetitive forms, the cadential sequences, and the swinging rhythm, is making it into an experience which is both soothing and profound.

During improvisation, especially after the style of 'bebop' had entered the scene, the very same songs and melodies might be paraphrased in a manner that is bringing much more of the misfortune to the foreground: so called 'blue notes', dissonant suspensions, and other chromaticism. Sometimes the improvisations would even constitute a dimension of atonality or 'musical prose', commonly referred to as 'playing outside' the tonality; which is apparently too complex or tense to serve as dance music or popular music; but even here the dissonances would be mediated by the regular rhythms, and by a greater amount of vitality in the form of faster tempi, virtuosity, pleasurable stimulation and surprise.

This interpenetration and careful calibration of harmony and conflict is observable in other fields as well; in fact, it is very much what life is all about. When doing sport, playing games, when experiencing a film, a novel, or other kinds of fiction, the immediate utility of our actions seems less relevant than the amount of stimulation experienced. We might not notice it, but such dramas or games are constituting modalities of being which are often closer to what is commonly referred to as music. Even if it is not taking place in the medium of sound, it is often more harmonious than ordinary activities and events. Even in novels and prose writing, the rhythms are more regular and harmonious than ordinary speech melody; and this is a circumstance that is also reflected in theatrical declamation and the sing song intonation of story-telling. Even in documentaries and so called 'reality-TV' this is the case; they are usually modified in a harmonious direction by the soundtracks. In other cases, the sense of suspense and

drama may be deriving almost entirely from the music. According to Arthur Schopenhauer, the contemplation of fiction and art is providing an almost nirvana-like existence, somehow liberated from the real perils and pains of our lives,¹¹¹ which is obviously a tremendous achievement on the part of our species.

As we will come back to in the next chapter, the reductionist point of view is very much the opposite: considering cultural products as purposeless and lacking in survival value. Yet it is hardly correct. Apart from the contributions of sound and melody to communication and the sense of agency and character in social and intellectual processes, the survival value of the harmonious modalities of this dynamic has already been exemplified. The strengthening of motivation, communion, religious belief, and sexual appeal; the coordination of labour, pleasurable restitution, consolation, and the calming of infants; these are just some of its functions.

Also what should not be forgotten is its 'therapeutic' role, which is stretching far beyond the clinical sense of this word. Certainly music therapy is a clinical discipline by now. And its therapeutic role was no less central to shamanic practice and rituals. Even composers like Beethoven were sometimes receiving patients. Reportedly, he was able, through his improvisations on the hammerklavier, to treat the problems of people in trouble, confronting and overpowering the trauma, making it possible to leave them behind, and open up for reconciliation and new hope.¹¹²

Yet this is what Beethoven was always doing. His symphonies and sonatas were battling with existential problems. The mentioned concern with distress in classical sonatas and jazz standards is common to all music and art. At the same time as the music is providing cathartic outlet, consolation and inspiration, it has also a reflexive function. It is normalising and reducing the problems by putting them into a larger perspective; by exemplifying strategies of dealing with conflict, evoking fighting spirit and unity, instilling fortitude and forbearance. As we will come back to in connection with Aristotle, the ancient Greeks put great emphasis on the 'ethos' of different scales and rhythms, especially with regard to the the moral upbringing of young people;

¹¹¹ Schopenhauer, *Die welt als Wille und Vorstellung*. Erster Teilband, §38: 252-253 and §52: 335.

¹¹² Maynard Solomon, *Late Beethoven: Music, Thought, Imagination* (London: University of California Press, 2003), 229-241.

and it is a phenomenon that has taken a new, but just as strong meaning now, with modern youth cultures developing new and much more self-defined ways of being.

It is more likely than not that these are characteristics and even preconditions for human existence as we know it; and it is only human beings that are operating with ideas of 'value' and 'purposefulness'. Nature may not have any ultimate 'purpose' or solution. It seems to pulsate between absolute nothingness and absolute being without ever reaching it; because these are *infinities*, and the only alternative is to exist somewhere between them. Even life may be such a dialectic. Most animals, and many humans as well, do not care much about the purposefulness of what they are doing, as long as the activity is fun and suitably challenging. At least when our fundamental urges are taken care of, our lives are not constructed according to necessities, but individual preferences with regard to intensity and challenge. People who are prone to big investments and risks may experience big ups and downs. Other people prefer a more easy-going life. It is a dialectic which is involving as a central feature what Wundt has described as 'the law of intensification by contrast';¹¹³ but it has no clear goal or solution.

From the individual point of view it is obviously a goal to live on, if not eternally. At least we are putting a value on our own lives. Many people have great fun killing animals, and would not shrink from killing people either, as long as it does not harm themselves. Other people are arguing that animals coming close to our selves in terms of intelligence and emotion should have the right to better treatment; but even with regard to such animals it is a general opinion that it is better for the animal to be killed than to be in pain. Luckily, it is a logic that is not yet applied to people, although there are many people who kill themselves for such reasons. So the *content* of life, in terms of consciousness, feeling, and pain *does* matter. On an overcrowded planet, it may be the only thing that matters in many cases. It is a common saying that we need 'something to live for'. An empty and laborious life, bereft of social interaction and other pleasurable stimulation may not be liveable. Besides love and play, the experience of harmonious music is probably the most universal and basic of these, and it is unquestionably a place where some of our deepest and most pleasurable feelings are created.

¹¹³ Wundt, *Outlines of Psychology*, §23: 324-325, or *Grundzüge der Physiologischen Psychologie*, Kapitel 19, 762-764.

1.4 The harmonious modes of being

1.4.1 Sacks versus Patel on the evolution of music

In a wide sense of the word, including animal vocalisation and prosody, there is no doubt that music, and the vocal and auditory apparatuses that subserve it, are integrated parts both of our emotional, cognitive, and communicative faculties, facilitating social interaction and bonding between individuals. When it comes to *human song and dance*, which is instantiating a much narrower definition of this concept, its adaptive value may not be so clear to all. The idea of what is natural and necessary is often limited to animal needs and instincts, and although human ceremonies and rituals are mentally much more demanding than animal interaction, a common argument has been that the harmonious modes of being, which are often at the core of such rituals, are mere byproducts of our general neurological make-up, with little or no biological justification of their own. Even William James was initially voicing such a view.¹¹⁴ In Oliver Sacks' opinion this might not be the situation at all. On the contrary, he argues, there are many indications that music, even in this narrower sense of the word, really *does* have its own neural correlates - a 'music instinct', as he calls it - and that our propensity for singing and dancing is much more ingrained in us than often believed.¹¹⁵

It has to be added that such physiological correlates are not necessarily *essential* to the independent status and reality of these activities. Even as side-products of the primeval functions of melody and vocalisation discussed above they might have gained a role which is important enough. As far as universality and freedom is concerned, such an independence might even be an advantage. Like the golden ratio, symmetry, or the perception of unique and variable sensory combinations in general, the qualitative identity of harmony is not exactly strengthened by considering it something species relative. Harmony is already incorporated into voice and tone as an experience of something restful and 'centred'. Or to be more precise: the experience of tone is self-identical with these qualia; so it is not obvious that something more is required to enjoy harmonious music. The feeling of harmony is deriving from the periodicity of acoustic vibration, which is constituting the essence of what we call 'tonality', and as we will come back to in the next section, a study by GERALYN M. SCHULZ and colleagues is evidencing that the experience of

¹¹⁴ James, *The Principles of Psychology*, Chapter 25, 484.

¹¹⁵ Sacks, *Musicophilia*, x-xi.

voiced speech has a much greater impact than whispered speech, both on cortical and subcortical brain regions dealing with emotional behaviour.¹¹⁶

The specifically musical tradition of *celebrating* this tonality and harmony might be connected rather with a heightened capacity for *reflection* and *discourse* which is not developed in most animals. Certainly the element of harmony is there, already in a cat's purr, it is just the melodic reflections that are missing. At the same time, it is not unlikely that the human fondness for entertainment, harmonious communion, and emotional self-regulation has contributed to a further development and specialisation of the brain regions and circuits dealing with these types of sounds; and that harmonious behaviour, in its turn, has also contributed to the development of our social and intellectual faculties in various ways.

What is especially speaking for the existence of a neural correlate for harmonious and rhythmical behaviour, Sacks argues, is not only the fact that many animals seem to be unable to perform it, at least not collectively, but just as much the vast amount of evidence emerging now from the study of various kinds of 'amusia', 'arythmia', 'dystimbria', 'dysharmonia', and musical 'anhedonia' in humans.¹¹⁷ Since these conditions are often detrimental to the perception of harmonious music, while sparing in many cases our normal capacity for orientation, speech, and even ordinary intonation, it seems unreasonable to conclude that our propensity for harmony and rhythmical regularity is merely a by-product of these capacities. A more likely hypothesis seems to be that the experience of song and rhythmical regularity has been so beneficial to us that this has triggered the evolution of a heightened ability to perform it and enjoy it, engaging also some secondary neural circuits which might even be specialised for the emotional reinforcement of such enjoyment.¹¹⁸

Here Sacks is leaning on the research of Isabelle Peretz and colleagues, who are especially pointing to the loss of the capacity for 'fine-grained pitch discrimination' as an essential defective component in amusia, as well as 'an essential component around which the musical system

¹¹⁶ G. M. Schulz et al., 'Functional Neuroanatomy of Human Vocalization: An H215O PET study', *Cerebral Cortex*, Volume 15, Issue 12 (December 2005): 1835-1847, <https://doi.org/10.1093/cercor/bhi061>.

¹¹⁷ Sacks, in *Musicophilia*, 240, is pointing to a study by Aniruddh Patel and John R. Iversen, indicating that even if elephants could be trained to 'play a percussion instrument with a highly stable tempo', a group of elephants is not able to do it in synchrony with each other. 'A non-human animal can drum a steady beat on a musical instrument', in *Proceedings of the 9th International Conference on Music Perception and Cognition*, ed. M. Baroni et al. (January 2006)

¹¹⁸ Sacks, *Musicophilia*, 290.

develops in a normal brain'.¹¹⁹ Similar song-specific correlates in the temporal cortex have later been described by Adam Tierney and colleagues.¹²⁰ While the ability to distinguish between small intervals is obviously crucial to the experience both of tonal relations, retentions, and advanced interval perception, it does not seem to be necessary for the performance of normal intonation, which does not require such exact intervals; and it might be this lower demand for tonal precision which is the reason why normal intonation is often spared in such cases. According to Oliver Sacks, at least, this was the case in people with first generation cochlear implants, which were limiting the frequency resolution to an extent which made the perception of tonal music virtually impossible, while it was seemingly sufficient for the perception of ordinary intonation.¹²¹

According to Aniruddh Patel, the retainment of linguistic intonation in cases of amusia might be explained rather by the accompaniment of words and sentence structure in speech, assisting an ability to activate some linguistic aspects of intonation and emphasis.¹²² Yet this may not be sufficient to explain the retainment of more subtle aspects of speech melody that are described by Sacks; and even Patel admits that 'music places much more stringent demands of pitch perception than does any other domain.'¹²³

The picture is further complicated by the fact that in some cases of amusia the factor of 'distorted pitch perception' or 'dystimbria' might also be involved, as well as the above mentioned possibility that the synthesising of tonal melody might require something more, or something else of the brain than other intonation. The dialectical reflections that are so typical of musical cadences are obviously more demanding than the immediate negation of tonal stasis in animal vocalisation, merely gliding from tone to tone. In fact, the type of lesions that are most

¹¹⁹ Isabelle Peretz, 'Brain Specialization for Music: New Evidence from Congenital Amusia', in *The Cognitive Neuroscience of Music*, ed. I. Peretz and R. Zatorre (2003), 198, <https://doi.org/10.1093/acprof:oso/9780198525202.003.0013>

See also Isabelle Peretz et al., 'Congenital Amusia: A Disorder of Fine-Grained Pitch Discrimination'. *Neuron*, Vol. 33, Issue 2 (17 January 2002): 185-191, [https://doi.org/10.1016/S0896-6273\(01\)00580-3](https://doi.org/10.1016/S0896-6273(01)00580-3).

¹²⁰ Adam Tierney, Fred Dick, Diana Deutsch, 'Speech versus Song: Multiple Pitch-Sensitive Areas Revealed by a Naturally Occurring Musical Illusion', *Cerebral Cortex*, Vol 23, Issue 2 (February 2012)

¹¹³ Sacks, *Musicophilia*, 54, 55, 106.

¹²² Aniruddh D. Patel, Jessica M. Foxton, and Timothy D. Griffiths, 'Musically tone-deaf individuals have difficulty discriminating intonation contours extracted from speech'. *Brain and Cognition*, Vol 59, Issue 3 (December 2005): 310-313, <https://doi.org/10.1016/j.bandc.2004.10.003>.

See also Aniruddh D. Patel, *Music, Language, and the Brain*, pp. 233-238.

¹²³ Aniruddh D. Patel, *Music, Language, and the Brain* (New York: Oxford University Press, 2008), 358.

commonly associated with amusia have been found to be harming areas in the right hemisphere inferior frontal gyrus; areas which have been connected both with action planning and the so called mirror neurone system.¹²⁴ When the pars opercularis (BA 44/45) or its pathways to the auditory cortex are damaged, the capacity to understand music is also dwindling.¹²⁵

This is precisely what Oliver Sacks is referring to as 'tune deafness'; which should not be confused with 'tone deafness' as described by Isabelle Peretz. Perhaps his alternative concept of 'amelodia' is more univocal.¹²⁶ There is no doubt that the perception of melodies, harmonic progressions, and tonal modulations require heightened integrative and retentive abilities, especially when considering the fact that the unitary conceptions we call melodies are consisting of tones nested into hierarchies of motives, themes, and phrases. The further circumstance that such amalgams are growing into whole tunes and musical works, incorporating also the temporal relationship between moods and tonal centres, is putting even higher demands on the brain, and the engagement especially of the medial prefrontal cortex.

This is not in opposition to the fact that more basic aspects of perception have evolved for other reasons. The psychoacoustician Ernst Terhardt has made a strong case for a theory of tonality and roots deriving from general tone perception, and from the neurodynamic mechanisms that are assigning pitches and fundamentals even to incomplete and partly inharmonic spectra of partial tones.¹²⁷ A similar general mechanism might be seen to explain our propensity for rhythmical regularity. Both fire-making, toolmaking, and more cooperative efforts like cracking small trees or pushing big stones, are obviously strengthened by rhythmical and synchronous movement, of which the aesthetic and practical values might even overlap or merge in many cases, like in work songs, goading, marching, or the calming and rocking of a child to sleep. The extent to which these latter capacities are requiring a development of more specific correlates in the human brain is not entirely clear. The idiosyncratic rocking response to rhythmical music by infants might be pointing in this direction. Even parrots, elephants, and

¹²⁴ Simone G. Shamay-Tsoory, Judith Aharon-Peretz, Daniella Perry, 'Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions'. *Brain*, 2009, Volume 132, Issue 3 (March 2009):617-627, <https://doi.org/10.1093/brain/awn279>.

¹²⁵ Aleks J. Sihvonen et al., 'Neural architectures of music - Insights from acquired amusia', *Neuroscience & Biobehavioral Reviews*, Volume 107 (December 2019): 104-114, <https://doi.org/10.1016/j.neubiorev.2019.08.023>.

¹²⁶ Sacks, *Musicophilia*, 110.

¹²⁷ See Chapter 13.2.2

some other animals seem to display such rhythmical rocking;¹²⁸ which may not exclude the possibility that even the brains of these animals have neural correlates for harmony and rhythm. A study by Hiroki Terashima and colleagues, for instance, is pointing to specific regions in the auditory cortex of monkeys devoted to harmony perception.¹²⁹

Besides Isabelle Peretz, the neuroscientist who has been most actively preoccupied with these questions is precisely Aniruddh Patel, having designed several of those experiments which Sacks is referring to as indicative of a brain specialisation for music.¹³⁰ In contrast with Sacks, however, he is sketching out a perspective which 'emphasizes commonalities' between music and language.¹³¹ Surely the *association* of these phenomena is obvious; they accompany each other both in song and speech. Patel is probably right that word rhythms are influencing the rhythms of instrumental music, even though there are many examples of instrumental music and even song where such 'oratorical' rhythms are not very prominent. The repetitive and hierarchical patterns of Indonesian gamelan music, Australian didgeridoo music, or the Sami 'joik', are all examples of rhythms which do not resemble speech.¹³² Patel may be correct that the neural correlates of language are more obvious than the neural correlates of harmonious music, but this is still a contentious issue. It might well be the other way round.¹³³ What is much more

¹²⁸ Elena Selezneva et al., 'Rhythm sensitivity in macaque monkeys', *Frontiers in Systems Neuroscience* (6 September 2013): <https://doi.org/10.3389/fnsys.2013.00049>.

See also Yuko Hattory and Masaki Tomonaga, 'Rhythmic swaying induced by sound in chimpanzees (*Pan troglodytes*)', *The Proceedings of the National Academy of Sciences*, Volume 117, Issue 2 (23 December 2019):936-942, <https://doi.org/10.1073/pnas.1910318116>.

¹²⁹ Hiroki Terashima and Haruo Hosoya, 'Sparse codes of harmonic sound and their interaction explain harmony-related response of auditory cortex', *BMC Neuroscience*, Vol. 11, Issue 1 (July 2010): <https://doi.org/10.1186/1471-2202-11-S1-O19>.

¹³⁰ See Sacks, *Musicophilia*, 239-240, 242, and 243; and Aniruddh Patel, 'Musical rhythm, linguistic rhythm, and human evolution', *Music Perception: An Interdisciplinary Journal*, Vol. 24, No. 1 (September 2006): 99-104. <https://doi.org/10.1525/mp.2006.24.1.99>. Here Patel is dealing with rhythmical idiosyncrasies.

In *Music, language, and the Brain* Patel also points to studies of monkeys, indicating that 'the preference for consonance may be uniquely human, raising the possibility that our auditory system has been shaped by selection for music', 397.

¹³¹ Patel, *Music, Language, and the Brain*, 4.

¹³² Patel, *Music, Language, and the Brain*, 159-168.

¹³³ There are many studies of apes and parrots demonstrating the ability to use a large vocabulary of signs. More recent research has also revealed how the brain regions and the patterns of brain activity earlier believed to be specialised for language in humans could also be observed in chimpanzees; see for instance Jared P. Tagliatela et al., 'Communicative Signalling Activates 'Broca's' Homolog in Chimpanzees.' *Current Biology*, Volume 18, Issue 5 (March 2008): 343-348. <https://doi.org/10.1016/j.cub.2008.01.049>. And it should be subjected to investigation whether any capacities or complexities ascribed to language beyond the relatively simple operation of associating noises or sequences with concepts should be ascribed to a confusion between signification, cognition, and nonverbal communication on the part of the researchers. This we will come back to in Part 4.

problematic is his hypothesis that tonal and rhythmically regular music is some kind of byproduct of language.¹³⁴

First of all, the phenomena of *melody* and *music* in the widest sense of this word, existed millions of years before language, and still exists independently of language in a wide range of animals, even in the shape of more autonomous and song-like activity. The howling or crying of a wolf or a dog, for instance, is not a bit less touching than that of a human. It can go on for hours, with a subtleness, a melodic variability, and a phrasing which is as astonishing as it is revelatory. And there is little doubt that it is precisely this kind of immediate and articulated emotional expression which our vocal apparatus was originally adapted for. The much later addition of *signification*, utilising especially those melody-independent aspects of sound we call *timbre*, *consonants*, *vowels*, and *formants*, might well have furthered the development of consciousness and communicative skills in general. Thus it might have indirectly contributed to the capacity for temporal dialectics which is needed when dealing with inherently static sensations like rhythmical monotony and sustained tones; but there is nothing about signification *per se*, which explains the development of harmony and rhythmical regularity.¹³⁵

Even though song is emotionally more gratifying than speech, even to newborn babies, this peculiarly restful, harmonious and *singing* mode of being does not seem to be suitable for ordinary communication at all. It is as easily combinable with signification as any other modes of intonation - perhaps even much more so, since the discreteness of the tones and beats makes for a much more explicit separation of the linguistic units - yet it is almost never used as a substrate for the ordinary exchange of ideas. Like emotional vocalisation and melody in general, it might just as well have developed long before language, or without any subsequent language development at all; which is suggested by Steven Mithen in his book *The Singing Neanderthals*.¹³⁶ There is little reason, at least, to believe that our vocalisations *before language* were any less advanced than those of parrots and howling packs of wolves.

¹³⁴ Patel, *Music, Language, and the Brain*, see for instance 312-315, 373, and 386.

¹³⁵ Even Patel himself is admitting that 'sensitivity to key membership does not have any obvious relationship to nonmusical auditory functions'. *Music, Language, and the Brain*, 374.

¹³⁶ Steven Mithen, *The Singing Neanderthals: the Origins of Music, Language, Mind and Body* (London: Phoenix, 2006), 4, 236; and concerning the supposed absence of the human version of the FOXP2 'language gene' in Neanderthals: 249-250.

A more plausible impact of language is limited to Patel's reasoning, and the tendency of ambiguous words to lead to category errors, pseudo problems, and false dichotomies. A reconstruction of Patel's line of reasoning might run like this: by merging and phylogenetically linking affective intonation and signification in a somewhat diffuse concept of communication as language, and by opposing this concept with the idea of 'music' as some kind of artificial modern construct, he is creating the illusion that music is opposed both to speech and emotional vocalisation. Indeed, when talking about 'intramusical meaning' he is pointing to the kind of formalism and relativistic cultural patterns that are outlined in the writings of Eduard Hanslick and L. B. Meyer respectively.¹³⁷

Conversely, when trying to join the concept of music with language again, it is this dubious amalgam of signification and affection that is the goal; as if the combination of affective and linguistic elements was not already accomplished in song. But this is disguised by his talking primarily of *instrumental* music. He admits that music is not about *semantics* in the conventional sense of this word, but by pointing instead to the ambiguous concept of *reference*¹³⁸ - comprising, amongst other things, a problematic confusion of contrary categories like *representation* and *relation* - there is created an illusion of overlapping phenomena. 'A link with affective cues in speech might be one reason that certain musical cues to affect are perceived in a consistent way across cultures,' he says for instance.¹³⁹

By 'linking' one type of 'cue' with another, more privileged and linguistic 'cue', the affects are supposed to be triggered. In other words, his idea of emotion seems to be limited to the kind of 'inner mind stuff', or at least a limited repertoire of interoceptive arousal, which supremacy is precisely what William James and more recent neuropsychology has been questioning. Patel does recognise that musical melodies 'feel very different,' and that they can get 'caught in ones heads' and produce 'chills' to a much greater extent than spoken melodies. He is also indicating that this may have something to do with the fact that musical melodies have different 'perceptual relations', and 'a richer set of perceptual relations' than spoken melodies;¹⁴⁰ but he pays little

¹³⁷ Patel, *Music, Language, and the Brain*, 305-308.

¹³⁸ More precisely, Patel is pointing to Nattiez's concept of 'intrinsic versus extrinsic referring', and Jacobson's 'introversive versus extroversive semiosis', 306 and 328.

¹³⁹ Patel, *Music, Language, and the Brain*, 315.

¹⁴⁰ Patel, *Music, Language, and the Brain*, 204-205 and 317-318.

attention to the *qualitative* aspects of these 'perceptual relations', and the circumstance that such qualia are also contributing to emotional experience.

If musical experience is really as strong and unique as Patel is indicating here, there has to be something about musical 'relations' that distinguishes them from other relations, or from *an imitation of a signification of something inner*, which is basically what his theory of music comes down to. The harmony and rhythmical regularity of song and dance is both unique, strongly felt, and integrated in our behaviour and our social lives, so it is not possible to exclude it from affective experience. But the concept of *embodiment*, especially in this radical sense of the word, is apparently still foreign to the genealogical and vegetative framework of many biologists.

As confusing as this diagnosis may seem, the point should be all the clearer by now, that unless this confusion is tackled in a systematic and stringent manner, combining the experimental and empirical approach with an equally 'scientific' phenomenological and ontological endeavour, there is little hope neither of making sense of ones findings nor tailoring any further experiments. Especially since the activity of playing music is involving so many different mental abilities, like the ability to read notes and handle instruments, which may not be essential to musical experience at all, it is obviously important to try to distinguish between these things. In many cases of reductionist reasoning - and even Patel is demonstrating examples of this - concepts like *melody, contour, gesture, shape, syntax, semantics, aesthetics, and genetics* are all mixed up, and many researchers are not entertaining even the slightest suspicion that they may be dealing with fundamentally different principles and realms of reality.

Patel's reflections may well be more openminded and creative than some other reductionists. Nonetheless, it is never a good omen that a whole field of reality is repressed from consciousness, or projected onto some other, perhaps more prestigious realm. The tradition within music psychology of operating with more or less randomly composed checklists of everyday emotions to which the music is supposed to conform, is only one example of this. The possibility that these emotions may not be relevant to musical experience at all, or that typically *musical* frames of mind - like jubilation, laudation, elegy, and dance - are usually excluded from such lists, seldom seems to bother these researchers.

It is reasonable to believe that if subjects in questionnaires were allowed to choose among more musical moods, like the major and minor modes or styles like blues, swing, rock, punk,

funk, soul, cool, glam, trance, trash, or psychedelic, the degree of agreement would be much higher. But then the illusion of *explanation*, typically produced by pointing to *something else* and 'inner', would be lost. Characteristically it is first when other fields of reality are explained by referring to categories of music, like when Damasio talks about 'the continuous musical line of our minds', 'the melodic line of background emotion', or the adage that 'you are the music while the music lasts', that the music is getting its independent existence back; although this is a paradox which has not yet reached the conscious level of Damasio's mind.

As for Aniruddh Patel, he is indicating that he might be ready to transcend this impasse when referring to researchers who argue that musical feelings are 'ineffable' and difficult to 'fit neatly into the pre-established everyday categories', or who are critical of the idea of 'basic emotions' altogether.¹⁴¹ He also seems to approach an understanding of speech melody and song melody as basically the same kind of phenomena, involving the same neural circuits,¹⁴² both of which are opposed to language, which, he admits, can easily 'jump modalities.' One should think that this might lead to the understanding of a fundamental distinction between non-verbal expression and arbitrary linguistic signification; but it does not. On the contrary, the lack of such arbitrariness, and the inability of music to 'jump modalities', is interpreted by Patel as an 'indicator that musical development is less robust than language.' 'If musical acquisition were equally robust,' says Patel, 'one might expect that deaf communities would create their own "sign music," in other words, a non-referential but richly organised system of visual signs with discrete elements and principles of syntax'.¹⁴³

Besides the neglect of *dance* and *pantomime*, which may be perfect examples of the kind of non-referential 'gestural music' he has in mind, his conception of 'nonreferential signs' which are meaningful and 'richly organized', is a contradiction in terms; and there is little room here, for the uniqueness and power of musical experience, which, it is natural to suppose, is what has triggered his interest in these things in the first place. The properties of harmony, tone, and

¹⁴¹ Patel, *Music, Language, and the Brain*, 315-317, pointing to Diana Raffman, *Language, Music and Mind* (Cambridge, MA: The MIT Press, 1993), <https://doi.org/10.1017/S0022226700016868>; and to Klaus R. Scherer, 'Which Emotions Can be Induced by Music? What Are the Underlying Mechanisms? And How Can We Measure Them?', *Journal of New Music Research*, Vol. 33, Issue 3 (2004): 239-251, <https://doi.org/10.1080/0929821042000317822>; as well as Andrew Ortony and Terence J. Turner, 'What's basic about basic emotions?', *Psychological Review*, Vol. 97, Issue 3 (August 1990): 315-331, <https://doi.org/10.1037/0033-295X.97.3.315>.

¹⁴² Patel, *Music, Language, and the Brain*, 238.

¹⁴³ Patel, *Music, Language, and the Brain*, 376.

rhythmical regularity are obviously central to this uniqueness and power. They have been cultivated for thousands of years, in ways that are largely universal and independent of linguistic barriers; so it is almost an intellectual feat of Patel to present it as a problem, a disadvantage, and something 'less robust'.

It is precisely this dismissal of harmony and rhythm as something artificial that is contrasting the most with the ideas of Oliver Sacks. Unlike Patel's work, and many other examples of nativism, formalism, and semiotics, Sacks' book is wholeheartedly *pro-music* and *pro-aesthetics*. Not only is it a main concern of Sacks to highlight the role of music as a modality of sensorimotor experience that is central to emotional communication and selfhood;¹⁴⁴ in some respects he even goes further than even William James, by accepting as natural and emotional even those states of mind that are peculiar to music. Especially his location of rhythm and song to the very core of religious experience is highly relevant, and reminiscent especially of Johann Gottfried Herder's idea of a fundamental relationship between music and the collective experience of religious devotion and awe [Andacht].¹⁴⁵

'While in many cases religious practice now tends to be somewhat decorous and detached', says Sacks, 'there is evidence that religious practices began with communal chanting and dancing, often of an ecstatic kind and, not infrequently, culminating in states of trance.'¹⁴⁶ The co-appearance, or even *coincidence* between chanting, dancing, ecstasy, trance, and religious experience is as apparent as it is a neglected. And it is well worth checking out some of Sack's references to literature which is nevertheless concerned with these matters.¹⁴⁷

Besides this intrinsic link with religious and ecstatic experience, Sacks also points to the social and societal benefits of these activities. 'Rhythm and its entrainment of movement (and often emotion)', he says, 'may well have had a crucial cultural and economic function in human evolution, bringing people together, producing a sense of collectivity and community.'¹⁴⁸ As was

¹⁴⁴ See especially the chapter on 'Kinetic Melody: Parkinson's Disease and Music Therapy', in *Musicophilia*, 248-258.

¹⁴⁵ Johann Gottfried Herder, *Kalligone* (Leipzig: Johann Friedrich Hartknoch, 1800), Zweiter Theil, p. 171.

¹⁴⁶ Sacks, *Musicophilia*, 246.

¹⁴⁷ Sacks is pointing here to Gilbert Rouget, *Music and Trance* (Chicago: University of Chicago Press, 1985); Havelock Ellis, *The Dance of Life*, (New York: Modern Library, 1923); Mickey Harts and Frederic Liberman, *Planet Drum and Drumming at the Edge of magic* (San Francisco: Harper Collins, 1991); and Merlin Donald, *Origins of the Modern Mind* (Cambridge: Harvard University Press, 1991).

¹⁴⁸ Sacks, *Musicophilia*, 246.

also noted by Augustine in his *Confessions*, there are few more efficient ways of stirring up and controlling the attitudes of a crowd than by collective rhythmical roaring and stamping.¹⁴⁹ It is an effect that has been exploited to excess probably since the dawn of humanity.

It is easy to take this kind of communion, and the concomitant possibility of mass suggestion, for granted. Like emotional communication in general, these social experiences are so natural parts of our lives that we seldom contemplate the basis of their existence; none the less: they have to be constituted by some kind of sensory and explicit activity; and tonal harmony and rhythmical regularity are probably the most effective means to this end. Especially in the case of rhythm, but also harmony, one might even argue that it is the essence or ultimate realisation of such communion; not only since rhythm is 'supramodal', or a 'quintessential mimetic skill' - here Sacks is referring to Merlin Donald -¹⁵⁰ but since synchronicity and harmony is what synchronicity and harmony is basically about. Even *within* the brain this seems to be the case. In fact, Sacks goes as far as drawing a parallel between the classical 'binding problem' of the central nervous system, the central unification of different aspects of perception, to the binding together of 'the individual nervous systems of a community'.

Neuroscientists sometimes speak of "the binding problem," the process by which different perceptions or aspects of perception are bound together and unified. What enables us, for example, to bind together the sight, sound, smell, and emotions aroused by the sight of a jaguar? Such binding in the nervous system is accomplished by rapid, synchronized firing of nerve cells in different parts of the brain. Just as rapid neuronal oscillations bind together different functional parts within the brain and nervous system, so rhythm binds together the individual nervous systems of a human community.¹⁵¹

Aniruddh Patel, on his part, is not so sure about this. Our capacity for rhythmical synchronisation could hardly have evolved for social reasons, he argues, since many autistic people are highly musical and apperceptive of music, but nevertheless 'lacking in social skills'.¹⁵² His remark is pertinent but also ignorant, since it is implying that collective rhythm is somehow

¹⁴⁹ Sacks, *Musicophilia*, 245.

¹⁵⁰ Sacks, *Musicophilia*, 247.

¹⁵¹ Sacks, *Musicophilia*, 246-247.

¹⁵² Patel, *Music, Language, and the Brain*, 371.

responsible for all aspects of social experience, which is not what Sacks is claiming. It is like saying that colour vision does not contribute to vision because a myopic person, when endowed with the capability of experiencing colours, would still be myopic. In reality there is not only one, but a lot of different abilities that may contribute both to social interaction and autism, such as face-blindness, sensory chaos and overload, as well as deficient connections between brain regions which might create problems with more apperceptive and contextual aspects of social cognition. One swallow does not make a summer, and the capacity for rhythmical synchronisation, or even musical interaction, is not sufficient to create a social butterfly.

Autistic people are not always musical, and seldom entirely asocial. Furthermore, music is seldom social in the sense of integrating complex social emotions like jealousy and sarcasm, which is exactly what is deficient in many autistic people. The joint production of regular rhythms is more to liken with the sharing of typical non-social emotions like joy or melancholy, and it is not unlikely that some autistic people might enjoy these aspects of music while missing out on more contextual and long-range gestalts, which are produced at higher levels of the musical and action-organising hierarchy. This is also in tune with the neuroanatomical investigations of Basilis Zikopoulos and colleagues, including also Helen Barbas. The local circuits of thin axons in the brains of autistic people are over-connected, causing a 'bias for reverberating short-range pathways from ACC to frontal areas', whereas the thick axons that travel long distances are compromised and poorly myelinated.¹⁵³

It is difficult to get away from the fact that collective rhythmical activity is an important aspect of social bonding in all societies, and that music therapy has been beneficial in the treatment of severely autistic people.¹⁵⁴ The heightened sense of bonding might also be ascribed to tonal harmony, which periodicity and repose is connected with rhythmical regularity, and opens up for extraordinary depths of collective feeling in song, heterophony and polyphony. If not contributing directly to any vegetative needs, like the grasping of a banana, its regulative and motivational functions are clear and instrumental enough. By motivating us and transporting us

¹⁵³ Basilis Zikopoulos et al., 'Opposite development of short- and long-range anterior cingulate pathways in autism', *Acta Neuropathologica*, Vol. 136, No. 5 (6 September 2018): 759-778, <https://doi.org/10.1007/s00401-018-1904-1>.

¹⁵⁴ Mariana Boso et al., 'Effect of Long-Term Interactive Music Therapy on Behavior Profile and Musical Skills in Young Adults with Severe Autism', *The Journal of alternative and complementary medicine*, Vol. 13, No. 7 (2007): 709-712, <https://doi.org/10.1089/acm.2006.6334>.

into a wide range of moods and experiences of joy, it has the potential of contributing considerably to our sense of drive, social cooperation, wellbeing, and purpose.

Music certainly gives us a reason for keeping our *selves* alive; which might well have been of important survival value to human beings. The soothing yet energising effect of good music can be overwhelming at times. At a more instrumental level, its impact is highlighted at the sports arena today, in pep talks, and the cheering and singing of the crowds, providing inspiration for activities which are themselves inspirational and unifying. In other cases the effect is merely subliminal; which is also the reason why it is heavily exploited in bars and shops; making us talk less, and drink and shop more. So perhaps its influence on the vegetative level of motivation is greater and more direct than we think.

As for the role of harmonious music in *sexual selection*, the showing off of a dancing queen or a rock hero may not be as consequential with regard to offspring as in earlier times or the lives of song birds or song apes (Gibbons), where contraceptives are nonexistent, and where the business of singing and making music is a responsibility of all the members of a tribe. Nevertheless, the erotical hysteria surrounding a Paganini, a Presley, or a local pop group, for that matter of sake, is almost surreal, and hardly more evident than in modern times.

It is probably true that some types of emotional display, such as facial expressions, do rely to a larger extent on the indirect and instinctual triggering of more visceral and chemoreceptive sensations for their effect. In most cases, however, the muscular and tactile sensations are probably important constituents of the emotions. Even in the case of facial expression this seems obvious enough, since 'uplifting' and energetic emotions raises the corners of the mouth. Depressed and low-spirited emotions make the face look slack and lifeless, whereas tense and ambiguous feelings are manifested in the combination of certain facial tensions and relaxations. The same is true for posture and gesticulation. Yet except for the experience of visual symmetry or asymmetry perhaps, the emotions are not really immanent in the overt visual impression of these movements; which is precisely what distinguishes it from music.

A silent movie or a pantomime may be telling enough. We see what is going on and we can identify with it. A frightful scream or the pounding bass of a rock band on the other hand, can lead to sensory overload and even physical pain in some cases. We do not need to identify with it. On the contrary, it is often so loud and shrill that it is impossible to shut it out. The distinction is monumental, and it is a mystery how it is possible to ignore it. When we further take into

account that the medium of sound is probably more multidimensional and exact than any other medium for feeling, this goes a long way towards explaining the power of music.

'Perhaps it is not just the nervous system,' says Oliver Sacks, 'but music itself that has something very peculiar about it - its beat, its melodic contours, so different from those of speech, and its peculiarly direct connection to the emotions.'¹⁵⁵ Yes, perhaps it is not a coincidence that harmonics are harmonious, that dissonance is dissonant, that dialectical music is dialectical, dramatic music dramatic, that swing is swinging, or that trills are thrilling. Perhaps it is not possible to reduce everything to codes or 'clues' about something else, or to some historical or phylogenetic accidents, which is what Patel and many others try to do. It may not even be correct to say, as Sacks do, that melody is 'contour', since it is not contour, but something invisible, dynamic, and behavioural.¹⁵⁶ But these are merely rhetorical questions. In reality there is little room for doubt here. As long as these phenomena exist, any attempt at explaining them away would always be a distortion of reality. These experiences are not merely *expressive*; to a large extent they *are* what they express and vice versa; which is probably the most plausible interpretation of Igor Stravinsky's somewhat cryptic saying that music 'express nothing.' It simply is what it is. This does not alienate it from the field of emotion; on the contrary, says Stravinsky, it 'produces in us a unique emotion having nothing in common with our ordinary sensations and our responses to the impressions of daily life.'¹⁵⁷

1.4.2 James and Sacks on 'the bodily sounding-board'

This may not be not the whole truth about music. If not impossible, it might be difficult to speak of emotion if not the whole person, including also the muscular-tactile and the autonomic and visceral feelings, are involved. Especially the factors of *breathing* and *weariness*, with their consequences for phrasing and timing, may be necessary ingredients of most mental and melodic processes, even if they are only indirectly reflected in the rhythmical and auditory display. Perhaps it is this Oliver Sacks means by saying that music has a 'connection' to the emotions. If so, it is not a sufficient account neither of music nor emotion. A definition of emotion which

¹⁵⁵ Sacks, *Musicophilia*, 40.

¹⁵⁶ For a discussion of pitch and tonal intervals, see Chapter 13.2

¹⁵⁷ Igor Stravinsky, *An Autobiography* [1935] (New York: The Norton Library, 1962), 52- 53.

does not include the mechanoreceptive, auditory, and behavioural dimensions is not only too limited, it is simply wrong.

Again it is essential to stress that there is no opposition between these things. Even if the auditory display is sufficient to constitute an articulated and unique stream of feelings, these feelings are not weakened by an association with, or awakening of, some secondary autonomic responses. Even intellectual acts, and the initiation of movement in general, might be triggered by dopaminergic surges and urges.¹⁵⁸ This does not exclude or downgrade the role of more peripheral motivations and sensations, which, as William James have pointed out, are nevertheless needed for the targeting of, and discrimination between, different movements and limbs.¹⁵⁹ Even the experience of harmonious music seems to be reinforced by such connections, although it is not always clear whether the sensations are hardwired or conditioned, connected with auditory experience in general, or more specifically with harmonious music and vocal communication. If we are to believe Oliver Sacks, however, some of these couplings may well be 'music specific'.

'The fact that one may have not only a selective loss of musical emotion but an equally selective sudden musicophilia,' says Sacks, 'implies that the emotional response to music may have a very specific physiological basis of its own, one which is distinct from that of emotional responsiveness in general.'¹⁶⁰ Sacks is pointing to cases of brain injury, after which the capability of experiencing emotional 'warmth' or depth in music is suddenly lost, while leaving other aspects of music perception untouched. The music is still perceived as such, it is just 'emotionally flat'.¹⁶¹ But it is not entirely clear whether this lack of reinforcement is connected with all modes of vocalisation, or more specifically with the harmonious and singing utterances we call song and music. There might be several correlates of 'warmth' and arousal in the brain. Some of these may be relatively hardwired or dealing with multi-sensory integration, others may be more indirect and concerned with the facilitation of arousal and excitement, others again may be concerned with the integration of experiences and memories into a lifeworld of hopes, fears, and other personal feelings.

¹⁵⁸ Joseph LeDoux, *Synaptic Self: How Our Brains Become Who We Are* (London: Penguin Books, 2003), 245- 250.

¹⁵⁹ James, *The Principles of Psychology*, Chapter 26, 497.

¹⁶⁰ Sacks, *Musicophilia*, 290.

¹⁶¹ Sacks, *Musicophilia*, 288.

Typically these emotional abilities are highlighted first when they are missing. A peculiar example is Capgras delusion, where the sense of familiarity or attachment to familiar faces is lost. Since the emotional 'warmth' which is normally producing the sense of attachment is absent, it seems to be almost impossible to convince the people suffering from this condition that the well known faces confronting them are not some kinds of impostors.¹⁶² It is unclear if the same could happen to our experience of familiar voices; but there are a couple of studies that are pointing in this direction. A study by Michael B. Lewis and colleagues seems relevant, although the deficits of their patient was limited to *famous* voices.¹⁶³

Pleasurable music is not always familiar, and cases of musical anhedonia have first of all been connected with a deficiency in the connection between the nucleus accumbens, often referred to as a pleasure centre in the brain, and the auditory cortex. According Noelia Martínez-Molina and colleagues, people with musical anhedonia have 'selective reduced' responses in the nucleus accumbens, which imply a deficient functional connectivity between the right auditory cortex and the ventral striatum, including the nucleus accumbens.¹⁶⁴ The activations of nucleus accumbens by music are often associated with so called 'chills' or 'frissons', which might be triggered by pleasurable surprising occurrences,¹⁶⁵ but also musical peak experiences in general, like during the anticipation of familiar musical events.¹⁶⁶ There are even studies of musical anhedonia which are connecting the nucleus accumbens with the reinforcement of all kinds of pleasurable sounds.¹⁶⁷ It is not implausible that some aspects of auditory-visceral integration

¹⁶² Hadyn D. Ellis et al., 'Reduced autonomic responses to faces in Capgras delusion', *Proceedings of the Royal Society of London. Series B: Biological Sciences*, Vol. 264, No. 1384 (22 July 1997): 1085-1092. <https://doi.org/10.1098/rspb.1997.0150>.

See also Martin Davies et al., 'Monothematic Delusions: Towards a Two-Factor Account', *Philosophy, Psychiatry, and Psychology*, Volume 8, Number 2/3 (June/September 2001): 140-145, <https://doi.org/10.1353/ppp.2001.0007>.

¹⁶³ Michael B. Lewis et al., 'Autonomic responses to familiar faces without autonomic responses to familiar voices: Evidence for voice-specific Capgras delusion', *Cognitive Neuropsychiatry*, Volume 6, Issue 3 (2001): 217-228, <https://doi.org/10.1080/13546800143000041>.

¹⁶⁴ Noelia Martínez-Molina et al., 'Neural correlates of specific musical anhedonia', *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 113, No. 46 (31 October 2016): E7337-E7345, <https://doi.org/10.1073/pnas.1611211113>.

¹⁶⁵ Ofir Shany et al., 'Surprise-related activation in the nucleus accumbens interacts with music-induced pleasantness', *Social Cognitive and Affective Neuroscience*, Volume 14, Issue 4 (April 2019): 459-470, <https://doi.org/10.1093/scan/nsz019>.

¹⁶⁶ Valorie N. Salimpoor et al., 'Anatomically distinct dopamine release during anticipation and experience of peak emotion to music', *Nature Neuroscience*, Volume 14, Number 2 (February 2011): <https://doi.org/doi:10.1038/nn.2726>.

¹⁶⁷ Psyche Loui et al., 'White Matter Correlates of Musical Anhedonia: Implications for Evolution of Music', *Frontiers in Psychology*, (25 September 2017): <https://doi.org/10.3389/fpsyg.2017.01664>.

might be taking place in the insular cortex as well. Both the posterior insula, which is bordering on the primary auditory cortex, and the anterior insula, which is located right below Brocas' area in the prefrontal cortex, may be involved in such integration.

A more established fact is the role of the upper brain stem periaqueductal grey in animal vocalisation. The periaqueductal grey is also involved in a whole range of pleasure inducing and pain reducing mechanisms, some of which are central to the bonding between parents and infants;¹⁶⁸ and the institution of lullabies does not exactly detract from its impact. The above mentioned study by GERALYN M. SCHULZ and colleagues is showing that the periaqueductal grey of humans is co-activated with, and receiving projections from, the medial prefrontal cortex (BA9 and 10), which, as we will come back to in a separate chapter, is often found to be dealing with the conscious monitoring and modulation of mood. According to Schulz and colleagues, these findings are suggesting that the call system of lower animals, which is located to the PAG, may have come under increasing voluntary control in humans, and it is essential to note that the mentioned co-activations are produced by *voiced* speech only, not with whispered speech or mere signification, the latter of which is not developed in lower animals.¹⁶⁹ Or to put it differently: the co-activations of PAG and the medial frontal cortex were triggered by the sensations of tone, which intrinsic qualia are produced by periodicity and harmony. Elevated activity in the anterior insular and cingulate cortices and the prefrontal pars orbitalis (BA47) was found to be produced both by voiced and whispered narrative speech, but more extensively in voiced speech.

One should not forget that the sensations of harmony and tone are specific to sound. Like all other sensations they might be reinforced, but they would hardly be reinforced if they did not exist, or if they were not already pleasurable to some extent. If reinforcement was all there was, music would not only lose all the subtle feelings that are produced by intervals and chords, it would disappear completely, since visceral reinforcement is not specific to sound or harmony. The sensations of tone and harmony are first of all auditory, not visceral, although the experience of vibration and tone might well be extending to the viscera and other parts of the body.

¹⁶⁸ Andreas Bartels and Semir Zeki, 'The neural correlates of maternal and romantic love', *Neuroimage*, Vol. 21, Issue 3 (March 2004): see Fig. 1, <https://doi.org/10.1016/j.neuroimage.2003.11.003>.

¹⁶⁹ Schulz, 'Functional Neuroanatomy of Human Vocalization', Figures 1. and 2.

It is an important distinction, which has also been debated by Oliver Sacks and William James. In neuroscience it is common to look for examples of so called 'double dissociation'; and sure enough, Sacks is pointing to cases where the capability of deriving pleasure or 'warmth' from music is retained, at the same time as the ability to recognise previously familiar melodies, and even discriminate between musical sequences is lost.¹⁷⁰ Conversely, and as indicated by Sacks' description of a pathological 'flatness' in musical anhedonia, the ability to perceive the more articulated level of musical feelings might still be preserved in such cases. It is understandable that without a sense of bodily engagement and arousal, the music would be 'flat'; but the experience of 'flatness' may not eliminate other aspects of music experience.

This, at least, is how William James came to understand it: the essential features of music might still be intact in such cases. Especially after his more musical friend Edmund Gurney's critique of his account of musical experience in *Mind*,¹⁷¹ his slightly revised view of these matters appears very thought through. His former emphasis on the importance of 'the bodily sounding board', as he calls it, is considerably downplayed now. And the experience of 'musical form' without any 'bodily reverberations', as supposedly existing in the expert critic's mind, is upgraded from being a mere glowless 'judgement of right' to an emotional experience in its own right. In fact, James might well have gone a little too far in this direction.

The argument that made James alter his former view might have been Gurney's observation that a mere 'judgment of right' is not sufficient to distinguish between trivially correct and superb art, which is what high level musical appreciation is very much about. At the same time James is also correcting Gurney's tendency to draw a sharp line between the immediately sensuous and the contextual, melodic, and harmonic aspects of experience. 'In organizations as musical as Mr. Gurney's', James comments in a long footnote, 'purely acoustic form gives so intense a degree of sensible pleasure that the lower bodily reverberation is of no account. But I repeat that I see

¹⁷⁰ Sacks, *Musophilia*, 289-290. See also Isabelle Peretz and Lise Gagnon, 'Dissociation between recognition and emotional judgement for melodies'. *Neurocase*, Volume 5, Issue 1 (1999): 21-30, <https://doi.org/10.1080/13554799908404061>; and Anne J. Blood and Robert J. Zatorre, 'Intensely pleasurable responses to music correlate with activity in brain regions implicated in reward and emotion', *Proceedings of the National Academy of Sciences USA*, Vol. 98, Issue 20 (25 September 2001): 11818-23, <https://doi.org/10.1073/pnas.191355898>.

¹⁷¹ Edmund Gurney, 'What is an emotion', in *Mind: A quarterly review of psychology and philosophy*, ed. George Croom Robertson, Vol. 9, (London: Williams and Norgate, 1884), 425. James' own discussion of music in *Mind* is also occurring in Vol. 9 (1884): 202-203.

nothing in the facts which Mr. Gurney cites, to lead one to believe in an emotion divorced from *sensational processes* of any kind.'¹⁷²

While the necessity of bodily and interoceptive sensation is downplayed, the concepts of emotion and embodiment are correspondingly radicalised. It is not that the 'secondary pleasures' are dispelled from the experience of music and art, but he is leaving much more room now, for 'aesthetic emotion, *pure and simple*.'

Aesthetic emotion, *pure and simple*, the pleasure given us by certain lines and masses, and combinations of colors and sounds, is an absolutely sensational experience, an optical or auricular feeling that is primary, and not due to the repercussion backwards of other sensations elsewhere consecutively aroused. To this simple primary and immediate pleasure in certain pure sensations and harmonious combinations of them, there may, it is true, be *added* secondary pleasures; and in the practical enjoyment of works of art by the masses of mankind these secondary pleasures play a great part. The more *classic* one's taste is, however, the less relatively important are the secondary pleasures felt to be in comparison with those of the primary sensation as it comes in.¹⁷³

This is about all that James has to say about music, but it is not insignificant. Certainly James is not as indifferent to music as Oliver Sacks is indicating. Sacks could not have read James very thoroughly when he claims that he is devoting only 'a single sentence' to music in *The Principles of Psychology*.¹⁷⁴ Sometimes one rather gets the impression that the issues of musical autonomy and immanence are constantly residing in the back of James' head, occasionally popping up in short remarks like 'Whistling to keep up courage is no mere figure of speech'.¹⁷⁵ The problem is just that unlike Sacks, William James has not developed a conceptual framework where *whistling* and other instances of harmonious being could be integrated as unique modalities of the broader field of self-consciousness and social behaviour.

Curiously enough considering his general emphasis on emotional embodiment, not even in his *Varieties of Religious Experience* these harmonious, incanting, and entrancing modes of

¹⁷² James, *Principles of Psychology*, Chapter 25, 469, footnote 22.

¹⁷³ James, *Principles of Psychology*, Chapter 25, 468-469.

¹⁷⁴ Sacks, *Musicophilia*, p. 291.

¹⁷⁵ James, *Principles of Psychology*, Chapter 25, 463. See also James' listing of bodily responses that might be triggered by artistic and musical experience in Chapter 25, 457. His reference to 'the cutaneous shiver which like a sudden wave flows over us', 'heart-swelling', 'lachrymal effusion', and the remark that 'in listening to music this is even more strikingly true', does not exactly speak of a detached relationship with music.

being are given any attention. Failing thus to grasp the function and value of song and rhythm, it is no wonder that he has come to reckon the susceptibility to music as 'a pure *incident* of having a hearing organ', having 'no zoological utility'. But this is a statement that is contradicted by the next part of the same sentence, talking of 'an incident depending on such instable and inessential conditions that one brother may have it and another brother not.'¹⁷⁶ Certainly he is talking of *musicality* here, not of hearing in general. His brother was apparently more or less *amusical*, but he was not deaf. In other words: William James is still considering musicality a *separate faculty*. Such a faculty would hardly have developed if there was no use for it. It might well have little 'zoological' utility, but this is not proven by the fact that some people do not have it. If this had been the case, the faculties of thinking, hearing and seeing would be inessential as well, since some people are born blind, deaf, or stupid.

His remark that aesthetic and ethical systems are somehow 'utopian' and craving to 'alter the given order of nature' might also indicate a tendency to think in terms of nativism and relativism, which is not in tune with the 'flux' and pluralism that is described in other parts of his writings. It is almost like nature is posited as something fixed and 'given' here, whereas the realm of art and culture is considered *unnatural* or *surreal*, and exempted from functional, physical, or ontological determinateness. This is not the case. Even the brain and inanimate nature is changing; in fact, the circuits of the brain are changing from day to day. And even if our minds are able to come up with new inventions, the identity of these phenomena is no less functional and real than other parts of nature. Certainly, if music is a utopia, it is a utopia come true; and as was also realised by James, it is a circumstance that could neither be explained as pure 'habit' nor as 'reproductions of the outer order'.¹⁷⁷

Another source of confusion here might be the common conception of tonal music as some kind of 'formal' and spatial construct, which could be evaluated in isolation from any psychical and emotional processes whatsoever. Even Edmund Gurney might, unwittingly or not, have entertained this view, speaking of musical 'forms' realised and enjoyed even in complete silence. Similarly he speaks of insignificant and unemotional music by analogy with 'geometrical

¹⁷⁶ James; *The Principles of Psychology*, Chapter 28, 627. For similar remarks by James, on 'higher musical sensibility', on 'the music faculty', and the perception of harmony being 'congenital' and unique to humans, see for instance Chapter 28, 624, 665, and 673.

¹⁷⁷ James, *The Principles of Psychology*, Chapter 28, 639.

demonstrations'.¹⁷⁸ This is problematic, not only because it is doubtful whether music could ever be experienced as shapes, but because it is eliminating the sensual interplay of tones, which is an intrinsic feature of all music. The question whether the actual processes are *behaviourally coherent*, and profound and intense enough to trigger some autonomic reactions as well, is quite another, and much more relevant matter.

It is not certain whether James' concept of 'purely acoustic form' is also implying this kind of formalism; but the unfortunate dissociation of 'expressiveness', 'meaning', and 'fitness of sequence' in his remark about 'an utterly meaningless fitness of sequence in one musical composition setting at naught any amount of "expressiveness" in another' may be indicative of a propensity to think along such lines.¹⁷⁹

1.4.3 Wilhelm Wundt on the specifically musical

When it comes to Wilhelm Wundt, his style of writing may not be as succinct as that of James, but his reasoning is all the clearer with regard to several of the above mentioned points. Even to a lesser extent than James he is guilty of the 'extreme psychologism' or 'species relativism' which Husserl is identifying him with.¹⁸⁰ Quite the reverse, he fervently rejects it; and even if psychology is seen as a necessary preparatory study - very much like in today's neurologically oriented philosophy - it does not prevent him from speaking of a 'universally binding' logic.¹⁸¹ Wundt's 'concept of actuality', 'apperceptive' activity, and 'monistic perspectivism' is reminiscent in many ways of Edmund Husserl's 'transcendental idealism', but his perspective is of wider scope, emphasising not only the importance of a physiological correlate, but the existence and lawfulness of a *psychical sphere* of *gestalts*, of which Husserl was for a long time ignorant.¹⁸² Especially, and this we will come back to in later chapters, his 'law of mental growth' or 'heterogeneity of ends', and the principles of 'creative synthesis', 'intensification through contrast'

¹⁷⁸ Gurney, *Mind*, 425.

¹⁷⁹ James, *The Principles of Psychology*, Chapter 25, 471.

¹⁸⁰ Edmund Husserl. *Logische Untersuchungen*, Erster Band (Halle: Niemeyer, 1901), §38, 124-125.

¹⁸¹ Wilhelm Wundt, *Erlebtes und Erkanntes* (Stuttgart: Kröner, 1920), 264-266.

¹⁸² Edmund Husserl, *Cartesian Meditations: An Introduction to Phenomenology* [1931], trans. Dorion Cairns (Dordrecht: Kluwer Academic Publishers, 1991), §20, 49. Here Husserl is talking about 'processes of consciousness' with 'no ultimate elements and relationships, fit for subsumption under the idea of objects determinable by fixed concepts'.

and 'development towards opposites' are breaking new ground in the understanding of behaviour and temporal experience;¹⁸³ and they are exemplified in great detail by reference to the unidirectional transformations and feelings of expectation and fulfilment even in the simplest rhythmic progressions.¹⁸⁴

Wundt's concept of emotion is just as flexible as that of James, and he seldom leaves room for any doubt that absolute music [das Rein Musikalische Kunstwerk] is a manifestation of emotion, which 'unparalleled emotivity' [unvergleichlichen Gefühlswert] is deriving precisely from the fact that it is uncontaminated by concrete conceptual content, producing, he says, moods and affects for some of which there exist no words.¹⁸⁵ In the case of Wundt, however, his concept of music is much more integrated both in his treatment of will, 'the intellectual feelings', and emotion in general. As a matter of fact, it is systematically employed as school examples in many of his discussions of emotion; which is a good idea, since it is the only region of emotion which has its own notational apparatus. In the very last chapter of the revised and expanded editions of his *Grundzüge der Physiologischen Psychologie*, for instance, when the emergent 'resultants' of composite feelings and temporal progressions are to be explained, he enters straight into a discussion of timbre, rhythm, and harmonic progressions. In fact, some of these chapters even contain detailed analyses of metric and harmonic progressions.¹⁸⁶

The problem with Wundt's as well as James' treatment of music is that the discussions are usually remaining on a general level. It is true that in section g of Chapter 16, on 'the emotiveness of rhythmical forms' [Inhaltliche Gefühlswirkungen rhythmischer Formen], Wundt develops a detailed hermeneutic of rhythms and metric feet. He is speaking for instance of 'die einfach austrebende Erregung des jambischen, an die lebhafter vordrängende des anapästischen, die hin-und herwogende des amphibrachischen Metrums, und andererseits an den einfach ruhigen Gang des Trochäus, den schwerfällig ernsten des Cretius', and so on; patterns which are not merely depicting the affects, he says, but are 'constituent parts of the affects themselves.'¹⁸⁷ Yet

¹⁸³ Wundt, *Outlines of Psychology*, §24.

¹⁸⁴ See for instance Wundt, *Outlines of Psychology*, §11, on 'temporal ideas'.

¹⁸⁵ See for instance Wundt, *Grundzüge der Physiologischen Psychologie*, Band 3, Kapitel 16.2.i, 163.

¹⁸⁶ Wundt, *Grundzüge*, Band 3, Kapitel 22.2.a, 755-756.

¹⁸⁷ Wundt, *Grundzüge*, Band 3, Kapitel 16.2.g, 147-161.

these are all fairly general emotional characteristics. They do attempt to pinpoint the specifically *lyrical* or *musical*.

On closer examination however, one will find that Wundt nevertheless goes further than James in this direction. In the last paragraph of Chapter 19.5 on 'Intellektuelle Gefühle', he is mentioning that there is a close connection between rhythmical movement, 'harmony-feeling', and the intellectual feelings of *concurrency* [Übereinstimmung] and *approval* [Billigung], which, he says, are also associated with ethical and religious feelings. Yet he does not, at least not in *Gründzüge der Physiologischen Psychologie*, attempt to expand on these matters, let alone sketching out a more detailed account of the purpose and logic of behaviour which is celebrating and affirming this harmony. And it is not that he is not conscious of the problem, he just refers it to the field of aesthetics.¹⁸⁸

But not even in the large volume on aesthetics in his *Völkerpsychologie* these things are given any extensive treatment. Surely he reckons music a kind of 'mother art' and nomothetic source for all the 'musischen Künste'.¹⁸⁹ The observation is in agreement with ideas that will also be forwarded in this treatise; and it is indicating a role for song and rhythmical regularity as opening up for a whole range of 'new' and fundamental modalities of human experience, comprehending also the fields of poetry and drama.

Even in this connection the element of rhythmical regularity is taking centre stage in Wundt's discussions. Especially the section on 'ecstatic dances' is interesting, like when he speaks about 'a highly intensified religious thrill or arousal [Erregung], which with a kind of natural necessity [Naturgewalt] is expressed in ecstatic dancing.' In like manner with Oliver Sacks, however, he is pointing to a general tendency towards secularisation here, an 'Umkerung seiner Motive', where ecstatic dancing is acquiring instead a role as 'one of our strongest sensual stimulants [Genussmittel]'.¹⁹⁰ When dealing with the general *essence* of such musical activities then, and the difference between song-melody [Liedmelodie] and speech-melody [Sprechmelodie] in particular, he is focussing rather on such factors as *intensification* ['steigerung'], *elevation*

¹⁸⁸ Wundt, *Grundzüge*, Band 3, Kapitel 19.5, 603.

¹⁸⁹ Wilhelm Wundt, *Völkerpsychologie: Eine Untersuchung der Entwicklungsgesetze Sprache, Mythos und Sitte*. Dritter Band: Die Kunst. Dritte, neubearbeitete Auflage (Leipzig: Alfred Kröner Verlag, 1919), Kapitel 3, 368.

¹⁹⁰ Wundt, *Völkerpsychologie*, 478.

[erhöhung], and *perfection* [Vervollkommnung].¹⁹¹ Which is not exactly false, and certainly indicative of immanent qualities, but it is not very precise. Even ordinary intonation could be intensified and perfected, without having to result in song. It is not that it is impossible or ineffective, but it would seem very eccentric, extremely melodramatic, and even counterproductive in many cases, to break into song every time one feels a need for raising ones voice.

The essence of song as contrasted with ordinary intonation must consist in something else and much more idiosyncratic then. And even if such a definition is already indicated by Wundt's pointing to phenomena like *harmony*, *concurrence*, *approval*, *ecstasy*, and *religious sentiment*, it is not clearly formulated as such.

¹⁹¹ Wundt, *Völkerpsychologie*, 516-517.

Chapter 2

Hegel on 'the Self-production of the Self' in the Medium of sound

While Wilhelm Wundt's holistic and humanistic aspirations were overlooked by many of the lesser philosophers and psychologists plagiarising him, it would probably be equally correct to say that Wundt was guilty himself, of downplaying the empirical bent and the psychological insight of an even greater philosopher preceding him, namely Hegel. So much had these thinkers in common, in fact, that a chapter on Hegel might favourably sum up, and complement in many ways, the previous discussion of embodiment, melody, and the apperceptive construction of the self. His understanding and appreciation of music was no lesser than that of Wundt. On the contrary, his descriptions of music as somehow *more self-reflexive and free* than other emotional behaviour, goes deeper in some respects, and it is demonstrating a surprisingly rich and precise vocabulary. Furthermore, when we know that a dialectical understanding was reflected also in many of Wundt's theories, like in his antithetical accounts of intensification and development,¹ one might well wonder if we are dealing with some kind of patricide here, a need for preparing the ground for himself. Wundt is speaking for instance of Hegel's 'arrogant attitude towards the special sciences and the empty formalism of his dialectical method'.²

It is not clear what Wundt was thinking of when speaking of arrogance here, nor is arrogance necessarily in contradiction with recognition. There is no doubt that Hegel did recognise the value of the special sciences. In his 'Encyclopedia', in the volume on 'The Philosophy of Mind', he was even calling for the establishment of a new and 'peculiar' special science, a 'psychical physiology', as he called it, were 'the *system* of inner feelings in their embodied *specificity*' (the italicising is made by Hegel himself) could be treated in detail; pointing first of all to 'the feeling of appropriateness or inappropriateness of an immediate sensation to the persistent tone of

¹ Wilhelm Wundt, *Outlines of Psychology* [1897], trans. C. H. Budd, (Bristol: Thoemmes Press, 1999), Chapter 5, §23, 324-325.

² Wilhelm Wundt: *Ethics: An Investigation of the Facts and Laws of the Moral Life*, Vol 2: Ethical Systems, trans. Margaret Floy Washburn (New York: The Macmillan Co., 1897), 375-376.

internal sensibility - the *pleasant* or *unpleasant*,' which was such a central point even in Wundt's 'Physiological psychology'. No less reminiscent of Wundt are his reflections on 'the bodily form adopted by certain mental modifications', especially the *emotions*.

We should have, for example, to explain the line of connection by which anger and courage are felt in the breast, the blood, the 'irritable' system, just as thinking and mental occupation are felt in the head, the centre of the 'sensible' system. We should want a more satisfactory explanation than hitherto of the most familiar connections by which tears, and voice in general, with its varieties of language, laughter, sighs, with many other specializations lying in the line of pathognomy and physiognomy, are formed from their mental source. In physiology the viscera and the organs are treated merely as parts subservient to the animal organism; but they form at the same time a physical system for the expression of mental states, and in this way they get quite another interpretation.³

For those who like the sport of turning everything on its head, it might be argued that in many respects Hegel is even *more* empirical than Wundt. In fact, it is possible to consider Hegel as a representative of a kind of 'acute empiricism', fulfilling his close friend Goethe's call for a much more 'delicate' account of reality: 'eine zarte Empirie'.⁴ Not only because of Hegel's emphasis on context, and the categories of reality defining themselves in relation to each other - this was in many ways realised by Wundt as well - but because Hegel is attempting to go much deeper than this: to the level of logical understanding and empirical description where one-sided finiteness is realised as absurd and non-existent, because it implies *infinity* as a necessary condition and vice versa; the condition known as *antinomy* or *paradox*.⁵

Contrary to common belief, this is an endeavour which is characterised rather by openness to experience than by dogmatic projection. While paradox and infinity is frequently encountered by science, but often repressed or 'renormalised', it is Hegel's mission rather to accept it and always make sure we recognise it, since it is precisely this interpenetration of opposites which is giving a clue to the coherence and logical necessity of existence. Furthermore, this dialectic seems to be implying a conflict and oscillation which is impossible to stop and appease; and it is precisely

³ G.W.F Hegel, *Philosophy of Mind: Part Three of the Encyclopaedia of the Philosophical sciences*, trans. William Wallace (Oxford: Clarendon Press, 1971), § 401.

⁴ Songsuk Susan Hahn, *Contradiction in Motion: Hegel's Organic Concept of Life and Value*, (New York: Cornell University Press, 2007), 10.

⁵ See for instance *Hegel's Logic, Being Part One of the Encyclopaedia of the Philosophical Sciences* [1830], trans. William Wallace (Oxford: Clarendon Press, 1975), § 95. 139.

this conflict and restlessness that might be providing the zest both to cosmic 'becoming' and to the vitality in vitalism.

Even materialists and relativists are influenced by dialectics, yet it is an uneasy or 'unhappy consciousness', as Hegel would put it: a condition where the opposite poles are isolated as one-sided and irreconcilable caricatures. It is a confusion of realism and lawfulness with something infinitely dense and frozen, while everything that is fleeting and emergent is considered lawless and surreal.⁶ Other philosophers, like Immanuel Kant and Edmund Husserl, are often defending or talking about the categories of reality, but with little concern for its principles of synthesis and regulation. And it is exactly this parasitising of categorial structure that is so problematic from Hegel's point of view. Quite unlike Wundt's employment of the term, it is the habit of taking the cognitive and affective categories for granted that is deserving of the label 'empty formalism'. Indeed, it was his core critique of Immanuel Kant and his tendency to explain away the categories of reality as illusions of the human mind.⁷

This is not to say that Hegel's dialectic may also be sloppy and self-contradictory at times; of this the following discussion will show many examples. More important though, is the overall logic and direction of his reasoning, which is not lacking in convincing descriptions. It is probably no coincidence that it is precisely at the fringes of existence, especially in the field of quantum physics, that the paradoxical nature of reality is highlighted and confirmed today; by the constant, and apparently unavoidable, coming to existence of virtual particles in vacuum; or by the just as eery, but apparently necessary transmutations between matter, energy, space, and time in quantum fields or Einstein's theory of gravity. The question whether something like Hegel's dialectic is applicable to all of reality is important and enthralling; and it is a question which to a large extent, but not only, will have to be answered by physicists. Some thinkers, like

⁶ See for instance the chapter on 'Freedom of self-consciousness: Stoicism, Scepticism, and the Unhappy Consciousness' in G. W. F. Hegel, *Phenomenology of Spirit* [1807], trans. A. V. Miller (Oxford: Oxford University Press, 1977), § 197-230, 119-138.

⁷ The concept of 'empty formalism' was employed first of all in Hegel's critique of Kant's moral imperative in *Elements of the Philosophy of Right*, trans. H. B. Nisbet, ed. Allen W. Wood (Cambridge: Cambridge University Press, 1991), §135R; but it also connects with his critique of what he saw as Kant's general practice of putting 'the object under a rubric otherwise ready to hand, instead of deducing its characteristics from its notion', and the kind of 'empty indeterminate thinking' which would have been the consequence of thought deprived of objectivity: Hegel, *Logic, Being Part One of the Encyclopaedia*, § 48, 77-78.

the philosopher and physicist Dieter Wandschneider, actually do think so, although the possibility is not well researched.⁸

More relevant here is the question of its applicability to music and psyche; and it is a discussion which will be carried out entirely on its own terms. This is also where Hegel's inversion of the reductionist mode of reasoning is consummated. Not only is his emphasis on the function and essence of phenomena making the tracing of them to some kind of accidental biological origin less relevant; in a certain sense this nativism, and even the physical level of existence, might be seen to be *less real*, since it is first at the latter stages of animal and human development that reality is shining to light, so to speak, by becoming conscious of its own presence and categorial structure.⁹ What we usually mean by 'being' - a context of objects having quality, shape, relation, function and so on - is hardly possessed by 'the thing itself'. Certainly the ethereal clouds of statistical potentialities described by modern physics have very little of it, which has led to some rather curious cosmological models recently; making even the solipsism of Berkley seem rational in comparison.

By becoming aware of our own limits, and by making the transcendence of them into our objective, we are also becoming 'free', says Hegel;¹⁰ which is true at least in the sense that it has enabled us to constitute an autonomous sphere of being: an idiosyncratic character, a rounded life of feeling, and an organised society, all of which is striving towards its own perfection. But this is a gradual development, one might reply, and humans are never *entirely* conscious of their limits, and never *entirely* liberated from instinct. Moreover, the consciousness of what *is*, does not necessarily entail the production something novel.

It might not be entirely wrong to speak, as Hegel occasionally does, of a 'second nature'; a region of existence which is also a product of 'habit'. But nature is also a product of 'habit'. It is a

⁸ Wandschneider is pointing especially to Hegel's Philosophy of Nature, and his Jena writings as unjustly neglected. Hegel's reflections on the importance of gyratory motion for the time-bridging and 'time-neutral' identity of mass and place, for instance, has a striking resemblance with concepts of spin, fluctuating virtual particles, and symmetry transformation in modern quantum physics. According to Wandschneider, it might not only provide a solution to Zeno's paradox, but 'help us to understand mass as an integral unity.' Conversely the lack of such symmetry and restfulness in *light* might explain its lack of mass and its non-relative 'absolute velocity', which is precisely how Hegel talks about these things. See Dieter Wandschneider, 'The Problem of Mass in Hegel,' in *Hegel and Newtonianism*, ed. M. J. Petry (Dordrecht: Kluwer, 1993), 249–265.

See also Wandschneider's *Raum, Zeit, Relativität. Grundbestimmungen der Physik in der Perspektive der Hegelschen Naturphilosophie* (Frankfurt am Main: Vittorio Klostermann, 1982)

⁹ G. W. F. Hegel, 'Die Philosophie des Geistes'. Volume 3 of *Enzyklopädie der philosophischen Wissenschaften im Grundrisse* [1830] (Frankfurt am Main: Suhrkamp Taschenbuch Wissenschaft, 1986), § 389, Zusatz.

¹⁰ Hegel, 'Die Philosophie des Geistes', § 386, Zusatz, 36.

self-productive and self-regulating system undergoing constant development and change. Conversely, the cultural sphere would also have to be similar to the rest of nature in the sense that the emotional and social functions must be distinguished from other functions, and incorporated into the overall categorial structure of reality. The emotional, rhetorical, and social concepts could not be reduced to chance or 'mere habit' without destroying the functional distinctions that produce their content and keeps them from each other. This would be tantamount to the kind of relativism which moments of self-contradiction were so thoroughly dissected in Hegel's own Phenomenology of Spirit. But Hegel is not always so consistent. Especially his music aesthetic is full of self-contradictions. Often he is able to sublimate these contradictions; but the sublations are not stable, and he is constantly relapsing into the kind of false dilemmas and pseudo problems he is himself critiquing.

The purpose of the following discussion is to dissolve these problems. So let us start with the immediate level; with Hegel's idea of a 'sounding soul', the embodiment of human self-consciousness in sound, which has been the main topic of our previous discussions. There are few, if any, thinkers that employ the term 'embodiment' more frequently than Hegel, and it is not limited to the body proper. Like in James' 'neutral monism', or in Wundt's 'monistic perspectivism', there is no isolated spiritual sphere in Hegel's universe. Even the 'immaterial' has a 'material' correlate, and is related to the material not as 'specific to specific', but rather as 'the truly general and overarching to the specific.'¹¹

Even the *thinking process* is felt and embodied; and like in James' and Wundt's, and even Damasio's conceptions of it, it is explicitly differentiated from the 'content' of thought: what we are thinking *about*.¹² As earlier mentioned, there is a growing awareness in neurobiology and the philosophy of mind today, of the importance of the kinaesthetic or sensorimotor aspects of feeling, both for the constitution of a sense of self and agency, and the perception of the environment which this self is constantly confronting. The commonplace notion of thought as

¹¹ Hegel, 'Die Philosophie des Geistes, § 389, Zusatz, 48.

¹² See for instance Hegel, 'Die Philosophie des Geistes, § 410, 186; but the distinction is formulated even clearer in a section on 'Musical Treatment of the Subject-matter' in Hegel's *Aesthetics*, Vol. 2: 'The same is true of the form of the *feeling* of a subject-matter which it is principally the business of music to express. As in self-conscious thinking, so here too there already enters into our vision and ideas the necessary distinction between (a) the self that sees, has ideas, and thinks, and (b) the object of sight, ideas, and thought. But, in feeling, this distinction is expunged, or rather is not yet explicit, since there the thing felt is interwoven with the inner feeling as such, without any separation between them.' 904.

isolatable from feeling and emotion, then, is rendered absurd, and it is a recognition that was fully shared by Hegel. 'Drive and passion is nothing else than the aliveness of the subject', he says for instance [Trieb und Leidenschaft ist nichts anderes als die Lebendigkeit des Subjects, nach welcher es selbst in seinem Zwecke und dessen Ausführung ist],¹³ and it is a statement which radicalness is only partly captured by William Wallace's translation:

Impulse and passion are the very life-blood of all action: they are needed if the agent is really to be in his aim and the execution thereof.

If isolated from these self-feelings, in fact, and the wealth of experience more peripherally related to it, the self is merely an 'indefinite shaft' [ein bestimmungsloser Schacht].¹⁴ Nevertheless, Hegel has a tendency to confuse this empty centre or 'shaft' with the kinaesthetic core-self, which, at least in the medium of sound, might well be produced from scratch, but is nevertheless concrete content. In any case, it is exactly at this articulated and freely produced core of selfhood where voice and music is performing such an important role according to Hegel. While the visual arts are capable of portraying a world of material objects, music cannot do this; consequently 'what alone is fitted for expression in music', he says, is 'the object-free inner life, abstract subjectivity as such'.

Stone and colouring receive the forms of a broad and variegated world of objects and portray them as they actually exist; sounds cannot do this. On this account what alone is fitted for expression in music is the object-free inner life, abstract subjectivity as such. This is our entirely empty self, the self without any further content.¹⁵

The question whether this 'abstract subjectivity' is really participating in, or merely *monitoring*, our inner lives - which of course, are always emotionally *concrete* and *replete* - is a problem we will come back to. There is little doubt, however, that the medium of sound is 'abstract' in the sense of being *purely dynamic*, and *transparent* in the sense of being *penetrated by the self and nothing but the self*. Moreover, since we are dealing with a kind of 'ideal and incorporeal

¹³ Hegel, 'Die Philosophie des Geistes', § 475, 298.

¹⁴ Hegel, 'Die Philosophie des Geistes', § 403, 122.

¹⁵ Hegel, *Aesthetics*, Vol. 2, 891.

corporeality' here [eine ideelle, eine sozusagen unkörperliche Leiblichkeit]¹⁶ - a phenomenon which is 'purely evanescent', and, as has also been pointed out by Hermann Helmholtz, has no existence apart from the mental forces that are producing it and the person who is perceiving it at this or that movement - even the minds of *other* people are captivated by this dynamism. There is simply no other refuge for music than this temporal and ego-dynamic sphere. At least Hegel is speaking of a 'loss of freedom' here; which is interesting, and call to mind the sense of defencelessness and vulnerability which especially otherwise typically self-controlled people have reportedly been experiencing when subjected to music.¹⁷

Expression in music has, as its *content*, the inner life itself, the inner sense of feeling and for the matter in hand, and, as its *form*, sound, which in an art that least of all proceeds to spatial figures, is purely evanescent in its perceptible existence; the result is that music with its movements penetrates the arcanum of all the movements of the soul. Therefore it captivates the consciousness which is no longer confronted by an object and which in the loss of this freedom is carried away itself by the ever-flowing stream of sounds.¹⁸

Especially the human voice, he says, 'can apprehend itself as the sounding of the soul itself, as the sound which the inner life has in its own nature for the expression of itself.' He even talks about a 'self-production and objectification of the soul as soul;' and what is more, he is pointing to the very criterium for such self-production, the fact that it is 'an expression which it regulates directly.'¹⁹ While, however, there is no doubt that the voice has a privileged, and biologically rooted, role in the constitution and communication of such feeling, this expression is not limited to the voice. Since the purely 'inner' is empty, and since the sensations of self are in a certain sense always 'outer', there is no fundamental difference between the voice and other instruments in this respect. It is not the instrument that matters most, but this element of control or 'direct regulation'. Even musical instruments might serve as such a medium for self-feeling then, if, as

¹⁶ Hegel, 'Die Philosophie des Geistes', § 401, Zusatz, 115.

¹⁷ One example of such vulnerability is furnished by Carl Gustav Jung's rumoured traumatic encounter with African music.

¹⁸ Hegel, *Aesthetics*, Vol. 2, 906.

¹⁹ Hegel, *Aesthetics*, Vol. 2, 903 and 922. Hegel also gives some examples, both here, and in his 'Philosophie des Geistes', in the Zusatz to § 401, of how this self-production in the medium of sound manifests itself in different personality types, national characters and so on.

Hegel put it, 'the externality of the instrument disappears altogether, i.e. if inner music penetrates this external reality through and through.'²⁰

It is a profound and very important recognition, which was based on an apparently mind-blowing experience from Hegel's own youth, of a guitar virtuoso, which, as he curiously formulates it, 'had composed great battle music in a tasteless way for this trivial instrument.' The man was a linen-weaver, he informs us, and 'if you addressed him, he was an ignorant man of few words'. Nonetheless, 'by putting into his instrument his whole soul', he not only 'forgot himself and produced marvellous effects', he was able to 'surpass himself', as if his soul 'knew no higher execution than the one that made these notes resound on this instrument.'²¹

Hegel's account of musical experience is as enthusiastic as was befitting in the romantic area, and it is an account which would have been completely in line with the conclusions that will be drawn in this treatise, were it not for the fact that Hegel is starting to contradict himself at this point, introducing materialistic and dogmatic elements, which are contradicted again, and so on. This is not to be understood as part of his ordinary dialectic, sublating conflicting positions, although it might well be utilised as such. We are dealing with genuine self-contradictions here, which are questioning in interesting ways his understanding both of temporality, embodiment, the specifically musical, and the self in general. It has to be mentioned, though, that what has been published as Hegel's aesthetics is merely a reconstruction of his lectures, based on his own and his pupils lecture notes, and there is always the possibility that some of the confusion might be caused rather by his pupils. As for the below discussed views and contradictions, however, they are so consistent that there is hardly any doubt that they stem from Hegel himself.

Like so many other philosophers before and after him, what Hegel first of all seems to have a problem with is the preoccupation with harmony and rhythmical regularity in music; which for some reason is not simply recognised as such, but connected amongst other things with a region of 'mathematical laws' and 'forms of regularity and symmetry,' not merely related to the experiences of harmony and rhythm as physical and quantitative correlates - which would have been the implication of his general account of auditory embodiment - but existing to a certain

²⁰ Hegel, *Aesthetics*, Vol 2, 957.

²¹ Hegel *Aesthetics*, Vol. 2, 957-958.

extent 'independently of the expression of feeling', or, in some cases, even freed from it altogether, constructing 'a musically regular building of sound.'

Music may be compared more closely with architecture, which derives its forms, not from what exists, but from the spirit's invention in order to mould them according to the laws of gravity and the rules of symmetry and eurythmy. Music does the same in its sphere, since, on the one hand, independently of the expression of feeling, it follows the harmonic laws of sound which rest on quantitative proportions, and, on the other, in relation both to the repetition of the beat and the rhythm and to the further development of the notes it is itself subject in many ways to the forms of regularity and symmetry. Consequently what dominates in music is at once the soul and profoundest feeling and the most rigorous mathematical laws so that it unites in itself two extremes which easily become independent of one another. When they do, music acquires an especially architectonic character because, freed from expressing emotion, it constructs on its own account, with a wealth of invention, a musically regular building of sound.²²

The analogy with architecture must be understood on the background of his previous treatment of the visual arts, which, at least at the time of Hegel, were even more closely tied to the realm of independently existing objects. Whereas architecture is seen as to a certain extent being liberated from this realm, we are nevertheless dealing with spatial objects here; and by talking of the possibility of some kind of engineering or 'building' even in music, the passage is in blatant contradiction with the above quoted statements on music as 'an art that least of all proceeds to spatial figures' and 'is purely evanescent in its perceptible existence'. It might well be argued that Hegel is talking metaphorically here, about a sphere of activity and feeling which, because of its externality and freedom, might justifiably be differentiated from 'emotion proper', or at least from more hard-wired and instinctual responses. But this does not make it into 'buildings', existing 'independently of the expression of feeling.'

The question whether such auditory 'buildings' are really possible and perceivable as such, is something we will come back to in later chapters. It is a hypothesis that was first tested, and to a large extent rejected, in the middle of the twentieth century, by composers like Webern, Boulez, and Xenakis. The formalism Hegel is thinking of then, must consist in something else, and it is natural instead to connect it with the increasing codification of music by abstract terms, rules,

²² Hegel, *Aesthetics*, Vol 2, 894.

and schemes in the eighteenth and nineteenth centuries, easily giving an impression of dealing with something independent and 'technical'. Especially amateur musicians and composers are often suffering from such dogma, implying not only a general desensitisation, but a certain behavioural incoherence as well, since the musical acts are detached from the expressive purport and the behavioural contexts from which the mentioned schemes and rules were originally derived. And the situation is not made any better by the pursuit of virtuosity for virtuosity's sake, which is still haunting our concert arenas.

It is apparently this superficial, quasi-gymnastic gesticulation, which Hegel has in mind here; and the fact that he is explicitly criticising it, makes it clear that he is not considering it a viable alternative.

Amongst all the arts music has the maximum possibility of freeing itself from any actual text as well as from the expression of any specific subject-matter, with a view to finding satisfaction solely in a self-enclosed series of the conjunctions, changes, oppositions, and modulations falling within the purely musical sphere of sounds. But in that event music remains empty and meaningless, and because the one chief thing in all art, namely spiritual content and expression, is missing from it, it is not yet strictly to be called art. Only if music becomes a spiritually adequate expression in the sensuous medium of sounds and their varied counterpoint does music rise to being a genuine art, no matter whether this content has its more detailed significance independently expressed in a libretto or must be sensed more vaguely from the notes and their harmonic relations and melodic animation.²³

It has sometimes been maintained that it is this freeing of music from texts which Hegel is so critical of; but considering the last sentence of this paragraph, and his account of Mozart's symphonies,²⁴ it should be obvious enough that it is rather formalism as such which is under attack here. In fact, Hegel's critique of formalism extends even into the field of music theory and its concepts. Especially the concept of 'scale' is interesting in this regard. Since this concept is very much a relict from earlier times, when the music was not consisting of harmonic progressions and contrasting chords, it has the misfortune now of leading to the false impression that even functional harmony is deriving from such a static reservoir of tones, or that it is somehow constructed or modelled directly after the harmonic series. By pointing amongst other

²³ Hegel, *Aesthetics*, Vol. 2, 902.

²⁴ Hegel, *Aesthetics*, Vol. 2, 923.

things to the antithetical role of 'the diminished and the augmented seventh,'²⁵ Hegel's descriptions are precise enough to challenge such ideas, emphasising instead the circumstance that scales are not independent 'structures', but abstractions from dialectical processes, incorporating opposition, modulation, and forward movement as essential features.

Music consists neither of single intervals nor of purely abstract scales and separate keys; on the contrary, it is a concrete harmony, opposition, and modulation of notes which therefore necessitate a forward movement and a transition from one to the other²⁶

It is certainly difficult to ally opposition, modulation, and forward movement with shape and symmetry. In fact, it might well be impossible; at least in a medium which is purely dynamic by nature. Whereas all shape is ultimately simultaneous and global, the field of behaviour is saturated both by asymmetrical 'growth' and a *non-simultaneousness* which is not merely a mode of presentation, but a component without which phenomena like movement and transition would never exist. But, as we will come back to in later chapters, this is a distinction which seems to have been much better brought out and exemplified by Wundt.

When it comes to higher level accounts of such processes, however, Hegel's descriptions are undoubtedly much richer than those of Wundt. Hegel's knowledge of classical music was pretty good; so good, in fact, that if he had had more confidence in his own observations, and a more 'arrogant attitude towards the special sciences', it might have rendered the whole analogy with architecture obsolete, providing instead a conceptual framework for a *purely psychological* music theory and hermeneutic. Indeed it is difficult to choose among his descriptions. Many of them are packed with emotional, rhetorical, and dramaturgical designations, which are not merely 'subjective', but might ultimately prove themselves as precise labels and tools in the analysis of these kinds of behavioural gestalts. The beneath paragraph, describing the battle between dissonance and consonance, the allaying of this battle, and the consequent 'celebration of the satisfying triumph of melodic tranquillity', is quite illustrative in this respect. Notice especially that, while the description is framed entirely in behavioural terms, it is at the same

²⁵ Hegel, *Aesthetics*, Vol. 2, 927.

²⁶ Hegel, *Aesthetics*, Vol. 2, 920.

time keeping entirely within the sphere of auditory and 'abstract' ego-dynamic processes. It is not concerned with any objects or relations which are not manifested in the music as such.

Boldness in musical composition therefore abandons a purely consonant progression, goes on to oppositions, summons all the starkest contradictions and dissonances and gives proof of its certainty nevertheless of being able to allay the battles of these powers and thereby to celebrate the satisfying triumph of melodic tranquillity. We have here a battle between freedom and necessity: a battle between imagination's freedom to give itself up to its soaring and the necessity of those harmonic relations which imagination needs for its expression and in which its own significance lies.²⁷

The confusion between behaviour and shape is as primitive as it is common; and as we have seen, it might easily have been overcome by Hegel. His description of music in behavioural terms comprehends not only what might be the *purpose* of this behaviour: 'the satisfying triumph of melodic tranquillity', but in several ways the detailed logic of these processes as well; which leaves little room for any formalism. The fact, however, that he is not yet ready to reject this formalism completely, should be sufficiently reflected by the last sentence of this paragraph, speaking of a battle between 'freedom' and 'necessity' as well: the necessity of 'those harmonic relations which imagination needs for its expression'. And it is exactly this concept of *freedom*, being in opposition with, and defining itself against a set of *laws*, which is bringing further confusion into his discussion of tonal music.

First of all, it is utterly obscure what these laws are supposed to consist in, if they are concerned neither with coherent behaviour nor with the constitution of spatial objects. Nor is it easy to understand how Hegel can operate with a region of laws which is both unfree and 'empty and meaningless', when his usual definition of laws is pointing rather to what is reasonable, actual, and definite in terms of content.²⁸ The illusion of some laws deriving from 'the purely musical sphere of sounds' is apparently difficult to get over; and it is understandable that Hegel is tempted to contrast it with *freedom*, which is such a central component of his definition of human existence and consciousness. But let us first consider the idea of 'harmonic laws'.

It is certainly a harmonic law that the experience of harmony and tonality is produced by the harmonic series with its multiplications of a fundamental periodic frequency; but it is also a 'dis-

²⁷ Hegel, *Aesthetics*, Vol. 2, 932.

²⁸ See for instance Hegel's *Logic, Being Part One of the Encyclopedia*, § 6 and § 133.

harmonic law' that dissonance, atonality, and noise is not periodic, or not reducible to such frequencies. There is nothing forcing us to emphasize the first of these options. On the contrary, there is probably more noise than harmony in nature; and as ordinary human behaviour and intonation is concerned, it is characterised rather by the constant *negation* of harmony: a manifestation, perhaps, of the 'absolute restlessness' - 'das absolut Unruhige, die reine Tätigkeit'- which Hegel considered to be an essential characteristic of the mind [Geist].²⁹

Whether we are consciously affirming harmony or instinctually avoiding it - which seems to be the normal condition - the feelings are all the time in accordance with physics and numerical relations. In fact, they are *produced* by it, as are any other instances of feeling. At least the feelings are always in need of some kind of *physical* correlate: a brain, and something producing the feelings in the brain. In other words, there is no principal difference between sound and other media in this respect. Even the feeling of muscular tension is produced in compliance with physical laws, as is the feeling of relaxation; but this does not make the latter sensation more lawful than the former. Similarly one might well maintain that it is a law that parallel fifths are destroying the sense of independent voices in polyphonic music; or that an authentic cadence is more conclusive than a plagal cadence; but there is nothing about acoustics that forces us to choose one of these options rather than the other. Even at Hegel's time there were plenty of music which contained both parallel fifths and plagal cadences, when such conclusiveness and independence of melodic voices was not wanted.

The kind of 'law' we are dealing with here is the law of *self-identity*, and the system of reality falling into different categories of existence. To speak of something *concrete*, a concrete feeling, style, or a specific realm of reality as having a higher and more lawful status than other realms of reality, is tantamount to dogmatism and the kind of Platonism which Hegel is by and large rejecting. Nevertheless: it is precisely Hegel's ascription of such laws to 'the notes themselves', to acoustics, or to a 'quantitative sphere', as he calls it, which is making his dogmatism so conspicuous in this case; as if this 'quantitative sphere' was not merely a correlate for everything which exists, but had a will of its own, so to speak, and a specific preference not only with regard to sensations, but with regard to progressions as well.³⁰

²⁹ Hegel, 'Die Philosophie des Geistes', § 378, Zusatz.

³⁰ Hegel, *Aesthetics*, Vol. 2, 911.

Such dogmatism is not only absurd, and out of touch with Hegel's usual metaphysic, it is a conception which throws his whole understanding of *embodiment* into doubt; as if sound was not merely a medium, in which the self was free to embody itself, but that the medium of sound, and 'the quantitative sphere', were rather *forcing us to sing*, as it were, rendering this 'melodic tranquillity' not a self-production and embodiment of feeling, but merely an antithetical reference point for the freedom of the self. But considering the almost total dominance of harmony and sustained tones in song, the self would not be free to produce itself at all in such a model. It would at best be restricted to some isolated moments of dissonance and deflection; or to a predetermined repertoire of emotions, asserting themselves in almost total opposition with their own activity and sensory presence.

As a defence of Hegel's point of view, and his dialectical way of reasoning, one might well argue that our dealing with the inborn tonality of our own voices is representing a necessity, since we are equipped with voices in the first place, and since this 'tonality' is providing a constant and necessary background for the production of tension and pitch in ordinary intonation. At least this would have been the case if we were not also able to produce noise. But this is the case of ordinary feeling and intonation, not music; and the tonality is not really there; it is merely implied or negated. There is certainly nothing forcing us to *affirm* it, like in song. Nor is song in opposition to harmony, like in ordinary intonation. On the contrary, it is something emphatically asserted and strongly felt, making it into another category of feeling altogether. If there is anything necessary here, it is rather the element of restlessness, which is so dominant in ordinary intonation, and which is a central aspect of being alive. Song and music is also in need of such unrest, and one might well say that harmony is battling against it; but this is a battle between assurance and doubt, not between feeling and physics.

Perhaps it would not be entirely wrong to say that if there is any difference between auditory feelings and other feelings with regard to freedom from natural constraints, this rather speaks to the advantage of sound. While our bodies are constantly producing sensations which we have to free us from - intrusive bodily needs and desires - pains that are difficult to get rid of - sound does not do this; except for tinnitus, hallucinations, and 'brain worms', that is; but these are pathological conditions. Only to a limited extent do we control the neurotransmitters and instinctual mechanisms which are involved in many emotions; but we do control song and melody; which is probably partly also why our personalities are constituted in a richer and

deeper manner in voice and music than even in facial expression. Of course, our voices are also manifestations of mood, general levels of energy, sensibility, and so forth; factors which to a certain extent are beyond our conscious control. There is also an element of physical resistance and effort involved in the production of sound, which is also a natural constraint; but this is true for all voluntary activity.

A melody is not more restrained by these physical and physiological factors than other feelings. It is probably less controlled by such restraints; and as strange as it may sound, this is not making it *less* mental, but rather *more* mental, since it is to an even higher extent penetrated by the conscious self.

Music is certainly confined by its medium, in the sense that the types of contrast, and the amount of contrast going into the activity is limited by the possibilities of the medium; but again, this is true for all feeling, and it is a circumstance which rather favours sound, since the amount of parameters and dimensions is greater here. The phenomena of harmony and tone are also opening up for some unique experiences, and a huge variety of behaviour and modes of behaviour dealing with these experiences, which is hardly conceivable in any other sensory medium. It is paradoxical that it is exactly this extreme richness and freedom which is also confused with *unfreedom* here, since it is so different from what we usually regard as 'emotion'. One seems to be forced to choose between two options then: either one have to accept these states of mind as separate categories of emotion; or one have to exclude music from the realm of emotion altogether; which has been the position of Eduard Hanslick and the formalists who succeeded him.

Hegel's position is not so clear; or to be more precise: he is clearly in a position of confusion; which is probably better than remaining in error. Having relapsed into a mode of thinking of laws as something concrete, he is forced into the kind of 'unhappy' fluctuation between untenable oppositions which is so precisely described in his own *Phenomenology of mind*. As a general diagnosis one might say that he is alienated by the specifically musical, ascribing it an independent physical necessity, which we have to free our selves from. When defending music as a fine art, however - as contrasted with more trivial emotional processes - the situation is inverted, since now he is forced to describe the specifically musical in positive terms, as something peaceful and free, which is 'bridling' or liberating the emotions, 'so that there is no being carried away into a bacchanalian rage or whirling tumult of passions, or a resting in the

distraction of despair, but on the contrary an abiding peace and freedom in the outpouring of emotion.'In its close link with harmony,' he says another place, 'the melody does not forgo its freedom at all; it only liberates itself from the subjectivity of arbitrary caprice in fanciful developments and bizarre changes;³¹ and one might well wonder what remains of his idea of a 'battle between freedom and necessity' if harmony and conflict are to an equal extent manifestations of freedom.

Surely there is a tendency in Hegel's thinking towards abandoning the whole conception of some necessary physical structures in music. Often, when talking about it - sometimes in the very next sentence - he seems to recognise its untenability, denying such necessities altogether, speaking now of music as 'spirits invention', as something which is 'moving in an element first manufactured by and for art.' 'Music does not possess a natural sphere outside its existing forms, with which it is compelled to comply', he says for instance, 'the range of its compliance with law and the necessity of its forms fall principally in the sphere of the notes themselves.' But even the 'notes themselves' and 'the numerical proportions' are very much deprived their own will, since while 'having their basis in the nature of sound itself,' as he puts it, they are 'used by music in a way first discovered by art.'³²

Only in a passage on rhythmical regularity and metre, however, this false opposition between numerical proportions and feeling is seemingly sublated, and the physical medium is rendered a mere correlate for the experiences which are manifesting themselves. At least this seems to be a good example of his recognition of something specifically musical as emotion in its own right; as the kind of self-production, in fact, which is implied by his own conception of embodiment.

The satisfaction which the self acquires, owing to the bar, in this rediscovery of itself is all the more complete because the unity and uniformity does not pertain either to time or the notes in themselves; it is something which belongs solely to the self and is inserted into time by the self for its own self-satisfaction. For in nature this abstract identity does not exist. Even the heavenly bodies have no uniform beat or bar in their motion; on the contrary, they accelerate or retard their course so that in the same time they do not traverse the same space. The case is similar with falling bodies, the projection of a missile, etc., and still less do animals reduce their running, jumping, snatching, etc. to

³¹ Hegel, *Aesthetics*, Vol. 2, 939 and 930.

³² Hegel, *Aesthetics*, Vol. 2, 894, 920, 898, and 911 respectively.

the precise repetition of a measure of time. In this matter, the beat proceeds from the spirit alone far more than do the regular fixed magnitudes of architecture, analogies for which may more easily be found in nature.³³

Notice that in this case he is abandoning both the analogy with architecture and the idea of some necessary forms pertaining to 'the notes themselves'. Whereas he was earlier speaking of rhythm as 'subjected to the laws of regularity and symmetry', he is now rejecting this altogether, and identifying it instead with the self; as an 'abstract identity' which does not exist in nature at all, but is 'inserted into time by the self for its own self-satisfaction'; and it is a recognition which could easily have been applied to our dealing with tone and harmony as well. In fact, he comes close to defining song and dance as a separate and valuable category of emotion. This however, he does not; and it might well be the main deficiency of his music aesthetic. Instead it is the concept of 'freedom' that is taking centre stage in his account of the specifically musical; the focussing on the element of repetition, regularity, and return in music as manifestations of 'the free self-subsistence of subjective life'.

Only as this movement, which never runs off into vagueness but is articulated in itself and returns into itself, does melody correspond to that free self-subsistence of subjective life which it is its task to express. In this way alone does music in its own element of inwardness perfect the immediate expression of the inner life, and it imparts to that expression, immediately becoming inner, the ideality and liberation which, while being obedient to the necessity of harmonic laws, yet at the same time lift the soul to the apprehension of a higher sphere.³⁴

As repressive as this might seem with regard to the *emotional* purport of music - its harmonious and singing character, and the affirmation and celebration of this harmony - his move is nevertheless understandable, since by connecting this otherness instead with the concept of *freedom*, he is making this concept seem much more absolute and detached from the condition of animal life. If not exactly incorporating it within the field of emotion proper then, the specifically musical is not really excluded from the realm of behaviour. On the contrary, he says, such activities 'liberate' and 'perfect the expression of inner life', and 'lift the soul to the

³³ Hegel, *Aesthetics*, Vol. 2, 915-916.

³⁴ Hegel, *Aesthetics*, Vol. 2, 933.

apprehension of a higher sphere'; which is certainly giving music a high rank in the hierarchy of existence. The question, however, is whether it is rather too high; since, by identifying this self-reflexivity and liberation with musical activity, he seems to exclude such reflexivity and freedom from those periods of time when we are not participating in it; as if our self-consciousness was somehow amputated or turned off when outside the mode of singing and playing.

As is so often the case, Hegel's thinking is not without a core of truth and deep insight. Music is certainly constituting a very intense and deep realm of collective feeling in most cultures, without which these cultures would be much more shallow, bland, and incoherent, if imaginable at all. And there is no doubt that music is requiring a much higher level of self-reflexivity than ordinary intonation; if only because the unrest is less immediate here, and in need of a temporal dialectic, which is requiring a much higher level of synthetic and memorial capacity. The concern with stasis and tonal fixation in song is simply meaningless and dead outside of a rhetorical context, which is probably why an animal is seldom engaging in it, at least not beyond the business of primitive howling or rhythmical self-stimulation. We are concerned with a level of reflexivity here, which often takes time to grasp even for humans. Once the required abilities are obtained, however, there is nothing preventing such reflexivity from leaving its mark on other modes of intonation as well. Song needs intelligence for its existence, but that does not mean that intelligence needs song.

Hegel seems to construct an illusionary divide between musical and ordinary behaviour by exaggerating the chaos of the latter processes; as if in ordinary feeling we were always 'carried away into a bacchanalian rage or whirling tumult of passions, or a resting in the distraction of despair'. But even in ordinary intonation and atonal music there is plenty of self-reflexivity. In fact, even such atonal modes of intonation are constantly relating both to the past and the future, involving even direct references to concrete events as well as recurring pauses and figures, if not necessarily in the same manner as in the activity of constantly insisting on harmonic repose and swinging movements. If such harmony and swing was a necessary component of consciousness and composure we would better sing and dance all the time.

Certainly the condition of *art* is deeper and more coherent than ordinary life. It is deeper because it is exactly this comprehensive, existential self-reflection, and the intensification and transcendence of ordinary feeling which is the goal here. At least it is a goal which is pursued with much more rigour, and in a much more condensed and rounded manner than in ordinary

life. But this is not limited to song and tonality. Not even the occurrence of 'bizarre changes' and so on. are necessarily in contradiction with unity and roundedness. On the contrary, the integration of 'bizarre changes' in a piece of music may require *more* of consciousness, and therefore transport it to a *higher* level, than in music of a more monotonous kind; assuming that the activity is really coherent and rounded. The operas of Wagner, Berg, or Schoenberg, are seldom repeating passages or returning to tonic triads, yet they are no less self-reflexive than a Baroque opera or a monotonous pop-tune.

The problem with Hegel's account of music, however, is not that he is emphasising the element of freedom, but that he is repressing the *emotional idiosyncrasy* of tonal music - the affirmation of harmony - from his own consciousness; which is neither possible nor necessary. It is not possible because it exists, to large extent even in Hegel's own vocabulary; and it is not necessary because there is no opposition between these things. On the contrary: by highlighting the experience of harmonic vibration and movement in music, he might have provided a link with some existential questions, and the issue of belief and doubt; which seem to be integrated elements of his own definition of 'absolute spirit': the circumstance that thought, as he puts it, has the freedom to 'withdraw itself from everything external and from its own externality, its very existence; it can thus submit to infinite *pain*, the negation of its individual immediacy: in other words, it can keep itself affirmative in this negativity and possess its own identity'.³⁵ Perhaps one might even argue that without this existential perspective, and the element of doubt and pain which is so typical of human existence, the celebration of *calm* in music would never come to be.

Obviously it is this grasping of *infinity* which is supposed to be the guarantor of absoluteness here. When talking of *limits*, says Hegel, we are already beyond them. The *finite* then, is merely posited by reason. By 'presupposing itself for its knowledge to work upon,' he says, 'it thereby reduces itself to finitude, and appears as everlasting movement of superseding this immediacy, of comprehending itself, and being a rational knowledge;' which might well be an important recognition.³⁶ The question, however, is whether this consciousness is really as absolute as Hegel believes. Certainly there are many stages and levels in the development of animal and human

³⁵ Hegel, *Philosophy of Mind*, § 382.

³⁶ Hegel, *Philosophy of Mind*, § 441.

consciousness, both as far as intelligence and emotional depth is concerned. It might even be possible to speak of many infinities. In fact, every antinomy or paradox could be seen to incorporate it. When we furthermore know that even some animals are able to feel anxiety, to engage in self-stimulation, to confront and transcend their own limits when solving problems, a situation of either-or - either totally free or not free at all - becomes much less plausible.

The idea of an unsurpassable gulf here is seemingly reinforced by Hegel's occasional identification of thinking with language;³⁷ but even this is contradicted by his own recognition that words or 'names' are 'externalities which of themselves have no sense', and that it is 'logical instinct which gives rise to grammar.'³⁸ The cognitive apparatus of apes is basically the same as ours, and even animals must organise and categorise their perceptual experience, which is hardly speaking of an absence of logical instinct. It might well be that human beings are approaching a limit with regard to what is beneficial in terms of consciousness; and that religion, art, and philosophy are constituting the final stages of this development. To speak of *absoluteness* and 'free will', however, is quite another matter. It is not necessarily proven by harmonious music.

The point, however, is that even when free will *is* proven by harmony and the religious sentiments that often to go along with it, we achieve this by virtue of an emotional and existential dialectic, implying the awareness of mortality, finitude, pain, and the necessity of cultivating harmony, not by battling with an emotionally indifferent framework of harmonic laws. If the components that are going into a musical process had no implicit content or value, the whole activity of dealing with these components would not only be devoid of meaning and motivation, the ego-dynamic stream would lack its continuous presence as well, and the possibility of integrating the temporal components into behavioural gestalts or wholes. But these are problems we will come back to in connection with Leonard B. Meyer's relativistic and more culturally oriented account of music. Hegel's conception of harmonic laws as something concrete and binding is already discussed and rejected as illusory and dogmatic.

Similarly, to speak of something *outside* laws, is equally tantamount to nihilism, since it would imply a lack of all the content which, according to Hegel himself, is constituting system and 'law' in the first place. It might perhaps be argued that by pointing to the abstract *innerness*

³⁷ See for instance Hegel, *Aesthetics*, Vol. 2, 898.

³⁸ Hegel, *Philosophy of Mind*, § 459.

of perception, and the self continuously positing itself against all content, we are outside the system; but this is merely the empty vantage point of consciousness. There is no content here. In fact, there is not even pain. Nor is this *abstract* innerness engaging in reality as something *concrete* and productive.

The phenomena of innerness, attention, and perceptual unity might well be likened with a point, but it is not a concrete point moving back and forth or to and from itself; except when it is turned off, that is, like in deep sleep. This, however, is how Hegel tends to talk about the self: as something which is 'rediscovering itself' in the bar, 'recalling itself and finding itself again', and making 'gaps' in the ordinary continuity of things.³⁹ Sometimes he even identifies it with tone and harmony. 'The inner life', he says for instance, 'is as a self this spiritual point which apprehends itself in notes *qua* the expression of itself';⁴⁰ which is not untrue: there are few feelings, if any, which have a stronger focus and living presence than a tone. Still it is never more than a *moment* of the self. Hegel is certainly approaching this recognition. Nonetheless, as long as the components going into the stream of self-consciousness are alienated from each other by being ascribed to contrasting regions like law, freedom, physics, emotion, self, not self and so on, the self would nevertheless be fragmented and deprived of synthetical unity; that is to say, of any content beyond some isolated fragments.

The fact is that the self is neither a specific tone, a beat, nor something alternating with it. The self is there both in discord and concord, tension and relaxation. It is there when we are questioning something, when we are hoping, struggling, or expecting, and when we reach a conclusion. Moreover: these functions are not isolated from each other. On the contrary, they are penetrating each other and constituting synthetical wholes at different levels. The frustration of getting a problem cannot be isolated from something frustrated. Similarly the conditions of hope, expectancy, and suspense are incorporating both this frustration and the idea of a possible solution. In some cases, depending on the stage of the process, they might even incorporate a sense of the struggle it would take to get there; a process which might already be started, but is at yet mixed with hesitancy and uncertainty. And when the resolution comes, its function and effect is nothing less than the product of the whole foregoing process; which is not merely

³⁹ Hegel, *Aesthetics*, Vol. 2, 914.

⁴⁰ Hegel, *Aesthetics*, Vol. 2, 921.

pointing to it, or joining with it, but integrated in the very conception of it, while at the same time preserving the aspect of time and stage which is lying at the heart of all behaviour. The moment of *conclusion* or *close* is certainly an entity in itself, with the potential of constituting the content of an abstract concept or even a term, but it is an entity which does not come into being without *a specific prehistory*, *a mental synthesis*, and sense of *actual temporality*.

It is this accumulation and interpenetration of stages and acts, and the general character and style in which they are executed, which is constituting self-consciousness, not a particular moment of these processes, or the mere idea of *innerness*. As Hegel says himself: the immaterial is related to the material not as 'specific to specific', but rather as 'the truly general and overarching to the specific [wie das über die Besonderheit übergreifende wahrhaft Allgemeine sich zu dem Besonderen];'⁴¹ which, however, is not entirely correct, since this synthesising of behavioural processes is also producing *concrete* and *new* higher level entities, not merely abstract concepts of things which already exist. In terms of higher level content then, the difference between physical and psychical is indeed 'specific'.

If the charting of physical reality into abstract categories was the sole mission of psyche, it would be reduced to a map or diagram. Certainly this conceptual systematisation is necessary for the constitution and diversification of content. Even this is validated by the neurosciences today, talking about a separate system for so called 'semantic memory', which might better be called 'conceptual memory', since it is not necessarily connected with language per se.⁴² The fact, however, is that even human behaviour and the field of emotions is contributing categories and concepts to this system. Far from being outside it, this is a prerequisite for our definition both of self and other. As we will come back to in the last chapter: the categories pertaining to the self might even be richer than that of inanimate matters. In addition comes the level of the particular, covered by so called 'episodic memory', which is comprising both the concrete details of a particular situation, as well as the memory of entirely specific events.

⁴¹ Hegel, 'Die Philosophie des Geistes', § 389, Zusatz, 48.

⁴² It is a fact, which is immensely important for correct treatment and therapy, of course, that even global aphasics may retain a considerable amount of intelligence and conceptual capacity, while people with so called 'semantic dementia' do not. But these are still contentious issues, especially since the functions of all the brain regions which are involved in conceptual thought and in language comprehension are not yet properly identified or differentiated from each other. See for instance Pessi Lyyra, 'Review of José Luis Bermúdez: *Thinking Without Words*', in *PSYCHE*, Vol. 11, Issue 2 (March 2005).

When it comes to Hegel, his thinking sometimes reminds a bit about the materialism and relativism he criticises so fiercely: the ascription of reality and lawfulness to immaterial nature alone. Other lines of thought that spring to mind are Damasio's tendency to conceive of self-consciousness as the mere trajectory of a body in nature, not to speak of Husserl's almost obsessive preoccupation with the experience of physical objects in some of his main works. And it is natural to ask whether Hegel is really aware of the emergent entities and processes pertaining to the sphere of psyche? Does he really pay enough attention to the coherence and autonomy of these processes; and just as importantly: is this inner life of ours really covered by his overall system within which all content is defined and confined in terms of falling within categories of what is possible and meaningful?

The answer to these questions seems to be yes, if not consistently, or without confusion. He is certainly aware of the magnitude both of the 'extended' or 'autobiographical' self, as well as the more continuous and immanent core of self-feeling and kinaesthesia. 'The underlying essence' [das Substantielle] of the person or 'genius', he says for instance, 'is the sum total of existence, of life, and of character, not as a mere possibility, or capacity, or virtuality, but as efficiency and realised activity, as concrete subjectivity.'⁴³ His treatment of feelings, emotions, and non-verbal communication is comprehensive indeed, and he never leaves any doubt that this content is *what we are*. What I feel, says Hegel, *I am*; and what I am, I feel.⁴⁴ Nor is he totally caught up in immediate matters here. As much as he has learned from people like Condillac, he explicitly rejects the conception of the mind as a mere aggregate or association of sensations. Because, he argues, 'it is a matter of chance whether the link of association is something pictorial, or an intellectual category, such as likeness and contrast, reason and consequence. The train of images and representations suggested by association is the sport of vacant-minded ideation';⁴⁵ all of which is suggesting an element of synthesis and conceptual awareness even at the local level of feeling.

There is no doubt at least, that Hegel wants to locate all feelings and emotions within a totality of mediated content. Especially when discussing moral and religious feelings in the Encyclopedia this becomes very clear. Here the concept of freedom is not defined as going

⁴³ Hegel, *Philosophy of Mind*, § 405.

⁴⁴ Hegel, 'Die Philosophie des Geistes', § 402, Zusatz, 119.

⁴⁵ Hegel, *Philosophy of Mind*, § 455.

outside the system - which is impossible - or being in conflict with laws - which was the case in his account of tonal music. On the contrary, it is considered a product of *recognising* this system and these laws, acquiring thus the more lasting and robust happiness which results from putting ones immediate problems and acts into perspective. 'With the stigma of immediacy upon it,' Hegel now argues, 'the subject's liberty is only a *manner of life*, without the infinite self-reflection and the subjective inwardness of *conscience*.' It is these considerations, says Hegel, which 'govern in their further developments the devotion and the worship in the religion of fine art.'⁴⁶ It is also the essence of mental health.

The self-possessed and healthy subject has an active and present consciousness of the ordered whole of his individual world, into the system of which he subsumes each *special* content of sensation, idea, desire, inclination, etc., as it arises, so as to insert them in their proper place. He is the *dominant genius* over these particularities. Between this and insanity the difference is like that between waking and dreaming: only that in insanity the dream falls within the waking limits, and so makes part of the actual self-feeling. Error and that sort of thing is a proposition consistently admitted to a place in the objective interconnection of things. In the concrete, however, it is often difficult to say where it begins to become derangement.⁴⁷

What is still problematic and ambiguous here, is Hegel's tendency to talk about 'the individual world' and 'the system' in the same breath. Certainly our lives are totalities or contexts, which have to be in balance, but they are not systems, let alone 'the system'. On the contrary, they are just as particular as the content of which they are consisting. It is also doubtful whether Hegel is fully aware of the synthetical units or *gestalts* at the *local level* of these processes. When he is talking about wholes, it is almost always these larger wholes, totalities, and the system of abstract categories, he has in mind.⁴⁸ He is certainly aware that the emotions might have a content which somehow reflect this totality; nevertheless, as long as he does not properly recognise the behavioural syntheses and functions which are occurring at the local level of the processes, his whole conception of consciousness might easily collapse, since if the content of the ongoing processes were reduced to immediate matters, merely filling this gigantic picture,

⁴⁶ Hegel, *Philosophy of Mind*, § 557.

⁴⁷ Hegel, *Philosophy of Mind*, § 408.

⁴⁸ See especially Hegel, 'Die Philosophie des Geistes,' §402, the main text as well as the *Zusatz*.

the self would still be reduced to a thing, or a succession of isolated points. It is true that Hegel is considering a musical work to be a whole - which, as was already prescribed by Aristotle's poetics, 'must be firmly rounded in itself, and thus needs a definite beginning and end, so that the middle is only the mediation between the beginning and the termination'⁴⁹ - but this is just as far as it goes; and if this totality is first grasped in the *finished* work, or *after* the process, as is indicated both in his *Aesthetics* and his *Philosophy of Mind*,⁵⁰ the self would still be empty, since in the meantime we would be unconscious.

In reality, of course, even the psychological realm is consisting of concrete synthetical entities at different levels. It is true that it makes a difference whether or not these entities are brought to a more conscious level by being verbalised and put into perspective. Nonetheless, this synthetical activity is going on all the time, even in non-verbal and 'half-conscious' communication like music, constituting functions and wholes at all levels and stages of the processes. A statement is a whole, merging into a phrase, merging into a section, merging into a movement, merging into a work, merging into a concert, merging into a life; and the individual makeup of these entities and processes should not be confused with the static system of concepts and categories within which they are falling. It is first at an abstract and general level that it is possible to talk about a universal system or metaphysics; which, as mentioned above, is also indicated by the distinction between episodic and semantic memory in the neurosciences.⁵¹

This is also the perspective in which the problem of immanence and *autonomy* in Hegel's philosophy of mind has to be understood. It is true that Hegel is ascribing to the emotions a certain intentionality or directedness. The content thus produced, however, is often deriving entirely from *outside*, says Hegel; like in *satisfaction, joy, hope, fear, anxiety, and pain*.⁵² The problem is just that, if these emotions did not also have a content which was deriving from the activity of the person, it would be impossible to differentiate between them, nor would they contribute anything to the self and the ego-dynamic processes as such.

⁴⁹ Hegel, *Aesthetics*, Vol. 2, 933.

⁵⁰ Hegel's *Aesthetics*, Vol. 2, 897, and his 'Philosophie des Geistes', § 402, *Zusatz*.

⁵¹ It should be noted though, that even the distinction between abstract and concrete is paradoxical and dialectical. If all content is synthetical of nature and mediated by its oppositions, it is always already conceptual. Even at the level of physical objects this would be the case. Conversely, if it was not specific also, it would hardly have any individual existence.

⁵² Hegel, 'Die Philosophie des Geistes', §472, *Zusatz*.

First when reaching the *ethical* realm, says Hegel, it is possible to talk about a sphere of such purely mentally derived content, and he is pointing especially to the feelings of *shame* and *remorse*. The question, however, is whether this in a certain sense should rather be the other way round. Especially the study of music might play an important role in this connection, by showing how emotions like joy, pain, and even hope and anxiety, may perfectly well be manifested even in instrumental music, indicating that these emotions are primarily concerned with the autonomous dynamics of the self; or if we are to borrow one of Husserl's more enlightening terms: they are first of all 'immanently directed'.⁵³ It is perfectly possible, for instance, to feel both hope and anxiety without relating to anything specific, except perhaps the idea or indication of a fortunate or unfortunate future. As a matter of fact, even Hegel is recognising that the kind of 'object-free inner life' in music is capable of displaying even 'jubilant delight' and 'the deepest grief'.⁵⁴ In the case of *shame* and *remorse*, however, the situation is different, since these emotions are also involving the idea of other people; which are people also, but extrinsic entities all the same.

What should be sufficiently demonstrated by now, at least, is that Hegel's conception of 'the ordered whole of his individual world' is not as complete and open as he likes to think. Especially the occasional confusion between abstract categories and concrete circumstances is remarkable, and it is not exactly speaking of a liberation from 'natural consciousness'. On the contrary, it is indicating the extent to which we are still relying on it, whether we are mentally healthy or 'deranged'. Similarly, we have seen several examples of Hegel describing in great detail phenomena which are not really incorporated into his own 'speculative reason', such as the category of song and harmony, or the stream of purely ego-dynamic functions which are manifesting themselves for instance in music. And there is little doubt that Wilhelm Wundt has gone further than Hegel in the formulation of some of the principles which govern these processes; at least this holds for some general principles, which distinguishes behaviour from shape, such as the principles of 'creative synthesis', 'mental growth', 'heterogony of ends', 'intensification through contrast', and 'development towards opposites'.

Wundt might not have contributed much to the understanding of concrete psychical dramas and rhetorical figures, which is where the real content of music and self-consciousness is starting

⁵³ M. Sukale, *Comparative Studies in Phenomenology* (The Hague: Martinus Nijhoff, 1976), 96.

⁵⁴ Hegel, *Aesthetics*, Volume 2, 939.

to crystallise; nevertheless, he went much further than most of the psychologists and philosophers that succeeded him, including even some of the gestalt psychologists, whose consciousness and focus to a large extent remained at the level of spatial objects. In fact, this is undoubtedly a field where psychology and the neurosciences are still in need of phenomenological information, which enterprise is not exactly discouraged today; but this the subject matter of the following chapters.

Chapter 3

The Self as Dynamic Gestalt

3.1 Wundt and Köhler on the actuality of behavioural gestalts

It should be sufficiently argued by now that the self is always in need of sensory presence and identity, incorporating as a central constituent the experience of its own voice and a self-generated 'behavioural melody': a coherent sense of being and thinking as isolated from what we are thinking *about*. But, as was highlighted especially in the discussion of Damasio's and Hegel's account of self-consciousness: the elements of sensation and time are never sufficient conditions for a self or melody to emerge. Without a conceptual *synthesis*, a sense of duration, development, and a developed apperception of the mental acts *as mental acts*, the self, or a melody, is little more than an isolated point. The circumstance that such points are following each other in a sequence does nothing to provide neither duration nor content beyond the chaotic or purely linear trajectory of let's say a ball or the growth of a plant.

The same is true of the long-range aspects of selfhood. Without an overall synthesis, and a mental 'drama' which is also self-reflected and autonomous, a history or autobiography would be little more than a chaotic stream of events. Not only would the local sense of *questioning* and *answering* be missing, the very idea of *reasoning*, *preparing*, *struggling*, *finishing* and *celebrating*, with its nonspecific ideas of *optimism*, *doubt*, or more complex and personal *styles* and *strategies*, would be totally absent.

The consciousness of agency and self is apparently more than a stream. It seems to imply a separate realm of acts and activities as well: what is usually referred to as emotions, frames of mind, rhetorical figures and schemes, mental stages and functions in the process of dealing even with purely existential doubts and delights. It is a type of content which is falling within the general concept of *behaviour*, but it is a separate aspect of behaviour, concerned primarily our selves, our own lives and personalities. This is also why the energetic and individually oriented concept of *mental dynamics* or *ego-dynamics* might seem like a more precise denomination of

these processes. Intriguingly enough, there are many signs now, that this dichotomy is also reflected in the organisation of the brain, as the prefrontal cortex in the *right hemisphere* is both more holistic and melodic than its left accompanist. As we will come back to in later chapters: the study of lesions to this region of the brain might be confirming not only the existence of the above mentioned functions but also their importance, since the consequences of missing them are often grave.

We are dealing with a region of content here, which Wundt was classifying as 'Psychischen Gebilde' or 'psychical gestalten', and if we are to believe in Hegel's identification of music with the self, it is nowhere observed in a purer form than the autonomy of a musical work. It might even be argued that music is consisting entirely of such psychical gestalten. So while seeking for scientific traditions and nomenclatures that might already have charted such content, we must be open to the possibility that much of this is not yet integrated into the field of psychology and philosophy of mind. The self is a work in progress, and especially the field of music has contributed tremendously to its enrichment and growth during the last centuries.

A basic constituent of all intellectual processes, however, is the commonplace experience of *questioning* something, dramatically increasing the vocal and tonal tension, or challenging a tonal centre by moving to let us say the sixth or the fourth. Such questioning is implying both the memory of the initial repose, the memory of having deflected from it, as well as a sense of active and ongoing opposition. It is a self-reflected behavioural entity. Yet its constituents are never simultaneous. Then there would be no sense of deflection or questioning at all, but a static chord or dissonance. The same is true for the sense of *suspense*, *expectancy*, and *foreshadowing of resolution* created by the fifth or by a dominant chord. And when returning to the tonic, the sense of *conclusion* is incorporating an even larger process of mutually penetrating stages. It is a distinct entity, what we call a perfect cadence, yet it is neither a spatial object nor a word. The word 'cadence' may well exist in the vocabulary of linguists and classically trained musicians, but it is not necessary for the experience of such entities; nor does it have any meaning if detached from such experience.

It would not be wrong to say that the experience both of spoken and sung cadences involves as a prerequisite a conceptual grasping and categorisation of rhetorical and harmonic functions. The process might not be wholly conscious, but it is allowing us to monitor and manipulate the intellectual acts according to generalised 'gists' of what the acts and melodic fragments are

doing. According to the research of Mary C. Potter, our perceptual and cognitive processes are very much depending on a continuous evocation and forgetting of such 'gists', which is usually too rapid to be consciously monitored. It is first at larger time-scales that they might be manipulated in working memory and episodic memory as elements of intentional thought and reflection. She calls it 'conceptual short range memory' or CSTM,¹ which is not specifically referring to musical or 'ego-dynamic' entities, but there is little doubt that the region of self-awareness, emotion, and conation is implicating a separate aspect of such rapid and half-conscious mental conceptualisation.

As evidenced especially by the complexity and variability of music, our grasping of intonation and other kinds of emotional behaviour is reliant neither on words nor detachable from its sensory and temporal content, which is the illusion often produced by language. On the contrary, it is precisely these sensory and behavioural gestalts which seem to provide content both to our immediate and conceptual experience of intellectual processes. At least there is little doubt that the progressions and entities just described are really experienced; that they are, in fact, *what we experience* when we perceive an intonation pattern or a harmonic progression.

What makes the art of music so illustrative of the embodied and autonomous existence of such entities is the circumstance that music is detached from any circumstances that are extrinsic to the volitional activity as such. It is a manifestation of what Hegel called 'object-free inner life, abstract subjectivity as such...our entirely empty self, the self without any further content.'² But the self, to the extent that it is really there, is never empty; it needs a sphere of content that is pertaining to itself. The 'transcendental ego', in as far as it is not an 'ego' but a mere locus of integration, might well be empty, and the medium of sound is certainly empty in terms of lacking independent existence; but at the same time it has a certain potential, opening up for realms of emotional content which are arguably richer and more manifold than in any other sensory modality. And it is not limited to the local level of behaviour. A piece of music might also be differentiated according to contrasts between *squarely articulated* and *cantabile*, between *determined* and *digressive*, between *dialectical argumentation* and *repetitive jubilation*. As a

¹ Mary C. Potter, 'Conceptual short term memory in perception and thought', *Frontiers in Psychology* (27 April 2012); <https://doi.org/10.3389/fpsyg.2012.00113>.

² Hegel, *Aesthetics*, the chapter on 'Music' in Volume 2, 891.

matter of fact, these are the configurations which are often constituting higher level perceptual entities like sections, movements, styles and works.

Similarly, it is easy to observe how some music, take a Beethoven sonata, might be going through different emotional stages, like untroubled *joy* and *certainty*; periods of great *doubt* and *hesitation*; perhaps followed by attempts at *repression* and return to joy, which are, more likely than not, relapsing into *flashbacks* and moments of *disenchantment*; by periods of *struggle*; by more or less premature experiences of approaching *triumph* and *mastery over doubt*, necessarily leading to new periods of *disenchantment* and struggle, before a sense of *clarification*, *victory*, or *reconciliation* is finally reached.

We are dealing with wholes here, which are clearly organised, but manifesting merely *the autonomous dynamics of psyche*. In other words: we are approaching, through the study of music, a phenomenology of the kinds of entities 'which at any rate were not simply impressed from without', as William James put it, but are constituting rather what he was referring to as 'a native wealth of inner forms whose origin is shrouded in mystery'³

While James deserves credit for recognising the existence of psyche here, his allusion to *nativism* is more problematic; so problematic, in fact, that the issue is better addressed straight away. Not only does the concept of 'nateness' evoke the idea of emotional expression as a mere reflection of something mysteriously 'inner' and 'inborn', such nativism tends to obscure the very *constitution of content*, as if the properties and character of the content was somehow irrelevant in relation to it being genetic, conventional, or programmed by repeated associations and the like.

It is true that our capacities for synthesising perceptual entities are native in the sense of requiring neural correlates specialised for temporality, actions, multitasking and so on. Even the conscious agent, and the sense of agency as such, has to be built up layer by layer by different neural mechanisms, loops, and networks. It is an open question to which extent the activities that are synthesised by these mechanisms are automatic, instinctual, or instances of 'conscious' self-production. Especially Antonio Damasio has emphasised the role of instinctual and even *insentient* 'action programs' in emotion - primitive reflexes involving jagged or recoiling motions⁴ - which is not entirely wrong, but does not exclude more conscious and intentional

³ James, *The Principles of Psychology*, Volume 2, Chapter 28, 632.

⁴ Damasio, *The Feeling of What Happens*, 70-71.

constitution of emotion. Undoubtedly there are also more complex levels of emoting: jubilation, jocularity, encouragement, or mistrust, all of which are incorporating what Wolfgang Köhler was referring to as 'insight' and 'understandable relationship'.⁵ As we will come back to below, it is usually these conscious and personal appraisals which are referred to as 'emotions', not the instincts, reflexes, or bodily urges. Certainly, if there were no elements of appraisal and freedom of choice in our lives, there would be no point in having feelings and consciousness as guiding lights in the first place. Everything could just as well happen automatically. Interestingly enough, and in diametrical opposition to Damasio, Wilhelm Wundt was suggesting that conscious volition might be something extremely fundamental, and prior to automatisisation even in primitive animals.⁶

In any case, it is important to realise that the phenomena do not need to be old or *native* to be real and 'universal'. Nor is nativeness as such providing any synthesis or content. On the contrary, whether an emotion is conscious or instinctual, old or new, it is always a product of its immediate physiological and sensory components. Certainly these amalgams might be enriched by going into higher level contexts and amalgams. But this does not necessarily detract from the identity of their elements. On the contrary, the amalgams are obviously reliant on the properties of their constituents. By integrating the elements in a wider perspective and consciousness, the properties might even be seen to be strengthened and cemented in most cases. Indeed, this might even be a law of physical materialisation: 'collapsing the wave function', so to speak.

What is formulated here is very much the essence of what Wundt was referring to as 'the concept of actuality', a 'method of considering all the contents presented to us in experience in their immediate reality, unmodified by any hypothetical supplementary concepts.'⁷ This was also the alternative by which Hegel and Husserl were attempting to supplant the inner-outer divide in Kant's philosophy; and it is an insight which is receiving a very concrete and empirically founded formulation in Wolfgang Köhler's gestalt psychology:

⁵ Wolfgang Köhler. *Gestalt Psychology: An Introduction to New Concepts in Modern Psychology* [1947] (New York: Liveright, 1992), 326.

⁶ The movements of the lowest animals, Wundt claims, 'are evidently all simple volitional acts', *Outlines of Psychology*, Chapter 2, § 14.10, 193.

⁷ Wundt, *Outlines of Psychology*, § 22.7, 316.

If I refer to the calmness of a man before me, I refer to a fact which I perceive. This "calmness" appears to be the same kind of state as I sometimes find, and sometimes fail to find, in myself. Under ordinary circumstances I am not interested in any other calmness which may be ascribed to the man. Similarly, if the man "gets excited," the *crescendo* which occurs before my eyes and ears is not, of course, a neutral sensory fact; rather, the dynamics of the perceptual event *is*, or *contains*, what I call the man's excitement. I do not ask myself whether something that belongs to a different world accompanies the impressive display.⁸

It is precisely this identity of content with its perceptual constitution which lies at the heart of Köhler's reasoning; and it is a question which does not really concern the issues of origins, which seems so important to biologists and historicists. 'It never occurs to the authors in question', says Köhler, 'that function might be orderly when neither inherited nor acquired arrangements in the nervous system are responsible for the fact.'⁹ Instead of focussing on the functional identity of this content, he says, 'they simply hand their problems down to somebody else.' But 'sooner or later', he says, the 'functional problems must be treated in functional terms.'¹⁰

What is particularly interesting from a musical point of view is the fact that Köhler's conception of such functions and *gestalts* is stretching even into the field of behavioural comprehension, which, he emphasises, is not consisting of *gestalts* in the sense of 'shapes', but nevertheless organised entities. The concept of a 'disturbance' is a good example of such a dynamic *gestalt*. Not only is it difficult to imagine outside a temporal framework, it is demonstrative of an integrative and holistic principle which is manifest even at the most elementary levels of temporal perception.

In the case of thought processes an event is a "disturbance" only with regard to a larger and otherwise unitary whole which it interrupts. Without this reference the word has no meaning. Those who are acquainted with the theory of music will remember that a tone has the character of the "tonic" only within a musical development in which it plays a particular part. The same is true of the "leading tone" which points beyond itself not independently, but as part of a larger musical structure.

Similar cases can easily be found among the adjectives and verbs. "Hohl" ("hollow") and "offen" ("open"), "complete" and "incomplete" belong in this class, in that their meanings refer to

⁸ Köhler, *Gestalt Psychology*, 241-242.

⁹ Köhler, *Gestalt Psychology*, 113.

¹⁰ Köhler, *Gestalt Psychology*, 124-125.

specific experienced units in which these adjectives are alone applicable. In the realm of terms which designate events and activities we have, for instance: "starting" and "beginning," "ending" and "finishing," "desisting," and "interrupting," "proceeding" and "continuing," also "deviating," "bending," "retarding," and so forth. If we consider the meanings of such words as "hesitating" or "deviating," we find that their meanings presuppose the occurrence of larger coherent developments, changes of which are designated by these terms. The developments may be melodies, or the activities of other people as we see them, or thought processes which take their course in a person. Essentially, the meanings of such words remain the same in all provinces of experience; for the principal phases of organization are not restricted to any special fields.¹¹

Yet even if Köhler is talking of tonality and harmonic functions here, he does not pay much attention to the affirmation of harmony as a *specifically musical* function or mode of being. It is a problem which might well have been resolved by Köhler by being true to his own empirical approach, simply describing and taking at face value the manifestations of tone and harmony. Instead he seems to avoid the issue by focussing on some elementary or 'principal phases of organisation,' which, as he puts it, are common to all fields of behaviour. This is well and good, but it is not made clear by Köhler that even when behaviour is transcending these 'principal phases,' and differentiated into behavioural and prosodic modalities like song, dance, and speech, these differences could also be explained in terms of functional and qualitative identities. Certainly we do perceive the difference between these things. The perceptual distinctions between song, dance, and speech and are just as concrete, and even less relative than the differences between calmness and excitement; so there is no reason why Köhler should shy away from these concepts. Nevertheless, his focussing on 'principal stages' here, might indicate that he has not completely managed to free himself from the nativism he is criticising.

It may well seem strange to start a presentation of the gestaltist approach with what seems more like a rejection of skepticism and relativism. Nevertheless, this skepticism and relativism was very much what the mentioned thinkers defined themselves against. We are talking of an *emergentistic* versus a *reductionistic* approach to reality here, which is different precisely in the sense of emphasising the coming into being of new and higher level functions. Certainly, everybody is recognising these entities when talking about emotions and other things, they are

¹¹ Köhler, *Gestalt Psychology*, 205.

just taken for granted. Being so integrated and common parts of our lives, the problem of their composition is not very pressing, and to the extent that it is even addressed, it is often referred to some kind of mystical 'supernatural' or 'cultural' realm, which is detached from science and 'reality proper'.

The fragmentation and self-contradiction that is necessarily going along with such reductionism is reflected in many variants of skepticism and relativism, like the so called 'poststructuralism' or 'deconstructivism' of the late twentieth century, but also in eighteenth century empiricism and associationism, and the materialist illusion that music or behaviour in general could be analysed at a mechanistic level below the experienced psychical functions and dramas. A similar ignorance of emotional gestalt formation is revealed by the talking of *perception* as something entirely different from *expression*, like in the subjectivist idea of musical appreciation involving different faculties and principles than musical composition and performance; as if the complex and subtle experiences we call *music* or musical *styles* and *works* could be constituted by one thing in the one moment and something else in the next, and thus by anything whatsoever, which is rendering the whole concept of music, styles, and works completely redundant and meaningless.

If instead we choose to focus on functional organisation, like in gestalt theory or in neuropsychology, it becomes much more obvious how perception and expression are not only activating the same parts of the brain; the symptomatology of neuroscience is also demonstrating how fatal it would be to confuse or project one distinction or function onto another distinction or function, or something organised onto something entirely undifferentiated and vice versa. It is true that there are examples, like agnosia or colour blindness, that are evidencing an occasional absence of such discrimination. But agnosia and colour blindness are extreme cases, which are potentially lethal or only marginally in conflict with orientation. Certainly, colour blindness might be lethal too, if a person fails to distinguish between poisonous or edible food, which is probably why we have developed this sense in the first place.¹² In most cases, says Köhler, both the behavioural and spatial fields are consisting of 'circumscribed units from which their

¹² While it is true that the light spectrum itself has no categories of colour, the things being perceived as coloured - flowers, insects etc - are nevertheless reflecting frequencies which are fixed by interactions between the animals which do perceive colour and the plants and insects that possess them, being part of a common food chain and reproductive system. The inner and outer are to a large extent already in harmony then. Furthermore, it is not that the categories of colour, the system of complementarity etc. are entirely devoid of reality and objectivity. On the contrary, they have a real psychophysical existence in the animal brains.

surroundings are excluded.' If the sensory field consisted of mutually independent sensory grains,' he argues, 'man would find it a hard task to orientate himself in such an environment.'¹³ Indeed, there would hardly be any environment or orientation at all.

According to Köhler 'James did not admit that this *organization* of the field is a sensory fact, because he was under the influence of the empiristic prejudice.' The accusation is grave, and, as Köhler is also admitting, it is mitigated somewhat by James' rejection of atomism.¹⁴ Nevertheless, there are plenty of examples of James speaking of the intellect 'cutting up the flux' according to different perspectives and so on;¹⁵ as if external reality or perceptual input was not merely complex and changeable, but somehow indefinite and amorphous as well. This amorphous 'flux' he identifies with 'pluralism', and it is questionable to which extent he understood that difference and change rather than being in opposition to identity and categorial structure is entirely dependent on it for a differentiation of content and function.

An amorphous stream related to an amorphous stream related to an amorphous stream and so on, produces neither content nor categories, let alone any higher level emotional functions or 'alternative worlds', which is the perspective that is often set up by James. The element of nativism in James' thinking also seems to have prevented him from realising that when something *really* new is produced, like in music, or in the evolution of *any* material and mental entities, this is not 'a mere ape and counterfeit of real inward fitness', as he puts it, but something *actual*.¹⁶

While reckoned 'the father of experimental psychology', Wundt is undoubtedly more of a rationalist than James. To this the below discussions should testify. Especially his hierarchical and elaborate system for classifying emotion, his differentiation between spatial and behavioural cognition, and the productive function which is accredited especially to volitional apperception, are significant contributions to psychology. In fact, his understanding of these circumstances is in several respects transcending that of Hegel, who tended to confuse the psychological realm with apperceptive or metaphysical reflection as such. While the apperceptive and comparing faculties are apparently necessary for the grasping and combination of psychological functions into even

¹³ Köhler, *Gestalt Psychology*, 139 and 163.

¹⁴ Köhler, *Gestalt Psychology*, 137 and 339-340.

¹⁵ See for instance the start of Chapter 7 in James, *Some Problems of Philosophy*, in *Writings* (New York: The Library of America, 1987), 1040; or *The Principles of Psychology*, Vol. 2, Chapter 28, 634.

¹⁶ James, *The Principles of Psychology*, Chapter 28, .639.

higher level entities and relations, Wundt is explicitly opposing the view that 'the existence of psychical elements and compounds is the same as their apperceptive comparison.'¹⁷ It seems to be much clearer to Wundt than to Hegel, that the psychical realm is not merely *re-producing* the natural world as an integrated whole, but that it is also *producing* a completely different kind of *inner world*, with its own kinds of entities, hierarchical levels, and principles of organisation. Wundt's 'law of psychical resultants' has already been mentioned, and it is time now to take a closer look at how he defines it.

A comprehensive formulation is to be found in the beginning of the section on 'Psychological Laws of Relations' in the last chapter of his *Outlines of Psychology*. Typically, although somewhat surprisingly in this case, he is drawing on music for exemplification, ascribing even to 'a compound clang', some 'ideational and affective attributes' which are more than a mere 'sum of single tones'. Like Köhler he contrasts his view with *nativism*, and the contradictions in which nativism is necessarily involving itself by tending to ignore the 'new attributes'. Then he is pointing to the function of 'apperceptive synthesis' and the activities of imagination and understanding, which are not only giving the elements 'a new signification', as he puts it; this activity is itself productive of 'new psychical content that was made possible, to be sure, by these elements, but was by no means contained in them.' Especially works of art and trains of logical thought are mentioned as 'striking examples' of such apperceptive synthesis.

To those how are not familiar with these lines of reasoning, Wundt's text might well seem abstruse and dense at times, and it is not always furnished with good examples; but it should be evident enough how the conception of let us say a *dominant chord* is in need of a certain amount of experience and comparative activity for its existence. It does not exist in isolation from the idea of a *tonic chord* and the kind of rhetoric within which these chords are constituting opposite but mutually dependent functions. Similarly an *interrupted cadence* is not experienced as such in isolation from the experience of a *full close*. Even more complex are entities like 'development section' or 'chorus', which would be entirely meaningless if isolated from the idea of a more decisive and contrasting 'exposition'.

It is partly this circumstance that the content, logic, and 'independent psychical causality' of such processes does not exist at lower levels, at the same time as it is entirely dependent on its

¹⁷ Wundt, *Outlines of Psychology*, § 17.6, 252.

constituent elements, which seems to be implied by Wundt's concept of 'psychophysical parallelism'. He does not defend the idea of some kind of otherworldly 'mind stuff.'¹⁸ It is an open question, however, whether concepts like emergentism, 'neutral monism' or Wundt's own concept of 'monistic perspectivism' would serve better for this purpose, since both the sensations and these larger mental syntheses are necessarily in need some kind of 'physical', if not exactly mechanistic, constitution.¹⁹

And when it comes to concrete descriptions of these syntheses, Wundt seldom penetrates so far into music theory as exemplified above. Nevertheless, a much more concrete definition of the 'psychical resultants' is to be found in the beginning of the chapter on 'psychical compounds' [psychischen Gebilde] in the same book. In fact, this passage is so packed with important points that it might well be quoted in its entirety. Most notably we recognise here many of the points that were later advanced by Köhler: the conception of emotional behaviour as forming 'gestalts', which are objectively 'marked off' [abgegrenzt] from their surroundings, and the timely warning that while the different categories of such content might well be designated by words, this should not lead to the confusion that we are dealing with fixed and static 'things'.

By "psychical compound", we mean any composite component of our immediate experience which is marked off from the other contents of this experience by particular characteristics, in such a way that it is apprehended as a relatively independent unity, and is, when necessity demands it, designated by a special name. In developing these names, language has followed the general rule that only classes and the most important species into which phenomena may be grouped, shall have special designations, while the discrimination of concrete compounds is left to immediate perception. Thus, such expressions as ideas, emotions, volitional acts, etc., designate general classes of psychical compounds, such expressions as visual ideas, joy, anger, hope, etc., special species included in these classes. So far as these designations, which have arisen from practical experience, are based upon actual distinguishing characteristics, they may be retained by science. But science must give an account of the nature of these characteristics and also of the peculiar contents of each of the chief forms of psychical compounds, in order to give every single an exact meaning. In doing this, we must avoid from the first *two* presuppositions to which the existence of these names might easily mislead us. The first is the view that a psychical compound is an absolutely independent content of immediate experience. The second is the opinion that certain compounds, for example ideas, have the nature of

¹⁸ Wundt, *Outlines of Psychology*, §22, 316-320.

¹⁹ The potential reality of so called out-of-body experiences would certainly provide the concept of parallelism with a new significance, but it would not necessarily introduce a non-physical sphere.

things. The truth is that these compounds are only *relatively* independent units. Just as they are made up of various elements, so they themselves unite to form a complete interconnection, in which relatively simple compounds may continually combine to form more composite ones. Then, again, compounds, like the psychical elements contained in them, are never things, but *processes* which change from moment to moment, so that it is only through deliberate abstraction, which is, indeed, indispensable for the investigation in many cases, that they can be thought of as constant at any moment.²⁰

It is not always clear what Wundt is talking about here: egodynamic *gestalts*, *gestalts* in general, apperceptive processes, or the abstract and 'constant' *concepts* which are resulting from such processes. And when he goes on to classify these things, the categories are also somewhat jumbled. First he distinguishes between *ideas* [Vorstellungen] and *affective processes* [Gemüthsbewegungen]; then he subdivides these classes into 'three chief forms of *ideas*: 1) intensive ideas, 2) spacial ideas, 3) temporal ideas; and three forms of *affective processes*: 1) intensive affective combinations, 2) emotions, 3) volitions.'²¹

The distinction between ideas and affective processes is somewhat curious, and probably deriving from his view that our conceptions of material objects are mediated by the abstract idea of *externality*, while the affects are more immediate.²² But, as was pointed out by Wundt himself: even the experience of a *self*, to which the affects are ascribed, is mediated; and even the affective entities are temporal complexes forming ideas and concepts. Wundt might well be misled by the metaphorical origin of the word 'Vor-stellung' here, suggesting that, when ideating, we are dealing with something placed *before* ourself; but even other people's emoting and our own acts and mental states are often occupying our attention in this sense. Whether the sensations are ascribed to the environment or to the self, there is no principal difference between the amount of perceptual compounding.

A better distinction might be 1): our sensations, ideas, and concepts of physical objects and processes, and 2): our sensations, ideas, and concepts of mental states and activities, which is probably also the most usual way of talking about these things.

²⁰ Wundt, *Outlines of Psychology*, § 8.1, 90.

²¹ Wundt, *Outlines of Psychology*, § 8.3, 93.

²² Wundt, *Outlines of Psychology*, § 22.6, 314.

Anyhow, it is Wundt's understanding of psyche, and the so called 'affective' content of which it is constituted, which will be our focus of attention here. If his treatment of the harmonious modes of being is elementary, his treatment of some general characteristics of psyche is certainly detailed enough; and since this is also the sphere to which music is thought to belong, the following discussion should also be relevant to music.

3.2 Wundt's musical approach to emotion

3.2.1 Elementary aspects of emotion and music

First of all: emotion is an *english word*, which connotations are both very complex and sometimes inconsistent with respect to usage.²³ The concept seems roughly equivalent with Wundt's description of *die Affekte*, and at first glance his definition appears pertinent enough. An *emotion* [affect] he says, is 'a series of feelings succeeding one another in time,' which 'unite to form an interconnected process which is distinguished from preceding and following processes as an individual whole, and has in general a more intense effect on the subject than a single feeling.'²⁴ It is a pertinent definition, because there is undoubtedly something more to emotion than mere feeling, drive, or reflex action. As opposed to what Antonio Damasio has sometimes argued, it might even be necessary to incorporate a personal or at least a conscious perspective here, which would never come about were it not for the parameter of time and a considerable amount of memorial and synthetical capacity. A machine might well be operating forcefully and harmoniously, but it would not be appropriate to call it *happy*. A plant may well retract from harmful environs, but it would not be correct to call it *afraid*. Similarly, the feelings of *hunger* or even *horniness* - which were so important to Freud - is probably experienced as being somehow 'out of context' in terms of personal purport, and too much of an involuntary physiological impingement to be called *emotion*.

As for the element of *intensity*, the situation is not as obvious; not only because many single sensations can be extremely intense, but because emotions come in all degrees of intensity. The

²³ A comprehensive presentation of different definitions of 'emotion', and a subsequent attempt at a more integrative account, is presented in James Hillman, *Emotion: a Comprehensive Phenomenology of Theories and their Meanings for Therapy* [1960] (Illinois: Northwestern University Press, 1992). Which is not to say that it is complete. The long-range and *dramaturgical* components of many emotions, for instance - like in nostalgia, regret, disillusionment and so on - are given relatively little attention by Hillman. As was noted by Wundt, the tendency to imagine emotion as something unarticulated and thing-like is widespread; which is partly why the concept of 'egodynamics' is often preferable, especially when talking of musical and mental processes.

²⁴ Wundt, *Outlines of Psychology*, § 13.1, 169.

experience of hope, melancholy, or nostalgia may well be strong, but also extremely faint, or even 'subconscious' in many cases. The situation also seems to be that, if not in a state of complete paralysis or coma, we are never without a certain sense of bodily presence, mood, motivation, and organised sensorimotor activity. When attempting to observe our selves in a placid state of mind, however, it is easy to ignore the observer, and come to the conclusion that there is no emotion there; but even this activity of *observing, scrutinising, being concentrated, curious, undecided*, coming to a *conclusion*, entertaining a *belief* etc. are temporal gestalts and frames of mind which, if detached from the auditory and kinaesthetic feelings of effort, tension, suspense, resolution, harmony and so on, would never exist as such.²⁵

If limiting the concept of emotion to situations of high intensity and autonomic arousal then, one might run the risk of developing a very fragmented picture of psyche. It is true that emotion is often spoken of in terms of high intensity and arousal, like when people are described as being more or less emotional - and this is even more evident in the case of *affect* - but since this concept is nevertheless meant to denote a general level of consciousness here, above the level of feeling in the hierarchy of psychical compounds, it is an open question whether Wundt would have been better off by dropping this criterion of intensity altogether, or by dropping the whole concept of *affects* in favour of more neutral and precise concepts like *autonomic reactions and urges* versus *frames of mind* produced by voluntary activity and more complex *ego-dynamic and psychosocial functions*. Indeed, this is the principle which will later be adhered to, when attempting to sketch out a typology of content manifestable in sound.

As we will later see, Wundt's occasional fixation on the element of *intensity* in emotion is clearly creating problems for his understanding of mental processes. Yet his account of these matters is far from unambiguous. 'All that is necessary to arouse [erzeugen] an emotion in all its fullness', he says for instance, 'is a mere hint [hinweisung] of qualitative affective content, such as it is possible to give in music through the clangs of a musical composition.'²⁶ Which, as we can see, is also bringing up the problem of Judd's translation. The German word 'erzeugung' is obviously closer to the idea of *production* than to *arousal*, and if this is also Wundt's intension,

²⁵ This recognition, that all experience, even cognitive functions like *belief*, boil down to sensations and feelings, was also central to 18th century empiricists and sensualists like Hume and Condillac.

²⁶ Wundt, *Outlines of Psychology*, §13.7, 176. In the subsequent chapter, on page 190, when dealing with the motivation of intellectual activity, and the 'psychological impossibility' of 'purely intellectual' motives and volitions, he is also talking about 'a degree of emotional excitement' which is often 'so weak and transient that we overlook it'.

he is in effect saying that 'emotion in all its fullness' is *constituted* by the rhythms and clangs, not merely *aroused* by them. The concept of 'Hinweisung', on the other hand, is more indirect even than a *hint*, and pointing more in the direction of *pointing* and *reference*, and it is not entirely clear whether such a 'pointing to qualitative affective content', which is already affective, is supposed to be requiring further arousal. There is no doubt that such arousal is often engendered, especially when we are listening to music, but it is not as obvious that this it is required to classify as 'emotion', or that it happens as easily as Wundt is indicating here.

The semantics is ambiguous, reality is real, and it is immediately begging the question of the role of the autonomic and limbic systems in emotion, as contrasted with the more voluntary, aesthetic and kin-aesthetic, feelings. By accrediting a considerable amount of 'qualitative affective content' even to clangs, however, there is little doubt that Wundt is reckoning even these auditory feelings as *part of* the emotions. The same is obviously the case when he is speaking of 'feelings of rhythm' and 'intense rhythmical impressions.' In fact, the feeling of rhythm is presented as a critical point here, at the border between feeling and emotion, which is already satisfying the requirement of 'a particular form of occurrence', but much more dubiously so the requirement of a certain intensity or arousal.

Every feeling of greater intensity passes into an emotion, and the separation between the two depends on a more or less arbitrary abstraction. In the case of feelings that have a certain particular form of occurrence, that is *feelings of rhythm*, such an abstraction is strictly speaking impossible. The feeling of rhythm is distinguished at most by the small intensity of its moving effect on the subject, which is what gives "emotion" [Affekt] its name. Still, even this distinction is by no means fixed, and when the feelings produced by rhythmical impressions become somewhat more intense, as is usually the case, especially when the rhythm is connected with sensational contents that arouse the feelings greatly, they become in fact emotions.²⁷

Already at this point, speaking of rhythm, motion and e-motion in the same breath, Wundt's account of emotion must start to look very strange to many a cognitivist and linguist. To an even higher extent than more physical concepts, the content of emotion terms seems to be constituted and re-enacted below the threshold of intellectual awareness, making only these sound-labels stand out with some clarity. And when formalist terminology and modelling is further detaching

²⁷ Wundt, *Outlines of Psychology*, §13.1, 169-170.

ourselves from the real world, the illusion of a world of disembodied ideas or words is complete. But seldom are the emotions *inside* these words. The experience of harmonious and vital activity, or of a slow, dragging, and intermittent sequence of movements, may well seem empty if detached from the labels which are sometimes attached to these states, yet it is activities like these which *constitute* the emotions, not the fact that they are called *joy* or *woe*. It is true that these qualities are occasionally partly manifested in the sounds and rhythms of the words - the circumstance that words like 'fun' and 'joy' are inherently brisker than let's say 'sorrow' or 'melancholy' - but this is only serving to confirm the musical aspect of emotion, which only to a very limited extent is compatible with the operation of signification. Especially when it comes to more extensive manifestations this is clear.

Yet it is surprising in many cases how little is required to establish a certain mental state. Even Antonio Damasio has shown how the 'jagged fast movements' of a chip on a computer screen is sufficient to make something appear 'angry', while 'harmonious but explosive jumps will look "joyous", and recoiling motions will look "fearful,""²⁸ all of which is demonstrating the extent to which such rhythmical processes are essential components of many emotions. And here the *sensory* components and relations, which exist in such an abundance and with such precision in music, are not even mentioned.

Then there are the bodily sensations and arousals, which James was referring to as 'the coarser emotions', 'the bodily sounding board', and the 'secondary pleasures';²⁹ and even Wundt is quick to comment on these matters. 'As a result of the summation and alternation of successive affective stimuli there is here not only an intensification of the effect on heart, blood-vessels, and respiration', he says, 'but the *external muscles* are always affected in an unmistakable manner.' As a rule, he says, these movements are 'entirely involuntary', engaging first the facial and oral muscles, then, when the emotions get even stronger, the whole body, like in trembling, convulsive contractions of the diaphragm, paralytic relaxation and so on. These reactions may nevertheless be modified, he adds, through 'voluntary intensification or inhibition of the movements or even through intentional production of the same', so that 'for the outside observer they are as a rule indistinguishable'; in fact, he wants to include 'the whole series of external reactions which we shall have to discuss under volitional acts' as potential elements of such

²⁸ Damasio, *The Feeling of what Happens*, 70.

²⁹ James, *The Principles of Psychology*, Chapter 15, 468-469.

emoting; which again is speaking of a certain confusion on Wundt's part, especially since he was just describing it as 'entirely involuntary'.³⁰

The necessity of such autonomic and bodily perturbations has already been discussed in connection with James' account of music. As unmusical as James is sometimes believed to be, there are few people who have put more effort into clarifying these matters. The question is important, although the total elimination of such 'reverberations' is very much a hypothetical situation. Under normal circumstances the body and the 'bodily sounding board' always seems to be active to some extent; which may also be the reason why Wundt has not focussed on this question. It redounds to the credit of Wundt's experimental approach, at least, that even the experience of the increasing speed of a metronome is found sufficient to produce an involuntary increase in respiration rate in the listener, as well as a tendency to synchronise it with the metronome; a phenomenon which even in the case of such elementary and monotonous stimulations seems to be going along with the purely rhythmical pulsations to produce some kinds of emotional composites. 'When the rate changes', Wundt says, 'we observe at first a quiet, then a sthenic [intense], and finally when the rapidity is greatest an asthenic emotion.'³¹ And when the music is incorporating a graspable behavioural process and a whole range of very powerful sensory elements as well, it is difficult to imagine that the mental states into which we are thus manipulated are not triggering the rest of our nervous system also. After all, a person is normally operating as a unit.

The instinctual components of vocalisation are extremely deep-rooted, and the pathways and connections between the auditory cortex, the neighbouring insular cortex, and the limbic system are undoubtedly very pronounced and strong. Under normal circumstances it may not be possible to hear *any* sound without some kind of further reverberation in the nervous system.³² The pathological impairment of this system, and the corresponding loss of 'warmth' and 'emotional depth' in some variants of amusia, has already been mentioned, but could be

³⁰ Wundt, *Outlines of Psychology*, § 13, 171-172.

³¹ Wundt, *Outlines of Psychology*, § 13.7, 175.

³² A comprehensive treatment of these matters is given by Rhawn Joseph in a chapter on 'Limbic Language: Social Emotional Development and infant Speech, Hypothalamus, Amygdala, Septal Nuclei, Cingulate', in *Neuropsychiatry, Neuropsychology, Clinical Neuroscience* (New York: Academic Press, 2000). Especially he is pointing to the circumstance that 'laughter, fear, cries, warning calls, and a variety of emotional vocalisations have been generated via electrode stimulation of various areas in the limbic system, including the hypothalamus, amygdala, cingulate gyrus, and septal nucleus, and the circumstance that the same areas often become activated in response to certain emotional sounds.' 'The limbic system', he argues, 'is more vocal than any other part of the brain.'

interpreted in different directions depending on how detrimental this 'loss' is really felt to be. If the music is nevertheless comprehended as such, the volitional feelings and the behavioural gestalts might still be intact and autonomous to some extent; and productive, if not exactly of full-blown emotions, then at least of certain mental modalities, rhetorical functions and so on. The question of the separability of these strata however, can only be determined by further research into such cases, or cases where the interoceptive feelings are gone altogether. Interestingly, and somewhat contrary to his emphasis on homeostatic symptoms in emotions, even Damasio is considering the possibility that, in cases of spinal chord damage, the facial musculature, the vocal apparatus and so on, may nevertheless remain as an available base for feelings.³³

If Wundt did not focus on this question, the importance of 'the physical symptoms', as he called it, is nevertheless discussed in connection with the problem of classifying the emotions. So plentiful, variable, and composite are these symptoms, that he finds it impossible to base a typology on any specific sensory components. Not only are the types of components varying according to intensity, 'It may sometimes happen', says Wundt, 'that emotions with very different, even opposite kinds of affective contents, may belong to the same class so far as the accompanying physical phenomena are concerned. Thus, for example, joy and anger may be in like manner sthenic emotions. Joy accompanied by surprise may, on the contrary, present the appearance, on its physical side, of an asthenic emotion.' 'All we can do', he says, is to take 'a general survey of the fundamental forms of emotions', according to principles that must be 'psychological'. For, as he puts it: 'the accompanying physical phenomena have only a symptomatic value and are even then, as noted above, equivocal in character.'³⁴ Which is a strange thing to say, since it is difficult to imagine any affective experience which is not constituted by some kinds of 'physical' and sensory phenomena. Even if some of the components of such states could be 'equivocal', the total complex, in as far as this complex is actually constituting the emotional experience, could not.

Sometimes one almost gets the impression that Wundt is relapsing into the antithesis of his own sensualism, in 'monistic perspectivism', but not necessarily in 'psychophysical parallelism', suggesting the idea of one single psycho-physical field where the composite entities and the

³³ Damasio, *The Feeling of what Happens*, 290.

³⁴ Wundt, *Outlines of Psychology*, § 13, 176-178.

distinction between inner and outer are produced by creative synthesis and apperceptive comparison. In later editions of his *Outlines of Psychology* he even includes an explicit critique of the James and Lange theory of emotion here. His main argument, however, that the amount of *visible* emotional symptoms may both be incomplete and misleading in many ways, is sound enough. And the crucial point that the emotions are synthetic, psychical entities, which do not even exist at lower levels, is undoubtedly much better brought out by Wundt than by James. The implications of the emergentist and gestaltist recognition that the whole is more than the sum of its parts, should never be underestimated, although it is questionable whether this is limited to the psychical sphere. At the same time, Wundt is also quick to add that this 'psychological' level stand in no opposition to the investigation of the 'physical effects'. Especially, he says, such investigations may be serving as useful correlates and 'cheques for introspection' when 'controlled by experimental methods.'³⁵

His points are both highly relevant to, and illustrated by, the field of music theory and music psychology, which to a large extent has also been dominated by reductionism and quasi-physical measurement. Even in the more 'hermeneutic' writings of Hermann Kretschmar and Deryck Cook there is a naive tendency to attach emotion labels to relatively isolated figures. The sensory and psychoacoustic identity of many tonal relations is very precise, for sure - even more so than could be accessed by the measurement of any bodily symptoms - but it is first first at a much higher, *psychical*, and *conceptual* level that it is possible to talk about more complex emotions and emotion categories. Depending on the context in which it is occurring, its speed and timbre, a trill might be experienced both as thrilling, enthralling, or a threatening element in a thriller, but it might also be a mere means of sustaining or 'colouring' a tone. A minor chord is certainly in possession of a certain discord or instability, but it would not be 'melancholy' before integrated in a musical rhetoric which is also incorporating other sensory elements, like heaviness, slowness, and softness, as well as a contrast with the more restful major mode, or at least a dominant chord, which is always major. In musical cultures dominated entirely by the aeolian, dorian, or phrygian modes, it is obviously misplaced to call all this music melancholy or sad. And the concept of 'sadness' may in any case be too extreme for such a minor perturbation and a frame of mind which is always concerned with the affirmation of harmony.

³⁵ Wundt, *Outlines of Psychology*, § 13.7a, 176.

In cases of even more dramatic music, an optimal comprehension of these dramas might even require the notion of muscular tension, heavy breathing, and the mentioned 'convulsive contractions of the diaphragm' which are often accompanying it, that is to say: situations which are only partly manifest in the auditory dynamic. The auditory harshness and uproar, the pounding rhythms, the dramatic increases in tonal tension, or the sudden sense of 'slackening' which could also be produced by tones, may be explicit enough, but not always sufficient to constitute an immediate sense of *panting* and bodily turmoil.

This, of course, is not to say that that these bodily sensations are in opposition to, or more important than, the auditory components. On the contrary, if tone, rhythm, and intervals did not somehow take part of the affective experience, it would not even be possible to speak of song and music, since these are frames of mind which are to a large extent defined by these factors, and do not even exist outside the medium of sound and rhythmical regularity. The experience of muscular tension, visceral arousal and so on, might well be involved, even on a regular basis, yet there is nothing about muscular or visceral sensation that is productive of song or harmony. Nor have these 'coarser emotions' much to do with the level of beauty and subtleness we categorise under labels like melody, intonation, voice, musical style, dialect and so on. And the experience of *rhythm* is already a product of voluntary activity; so even the *classification* of affective experience then - at least when it comes to this articulated level of feeling and the distinction between singing and speaking - is more or less independent of the visceral or purely instinctual level.

As was also pointed out by Wundt: the typical bodily symptoms are highly variable and often serving merely to *intensify* a certain experience.³⁶ This is also confirmed by more recent research on these matters, such as Schachter and Singer's 'two component theory of emotion',³⁷ which, although incomplete in many ways, is indicating that components like arousal and trembling, which could be artificially produced by epinephrine injections, are not sufficient to provide the content of what we call 'emotion.' The states of mind experienced by the subjects participating in their experiment were described in very different, or even contrary ways, depending on the

³⁶ Wundt, *Outlines of Psychology*, § 13.8, 177.

³⁷ Stanley Schachter & Jerome Singer, 'Cognitive, Social, and Physiological Determinants of Emotional State'. *Psychological Review*, 69, 5 (1 September, 1962): 379–399. <https://doi.org/10.1037/h0046234>.

context in which the experiment was carried out, that is to say: the circumstance whether the participants were accompanied by a euphoric or angry stooge actor.

What seems to have been less clear to these researchers, and even more so to those who have been critical of the cognitivist leanings of this experiment,³⁸ is that even the mere perception or *idea* of euphoria and anger might require an internal 'mirroring' and simulation of both the vocal and rhythmical activity of which euphoria and anger are typically constituted. In other words: the idea of a 'purely cognitive' and disembodied level of emotion was by no means proven by this experiment; it is just referring the classification of emotion to a higher, more behavioural, sensorimotor, or *auditory* level of feeling, which existence and importance has become much more obvious with the advent of modern neuroscience, scanning techniques, and the discovery of mirror neurones.

The meanings which are conveyed by this behavioural show are undoubtedly much more precise and necessary for social interaction than Wundt is indicating. Nevertheless, his opting for a principle of classification which is more 'psychological' in the sense of occurring at a more emergent and general level is reasonable enough. And in his usual style he goes on to distinguish between three such 'psychological' principles, focussing either on the *quality*, the *intensity*, or the 'form of occurrence' of the feelings, that is to say: the question whether the emotions are *sudden and irruptive*, *gradually arising*, or *intermittent* (permitting periods of increasing and decreasing intensity).

As far as *intensity* is concerned, its role as distinguishing characteristic is only 'of subordinate significance' says Wundt, 'especially since emotions that agree in all other respects, may not only have different degrees of intensity at different times, but may on the same occasion vary from moment to moment.' The same could be said about *form of occurrence*, since some changeable emotions, like joy and anger, may also be sudden and irruptive.³⁹ Only in the case of *qualitative* distinctions - which are subdivided into *pleasurable and unpleasurable*, *exciting and depressing*, and *straining* [spannende] *and relaxing* [lösende] elements - does Wundt operate with the idea a single affective direction being the '*primary tendency*' for a particular emotion. Thus, he says: 'joy [Freude] is primarily a pleasurable emotion. Ordinarily it is also exciting, since it intensifies

³⁸ See for instance Jesse Prinz, *Gut reactions: A Perceptual Theory of Emotion*, Chapter 3 (New York: Oxford University Press, 2004).

³⁹ Wundt, *Outlines of Psychology*, § 13.12. 180-181.

the feelings, but when the feelings are too strong, it becomes a depressing emotion.⁴⁰ The element of *pleasure* [Lust] then, is the most important of these. The parameter of *excitement*, he argues, is always secondary. Feelings of *tension* and *release*, however, may also be 'primary components.' Especially he is pointing to the essentiality of tension in *expectation* [Erwartung], which again, he says, is often associated with unpleasurable feelings. And even here he is turning to the field of rhythmic and harmonic progressions for illustration.

In the case of rhythmical impressions or movements there arise from alternation of feelings of strain with those of relaxation pleasurable emotions which may be either exciting or depressing according to the character of the rhythm. When they are depressing we may even have unpleasurable feelings intermingled with them, or they may all be of this kind, especially when other affective elements cooperate, for example feelings of clang or harmony.⁴¹

To cut it short: the potential for unique combinations and individual variation is obviously enormous, which may well be the most important lesson to learn from Wundt here. It would go too far in this connection to discuss his multidimensional system in detail. It has to be noted, however, that the distinction between pleasurable and unpleasurable is already too general to account for the fundamental distinctions between song, ordinary intonation, ordinary behaviour, and dance. Even speech and ordinary behaviour may be pleasurable it seems. It may not be as pleasurable as song and dance, but the qualitative differences between these tonal and rhythmical modalities are not explained by pleasure as such.

His idea of 'primary and secondary components' is also questionable, and slightly at odds with his own emergentistic aspirations. If emotions are really composite units, both pleasure and excitement may be 'primary components'. At least this seems to be the case in joy, if not necessarily in Freude. The joy may well transform into something else and more depressed, but then it is no longer joy. Similarly, the component of tension in expectation is not alone the essence of this emotion; it also needs a dialectical and foreshadowing element, like in the dominant chord, which is certainly tense, but also 'gravitating' towards repose.

⁴⁰ Wundt, *Outlines of Psychology*, § 13.10, 178.

⁴¹ Wundt, *Outlines of Psychology*, § 13.10, 179.

3.2.2 Social versus non-social emotions

Another distinction, which Wundt is also subsuming under the category of *quality* - or as he prefers to put it: of *names* of qualitatively distinguished emotions - is the question whether or not these 'names' are also implying some *extrinsic elements*. Even here he is rash - much too rash it seems - to set up a trichotomy of classes, a distinction between emotions that are '*subjectively* distinguished, chiefly through the affective state itself, such as joy and sorrow' (with subforms of sorrow like sadness, care, grief, and fright); '*objective* emotions referring to some external object, such as delight and displeasure,' (with subforms of displeasure like annoyance, resentment, anger, and rage); and as a third category: 'objective emotions that refer rather to outer events not expected until the future, such as hope and fear and, as modifications of the latter, worry and anxiety'.⁴²

And the matter of contention here has nothing to do with the *existence* of such 'objective' or temporally extended emotions, but rather whether this teleology, the location of components to the future, should not occur in wholly *subjective* processes as well. As we will come back to at the end of this chapter, it is exactly the observation of such extrinsic components in emotions that has been a challenge to the understanding of musical emotion, which, especially in solo performances, is limited to its own dynamic processes. This has also been a source of confusion in discussions of personal autonomy and the nature of emotion, sometimes creating a gulf between somatically, individually, and sociologically oriented models, as if these regions of being were somehow incompatible. As so often the problem may turn out to have more to do with myopic perspectives and the difficulty of entertaining several thoughts at the same time.

The confusion which is still reigning in this field, and the need for clarification, is succinctly conveyed in an article by Shlomo Hareli and Brian Parkinson, taking as their starting point a comprehensive study of the recent literature on these matters. While pointing to the necessity of incorporating 'social appraisals' in the definition of many emotions, they are also calling for a heightened awareness of the distinction between social and non-social emotions, a willingness to investigate whether a given emotion is *necessarily* involving a social context, or whether it might also occur in isolation from it. This may not be so difficult as one should think, and on the basis of the manner in which the emotions are described and exemplified in this literature they

⁴² Wundt, *Outlines of Psychology*, § 13.11, 179.

mention *safety, fear, sadness, joy, and disappointment* as potential examples of such emotions.⁴³ It is still a very low estimate, though, and as will hopefully be shown by the below discussion and the example of music, the sphere of the autonomous self is both more central and rich in content.

At first sight one might easily get the impression that we are dealing with radically different or even incompatible phenomena here. The thought of integrating external objects and people in our own psychophysical representations and states is certainly counterintuitive, making us suspect that we are dealing with some kind of misnomer or confusion. Notice that even Wundt is distinguishing between 'the affective state itself' and the objects and future events that are merely 'referred to'; as if these things were adjoined in *language* only. One might even speak of a certain nominalist and associationist impulse on Wundt's part here, which is not entirely in line with his own emergentism and monistic perspectivism. If all impressions are part of the same sensory field, they are all present to the subject. And if the components are engaging in *relations*, these relations are real and integrated enough; but, as we will come back to in the last chapters of this treatise, they are not present in the *language*, that is to say: in the chaotic sequence of arbitrary signifiers. It might well be possible to discuss whether the concept of emotion should be reserved for purely subjective and local activities, such as joy or sadness, whereas our dealing with objects, people, and future events should rather be referred to as reactions, attitudes, social relations, dramaturgical functions and so on. But this is not what Wundt is arguing for, nor has he given up the practice of referring to all these entities as 'emotions'.

It is undoubtedly easy to fall into a thinking of these more complex emotions as combinations of feelings and 'mere ideas', and to limit these ideas to social and extrinsic matters only. In fact, it is a point of view which is still alive and kicking, especially in poststructuralist quarters.⁴⁴ Even in earlier chapters of this treatise the activity of thinking and the content of thought were kept apart, as if these things were completely different. If going beyond the surface of these concepts,

⁴³ Shlomo Hareli and Brian Parkinson, 'What's social about social emotions', *Journal for the Theory of Social Behaviour*, Vol. 38, Issue 2 (8 May 2008): 131-156, <https://doi.org/10.1111/j.1468-5914.2008.00363.x>.

⁴⁴ Even Hareli and Parkinson are open to the idea that some emotions are combinations of emotion proper and some purely 'semantic' elements which might even be considered 'artefacts of our contemporary linguistic categories'. Especially the enjoyment of *harm* in 'schadenfreude' is mentioned as a possible example of such a combination. In reality, however, and as is indicated by Hareli and Parkinson at the last page of their article: the 'representations of emotions cannot be totally detached from the real phenomena that they represent', and the idea of 'Schade', harm, and the suffering of the other, is undoubtedly also implying some highly unpleasant and disruptive feelings, which have to be interiorised by the self and incorporated into the total experience and conception of such joy.

however, one will see that our 'subjectively distinguished' sensorimotor processes are already contextual and ideational in the sense of being synthetical wholes, producing conceptual entities like *questioning*, *asserting*, *hesitating*, *accelerating*, *emphasising* and the like. Even Wundt is referring to rhythmical gestalts as 'temporal ideas' [zeitlichen Vorstellungen], of which elements are grasped together as a single whole.⁴⁵ At the same time, our concepts of extrinsic objects, whether imagined or directly experienced, are also consisting of sensations, which are instantly brought into contact with the sensations of our selves. When experiencing discomfort or freezing, or merely thinking of freezing, the bodily shivering and discomfort is not merely *referring to* coldness, the coldness is really part of the compound, if only as a faint memory of a sensation. Such entities may not yet qualify as *frames of mind*, though, which status is often what seems to be implied by the concept of emotion. For this we probably require some conscious activity or attitude on the part of the subject as well, which is certainly there in *delight* and *displeasure*, but not in mere *unpleasure*.

In many cases, such as *delight*, and even *anger*, this element of subjective activity may be such a central part of the concept that the extrinsic element may well seem of negligible relevance, or locatable even to our own bodies. For instance, we might well be *delighted*, *disgusted* or *irritated* by our own bodily qualities or limitations. In fact, we might even be delighted by our own singing or irritated by our own intonational or behavioural blunders and so on. So Wundt is not entirely correct then, to classify these emotions as 'objective' and opposed to the 'subjectively distinguished emotions'. Whether these emotions are always manifested in the auditory display is another discussion. The element of rapture, jubilation, or even ecstasy which is implied by the concept of *delighting* (if not by 'Vergnügen', which is the word employed by Wundt), may be nowhere better constituted than in singing, but it may not always be obvious to the listener whether the singing is just ecstatic or ecstatic *over* something, which is also a necessary component of this concept. When celebrating or 'singing' a long awaited conclusion, however, there is no doubt that the cause of this singing really *is* manifest and explicit, thus it may well be possible, at least in some cases, to speak of musical *delighting*. The same could be said about *irritation*, as caused for instance by the difficulty of hitting a note. Both the element of repeated and unintentional unpleasantness and the combined impulse to retraction and

⁴⁵ Wundt, *Outlines of Psychology*, § 11.10.

aggression, which seem to be essential to the concept of irritation, may be explicitly manifest in this case; and whether irritation is classified as an emotion or as a reaction to something unpleasant, there is little doubt that we are dealing with a composite and basic concept.

Some of the examples which Wundt is mentioning as 'subjectively distinguished' on the other hand, such as *fright* [Shreck] or *grief* [Gram], might better be classified as 'objectively' oriented; at least partly so. It is difficult to conceive of these emotions in isolation from some kind of extrinsic danger or loss, except perhaps our own death, which may be subjective enough. We are seldom frightened by our self, or by our own singing or playing. And it is not an entity that could easily be manifested in solo music. In more polyphonic music, however, like in a session of free jazz, one might well be frightened by a fellow musician, and both the actions and the re-actions which are going into this concept may easily be conveyed by the music. As a matter of fact, there is a whole genre of *horror music* dealing with this, injecting horror and suspense into films which without this music would not be horrific at all. The difference is so striking and overwhelming, in fact, that there is little doubt in this case, that the main components of this frightfulness are produced *in the music* and associated with the rest of the action, and not vice versa, as the relativists and semioticians like to believe.

The case of *grief* is somewhat similar. And even in this case its status becomes clearer if imagining the possibility of a musical rendering. The melancholy, depression, and disillusionment that is going into the condition of grief may well be there - the music may certainly be *sorrowful* - but the sense of radical loss or death, which is also an integrated component of this concept, is probably too physically concrete to be conveyed by the dynamics of personal feeling as such, or even the dynamic interactions between musicians. One's fellow musicians may leave the stage or auditory scene, producing thus a sense of relative emptiness, loneliness and even melancholy, but hardly grief. The idea of grief might perhaps be conveyed if the element of loss or departure is clearly set off and emphasised, and the reaction is very dissonant and intense, but it is easy to slip into the realm of caricature here. On the other hand, the music may well add dimensions and depths to grieving that would not otherwise be there; making it so intense and solemn, in fact, that the object of this grieving, and the concept of grief itself, would be relatively obvious even in the absence of any explicit loss.

Here we have already entered into the field of *social* emotions, which seem to be unique in the sense that they are often locating more of the content to the *extrinsic* aspect of the

experience. Especially in concepts like *envy* or *jealousy* the extrinsic component is much more complex than the mere idea of some *thing* to which we are reacting. It incorporates the experience or imagining of other *people* as well: an imagining of something they have *done* or might be doing, *with* somebody else, who we are also desiring and so on. And since our ideas of other people are consisting of the same type of behavioural and sensorimotor components as those that are constitutive of our own sensorimotor processes and gestalts, the interrelation of these elements with our own self-representations is even easier to understand in this case, if not necessarily to perceive.

To be able to understand other people and their emotional behaviour, their behaviour has first to be mentally re-enacted and felt by ourselves. It is a process which to a large extent is automatised in the brain, possibly incorporating *mirror neurones*. Neurologically this may not be a simple process, and it is easy to understand how it may be hampered in autism or different kinds of agnosia; especially, perhaps, when the affective qualities are not as explicit as in music. At the same time, it is not so difficult to understand how these mirrored sensorimotor processes may enter into synthetical relations with our own sensorimotor processes, which are monitored by the very same neurones. This is how Kurth Koffka, another of the founding fathers of gestalt psychology, is formulating it:

In these objects qua behavioural objects, there may then arise an intra-object and an object-object or even and object-Ego dynamics, comparable to the intra-Ego and the Ego-object dynamics which we have treated as the real basis of emotions. In this way our theory can be easily generalized so as to account for non-Ego emotional experience.⁴⁶

The habit of referring to people and their lives as 'objects' is not particularly illustrative. Even Wundt is speaking of objects in this connection, which is not entirely in line with his dynamic conception of emotion and behaviour, the 'heterogony of ends' and so on. As has already been argued, and it will be further elucidated in later chapters of this treatise, a person is not a mere object or body. It is a living and developing *process*, from which a body or body part may even be dissociated if it is not used. And it is exactly the integration of such behavioural processes which seems to be special to social emotion. So similar are these processes to our own self, and

⁴⁶ Kurth Koffka, *Principles of Gestalt Psychology* (London: Routledge and Keagan Paul Ltd, 1935), 407.

so precisely communicated, that the behaviour of other persons - constituting, in fact, the very idea of these persons - is often engaging in creative alternation with our own personal narratives; accompanying, interacting, discussing, or imitating it; producing a total narrative and a common style which origin is sometimes difficult to trace. And when the social needs are also taken into consideration, - the need for love, company, and sex - it is no wonder why the so called social emotions have gotten a special status.

Nonetheless, Koffka's notion about the 'ego-object dynamics' being 'the real basis of emotions' should not be forgotten. Curiously enough even Floyd Henry Allport, who is often referred to as 'the founder of social psychology' is making it a central undertaking to argue against what he calls 'the group fallacy': the idea of 'collective minds' or 'group consciousness' as something existing independently of the minds of individuals. He may even have gone a little too far in this direction, reckoning these entities little more than 'the sum of the actions of each taken separately'.⁴⁷ 'It was not the "collective mind" or the "crowd impulse" which stormed the Bastille' he argues, it was the *individual citizen* 'who had for many years felt the same hatred' and 'lust for freedom,' and 'nothing new or different was added to the crowd situation except an intensification of the feeling already present.'⁴⁸ If nothing else, he seems to be neglecting the unique experience of *communion* here, and the fright of falling out with the flock and the politically correct. 'The word "we" refers to a reality,' says Koffka, 'It is never a mere abbreviation of "they and I", or "he and I".'⁴⁹

Yet Allport is right in emphasising that the individual is always the source of such unity, especially as processes are concerned. The biological needs and the organic life is always located in the individual. The same, of course, is true of consciousness, or as Allport put it: 'there is no nervous system of the crowd.' The idea of a 'collective spirit' then, like 'the spirit of a meeting', is undoubtedly misleading if taken literally. It is first of all, says Allport, a product of corresponding segments of individual lives, and the tendency to accredit it of some kind of independent status is negligent of the fact that the meeting, like other social encounters, is also 'broken up.'⁵⁰

⁴⁷ Floyd Henry Allport, *Social Psychology as a Science of Individual Behavior and Consciousness* (Boston: Houghton Mifflin Company, 1924), 4-5.

⁴⁸ Allport, *Social Psychology*, 295.

⁴⁹ Koffka, *Principles of Gestalt Psychology*, 651.

⁵⁰ Allport, *Social Psychology*, 6.

Allport's assertion that 'the significance of social behaviour is exactly the same as that of non-social, namely the correction of the individual's biological maladjustment to his environment,'⁵¹ may not be entirely correct, but we are certainly encountering an almost infinite amount of people, objects, and constellations on our roads, and if our lives were merely consisting of such chaotic and arbitrary trajectories they would be very disintegrated indeed. As a matter of fact, there would be no individuals or selves at all.

Even if we do relate to other bodies and selves, there also has to be a logic deriving from our own body and self, which is making it into a self in the first place, and which comes in addition to these other relations: a regular alternation between breathing in and breathing out, and a 'tendency' for deep breaths to follow from shortage of breath; a tendency for weariness to follow from activity, and recovery from rest; a certain style and manner of dealing with problems whatever these problems are; an urge to fight or repress the problems; a tendency for failure to be followed by disappointment and disappointment by reinforced attempts; persistence by success, and success by jubilation; a tendency for repetition to result in boredom, refreshment in refreshment, re-conciliation in reconciliation and so on. As we will come back to later, the examples of this autonomy are in many ways tautological, in the sense that the content of the phenomena described is to a large extent defined by its manner of occurrence, and it would be very difficult to account for musical emotion without it.

As was noted by Wundt: the self is precisely that part of the sensory field which is relatively permanent and controlled by the will. And even breathing and resting is voluntary and planned to some extent. *The other* then, is what is *not* thus integrated. A similar recognition is reflected in the below statement by Koffka. This citation may not disclose the view, which is also held by Koffka, that 'voluntary movements are the motor counterpart of perceived tunes', both of which are serving as 'schemata' or 'models of ourselves,' yet the idea of a much looser synthesis *between* these schemas than *within* them should be clear enough.

In the composer's mind the tones do not exist prior to or independently of the melody. Here the melody, the whole, entirely determines its own members. The fact that the members of groups are not

⁵¹ Allport, *Social Psychology*, 3.

thus completely determined by the group is the same as saying that the group is not of the strongest gestalt type possible.⁵²

Even when several people are singing in unison, or adhering to the same harmonic progression, it is the inflections and functions of *a single line of thought* they are experiencing, which, although it is shared, is not a collective product. At least the melody or harmonic progression has to be *thought out* by one person and then notated or learned, it could not be collectively improvised.

The situation is obviously a little different when it comes to more long-range and less articulated processes. Such processes, at least some kinds of such processes, might well be collectively improvised, like in discussion, play, or other joint pursuits with a collective dramaturgy. Even this is demonstrated by free improvisation and jazz. But this is not in opposition to individual lives. On the contrary, the constitution and integration of the various stages and functions of such processes is first of all deriving from the individual, with its reactions and hopes, needs for variation, rest, success and so on. As far as the coherence of the processes are concerned, the cooperation of several independent voices is adding rather a certain cacophony or heterophony, which is even more pronounced, of course, when the processes are detached from the local setting. It is not surprising then that the concept of 'collective histories' is problematic in many cases. It is a phenomenon which has always to be reconstructed from the perspective of individuals.

Certainly is difficult to conceive of a community without the lives and endeavours of individual beings. The opposite situation, however, the possibility of leading a solitary life, is always there. Such a life may well seem meaningless, and the absence of any environment whatsoever is absurd, but even when living in total isolation from others, or floating in mid-air, there may be motivation, development, and song. In fact, this is precisely the situation which seems to be set up by instrumental music, which is also what makes it so enlightening.

What is first of all revealed by music, and this is exactly where Wundt goes wrong, is the point that even in this purely subjective dynamic, and in self-conscious activity in general, there are 'intra-objects' in the sense of relations with future and past stages of ones own activity. The fact that Wundt does speak of 'subjectively distinguished emotions' is certainly indicative of such

⁵² Koffka, *Principles of Gestalt Psychology*, 515 and 650.

an understanding; and the integration of a temporal dimension even in these subjective states seems to be covered already by his general definition of emotion. Thus he is already beyond the limitations of many social constructionists; yet he does not seem to have had taken into consideration here the long-range aspects of the self, and the circumstance that the emotions are not only 'referring to outer events in the future' but incorporating *subjective states in the future and in the past* as well.

An *up-beat*, *intro*, or *prelude*, for instance, is obviously setting up a certain expectation of some more decisive or finished activity - at least it may get this function in retrospect - and these are concepts which would not exist at all if the different stages involved were not somehow interpenetrating. Similarly a *development section*, a *chorus* or a *coda* is elaborating on or celebrating what has earlier been asserted, in a manner which would not be graspable were it not for a retention of the previous *exposition*. The character of the activity might well be peculiar to its stage, so peculiar that it might be recognised as a development or coda even in isolation from a concrete past or future. The idea of such a context however, would still be there. In a *transitional passage*, of course, this retention and 'protention' is what the music is all about, calming down and echoing what has been, at the same time as it is gradually refocussing attention and trying to prepare for something new; and, as we will come back to in the section on the neural correlates of such phenomena, there is no doubt that the demands on timing and contextual orientation here, are implying an enormous amount of mental synthesis. 'For the composer and the highly trained musical listener', says Koffka, 'even a long piece may be such a perfect unity that each new theme is experienced with reference to all that preceded it.'⁵³ Yet there are no objects here that are extrinsic to the egodynamic activity as such.

This interpenetration of subjective stages may well be more complex in musical 'works' than in ordinary life; it is certainly more 'reflected;' yet it is not limited to the specifically musical. To the extent that our behaviour is really self-reflected, of course, it is never without a certain self-reflection. Our dealing with weariness, problem-solving, and personal development has already been mentioned, and it goes without saying that the experience of being *exhausted* or *reinvigorated*, if it is really conscious, is first of all relating to the previous stages of our own activity. The same could be said about *calming down*, *working oneself up*, or *freaking out*. More

⁵³ Koffka, *Principles of Gestalt Psychology*, 516.

intrinsically reflected and typically 'emotional' perhaps are the concepts of being *dispirited* and *disenchanted*. It is not possible to be dispirited if it is not incorporating the consciousness of a more spirited past. In fact, this is what it is all about, it is not a mere getting out of spirit. It is a loss of positive outlook, which is much more complex in the sense of integrating both the present, the future and the past. Yet there are no extrinsic elements here. The cause of the condition may well be purely subjective: an unrealistic amount of optimism in view of the bleaker prospects of existence. Even this is manifestable in music, if a more dismal situation has initially been outlined, but is repressed or left untreated, and the joy is rocketing to disproportionate levels, entailing with necessity a backlash.

Similarly, when *procrastinating* or being *hesitant*, what we are postponing is our own action, something subjective in the future, and it is completely irrelevant to these concepts whether this action is concerned with our own singing, thinking, meditation, or something extrinsic. Being *ardent*, *spontaneous*, or *fervent* is pretty much the opposite, and here we are already long into matters, which, depending on how one looks upon it, could be considered both personal characteristics and strategies of dealing with life. Considering the previous processual definition of psyche, it is not so strange perhaps, that a person may be identified with such a strategy. A person might perhaps be ugly and poor also, yet it would not be wrong to say that a *personality*, at least, is better characterised as *impulsive*, *assertive*, *pensive*, *loud*, *floundering*, *strained*, *confrontational*, *conflict-shy*, *undecided* and so on. These are all approaches or styles which are developed and integrated over time, and whether we call it emotion or something else, it does not necessarily transcend the limits of the ego-dynamic narrative.

This is not to say that our concepts of people and their doings are always isolated from their environment. The concepts of *clumsiness* and *stinginess*, for instance, seem to be implying more of a material context, if not necessarily so. When the ego-dynamic autonomy is emphasised here, it is because these dynamic gestalts are often the only content music can reveal. And even if this autonomy is defined in opposition to the resistance of our surroundings, it is also existing together with it. This, of course, is evident both in thinking and singing, where the self is relatively free to constitute its own intellectual or rhetorical process at the same time as it is also thinking or singing about a lot of extrinsic things. When *questioning* or *answering*, for instance, we are often, but not always, thinking of something extrinsic and material. But if the questioning or answering is not in a questioning or answering *tone*, and related to its antithesis as a function

of a coherent dynamic process, it is hardly questioning or answering at all. It is first within the coherent scheme of this subjective rhetoric, which is the supreme ruler of such processes, that this would be the case.

In instrumental music, of course, it is basically only these conative and rhetorical operations of the self that are revealed, and it is a condition which puts extra demands on personal coherence; yet it does not necessarily imply that the processes are *conceived* in isolation from everything extrinsic. This may or may not be the case. Music may well be a manifestation pure self-enjoyment. Yet even in instrumental music the composer may be thinking of something concrete and material, a specific problem or future goal, an absent lover and so on. Since these matters are not manifestable in the medium of sound, however, it could not easily be inferred from the vocal and intonational processes as such, and it would only be the functions and strategies going into the process of battling with or 'telling about' these problems that are explicitly manifest to the listener.

If we take the examples of *nostalgia* or *hope*, the latter of which is mentioned by Wundt as 'referring to objective events in the future', a composer may well have a very specific goal or memory in mind. Since, however, the concepts of hope and nostalgia may also imply a purely subjective teleology, the longing for a future or past state of joy, these concepts are not dependent on any extrinsic matters for their manifestation. The future or past elements of joy may well be represented as glimpses of the joy to come, or the joy that has been. In fact, this is how the future and the past is always represented, it is just not attended by any words or extrinsic objects in this case. It is not correct then, to oppose these emotions to emotions that are 'subjectively defined'. As a matter of fact: even in those cases when we are looking back on or forward to something extrinsic, like an ice cream, the concepts of hope or loss are pertaining to the self as functions of temporal and attitudinal comprehension; they are not features of the ice cream.

The concept of *belief* may seem more complex, but it is not attached to anything specific. We might believe in many things, including ourselves. The subjective components of this attitude, the determinedness and resolve, which are also temporally extended, are nowhere better constituted than in tonal music; which, it seems, is also why it plays such a central role in religious practices. Especially when it is contrasted with *hesitation* and (harmonic) *ambiguity*, which seem to be essential ingredients of uncertainty, it becomes very clear, even in instrumental

music, that we are dealing with a battle between if not exactly belief and doubt then at least some kinds of *qualms* and a sense of *assuredness* and *piece*. And when the element of extrinsic content is reduced to being the absent object of an affirmatory process or jubilation - a tonal cadence which is repeated, extended, sung, or hammered in - the absence of this extrinsic content seldom matter much. Since these 'rhetorical' vehicles are nevertheless constituting the bulk of the content in this case, there is very little that is missing from it. In some cases the melody may even be portraying the character of a person of which we are singing, or imitate the sounds of extrinsic events, like a car, a cat, and the whining of brakes.

One might perhaps say that instrumental music, when it is abstaining from such 'Mikey Mousing', is 'abstracted' from reality in this sense, conveying merely the idea of some abstract conflict and resolution; but even this would be wrong. The purity of 'absolute music' is probably better defined as a limitation to the purely psychical or ego-dynamic aspects of thought, which manifestations are not abstract at all. A melody or intonational pattern may well be 'abstracted' from its marriage with text in speech and song, but the sensory and synthetical effects that are pertaining to this stream are always real and individual. Even in ordinary intonation, groaning, moaning, sobbing, laughing and so on, this is the case, and there is nothing preventing us from making rounded compositions out of such vocalisations. Of course, the richness of this field is not deriving from its abstractness, but rather from its concrete sensory potential, constituting experiences which are unique to its own medium: what we call song, sing-song, harmony, and polyphony. Especially the emotions that are developed within these harmonious frames of mind are making this self-enjoyment so intense and complex that even the normal self is appearing bland and trivial, not to speak of the mentioned imitations of physical events.⁵⁴

Moreover, since the subjective and *existential* concerns, which are manifested so richly in the medium of sound, are also our most important concerns, we would gain little in terms of depth by connecting more explicitly to any extrinsic matters.

⁵⁴ Even if Wundt's descriptions of the mentioned self-oriented content of music is wanting in some respects, he shares the conception of music as 'nothing but an objectification of affects'. 'It objectifies such moods and affects for which language has no sufficient means of expression', he says, yet 'we find it disturbing' when it tries to 'comprehend conceptual content which could be adequately expressed only in language or the visual arts'. Wilhelm Wundt, *Grundzüge der Physiologischen Psychologie*. Sechste, umgearbeitete Auflage. Band 3 (Leipzig: Verlag von Wilhelm Engelmann, 1911), Kapitel 16.2.i, 163. The citations are translated by S. Bang.

The behavioural gestalts going into processes of dealing with existential feelings like doubt and harmony have been described in earlier chapters of this treatise as *functions of the autonomous self*, and it is difficult, especially in view of his emergentist and encyclopaedic approach, to understand how Wundt could neglect so much of this autonomy in his description of ordinary emotional processes. The fields of study traditionally dealing with these matters may have been suppressed by formalism and materialism already in the nineteenth century, but the literature is still here. Especially Aristotle's *poetics*, and the even older field of *rhetoric*, which was refined and adapted for music by the so called 'affektenlehre' or 'doctrine of the affections,' have played an important role in the development both of music and the dramatic arts. Given his vast output of writings, it is difficult to know what Wundt says elsewhere, and one might suspect him of being inconsistent only. As we will come back to in the section on 'complex volitional processes', his idea of interpenetrating intellectual and religious feelings which are treated and resolved within the framework of musical compositions, is much more holistic and self-referential.⁵⁵ The fact remains, however, that he *does* limit the long-range emotional components to 'outer' encounters here. And when the other confusions between subjective and objective emotions and his neglect of the past is also taken into account, it would not be to go too far to claim that the above mentioned systematic endeavours are imprecise and even deficient in several ways.

Part of the reason for these shortcomings, and this we will come back to below, may be his focussing in this chapter, on more local, and experimentally controlled interactions of strong emotions and single decisive volitions. There is also a tendency, which is understandable, to relapse into more commonplace and materialistic conceptions, like the tendency to talk of ideation or 'Vorstellung' as dealing basically with material objects. When speaking of the ideational aspect of *gesticulation*, for instance, it is the pantomimic imitation of the 'objects of emotions' he has in mind. He does not seem to take into account here what might be the primary function of gestures: the manifestation of emotional *attitudes* as well as more elementary acts like *reaching, grasping, hitting, turning* and so on; which are ideas also, but pertaining to a large extent to the self.⁵⁶

⁵⁵ Wundt, *Grundzüge der Physiologischen Psychologie*, section 19.5 on 'Intellektuelle Gefühle'.

⁵⁶ Wundt, *Outlines of Psychology*, § 13.5, 172-173.

Wundt's conception of temporally extended emotion is in many ways reminiscent of the cognitivism and the scholastic tradition which he is himself so critical;⁵⁷ connected more specifically with the concept of 'intentionality': the idea of an abstract 'ego-pole' being directed towards an object-pole, as if both the self and the other were such 'poles,' and as if the relation between them consisted in nothing else than this pointing or 'propositional aboutness.' It is true that Brentano, who played a crucial role in the spreading of this concept, is remarking in a parenthesis that 'it is not to be understood here as meaning a thing', but it is not clear what he means by this, and when he goes on to exemplify it, his examples are all typically extrinsic. In fact, the absence of this 'immediate' thingness in memory and thought is basically what he is concerned with as a problem, as if in ordinary perception the thingness was penetrating right into our minds without any transcendence or mediation at all.⁵⁸

Such a conception is wrong and materialistic, not only because it is neglecting the whole field of temporal and ego-dynamic functions, but because it is missing the point that all cognition is sensory, synthetical, and apperceptive by nature. The idea of consciousness is reduced to an instance of pointing to something physically absent. Such a pointing, however, is not sufficient to re-present neither objects nor relations. It is not even pointing, since even the idea of pointing or being directed is requiring a behavioural and much more global framework for its understanding. Our sense of physical embodiment, orientation, and the projection of sensations into space might be put forward as examples of such a simple and elementary directedness. In reality, however, even our experience of space is a construction, which is requiring a huge amount of synthesis and global interpenetration for its existence.

This is also the case with ego-dynamic or 'emotional' processes, and even Wundt's own examples are precise enough to catch it in many cases. The characteristic decisiveness which is the essence of *decision*, he says for instance, is intensified by the preceding wavering and *doubt*.⁵⁹ But then this doubt would be *part of* the decisiveness, and not merely an isolated moment preceding it. Nor could the function of a decision be explained by 'aboutness' or reference. As is also recognised by Wundt, this relation, like all such relations, is a synthetical

⁵⁷ Wundt, *Grundzüge der Physiologischen Psychologie*, Vol. 3, section 15.3.d, 218.

⁵⁸ Franz Brentano, *Psychology from an Empirical Standpoint* [1874] (London and New York: Routledge, 1995), 88 and 272.

⁵⁹ Wundt, *Outlines of Psychology*, § 14.7, 189.

interpenetration of opposites, a 'correlated relation,' which, he says, is both a *unity* and a 'binary connection'. In fact he ascribes it a principle of its own: 'das Prinzip der beziehenden relationen' [the principle of correlated relations], and the 'principle of intensification by contradiction' is explicitly mentioned as an example of this.⁶⁰

Needless to say, this dialectic is also necessary for the *definition* of the mentioned function, since it is hardly possible to conceive of a decision in isolation from some kind of option and uncertainty, and then: the act of removing it. To demonstrate it - and this is what music is doing all the time - the wavering and suspense has also to be represented. First then it is possible to form a concept of decision. And it would be ignorant to claim that we do not experience this interpenetration 'directly', or at least as directly as many other *gestalts*. Even if some higher level rhetorical entities are clearly in need of more extensive temporal and apperceptive contextualisation, the elements that are going into the auditory stream are always already interpenetrating. It is a product of the synthetical nature of temporal perception without which we cannot 'endure.'

These circumstances may not necessarily be in opposition to the concept of intentionality. Husserl's understanding of this concept is obviously much more holistic than the atomism that came to characterise much of the so called analytic or cognitivist schools. Even Husserl is recognising that the ego is constituted by the 'unity of a history' and a 'reflexive intentional relatedness to itself' and so on.⁶¹ His statement that the 'processes of consciousness... have no ultimate elements and relationships, fit for subsumption under the idea of objects determinable by fixed concepts,⁶² is nevertheless revealing a certain materialistic and irrationalistic attitude towards the realm of psyche, which is somewhat contrary to that of Wundt, and in direct opposition to the views and classifications that will be presented in this treatise. It is also an open question whether Husserl was able to fully comprehend the difference, which was also pointed out by Wundt, between the apperceptive creation of higher level functions and the mere

⁶⁰ Wundt, *Grundzüge der Physiologischen Psychologie*, Vol. 3, section 22.2.b and c, 759-763.

⁶¹ Edmund Husserl, *Cartesian Meditations: An Introduction to Phenomenology* [1931]. trans. Dorion Cairns. (Dordrecht: Kluwer Academic Publishers, 1991), 43.

⁶² Husserl, *Cartesian Meditations*, 49.

perspectivation of existing matters,⁶³ not to speak of the paradoxes and a priori logical necessities driving it, which was the subject matter of Hegel's project. Rather than being 'about' a lot of preexisting 'things,' the self, like the rest of nature, is continuously producing its own content. And the results of this process, and its global character, is probably better caught by concepts like creative synthesis, emergence, consciousness, self-consciousness and so on, than by 'intentionality.'

The philosophical and dramaturgical levels of such gestalt formation - capabilities of *grudge*, *resentment*, or long-range *planning* and *reflection* - might well be lost, as in some cases of rostral prefrontal damage; so also the ability to distinguish between different classes of material objects and the ability to perceive and integrate other selves, like in some variants of agnosia and autism; but if the ability to grasp and differentiate between more local 'egodynamic melodies' is also gone, there is hardly any self or consciousness left. It is a hierarchy of content, which basic features seem to be created in the premotor and anterior cingulate areas. These gestalts, and the 'auto-noetic' perspectives on reality in which they take the centre stage, are governed by the prefrontal cortex; and the evidence of the importance of such auto-noetic perspectives to consciousness is growing along with the appreciation especially of the fronto-parietal circuit. Stuart Hameroff is talking for instance of the 'conscious pilot' relying on 'gamma synchrony' between the frontal and posterior cortex.⁶⁴ Others are distinguishing between the importance of bottom-up processing to *wakefulness* and the importance of top-down processing to the *content* of consciousness.⁶⁵ To a materialist, the global and self-oriented perspective of the latter field might seem unreal, more unreal even than the wave-particle duality that is lying at the foundation of 'massless' light; to a conscious being, however, it is *not*, and it is a recognition that ought to have vast implications both for cosmology and the analysis of human behaviour.

⁶³ Wundt, *Outlines of Psychology*, § 17, 251- 252. See also the following section on *Complex Apperceptive Functions* and the difference between apperceptive *relating* and *comparing*, the former of which is described as being productive of new compounds and ideas (synthesis), whereas *comparing* as such is contributing merely to understanding and analysis.

⁶⁴ Stuart Hameroff, 'The "conscious pilot" - dendritic synchrony moves through the brain to mediate consciousness, *Journal of Biological Physics*, Vol. 36, Issue 1 (January 2010): 71-93, <https://doi.org/10.1007/s10867-009-9148-x>.

⁶⁵ George A. Mashour and Anthony G. Hudetz, 'Bottom-Up and Top-Down Mechanisms of General Anesthetics Modulate Different Dimensions of Consciousness', *Frontiers in Neural Circuits*, Volume 11, Article 44 (20 June 2017): <https://doi.org/10.3389/fncir.2017.00044>.

3.2.3 Emotions and simple volitions

As we have just seen, there are many indications that the self is much more autonomous and 'musical' than often believed, involving with necessity an *integrated drama* as well, with all the functions and stages that are pertaining to it. Even many of the entities which are often considered 'intentional,' such as belief or doubt, may be concerned entirely with our own existence or constituted first of all by the attitudes and vicissitudes of the self. Indeed, it would be very difficult to conceive of a self without it. This dynamic and integrative nature of psyche is certainly one of Wundt's main points, and the reason why he is so relevant to this discussion. At the same time, however, he has a tendency to relapse into commonplace modes of reasoning which he is himself criticising, like the idea of the self as a physical body or a mere stream of associated feelings which, to the extent that it is transcending this stream, is merely 'referring' to other bodies or to physical events in the future etc. This is a tendency which becomes even clearer when Wundt goes on to discuss what he believes to be a higher level of cognition, the level of *volitional processes* [Willensvorgänge].

As for his conception of the relationship between emotion and volition, it bears resemblance in many ways to Nico Frijda's rather biologicistic concept of 'action tendencies' and 'action readiness' in emotions,⁶⁶ which again is reminding of the Wundtian concept of 'instincts', incorporating both a bodily urge and a potential behavioural component. Especially the example of strong unpleasant arousal demanding resolution seems to be central both Wundt's and Frijda's account of (simple) volitional processes, probably because Wundt was also the originator of some of these ideas. But, as we will come back to below: what we call 'emotion' is not restricted to instincts, pains, and needs. And it is a question that will be subjected to further investigation here, whether the concept of emotion is first of all pertaining to a personal and autobiographical sphere, which to a large extent is autonomous, top-down governed, and therefore much more indirectly related to the instincts.

We are confronted with the entire realm of mental states and attitudes here, which entities, of course, are always followed by other mental entities, but rather than being limited to involuntary urges triggering 'action programs,' our emotional states could also be characterised as

⁶⁶ Nico H. Frijda, *The Laws of Emotion* (Mahwah New Jersey: Laurence Erlbaum Associates, 2007), 2-4 and 17.

retrospections, situational appraisals, conscious responses, intermediate stages, dead ends, and as goals and activities in their own right.

These are recognitions which are much more in tune with Wundt's voluntaristic and humanistic psychology. Nevertheless, there is a certain tendency in Wundt's thinking to compartmentalise and sequence the different aspects of psyche, as if feeling, emotion, and volition were separate stages of a process, starting with an emotion, incorporating an idea or 'Vorstellung' of some extrinsic matters, which is triggering a volition, which 'brings the emotion to an instantaneous close', as he puts it; leading back to 'the ordinary variable and relatively unemotional course of feelings.'

Every emotion [Affect], made up, as it is, of a series of interrelated affective processes [Gefühlsverlauf] having a unitary character, may terminate in one of two ways. It may give place to the ordinary variable and relatively unemotional [affectlosen] course of feelings. Such affective processes that fade out without any special result, constitute the *emotions* [affecte] *in the strict sense* as discussed in the last paragraph. The process may, in a second class of cases, pass into a *sudden* change in sensational and affective content, which brings the emotion to an instantaneous close; such changes in the sensational and affective state which are prepared for by an emotion and bring about its sudden end, are called *volitional acts* [Willenshandlungen]. The emotion itself together with its result is a *volitional process*.

A volitional process [Willensvorgang] is thus related to an emotion [Affect] as a process of a higher stage, in the same way that an emotion is related to a feeling [Gefühl].⁶⁷

It is exactly this occasional compartmentalisation and fragmentation of psyche which has to be questioned, first of all because it is much that indicates that by suspending volitional activity and bringing the emotions to an 'instantaneous close', as Wundt puts it, we would bring our conscious existence to an instantaneous close as well, which could hardly be a goal of ours. As a matter of fact, this is something which follows from Wundt's own voluntaristic conception of self-consciousness as a stream of volitions defining themselves against their environment: the volitional acts could never be absent from such consciousness. Nor could the acts be experienced as acts without going into higher level gestalts and activities, many of which are called 'emotions' and 'ideas'. Wundt certainly recognises the first of these requirements, that volitional activity is necessary for consciousness, but not as easily, it seems, the second.

⁶⁷ Wundt, *Outlines of Psychology*, § 14.1, 183.

Now, volitional processes are apprehended as unitary processes and as being uniform in character in the midst of all the variations in their components. As a result there arises an immediate feeling of this unitary interconnection, which is most intimately connected with the feeling of activity that accompanies all volition, and then is carried over to all conscious contents because of their relation to will, as mentioned above. This feeling of the interconnection of all single psychological experiences is called the "ego" [das Ich]. It is a *feeling*, [*Gefühl*] not an idea [Vorstellung] as it is often called. Like all feelings, however, it is connected with certain sensations and ideas. The ideational components most closely related to the ego are the common sensations and the idea of one's own body.⁶⁸

The picture given here, of volitional processes 'apprehended as unitary processes' interconnecting 'all single psychological experiences,' is in clear opposition to the fragmented picture above, of emotion being followed by a single volition, before collapsing into mere feeling. It is as if volition was temporarily repressed from Wundt's consciousness in that case, or relegated to a stream of mere 'reflex movements,' which is sometimes how he describes pantomimic activity.⁶⁹ But even when Wundt is reminding or being reminded of his own definition of the self, the result is fragmented. The ego is first of all 'a feeling' he says, 'not an idea.' The problem is just that without an ideational grasp of the volitions, there would hardly be any volition or emotion at all, let alone an 'apprehension' of agency and selfhood, which is already something much more complex than a 'body'. Nor is it easy to imagine a partial possession of this ability, a fragmented idea of activity. This might well be a precursory stage in the evolution of volitional activity, but at least as humans are concerned: if the acts and activities are not grasped as unitary wholes, comprehending also their character and valence, we would have little chance of modifying the acts and adapting them to their use, which is undoubtedly the reason that we have developed this ability in the first place.

Again, the possibility should be taken into consideration, that some of these confusions are due to translational issues. When Wundt is speaking of the self as a *Gefühl* he may imagine something more like *emotion*, while *affect* may be connoting something coarser and more intense. After all, the German word 'Gefühl' could mean both feeling and emotion. Similarly, when talking about an absence of ideation in self-consciousness, the concept of 'Vorstellung' may indicate that he is first of all thinking of conscious intellectual imagination here, which is

⁶⁸ Wundt, *Outlines of Psychology*, § 15.11, 221.

⁶⁹ Wundt, *Outlines of Psychology*, §14.10, 194.

not required for a more intuitive grasping of ones actions. Yet this is not how Wundt seems to employ these terms, and even if adjusted for these possibilities, there is no denying that Wundt does speak of the ego as an 'immediate' feeling in this case.

If this was all he had to say about the self, which is obviously not the case, his conception would be closer to that of a plant; not a self imaging itself as a plant, but a plant proper: a vegetative state; which is exactly what has been indicated by Damasio's research on epileptic automatism and akinetic mutism caused by stroke, damaging the cingulate cortex or other midline structures of the brain. When being limited to mere wakefulness and automated behaviour without 'an image of knowing centred on a self; an enhanced image of the objects he was interacting with; a sense of the appropriate connection to what went before each given instant or what might happen in the instant ahead,' the sense of self was suspended as well. The patients might well have been awake, attentive, and even engaging in zombie-like behaviour, but when the more extensive self-monitoring capabilities were later regained, and the patients were getting self-conscious, they had little memory of what had happened. And all along, there was no emotion display;⁷⁰ all of which is indicating that what we call *emotion* is first of all occurring at the level of the self, not the 'protoself', as Damasio is often suggesting.

When Wundt is nevertheless stuck with immediate sensation here, it is probably deriving partly from his somewhat self-contradictory tendency to ascribe ideas and conceptual content [Vorstellungsinhalt] only to physical things 'before himself'; and his consciousness of the gestalt properties of articulated mental processes is undoubtedly underdeveloped in many respects. Even Damasio may be suffering from this defect, speaking sometimes of 'images' of action, as if actions were also spatial objects. It may well be true that in some cases we are more conscious of images and material things than our own behaviour, but, as is indicated by the fact that we have a rich vocabulary even for acts and emotions, we are also conscious of our own mental conditions and operations. Such ideation may well be wordless and subliminal in most cases, and below the threshold of epistemological reflection, but it is still there.

When it comes to Wundt's sequential account of emotion, volition, and the hierarchy of mental functions, it is obviously related to the recognition that all behaviour is part of purposeful dynamic processes, where all the constituent feelings 'contain in some degree an effort towards

⁷⁰ Damasio, *The Feeling of What Happens*, 96-106.

or away from some end,' as he puts it.⁷¹ Thus it is easy to yield to the temptation to model volitional processes on some kind of linear, mechanistic causality, confusing emotions with unpleasurable feelings, and voluntary acts with impulsive resolutions of these feelings. It would not be correct to say that Wundt defended such a view; on the contrary - and this we will come back to below - he criticised it. At the same time, however, he seems to have given such 'simple volitions' and 'impulsive acts', as he calls it, a more dominant role in our lives than is really the case. His dwelling on this evolutionary primitive type of activity might also have had a practical reason, connected more with the conditions for experimental investigation of these processes. 'We must limit ourselves', said Wundt, 'to the observation of certain processes which can be easily influenced through external means and which terminate in external acts. The experiments which serve this purpose are the so-called *reaction-experiments*,⁷² and there is a possibility that in some cases this limited his perspective.

It is not that 'simple volitions' or reflex acts never occur. When retracting from something burning hot, or regaining balance when tumbling, we even depend on it. Yet it is not a good or sufficient description of human behaviour. Often the problem is not consisting of an isolated pain or imbalance. Such elementary pains or drives may well be there as a background for much of what we do, but they are hardly classifiable as 'emotions', and they are seldom resolved by a single act. On the contrary, our dealing with problems is often involving a vast range of strategies, attitudes, and mental states along the road. Even the solution of simple operations like opening a door involves a considerable amount of planning, synthesis of behavioural gestalts, integration into longer action sequences, which are going into higher level plans, reasons for opening the door and so on. Furthermore, the manner of doing it is always within a certain outlook, mood, and style, which puts its mark even on the simplest of movements. This is where the prefrontal cortex comes into the picture, synthesising bodily and kinaesthetic feelings into temporal compounds like believing, hoping, missing, hating, wondering etc., as well as the extended self-consciousness that is produced by these entities; and, as was pointed out by Wundt himself, there is much that indicates that it is primarily these stages and modes of ego-dynamic and psychosocial outlook that are called emotions, not the elementary needs or occasional pains motivating it.

⁷¹ Wundt, *Outlines of Psychology*, § 14.3, 185.

⁷² Wundt, *Outlines of Psychology*, § 14.11. 197.

The intensity of the feelings may certainly vary - which is probably what has led some thinkers to designate just some isolated aspects of it as 'affect' - but it does not rule out all the attitudes, feelings, and 'feeling gestalts,' that are occurring along the road. Furthermore, the intensity does not necessarily vary in the manner described by Wundt and Frijda. In many cases the initial stages of such processes, the appraisal of a new situation and the feelings of the implicated internal and external acts, are not so intense. First after a while, when given time to reflect over the insults or threats to which we have been exposed, and the vulnerability of our own existence; first then the intensity of the feelings are rocketing; and we are dealing with experiences here which are sometimes so traumatic and long-lasting that it takes a lot of treatment and even therapy to make us 'ready' for anything.

As is demonstrated by the example of trauma: the action components of emotions are not always in the shape of automatic projections into the future. There are many emotions that first of all have their action in the present and in the past. Trauma, regret, mourning, envy, or joy are just some examples of this. The conception of emotion as 'action tendency' then, while not exactly wrong, is not very precise.

The concept of 'action readiness' is even more problematic, since it seems to imply some kind of instinctual component as well, something that is 'elicited,' 'arising,' or 'surging up in response to patterns of information', as Frijda tends to put it. 'The primary phenomenon of emotion' he says, 'is the control precedence of its action readiness. The action readiness of emotion tends to occupy the centre stage. It tends to override other concerns, other goals, and other actions. It tends to override considerations of appropriateness or long-term consequence'.⁷³

Frijda is clearly focussing on intense arousal and instinct here, which he identifies with emotion in general. To make his case then, he not only has to exclude the vast field of weaker and more volitional behaviour from the concept of emotion, he has to create the impression of a necessary alliance between intense arousal and unconscious urges as well. Such alliances certainly exist, yet it is not so obvious that arousal is always forced on us in preparation for something else. There may well be instances of arousal that are neither triggered by or leading to any kind of programmed behaviour. Especially musical activity is known to constitute intense experiences of excitement, thrill, rapture, bliss, ecstasy, exhilaration and so on, which are

⁷³ Frijda, *The Laws of Emotion*, 4-16.

sometimes triggering bodily reactions as well, like chills, goose bumps, freezing on the back, pangs, and rushes of various kinds. Even the experience of a single beautiful tone or harmony may involve a considerable bodily 'warmth' or arousal; but such experiences are hardly describable as 'action readiness.'

Frijda admits that this is a problem, but nevertheless tries to justify his theory by hypothesising instincts like the 'readiness to spill a plentitude', or the 'striving to broaden and build.'⁷⁴ And there is little doubt that even strongly positive experiences have an impact on further action, by way of the intrinsic satisfaction and sense of meaning they provide. The ability to harness such feelings may even be biologically advantageous, yet they are not necessarily implying any inborn 'action programs', which seems to be the essence of his hypothesis.⁷⁵

These questions, however, are much more complex than it seems, ultimately bringing up the whole debate about free will. As has been suggested by Libet and others, our lives may be much more automated than we like to think. It might well be that all our actions are involving 'scripts' and chance in various ways, as well as a 'readiness potential' in the premotor cortex, possibly controlled by some kind of last moment veto by consciousness;⁷⁶ a conception which, as was pointed out by Wundt, is also bringing up the problem of *infinite regress*. The point here, is just that the phenomenon of automatism is not limited to the most intense mental states. On the contrary, some of our most automated activities are probably also the less intense ones. Conversely the strongest arousals are often occurring when something *unusual* is happening, a situation that is not yet automated, and the reactions are seldom detached from reason. On the contrary, our intellectual faculties may never be more alert and active than in such cases. The consequences of our choices are certainly much bigger when there is a lot at stake, but that does not necessarily make them any more automated or wrong-headed than reactions that are careless or repressed. 'Great achievements of mankind', says Walter Freeman, have been forged in states of high intensity indeed.⁷⁷ In many cases our expressions of anger, rejoicing, passion, or

⁷⁴ Frijda, *The Laws of Emotion*, 37-39.

⁷⁵ Frijda, *The Laws of Emotion*, 40.

⁷⁶ Gilberto Gomes, 'Volition and the Readiness Potential', *Journal of Consciousness Studies*, Vol. 6, No. 8-9 (1999): 59-76, <https://philarchive.org/archive/GOMVATv1>.

⁷⁷ Walter J. Freeman, 'Emotion is from preparatory brain chaos; irrational action is from premature closure,' commentary to Marc D. Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modeling,' *Behavioral and brain sciences*, Volume 28, Issue 2 (12 August 2005): 204-205, <https://doi.org/10.1017/S0140525X05330044>.

compassion are also 'rational', voluntary, and intimately controlled. A totally insentient process is neither rational or irrational; it is senseless.

We are dealing with evaluative-responsive patterns here, which are involving as central elements the sensations of our own bodies and acts, and it is not given that the most intense experiences are the most automated. In many cases the opposite may well be true.⁷⁸ Without going as far as constructivists like James Averill, who considers emotions to be voluntary choices that we merely dupe ourselves into treating as involuntary,⁷⁹ it would not be wrong to say that what creates the impression of involuntary programming in many cases is the fact that the viscera and the endocrine system is reacting slower and is only indirectly accessible to voluntary control. The situation might well occur then, that, after having received a hurtful remark or having won the top prize in the lottery, we suddenly, and sometimes to our great surprise, find ourselves in bodily states that are completely altered. Our posture, energy, and voice control may totally break down, or we may be saturated by a rush of energising endorphins. And it is easy to make the inference that we are under control of some kind of biological instinct here. In some cases, like when experiencing vertigo or sexual attraction, that might well be true - and the instinctual route, going directly from the sensory thalamus to the amygdala is always there as a defence mechanism - but, as was pointed out by Joseph LeDoux, there is also a 'high cortical road' from stimulus to response,⁸⁰ enabling situations which are obviously both triggered by thought, modified by thought, and removed by thought. It is easy to forget, and sometimes repress, these trains of thought - the subconscious images of a wealthy and powerful existence enabled by money, or the underwhelming image of oneself as a worthless loser - but it is these complex and individual self-evaluations that makes one jubilate, despair, or retaliate in these cases. Even the so called 'fight or flight response' is involving choice, and it is not always caused by snakes.

These are recognitions that bring to mind Hegel's remark that the viscera plays a different role in emotion; it is not just a source of homeostatic symptoms or inborn reflexes, surging up from

⁷⁸ For a discussion of these matters and a critique of emotion as passive and automated see for instance Jing Zhu and Paul Thagard, 'Emotion and action', in *Philosophical Psychology*, vol.15, no. 1 (2002): <https://doi.org/10.1080/09515080120109397>.

⁷⁹ James R. Averill, 'A constructivist view of emotion'. Chapter 12 - A in *Emotion: Theory, Research and Experience*, ed. R. Plutchik and H. Dellerman (New York: Academic Press, 1980), 305-339. <https://doi.org/10.1016/B978-0-12-558701-3.50018-1>.

⁸⁰ Joseph LeDoux, *The Emotional Brain: The Mysterious Underpinnings of Emotional Life* (New York: Simon and Schuster, 1996), 163-165.

below as it were. Indeed his call for research into these matters is still relevant. Damasio's 'somatic marker hypothesis' is one step in this direction, and rather than reducing us to thermostats, which seems to be suggested by other parts of his thinking, it describes how thoughts are often 'marked' with visceral feelings according to their value, import, danger and so on.⁸¹ It is a rather associationist picture of the volition-arousal connection that is drawn here, which certainly holds for many cases of conditioning; another model, more relevant to aesthetic experience, and the coupling of articulated feeling and arousal in general perhaps, is James' conception of a 'bodily sounding board', providing perceptual qualities and sensorimotor complexes that are already joyful, melancholy or problematic with additional intensity and depth.

These arousals may well be facilitated by pre-established wirings and packages in some cases, yet it is difficult to identify such packaging with emotion per se. The combinations of sensations in arousals are infinitely variable, also in terms of intensity and duration. Sometimes they are almost absent, other times they may linger for a long time, during which our attitudes are frequently changing, depending on how we choose to act; and it is these acts, the question whether we are grimacing, sighing, or shaking our fist, that seem to determine the content of the emotions. As was indicated by Schachter and Singer's experiment: a medicamental inducement of arousal is all too ambiguous to accomplish this.⁸²

It is exactly this confusion of emotion with intense surging arousal that is the biggest problem with Frijda's model: the leaving out of account all those 'emotions' that are not so intense and automatic, and which, after all, are forming the greater part of our emotional lives. Thus his conception of emotional processes is not only fragmented, the illusion is easily created of some kind of insentient 'cognitive' sphere detached from emotion altogether. An emotion 'tends to override other concerns, other goals, and other actions,' says Frijda; 'It tends to override considerations of appropriateness or long-term consequence.'⁸³ But, if we take a closer look on Frijda's wording here, even these 'other concerns,' the mentioned activity of *tending*, the sense of *overriding*, the feeling and activity of being *concerned*, the sensorimotor experiences of *striving* and *wanting* which are integrated in the very concept of having a goal or executing a certain

⁸¹ Damasio, *Looking for Spinoza*, 147-149.

⁸² Schachter, 'Cognitive, Social, and Physiological Determinants of Emotional State', 379-399.

⁸³ Frijda, *The Laws of Emotion*, 4-16.

action, the combination of *focus*, *effort*, and *emotional ambivalence* in the act of *considering*, the feeling of *appropriateness*, the assessments of long-term consequence, *good*, *bad*, *dubious* etc; all these concepts which are referred to as 'other concerns' are also sensory and sensorimotor compounds, which may be, and often are, classified as emotions.

If taken to its extremes, and brought into line with William James' account of 'the stream of thought' described in Chapter 1, even the commas, the full stops, the ands and ors, and the very rhythm and brevity of Frijda's sentences; even these prosodic features and 'function signs' are involving attitudes and egodynamic functions, the feeling of *ambivalence*, *relative incompleteness*, *completeness*, *assertiveness* and so on. Some of these entities, like the experience of *considering* or *having a goal*, may well be weaker than the feelings of *pondering* or *longing*; and the feeling of *concern* is certainly weaker than *worry* or *anxiety*. Yet these are differences in intensity and valence, not in essence.

These sensorimotor compounds, as well as the myriad of 'visceral tones' that are accompanying them, seem to comprise each and every moment of our conscious lives. Even the logical, social, and ethical concepts may be seen to be constituted by them. And even if there are elements of automatism here, it would not be correct to restrict it to any fixed and primeval programs. On the contrary, it is precisely the feelings of our active presence that makes it conscious and available to manipulation, and if there were no elements of freedom in choice, we would hardly need any feelings in the first place.

3.2.4 Complex volitional processes

To a large extent this is a discussion about what to call things, and some of the disagreement here would probably disappear if Frijda instead of emotion had spoken of *intense arousal*, *instinct*, or *animal affect*; phenomena that may not even be essential to consciousness and musical experience. Conversely the situation would be clearer if the level of self-consciousness that is the main focus of this treatise was consequently referred to as *articulated feeling*, *sensorimotor melodies*, and the kind of 'egodynamic gestalts' and concepts that constitute the content of the self. When the concept of 'emotion' is found useful in this connection, it is not only because the articulated feelings and interactions might nevertheless be essential to our employment of this concept, it is also in tune with the tendency towards an integration of the intellectual, sensorimotor, and autonomic faculties in modern neuropsychology, and what is

more: it gives a very concrete meaning now, to the concept of music as 'the language of the emotions' which have been so central to the aesthetics of music.

As we will come back to in the next section, the elements of intense arousal and instinctual reaction may not be as essential to the concept of emotion as some people believe, and the focussing on these ingredients may easily lead to a neglect of the articulated and top down organised stream of feelings at the core of music and selfhood. If Wundt's account of 'impulsive acts' is treated in isolation, even Wundt may be criticised for such a neglect. But this is only the first part of Wundt's account. The simplicity of 'simple volitions' may certainly be exaggerated by Wundt, and isolated from the prevailing complexity of the self. However, the picture gets entirely different when he goes on to describe what he calls 'complex volitional processes,' 'internal volitional acts,' and 'intellectual feelings.'

The distinction between his concepts of emotion and volition becomes much more blurred now, and much more in tune with his original definition of emotions as composite temporal processes, incorporating rhythm, pantomimic activity, and potentially the whole field of volitional activity.⁸⁴ Now the faculty of *complex volitional processes*, the sensorimotor 'wavering' between competing motives and acts going into *doubting* and *deciding*, is also added to the picture, and it is not limited to external acts. Even the *internal volitions*, the mental acts, may 'remove the exciting affect,' he says.⁸⁵

And even if the concepts of affect and volition are to some extent kept apart, there are also tendencies towards a much more integrated conception. 'Intellectual processes', he says for instance, 'can, indeed, never do away with emotions, they are, on the contrary, in many cases the sources of new and characteristic emotions.' He is even talking about emotional excitement 'so weak and transient that we overlook it,'⁸⁶ which is a far cry from his earlier definition of emotion as in general more intense than single feelings.

The focus on intense arousal then, as being part of a simplistic stimulus-response model of behaviour, is considerably modified. In fact, he opposes it explicitly. Ironically he is attacking 'older psychologists', as he puts it, for a kind of behaviourism that was going to dominate the scene after his death. 'The tendency was', he says, 'to limit the concept of will to external

⁸⁴ Wundt, *Outlines of Psychology*, § 13.4, 172.

⁸⁵ Wundt, *Outlines of Psychology*, § 14.6-9, 188-191.

⁸⁶ Wundt, *Outlines of Psychology*, § 14.8, 190.

volitional acts, and thus not only to neglect entirely the whole sphere so important for the higher development of will, namely internal volitional acts, but also to pay very little attention to the components of the volition that are antecedent to the external acts.' Instead, he says, there arose an idea of a mystical 'choosing faculty of the mind.'⁸⁷

His critique is directed specifically towards Schopenhauer's reference to a single unconscious Will, a first cause, which, at least as Wundt sees it, 'is coming to consciousness only in its result.' But his critique is also striking at the roots of behaviourism, cybernetics, and the emphasis on the earlier mentioned 'readiness potential' in the brain. He is even talking about a 'materialistic metaphysics' in this connection, a tendency towards the reduction of psychology to neurophysiology which was looming even at his own time. 'But it is an indispensable principle of psychology as an empirical science', he argues, 'that it shall investigate the facts of psychical processes as they are presented in immediate experience, and that it shall not examine their interconnections from points of view that are entirely foreign to them.'⁸⁸

Because, even if action is also involving automatisations, computation, and subconscious inclinations, the choice to make a particular act may nevertheless, and in most cases probably is, taken on the background of a whole culture of high level insights, convictions, as well as a unique prehistory and a multidirectional intentionality which per definition is always 'conscious,' if not in a complete or philosophical sense. Which is very much the position that contemporary researchers like Marcel Brass has come to take: 'Brain activity preceding conscious decisions reflects the decision process rather than its outcome.'⁸⁹ Even the concept of *infinity* is within our reach, so its influence should not be underestimated, neither as a motive nor as a definition of consciousness as such. Especially the religious and aesthetic emotions might be seen to require it.

It is a wholly different picture that starts to emerge now, of a self that is never devoid of acts and emotions, but where the acts are rather going into emotions as constituent elements, and where the emotions are serving as composite entities, which are also ideas. This integrated view may not be consequently entertained by Wundt, but it is described in detail in the earlier

⁸⁷ Wundt, *Outlines of Psychology*, § 14. 10a, 194-195.

⁸⁸ Wundt, *Outlines of Psychology*, § 14.10.a, 196.

⁸⁹ Marcel Brass, Ariel Furstenberg & Alfred R. Mele, 'Why neuroscience does not disprove of free will', *Neuroscience & Biobehavioral Reviews*, 102: 251-263 (May 2019): <https://doi.org/10.1016/j.neubiorev.2019.04.024>.

mentioned chapter on *intellectual feelings* in his *Grundzüge der Physiologischen Psychologie*. The kind of hierarchy that is outlined here is much more *vertical* in character, and suspiciously similar to the one that is sketched out in Hegel's aesthetics and philosophy of mind.

The simplest forms of intellectual feelings, says Wundt, are the 'logical feelings,' that is to say: the behavioural dynamics which was also described in *Outlines of Psychology* as consisting basically of a 'rising and falling' stream of sensations constituting our consciousness both of external and internal activity. The feelings that are initiating the acts are often those of *resolution* and *decision*, but there are also a lot of other emotions and functions occurring along the road, such as *doubt*, *fulfilment*, *satisfaction* and *disappointment*.⁹⁰ In *Grundzüge der Physiologischen Psychologie* the examples of logical feelings are *contradiction*, *agreement*, *truth*, *untruth*, and *doubt*; the latter of which is described here as 'an oscillating state of mind,' that is to say: the wavering is not only 'attending' the doubt - which is how he formulated it in *Outlines of Psychology* - it is constituting it. The feelings of *accomplishment* and *failure*, *ease* and *effort*, are even referred to as 'affects,' which motor components should be no less obvious.⁹¹

At a higher and more complex level, as products of the dialectical strife between self-esteem and empathy, comes what he calls the 'moral feelings' [sittliche Gefühle], comprising entities like *hurtfulness*, *approval* and *disapproval*.⁹² When it comes to 'the religious feelings,' he says, they are even connecting to 'a last ground' [einem letzten Grund], which is exactly where infinity comes into the picture. In other words: his account is reminiscent in many ways of Hegel's philosophy of freedom. Even the distinction between different degrees of freedom in different art forms is reflected in Wundt's account. Whereas architecture is considered more freed from the manifestations of 'external nature' than painting, and poetry is described as the direct communication of intellectual feelings, music is *producing them*, he says, via 'the movement and resolution of the affects.'

What is common to 'the higher aesthetic feelings,' however, is that they are reckoned composite resultants of all the other feelings, as well as the elementary feelings that are peculiar to the different aesthetic media themselves, representing thus, he says, 'the most entangled forms of intellectual feelings.'

⁹⁰ Wundt, *Outlines of Psychology*, § 14.7, 189.

⁹¹ Wundt, *Grundzüge der Physiologischen Psychologie*, Vol. 3, Chapter 19.5, 600.

⁹² Wundt, *Grundzüge der Physiologischen Psychologie*, Vol. 3, Chapter 19.5, 601-602.

As composite resultants of all these forms of feeling [Gefühlsformen], and thus as the most entangled [verwickeltesten] forms of intellectual feelings that exist, appears finally the higher aesthetic feelings. They are products of the connection between aesthetic elementary feelings with intellectual feelings, logical, ethical and religious, while furthermore simple sensory feelings and affects go into them as elements. By thus joining together all the other feelings in itself, the aesthetic feelings embrace the totality of sentient life [Gemütsleben]. A perfected work of art puts the logical feelings in suspense, stimulates moral and religious feelings, produces affects and sensual feelings, which work back on all the other components, at the same time as they moderate the resulting affects. Thus the elementary aesthetic feelings become carriers of complex feelings [komplexen Gefühle]...Every art form turns first of all to a specific form of feeling, which puts the other feelings in movement as well. Thus music produces [erzeugt] affects, which it describes and leads to their final resolution. In so far as the natural resolution of affects in our mind succeeds through the victory of the rational will, arises as secondary components logical, ethical and religious feelings. Among the visual [bildenden] arts, architecture is the freest.⁹³

Curiously enough, the concept of *Gefühle*, which was elsewhere classified as below the affects and volitions, is located to the top of the hierarchy here, comprising both affects, logical reasoning, as well as 'the totality of sentient life.' Obviously it is not mere sensation or arousal he is talking about, but something conceptual and holistic, comprehending not only single acts or functions, but sequences, sections, and the whole context of human life.

It is a grandiose journey that is leading up to this understanding. Especially the last edition of his *Grundzüge der Physiologischen Psychologie*, which is expanded into three large volumes, is remarkable in its scope. Starting out with a large volume on neurobiology, the second volume is concentrating on elementary sensations and feelings, while the third volume is gradually building up an account of ethical and religious emotions, which is also the realm of music as a form of art. Throughout the whole work, many of his examples of gestalt formation or 'creative synthesis' have been musical; especially he is often pointing to rhythmical patterns. On one occasion he even goes into an analysis of concrete harmonic progressions. But this is also where he is confronting his limits of competence. In a section on 'the quality of affects' in Chapter 16 of the same work he describes three simple harmonic progressions, which are also connected with various forms of 'breathing curves' [atemkurven] and processes of tension [erregungskurven] and

⁹³ Wundt, *Grundzüge der Physiologischen Psychologie*, Vol. 3, Chapter 14.5, p. 601-602. Citation translated by S. Bang.

relaxation [beruhigungskurven], which, according to Wundt, are common bodily admixtures in the experience of music.

A: the chord $e^1 - g^1 - h^1$ 'resolved' [ausgelöst] by $c^1 - e^1 - g^1 - c^2$ is described as noble, calm [erhaben, ruhig].

B: the chord $c^1 - e^1 - g\#^1$ resolved by $E - h - e^1 - g\#^1$ is described as gloomy, tragical [düster, tragisch], or as containing a 'faint unpleasure' [unlustmoment] which is calming down [in beruhigung ausklingt].

C: the chord $a - c^1 - g^1$ 'resolved' by $a - c^1 - eb^1$ is described as 'hopeless grief' [Höffnungslose Trauer], but even here the 'Unlustkurve', is retarded, he says, so that a certain calm is also ensuing.⁹⁴

A problem with these analyses is that the overall function of such harmonious behaviour is not distinguished from other emotional behaviour, which seems to be skewing the terminology in the direction of working day concepts. The problem is not that these concepts are too low level, but they are taken from a different sphere of human life: the sphere of 'ordinary emotions' which are generally much more inharmonious than tonal music. Certainly harmonious behaviour cannot be described in terms of to inharmonious behaviour. Rather the music, if it is not atonal, might be described as jubilant or lamenting. Such lamentation is not 'grief' proper; harmonious music might seldom be able to instantiate such a concept. In the absence of a text, it might better be described as a consoling form of melancholy.

In the passage on the 'higher aesthetic feelings', cited on the previous page, Wundt was talking of ethical and religious feelings that are 'working back on and moderating the components', which is indicating that he is on track of the connection between musical feelings of calm and harmony and feelings of religious devotion. He is also pointing to the element of 'logical' feelings in aesthetic experience, but it is an understanding that is not reflected in his account of the above mentioned chord progressions.

⁹⁴ Wundt, *Grundzüge der Physiologischen Psychologie*, Vol. 3, Chapter 16.3.c, fig. 353.

An important example of such 'logical' feelings that is neglected in these examples is the rhetorical context of the chords, that is to say: the progression of different cadences which are typically going into the process of lamentation, celebration or other examples of tonal music. Since Wundt is not specifying whether he is dealing with a full close, a half close, a question or an assertion, the emotional characteristic will also be skewed. Rather than expressing something 'tragic' or 'hopeless' the tensions to which he is pointing may be examples of the ordinary dialectic of tonal music, the typical alternation between question and affirmation, tension and release.

Example B might be understood as a cadence of sorts: an augmented triad resolving into a major triad. Certainly the augmented triad might be characterised as 'gloomy' [düster] even in total isolation, but when resolving into a major triad the effect is not exactly 'tragical'. It is basically a progression from a feeling of tense ambiguousness to a feeling of stability and perfect harmony, which however is not rhetorically decisive, since it is lacking the interpenetration of opposites that is typifying the common tonic-dominant relationship: the circumstance that a dominant chord on the closely related fifth is foreshadowing the tonic at the same time as it is contradicting it. It is probably this circumstance that explains why cadences that are not involving the dominant proper are used in more intermediate conclusions, as so called secondary or substitute dominants. But this is a common feature even in relatively happy music.

Something similar is true of example A. Example C is basically a half-diminished seventh chord, which is not 'resolving' here, but rather increasing in tonal ambiguousness. But this is a common feature even in relatively lusty music. It might well go into dramatic music and 'grief' as well, like in Wagner's dramas. But that would demand a context that is also dramatic or gloomy, involving a lot of other parameters and events that are pointing in the same direction. This is not to say that the isolated chords are lacking in emotive identity, it is just that relatively simple sensory compounds should be described as relatively simple sensory compounds. It is first at higher levels of gestalt formation that they integrate into emotions or 'complex volitional processes'. Even the mentioned breathing patterns would require a context that is demonstrating the length, swiftness, and intensity of phrases, and the accumulation of a sufficient amount of weariness or breathlessness.⁹⁵

⁹⁵ See Bang, *Psychologizing Music*, which last chapter contains discussions of various breathing patterns and even *panting* in the analysis of the second movement of Beethoven's Piano Sonata Op. 54.

It is difficult to blame Wundt for these shortcomings. Even much later analysts, like Derrick Cook, are guilty of the same errors. The difference is just that Wundt had already understood how a whole hierarchy of behavioural gestalts, including even specifically aesthetic and auditory feelings, are required to make sense of complex emotional processes. He just was not able to consummate his project in a consistent manner. Of course, there is the possibility that Wundt extracted the mentioned chord progressions from works that justify the kind of emotions he is talking about, but it is not justified by these examples alone.

3.3 Contemporary tendencies towards an integration of volition and emotion

Wundt's terminology is both confusing and contradictory at times. The word 'Gefühle' has different meanings, and even the spelling of the word 'affect' changes. It is tempting to try to sketch out an alternative practice, which may not be so different from that of Wundt after all. As suggested amongst others by Juan Pascual-Leone,⁹⁶ it might be a good idea to reserve the word 'affect' for 'innate organismic processes and dispositions', as he calls it, rendering the concept of 'emotion' as a designation especially of the 'acquired and situated feelings, more complex than affects, which usually combine affective and cognitive aspects.' These aspects are never 'purely innate,' he argues, 'because they often involve an implicit reference to past experience.' Nevertheless, one might add, they are forming the bulk of what we call emotion, and might very well be identical with what Wundt calls 'komplexen Gefühle' or 'complex volitional processes;' it is just that the latter term is not in tune with ordinary language use, which is usually referring to such composite egodynamic gestalts as 'emotions.'

Even the concept of 'feeling' is misleading, precisely because it fails to convey that we are dealing with *hierarchies of social, rhetorical, and dramaturgical functions* here, which holistic and behavioural aspects and are never reducible to mere sensation. The concept of 'feeling' then, might better be reserved for the kinds of sensations that are forming the *immediate* aspects of emotional processes, be it visual, mechano-receptive, or chemo-receptive. It may not be possible to apply this rigorously; we will still be talking about 'feeling jealous' or 'feeling justified' and so

⁹⁶ Juan Pascual-Leone: 'Not a bridge but an organismic (general and causal) neuropsychology should make a difference in emotion theory'. Commentary on Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modelling,' *Behavioral and Brain Sciences*, Vol. 28, Issue 2 (April 2005): 213-214, <https://doi.org/10.1017/S0140525X0542004X>.

on; circumstances which, like all mental acts, are certainly consisting of sensations, but they are also emotions and ideas, or 'appraisals', as many emotion theorists prefer to call it.

It is the cleft between humanistic and physiological psychology - between cognition, emotion, and volition - that is starting to be bridged here, and even if Wundt was not able to complete this project himself, he is hardly to blame for the setbacks of twentieth century psychology and music theory. As we will come back to in the next chapter, the forays into holistic psychology that were made by some of Wundt's followers and by the gestalt psychologists, produced significant insights into music and the self, but this was never the dominant trend. It is first in recent years that a more integrated picture of thought and emotion, incorporating also the findings of gestalt psychology, is really gaining ground. The development may not have caught up with Wundt and James, and the classification of 'psychical gestalts' that is going to be the subject matter especially of the next part of this treatise, is still beyond the imagination of most psychologists, but at least there are tendencies that seem to point in the right direction now.

A good picture of the state of affairs, at least as things were looking some years ago, is given by Marc Lewis' article 'Bridging emotion theory and neurobiology through dynamic systems modelling,' and by the thirty peer commentaries that are accompanying it.⁹⁷ A central hypotheses is the conception of a 'meta-synchronisation of independent oscillatory subsystems' at the so called 'theta-band,' contributing both to 'unified emotion-appraisal gestalts' as well as 'feedback-loops serving as vehicles for positive and negative feedback interactions among the brain structures underlying appraisal and emotion processes.'⁹⁸ It is a conception which seems to depend less on instinctual packaging than the kind of synchronisation and resonance between cortical and subcortical regions that was indicated already by James' concept of 'a bodily sounding board.' At least, the packaging that Lewis is talking about is susceptible to change and learning, gravitating towards 'stabilised gestalts' that tend to repeat themselves on subsequent and similar occasions.⁹⁹ And it goes without saying that the possible centrality of brain waves as a binding mechanism is hardly unfortunate from the point of view of musical experience, which is produced by vibrations and rhythms in the first place. As earlier mentioned, sound may even

⁹⁷ Marc D. Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modeling', in *Behavioral and Brain Sciences*, Vol. 28, Issue 2 (April 2005): 169-194, discussion 194-245, <https://doi.org/10.1017/S0140525X0542004X>.

⁹⁸ Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modeling', 183-184 and 188.

⁹⁹ Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modeling', 193.

have a direct vibrational impact on cells; and the reflection of perceived auditory and rhythmical patterns in synchronised inter-regional neural oscillations has been documented in several studies.¹⁰⁰

A problem with Lewis' account - which was pointed out by several of the commentators - is that the concepts of emotion and appraisal are still kept apart. The sensorimotor aspect of emotion, which is also central to the perception of a self and the environment against which it is defined, is insufficiently incorporated in Lewis' model, but it is highlighted in several of the peer reviews. Especially Giovanna Colombetti and Evan Thompson are pointing to the sensorimotor and 'enactive' aspects of perception and emotion. 'Action and emotion,' they maintain, 'are not simply instrumentally related,' but 'constitutively interdependent,' suggesting also that 'it may ultimately prove unproductive even to try to differentiate distinct "appraisal constituents" and "emotion constituents," which then "interact" in the formation of an emotional interpretation.' Rather,' they say, 'we suspect that there may be no appraisal constituent that is not also an emotion constituent, and vice versa.¹⁰¹ The same argument was formulated in different ways by Charles S. Carver, Greg Downey, Georg Northoff, Juan Pascual-Leone, David Sander and Klaus R. Scherer, and Don M. Tucker.

As pointed out by Kalina Christoff and colleagues, it is easy to relapse into false dichotomies here. Particularly misleading is the tendency of some neurobiologists to associate emotion and the self with the so called 'resting state network', which is known to be partially deactivated during the performance of demanding tasks. Not only does this exacerbate the ignorance of sensorimotor aspects of emotion and selfhood, it makes it all the easier to forget that these regions of the brain are often operating in tandem, or in loops. The close association between the 'conflict-monitoring' anterior cingulate cortex and the 'cognitive control' of the lateral prefrontal cortex, is only one example of this.¹⁰²

The intertwining of these aspects of emotion is intriguingly illustrated in an article by Simone G. Shamay-Tsoory and colleagues, inverting in several ways the ordinary manner of

¹⁰⁰ See for instance Joydeep Bhattacharya et al, 'Interdependencies in the spontaneous EEG while listening to music', *International Journal of Psychophysiology*, Volume 42 (December 2001): 287-301, [https://doi.org/10.1016/S0167-8760\(01\)00153-2](https://doi.org/10.1016/S0167-8760(01)00153-2).

¹⁰¹ Giovanna Colombetti and Evan Thompson, 'Enacting emotional interpretations with feeling.' In Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modeling', 200.

¹⁰² Kalina Christoff et al., 'Specifying the Self for Cognitive Neuroscience', *Trends in Cognitive Sciences*, Vol. 15, No. 3 (March 2011): 104-112. <https://doi.org/10.1016/j.tics.2011.01.001>.

speaking of these things by connecting 'emotional empathy' with the inferior frontal gyrus, which is usually associated with action planning, and 'cognitive empathy' with the ventromedial prefrontal cortex (Brodmann areas 10 and 11), which is often associated with 'somatic markers' and the like. The distinction is reasonable, because the mirror neurones, so central to empathy and the communication of attitudes, are located to the inferior frontal gyrus, while the orbitofrontal cortex is providing value assessments and the like, usually in cooperation with the intellectual perspectives of the dorsolateral prefrontal cortex. Yet it has the strange consequence of identifying cognition with what is often referred to as emotion and vice versa.¹⁰³

Antonio Damasio may well be right that the precursors of emotion, certain mechanisms for attraction, retraction, repulsion, energy maintenance and so on, may exist even at a 'proto-conscious' level. Even plants have some kinds of sensory, behavioural, and memorial faculties. There is also the condition of 'minimum attention' in brain damaged and 'akinetic' patients; but, as earlier mentioned, if no individual perspectives or attitudes are added to these conditions, it is doubtful if they would qualify as what we normally call 'emotions.' A sensation or reflex action does not usually fall within this category, and without an apperceptive construction of self and other, of agency and body ownership, there would be little that distinguished a so called 'interoceptive' sensation from the rest of the sensory field. The distinction between 'interoceptive' and 'exteroceptive' would hardly exist at all.

It is a conception that is still intact in contemporary neuropsychology; like in Kalina Christoff's article about the processes 'specifying the self'. 'We argue', says Christoff, 'that cognitive-affective processes instantiate the self-experience of being a cognitive-affective agent.'¹⁰⁴ Yet there is surprisingly little emphasis in this article, on the higher level products of such processes, of which sensorimotor agency is only a rudimentary starting point.

Joseph LeDoux goes further in this direction. At least he is explicitly rejecting now the low-level conception of emotion which dominated his previous research. After decades of research on so called 'basic emotions' in animals he has come to realise that he may not have been dealing with 'emotions' at all. Rather we should speak of 'survival circuits', he suggests. Categories like 'fear' or 'anger' are first of all human concepts, he argues, which may not apply to the lower level

¹⁰³ Simone G. Shamay-Tsoory et al., 'Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions,' *Brain*, Vol 132, Issue 3 (March 2009): 617-627, <https://doi.org/10.1093/brain/awn279>.

¹⁰⁴ Christoff, 'Specifying the Self for Cognitive Neuroscience', 104-112.

functionality of defensive or predatory animal aggression. More importantly, says LeDoux: it is first at a level of conscious monitoring and appraisal, when the composite situational and 'global organismic states' are integrated and memorised in 'cognitive workspace circuits' in the prefrontal and parietal cortices, that it is possible to speak of distinct emotion concepts and the like. Even the concept of a set of fixed 'basic' emotions is questioned by LeDoux, which is evoking the Wundtian understanding that emotions are 'dimensional in nature'.¹⁰⁵

It is not clear whether Damasio's understanding is developing in the same direction. In his 'Self comes to Mind' from 2010, he seems to be going in the opposite direction, focussing on even lower structures of the brain. 'Hydraencephalic children who lack insular and other somatosensory cortices but have intact brain-stem structures exhibit behaviours suggestive of feeling states'; he says for instance.¹⁰⁶ Certainly, even some beheaded animals may do this, but does that imply that they do not normally need a head, or that behaviour like smiling would have developed in the absence of the cortex? Even many animals have a head, a cortex, and a primitive sense of self and other; and even if some emotional behaviour has been completely automated - what Wundt described as a 'retrogradation' or 'reduction of volitional to mechanical processes'¹⁰⁷ - this total automatisisation may not be the original or normal situation. 'The appropriate character of the reflexes,' says Wundt, is indicating something else.

There is little doubt, at least, that smiling, roaring, and much other emotional behaviour has evolved for communicative and social reasons even in some animals. And there is a whole world of new behavioural gestalts that come with such perspectives: the act of avoiding confrontation by *threatening* and *scaring away* a competitor or aggressor, or the act of demonstrating *submission* or *goodwill* towards a superior. These instances are not merely 'adding feeling' to impulsive acts and reflexes, which Damasio sometimes seems to believe. We are dealing with complex behavioural compounds here, which are new and composite resultants of such fragments, producing very much the higher level entities of which conscious beings consist.

Even in many animals there has to be a considerable amount of such compounding: a subliminal grasping of composite attitudes and more or less complex interactions, which when

¹⁰⁵ Joseph LeDoux, 'Rethinking the Emotional Brain,' *Neuron*, Vol. 73, Issue 4 (23 February 2012): 653-676, <https://doi.org/10.1016/j.neuron.2012.02.004>.

¹⁰⁶ Antonio Damasio, *Self Comes to Mind: Constructing the Conscious Brain* (New York: Pantheon Books, 2010) 81.

¹⁰⁷ Wundt, *Outlines of Psychology*, Vol. 3, § 14.10, 192-193.

generalised may even reach a conceptual level. There is also an element of flexibility that seems to come with such awareness - a certain removal from automatism. And there is no doubt that humans have moved much further in this direction. As a matter of fact, it is exactly this radical reduction of instinct, and the creative freedom that seems to go along with it, that define us as a species. Needless to say, it is highly problematic then, to extrapolate the results of animal research on the human condition, or to model the emotions on the theory of some inflexible and primeval reflexes.

Certainly there is much that is similar between animals and people, and between different cultures, but that does not necessarily imply that emotional behaviour, arguably comprising all behaviour, is reductive to 'complex, largely automated programs of *actions* concocted by evolution', which is how Damasio describes it.¹⁰⁸ There is also the possibility that some similarities might be there for functional rather than phylogenetic reasons, reflecting some essential and common needs. In fact, a placement along the axes of pleasurable-unpleasurable, exciting-depressing, past-future and so on, is ubiquitous in many ways, because, at fundamental levels, these are the basic dichotomies. The same is true of 'intellectual emotions' like *doubt* and *belief*: they are logical dichotomies, which, like the categories of mathematics and logic in general, could not be ascribed to habit and evolutionary programming alone.

Anyhow, and as pointed out by many researchers, there is a considerable amount of difference between cultures, both as style, temperament, and terminology is concerned; and whether we are focussing on the qualitative or behavioural differentiations, there is nothing that demonstrates it better than music. Whereas the possibility of song and dance was realised for thousands of years ago, more or less in the same manner in all cultures, there is also a considerable room for stylistic variation; and with the advent of new institutions and notation techniques, the possibility of an increasingly more *discursive* preoccupation with harmony did also arise. The experiences produced by Machaut, Mozart, Debussy, or Schoenberg, are both new and distinctly different. One can try to explain these differences away, or locate them to a region of emotion that is freer and more subtle than ordinary emotion; but even ordinary emotions are made up of such behaviour, and by sensations that are subtle and variable in many ways.

¹⁰⁸ Damasio, *Self Comes to Mind*, 123.

Already the so called 'basic emotions' may be much more 'intellectual' and social than is usually thought. At least it is the hypothesis of Jesse Prinz, that the basic emotions may not be so basic after all, but 'outgrowths and byproducts of more fundamental emotions,' not named by 'ordinary emotion words.' *Happiness*, he says for instance, 'may subdivide into sensory pleasures, satisfaction associated with goal attainment, and joy from play.' *Sadness* he explains as 'separation distress'.¹⁰⁹

His analyses are pertinent and very much in tune with those of Joseph LeDoux, although LeDoux' understanding of the behavioural complexity of emotions is less developed, which in certain respects brings him closer to Damasio. Even Prinz' analyses may be simplistic in certain respects. It is not immediately clear, for instance, that the above examples are paying respect to the most important senses in which the words 'happiness' and 'sadness' are employed. Certainly these emotions are often, or usually, much more complex, involving appraisals of our *total existence*, regrets and hopes included. Even the concepts of *joy* and *contentment* might be seen to require an element of active enjoyment and reflexion, which is hardly attainable by most animals. But sometimes we even refer to animals as happy or sad. Is this an anthropomorphism? It might well be. A snail or a rabbit might well feel pleasure, pain, energy, and relief, but hardly 'happiness;' and when it comes to higher animals like dogs or apes, they might already have developed the capacity for more complex social emotion, like when recognising in a fellow being the behavioural characteristics of *playfulness*, *triumph*, or *defeat*.

Less questionable perhaps, is Prinz' account of *surprise* as subdividing into 'a positive sense of interest or wonder and a negative state that cannot be fully differentiated from low-intensity panic.' Certainly surprise is more than a startle reflex. And when the element of *wondering* is introduced, we are already into the realm of intellectual reflexion.

Anger, he says, 'may emerge as a blend of something like goal frustration and aggressiveness.' And it is probably correct that anger may be overlapping with mere frustration in some cases. But it is not the same as frustration; and it is the social mediation or intentional directedness, involving entities like personal indignation, the wish for retribution, and the dialectical interpenetration of these functions, which seems to make the difference. If it is not grasped as such, neither by the sender or the receiver, it is difficult to see how it would qualify as anger. A

¹⁰⁹ Jesse Prinz, 'Which Emotions Are Basic?', in *Emotion, Evolution, and Rationality*, ed. Dylan Evans and Pierre Cruse (Oxford University Press, 2004), § 4.

roaring and attacking lion is aggressive, but not necessarily angry. First when involved in some kind of *rivalry*, or self-threatening combat, this would be the case.

Prinz also mentions *disgust*, which he says, 'may begin as a form of physical revulsion that ultimately gets expanded to subsume moral aberrations'. And here it is even clearer how many emotions may be seen as outgrowths of more primitive acts, which is the standard hypothesis of the adaptationists. One might reply that disgust is an instance of 'active positing', some kind of *contempt*, and thus something distinctly different from a mere revulsion. A snail that is retracting from something displeasurable is hardly 'disgusted.' Yet the manner in which we use these words is not so consistent, and the search for some uniquely human emotions is not as easy as one should think. Even elephants may be *bitter*, taking *revenge* over people who have mistreated them. They may be *nostalgic*, when returning to the sites of their dead relatives, or *disagree* about this, if pulling in different directions. But this is not an argument against the fact that we have already reached an *autobiographical* level of comprehension here, which is much more complex than the fairly local comprehensions of most animals.

And it is more than memorial capacity that separates the different levels of complexity. Both *sarcasm*, *irony*, *joking*, and *humour* in general, are fairly local comprehensions, yet they are probably more complex than any animal emotion. In fact, they seem to be examples of the kinds of unique higher level entities which we are looking for. This is also true for many other concepts, like for instance *religious conviction*, yet it is more difficult in this case to draw a clear line between higher and more primitive ideas, like the idea of where to go or what to do. This may not detract from its complexity, but it seems more evident in the case of irony, that we are concerned with something new.

Even the *changeability* of emotion is commented upon by Prinz; the circumstance that some densely populated societies allow less aggression, and replaces anger with something like *sulking* or *sullen brooding*; or the circumstance that some collectivistic societies are operating with entities that are not named in other countries, like the Japanese 'amae', denoting some kind of *indulgent dependency*.¹¹⁰ The problem with Prinz' account is just that this variability is seen to be constituted by the 'appraisals' only, which, according to this view, are not integrated into the

¹¹⁰ Prinz, 'Which Emotions are Basic?', § 1.2 and § 2.

emotions as such. The emotions are merely 'representing' the appraisals, he says, or they are 'elicited' by them. These 'elicitation files', he claims, 'are content-determining causes of our emotions, not constituent parts.'¹¹¹ But his assertion is a contradiction in terms, since if they are 'content-determining' they are more than causes or elicitors. It is the familiar emotion concepts that exemplify what we usually think of as emotions. The behavioural and social components are always present in these concepts, if only at a subliminal level, which is difficult to pinpoint by most people. The bodily arousals are easier to notice, partly because they are often beyond our immediate control; yet there would be very little left of the emotions if deprived of their behavioural and social aspects.

But Prinz is not yet ready for such an integration. The emotions are simply confused with visceral arousal or 'arousal packages', which are relatively simple, and not even combinable, he says. The circumstance that joy is implicating *active rejoicing*, that hate is a *social relation*, and that surprise is a *contextual phenomenon*, does not seem to be properly recognised by Prinz. Nor has he considered the possibility that even the visceral or endocrine arousals may be flexible and re-programmable in many ways. Especially it is easy to notice how they vary in intensity. But there is also a great amount of flexibility with regard to the *combination* of visceral feelings. Some obvious examples are *gallows humour*, *smile through tears*, the mixture of detachment, enjoyment, and fright in the *watching of horror films*, *hysterical laughter*, *sarcasm*, and *love-hate ambivalence*.

Some of these conditions are so intense and so ambivalent that they seem to imply with necessity that even the visceral or endocrine components are mixed; yet we are dealing with emotions here, that are so peculiar and even new, that they are hardly explainable as hardwired biological packages. Even the stream of thought, which is most often associated with freedom, is underpinned by combinations of sensorimotor, aesthetic, dopaminergic, and other autonomic components, so the distinction between hardwired arousal and flexible volition is not as clear cut as we often think. The brain has areas for arousal at many levels, both in the brain stem periaqueductal gray as well as in the limbic system and the orbitofrontal cortex, and it would be unreasonable to suppose that the highest of these areas are just as hardwired and inflexible as the lower ones.

¹¹¹ Prinz, 'Which Emotions are Basic?', § 4.2.

It would be to go to far, in a chapter on melodic gestalts, to go more into detail about the confusions that still reign in this field, but the problem of Prinz and other supporters of 'embodied cognition' today, is that they seem to see only fragments of the picture. Ronald De Sousa's concept of 'epistemic feelings' is one example of this, focussing basically on the 'chemical' or somatic aspects of thinking, giving *salience* to some isolated moments only.¹¹² A more peculiar example is Lakoff and Johnson's confusion of embodiment with *metaphor*, which is very much the diametrical opposite of embodiment: the comparison with something that is not thus embodied.¹¹³

Very often it is the perspectives of James and Wundt that are left out of account: the continuous sensorimotor activity of the self, and the manner in which such activity is nested into melodies or 'ego-dynamic gestalts'. Prinz is criticising James for a one-sided bodily focus,¹¹⁴ revealing thus a lacking knowledge of James, which is first of all ignoring that the concept of embodiment has a much wider meaning in James' psychology, comprising even our personal belongings, our clothes, the vocal intonations in the stream of thought and so on.

William James also mentions some of the behavioural or ego-dynamic *content* that is going into intellectual activity, like the sense of *partial or definite completion, mental effort, consent, negation, hesitation, aversion* and so on.¹¹⁵ These are ideas or subliminal comprehensions that are constituted by kinaesthetic and auditory feelings. They are forming the central 'nucleus' of self-consciousness, says James, which is alluding more to the functional centrality of such feelings in conation than their status as evolutionary primitives. And as has already been argued: there are no principal differences between these 'intellectual' emotions and other feelings and percepts. They are all consisting of sensations, tactile feelings, movements, relations and so on. As we will come back to in the next chapters, the concept of emotion might well have *valence* as an essential component, but as James is also arguing: emotional activity, and he is pointing especially to music, may well have valence and feeling without involving the autonomic nervous system to a large extent.¹¹⁶ And even when it does, this does not imply that the auditory

¹¹² Ronald de Sousa, 'Epistemic Feelings', *Mind and Matter*, Vol. 7 (2) (January 2009): 139-161.

¹¹³ See for instance George Lakoff and Mark Johnson, *Philosophy in the flesh: The Embodied Mind and its Challenge to Western Thought* (New York: Basic Books, 1999)

¹¹⁴ Prinz, 'Which Emotions are Basic?', § 3.1.

¹¹⁵ James, *The Principles of Psychology*, Vol. 1, Chapter 10, 299.

¹¹⁶ James, *Principles of Psychology*, Chapter 25, 468-469.

sensations are not also 'affecting' the experience. The remarkable composite feeling that is constituted for instance by Wagner's 'Tristan chord' is peculiar to the Tristan chord, it is neither inborn nor visceral, and one must be very 'amusical' or oblivious to ignore that it is contributing to our emotional experience.

At any rate, the element of visceral arousal in emotions like certainty, doubt, or even aggression and melancholy, could be toned down. They might still be experienced as certainty, doubt, aggression, and melancholy. If removing the kinaesthetic, melodic, or harmonic dialectic as well - what Husserl referred to as 'ego properties' like conviction, decision, or 'modalization of active positings' like 'for example "cancellation" or negation, undoing of their acceptance', as well as an 'abiding style' and 'personal character'¹¹⁷ - there would be very little left. If forced to choose between these constituents then, it would not be the sensorimotor and melodic feelings, but rather the visceral feelings and arousals that would have to go. The emotions would be flatter then; but we might still be able to feel and think.

¹¹⁷ Husserl, *Cartesian Meditations*, §32, 66-67.

Part Two

The Hierarchy of Ego-dynamic Gestalts

Chapter 4

Animal Affect and Elementary 'Action Chunking'

4.1 The concepts of 'emotion' and 'ego-dynamic gestalts'

It should be sufficiently indicated in the previous chapter, how the entities we call 'emotions' should also be described as *behavioural gestalts*, among which *melodies* are probably the most subtle and integrated manifestations. Mentioned above are relatively simple affects like *joyfulness*, *frustration*, or *aggression*, but also more intellectual frames of mind like *doubt* and *conviction*, as well as more temporally extended functions like *lament*, *celebration*, or *reconciliation*, all of which are common ingredients of melodic and musical processes. Yet it is not clear whether the concept of 'emotion' or 'emotional behaviour' might serve as a general term for all this content, in the manner suggested by references to music as 'the language of the emotions'. There are many reasons why we should have a common term for such 'Gemütsbewegung' or 'ego-dynamic' gestalt formation, yet it is not certain whether 'emotion' would do the job. A subsidiary question might be whether the word 'emotion' could serve as a designation at least for some of these entities. Especially when attempting to sketch out an inventory of musical content it is important to know how to categorise it.

The most usual connotation of 'emotion' is probably that of a *mental state*. And there is no doubt that emotions are mental conditions which are denoted by nouns in many cases. But this grammatical *passivity* may also be misleading, since it is hiding its *activity*, and the fact that the same or similar activities may also form the content of adverbs, verbs, and verbal nouns. A person may well perform a single act of rejoicing or jubilation, shouting *yippee*, or erupting into energetic and rhythmically regular singing and dancing; but he may also *be joyful*, or in a *state of joy*, when this harmony and vitality is characterising his behaviour. Similarly we may be *in love*, but we may also *actively love*, *show love*, or *make love*. And whether we call it *an act*, a *sequence of acts*, a *state*, or a *characteristic*, its content is more or less the same.

Needless to say, the concept of 'affective states' does also hide the similarity with the kind of behavioural gestalts that are often called 'thoughts.' But even emotions consist of such

intellectual activity, and even this intellectual activity is often spoken of as states or characteristics. One may *doubt something* by introducing some kind of deflection, faltering, or disruptive discord, as a reaction to something or someone more decisive or harmonious; but one may also be *full of doubt*, or *in doubt*, when such acts and reactions are characterising ones behaviour. Similarly, one may *deny something*, or *be in denial*, *think* or *be thoughtful*. A *decision* may be instantaneous, but the activity of *deciding* or *being decisive* may last for a long time.

It is true that some of the entities we call emotions may be more ongoing or mood-like than others, but not always consistently so. Tension and suspense may last for a long time, but also be part of a tonal cadence, as a leading tone, or a moment of melancholy in a suspension, lasting for a fragment of a second. And even in the cases where repetition is involved or required, like in *boredom*, which seems to be a mixture of monotony and some kind of eruptive irritability, these conditions are still consisting of characteristic behavioural patterns.

As we can see: the distinctions between *state*, *act*, *active* and *passive*, come down in many cases to our manner of speaking and our choice of grammatical tense rather than any significant ontological distinctions. In many cases we even talk of complex reasoning as were it instances of immediate 'feeling'. And James Averill may well be right, that especially this passive mode of talking about ourselves may be misleading in many cases, and upheld by a wish to justify our actions as something that just comes over us; a remnant perhaps, of times more fatalistic.¹

And when it comes to the entities pertaining to higher level autobiographical or dramaturgical processes, like *regret*, *resentment*, *disillusionment*, or *hope*, the dichotomy between acts and states is even less pertinent. Certainly these entities are consisting of acts, or instantiated by certain acts, but their content is not exhausted by a single act. A *pause*, for instance, is not very informative in isolation. It is nothing; yet it may take on some very complex significance at a certain stage of a sociodynamic or rhetorical process. Even these long-range processes and interactions may be considered ego-dynamic gestalts, yet when talking about a certain stage of a rhetorical process or drama, the concept of 'function,' as in rhetorical functions, or in psychodynamic or dramaturgical functions, is probably more precise.

¹ James R. Averill, 'A constructivist view of emotion'. Chapter 12 in *Emotion: Theory, Research and Experience*, ed. R. Plutchik and H. Dellerman (New York: Academic Press, 1980), 305-339. <https://doi.org/10.1016/B978-0-12-558701-3.50018-1>.

We have reached a level here, which is much more complex than moods and even many thoughts, and even if most of what we call emotion belongs here, it is not reflected in the passivity of the terms. To a certain extent this deficiency may be remedied by talking about 'emotional behaviour,' 'intellectual feelings,' or 'intellectual emotions'; and, as earlier mentioned, the concept of emotion is undoubtedly better than 'feeling' at capturing the complexity and the holistic character of these entities. At the same time, the common tendency to associate emotion with visceral *arousal*, and the associated false dichotomy between emotion and cognition, is misleading, and gives the impression of some isolated or optional aspects of mental activity.

It should be seriously considered then, whether concepts like 'mental dynamics' and 'ego-dynamic gestalts' are better suited as general denominations of this field. Indeed this is the practice that will be adhered to in the rest of this treatise, and it seems to be difficult to come up with any alternative and better terms.

Another circumstance that makes the concept of emotion rather problematic and the concept of mental dynamics preferable, is our dealing in many cases with mental operations in isolation from their character and feeling tone. Such abstracted functions may not exist in real life, and they are not called 'emotions,' yet they do pertain to the dynamics of thought and music.

The activities of *stating*, *retrospecting*, *preparing*, *repressing*, or *emoting* for instance, are all examples of such 'abstract' functions. One might also imagine a *question*, an *affirmation*, or an *intensification*, without implying the valence of what is affirmed. At least this is seemingly the case. Our conceptions of rhetorical functions like *question* and *answer*, or even *preparation* and *conclusion*, are never completely devoid of valence. If the idea of a question does not incorporate the idea of conflict, or if the idea of an answer does not imply some kind of resolution, there is no question and answer. Even in a negative answer, incorporating elements of conflict and aggression, this is probably the case. Or to put it differently: even a negation is assertive in some sense. Yet these melodic or kinaesthetic fluctuations are penetrating all our intellectual operations, in a manner which to some extent is independent of the larger variations in valence and character that may characterise the same activity, so it has to be considered, at least, whether they should be classified as general ego-dynamic functions rather than emotions.

Within the sphere of *sociodynamic* compounds, even a *discussion* may imply a certain amount of conflict or suspense. If it did not, it would be a mere exchange of facts. Some people

do not like it for this reason. Yet it is questionable if the component of feeling is conspicuous enough to make it into an 'emotion' that can be listed among those functions that have character and valence. First in *strife*, *quarrel*, and *animosity*, the level of intensity seems to transcend the normal suprasegmental dynamic.

In cases of entirely neutral concepts like *retrospection* or *imagination*, their difference from concepts with valence is more obvious. It is much clearer in these cases that when the valence and character of these acts are taken into account, even if it is of minimal intensity, they are turning into something 'emotional', like *nostalgia*, *hope*, or a *cynical outlook*.

The same could be said about many *rhetorical* concepts. First when a characteristic *vigour* or the *harmony of song-melody* is added to a statement or sentence it is turning into *laudation* or *jubilation*. Yet we can also observe how the experience of song-melody, which is harmonious by nature, may recede into the background and take on the role of a general suprasegmental substrate, while highlighting more discordant and depressing elements, producing amalgams like *lament* or *threnody*. This is no 'ordinary' mourning or grieving; it is a higher level synthesis of harmony and grieving, which, even when it does not trigger the autonomic nervous system to a large extent, is about as emotional as it gets.

So what we call 'emotion' then, is in many cases a combination of some abstract function or activity and the valence and character of this activity. But neither of these aspects are redundant. And whether the factors are spoken of in isolation or together, they all belong to a common field.

As concerns the character and valence of these gestalts, one may wonder which is the most important of these: valence or some other aspects. *Busy*, *stressed*, *funky*, *turbulent*, and *animated* have already character, yet not enough valence, it seems, to be called emotions. As was pointed out by Wundt, the pleasure-unpleasure distinction is probably the most important determinant, and it is worth considering whether we should establish a separate category for all gestalts with valence, and group the other characteristics either in a separate category or together with more abstract concepts. This, however, is not the option that is chosen here. It seems more rational here, to limit the taxonomy of non-social compounds to two main categories, contrasting the category of 'abstract' ego-dynamic functions with ego-dynamic functions that have valence and character. It is first of all this category of *valenced* functions that is constituting *emotions proper*; and the category of *moods* and *styles* might be regarded as a subcategory of emotion, having a more pervasive character.

As we will come back to in separate chapters, the distinction between 'abstract' and more intense ego-dynamic compounds has a parallel in the division of the frontal cortex into medial and lateral structures. While the lateral structures might be described as an action-nesting hierarchy, the medial regions, constituting the midline walls between the hemispheres, seem to be dealing with more pervasive and visceral aspects of emotion, which may be aroused to different extents. Yet one cannot restrict the concept of emotion to either of these categories. This topological dichotomy may be more concerned with the distinction between the articulated and mood-like aspects of emotion.

The aspect of *intensity* has already been discussed, and even if the association of emotion with arousal and high intensity is not wrong, it is not an absolute requirement. Many emotions are weak, and many behavioural patterns are common to weak and intense expressions. This is not to say that even auditory experience may be extremely loud, dissonant, and more harmonious than anything, but even if it is not so loud, and even in the absence of much somatic involvement, it may be sufficient to provide the content of rhetorical figures like *cadence*, *phrase*, *exposition*, or more emotional designations like *giocoso*, *lamentoso*, *maestoso*, and *risoluto*.

This is also what is indicated by a study by Erica L. Johnsen and colleagues: the ability to recognise and feel 'happiness,' 'sadness,' and 'fearfulness' when listening to music was intact even in patients with a damaged ventromedial prefrontal cortex, even though the skin-conductance responses typical of autonomic engagement was missing. Conversely, the ability to generate skin-conductance responses was intact in patients suffering from lesions in the right hemisphere somatosensory cortices, although the reported *intensity* of the emotions was lower in this group; and one might speculate whether this could have been caused by a reduction of musculoskeletal involvement. The ability to *recognise* the emotions upon hearing music clips was intact in both groups, probably because this study did not include lesions in the ventrolateral prefrontal cortex, which is where melody and emotional behaviour is often found to be organised.

It is crucial to remember that the concepts of 'sadness' and 'fearfulness' are never entirely relevant to music which is concerned with the affirmation of harmony; and the agreement between subjects would probably have been even higher if they had been allowed to choose between more precise descriptions of the music, like *major*, *minor*, *blues*, *baroque*, *romantic* and

so on. Indeed, a comprehensive experiment by Marcel Zentner and colleagues, involving different genres of music and hundreds of emotion words, revealed that music was very often described as joyful or melancholy; seldom as sad, fearful, angry, or surprising; and never as disgusted, guilty, shameful, contemptuous, jealous, or embarrassed.² But this is a problem that was to a certain extent circumvented in Erica L. Johnsen's study, by omitting non-musical emotions like *anger* from the checklist, and by the use of film music, which is much more dramatic and relevant to the concepts of sadness and fearfulness than is usually the case in tonal music.

Johnsen's data and theoretical perspective may not be sufficient to draw such conclusions, yet she is speaking here of 'a double dissociation between feeling emotions and autonomic responses to emotions, in response to musical stimuli,' which, she says, is supporting the hypothesis that 'autonomic response and emotional experience can be dissociated, and that each can occur despite impairment of the other.'³ These data, she argues, are contradicting 'at least the strongest version of William James' original idea.' But as we have seen: James' interpretation would be different. According to James, emotion is restricted neither to the visceral nor the kinaesthetic sensations. Even sound may be a medium for emotion,⁴ and it might well be the retained capacity for auditory feeling and gestalt formation that makes a classification of emotions possible in these cases, even in the absence of many visceral and musculoskeletal sensations. Emotion without any kind of feeling or sensation is absurd. Certainly the more corporal and interoceptive sensations often play a central role in emotional experience, but as was indicated in a fMRI study by Manos Tsakiris and colleagues: the sense of *agency*, activating especially the pre-supplementary motor area (pre-SMA), was neither dependent on nor produced by the sense of 'body ownership', activating midline structures like the posterior cingulate cortex.⁵

² Marcel Zentner et al., 'Emotions Evoked by the sound of Music: Characterization, Classification, and Measurement', *Emotion*, Vol. 8, No. 4 (September 2008): 494-521, <https://doi.org/10.1037/1528-3542.8.4.494>.

³ Erica L. Johnsen et al., 'A neuroanatomical dissociation for emotion induced by music', *International Journal of Psychophysiology*, 72(1) (April 2009): 24 and 32, <https://doi.org/10.1016/j.ijpsycho.2008.03.011>.

⁴ James, *Principles of Psychology*, Chapter 25, 468-469.

⁵ Manos Tsakiris, Matthew R. Longo, and Patrick Haggard, 'Having a body versus moving your body: Neural signatures of agency and body-ownership,' *Neuropsychologia*, Vol. 48, No. 9 (July 2010): 2740-2749, <https://doi.org/10.1016/j.neuropsychologia.2010.05.021>.

It is probably the one-dimensional focus on arousal, interoception, and instinct, as well as the exclusion of more active and abstract elements from the concept of emotion, that has created the illusion of a gulf between emotion and cognition. Demanding so little from the emotions in terms of behaviour, and so much in terms of arousal, it tends to relegate everything that is not so intense, or abstracted from this aspect, to a category of non-sentient computation. But as long as it is conscious, it is all sentient. At the same time, all sentient experience, to the extent that it is transcending an isolated point in time and space, is also ideational and cognitive.

If forced to choose between emotion and cognition as a general term for all self-reflexive mental activity, the concept of cognition or *self-cognition* might seem preferable, since it covers even the articulated and abstract functions of this dynamic. But even the concept of cognition is problematic, since it is often contrasted with emotion and embodiment.

It is a false dichotomy; and as we have already seen, even Wundt is confused by it, ignoring in many cases those conceptual aspects of emotion and selfhood of which he was also speaking. It is not a consistent error, and he is remarking that especially ideas of a *body* is central to the ego. Yet such ideational components, he says, 'can never be sharply distinguished from the rest of consciousness,' and he is pointing to the circumstance that 'the idea of one's own body sometimes fuses with the feeling of the ego, sometimes is distinct from it as the idea of an object.'⁶ In music the body is always extrinsic, since the medium of sound can only incorporate the dynamic aspects of the self. This is the self isolated from 'any further content', as Hegel put it.⁷ 'Self-consciousness in its development always tends to reduce itself to its affective basis,' Wundt remarks; but both Hegel and Wundt tend to forget that even affects and purely ego-dynamic processes are productive of *gestalts* and ideas; many of which are exemplified above. And, as we will come back to especially in discussions about their neuroanatomical correlates: such *gestalts do* seem to constitute a class of concepts that is different from spatial objects and 'distinguished from the rest of consciousness'.

To better capture the essence of this field then, we need a concept that is integrative enough to cover both the conceptual and sensual aspects, at the same time as it makes it clear that the class of entities we are dealing with is pertaining to the self: to an *inner world* so to speak. 'Mental dynamics', 'psychodynamics', 'ego-dynamics', and 'ego-dynamic gestalt formation' are terms that

⁶ Wundt, *Outlines of Psychology*, § 15.11, 221-222.

⁷ Hegel, *Aesthetics*, the chapter on 'Music' in Volume 2, 891.

might all serve as labels for this category of content, although the concept of 'psychodynamics' might be too bound up with Sigmund Freud's theories of an interplay between conscious and repressed elements, involving as essential features the sexual drives, cultural taboos, and an ego that is not particularly rich or articulated. This we will come back to in Chapter 8. The different *hierarchical* levels of mental dynamics, and the classification of content according to complexity and temporal comprehension, will be discussed in the following chapters. We also have to consider in greater detail the limitations and unique possibilities that are given by the medium of sound. As concerns the most general categories of such content, which has been the subject matter of the above discussions, the terminology will be as follows:

A) GENERAL EGO-DYNAMIC FUNCTIONS

Ego-dynamic concepts that are abstracted from valence and character, constituting attitudinal, rhetorical, and discursive functions.

B) EGO-DYNAMIC FUNCTIONS WITH CHARACTER AND VALENCE

Ego-dynamic concepts that are integrating behavioural function with valence, constituting *emotions*; and concepts of character abstracted from behavioural functions, constituting *moods* and *styles*.

C) SOCIO-DYNAMIC FUNCTIONS

Concepts of social interaction, comprising concepts of general functions and functions with character and valence, constituting *social emotions*.

4.2 Agency and attitude in animal vocalisation

As was indicated above, the concept of 'ego-dynamics' has the potential of covering a wider range of content than 'emotion', comprising also more rhetorical and discursive functions, which are often abstracted from its own valence and emotional character. Perhaps one could say that all emotions are ego-dynamic gestalts, but not all ego-dynamic gestalts could be called emotions. It is a vast realm of reality, which even if it is producing the content of all selves and conscious beings is to a large extent neglected. And it may not be immediately obvious how it is possible to disentangle it from our engagement with our surroundings or the literary and literal 'programs'

that are sometimes accompanying musical works. To demonstrate the existence of this region then, and a conception of personal autonomy that is radically different from a materialist account of selfhood and music, it may be a good idea to start with the elementary acts, which are most closely tied to our immediate concerns, and try to reconstruct the hierarchy of autonomous ego-dynamic gestalts as we go along.

Prototypes of such a hierarchy have been provided by philosophers and developmental psychologists alike, and even if much of this content is often ignored or taken for granted, it has to a considerable extent been treated by fields like rhetoric, dramaturgy, psychoanalysis, and music theory; and where it not for common-sense psychology and parlance we would not even have any words for these things. So rather than speculating wildly here, or relapsing into reductionism, it should be considered whether the concepts that have already proven valid and functional within these fields might be arranged into a more systematic nomenclature of ego-dynamic gestalts.

More recently the fields of neuroscience and neurodynamics have also provided important clues to how such a hierarchy of content might be produced in the brain. It is a hierarchy that stretches all the way from the tendency towards hierarchical organisation of small neuronal circuits,⁸ via the composition of basic sensory gestalts and scenes in the occipital and temporal cortices, to the highest levels of 'action chunking' and 'metacognition' in the frontopolar cortex. Some researchers are even providing lists of 'action vocabularies,' 'communicative gestures,' and 'calls' which, although they are extracted from the behaviour of nonverbal animals, are already encroaching on the fields of hermeneutics and musical analysis.

At an elementary behavioural level there are for instance such entities as *moving*, *turning*, *shaking*, *twisting*, *rocking*, *rolling*, *banging*, *blowing*, *striking*, and *plucking*. These are the kinds of elements that go into all higher level behavioural compounds. But that is not to say that they are already productive of selves or self-consciousness. The acts may be reflexes or entirely automated procedures, which may be construed - at least this is what some people seem to believe - in 'mechanical' terms only, like when a virus is infecting a bacterium as a mere physical or physiological chain of events serving to maintain the existence of its genes.

⁸ See for instance Mark Shein Idelson et al., 'Innate Synchronous Oscillations in Freely-Organized small Neuronal Circuits', *PLoS ONE*, 5(12) (28 December 2010): <https://doi.org/10.1371/journal.pone.0014443>.

See also Itay Baruchi et al., 'Functional holography of complex networks activity - From cultures to the human brain', *Complexity*, Vol. 10, Issue 3 (9 February 2005): 38-51, <https://doi.org/10.1002/cplx.20065>.

Nonetheless, already at such primitive levels one can observe how an organism is productive of autonomous behavioural to some extent. Its activity is neither a spatial object nor a sequence of objects. An ant may *shake*, *unhitch*, and *drag* a pine needle, yet none of these actions derive neither from the pine needle nor from the ant as a physical object. The acts of shaking and dragging may be concerned with something material, like a pine needle, but the *shaking* and *dragging* as such is not inside this needle, nor is it identical with the organism that is performing these things. These are structured processes, with a certain development, rhythm, and a synthetical or proto-conceptual unity, which is not always bound up with any specific surroundings.

Luciano Fadiga and colleagues are speaking of a 'vocabulary of motor actions', which is represented by different populations of neurones in the premotor area of monkey brains, more specifically the region called F5. Their research is suggesting that these neurones are capable of 'generalizing the goal independently of the acting effector.' As examples of such generalised content they are referring to different classes of neurones, some of which are specialised for 'grasping' while other neurones are specialised for 'holding', 'tearing', or 'manipulating'. They are also pointing to neuronal populations that subdivide the actions into smaller segments.⁹ Other studies have located vocabularies of communicative 'calls' to more anterior parts of the macaque ventrolateral prefrontal cortex, more specifically to pars orbitalis (BA 47/12).¹⁰ And other findings, indicating that these areas are also crucial to melody and emotion recognition in humans, are very much confirming the above argued centrality of articulated behaviour in emotions.¹¹

As earlier noted: 'intentionality' may also be internally directed, when concerned with the different stages of a certain behavioural sequence. Even elementary gestalts and concepts like 'shaking' or 'rocking' are consisting of characteristic sets of movements, which do not require that something specific or even 'external' is shaken. In music, dance, or animal play, it might even be driven by the mere pleasure of performing it. Yet it is questionable whether lower

⁹ Luciano Fadiga et al, 'Broca's Area in Language, Action, and Music', *Annals of the New York Academy of Sciences*, Volume 1169, Issue 1 (24 July 2009): 450-451. <https://doi.org/10.1111/j.1749-6632.2009.04582.x>.

¹⁰ Lizabeth M. Romanski, 'Representation and Integration of Auditory and Visual Stimuli in the Primate Ventral lateral Prefrontal Cortex', *Cerebral Cortex*, Volume 17, Issue suppl. 1 (1 September 2007): i61-i69. <https://doi.org/10.1093/cercor/bhm099>.

¹¹ Simone G. Shamay-Tsoory et al., 'Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions'. *Brain*, Vol. 132, Issue 3 (March 2009): 617-27, <https://doi.org/10.1093/brain/awn279>.

animals, like ants, have awareness and freedom enough to disentangle themselves from more organic and automated impulses in autonomous activities like song, play or rhythmical self-stimulation.

Nevertheless: as long as the moving entity is also an organism, there is always a certain autonomy already at the organic level. The ant *runs out of energy*: the shaking and dragging gets weaker and slower, and more hesitant perhaps, before stopping completely. The ant is *exhausted*, at least its *energy* is exhausted. It has to *rest*, and it has to do this at regular intervals, to regain energy and to be able to carry on. Similarly it has to *breathe* at regular intervals, if not exactly through its mouth, as do some other animals. And it seems to be a logical and empirically verifiable concomitant that the animal is breathing heavy and often when under strain, but much calmer and infrequent when rested.

Then there are developments that are stretching across the life span of an organism. They may not be conscious, but even plants have a life cycle, with its intrinsic patterns of development and deterioration. Such processes are not autonomous in the sense of being very flexible, yet they are disentangled from their surroundings in a manner which is already going a long way toward explaining the autonomy of animals and musical works: the reason why the music could be understood and conceptualised even in abstraction from extrinsic matters.

In other words: we are already close to the realm of the self here, but it is not certain that we have reached it. Certainly these organic and respiratory processes are forming an important part of all psychical and musical processes, contributing important aspects of *phrasing*, the *timing* and *dynamic modulation* of phrases, the division of a musical work into sections of *more or less activity*, *more or less attention*, periods of *exhaustion*, *heavy breathing*, *resting*, *diversion* and *recreation*, the process of *refocusing* in transitional passages, and *the return to focussed activity*. However, as long as it is not *self-aware*, it is hardly emotional or psychical.

The term 'protoself' might cover the earliest stages of such development. Another concept is 'vegetative state,' which, however, is not a good description of active animals without self-awareness, to the extent that such creatures exist at all. The element of *sensorimotor awareness*, and the enhanced ability and drive to adjust to ones surroundings that seems to come with such awareness, may well be what distinguishes animals from plants, even when the element of awareness and freedom is minimal. Some studies are indicating that even the behaviour of fruit

flies is guided by memories of earlier experienced negative or pleasurable stimuli.¹² The size of the insect brain does not necessarily rule out mental complexity, and as we will come back to below: the question whether it is possible to speak about a purely automatic and 'mechanistic' animal existence is problematic. It is problematic already at the inanimate and atomic level.

What is fairly clear, and much more central to the understanding of music, is that it is first with the experience of 'agency' that something like a 'self' is starting to evolve. The phenomenon could be explained as a product of comparison or 'apperception', opposing a sense of controllable sensorimotor activity to what is not controllable, thus organising experience into two main conceptual spheres: the sphere of me and others like me, and the sphere of inanimate objects. And it should be needless to repeat that this dialectic has also a temporal dimension. As was pointed out by Damasio, it is the experience of movements being integrated into 'plans', 'forethoughts', and a sense of 'an individual organism wishing, wanting, considering, believing', that distinguishes conscious individuals from cases of so called 'epileptic automatism'. Damasio is even talking of 'a melodic line of emotions' here, 'an image of knowing centred on a self' which is developing 'in parallel with' the image of surrounding objects. Mere wakefulness is not sufficient.¹³

Wundt might well be right that the *willing* precedes the self, either as a primitive self, or without self at all. There are probably countless stages of development even at this fundamental level; and even if some of the neuroanatomical locations of will, agency, and bodily awareness might be charted, the 'hard problems' concerning the transcendental aspects of these capacities are much more difficult to solve. The prehistory of consciousness is still obscure, and it is not uncommon among biologists to consider consciousness as something very limited: a ripple or 'vortex' on an enormous sea of unconscious processes.¹⁴

On closer inspection the situation might well be the opposite, and even the dialectic that is characterising the inanimate and elementary stages may not be as inaccessible as it seems. Even if our attentional capacity is limited, our percepts are almost infinitely complex; much more so than any inanimate object. Already primitive animals are capable of perceiving categories like substance, space, energy, the electromagnetic spectrum, movement, vibration, chemical

¹² Yoshinori Aso et al., 'Three Dopamine Pathways Induce Aversive Odor Memories with Different Stability', *PLoS Genetics*, Vol. 8, Issue 7(12 July 2012): <https://doi.org/doi:10.1371/journal.pgen.1002768>.

¹³ Damasio, *The Feeling of What Happens*, 98-101.

¹⁴ See for instance Rodolfo R.Llinás, *I of the Vortex: From Neurons to Self* (Cambridge: MIT Press, 2001)

reactions, and categories of reality to some extent. Not from a vantage point outside 'the thing in itself', as it were. The animal mind is already a 'thing in itself'; it is just constructing a much more integrated and complex 'Umwelt' now, which seems to be growing proportionally with its mental faculties and capabilities of movement and reflection.

Kalina Christoff and colleagues are talking about a 'self-specifying' process, where 'externally directed, attention-demanding tasks, rather than suppressing self-experience, give rise to the self-experience of being a cognitive-affective agent.'¹⁵ What she fails to notice is the fact that this is a reciprocal process, where even the perceptual properties of external objects, indeed the whole realm of conscious content, is defined. As was pointed out by Daniel Dennett in his first book: 'The significance an item in the environment can have to a creature is limited by the creature's behavioural repertoire.'¹⁶

Yet it is not clear whether Christoff and Dennett are realising the extent to which a sphere of uniquely *mental* gestalts is emerging as well: an inner world of attitudinal, emotional, and intellectual functions which are providing the content of self-consciousness, even, or especially, during its highest mental operations. As we will come back to in later chapters, it is probably this ego-dynamic and 'autonoetic' perspective that is organised in the prefrontal cortex. The elementary 'behavioural repertoire' might already belong to this sphere, but when the sense of *agency* and self is evolving, the behavioural repertoire is also expanding and extending into the field of emotions and more 'intellectual' functions, all of which are subsumed here under the general category of 'ego-dynamic gestalts'.

There are many indications that a wolf or dog, for instance, may have cognitive capacity to grasp its own acts as defined against, and interacting locally with, external, previous, and future acts, providing reflection enough to experience a sense of *option, choice, failure, resignation, loss*, and the idea of *searching elsewhere*. And when it stops, it may not simply be stopping, it may be *hesitating, waiting, or preparing* for something else. This dialectic, which is not only intra-behavioural, but inter-behavioural and social, may also be extended to comprise the notion of other agents *interfering* with itself, *approaching, retracting, dominating*, being *submissive* and

¹⁵ Kalina Christoff et al., 'Specifying the Self for Cognitive Neuroscience', in *Trends in Cognitive Sciences*, Volume 15, Issue 3 (March 2011), 105, <https://doi.org/10.1016/j.tics.2011.01.001>.

¹⁶ Daniel Dennett, *Content and Consciousness* (New York: Routledge & Kegan Paul, 1969), 53.

so on. And when valence is also added to these compounds, typical emotional compounds like *joy, frustration, anguish, fright, threat, aggression, attack, fight*, and *flight* are also emerging.

Yet these are claims which have to be backed up by evidence. So what kind of evidence do we have? It is tempting to answer that especially the existence of *vocalisation* and melody are clues of this. Body language is a manifestation of emotion too, but it is not as explicit and malleable as vocal communication. Even in bodily communication the acts of the other are simulated and re-experienced, but the observation of a retraction, or a wrinkle in another animals face, is not necessarily indicative of fright. In a vocal *cry* or *yelp*, the valence, tension, and intensity which is going into this emotion is often much more immanent and independent of the repertoire of instinctual programming. And there is another clue as well: its purely *communicative and social function*. Unlike spatial movements, the sounds have little or no utility beyond this function; they are occurring primarily for the sake of communication and social interaction; so if a sudden retraction or submission is accompanied by *yelping*, or a loss is accompanied by hours of tense and soul-wrenching *howling*, or if a sudden approach or arrest is accompanied by *intense barking*, it seems much more likely that we are dealing with social emotions like *fright, anguish, longing, aggression, submission, and dominance* in these cases, and with an animal which is also self-aware to some extent.

Certainly if the dog is perceiving and responding to the mere attitudes and behavioural gestalts of other creatures, the likelihood of it being aware of its own attitudes is also higher, even if this awareness is not yet self-reflexive in the sense of grasping its relational attitudes in the perspective of other relational attitudes. This second order compounding or elementary 'theory of mind', is probably still lacking in dogs, but this does not preclude the perception of some kind of social emotion. It might not be a matter of one dog consciously *revering* a stronger dog, but if its dominance is not grasped and respected in a more immediate manner, the consequences would often be grave.

It is probably true that in some insects their vocalisations may function rather as a kind of instinctual *signalling system*, perhaps below the threshold of emotional awareness. The communication of bees for instance, may be an example of this, signalling information about distance and direction, which again seems to be triggering certain patterns of behaviour. Even in bees, however, this signalling may not be entirely automatic or unrelated to the immanent quality of the acts. If counting and pointing is involved, it is not arbitrary at all. Nor must it be

completely accidental that they use a short *buzz* to alarm, and other sounds, like *piping*, to sooth and calm the hive.¹⁷

In 'higher' animals, however, it seems much more obvious that their expressive behaviour is an integrated part of what they express in most cases. The explosive energy and roughness of *barking*, for instance, is communicating little but this explosive energy and roughness. *Yelping* is sudden too, but it is rather suppressed and implosive than explosive, which is exactly what makes it into a manifestation of pain or fright. It is not powerful and insistent, which are the earmarks of aggression. This element of *insistence* in barking, however, is not very harmonious in the sense of being rhythmically regular; it is rather unpredictable, turbulent, and rough, which might also contribute to its effect. A male gorilla on the other hand, may demonstrate its power when it is banging its hands on its own chest, but this is a much more rhythmically regular and self-oriented activity, which is exactly what makes it into a demonstration of self-satisfied power rather than an act of aggression. Similarly, when a dog is wagging its tail, it is neither aggressive nor powerful, it is just harmonious and vigorous.

Certainly these behaviours are instinctual also, but they are not arbitrary or fixed like signs. The parameters are all adjustable to the perceived overall situation. The aggression that is constituted by barking is varying in loudness, roughness, and intensity; the vigour and joyfulness of tail-wagging is varying in frequency and rhythmical regularity; the painful retraction manifested in yelping is varying in pitch and swiftness. And when activities like *howling* and *miaowing* are taken into account, we can observe how more extensive melodic progressions are also individuated and variegated in many respects.

Many biologists do not seem to be aware of this possibility, or even the fact that all emotion is necessarily manifested in some kind of medium. The exponents of nativism and reductionism are preoccupied with *origins*, as if tracing everything back to a creator would explain it. The qualitative modulation and functional identity of the emotions, and the fact that this content has to be manifested and perceived before it can be labeled by words, is often neglected. Yet the content exists. Especially the purely 'vocal fencing' of many animals seems to demonstrate it: it requires a sensory and socio-emotional synthesis, which does not exist at lower levels of awareness. But, as earlier mentioned, an animal cannot be social if it is not already in possession

¹⁷ Adrian M. Wenner, 'Sound Communication in Honey Bees', *Scientific American*, 210 (April 1964): 116-124.

of a certain individual autonomy. When the dog is *hesitating, daring, giving up, deciding to seek elsewhere*, or when it is fluctuating between tension and release when howling, there is already an element of strategy and independent life in place, which is neither purely social nor purely metabolic.

Perhaps one could say that the howling of dogs, and the often elaborate mewling of cats, is *musical*, even in the sense of some 'artistic' connotations of this word; adding a considerable amount of complexity and self-reflection now, to the kind of self-stimulation and self-enjoyment which is very much the essence of artistic activity; which is not to say that autonomous behaviour is always non-social by nature. Even the concept of *playfulness* is autonomous and 'aesthetic' in the sense of being a mental product, detached from the material or purely organic level. It might not be a necessary component of solo music or solo howling, but it is certainly immanent in much ensemble- and improvisatory music, and in dance and sports of various kinds.

One might theorise perhaps, that in the case of animal emotional interaction, concepts like *play* are not necessarily perceived by the animals themselves, but emerging rather as a product of simpler constituents, which are synthesised only in the human perception of what goes on. A certain action may trigger a reaction which is triggering yet another reaction and so on, making the process seem more complex than is really the case. A structured and independent life, where the 'playful' fights are grasped and contrasted with more serious fights in a manner which makes it possible to monitor and internalise the fights as subordinate stages of collective histories or individual autobiographies, is hardly developed.

On the other hand, it seems pretty obvious that if the dog is not able to distinguish between play and real aggression, it would soon get into problems, which is indicating that the notion of *play* and *playfulness* might be within its reach after all. Yet the concept may be different and much more limited than what is often implied by human play: more like sensing and remembering the excitement of mild fright, mild aggression, combined with some harmonious components perhaps, and the pleasure of being active and excited. The idea of *pretending* aggression or doing things *just for fun*, which seems to be central components of the human conception of play, is probably beyond its comprehension. Not because dogs are dead serious and practical beings, but because they are never serious or practical, at least not in the complex intellectual sense that that is often implied by this word.

It is exactly this pleasure-orientation of the dog, the fact that it is engaged in activities that are not 'useful', but having the character of *amusement*, which is the central point here. It is central because the concept of amusement is already approaching the definition of art and music in the sense of art. One might even argue that the animal is concerned with pleasure all the time, it is just more evident in self-stimulation, where the self is constituting both the tension and the release. Certainly the dog does not care whether a certain activity is 'useful' or not. It is perfectly content with fetching sticks all day long, experiencing the suspense of *waiting*, the thrill of *running* and *catching*, the power of *keeping*, the release of *returning*, *delivering*, and *hearing the pleased and praising voice of its master*. Certainly this type of behaviour would disappear if it were detrimental, like the species of deers which died out because of the female fascination for enormous, but all too heavy horns. It would also stop if stronger and more metabolic urges were pressing on. But as long as it is not, there is nothing that prevents the play from continuing.

According to some biologists, the phenomena of music, art, and even consciousness itself, are meaningless, epiphenomenal, and even illusory. Their skepticism seems to originate in a mechanistic and reductionistic view of nature, which is hardly realistic. The controversy was reignited by the philosopher and jazz clarinetist David Rothenberg recently, causing quite a stir among traditional ethologists with his claim that birds are singing for pleasure.¹⁸ Typically the issue of anthropomorphisation is brought up, and it is not an undue concern, but it is an accusation that should rather be turned against the ethologists themselves.

If a female bird is fascinated and attracted to singing, and if this fascination is increasing in proportion to the virtuosity and vitality of the singing, and the amount of variation, invention, and intensifying contrasts; then this fascination is *aesthetic* by nature. It is not purely automatic. Nor is it consisting in the intellectual pleasure of imagining the fitness of her future offspring, or the never-ending continuation of her kin; which, incredibly enough, is how the story is often told by biologists. Not even humans are as rational as that; and it seems like a much simpler explanation that the female thrill is triggered partly by the kind of aesthetic elements of which thrills are also consisting. She is attracted because she likes the music; she is not planning the future. In fact, there is not even a point in having a future if it is not fun and pleasing.

¹⁸ David Rothenberg, *Why Birds Sing: a journey into the mystery of bird song* (New York: Basic Books, 2005).

Certainly Freud is also speaking of a 'reality principle', but this *indirect* road to pleasure is not very well developed in animals. It is much more characteristic of humans, involving functions like postponement, thought, long-range planning, and sublimation. But even sublimation is under the spell of the 'pleasure principle'. 'The substitution of the reality principle for the pleasure principle,' says Freud, 'implies no deposing of the pleasure principle, but only a safeguarding of it.'¹⁹

This may not be the place to go into detail about such matters, but as pointed out by Henri Bergson in the first chapter of his *Creative Evolution*, the principle of natural selection, while not wrong, may be insufficient and 'finalistic' if detached from a certain 'impetus of life' [Élan vital] that is driving the process.²⁰ Yet it is not clear how and why nature should provide a system with such an 'impetus' and even wish to protect itself against entropy. Perhaps such integrated experience and feeling is an intrinsic feature of all integration in nature. The existence of harmony may be identical with the feeling of harmony already at the atomic level. Sentient systems are obviously possible, and the more the system is able to feel and comprehend, the better it is able to protect itself against destruction and pain.

Something along these lines was also indicated by David Bohm. We can infer from the discovery of general relativity, claims Bohm, that nature is fundamentally 'relational'. This relational system he compares with the development of perceptual abilities in infants. In fact, the last chapter of his textbook on general relativity was devoted to Jean Piaget. As pointed out by Piaget: infants do not passively perceive isolated aspects of their surroundings, they are systematically charting reality by engaging 'groups of operations', reversible categories like *turning, hiding, bringing back, and shaking*. Like in inanimate nature, it is this dynamic process that arrives at 'invariant' forms and categories, says Bohm. As for the importance of feeling to this process he is pointing to Piaget's observation that the driving force of infant development is aesthetic by nature. The infant explores its surroundings by taking pleasure in producing 'interesting spectacles'.²¹

¹⁹ Sigmund Freud: 'Formulations on the two principles of mental functioning' [1911], in *Sigmund Freud, On Metapsychology: The theory of Psychoanalysis*, Volume 11 in The Penguin Freud Library, trans. James Strachey (London: Penguin Books, 1984), 40.

²⁰ Henri Bergson, *Creative Evolution*, trans. Arthur Mitchell (New York: Henry Holt, 1911), 87.

²¹ David Bohm, *The special Theory of Relativity* [1965] (London and New York: Routledge Classics, 2006), Appendix: Physics and Perception.

What makes this principle so relevant to the discussion of music, is the fact that it is an 'aesthetic' principle. 'We are geometricians only because we are artisans', says Bergson;²² and it is this predilection for pleasurable presence that is providing existence with value and purpose. Self-stimulation, like in play, song, and cat purring, is the easiest way to optimise it, and it has the further benefit of providing training, exercise, social communion, and even the vibratory healing of cells. Even more important perhaps, is the ability to attract a musical and vital partner. Self-stimulation for the sake of more long range purposes, like ritual preparation, celebration, or the religious counteraction of existential angst, is apparently beyond the comprehension of most animals.

It is not even likely that the bird is thinking of females and 'courtship' when singing, at least not when the female is not within sight. The concept of 'seduction' is probably too complex and discursive. Similarly, the female wants to enjoy herself; she is not contemplating her future family life. One might say that this is all about 'the survival of the fittest'; but if the goal of a system had been to fit in, it would be easier to yield to the outside pressure and merge with the chaos of the surroundings. The maintenance of homeostasis requires something more. It seems to require at least a proto-conscious and pleasure-seeking organism, so it would not be far fetched to talk about 'The Survival of the Beautiful'. Indeed, this is the title of another of David Rothenberg's books.

Besides humans, the creatures that have developed furthest in this direction are obviously our fellow primates, but also some species of whales and birds are often mentioned in this connection; and it is a circumstance that is to a large extent reflected in their level of musical artistry. Whales, dogs, and some species of apes may perform 'concerts' too, and the difference between whale song, dog song, and bird song may not be so big as we think. Especially if the whale song is artificially speeded up, or if bird song is slowed down, what sounds like meaningless noise, chirrup, or twitter may turn into something eerily similar to dog howling. In some cases it may even appear more like human vocalisation and song, displaying a level of intricacy and organisation that is not perceivable at a normal speed level.

David Rothenberg has even carried out the opposite experiment of speeding up his own sighing, grunting, groaning, and moaning, making him sound and look very much like a bird;

²² Bergson, *Creative Evolution*, 44.

which, of course, is not a conclusive proof. In rats and bats, however, this phenomenon is even more significant, since their singing is so high frequent and so fast that the tones and the melodic figures are not at all perceivable by humans unless slowed down; which makes it relatively clear that at least some animals really experience reality at a different frequency and pace than us. Nevertheless, the case of birdsong is more compelling since we are dealing with a species here that is more closely related to dinosaurs than to mammals. If the similarities between our vocalisations are real, it might even indicate that we are dealing with some kind of convergent evolution here, and a set of principles which would be common to all self-aware creatures, simply because it is a realisation of what defines them: a sequence of sensorimotor gestalts, alternating between tension and release, and in some cases even dealing with harmony and rhythmical regularity.

Some of the examples and recordings on YouTube, on Rothenberg's YouTube channel, and in his books, are so complex that one might speculate whether some birds have reached a higher level of self-reflection than other animals. Their singing is reminiscent in many ways of our manner of communicating with newborns, consciously soothing them and entertaining them with all kinds of whims and contrasts. Especially a slowed down recording of a Marsh warbler is enthralling.

And it is precisely this element of *entrancement* that seems to be the central component of such entertainment. For instance: the attention might be caught by swiftly raising the pitch and pausing, directly inducing the kind of tension of which *suspense* and *startle* is partly consisting. All sudden and unpredictable pauses may stimulate the attention in this way, and if combined with some *harmonious* and optimistic elements, it might even produce a sense of *play* and *pleasurable hide and seek*. Conversely the pitch might be slowly lowered, to produce a *calming* and almost *hypnotic* experience. The elements of repetition and tonality are also contributing to this, even when the vocalisations are not yet tonal in the sense of fixating the tones. Such repetition and calmness, of course, is making a sudden quickening all the more effective and captivating

The child or bird might also be *enthralled*, and *pleasurably overwhelmed* by virtuosity and complexity. And when more sexual instincts are taken into account, a manly demonstration of *strength*, might also be on its place. It might even be contrasted with more *caressing* and *fragile* sounds, intensifying the strength by putting it into perspective, or stimulating the female instinct

for *care*. Similarly the interest may be stimulated by introducing *novel* elements, which however, is always a delicate balancing art. As any improvising musician knows: the hypnotic effect of repetition must always be contrasted by a certain amount of variation and irregularity and vice versa.

But these are just some suggestions of how bird song, and other types of gabbling, might be analysed, given the analogy between these idioms is valid. The question, which has to be raised, is whether Rothenberg's examples are representable, and not merely sampled from a background of all kinds of arbitrary sequences. The human inclination to perceive and seek meaning, even where there is none, is well known, and it would require a considerable amount of comparative analysis to prove whether this is the case or not. In the case of cats, dogs and other pets, their vocalisations are easier understood, because they are so integrated in our daily lives and the vast field of nonverbal communication which is largely subconscious and taken for granted but is nevertheless a precondition for communication. The comparison with song birds, whales, and bats, is more controversial.

As mentioned above, it is also questionable whether the animals are self-conscious in the sense of consciously *performing* or *showing off*. More demanding yet are ideas of *manipulating*, *surprising*, *seducing*, and *scaring away*, and even when these functions are operative, it is by no means certain that the animals are able to grasp them. The performances may be rooted more in instinct, habit, the animal's crowing self-indulgence, and the need for variation that is developing at higher levels of comprehension. Similarly the scaring away of intruders by barking may be a manifestation of fright and resistance, combined perhaps with a physical approach towards pushing and destroying, rather than a conscious idea of 'manipulating' the intruder by making a certain impression.

4.3 The concept of 'action-chunking' in the lateral frontal cortex

When looking for similarities and differences between humans and animals it is obviously beneficial to be able to investigate whether the brain regions, the electrical impulses, and the chemical reactions which have been found to be correlates of various faculties in humans are also in operation in animals. In fact, it is a possibility that has already revolutionised our understanding of animal sentience. A particularly promising theory, which seems to be gaining in popularity, is the concept of 'action chunking.' It seems to confirm what has already been

deduced by means of more phenomenological methods, that a hierarchy of dynamic gestalts is lying at the core both of self-consciousness and the apperception of an external reality.

According to Etienne Koechlin and Thomas Jubault, such 'action chunking' is not only hierarchical by nature, the different hierarchical levels are located to topologically distinct regions of the frontal cortex, especially in the vicinity of the so called 'Broca's area' in the left inferior frontal gyrus and its right hemisphere homologue.²³

In an article from 2006 they are pinpointing, by means of magnetic resonance imaging, the neural activations which, they say: 'control start and end states and the nesting of functional segments in action plans.' More precisely, they detected three distinct levels of such nesting: first the level of 'simple motor acts', which they locate to the premotor cortex (BA 6, somewhat posterior and dorsal to the Broca's area); secondly a level of 'simple action chunks', which they locate to the so called 'pars opercularis' (BA 44); and thirdly, the level of 'superordinate action chunks,' located to the neighbouring and more anterior 'pars triangularis' (BA 45). Somewhat simplified, the hierarchy might be illustrated like this:

BA 45: superordinate action chunks.

BA 44: action chunks

BA 6: acts

Since the most complex tasks and 'superordinate chunks' also activated the simpler chunks and the 'simple motor acts', but not vice versa, Koechlin and Jubault also found reason to confirm the idea of top down processing in the prefrontal cortex. More concretely, the experimental setup contrasted simple motor acts with relatively simple action chunks: the execution of pre-learned sequences of button presses, and finally: with the execution of a more complex 'pre-learned sequence of categorization tasks' that did also require the inference of the following categorisation task. The brain activity in the given areas was highest at the intersection between the action chunks, not during the execution of these chunks. Similarly, the engagement of the most anterior regions was reflected only at the boundaries between the largest chunks, not at the level of single motor acts, or in tasks that did not require such chunking.

²³ Etienne Koechlin and Thomas Jubault, 'Broca's Area and the Hierarchical Organization of Human Behavior,' *Neuron*, 50(6) (15 June 2006): 963- 974, <https://doi.org/10.1016/j.neuron.2006.05.017>.

This experiment was also described in an article from 2007, with more focus on activations in the intraparietal sulcus now, as well as the pre-SMA and the anterior insular cortex. Yet the engagement of the IPS was 'not sensitive to recursive chunking of action segments'. Unlike the activations in the Broca's area, the engagement was merely 'serial'.²⁴

It should be noted that these were meaningless and artificial tasks, of a type that is often associated with left hemisphere processing of arbitrary directions, rules, and the like; but it is reasonable to think that the execution of this experiment must also have been emotionally taxing for the subjects, engaging ego-dynamic functions like stopping, starting, the allocation of attentional tension and release, moments of dilemma, uncertainty, and effortful reorientation. To the extent that they are conscious, these are functions that go into all mental processes, although these processes were not particularly autonomous in this case. Given the challenging character of the experiment, however, it is not surprising that the right inferior frontal gyrus was also active. As we will come back to in the chapter on lesion studies, it has been found to be particularly active in new and emotionally taxing situations; which is understandable, since routine behaviour seldom require much attention or self-consciousness.

To back up their notion of hierarchical action-chunking in these regions, Koechlin and Jubault were themselves pointing to similar findings from neurolinguistics, locating more complex comprehension, like in ambiguous words or syntactic rules, to more anterior regions of the inferior frontal cortex.²⁵ In this connection they are also mentioning the pars orbitalis, BA 47, which is not included in their own model of action chunking, but is described by Susan Y. Bookheimer as being involved 'not in decoding meaning of individual words but in processing semantic relationships between words or phrases'.²⁶ In later chapters we will also go into detail about similar findings and activations during music experience and the melody of talking and thinking, which might be manifested especially in the right hemisphere homologues of these areas. Such egodynamic and *melodic* activity is probably both more primeval and complex in the capacity of being a substrate for the articulated and autonomous self.

²⁴ Thomas Jubault, Chrystele Ody, and Etienne Koechlin, 'Serial Organization of Human Behavior in the Inferior Parietal Cortex,' *The Journal of Neuroscience*, 27(41) (10 October 2007): 11028-11036, <https://doi.org/10.1523/JNEUROSCI.1986-07.2007>.

²⁵ Peter Hagoort, 'On Broca, brain, and binding: a new framework', *TRENDS in Cognitive Sciences*, Vol. 9, No. 9 (September 2005), <https://doi.org/doi:10.1016/j.tics.2005.07.004>.

²⁶ Susan Y. Bookheimer, 'Functional MRI OF LANGUAGE: New approaches to understanding the cortical organization of semantic processing', *Annual Review of Neuroscience*, 25(1) (February 2002): 151-188, <https://doi.org/10.1146/annurev.neuro.25.112701.142946>.

Yet even the task sets prescribed by Koechlin and Jubault are behaviour of some sort, and the manner in which they are describing and illustrating it bears a striking resemblance with musical notation, and the organisation of rhythmical patterns according to metrical groupings like beams, slurs, bar lines, and double bar lines. Like in Koechlin and Jubault's experiment, it is usually the transitional points at the highest levels that tend to get most emphasis and attention in music. Similarly the melodic units, the combinations of motives, themes, and sections are not merely sequentially arranged but characterised by local leaps and runs constituting rhetorical functions, which are defining themselves in relation to previous and following rhetorical functions, which again are subordinate elements of higher level functions like exposition, development, and recapitulation, which are going into works, genres, personal styles and beliefs, all of which are governing the lower levels in a top down manner.

The extent to which the egodynamic and melodic functions are produced by common behavioural hierarchies, especially in the right inferior frontal gyrus, is obviously in need of more documentation, which will be provided in later chapters of this treatise. For now it must suffice to point to a couple of studies, one by Lisa Aziz-Sadeh and colleagues, and the other by Steven Brown, which are dealing with the similarities and the neuro-anatomical co-location of these processes.²⁷

It has already been argued that emotion words are names of 'ego-dynamic gestalts', which are incorporating many layers of behavioural nesting. Especially pars opercularis (BA 44) has been found to be a nexus for such nesting, and according to lesion studies by Simone G. Shamay-Tsoory and colleagues, it seems to be a precondition for emotion recognition and empathy, without which these capabilities are 'extremely impaired'.²⁸ It is also in agreement with the concept of an action hierarchy in the inferior frontal gyrus that more anterior regions, like the bilateral BA 45 and BA 47, have been associated with more complex emotions, like irony and

²⁷ Lisa Aziz-Sadeh et al., 'Common Premotor Regions for the Perception and Production of Prosody and Correlations with Empathy and Prosodic Ability', *PLoS ONE*, 5(1) (20 January 2010): <https://doi.org/10.1371/journal.pone.0008759>.

Steven Brown et al., 'Music and language side by side in the brain: a PET study of the generation of melodies and sentences', *European Journal of Neuroscience*, Vol. 23(10) (May 2006): 2791-2803, <https://doi.org/10.1111/j.1460-9568.2006.04785.x>.

²⁸ Simone G. Shamay-Tsoory et al., 'Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions'. *Brain*, Vol. 132, Issue 3 (March 2009): 617-27, <https://doi.org/10.1093/brain/awn279>.

humour,²⁹ and a reduction in gray matter volume in schizophrenia, especially in the right BA 45.³⁰

It is not always easy to determine where animals fit into this picture. There is seldom a one-to-one relationship between our brains. Nor are animals able to report what they think. But there is already research on rats indicating that even 'rats can use sequence-level representations, or action chunks, to organise their behaviour in a goal-directed manner'.³¹ Similarly, a study by Keisetsu Shima and colleagues is demonstrating how monkeys are able to categorise different abstract patterns of temporal structures. Like in humans, it seems to be performed in the lateral prefrontal cortex.³² But Shima and colleagues did not go into the discussion of the different hierarchical levels of such categorisation. An article by Carel Ten Cate and Kazuo Okanoya may be more informative in this respect. Although their identification of song structure with grammar and linguistic syntax is highly problematic, their research on song birds is showing for instance how the juvenile birds are breaking tutor songs into smaller chunks, which are practiced separately, and later recombined during the creation of their own individual songs and repertoires.³³

Also one should not forget that it was the study of the premotor F5 area in monkeys which led to the conception of 'mirror neurones', which has become so central to the understanding of behavioural perception and empathy even in humans.³⁴ In some respects, the investigation of these functions in animals should be even easier, since the researchers may allow themselves to use much more invasive measurement techniques; like in the study of Lizabeth M Romanski,

²⁹ Alexandre Obert et al., 'Neural Correlates of Contrast and Humor: Processing Common Features of Verbal Irony', *PLoS One*, 11(11) (16 November 2016), <https://doi.org/10.1371/journal.pone.0166704>.

See also Tomoko Matsui et al., 'The role of prosody and context in sarcasm comprehension: Behavioral and fMRI evidence', *Neuropsychologia*, Vol 87(1 July 2016): 74-84, <https://doi.org/10.1016/j.neuropsychologia.2016.04.031>.

³⁰ Motomu. Suga et al., 'Reduced gray matter volume of Brodman's Area 45 is associated with severe psychotic symptoms in patients with Schizophrenia', *European Archives of Psychiatry and Clinical Neuroscience*, 260(6) (September 2010): 465-473,

³¹ Sean B.Ostlund, Neil E. Winterbauer, Bernard W. Balleine, 'Evidence of action sequence chunking in goal-directed instrumental conditioning and its dependence on the dorsomedial prefrontal cortex', *Journal of Neuroscience*, 29(25) (24 June 2009): 8280-8287, <https://doi.org/10.1523/JNEUROSCI.1176-09.2009>.

³² Keisetsu Shima et al., 'Categorization of behavioral sequences in the prefrontal cortex', *Nature*, vol. 445(7125) (February 2007): 315-318, <https://doi.org/10.1038/nature05470>.

³³ Carel Ten Cate and Kazuo Okanoya, 'Revisiting the syntactic abilities of nonhuman animals: Natural vocalizations and artificial grammar learning', *Philosophical Transactions of The Royal Society of Biological Sciences*, vol. 367(1598) (11 June 2012): 1984-1994, <https://doi.org/10.1098/rstb.2012.0055>.

³⁴ G. Rizzolatti, L. Fadiga, L. Fogassi, V. Gallese, 'Resonance behaviors and mirror neurones', *Archives Italiennes de Biologie*, vol. 137(2-3) (May 1999): 85-100.

which was mentioned already in the previous chapter. As we will come back to below, her findings that anterior regions of the inferior frontal gyrus of macaque monkeys, especially BA 47/12, are charting repertoires of various call types might already be encroaching on the field of a simple rhetoric in these animals; so there is little doubt that we are on the right track when talking about an emotional and behavioural hierarchy in the lateral prefrontal cortex.³⁵

If the pars orbitalis (BA 47) is involved both in word combinations and animal vocal communication, it is questionable whether Brodmann area 45, which Koechlin and Jubault associated with the concept of a 'superordinate' level of action chunking, is sufficient to capture the nesting of all the behavioural components of human emotion and thought. It might be sufficient for the artificial chunking games they are describing, but hardly for the formation of discourse proper, or the more complex, dramaturgical, and moral emotions.

Surely Koechlin and Jubault are also talking of 'higher stages of executive control over time showing sustained activation related to action selection based on integrating information from temporally dispersed events', the latter of which, they say, seem to be located to more anterior prefrontal regions, such as BA 46 and BA 10. But these regions are not integrated in their conception of an action hierarchy. Their conception of a 'hierarchy' of action planning is strangely opposed to other aspects of temporality, as if the mentioned long range-temporal experiences were merely serial, and not involved in temporal reflection and concept formation which is also incorporating the lower levels in a 'recursive' manner. Thus it is the 'pars triangularis' that is reckoned 'the apex of the prefrontal system' in this article. According to Koechlin and Jubault, it may be able to engage 'recursively' in the remapping of lower-level representations onto higher-level representations, allowing thus for 'multiple hierarchical levels'.³⁶

It is an idea that does not seem to be prolonged in later articles by Koechlin. At least, the conception of a hierarchy of lateral prefrontal processes was revised and expanded to include even the medial and lateral frontopolar cortex (BA10).³⁷ The role of the frontopolar cortex in so called 'cognitive branching' as well as metacognition and the formation of higher level ideals and

³⁵ Lizabeth M. Romanski, 'Representation and Integration of Auditory and Visual Stimuli in the Primate Ventral lateral Prefrontal Cortex', *Cerebral Cortex*, Volume 17, Issue suppl. 1 (1 September 2007): i61-i69. <https://doi.org/10.1093/cercor/bhm099>.

³⁶ Koechlin and Jubault, 'Broca's Area and the Hierarchical Organization of Human Behavior,' 971.

³⁷ Etienne Koechlin, 'Frontal Pole function: what is specifically human', *Trends in Cognitive Sciences*, Volume 15, No. 6 (June 2011), 241, <https://doi.org/10.1016/j.tics.2011.04.005>.

the like, is so established by now, that it is difficult to escape it. As for BA 47, we will later see how this region is dealing with instances of dramatic emotional *reversal*, *re-appraisal*, and *re-valuation*. Its contribution to the hierarchical nesting of egodynamic gestalts and emotions may be different from the kind of chunking that is performed in BA 44 and BA 45, but it is an open question whether it could operate independently of these structures.

A more serious problem with Koechlin and Jubault's account is their ignorance of conceptual gestalts and emotions. Their studies have a reductionistic character, as if these things did not even exist. Surely they imply the existence of such gestalts when they are talking of words and concepts, especially complex and abstract concepts like 'plan', 'rule', and 'classification'. Even syntax requires a conceptual grasp of categories like verbs, nouns, and pronouns. It is such universal concepts that are combined when arbitrary symbols and syntactic rules are learned and grasped by the left inferior frontal gyrus. It is not a collection of isolated movements. In their daily lives, Koechlin and Jubault must also be talking about *emotions*; and the emergence of hierarchically higher levels of content is both more obvious and intrinsic in the case of emotion concepts. These gestalts are nested into being in the brain, and the above mentioned regions, especially in the right hemisphere, are undoubtedly central to their existence. The business of phenomenologically dissecting and arranging the emotional components in a hierarchical manner might require an unprecedented level of precision and attention to detail, yet it is impossible to avoid it, if the functions of the self and the prefrontal cortex are to be properly understood.

In this chapter it will be important to try to distinguish especially the lowest levels of this hierarchy. What we are looking for is a set of terms to characterise the various levels of gestalt formation. It would also be useful to provide some concrete examples of the emotional components and the manner in which they are building on each other and merging into more complex emotions, at levels which are not yet involved in human level metacognition and apperception.

Much of this has already been discussed in previous chapters, like in Chapter 3.3, which contained a reference to Juan Pascual-Leone and his suggestion to reserve the word 'affect' for 'innate organismic processes and dispositions', whereas 'emotion' might serve a designation especially of the 'acquired and situated feelings, more complex than affects, which usually

combine affective and cognitive aspects.³⁸ So, at a minimum, we might speak of an 'affective level' of consciousness in animals. Yet this concept is not very precise or articulated. Alternative concepts have been suggested for instance by Jean Piaget, talking of an initial 'sensorimotor' stage of development, which is also reminiscent of Aristotle's 'locomotive souls'. Piaget's next and 'preoperational' stage is also supposed to be prior to logical thinking.

More evocative and precise perhaps, is the concept of 'attitudes'. The communication of attitudes, like aggressive attitudes, or attitudes of dominance and subordination, is probably higher than mere stimuli and response, especially in the sense that it is detaching itself from more physical encounters between animals. When one animal is perceiving an other animal preparing for attack, or displaying a large amount of strength and eruptive vitality, the animal might counteract these attitudes by displaying even more strength, or by submissive behaviour, so that the other individual loses its reason for fright and attack, and both of the animals remain unscathed. It is a kind of attitudinal 'shadowboxing' that is obviously requiring a higher level of understanding and action chunking than the automated behavioural patterns that are exemplified by so called fight or flight responses.

As mentioned in chapter 3.3, the idea of affective levels below the level of most human 'emotion words' was also discussed by Jesse Prinz in his article 'Which Emotions Are Basic?'. Much of what we call emotion and even 'basic emotion', he said, may be 'outgrowths and byproducts of more fundamental emotions'; and several of his descriptions are welcome contributions to the understanding of emotional gestalt formation. 'Happiness', he says for instance, 'may subdivide into sensory pleasures, satisfaction associated with goal attainment, and joy from play.' Indeed, concepts like *pleasure*, *satisfaction*, *joy*, and *play* are all examples of emotional gestalts at various levels of complexity. Certainly joy is higher than mere pleasure, in the sense that it implies the monitoring of a certain pattern of activity: a pattern that is both vigorous and harmonious. Tail wagging might be one example of this, and the level of monitoring might well be restricted to Koechlin and Jubault's 'simple motor' gestalts as monitored in the premotor cortex.

³⁸ Juan Pascual-Leone: 'Not a bridge but an organismic (general and causal) neuropsychology should make a difference in emotion theory'. Commentary on Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modelling,' *Behavioral and Brain Sciences*, Vol. 28, Issue 2 (April 2005): 213-214, <https://doi.org/10.1017/S0140525X0542004X>.

Concepts like play and fun are probably higher than joy, in the sense of involving an interaction between attitudes like mild dominance and submission, mild provocation and fright, entertaining tension and release, all of which is performed within a harmonious or joyous mode of being. It is an example of what we might refer to as *attitudinal interplay*, which would also require a considerable amount of 'action chunking', at least at the level of 'simple action chunking' which Koechlin and Jubault have located to the posterior Broca's area. It is not sufficient in this case, to monitor vigorous and regular rhythms. It is the voluntary interplay of joyful arrest, challenge, and resolution that is constituting the experience, an it might not be perceivable by all animals.

Still we have not reached the level of 'happiness'. So complex is this concept that we might have to introduce two new levels of action chunking. The first of these is not exemplified by Prinz, but it is already transcending the comprehension of most animals. As we will come back to below, it might be possible to speak about a level of 'jubilant' howling in wolves, which is similar to human song in many ways. Parallel expressions of a more negative kind are *wailing* and *lament*, all of which are examples of self-stimulation that is more articulated and detached from the immediate situation than the attitudinal interaction in animal play. Both in howling and wailing the animal is detaching itself from the immediate situation and even the interaction with its surroundings in many cases, *celebrating*, *preparing*, or *mourning* in a manner that might also be seeking to reinforce the social bonds of communion and mutual support in the future. Certainly it requires a 'superordinate level' of action chunking, but it is not clear whether this is sufficient.

Already in connection with the discussion of crying and animal wailing in chapter 1 it was argued that such wailing is serving a mission that is also 'rhetorical' to some extent. There is little reason to wail when alone, which is probably the reason why we cry less when alone. The wailing might first of all serve to attract the attention of others. It is *telling* something or *giving a message* to others about our selves, portraying in detail our miserable state of mind. By overtly indulging in our own *self-pity* we are hoping to evoke the pity of others. It is a simple rhetoric, not a 'discourse' in the sense of questioning, answering, and hypothetical reasoning. The same seems to be true for howling and even some other animal 'calls', to the extent that they are not merely attitudinal interplay, but seeking to tell something to others, with regard to potential

future events, or negotiate the social positioning among pack members by taking a leading or subordinate role in the vocal polyphony.

Yet it is probably first at the next and even higher level that concepts like 'happiness' might be seen to arise. At least to the extent that the word 'happiness' is implying a reflection on one's general life situation or one's life at large, this requires an amount of comparison and episodic memory that might also require the dorsolateral prefrontal cortex and the fronto-parietal network to some extent. It is a level of action chunking that is already transcending the first version of Koechlin and Jubault's system, in the sense that it requires the monitoring both of complex emotion as well as long stretches of time. It might be described as a 'narrative' or 'dramaturgical' level, which is probably beyond the comprehension of animals.

Related concepts like 'love' and 'romance' might also belong to this level. At least these concepts are often implying a narrative of *trust*, *truthfulness*, and the planning of a happy future together; all of which is probably beyond the comprehension of animals. Concepts like 'seduction' and 'courtship' are simpler. At least they do not require this long-range dimension of action chunking. The concept of animal seduction was discussed already in the previous section, arguing that it might still be too manipulative and rhetorical to be grasped by most animals, so it is possible that even bird song is better characterised as courtship of a simpler and less manipulative kind. Perhaps the most advanced examples of bird song might qualify as such manipulation: a 'conscious' attempt to impress and stimulate the female need for entertainment, care, protection, submission and so on. Yet the courtship of most animals is not manipulatory in a rhetorical manner. Such courtship is probably sufficiently described as a 'shadowboxing' of passionate and reluctant attitudes, which is nevertheless above the levels of desire and concrete acts of craving.

As we can see, the emotions might be arranged in hierarchies, where emotions with similar character and valence are grouped together, but varying in the level of action chunking and temporal and contextual comprehension. And even some of the negatively valenced variants of such emotion hierarchies are mentioned by Prinz. He is talking for instance of sadness as 'separation distress' whereas anger 'may emerge as a blend of something like goal frustration and aggressiveness.'³⁹

³⁹ Jesse Prinz, 'Which Emotions Are Basic?', in *Emotion, Evolution, and Rationality*, ed. Dylan Evans and Pierre Cruse (Oxford University Press, 2004), § 4.

Even in these cases it might be necessary to supply his descriptions with levels that are both higher and lower. When we are saying that someone is sad, we are referring to a conflicting state of mind, which is also vocalised or *conveyed* to some extent, it is not mere physical resignation and depression, like in a worm that is exhausted from trying. The animal or person is sad *about* something. And it is not obvious how an animal should want to vocalise or *express* its sadness where it not for a socio-emotional context which is implying even the potential of consolation and help. Sadness might well be caused by 'separation distress', but it is not the same as distress. So there is little doubt that Prinz could have gone further in his analysis of 'basic emotions'. Like in the hierarchy of joy, jubilation, and happiness, there are also higher levels of sadness, such as lament, grief or tragedy, which are building on sadness, but also engaging a rhetorical and dramaturgical dimension.

In the case of 'anger', the social and rhetorical dimension is even clearer. It is first when engaging in the rhetoric of *reproach*, *blaming*, and the idea that the other has done something that is reproachable or *demeaning*, that anger seems to arise. We are angry *at* someone, *because* of something the other has done, and the anger is a kind of *reprimand*: a manner of telling the other that he has to change his behaviour or get out of sight. It is not a mere interplay of attitudes. The plausibility of animals experiencing such anger has already been discussed, and like the concepts of happiness and sadness it is hardly qualifying as a 'basic emotion' in the manner described for instance by Paul Ekman's 'nine characteristics'. Certainly Ekman also speaks about 'complex emotions' like grief and jealousy, which are characterised by what he calls 'emotional plots', but even the concept of anger might be encroaching on this level.⁴⁰

Nevertheless, is not unlikely that dogs and apes are able to express such anger. When treated unfairly in comparison with other guests or animals, they might feel a sense of *indignation*, which is expressed by barking. Even when no physical reward is involved, like when the dog is simply *ignored*, it might well be experiencing a sense of *humiliation* or *degradation*. There is little doubt that dogs have a strong sense of social hierarchy and rank: a wish to be *respected*, which might also be challenged. These are social emotions, not mere goal frustration. It is unlikely that a dog would bark at a wall or a fence when it is unable to climb it or cross it. Indignation is seldom directed towards inanimate objects.

⁴⁰ Paul Ekman, 'An argument for basic emotions', *Cognition and Emotion*, Volume 6, Issue 3-4 (1992), 194, <https://doi.org/10.1080/02699939208411068>.

If no personal *indignation* is perceived by the animal, it is hardly angry in the sense that is usually implied by humans. It might not even be correct to call it aggression. The reactions are more likely an outgrowth of *frustration*, *fright*, and *defence* in most cases, which might subdivide into even lower level reactions like reflexive repulsion. Certainly a predator is also demonstrating some kind of aggression, but it is not deriving from anger, hate, or displeasure, but a sense of dominance, power, and a desire to passivate and devour its victim, which may not even be perceived as negative or frustrating by the animal that is performing it. Typically a cat is often playing with its victim, enjoying the game of hunting, which is difficult to group together with emotions that are characterised by frustration and negative feelings. When it comes to aggression proper, the components of frustration or fright are probably more central, which is also opening up for the possibility of an attitudinal interplay: causing fright in others by acting in a frightening manner. But it would hardly be correct to classify this as 'anger'.

Prinz also mentions *disgust*, which he says, 'may begin as a form of physical revulsion that ultimately gets expanded to subsume moral aberrations', which is interesting, but obviously skipping some intermediate layers. As earlier argued, the concept of disgust is not as elementary or 'basic' as often believed. It is not a mere reflexive revulsion, but constituting in most cases an active attitude towards something. Just like anger, disgust is usually disgusted *by* something in the sense of taking a stance against it. At the upper end of this hierarchy are emotions like *hate*. Here we are entering the narrative level again, engaging concepts like *enemies* and *friends*, long range *grudge*, and concepts like *revenge*. The level of *moral* devaluation and *contempt* is even higher in the sense of deriving from a metacognitive evaluation of personalities and ethical standards.

It has to be added that more pervasive or visceral feelings like *liking*, *disliking*, *loving*, *believing*, and *hoping* might require separate faculties and brain regions, adding to the emotional gestalts in a less hierarchical manner, which, as we will come back to in later chapters, might be reflected especially in the array of fibre pathways between the medial and lateral frontal cortices, both dorsally, ventrally, and 'diagonally', like the so called 'aslant tract', connecting the medial pre-SMA with Broca's area. Such content may not be concerned with behavioural complexity but an ability to monitor and sustain in memory more pervasive feelings and moods, which might be enabled especially by the medial regions of the prefrontal cortex. These experiences are

obviously added to the sensorimotor gestalts at different hierarchical levels, but they might also be dissociated from them, as in various pathological conditions.

A precise phenomenological dissection of all these concepts into sensations, acts, and action chunks might not be impossible, at least not in music analysis, which has very explicit and precisely notated material to work with. In fact, this has already been done.⁴¹ But it is more difficult with regard to ordinary behaviour, since the components of speech melody and ordinary behaviour are displayed in media that are either less explicit or less discrete. The lay out of such a hierarchy would also depend on what is meant by chunks and acts. Even relatively simple acts are consisting of many subordinate movements and sensory elements. There may be chunking even below the motor areas, like in the auditory cortex, the basal ganglia, the amygdala, and the cerebellum.⁴² As a matter of fact, there is chunking all the way down to atoms and the like. So when we are talking of 'simple' or 'superordinate' action chunks these are obviously simplifications.

Moreover, the business of hierarchical classification is confusing, since it is not entirely clear whether a certain level, like for instance the 'attitudinal' level, is supposed to imply a mere *intuition* of attitudes from the level below, or an ability to *monitor* the attitudes from the level above. If the latter is the case, there is already an intuition of more complex functions on the way. It is a problem that is also reflected at the highest levels of comprehension, like in Hegel's distinction between 'natural consciousness' and philosophical understanding. Even if philosophy is dealing with concepts and principles that are already labeled by ordinary language and consciousness, it is in a position to monitor these principles and their limits at a meta-cognitive and metaphysical level, so even the concept of philosophy might be seen to be straddling two levels: one that is 'intuitive' and one that is 'conscious' in a much more insightful and stable manner.

Perhaps the 'attitudinal level' in animals is best conceptualised as an *intuition* of attitudes from below, a result of 'simple action chunking', whereas more rhetorical interaction is deriving from 'superordinate action chunking' and the monitoring of attitudes, enabling the animal to intuit

⁴¹ Steinar Bang, 'Psychologizing Music: a Psychodynamic Explication of Beethoven's Op. 54' (Cand. Philol. thesis in musicology, University of Oslo, 2004)

⁴² Ann M Graybiel, 'The Basal Ganglia and Chunking of Action Repertoires.' *Neurobiology of Learning and Memory*, Volume 70, Issues 1-2 (July 1998): 119-136. <https://doi.org/10.1006/nlme.1998.3843>.

simple rhetorical solicitations, but not monitor it in a reflected manner. But one might just as well leave a certain room for uncertainty here, until these matters are investigated more in detail.

To illustrate these hierarchies in a more visual and iconic manner, this process of egodynamic gestalt formation might be conceptualised in the manner of inverted pyramids, where the putative elementary levels are located to the bottom, and each new level is supposed to function as a higher level of nesting and monitoring, combining the lower level ingredients into higher level egodynamic compounds. The below hierarchies are examples of this. It is not an exhaustive list; and some of the emotions, like hate and misanthropy, are obviously irrelevant to music that is dealing with jubilation and harmonious communion; yet it might be serving to sum up the above reflections.

Some of the words, like *rhetoric*, *narrative*, *comedy*, and *tragedy*, which are used to describe the different levels, may be blurry in many respects, but they are more informative than the concepts of 'simple' and 'complex emotions'. It is no coincidence that words like rhetoric and dramaturgy are denoting fields of study which have remained central for several millennia. Furthermore, the wording is aiming to indicate how the rhythmical and melodic streams of feeling are central both to the attitudinal and rhetorical levels of communication, and it is a rhetoric that is obviously penetrating even into the highest levels of narrative and philosophical discourse.

Optimism = philosophy of happy life, arguing for the advantage of humour over pessimism

Comedy = narrative of humour, lasting happiness, and the reversal of tragic fortunes

Jubilation = rhetoric of howling or singing, seeking harmonious communion

Fun = interplay of harmonious and challenging attitudes

Joy = active and harmonious

Pleasure

Pessimism = philosophy arguing against the realism of positive narratives and optimism

Tragedy = narrative of long term misery, and the reversal of happy fortunes

Lament = rhetoric of wailing or singing, seeking compassion and help

Sadness = interplay of crying and consoling attitudes

Depression = active but uneasy

Pain

Philanthropy = philosophy of loving communion and kind treatment of all human beings

Romance = narrative of long term love, and the formation of trust and partnership

Seduction = rhetoric of (vocal) manipulation and trickery during courtship

Courtship = interplay of passionate and reluctant (vocal) attitudes

Desire = active craving

Attraction

Misanthropy = philosophical disbelief and scepticism of the goodness of human beings

Hate = narrative of long term grudge and the formation of enemies and plots

Anger = rhetoric of (vocal) indignation, humiliation, and reproach

Aggression = interplay of scary and scared (vocal) attitudes

Fright = active defence

Repulsion

The top two levels of these hierarchies are probably uniquely human and ascribable to the frontopolar and dorsolateral areas that are either lacking or much smaller in animals. We are dealing with a monitoring of complex emotions here, producing the kind of gestalts that are often referred to as 'stories', 'dramas', 'autobiographies' and 'narratives'. And it is first when different narratives and fortunes are simulated and compared that we are reaching a level that is 'discursive' and 'philosophical', if not in a scientific or metaphysical sense. It is a difference that is also reflected in concepts of character and personality. A dog certainly has a *disposition*, which is innate or copied from its master, qualifying for adjectives like *playful*, *fearless*, *chase-prone*, *sociable*, *aggressive*, *shy*, or *bold*, but it is hardly *honest*, *false*, *ironical*, *pessimistic*, *good*, or *wise*.

As we come back to in the following chapters, not even the seemingly simple tasks of *questioning* and *answering* seem to be within the reach of animals. These are core features of hypothetical reasoning which are manifested even at the local level of music and thought, so it is easy to think that that they are also produced at these intermediate levels of ego-dynamic gestalt formation. Yet the circumstance that these abilities are uniquely human gives us reason to

suspect that such reflection is rather enabled by the human specific rostral areas, and projected back on the lower levels of action chunking in a top down manner. Alternatively it might be produced in areas of the inferior frontal cortex that are more developed in humans. These are questions that might easily be resolved by neuroscience once they become aware of the problem.

There might even be a higher level of human consciousness, which is difficult to include in such a list of examples. Knowledge that is 'absolute' in the sense of taking everything into account is also detaching itself from the individual emotions and viewpoints.⁴³ As indicated by Hegel, dichotomies like optimism, pessimism, and other kinds of isms, tend to be sublated when merging into a more systematic, balanced, and pluralistic account of reality.

4.4 The transition from attitudinal to rhetorical levels of consciousness

Exactly how and where the transition to higher levels of 'action chunking' and *self-consciousness* occurs is difficult to specify, but like the expressions of attitude discussed above, it might be manifested in the vocal display. Of course, the ego-dynamic gestalts, and the self-consciousness that is produced by such gestalts, is always 'melodic' and 'musical' in the sense of being composed by a stream of articulated feelings and rhythms. But the existence of these gestalts is nowhere as explicit and precisely notated as in music proper. Especially when we get to the discussion of more complex rhetorical and discursive musical functions it becomes exceptionally evident how the ego-dynamic hierarchy is branching out in the formation of motives, themes, phrases, and movements. And even if the discussion of the elementary attitudinal and rhetorical levels is not completed, it might be useful now to focus on the transition between these levels, and the clues that such a transition is really taking place. It is first when compared with the human level of reflection that animal cognition and vocalisation could get a precise definition.

It has already been suggested that the lack of tonality and tonal fixation in most animal vocalisation may be due to an inability to engage in truly self-reflexive behaviour. If excluded from such reflection, like the dialectic between subdominant, dominant, and tonic, a sustained tone or chord might simply appear meaningless and all too static to the animal. But according to thinkers like David Rothenberg, and more experimental research like that of Emily L. Doolittle, some birds are really able to sing tonal music; and they are pointing to the Hermit thrush and the

⁴³ See for instance the introduction to Hegel's *Logic*, § 14.

Wood thrush as species mastering both pentatonic and heptatonic scales.⁴⁴ Whether some of the tone combinations in these kinds of bird song are coincidental or signs of higher intelligence is by no means clear, but it has to be considered at least, whether the business of enjoying harmony might not be as demanding as earlier indicated. After all, the alternation between a fundamental tone and some contrasting tones is not so different from the tension and release which is characteristic of all animal vocalisation. A modal sense of tonality, or a more primitive contrast between fixed tones and more dynamic elements might well be within the reach of some animals.

Especially dogs and wolves may be found to engage in such a dialectic. By fixating a tone for several seconds, a certain sense of tonality or tonal repose might well be established without totally destroying the dynamic impetus of their howling. The activity would be more to liken with the 'tumbling strains' which were hypothesised by Curt Sachs to be a precursor of tonal song.⁴⁵ First the dog is intoning or falteringly approaching a high sustained tone - experiencing, perhaps, the enthrallment of harmony and the transcendence of its usual dynamic - then, when tumbling or sliding down, it is returning to the unrest which is very much the essence of ordinary life. There is little doubt that the dog is feeling something out of the ordinary during such performances, and it should not be confused with wailing or *whining*, which seems to have the character more of surges of tension triggered by painful thoughts: an immediate sense of loneliness, or the longing for something already glimpsed. At least it should be subjected to investigation to which extent the tones are really more sustained when the dog is singing, and thus more reminiscent of the dialectic between tonic and non-tonic elements. In any case, the dog is still at a rather simple and sequential level of reflection here.

The singing may be more complex and variegated in wolves; and the similarities with human polyphonic song and song-induced bonding are intriguing. Yet the mere fixating of tones may not be a sufficient criterium for a higher stage of mental development. A more consistent sustaining of tones, however, with the intent of contrasting them with other fixed tones, to experience the satisfaction of returning to and *affirming* the first tone, is obviously much more

⁴⁴ Emily L. Doolittle, Bruno Gingras, Dominik M. Endres, and W. Tecumseh Fitch, 'Overtone-based pitch selection in hermit thrush song: Unexpected convergence with scale construction in human music', *PNAS*, vol. 111, no. 46 (3 November 2014): 16616-16621, <https://doi.org/10.1073/pnas.1406023111>.

⁴⁵ Curt Sachs, *The Wellsprings of Music*, ed. Jaap Kunst (New York: Da Capo Press paperback edition, 1962), 51-55.

indirect and complex in the sense that it is already two steps ahead of itself. The same is even more true for the alternation between different harmonic functions, especially when there are several such functions, *deflecting from* or *foreshadowing* the tonic. It may not necessarily engage the highest levels of human reflexion. If this were the case, small children would not be able to perform it; but it has an *assertive* and *assuring* effect, which is already engaging the perspective of *doubt* and *promise*: the promise of the dominant, which is merely implying the tonic. We are dealing with a *contrast between*, or even a conscious *manipulation of attitudes* here; which, to be experienced, is requiring at least a level of 'superordinate action chunking,' relating action chunks to action chunks.

It is not impossible that some wolves or certain wolf populations have already started to encroach on such a mental territory. When listening to recordings of wolves, it is not uncommon to encounter what sounds eerily similar to a tonic-dominant dialectic: an alternation between specific pitches, in some cases a fifth or a major triad, which is repeated over and over again, or even imitated by other individuals in heterophonic interplay.⁴⁶

Certainly some parrots are able to perform this dialectic too, but it is not always clear whether they are merely 'parroting' human songs or also grasping the emotional purport of what they are doing. If it is true what is sometimes said, that parrots are at the same or higher intellectual level than human toddlers, they might well be. If a parrot always sing a certain song in the same key it might indicate that we are dealing with some kind of automatic 'recording' here; but some youtube video recordings, like the improvisations of Tico in the popular duo Tico & the Man Frank Maglio, might indicate that this bird is adapting both to the shifting keys and the chord progressions to some extent. When improvising, listening to, and taking turns with other people, it is less plausible that we are dealing with mere parroting. At least, one should not exclude the possibility that some parrots are able to grasp even some elementary aspects of music rhetoric. It is difficult to tell the difference, since even humans are learning the songs by mimicking them. Some people, especially children, have also absolute pitch, but even if they are reproducing the songs in an exact manner they are not insensitive to what is going on.

Parrots are emotional creatures too, and it is not very likely that their emoting is turned off during singing and chatting, which may last for long stretches of time and characterise their

⁴⁶ This harmonious type of 'howling' may be more characteristic of American than European wolves, and can be witnessed for instance on the website of wolfpark.org, Indiana USA.

interactions both with humans and each other. Examples of such singing and vocal interaction are easily accessible now, on the internet. It is even possible in some cases, to compare a set of different performances of a certain song, sung by the same bird on different occasions; which seems to reveal that their renditions are not entirely mechanical, but also varying in expression and precision to some extent. The songs may be fragmented, more or less off key, more or less intense; the parrot may hesitate, stop in the middle of a song, take up the thread, and take turns with their human partner. And especially their tonal errors might be an interesting subject of research, since if these deviations are done in a meaningful way, exchanging a third with a fifth, or simplifying the chromatic parts, it may be indicative of a certain intuitive understanding of what tonality is about.

Whether they are able to engage in more creative activity, like in humming or in musical improvisation, is not always clear. While not as flexible as humans, some birds, like Tico, are apparently capable of combining the learned fragments in different ways, which is very much what human improvisers are also doing. The amount of automatism is probably no lesser in improvisation than in other activity. On the contrary, there are studies indicating that subordinate regions of the prefrontal cortex are less active during improvisation, more like in lucid dreaming. The real challenge might consist in the ability to monitor the discursive or dramaturgical functions of the elements, which is probably why the frontopolar cortex is the most active brain region during human improvisation.⁴⁷

To investigate the level of emotional involvement in parrot song then, it may be necessary to focus on some other aspects of their behaviour as well: the amount and character of bodily involvement, the rhythmicity and timing of rocking and head-banging. This may be imitative too, and unrelated to the actual mental state of the parrot, but it may also be indicative of a certain excitement and emotional engagement during singing; at least this is something that should to be subjected to closer investigation. There is already a study by Aniruddh Patel and colleagues, indicating that some parrots are able to keep the rhythm, and synchronise it with others to some extent.⁴⁸ If this is really the case, this capability may not be human-specific after

⁴⁷ Charles J. Limb and Allan R. Braun. 'Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation'. *PLoS One*, 3(2) (27 February 2008), <https://doi.org/10.1371/journal.pone.0001679>.

⁴⁸ Aniruddh D. Patel et al., 'Investigating the human-specificity of synchronization to music', in M. Adachi et al. (Eds.), *Proceedings of the 10th International Conference on Music Perception and Cognition* (Adeleide: Causal Productions, 2008)

all; which is intriguing, since it is joining with a whole set of features now, which are not arbitrary, but self-identical in many ways with the manifestations of mental reflection and social integration that are starting to emerge at this stage of evolution.

Even chimpanzees and some other apes are often believed to have reached such a level of development; and sure enough, they are also engaged in rhythmical rocking, excited howling and jumping, but hardly tonal singing or synchronised dancing. Some of these limitations may well be due to more physiological factors, like the refinement of respiratory control or pitch perception. While the vocal resources of birds are exceptional even in comparison with humans, most apes are somewhat simpler in these respects, which may or may not be congruent with their level of intelligence. To investigate the level of self-reflection in apes in comparison with parrots and humans then, it might be necessary to focus on some other clues as well, which are not necessarily connected with song, but may nevertheless shed some light on the extent to which the singing abilities are correlated with it.

An often mentioned criterium of intelligence is the utilisation of tools and other indirect ways of attaining a goal, like bending a wire to make a hook. Parrots are clearly able to do such things, but so are chimpanzees, although one should be careful not to rule out the possibility that such acts may be less creative and more instinctual than is seemingly the case. The same is true for the use of sounds, objects, or gestures to signify ideas which are not immanent in, but merely *represented* by these things. Certainly many apes, birds, and even dogs, are able to comprehend and respond to signs, so signification as such, or at least the ability to *grasp* it, may not be indicative of a human level of cognition. The ability to *use* it however, might require yet another level of action chunking: a monitoring and understanding of the communicative process. And when more intricate techniques of signification are developed, utilising conventionalised temporal combinations of certain categories of concepts as means to signify other concepts - what is usually referred to as 'syntax' - the significance is apparently beyond the reach both of apes and parrots.

These, however, are practical skills, concerned with the manipulation of objects according to techniques and 'rules,' many of which are arbitrary and illogical from a purely dynamic and intrinsic point of view. We are dealing with procedures here, which although they are hierarchically organised, may have little independent ontological status beyond the functions of tool use and signification per se. The emergence of tool use and the related refinement of motor

dexterity that is taking place at a certain evolutionary stage has often been associated with the development of right hand dominance in humans, which is intimately connected with the left side of the brain. Especially the so called *Broca's area* in the left ventrolateral frontal cortex is considered to be involved in tool-, rule-, and syntax-oriented manipulations.⁴⁹ Yet it is not the kind of content that music is constituting.

It is the mission this treatise is to point to another realm of content and human behaviour, which is unrelated to, or independent of these matters; and it is paramount at this point, to remind of the hypothesis that has been elaborated in several of the preceding chapters, of a fundamental difference between the perceptual gestalts that are pertaining to *the extrinsic world* - the things and events we are often thinking *about* - and the perceptual gestalts which are pertaining to *the dynamics of thinking* - which are charted in this treatise. This idea may still seem unfamiliar to many, but there is little doubt by now that it is confirmed by neurobiology to a large extent, indicating a specialisation of *the right cerebral hemisphere* for emotion and self-consciousness. It is not clear when and how this specialisation occurred, but it is not unlikely that the specialisation of the left hemisphere did also liberate some resources in the right hemisphere, devoting itself to more self-reflexive and autonomous processes.

The picture is not entirely clear-cut; to a large extent the two cerebral hemispheres are able to do the same things, and there are considerable individual and sex related differences in this regard. Yet the evidences of a certain lateralisation, or even double dissociation between hemispheres and abilities in some cases, are impossible to neglect.

The general tendency then, is to ascribe to the left hemisphere a capability of dealing with sequential, linguistic, and other tool-related matters, while the right hemisphere is often connected with more holistic or autonomous ego-dynamic processes, like in melody, discourse processing, or other instances of complex emotional and 'autonoetic' integration. It is important to keep in mind that the results of research into these matters are influenced in many ways by the experimental designs, whether the focus is on the melody or the rhythm, the latter possibly involving *counting*, which is left lateralised. Also it is important to distinguish between musicians and non-musicians in this connection; the former group engaging *technical*, *motor*, and *notational* aspects, which are also requiring the left brain. Similarly there is an essential

⁴⁹ Satomi Higuchi et al., 'Shared neural correlates for language and tool use in Broca's area', *NeuroReport*, 20 (2009): 1376-1381, <https://doi.org/10.1097/WNR.0b013e3283315570>.

difference between rule-based composition and spirited emotional enactment, and between the perception of isolated musical features and the experience of coherent and poignant works.

Understandably the findings of such studies are bound to point in different directions, and the field is obviously in acute need of phenomenological clarification, as it is only some of these aspects - the experience of *real music* by *non-musicians* - that are essential to the mental and musical functions under discussion. The handling of instruments or the reading of diagrams is not a typical musical activity. It is performed by car mechanics and electricians alike; and, as will be further elaborated below, it is paramount in this connection to give prominence to studies that are able to take such matters into account.⁵⁰

For now it must suffice to point to Steven Brown and colleagues, noting that 'the right-hemisphere regions homologous to left-hemisphere areas for lexical and syntactic functions are thought to be specialized for global meta-linguistic functions such as affective prosody (Ross & Mesulam, 1979; Buchanan et al., 2000), discourse processing (St. George et al., 1999), and the disambiguation of alternative meanings in sentences or discourse (Bottini et al., 1994; Rapp et al., 2004; Stowe et al., 2005)'.⁵¹ Even in animals there is often a lateralisation of routine behaviour to the left hemisphere, and the dealing with intense emotion to the right.⁵²

A similar picture is sketched out by Elkhonon Goldberg, observing how 'Males with a damaged right frontal lobe behaved in an extremely context-dependent manner and males with a damaged left frontal lobe behaved in an extremely context-independent manner',⁵³ all of which may serve as an indication at least, that the extraordinary processing demands of independence, personal autonomy, and heightened self-consciousness are facilitated by the right hemisphere. It is no surprise for instance, that the comprehension of advanced humour, requiring a comparison

⁵⁰ One example of a study that investigates music under 'natural listening conditions', documenting activity primarily in the right hemisphere, is Devarajan Sridharan et al., 'Neural Dynamics of Event Segmentation in Music: Converging Evidence for Dissociable Ventral and Dorsal Networks', *Neuron*, vol. 55, issue 3 (2 August 2007): 521-532, <https://doi.org/10.1016/j.neuron.2007.07.003>.

⁵¹ Steven Brown et al., 'Music and language side by side in the brain: a PET study of the generation of melodies and sentences', *European Journal of Neuroscience*, vol. 23(10) (May 2006): 2792, <https://doi.org/10.1111/j.1460-9568.2006.04785.x>.

⁵² Giorgio Vallortigara, Lesley J. Rogers, 'Survival with an asymmetrical brain: Advantages and disadvantages of cerebral lateralization', *Behavioral and Brain Sciences*, 28(4) (2005): 577, <https://doi.org/10.1017/S0140525X05000105>.

⁵³ Elkhonon Goldberg, *The Executive Brain, Frontal lobes and the Civilized Mind* (Oxford University Press, 2001), 95.

and integration of different scenarios and twists, has been found to be located to anterior parts of the right frontal cortex.⁵⁴

But even at lower levels of this self-oriented sphere there are some important demarcation criteria, the most researched one being probably the ability to recognise oneself in a mirror, to put oneself in the position of *the other* over there, and identify it with *oneself*, thus viewing oneself from outside, as it were. Certain apes, corvids, dolphins, and elephants are undoubtedly capable of doing this. It is an ability that is requiring a lot of visuospatial and bodily integration, going into the perspectives and the perspective taking which is necessary to grasp these kinds of relations. These are abilities which to a large extent are engaging the *parietal cortex* as well, positioned as it is, between the somatosensory, temporal, and visual regions of the brain.

The parietal cortex is densely connected with the more executive and 'action nesting' prefrontal cortex, constituting what is often referred to as a 'fronto-parietal network;' and there is a whole realm of new content that might be connected with it; at least the research literature is frequently discussing and attempting to ascribe to such animals the enactment of social functions like *warning, threatening, consoling, mourning, grooming, building alliances to secure goodwill, trading sexual services to avoid aggression, stealing* when the other is unable to see it from his point of view, or imagining that the other may steal: a *suspicion* which, according to Nicola S. Clayton, is aroused only in birds who have been stealing themselves. More fascinating yet: it is an ability that seems to enable the bird to *fool* the other by openly hiding its food only to re-hide it when the other is out of sight.⁵⁵

We are undoubtedly encountering a higher level of self-consciousness and social emotion here, integrating and monitoring different perspectives and attitudes to some extent; yet it is not clear whether this is sufficient to explain the imaginative and prospective juggling of attitudes which is occurring even at the relatively local level of human music.

According to Catherine Crockford and colleagues, the vocal warnings of Chimpanzees are *intentionally* communicative, since when encountering a snake, they scream louder when the rest

⁵⁴ P. Shammi and D. T. Stuss, 'Humour appreciation: a role of the right frontal lobe', *Brain*, vol. 122, issue 4 (April 1999): 657-666, <https://doi.org/10.1093/brain/122.4.657>.

⁵⁵ Nicola S. Clayton et al., 'Social cognition by food-caching corvids. The western scrub-jay as a natural psychologist', *Philosophical Transactions of the Royal Society B*, Vol. 362, No. 1480 (29 April, 2007): 507-522, <https://doi.org/10.1098/rstb.2006.1992>.

of the group is unaware of it.⁵⁶ But this might also be explained by the diminished sense of safety of the individual lacking the attention of the group on its side. It may not necessarily require a mentalising of the others' *unawareness*, and the idea of manipulating them by *informing* them. Similarly the act of *grooming* might be concerned less with strategic planning than with the solution to a more immediate threat, as the apes are always surrounded by each other. Even the re-hiding of ones cache may not be consciously *delusive*, but based more on a sequential process, experiencing *dissatisfaction* with ones first attempt at hiding, having been observed, following then a more immediate urge to avoid the theft which is directly associated with it.

If we are to believe Wolfgang Köhler, who was not only a groundbreaking gestalt psychologist but a pioneer in primate research as well, it was possible to observe an *aha moment* in chimpanzees, when after a moment of contemplation, they were able to figure out how to move a chair to reach some food.⁵⁷ It was a bold claim in the age of behaviourism, and there is little doubt that the apes are really thinking in some sense; yet this process may not be an example of deductive reasoning, having a goal in mind while asking oneself what will happen if one do this or that. The ape is still at the local level of cognition here, in the sense that the problem is physically in front of it, and it may not be conscious of the process of combining the idea of moving the chair and climbing it.

It is exactly these boundaries between present and hypothetical scenarios, and the introduction of mental effort concerned more with the thinking process than the foraging as such, which seems to define the border between human and animal cognition. Especially it is a circumstance that seems to be reflected in their limited ability to make use of language. Certainly the apes may understand words or other signs when presented to them, to the extent in fact, that they may even be able to answer simple questions from the researchers; but they are only to a limited extent *initiating* or *spreading* the use of this communicative device, by teaching such signs to other apes or by asking questions to themselves or others.

It is a limitation that is observable in parrots as well, that while they may be able to *answer* questions, they are hardly questioning themselves. Especially Irene Pepperberg has done

⁵⁶ Catherine Crockford et al., 'Wild Chimpanzees Inform Ignorant Group Members of Danger,' *Current Biology*, Volume 22, Issue 2 (24 January 2012): 142-146, <https://doi.org/10.1016/j.cub.2011.11.053>.

⁵⁷ Wolfgang Köhler, *The Mentality of Apes* [1925]. Trans. Ella Winter (New York: Liveright, 1976), 20 and 37.

groundbreaking research within this field, demonstrating beyond doubt the ability of some parrots to verbalise abstract concepts and correctly answer questions like 'how many corners?', 'what shape?', 'what's different?', 'what's same?'.⁵⁸ When it comes to more reciprocal exchanges of information, however, their communication seems to be restricted to egocentric sentiments like: want banana!, want shower!, wanna go back!, which may well count as an elementary rhetoric; but it is not a *discourse*.

As has recently been pointed out by the ethnomusicologist Joseph Jordania,⁵⁹ there are many indications that it is precisely this *questioning* that is the most important demarcation criterion in the evolution of human-level intelligence and song. From the point of view of the animal, which is still restricted to the relatively local level of its existence, the activity of questioning may seem neither necessary nor reasonable. The action-nesting and prospective operations, which are also involved in questioning, are difficult in themselves, but its *emotional* correlate, the introduction of cognitive dissonance and worry about things which are not even there, may be straight out illogical from the animal's point of view. It might not even be *useful*, when all its goods and evils are nevertheless surrounding it in most cases. It is first when forced to deal with things that are absent in time and space, and when such reasoning and information exchange is providing an advantage over other animals, that questioning emerges as a useful mental operation.

Needless to say, this is also the foundation for the existence of signification and language: it conveys information about what is not here, enabling higher levels of cooperation, a sharing of imaginary exploratory processes, and a level of confrontation which is even further detached from physical fighting: the level of discourse, quarrelling, and demagogic.

It is essential to remark, however, that this questioning and exchange of information is not necessarily bound up with signification and language as such. There might well be reflection and discourse without language. The emotional aspect of questioning and answering is all the time constituted by facial and vocal activity; by shaking, grimacing, or raising the pitch to convey doubt or disbelief in want of resolution; begging for mental resolve, as it were. Conversely the affirmative function is constituted by nodding or tonal cadencing. Even the element of 'information' in discourse might be conveyed by nonverbal means, like in pantomimic and vocal

⁵⁸ Irene M. Pepperberg, *The Alex studies: Cognitive and Communicative Abilities of Grey Parrots* (Cambridge, Mass., Harvard University Press paperback edition, 2002)

⁵⁹ Joseph Jordania, *Who Asked the First Question: The Origins of Human Choral Singing, Intelligence, Language and Speech* (Tbilisi: Logos, 2006), 327-346.

simulations of absent situations and events, by demonstrative *pointing* and *glancing*, or by concentrating entirely on content that is intrinsic to the emotional behaviour as such, like in instrumental music, when it is playfully challenging or celebrating its earlier affirmations of harmony.

Once this discursive and explanatory capability is developed, however, it is easy to imagine how the mimicking of situations and events might quickly develop into a set of standardised signs or 'words' which are representing or 'signifying' these things. Then it would not matter much if the resemblance between sign and signified was gradually lost. A problem would still remain with regard to the *learning* of these signs; and it is no surprise that the human brain has developed some extraordinary resources for the picking up of subtle auditory and contextual clues over the years. It is a process that is reflected in the very development of children. First the vocalisations are entirely emotional and musical, like in other animal communication; then the onomatopoeic sounds are grasped; and once the concept of signification is grasped, the language acquisition is proceeding at a rate that is truly remarkable, and inimitable by adult brains.

Certainly chimpanzees and other great apes have a repertoire of communicative vocalisations and gestures too, and there have been several studies seeking to count and list them. The predominantly *quantitative* orientation of these studies, however, is hardly suited to grasp the behavioural contexts and functions of such communication, even at the level of apes, but some interpretative and classificatory attempts have inevitably been made. Erica Cartmill and Richard W. Byrne, for instance, are subsuming orangutang gestures under six social goals: to initiate an affiliative interaction (contact, grooming, or play), request objects, share objects, instigate co-locomotion, cause the partner to move back, or stop an action.⁶⁰

Similarly Anna Roberts is referring to contexts of *affiliation*, *antagonism*, and *maternal care* in chimpanzee gestural communication. As regards the function of 'pointing,' which is a central element of nonverbal discursive communication in humans, Roberts finds it difficult to single out any examples of pointing as distinguished from the typical 'reach gestures, in which the signaller appeared to request that a recipient give or take an external object.' Even if Cartmill and Byrne are speaking of 'semantics' in this connection, there are few clear signs of any

⁶⁰ Erica A. Cartmill and Richard W. Byrne, 'Semantics of primate gestures: intentional meanings of orangutan gestures', *Animal Cognition*, Vol. 13, No. 6 (19 June 2010): 793-804, <https://doi.org/10.1007/s10071-010-0328-7>.

representational meanings in ape communication. As pointed out by Roberts, the 'manual gestures are best considered as graded rather than discrete communication signals.'⁶¹

The indirect benefits of such communication, and the nesting of stages that are going into it - *pointing* out things, and expecting the others to understand that you are *informing* them about something which is not an immediate egocentric wish but something that is beneficial first in the long run because it is aiming at a future goal and implying a mutual agreement about *helping* each other - is hardly understood by apes. Like when interacting with humans, their communication seems to be translating into simple messages like *come!*, *give!*, and *look at me!* Such messages may not be expressible by animals that are not able to experience social emotions to some extent, but they are not *monitoring* the emotions, so to speak, which may be required to constitute a truly cooperative or discursive process. At least, there is no mentioning in the mentioned studies of *questioning* to get *information* or *help*, declarative *pointing*, *pantomiming* or *mimicking* to *inform*, *nodding* to *confirm*, *shaking* to *deny*, let alone any attempts at *instruction*, *teaching*, or *advising*.

Some of these animals have apparently reached a level where they may be able to intuit some of these functions when interacting with humans. In the case of parrots they even seem to be able to grasp the emotional dialectic of human singing. In fact, there are studies indicating that even Rhesus monkeys are able to perceive a melody as an identical gestalt after octave transposition, if only in the case of tonal children's songs. Synthetically assembled tone combinations and atonal melodies were not thus perceived, all of which is indicating that what is behaviourally meaningful at this level of reflection is behaviourally meaningful to monkeys as well, even if they do not have the intellectual and vocal resources to reproduce it.⁶²

Other animals, like birds and wolves, have apparently stumbled upon some kind of song-like reflexivity on their own. To be able to *manipulate* the functions that are going into tonal progressions, however, it might not be sufficient to *sense* them. To account for more conscious and elaborate manifestations of this dialectic, it might already be necessary to introduce a level

⁶¹ Anna Ilona Roberts et al., 'A structure-based repertoire of manual gestures in wild chimpanzees: Statistical analyses of a graded communication system', *Evolution and Human Behavior*, Vol. 33, No. 5 (September 2012), 10, <https://doi.org/10.1016/j.evolhumanbehav.2012.05.006>.

⁶² Anthony A. Wright et al., 'Music perception and Octave Generalization in Rhesus Monkeys', *Journal of Experimental Psychology General*, Vol 129, No. 3 (October 2000):291-307, <https://doi.org/10.1037/0096-3445.129.3.291>.

above it, involving the capabilities which are commonly referred to as *metacognition* and 'theory of mind'.

Certainly many humans have trouble with metacognition and 'theory of mind' as well. The perspective of many people is still at an ego-centric and local level. Even states and companies may still be governed by the law of the jungle, people satisfying their own greed with little concern for their fellow beings, failing to comprehend the utility of common measures, failing to explain and put themselves in the position of the other, forcing others to manage and learn by their own, or by watching each other, which is pretty much how a community of apes is functioning as well. But at least there is a process that have been started among humans, which has already differentiated us from apes to some extent. We are not talking about altruism proper - a product of abstract moral reasoning - it is just a higher degree of reflexion and cooperation which is manifesting itself in *tribes* and *democracies*.

As for the functions pertaining to the levels leading up to this consciousness, many of the above examples are *social emotions*; which may be what is added or refined by the kind of perspective-taking that is demonstrated in the mirror test. Some of these social emotions may well be manifestable in musical interaction as well, like in a pack of singing wolves, when the alpha male is acting as a lead singer and quelling any attempts of juveniles to raise their voice. More relevant to musical progressions, however, are the autonomous and individual aspects of mental dynamics, which are probably reaching a distinctly higher level first when the reflexive capabilities of the frontal-most cortex are also developed. Or to put it differently: it is not obvious that the refinement of perspective taking and social apperception that is enabled by the Broca's area and the fronto-parietal network is sufficient to produce the behavioural and behavioural-motivational nesting that is characteristic of self-reflexion and discourse. As earlier mentioned, the field of rhetoric might have to be divided into several sub-categories: mere 'telling' or affirming, reflexive thinking (as in questioning and answering), and finally: long-range discourse, traversing the narrative and metacognitive levels of consciousness.

It is first when these *discursive* capabilities are developed and internalised that human evolution is really taking a great step forward. Not only is cooperation enhanced then, but the personal autonomy is experiencing a tremendous growth as well, going far beyond the moment to moment considerations of animals and the regulative processes of the body. We are dealing with the introduction of subjective lines of reasoning and imagination here, posing questions to

oneself regarding the future, imagining different solutions, striving towards final resolution, celebrating resolutions in music and dance, employing music as a strategy to intensify ones own emotions to reach a state of ecstasy, or a readiness for fight, courtship, or athletic achievement.

It is true that even discursive musical processes are social in the sense that they are directed to an audience and contributing to the sense of harmonious communion which is creating a community in the first place. The most complex manifestations of such reflection, however, are usually 'subjective'. Our capability of spontaneously planning together, remembering together, and acting together, is limited. It is difficult to write a book or compose a symphony together with other people, but it is clearly within the grasp of highly integrated individual minds; which is exactly why we are witnessing the emergence now, of intrinsically structured melodies, works, lectures, and lives.

Chapter 5

Rhetorical Gestalts

5.1 The hierarchy and lateralisation of ego-dynamic functions

As is demonstrated both by animals and humans, there are many stages and kinds of intelligence. Even the development and diversification of animal emotional vocalisation into more articulated melodies, which is also allowing for more harmonious and song-like modalities, seems to take different forms in various species. Some of these differences might be due to differences in time perception and the pace of living, making bird 'howling' sound more like twitter when processed by the brains of human beings. Other differences may be related to the development of the vocal apparatus or a favouring of gesticulation and dance. But the complexity of emotional communication is always expressive of a certain level of personal autonomy and self-reflection.

The idea of a special region for the constitution of such 'ego-dynamic' autonomy and self-consciousness in humans, dissociating itself from, yet developing in parallel with, more contingent, technical, and linguistic operations, was discussed already in the previous chapter. The whole right hemisphere, from the right parietal cortex all the way to the right frontopolar cortex, might well be optimised for this mission. Certainly emotional vocalisation is not limited to the right hemisphere. Perhaps because emotion is much older than the use of tools and symbols, it may be less vulnerable to unilateral damage. The picture is by no means clear, and it seems to depend to a certain extent on the focus of the studies, the intensity and complexity of the emotions, and the amount to which a musician is focussing on the purely technical aspects of his trade. If a melodic fragment is lacking in emotional engagement and context, there is little reason why the right hemisphere should be particularly active.

According to Belin and Zatorre, however, the experience of *vocal character and identity* is primarily located to the right hemisphere, to the voice area in the anterior temporal cortex (TVA).¹ And even the phylogenetically later addition of *tonal song*, implying the ability to

¹ Pascal Belin, Robert Zatorre et al., 'Voice-selective areas in human auditory cortex', *Nature*, Vol. 403, No. 6767 (20 January 2000): 309–312, <https://doi.org/10.1038/35002078>.

discriminate between specific tones and intervallic ratios, seems to rely on some capabilities for fine-grained pitch perception which may be located to the right auditory cortex only.²

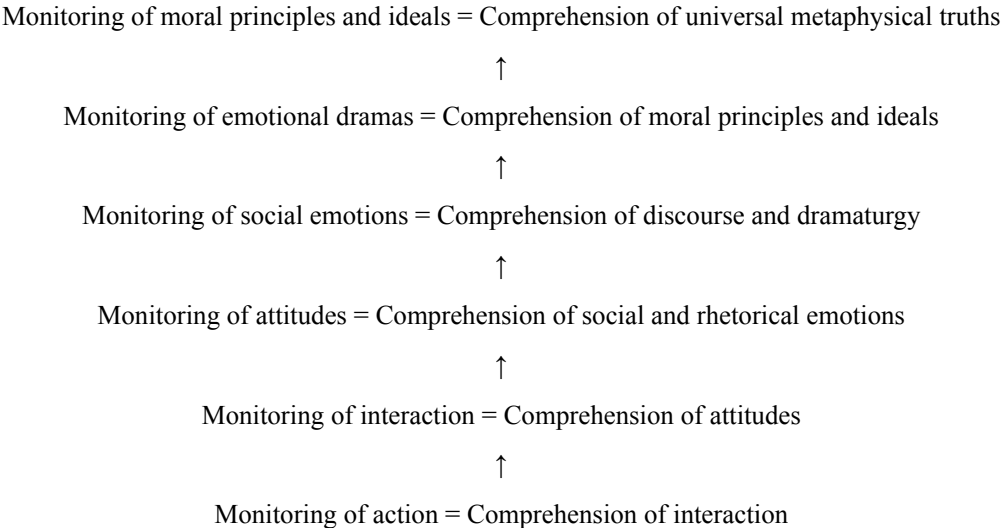
We also have to explain, in neurobiological terms, the extraordinary *complexity* of such behaviour. The action-nesting capabilities of the ventrolateral frontal cortex is one aspect of this complexity; the spatial-behavioural contextualisations of more dorsal and fronto-parietal networks is another, and the monitoring of moods and motivational processes in the medial frontal cortex is a third. And these are only some of the structures that may be differently developed and wired in animals and human beings.

The most important of these developments however, and the most central requirement for melodic reflexivity, is probably the increased capacity for action-nesting: the ability to compound and monitor the behavioural aspects of emotion. This may also be the easiest to explain. At least the concept of 'action chunking' as formulated by Etienne Koechlin is a very simple and illustrative model, which may serve as a template at least, in the charting of these capabilities. In fact, this model, and the experiments set up by Koechlin and others to test it, have a very concrete relevance to the hierarchical compounding of motives, phrases, and sections in musical progressions. It is not clear whether Koechlin is ready to recognise the conceptual and emotional gestalts that would also be the product of such compounding, especially in the right hemisphere; but if the 'action chunking' which Koechlin locates to *pars opercularis* is productive of *attitudes* - a type of entities which seems to be relying precisely on this ability to grasp the relations between contrasting actions - the 'superordinate action chunking' of the triangular area in front of it might accordingly be seen to enable the comprehension of the *relations between attitudes*, which might be compounded into *rhetorical or socially mediated emotions*.

However, there is a need for yet another level now, a *monitoring of emotions*, which might simply be conceived as yet another level of action chunking, producing what is often referred to as 'theory of mind', rhetoric in the form of *discourse*, and the kind of intellectual functions or emotions that are going into discursive processes. If we recapitulate the hierarchy exemplified in

² Robert Zatorre, Shari R. Baum, 'Musical Melody and Speech Intonation: Singing a Different Tune'. *PLoS Biology*, Vol. 10, No.7 (July 31 2012), <https://doi.org/10.1371/journal.pbio.1001372>.

the previous chapter in a slightly more principal and simplified form now, all the time with the lowest level of complexity at the bottom, it might be presented like this:



The model is obviously in need of further investigation, elaboration, and terminological justification. The concepts of *attitudes*, *emotions*, and metacognitive or *intellectual functions* are often overlapping and blurred in common parlance. Yet there is also a tendency towards differentiation and ranking here, which may be amplified and exploited for more scientific use. As has already been noted, the common categories of 'emotion' are usually implying an element of self-conscious *engagement* and *interaction*, which needless to say, is very different from Damasio's identification of emotion with unconscious homeostatic regulation. In most cases the mental states that are falling under this rubric might already have transcended the merely attitudinal level of most animals. Even the ego-dynamic substrate of intellectual discourse - featuring functions like *believing*, *suspecting*, *asserting*, *doubting*, *hesitating*, *interrupting*, *denying*, *contending* and so on - is often referred to as 'emotional', and even the integration of such rhetorical figures and gestalts would have to be located to specific regions in the brain.

It is a requirement that is realised by Etienne Koechlin as well, although he tends to attack these matters from a much more practical point of view. While in the article from 2006, on 'Broca's Area and the Hierarchical Organization of Human Behavior', he was speculating about

pars triangularis being the 'apex of the prefrontal system', capable of producing 'multiple hierarchical levels' by 'remapping lower-level representations onto higher-level representations,' he quickly became aware of the need for a specifically human 'ad-on' to this hierarchy. Thus, in a short article from 2011, it is the *lateral frontopolar cortex*, also called the 'rostrolateral' prefrontal cortex, that is described as 'the apex of the hierarchy of lateral prefrontal processes controlling the selection of task sets driving behavior'.³

The rostrolateral prefrontal cortex is located in front of the earlier mentioned 'action chunking' areas - basically to Brodmann area 10 - so the hierarchy should be relatively obvious, even from a topological point of view. Whether we are simply dealing with yet another level of monitoring here - a 'hyper-monitoring' or 'monitoring of monitoring', as Michael Petrides calls it⁴ - or something operating according to slightly different principles, is not as clear. Petrides' conception of rostrolateral monitoring also includes a monitoring of the neighbouring *dorsolateral* prefrontal cortex (BA 46 and 9), often connected with more memorially oriented evaluations, which is undoubtedly giving the rostrolateral prefrontal cortex an advantage over the more posterior or 'caudal' structures. It is not restricted to the ventrolateral or 'inferior' regions of the frontal cortex.

Koechlin, for his part, is basically - at least in the mentioned studies - talking of a bilateral *ventrolateral* hierarchy, where the rostrolateral prefrontal cortex' function is described in terms of 'multitasking', 'cognitive branching', and 'the ability to put on hold an alternative course of action during the concurrent performance of the ongoing one', which is exactly the kind of discursive reflexivity we need to account for now. While in the mentioned article from 2006, Koechlin tended to differentiate between frontopolar prospection and a more atemporal type of behavioural nesting in Broca's area and its right homologue, it is a distinction that seems to be downplayed now, when these regions are all incorporated in the same action-chunking hierarchy.

³ Etienne Koechlin, 'Frontal Pole function: what is specifically human', *Trends in Cognitive Sciences*, Volume 15, No. 6 (June 2011), 241, <https://doi.org/10.1016/j.tics.2011.04.005>.

⁴ Michael Petrides, 'Lateral prefrontal cortex: architectonic and functional organization', *Philosophical Transactions of the Royal Society of Biological Sciences*, Vol. 360, No. 1456 (29 April 2005): 781-795, <https://doi.org/10.1098/rstb.2005.1631>.

At least he is featuring as a coauthor of articles where the hierarchical levels are described more in terms of temporal structure and complexity.⁵

In any case, we are dealing with a much more elaborate postponement of action here, adding now an element of long-range monitoring to the behavioural compounds. The ability is easily pinpointed in experiments, and it is no doubt essential both to verbal and purely musical discourse, accounting, as it is, for this element of *imagination* and *planning* which is so crucial both to 'theory of mind' and to reasoning in general.

It is no wonder that the rostrolateral prefrontal cortex is often reckoned to be one of the last regions to mature in humans. In a study of adults and children between 8 and 12 years, comparing their approach to one-relational and two-relational problems from the so called Raven's Progressive Matrices, the two-relational problems were found to recruit the rostrolateral prefrontal cortex even in the children; but, as opposed to the adult group, they failed to sustain the activity, and persevere in the consideration of multiple relations. Also, the activation of this region was found to increase as a function of age.⁶

If we are to judge from other neuroanatomical studies, however, it is rather the *temporal* and *dorsolateral prefrontal* cortices - the latter of which is slightly above and behind the rostrolateral areas - that comes latest in the pruning and wiring process;⁷ which might indicate a higher relative importance of memorial and spatial contextualisation as well as fronto-parietal wiring in maturation. These are abilities which have all been attributed to the dorsolateral prefrontal cortex on a fairly consistent basis. Michael Petrides, for instance, is pointing to its unique projections to the memory-related hippocampal and parahippocampal regions via the cingulum bundle and the retrosplenial cortex;⁸ and it is tempting to associate the dorsolateral prefrontal cortex with the kind of apperception and conceptual contextualisation that is so central to philosophers like Hegel and Husserl.

⁵ Frédérique Kouneiher, Sylvain Charron, and Etienne Koechlin, 'Motivation and cognitive control in the human prefrontal cortex', *Nature Neuroscience*, Vol. 12, No. 7 (July 2009), <https://doi.org/10.1038/nn.2321>.

⁶ Eveline A. Crone et al. 'Neurocognitive Development of Relational Reasoning,' *Developmental Science*, Vol.12 No.1 (January 2009): 55-66, <https://doi.org/10.1111/j.1467-7687.2008.00743.x>.

⁷ Nitin Gogtay et al., 'Dynamic mapping of human cortical development during childhood through early adulthood', *Proceedings of the National Academy of Sciences of the United States of America*, Volume 101, No. 21 (25 May 2004), Figure 3, <https://doi.org/10.1073/pnas.0402680101>.

⁸ Michael Petrides, 'Lateral prefrontal cortex: architectonic and functional organization,' *Philosophical Transactions of the Royal Society of Biological Sciences*, Vol. 360, No. 1456 (29 April 2005): 781-795. <https://doi.org/10.1098/rstb.2005.1631>.

Since such perspectives are always *self-oriented* or 'autonoetic', and since it is the right prefrontal cortex that seems to be dealing with their most holistic and personal aspects, there is little surprise that this is also a region that is somehow weakened or disengaged in schizophrenia and in dreaming,⁹ but not in so called 'lucid' dreaming.¹⁰ The neuropsychological colocation of these phenomena to the dorsolateral prefrontal circuits, and the dream-like distortion of 'the ordered whole of ones individual world' which Hegel was positing as a core deficit in insanity,¹¹ is almost eerily in agreement. Certainly the dorsolateral prefrontal cortex is not the only brain region that put things into perspective - the whole brain is apparently operating according to gestalt principles - but it is obviously an important correlate of higher level understanding and abstraction in humans.

As for the purely 'melodic' or self-reflexive aspects of frontopolar processing, constituting the apex of the hierarchy of ego-dynamic functions in reasoning and articulated selfhood, this dynamic may well be more complex in children than is often thought, but it is a complexity that is not shared with other animals.¹² Certainly apes have a prefrontal cortex too, and building on various cytoarchitectonic studies, Michael Petrides was able to locate in the macaque frontal cortex most of the areas which are found in the human frontal cortex as well. The status of the monkey frontopolar cortex, however, is not so clear. In Koechlin's opinion, the function of this part of the monkey brain is restricted to the functions that are performed by the so called medial, mesial, or midline structures of the human frontal cortex; and he is referring to anatomical studies by Carmichael and Price among others.¹³

Even in this *medial* region of the prefrontal cortex, which is shared by apes and humans, there is an element of prospection and monitoring of future reward. Especially the ventromedial frontal cortex is often associated with such expectation and seeking. Yet this medial region may

⁹ Pilar Salgado-Pineda et al., 'Schizophrenia and frontal cortex: Where does it fail?', *Schizophrenia Research*, Vol. 91, Issues 1-3 (Mars 2007): 73-81, <https://doi.org/10.1016/j.schres.2006.12.028>.

¹⁰ Martin Dresler et. al., 'Neural Correlates of Dream Lucidity Obtained from Contrasting Lucid versus Non-Lucid REM Sleep: A Combined EEG/fMRI Case Study,' *Sleep*, Vol. 35, No. 7 (1 July 2012): 1017-1020, <https://doi.org/10.5665/sleep.1974>.

¹¹ Hegel, *Philosophy of Mind*, § 408.

¹² James K. Rilling, 'Human and NonHuman Primate Brains: Are They Allometrically Scaled Versions of the Same Design?,' *Evolutionary Anthropology*, Volume 15, Issue 2 (20 April 2006): 65-77, <https://doi.org/10.1002/evan.20095>.

¹³ S. T. Carmichael and J. L. Price, 'Connectional networks within the orbital and medial prefrontal cortex of macaque monkeys', *Journal of Comparative Neurology*, Vol. 371, Issue 2 (22 July 1996): 179-207, [https://doi.org/10.1002/\(SICI\)1096-9861\(19960722\)371:2<179::AID-CNE1>3.0.CO;2-%23](https://doi.org/10.1002/(SICI)1096-9861(19960722)371:2<179::AID-CNE1>3.0.CO;2-%23).

not have the ability to produce the behavioural complexity and executive control as more lateral frontopolar and dorsolateral areas, allowing for the kind of discursive imagination and evaluation of 'self-generated information' which is also the essence of Kalina Christoff's definition of rostrolateral prefrontal functions.¹⁴ Or as Etienne Koechlin is formulating it: 'the lateral frontopolar cortex appears to subserve a unique anthropoid function providing additional cognitive flexibility that could explain the emergence of human reasoning and planning abilities.'¹⁵

There is little doubt that monkeys fall short of such complex demands, and that the reason for this lies partly in their smaller and much more pointed prefrontal cortex. Especially Brodmann area 10 is disproportionately large in humans. This is confirmed in a study by Franz-Xaver Neubert and colleagues, comparing the functional connectivity of different regions in the right ventrolateral frontal cortex of humans and monkeys. While eleven regions in the right ventrolateral frontal cortex of humans were found to be functionally similar to corresponding regions in monkeys, they found no parallel to the frontopolar cortex in the macaque brain.

A second major difference discovered in Neubert's study, was connected with projections from the auditory association cortex to the prefrontal cortex, which, while prevalent even in macaque brains, were much stronger in humans. It is a finding that is not only strengthening the idea of sound as a means of communication. Since the auditory modality is so strongly represented, even in the right frontopolar cortex, the role of sound and melody as *a dynamic substrate for consciousness* is even clearer.¹⁶ At a more fundamental level this is a hypothesis that is also strengthened by research into differences between so called vegetative states and states of *minimal* consciousness.¹⁷ A musical stimulation of the so called 'auditory network',

¹⁴ Kalina Christoff et al., 'Evaluating Self-Generated Information: Anterior Prefrontal Contributions to Human Cognition,' *Behavioral Neuroscience*, Vol. 117, No. 6 (2003) 1161-1168. <https://doi.org/10.1037/0735-7044.117.6.1161>.

¹⁵ Koechlin, 'Frontal Pole function: what is specifically human', 241.

¹⁶ Franz-Xaver Neubert et al., 'Comparison of Human Ventral Frontal Cortex Areas for Cognitive Control and Language with Areas in Monkey Frontal Cortex,' *Neuron*, Volume 81, Issue 3 (February 2014): 700-713, <https://doi.org/10.1016/j.neuron.2013.11.012>.

¹⁷ Athena Demertzi et al. 'Intrinsic functional connectivity differentiates minimally conscious from unresponsive patients', *Brain*, Vol. 138, Issue 9 (September 2015): 2619-2631, <https://doi.org/10.1093/brain/awv169>.

connecting central structures in the temporal and frontal lobes, might mean the whole world to a patient paralysed in a state of 'unresponsive wakefulness'.¹⁸

It is precisely this distinction between the practical and emotional aspects of thinking and feeling, the question whether our discursive abilities are also in need of a suprasegmental and 'melodic' substrate, pertaining more to the ways of the self than the contingent transactions with external matters, that is so central to the discussion of selfhood and music. As earlier argued, such awareness may be important not only to consciousness as such - as a perspective against which the inanimate world is also emerging - it also has a more immediate relevance, in the sense of developing an awareness of the intellectual strategies and cognitive styles by which a problem or a different person could best be approached.

So crucial is this mental dynamic, that the whole right hemisphere may be optimised for it. And the circumstance that the rostrolateral prefrontal cortex is also physically bigger on the right side does not exactly detract from its importance. It is a fact that is visible to the naked eye, that the brain is somewhat asymmetrical and twisted, making it slightly bigger in the regions of the right rostrolateral cortex and the diametrically opposed left occipital cortex.¹⁹ The reason for this torsion is not known, but it is not surprising, given that the self is also the most complex object imaginable, and that more practical transactions, subserved by the left hemisphere, require more visual and occipital involvement.

This idea of a more self-conscious and 'emotional' right hemisphere is neither new nor unknown. On the contrary, it is a distinction that is often exaggerated in the media, along with an equally exaggerated criticism, which will be difficult to refine as long as our phenomenological understanding of emotion, especially with regard to its sensorimotor, melodic, and emergent properties, is not also developed. This is precisely the point that has been pressed in the previous chapters, and which will be elaborated in detail in the chapters to come. Yet even the

¹⁸ Melanie Boltzmann et al., 'Auditory Stimulation Modulates Resting-State Functional Connectivity in Unresponsive Wakefulness Syndrome Patients', *Frontiers in Neuroscience* (16 February 2021), <https://doi.org/10.3389/fnins.2021.554194>.

¹⁹ Aida Gómez-Robles et al. 'Increased morphological asymmetry, evolvability and plasticity in human brain evolution,' *Proceedings of the Royal Society, B: Biological Sciences*, Volume 280, No. 1761 (24 April 2013), <https://doi.org/10.1098/rspb.2013.0575>.

neurosciences are producing studies now, which may contribute at least to a partial clarification of these matters.

A fMRI study by David Badre may be focussing less on hemispheric differences than on the role of 'individual differences in uncertainty-driven exploration', but the results are unambiguous: the exploratory approach to problem solving - trying out new and unknown alternatives in hope of even better results in the long run - did first of all activate the *right* rostralateral prefrontal cortex.²⁰ To determine how fast to press a button to win points, a condition which also varied over time, the participants in Badre's study were forced to 'track the relative advantage of switching to alternative courses of action', in a model which, he says, did also 'estimate the individual participant's reliance on relative uncertainty to explore'. To cut it short, he located two regions in the right rostralateral prefrontal cortex that were correlated with such exploration: a ventral cluster (XYZ = 30 50 -14; 36 56 -10) and a higher, 'dorsal' cluster (XYZ = 22 56 26; 26 52 16; 44 42 28). The different functions of these clusters are not entirely clear, but it seems relevant to understand the right dorsal activation in connection with studies that are ascribing this region a unique role in the evaluation of one's own personality traits,²¹ whereas the ventral activation might possibly be related to the meta-emotional evaluation of more visceral aspects of uncertainty-driven exploration.

Needless to say, this strategy of thinking ahead and voluntarily confronting uncertainty to try to 'optimize the information gain', is as cognitively demanding as it is effortful; and even in the case of many humans it is not easily entertained. At least there are cases where a problem may also lend itself to more random or what Badre calls 'stochastic' approaches: testing out options in a more generalised manner, or sticking to safer and more familiar choices. As demonstrated by Badre, there are considerable differences between people in this respect; a circumstance that is often referred to as differences in 'cognitive style'. Some people are simply more inquisitive by nature, or less averse to uncertainty, or as Badre is also suggesting: 'they may explore in order to reduce this uncertainty in the long run'. A different, and less convoluted, way of putting it is that

²⁰ David Badre et al., 'Rostrolateral Prefrontal Cortex and Individual Differences in Uncertainty-Driven Exploration', *Neuron*, Volume 73, Issue 3 (9 February 2012), 599-602, <https://doi.org/10.1016/j.neuron.2011.12.025>.

²¹ Taylor W. Schmitz et al., 'Metacognitive evaluation, self-relevance, and the right prefrontal cortex', *Neuroimage*, Vol. 22, No. 2 (30 April 2004), 943-944, <https://doi.org/10.1016/j.neuroimage.2004.02.018>.

the 'explorers' may be more prone to thinking and questioning; which, as Badre also indicates, may be connected with the level of dopamine that is supplied to the prefrontal cortex.

But even in the case of the 'non-explorers' there was uncertainty and right hemisphere activation, if only at a simpler and more local level of volition. Generally Badre found that 'uncertainty about each option was maintained by more caudal regions that do not necessarily track changes in relative uncertainty.' More specifically he is pointing to the right dorsolateral prefrontal cortex, regions of the supplementary motor area (SMA), the right dorsal premotor cortex, and bilateral occipital and posterior parietal cortex.²²

This role of the right hemisphere in the treatment of relative uncertainty is also confirmed by a study by Johanna M. Jarcho and colleagues, although Jarcho seems to be focussing on a level somewhere in the middle of the hierarchy: the ability to deal with 'cognitive dissonance' and what she calls 'decision related attitude change' as registered especially in the triangular part of the right inferior frontal gyrus; the region which Koechlin identified with 'superordinate action chunking' (BA45). Even when self-reflexive reasoning and the frontopolar cortex is not involved to a large extent, people often have to make difficult choices, which also involve relative uncertainty to some extent. Especially when confronted with difficult choices between equally tempting options, which have also some personal ramifications, such dissonance may be strong, and if we are to believe in Jarcho's study, we might even be dealing with a unique right hemisphere function here, 'positively associated with activity in right but not left pars triangularis.'²³

The focus of Jarcho's study was not the decisions as such, but the 'attitude change' they are often causing; *repressing* the prior difficulty and cognitive dissonance as it were, and making the choices more liveable and straightforward in retrospect. This kind of attitude change has often been described as a much slower process, a tendency to view our previous choices in a positive light, unconsciously or even instinctually convincing ourselves that we have made the best choice. According to Jarcho, however, this is a phenomenon that may also occur on a much more short-term basis.

²² Badre, 'Rostrolateral Prefrontal Cortex and Individual Differences in Uncertainty-Driven Exploration,' 602.

²³ Johanna M. Jarcho et al., 'The neural basis of rationalization: cognitive dissonance reduction during decision-making'. *Social Cognitive and Affective Neuroscience*, Volume 6, Issue 4 (September 2011), 462-463, <https://doi.org/10.1093/scan/nsq054>.

The actual physical manifestation of this change seems to be instantiated by decreased activity especially in the anterior insula, a region that has been connected with the integration of visceral, auditory and somatosensory sensations, possibly reflecting a reduction in affective conflict and distress, or even vocal and auditory tension, one might add, if speech or other vocalisation is also involved. Even if this change has often been described as a 'post-decisional' stage, says Jarcho, more recent models have suggested a much more instant resolve, where 'cognitive mechanisms supporting attitude change can be engaged rapidly, without extended deliberation, as a by-product of the decision-making process itself.' This was also the conclusion of her own study.

It is a phenomenon that is not observable in all people. Even here we seem to be dealing with different sensibilities and cognitive styles; which does not exclude the possibility that weaker activations or less visceral resolutions are also taking place. From a phenomenological point of view one might even argue that a decision is always involving *release* to some extent. The process of *deciding* is hardly conscious without it. And it is interesting to notice that Jarcho seems to have stumbled upon some general aspects of volition here, which are also confirming Wundt's description of an initial moment of release in conscious volitions. We might well be dealing with different phenomena and levels here, stretching from absentminded reflexes to long term deliberations; but as far as they are *decisions*, suddenly switching from the hesitation and hovering between different options to the determined focussing and pursuit of a specific goal, they are also changes in attitude, or what might also be described as basic intellectual feelings and emotions.

5.2 Music rhetoric as a distillation of ego-dynamic gestalts

5.2.1 Verbal versus purely ego-dynamic figures

The existence of a region devoted to meta-emotional reflection in the human frontopolar cortex should be well documented now. And as was argued in the previous chapters: the ability to put on hold ones immediate desires for the sake of exploration and hypothetical future optimisation of pleasure may also be an important component of the harmonious modalities of prosody: what is usually referred to as *song*. There is little life in the harmonic series, nor has it any dynamic impetus, which is probably the reason why pentatonic and modal music is more often than not

based on the slightly inharmonious *minor* triad, or as in the blues: something between a major and minor triad. It is a trait that might be providing the necessary unrest to music that is harmonically static. But even such harmonically static music depends on a certain *temporal dialectic* to infuse it with life, if only melodically: challenging and dialectically affirming the harmonic series by turning to foreign but related tones like the fourth, the sixth, or more daringly: to remote and dissonant 'blue notes' like the minor second or tritone.

Certainly some birds and wolves may already have discovered the pleasures and benefits of this fiddling with harmony, so it may not depend on the frontopolar cortex for its perception; yet it is first with the meta-emotional imagination of human beings - consciously manipulating their own mental states for the sake of encouragement, bonding, and the celebration of success in the face of past and future challenges - that it attains the level of complexity which is usually associated with music. Whether such reflection takes place within the modality of sung or spoken thought it is possible to observe the emergence of an unprecedented amount of intellectual functions and 'ego-dynamic gestalts' here. In fact, it is probably first with reasoning and dialectical argumentation - constantly referring back to itself - that human existence is really gaining its independence and autonomy.

Luckily these matters are also well researched. Much of this knowledge may have sunken into oblivion by now, but it is a field that has dominated humanistic scholarship for more than two thousand years. First of all we are dealing with the tradition of greek and roman rhetoric and oratory, but also the forays into dramaturgy and psychodrama of Aristotle and Freud, which will be treated in separate chapters. The dynamic aspects of these gestalts may still be in need of substantiation though, and it is exactly here that musicology may play such an important role. Not only is sound the only medium for feeling for which it has been developed an elaborate technical and notational apparatus; this is also where it displays the greatest amount of diversity: the riches of prosody, prosodic dialects, different types of song, sing-song, and melodrama.

This may well come as a surprise to the children of materialism and postmodern relativism, but especially the music we are most familiar with today is a product of an interaction between creative intuition and rhetorical theory. As a matter of fact, the field of rhetoric dominated music theory and analysis for centuries, at least in Germany. As opposed to Aristotle's *Poetics* - which is still the *modus operandi* of dramaturgy, especially within commercial cinema and soap opera -

the field of rhetoric is known more indirectly today, through its contributions to established language and musical terminology, such as *introduction*, *exposition*, *development*, *motif*, *theme*, *cadence* and so on. Stifled by antiquated terminology perhaps, by the programmatic and narrative aspects of romantic music, and by a formalistic impulse which was noticeable even in nineteenth century music theory, the field of musical rhetoric may have faded into oblivion. Yet its content is real and operative, and it is essential to try to revive it now, in the light of present knowledge.

What is so promising about music research is that it has the potential of revealing the dynamic substrate of rhetorical figures: the type of entities that Wundt was referring to as 'intellectual feelings', 'complex volitional processes' and 'psychische Gebilde'. Whereas in ordinary rhetorical nomenclature the ego-dynamic functions are often intertwined with the factual aspects of discourse, or the principles for a poetic and 'musical' combination of words, a discussion of *instrumental music* - if it is true to the autonomy and universal communicability of music - would necessarily have to cleanse the rhetorical vocabulary of such concepts, leaving only the purely emotional or ego-dynamic functions behind. There is no way that melody, if detached from the lexical meanings of words, could instantiate let us say a *euphemism* or an *oxymoron*. Certainly a euphemism may contain a dynamic element in the sense of downplaying and lowering the intensity of something, but the circumstance to which it is *referring* is external to the music both in time and space.

Without attempting to develop an exhaustive taxonomy of rhetorical concepts, many of the concepts implying referentiality seem to be centred around comparisons or *analogies* of kinds, such as *metaphor*, *irony*, *pun*, *tautology*, *anachronism*, and *personification*. These are rhetorical techniques, but not necessarily ego-dynamic *gestalts* that could manifest in the local behavioural dynamics. Certainly there may be cases of referentiality or allusion even in music, like when the bebop trombonist Frank Rosolino suddenly breaks into 'The ballad of Davy Crockett', or when Gustav Mahler quotes the children song 'Frère Jaques'. This might well be funny or ironical, or examples of anachronism and other allusions, but it depends on common references among the musicians and listeners. It is not even clear whether it should be considered a part of the music or merely attached to it. Only within the autonomous context of a whole work it is possible to set

up a contrast - let's say a contrast between something serious and something strangely lusty and banal - that would be perceived as ironical even in the absence of texts and cultural connotations.

In some cases, like in the above mentioned examples, or when the melodies have a text, there is an intra-musical drama in addition to the extra-musical connotations, which is the only way to safeguard such rhetorical devices as functions of a truly autonomous work. And this is a point that has been very important to classical composers. As we will come back to in separate chapters, it was formulated in a series of enthusiastic writings at the turn of the eighteenth century by people like Wackenroder, Tieck, and Hoffmann, making classical music the very epitome of autonomous art.²⁴ Characteristically, Wackenroder is talking about the symphonies of his time as simultaneously 'abstract' and unique emotional dramas; and his conception of 'sounding souls' and a wordless 'Seelenlehre' (psychology or soul-doctrine) that is provided by such music is strangely reminiscent of the musical 'distillation of ego-dynamic gestalts' that is the subject matter of this chapter.²⁵

It was a point that was only strengthened by the nineteenth century debate between the adherents of program music and more conservative formalists like the music critic Eduard Hanslick. While Hanslick is operating with a false dichotomy between musical autonomy on the one side and 'the doctrine of the emotions' on the other - paradoxically leading to his conception of music as an imitation of kaleidoscopes, buildings, and flowers,²⁶ which is not musical at all - the composers of more narrative works, like Beethoven, Schumann, and Berlioz, were eager to emphasise that the literary program was serving basically as a source of inspiration, or as Berlioz put it: a means of achieving contrast and dramatic unity.²⁷ It is first at this time that musical unity stretches across all the movements of a symphony, and Beethoven was careful to point out that his Pastoral Symphony was functioning 'more like emotional expression than painting' [Mehr Ausdruck der Empfindung als Malerei].²⁸

²⁴ E.T.A. Hoffmanns *Musikalische Schriften*, ed. Edgar Istel (Stuttgart, Greiner & Pfeiffer, 1907), 86.

²⁵ Wilhelm Heinrich Wackenroder, *Die Wunder der Tonkunst. Das eigentümliche innere Wesen der Tonkunst und die Seelenlehre der heutigen Instrumentalmusic* (Offenbach am Main: W. Gerstung, 1926)

²⁶ Eduard Hanslick, *Vom Musikalisch-Schönen* [1854] (Leipzig: Breitkopf & Härtel, 1910), 59-60.

²⁷ Berlioz, 'On Imitation in Music', In *Berlioz's "Fantastic Symphony"*, ed. Edward Cone (Northon Critical Scores, Chappell & Co. Ltd, 1972), 41.

²⁸ Program notes to Beethoven's *Sixth Symphony*.

More intrinsic to the auditory dynamic is a class of rhetorical terms dealing with the *sound* of words, such as *alliterations*, *rhyme*, *assonance*, and *onomatopoeia*. Except from onomatopoeia, which is referring to animals and other things which are imitated, these are expressive and dynamic manifestations, encroaching on the field of pure music, but it has little relevance to music that is not consisting of words. Not even scat song use words or rhyme to any great extent. Imitations of cuckoos and the like are occasionally used even in orchestral music, but is considered by some too banal or concrete to be integrated in serious works. Even Berlioz, who used it himself, specifically warns about this, because, as he puts it: it 'borders on parody'.

What is much more relevant to music are some general concepts of rhetorical intensification and disposition which do not depend on words or signification at all, but are concerned with the manner in which a melodic statement or cadence could be *amplified* by physical *emphasis* (loudness and accent), by making it shorter or longer (*diminution* and *elongation*), by introducing conflict, deflection and interruption (*confutation*) which is also negated, or go into more long range functions and sections like *introduction*, *exposition*, *development*, *recapitulation*, and *coda*.

A subclass of such concepts is concerned with the *reordering* or omission of elements. Some of these concepts may be relevant only to linguistic syntax; others, like *syncope*, *permutation*, *transposition*, *cacophony* and *rhapsody*, are just as relevant to the melodic, rhythmical, and harmonic aspects of communication. In fact they are better known from the field of music today.

It is by limiting itself to these immanent, dynamic, and general aspects of rhetoric, that one could say that absolute music is 'distilling' the ego-dynamic gestalts from the field of rhetoric, which is simultaneously making this autonomous core of selfhood much richer and explicit. And as we will see below, there are several music theorists and philosophers, already in previous centuries, who came close to such a distillation. It might not have been a conscious strategy, but it is a consequence of the attempt to give a precise description of the somehow 'abstract' or purely emotional logic of musical progressions. In fact, many of the subtler aspects of this dynamic might have no other existence outside tonal music, and no other means of discussing it than by employing musical notation and terminology.

It is a circumstance that is reflected already in Aristotle's employment of rhythmical notation and musical terminology when distinguishing between rhetorical functions and genres.

However; before going into detail about the musical aspects of Greek rhetoric and its renaissance in baroque music rhetoric, it might be a good idea to give some examples of musical processes now. Not only will this serve to substantiate the idea of a category of autonomous and musical behavioural gestalts. It will provide a better basis for the discussion whether the concept of 'rhetoric' is really a suitable label for the stage of ego-dynamic gestalt formation which is currently under discussion.

The most fundamental and obvious examples of gestalt formation at this level, if not always included among rhetorical concepts, are *questions* and *answers*. It is a narrow line between questioning and answering and animal *begging* and *compliance*, but to the extent that they involve some kind of voluntary prospective reflection at least, they might be seen as products of metacognition. They seem to saturate all modalities of thought, usually in the shape of muscular or melodic tensioning and relaxation, which, as has already been argued, is more than a nonverbal expression of these functions, it is their core dynamic substrate, without which we would hardly have any consciousness of questioning or answering in the first place.

In some cases we are even raising the pitch of our voices, or lowering it, without accompanying it with words at all; when wondering if something is up, brushing it aside, or calming someone down. It is a subtle aspect of communication, reminiscent in many ways of animal vocalisation. For millions of years it might have been our main means of communication. It still penetrates our discourses, as a medium in which the ego-dynamic functions are realised. It is so integrated in us that we do not see it. Yet we must try to distinguish it now, from the larger field of rhetoric.

There are many other functions of this dynamic, of course, which, like questioning, might also manifest their function without referring to anything extrinsic. It may be difficult to grasp how this dynamic is sufficient to create its own rhetoric or drama in the absence of references to any kind of extrinsic subject matter, but especially in processes dealing with harmony it has its own content so to speak: affirming, challenging, and reaffirming the experience of harmony, which is intrinsically related with important existential factors like faith, communion, and optimism, if only at a general or abstract level. To the extent that our lives are liberated from more basic and metabolic struggles, this autonomous dynamic, concerned with the entertainment, encouragement, and realisation of ourselves, is very much what our lives are

centred around. And if sound is the most subtle medium for sensory and behavioural enrichment, and the most diverse in terms of opening up for states beyond the restless dynamics of foraging and other struggles, it is no wonder how it has come to take the centre stage of modern culture. Our lives are nowhere richer than when in the modes of playing, singing or listening to music. It is a field of activity that could capture our attention for a lifetime without ever exhausting its potential for development and enrichment.

When that is said, even song may relate to more prosaic and factual problems. The relationship between text and melody is basically the same within the spoken and sung modalities of feeling and communication; with the exception perhaps that even when a song is accompanied by words we seem to demand that it has a high degree of coherence independently of the text, making it meaningful even to those who do not understand the language. Unlike ordinary speech melody, which is such an integrated part of us that it often seems to elude our conscious attention, there is something about harmony and rhythmical regularity that captivate us and tend to overshadow any factual concerns. It is apparently the aesthetic experience and the celebration of harmony that is the *raison d'être* of this activity, not the mere conveyance of factual information, thus it is also putting a higher demand on its intrinsic organisation. Even in poetry which is not sung this seems to be the case.

To exemplify such a process then, let us imagine a person humming or improvising, going through a period of initial *indecisiveness*, *fumbling* with certain melodic whims or ideas, *hovering* between different motifs, before deciding to go for a certain motif, *affirming* it by making a complete cadence or *full close*, which dialectic is extraordinarily effective in tonal music. By contrasting intervals or chords which are either *challenging* the tonal (and mathematical) centre or *foreshadowing* it (by fitting into the lowest part of its harmonic series) at the same time as it is *conflicting* with it (containing the 'leading tone', which is only a half tone away) there is created a sense of tension and resolution which, even if has no factual content, could hardly be matched by less harmonious types of rhetoric. It is easy to understand how it has acquired such a central position in religious worship and liturgy. It seems like a perfect example of Hegel's interpenetrating opposites. Certainly gesture and other modalities of feeling might contain it - if Hegel is right, dialectics penetrates everything - yet it is nowhere as conclusive and explicit as in tonal music, which is incorporating in an inter-personal medium the reference of live harmony.

Having thus 'set the tone' and established a certain way of *rejoicing in harmony*, which is always entailing a specific key note or tonic, the person is ready to embark on a more extensive line of musical argumentation, *insisting on* this affirmation of harmony by making it longer and more *elaborate* or shorter and more *punching*. Or to be more precise: it is the constant interplay and contrast between these factors that makes for interest and intensification. The same holds true for contrasts between loudness and softness; the *raising of ones voice* is only effective on the background of soft-spoken-ness. A similar effect is created by suddenly *dampening* the volume, as if switching to something *absentminded*, *thoughtful*, or *secretive*; the exact character of the contrast depending on rhythmical, articulative, and other factors. If the articulation is 'tightened' there is nevertheless an aspect of real intensification going on.

More essential to the progression, however, is the introduction of antithesis and doubt in the shape of *tonal deflection*, *uncertainty*, *indecisiveness*, *hesitation*, *interruption*, *confusion*, or *active contradiction*, all of which are serving to make the sense of harmony and assurance even stronger when it returns. Even if the person, humming away, is not aware of what is technically going on when humming, the process is typically alternating between cadences which are more or less conclusive and complete, sometimes including so called interrupted or 'disappointing' cadences, or modulations to more or less related keys.

A primitive example of such modulation, more typical of humming perhaps, is the *wavering* or *swerving* into contrasting keys, before *finding back* by managing to establish a firmer sense of tonality. It is also observable in children's spontaneous and seemingly ubiquitous 'teasing songs', constantly *gliding off pitch*; which is not necessarily an indication of imprecision on the part of the singer. A child or a person humming or whistling is seldom concerned with perfection. Rather this might be an example of ordinary intonation penetrating into the realm of song: a *hybrid dynamic* as it were. Since the keys reached in this manner are approximate in terms of pitch but remote in terms of tonal affinity - the keys laying only a minor second or less apart - one might say that it is containing both tonal and atonal elements. In a certain sense this dynamic might even be more complex and beautiful than more disciplined song, since it is capturing a more intuitive and wider range of auditory feeling.

Even the long-range functions of this rhetoric might be different in humming than in ordinary song. Our attention span and concentration is not as high then, so rather than consciously

embarking on a *chorus* or *development section*, it might be better described as fading into *absentminded fragmentation* and chaos for a while. The psychological reasons for these contrasts, however, may not be so different: after a while the process of focussed assertion and rhetorical intensification is inevitably becoming *boring* or *wearisome* to some extent. One might need some time to 'digest' it, or contrast it with something more *relaxed*, although such contrasts do not have to be relaxed in every possible sense. While in a classical sonata 'development section' the activity could be relaxing or *recreational* in some senses, it might well be intensifying in other respects, possibly giving free rein to digressive *fantasy*, *wonder* and *romantic longing* which may be curbed during the rhetorically more argumentative and strict exposition.

In humming, the contrast with the focussed exposition would be less articulated yet, possibly a mere reduction in activity, or a turning to something entirely different. Even ordinary speech melody may serve as such a contrast and relief then. This we can observe in certain types of music theatre as well, such as operettas and musicals. It is as if this spoken modality of mental dynamics, which is intrinsically more restless than song, is nevertheless more relaxing now, by dint of it providing some change and physical rest.

But even relaxation becomes tiring in the long run, and a need for 'picking up the threads' is gradually arising, reaffirming the argumentation by *recapitulating* it, or trying to remember the previous melodic snippets or statements. These melodic statements might well be *reinforced* now, because they have been given time to establish themselves in the neural circuits, or because they are serving as a refreshing negation of the previously more recreational and in some cases more tense or intense modalities of tonal affirmation.

As such processes develop, however, there seems to be a general tendency towards a greater amount of recreational or celebrating activity even within the argumentative sections, that is to say: a looser, more repetitive, and *jubilant* delivery, favouring so called 'sequences', as well as *cantabile* passages. Especially in *codas* this can often be observed.²⁹ Having asserted and recapitulated a certain statement, there is little left to do than *playing* with it and *celebrating* it; if not at the very end of the work or activity, which is often calling for a more articulated

²⁹ All these rhetorical and discursive functions are discussed and supplied with examples and music notation in Steinar Bang, *Psychologizing Music*.

conclusion. Certainly the music or the humming might simply disintegrate or fade away, but if one wants to settle the discourse in a more definitive manner it has to be rounded off by a more decisive cadence. Even a person humming or whistling might get the idea of trumpeting such a cadence, as a signal perhaps, that: all right, now it is time to do something else.

More curious yet are the *social aspects* of music rhetoric, which seem to be less prevalent in humming and whistling than in other types of musical activity. There is something highly private and emotional about humming; a symptom perhaps, of the growth and individualisation of urban societies, leaving little room for spontaneous *collective meditations*. Some people may whistle in a shop or on the workplace, and it is often tempting to join in; but few people dare to do so, probably because it feels like intruding into their intimate personal spheres. Children and mentally deranged people might do it, or drunk people once in a while. Perhaps some married couples are humming together. In more preindustrial cultures the collective improvisation of *work songs*, *shanties*, and other expressions of enjoyment or grief is probably more common. In western societies it is often limited to instrumentalists specialising in rhythmical music and improvisation. Especially in free jazz and avant-garde improvisation the aspect of socio-emotional interaction is taken to unprecedented levels, developing complex collective narratives and emotions, all of which is highlighting the importance of such music.

5.2.2 Adding character and valence to the rhetorical gestalts

The above mentioned rhetorical gestalts are all composed by feelings or sensations. In fact, all conscious experience is consisting of such sensations. At the same time many of the mentioned functions - such as *assertion*, *affirmation*, *confirmation*, *question*, *interruption*, *development*, and *recapitulation* - are also abstracted from concrete cases, or they do not rely to a great extent on arousal or intensity, which is probably why they are not usually classified as emotions but often labeled as 'cognitive'. They might more easily be classified as 'intellectual emotions' or 'ego-dynamic gestalts', and it is first when their *character* is also taken into consideration, or when they are supplied with a more intense background of *mood* or *arousal*, that they are starting to conform to more traditional definitions of emotion.

It goes without saying that the musical activity of *affirming harmony* will always be dominated by positive valence. The fact that tonal music is preoccupied with harmony will

inevitably put its stamp on all the above mentioned functions, making them radically different from more mundane working day rhetorical and emotional functions. This is also the finding of Marcel Zentner and colleagues' comprehensive study, steering clear of what they are referring to as 'the procrustean bed of canonical emotion labels'. Feelings like guilt, shame, jealousy, disgust, contempt, embarrassment, anger, and fear were 'practically never aroused by music'.³⁰ At the same time, there is obviously plenty of room for subtle variations within tonality, tilting the experience in the direction of ecstasy, melancholy, or agitation, as well as a whole universe of nameable and unnameable nuances providing the character and identity of different styles, melodies, and songs.

What is so peculiar about many of these *musical emotions* is that they are in reality a mixture of *soothing* and *bemoaning* elements. As pointed out by Zentner and colleagues: musical 'sadness' is not a sadness that make people turn off the radio or 'purge their CD collections of sadness-inducing albums'. Music rated as fearful or sad still tends to produce positive affect.³¹ This is a dialectic which may go a long way towards explaining the power of music. It is first in perspective of pain and sorrow that harmony is really gaining relevance. Similarly, the sense of grief might also be reinforced by being put in perspective of the experience of social communion, which is another aspect of harmonious music, opening up for catharsis through lamentation, at the same time as it is providing hope and collective support.

What Arnold Schoenberg called 'pantonal' music or 'musical prose' is obviously approaching the 'trivial' emotions to a greater extent, if not totally so. Whether tonal or pan-tonal, the very act of *sustaining the tones*, what is usually referred to as *singing*, will still be suffusing this rhetoric with a certain restfulness. It is providing a certain attitude to the narrative, typifying in singsong recitation, 'Sprechgesang', and atonal song, the relative calm and distance of a narrator. Or to put it differently: the prosody is characterised by the pleasurable process of entertaining people by reading or telling an exciting story; which is also containing conflict; but ordinary thinking and discussion is tense in a much more acute and abrupt manner. The emotional modality of storytelling is reflected first of all in a different, more *sing-song* type of intonation. The tone of recitation, atonal song, or so called 'Sprechgesang', is not entirely mundane then, but transported

³⁰ Zentner et al., 'Emotions Evoked by the Sound of Music', 495 and 500.

³¹ Zentner et al., 'Emotions Evoked by the Sound of Music', 513 and 496.

to a slightly detached, metacognitive and artistic realm, where the local activity is mediated in a top down manner by functions like narration, mystique, and entertainment.

It is first in ordinary speech melody and emotional vocalisation that the tonality is thoroughly negated, giving free rein to manifestations of raw agony, as in *yelling*, *shouting*, or *groaning*. Nevertheless, let us concentrate on the typical musical or harmonious emotions first, to see what happens to the above mentioned rhetorical gestalts when supplied with more valence and intensity.

Although the character of the music is integrated in its constitution, as notated in the score, it has to saturate those subtle aspects of performance which are not possible to notate as well, which is why it is often verbally indicated in the score or in a title, making it easier for the performer to re-enact it. In keeping with the classical tradition, a piece of music is typically labeled with Italian words like *maestoso*, *gusto*, *furioso*, *doloroso*, *lamento*, *giocosso*. Even the concepts of musical styles, genres, and sub-genres are often revealing something about their character. Only within the category of rock there are sub-categories like, *funk*, *punk*, *soul*, *glam*, *trance*, *psychedelic*, *thrash*, *grunge* and so on. In a global perspective the amount of musical styles is literally countless, and the distinctions are extremely subtle in many cases. The fact that people find these subtle distinctions useful, and that they are able to distinguish between them, says a lot about the precision and objectivity of musical perception.

When speaking of a certain phenomenon - and even more so: a class of phenomena - an agreement about the distinguishing characteristics of these phenomena has necessarily to be shared among the participants; if not the concepts would not be understood. Nor would they be useful as communicative tools. It is only when the distinctions conform to what they describe that they could be applied on an objective basis. Which does not conform, of course, to private associations, or to descriptions which do *not* conform to what they describe. An extreme example of this is researchers demanding their subjects to analyse a piece of music according to preconceived checklists of what they believe to be 'basic emotions': categories like *anger*, *fright*, *sadness*, or *disgust*. Since the joint affirmation of harmony is seldom about anger, fright, or even unalloyed sadness, the result would obviously be dismal. None of these concepts would readily apply to tonal music. In lack of better emotional labels, they might sometimes be used as metaphors; but they are not very precise.

It is essential to stress that music, in the narrow sense of tonal and pan-tonal music, is different from other modalities of intonation and ego-dynamic gestalt formation, which is also making the emotional content different. The combination of harmony and melancholy has already been described as being unique to many musical emotions.

But if these musical emotions are really as unique and important to us as is indicated above, is it not reasonable to expect that even this *uniqueness* is reflected in our languages, providing the musical emotions and rhetorical modalities with their own labels? Certainly, concepts like *song*, *dance*, *jubilation*, *laughter*, *music*, and *harmony* are already serving as such labels. There is no *song* outside the auditory domain, and no laughter without regular rhythm. At a lower level of generality, fundamental dichotomies like *major* and *minor* are often serving to divide the realm of tonal music into two categories, the one tending towards joyfulness, the other towards something slightly melancholy. Less technically sounding are the German concepts 'Dur und Moll', which are sometimes even used as metaphors in other fields when talking about such contrasts. The experience of 'Moll' is created by the slightly inharmonious minor third, which is by no means a sufficient factor to create melancholy or sadness, but if pulling in the same direction as slow tempo, dragging rhythm, and dissonant suspensions, it may turn the rhetoric into something more precisely called a *nocturne*, a *blues*, an *elegy*, a *lament*, a *threnody*, or a *requiem*. These are rhetorical phenomena, which are first of all associated with an auditory and tonal realisation. So a recognition of such musical emotions and musical modalities of rhetoric is not lacking in our common vocabularies. But is this all?

Let us consider the instance of *naivety* and *simplicity*. There is something potentially lulling and safe about tonal music as well, especially if it is combining rhythmical simplicity and calm with an emphasis on the simplest melodic intervals, like fifths and fourths. There is a strong and predictable 'gravitational pull' in these intervals, at the same time as they are approaching the octave in terms of qualitative simplicity and purity. And if adding elements like optimistically rising pitch and spellbinding or calming rhythmical repetitiveness, the rhetoric is no longer an abstract process of affirmation, but something better described as a *children's song*, a *lullaby*, a *berceuse*, a *cradlesong*, a *ditty*, or a *nursery rhyme*.

Similarly, if we add *vigour*, *zest*, and *animation* to the music by making it more vigorous, zestful, and animated, the musical rhetoric obviously becomes more *vigorous*, *zestful* and

animated. If it is very steadfast and energetic it might serve as *cheering*, which is a central ingredient of most sporting events. Even more unique to music is the concept of *applauding*, expressing *revere* by rhythmical *clapping*, which is intensified by *standing ovations* and clapping in unison. It might not seem very rhetorical, but it is undoubtedly beyond the mere attitudinal and egocentric expressions of most animals.

The music may even be *ecstatic* or *elated*, although this might demand more in terms of total bodily involvement; including factors that are not implicit in the auditory dynamic. The concepts of *jubilation* or *exultation* comes close to what is going on in such cases, and 'exultate' and 'jubilate' are often serving as titles in sacral music, denoting specific psalms or works. Nevertheless, the english language is not particularly rich in uniquely musical concepts of joy. The concept of 'lilting' may be such a word. It is a joyful and purely musical aspect of rhetoric, but it is not very common. One reason for this may be that singing and dancing are already serving as such concepts. It is a hypothesis that is confirmed at least by the concept of *singing and dancing with joy*; as if singing and dancing were already established as the epitome of joy.

Joy might well be the only 'basic' emotion that is truly musical, or one might put it the other way round and question its status as 'basic'. It is doubtful whether most animals experience joy in the same sense as humans are doing. Certainly they are not 'happy' in the sense of reflected contentment, which is how we often use this concept. Perhaps playing and smiling is sufficient to classify as joy - and some dogs and monkeys certainly do this. When it comes to more active *rejoicing*, however, it might well be musical all along, related as it is, with rhythmically regular cheering, clapping, and breaking into song. Wolves and birds may reach transcendental bliss in singing, and *tail-wagging* is also rhythmically regular to some extent; but then we are already into the sphere of singing and rhythmical regularity.

Related to such joy and bliss, and even more central to the uniqueness of musical emotion perhaps, are experiences concerned with *solemnity* and religious *awe*. As pointed out by Johann Gottfried Herder in his book *Kalligone*, there is no other concept that better captures the essence of musical sentiment than 'awe'. It is also serving, he argues, as the dominant subject matter of autonomous musical works.³² Herder's idea may seem far fetched, but is partly confirmed by another subclass of common musical vocabulary. If dominated by factors like *gracefulness*,

³² Johann Gottfried Herder, *Kalligone*, Zweiter Theil (Leipzig, Johann Friedrich Hartknoch, 1800), 171.

steadiness of rhythm, and *firmness of resolution*, the musical argumentation or rhetoric would get the character of a *hymn*, a *chorale*, a *psalm*, or a *carol*. If we add some *pompous*, *enthusiastic*, and *powerful* elements as well, it might serve particularly well as an *anthem*.

The fact that we have developed all these unique concepts to capture the musical modalities of rhetoric is obviously confirming the reality and importance of musical sentiment. Not only do these concepts bear witness of the richness of musical emotion; some of these categories, like *cradle songs*, *carols*, *chorales*, *cheering* and *clapping* are important and longstanding institutions in human social life. The labelling of them as instances of 'music rhetoric' and 'musical emotions' may seem strange to biological nativists - refusing to accept anything but some primeval and animalistic feelings - but these experiences are real; they are deeply felt, and they have no existence outside music.

In other words: the problem with explaining or accepting the objectivity of these states might be related less with their empirical reality than the tendency of reductionist or formalist researchers to repress them or distort them to make them fit into preconceived theories about emotion. It is true that some of the above mentioned distinctions, like the distinction between psalm and carol, are alluding to textual and extramusical matters - which is why a concept like 'carol' will not be included in the list of immanent ego-dynamic gestalts presented below - yet there is a core of solemnity, firm assurance, and jubilation in such psalms, which is unique to music rhetoric. Reciting poems about different religious festivals does not come anywhere close to the qualitative identity and feeling of carols.

This is not to say that music is only concerned with harmony and joy, and that sound may not be a source of more intense *negative valence*. On the contrary, many categories of musical conflict, like *dissonance*, *noise*, *shrillness*, *screechiness*, *discord*, *disharmony*, *cacophony*, are as conflicting as it gets. In fact, sound seems to have a forte even when it comes to dissonance and noise, which could be exploited in *horror music*, adding horror and suspense to films which would otherwise be perceived as relatively neutral. In rock music, the component of timbral *roughness* and rhythmical banging, will necessarily modify the otherwise harmonious music in the direction of something rough and banging.

So explicit is this auditory discord that other fields are often pointing to it as analogies or metaphors when they want to shed light on other types of conflict and disagreement, like the

modern concepts of 'cognitive and cultural dissonance'. And this is not all; these sensations may be intensified to the level of being almost *unbearably loud* if needed. The acceptance, use, and relative intensity of such means of expression may vary, but that is not altering the fact that the loudness and shrillness is always intrinsically loud and shrill.

At a much subtler level, tonal music has a large repertoire of so called *subdominant chords*, *dominant chords*, *secondary dominant chords* and *tritone substitutions*, containing minor or major sevenths, ninths, elevenths, suspended fourths, added sixths, augmented fifths, diminished fifths and sevenths, and omitted roots, in all kinds of 'positions' (with different tones serving as bass or top tone). These are the 'technical' correlates of feelings which are shading the *antithetical functions* in different directions. For instance, it is probably the lack of affinity with the tonic that explains why a tritone substitution or a dominant in lack of root is more frequently used as a *secondary dominant* than as a dominant proper, the latter of which is not merely *contradicting* the tonic but *foreshadowing* it as well.

More relevant to the discussion of mood, however, is the contribution of chords to valence and ambiguity: the *dissonance*, *suspense*, and tonal *ambiguity* created by dissonant, suspended, and tonally ambiguous intervals. By adding conflict to hesitation, indecision, or anticipation, one may modify the ego-dynamic gestalts in the direction of *frustration*, *doubt*, *suspense*, and *longing*. As for *tonal ambiguity*, this is created by equidistant intervallic relations like augmented triads, diminished seventh chords, whole tone scales, or chromaticism. These features may constitute brief moments of tension and tonal *uncertainty* in harmonic progressions, but also characterise longer stretches of music, like in the last movement of Beethoven's piano sonata opus 54, interspersing the ecstatic polyphony with periods of *imbalance*, *confusion*, and signs of *dizziness*.³³

Further along the rhetorical process, more long-term mnemonic nesting also comes into play, like when a previous statement is revisited with a certain melancholy which, given a certain context, might be experienced as an instance of *resignation* or *nostalgia*. Like many other emotional concepts these concepts are not specific to music, but nevertheless general enough to cover musical resignation or nostalgia as well. But here we are already into the category of

³³ Bang, *Psychologizing Music*, Part Four, Chapter 9.

dramaturgy, which might be posited as a higher level of complexity and emotional gestalt formation.

A *conclusion* or *coda* is also part of longer process, although it is difficult to exclude it from the field of rhetoric. Its contextual demands, however, are not necessarily so high. The impression of *finality* or *decisiveness* may be created even by fairly local factors, like when a lot of power, rhythmical decisiveness, and accent, is added to a cadence, turning it into something that is intrinsically *triumphant*, or at least very *confident* and *assured*, leaving little more to say. The concept of 'triumph' might seem closer to a metaphor, since music is seldom triumphant in a military sense, except in some marches perhaps. Yet it might be flexible enough to cover a more 'abstract' triumph as well, like a triumph of harmony over conflict and doubt.

There are thousands of ways to end a piece of music, each fulfilling a certain rhetorical or dramaturgical function, which is often difficult to describe in words. It may be *decisive*, *sudden*, *abrupt*, *surprising*, a *flourish* of elated improvisation, leaving room for *afterthought*, introducing conflict, *questioning everything* that has happened, *leaving everything open*, or *leading on* to something else. Some of these are better discussed in the chapter on dramaturgical and philosophical comprehension.

5.2.3 Social aspects of rhetorical gestalt formation

When it comes to the *social* aspects of rhetorical gestalt formation, even these social functions could be valenced and intensified in different ways. Obviously the concepts of anger or strife have little relevance to the business of affirming harmony. Singing and playing together is basically about *cooperation* and *communion*, which as earlier mentioned, might be one of the prime reasons why song and dance developed in the first place. It may be feared by dictators, yet it is not itself about fear. On the contrary, these are uniquely harmonious states of mind, so there is no surprise that the concept of *accompaniment* has taken on such a unique and central role in musical terminology. Also there are several 'philharmonic' - or 'harmony-loving' - concepts in the English language, denoting different aspects of musical communion in *symphony*, *polyphony*, *heterophony*, or *counterpoint*.

Especially the concept of 'counterpoint' is interesting in this regard. It is a rhetorical category that is uniquely musical in the sense that it makes it possible to pose several points or statements

at the same time; in several layers in fact; or overlapping in different ways. It may serve as a perfect metaphor when other fields need to refer to matters which also reflect upon each other in a simultaneous manner; which is not excluding the possibility, of course, that even in tonal music the comments may be *dialogical* to some extent. The friendly 'battles' between jazz soloists are examples of this, or the *antiphony* in Giovanni Gabrieli's canzonas, alternating different choirs or sections of brass players, which are also differently *located* in a church. Gabrieli was also the first to specify different *dynamic levels* going into this dialectic.

The *valence* of such harmonious social interaction is obviously on the positive end of the spectrum, which however, is not without nuance and contrast. The categories of joyful interaction in tonal music have few parallels in ordinary life, but it may be possible to describe it in some cases as *tenderness*, *enthusiasm*, or *support*. According to the study of Marcel Zentner and colleagues, words like *moved*, *enchanted*, *wonder*, *tenderness*, *nostalgia*, *dreamy*, *relaxed*, and *sublime* were favoured picks when it came to people's experience of harmonious music. Concepts like *amazement* and *peacefulness* were limited to jazz and classical music, whereas popular music was more 'vital'. They also found that all these moods 'tend to occur in a blended manner most of the time'.³⁴

More articulated, social, and specifically musical concepts like *major*, *minor*, *swinging*, *rocking*, *cheering*, and *applauding*, were not treated in this study. Typically such characteristics are too obvious to be noticed, or they may not fit into preconceived notions of emotion as something that is mood-like, purely 'inner', and different from its own expression. A musical statement might also be socio-emotional in the sense of *intruding*, like when a jazz soloist is 'horning in' with a dissonant suspension to get the attention, before resolving it. It might also be possible to *overpower* ones fellow musicians, to *be out of tune with* them, to *neglect* them, *disturb* them, or *interrupt* them. Certainly these are central ego-dynamic and emotional categories.

To say that there is irritation or anger involved would go too far, as it is clashing with the core function of joint jubilation. Singers displaying anger towards fellow singers is comical, because it is intrinsically contradictory. Perhaps the habit of children *teasing* each other with pentatonic melodic snippets goes further in the direction of anger. A certain grimace or distortion of timbre

³⁴ Zentner et al., 'Emotions Evoked by the Sound of Music', 506 and 514.

may tilt the expression in the direction of aggression then; yet it is probably still within a playful and harmonious attitude. A mob does not sing to its victim. Also it might seem to demand extramusical reference and text to some extent, like when expressing 'schadenfreude' over something: 'you don't have what I have'. Yet even when such references are removed - when we cannot grasp what is said - the intrinsic musical factors may be sufficient to constitute the impression of *sarcasm*, *jocular*ity, *teasing*, or *poking*.

Even in narration and singsong recitative there is harmony. It is not natural that there should be any real conflict between cooperating narrators, although one might cooperate, in a setting of free improvisation or as part of a composed work, to illustrate such interaction. If letting go of the preoccupation with harmony, however, like in ordinary speech melody, there is obviously room for all kinds of raw *strife* and *clash*. Much of the integrated unity falls apart then, which is one of the reasons we call it 'life' rather than music. Yet it is possible to combine this realism with harmonious or rhythmically regular elements in different ways, saving elements of collective rhythm while the rest is characterised by cacophony and joint aggression; like when an aggressive mob is banging or shouting in unison. Even classical opera is a hybrid of such elements, alternating between *recitatives* and *arias* to drive the narrative forward.

To the extent that their functions are constituted by melodic and rhythmical components, these are all modalities of music rhetoric in a wider sense. Even ordinary intonation may be considered a category within this field. The addition of auditory tension and loudness, abruptness, softness, or roughness, may turn a 'neutral' statement into an instance of *contempt*, *seduction*, *soothing*, *pleading*, *commanding*, *resisting*, or *protesting*. There might not be a text here, or a text that is understandable, yet there is seldom much doubt about the intentions. At least there is a considerable room here, for inter-human communication at a cross-cultural level. These feelings might not be 'universal' in the sense that individuals or peoples from different nations are pleading, commanding, or protesting to an equal extent, but this has more to do with individual differences and cultural conventions than pleading, commanding, or protesting not being universally perceived as such. As we will come back to in later chapters, we are dealing with different senses of the word 'universal' here.

Going further in the direction of intensification one may resort to *yelling*, *shouting*, and unconstrained *wildness*, which may turn the discourse into an instance of *anger*, *desperation*, or

hysteria. The question then is whether one is rather relapsing into a lower level of gestalt formation. This might not always be the case, as there is often a lot of reflection and metacognition in desperation, at the same time as it is combined with more automated and visceral, if not exactly hard wired or instinctual responses. In any case, there is little doubt that loudness, timbre, and pitch, make considerable contributions to the intensity and roughness of the discourse in these cases. Even when it is extremely subtle, merely *raising ones voice* or formulating something in a slightly *exaggerated or twisted tone*, this may be enough to cause offence or suspicion of dishonesty or *irony*. Conversely a *dampening of the voice* might be sufficient in many cases to calm a dispute.

Whether mood and behaviour is really as dissociable as indicated in the above discussions has to be determined by neuropsychological investigations. If it is a central dichotomy it is likely that this is reflected in the brain as well. As already mentioned, there are indications that the behavioural aspects of emotion are nested in lateral regions of the neocortex, while many motivational factors, like mood, value, and autonomic reinforcement are more medial and subcortical.

Yet it is not always obvious that mood or motivation as monitored in the medial frontal cortex is more 'visceral'. There might well be aspects of mood and motivation that are almost entirely harmonic or *aesthetic*. For example, there is a study of Petr Janata and colleagues demonstrating how the medial frontopolar cortex is mapping the modulations between different keys;³⁵ which is not very surprising, since even when these modulations are familiar, they are typically charging the transitions between keys with a peculiar sense of 'freshness' or harmonic 'ambivalence', lasting for several seconds before a new key is established. Whether this freshness is entirely independent of visceral reinforcement is not clear. The amount of sensory integration in the brain is so extensive that it may be difficult to disentangle it; but the character of these feelings seem to depend to a large extent on the *affinity* between the keys, and the question whether the modulation is going towards the *tenser* dominant or towards the more *relaxing* subdominant. It is not possible to isolate these feelings from auditory experience.

³⁵ Petr Janata et al: 'The Cortical Topography of Tonal Structures Underlying Western Music', *Science*, Vol. 298, No. 5601 (13 December 2002): 2167-2170, <https://doi.org/10.1126/science.1076262>.

Conversely, there might well be instances of articulated behaviour that are more visceral than some aspects of mood. Especially vocal behaviour, engaging breathing and the larynx, is already 'visceromotor' to some extent, which might be reflected in the co-activation of the frontal operculum and the anterior insular cortex.

Other factors that may go into the emotional amalgams are feelings of *liking* and *loving*. These phenomena are often confused with aesthetic experience, but might be dissociated from it in imaging and lesion studies. Here research like that of Tomohiro Ishizu and Semir Zeki, locating aesthetic liking to a region of the ventromedial prefrontal cortex right in front of the anterior cingulate cortex, will be central.³⁶ Similarly the role of autonomic *reinforcement* and *arousal* has to be determined. Especially phenomena like *chills*, *goosebumps*, and *shivering down the spine* are often associated with musical experience, which might suggest some kind of facilitated link between auditory phenomena and the so called pleasure centres of the brain: especially the 'nucleus accumbens'. Indeed, this is a hypothesis that is confirmed by experiments and lesion studies.³⁷

5.2.4 Rhetorical gestalts versus higher level gestalts

The visceral and autonomic aspects of music and emotion in general will be treated in a separate chapter on the medial prefrontal cortex. It is more pressing now, to try to distinguish the rhetorical gestalts from higher level gestalts. As previously indicated, the rhetorical figures are not the only behavioural gestalts that may be supplied with character, valence, and autonomic reinforcement. There are also more complex levels of gestalt formation, where the rhetorical figures are participating as subordinate elements in more complex and long-range reflections. Some of the rhetorical functions, like *recapitulation* and *coda*, may already incorporate episodic memory to some extent, so one might argue that the distinction between rhetoric, narrative, and dramaturgy has more to do with differences in genre or overall function than with different levels of action chunking and complexity. Certainly we have no clear-cut or unambiguous

³⁶ Tomohiro Ishizu and Semir Zeki, 'Toward A Brain-Based Theory of Beauty', *PLoS ONE*, Volume 6, No. 7 (6 July 2011), <https://doi.org/10.1371/journal.pone.0021852>.

³⁷ Noelia Martínez-Molina et al., 'Neural correlates of specific musical anhedonia', *Proceedings of the National Academy of Sciences USA*, Volume 113, No. 46 (31 October 2016), <https://doi.org/10.1073/pnas.1611211113>.

See also Psyche Loui et al., 'white Matter Correlates of Musical Anhedonia: Implications for Evolution of Music', *Frontiers in Psychology* (25 September 2017), <https://doi.org/10.3389/fpsyg.2017.01664>.

terminology for these levels. It depends to a large extent on the manner in which the words are used. Yet there are some differences between these concepts that might make some of them suitable as designations of different levels of behavioural nesting.

At first glance, a rhetorical process or lecture might seem more complex than a drama. It is an intellectual pursuit, with a high degree of autonomy, which is not present in all dramas. In the case of most animal action and interaction at least, the process is basically sequential, with little amount of long-range reflection and roundedness. It might be very dramatic, and even appear like a drama proper, but there is no overall disposition, like in a lecture or speech. Even in symphonic poems and the melodramas of Arnold Schoenberg, the action seems to be driven by some extrinsic triggering events, if only in the shape of a haunting memory which is suddenly thrown into the process. It does not seem logical at first, that such trouble should be a product of personal autonomy.

This is seemingly in contrast with an argumentative process, where the rhetorician is often introducing rhetorical questions and counterarguments for the sake of reinforcing a statement. What is fairly obvious, at least, is that rather than being driven by feedback from people and extrinsic circumstances, the rhetorician seems to be preoccupied with his own reasoning to a large extent, freely disposing his lecture according to pedagogical principles. Since the affirmation of harmony in tonal cadences has even more rhetorical power and decisiveness than ordinary intonation, it is no surprise that music and the classical sonata in particular, has often been posited as the epitome of such autonomy. As we will come back to below, it is a rhetoric that is at its most powerful and intricate in Beethoven's music, whose symphonies have often served as models for later composers who were concerned about musical autonomy. So if autonomy is the highest criterion of an integrated self, doesn't this imply that rhetoric should figure higher in the hierarchy of ego-dynamic gestalts as well?

The situation is not as simple. As argued in connection with Hegel's critique of modern music, the incorporation of angst and disruption in mental processes may challenge the self, and demand more of it, not less; at least if it is to be integrated into a personal narrative that is consistent and rounded. This is the difference between animal drama and drama proper. The rendition of animal life in animal documentary films as dramatic stories is artificial and

anthropomorphic to a large extent: a product of creative editing and commentary. A human life or drama is much more complex. In fact, it is where the *complex emotions* are produced.

Furthermore, the object of Hegel's critique, and the praise of later composers, was Beethoven's music, which has already a lot of drama. In fact, this is what separates it from Rococo and Baroque music. The basic means of presenting, questioning, and confirming a musical motif are fairly elementary and local. Symptomatically the Baroque composer and theoretician Matheson's analysis of a sonata by Marcello in rhetorical terms like 'narratio', 'confutatio', 'peroratio' and so on, is focussing on a relatively short period of time. A pronounced sense of musical drama in instrumental works was first introduced by 'Sturm und Drang' composers like Carl Philip Emanuel Bach, of which a dramatic enlargement of the development section was one of the most notable remnants in the following 'Classicist' period. Some of the processes and functions in Beethoven's late period sonatas and symphonies may need up to an hour to play themselves out, which brings us into a different sphere altogether: the sphere of *dramaturgical* and *moral-philosophical* reflection.

The fact is that even these complex and long-range ego-dynamic functions may be manipulated by us. This is exactly what novelists and dramaturgists are doing, and it is radically different from drama in an animalistic sense. Even in traditional fables and fairy tales, conflict is often introduced to exemplify some moral dilemma or value, which is higher even than the dramaturgical functions. Perhaps the level of autonomy in such processes is not so different from more discursive processes after all. Even in a lecture the problems are 'artificially' introduced and manipulated; but they are not necessarily as complex as full-blown dramas or lives. On the contrary, local discourses are often elements of such dramas. The fact that a narrative or drama does not repeat the first part of the work towards the end of a work does not make it less rounded. This is to confuse roundedness with the summary of arguments in lectures and argumentative music. Even narratives may be concluded by alluding to a previous 'theme', or by ending with a feeling of reconciliation which is a product of the previous process. But it does not have to recapitulate the whole story.

From a purely perceptual point of view, the perception of such long range processes and complex emotions, not to speak of the moral-philosophical perspectives evoked by art, is also much more demanding; both in terms of aesthetic training, mental capacity, and memory. It is a

circumstance that could be confirmed by any concert goer, that while it is easy to grasp and even remember a section or transition, it is much more demanding to grasp and reflect on what is somewhat misleadingly referred to as the 'form' of a work.

Whereas it is possible to say that a drama requires and builds on a local level that is 'rhetorical', or concerned with cadences, phrases, and local discourses, the opposite is not necessarily the case. Rhetorical gestalts, at least if understood in the narrow sense of a certain manner of speaking or formulating oneself, could be fairly local. It is fully possible to experience this local activity without grasping the more complex functions into of which it is going.

What is complicating these matters is the fact that in music the lowest levels are brought about in a manner that is always already informed by higher level functions, like the need for *celebration, entertainment, mood-regulation, or religious affirmation*. But again, the perception of these activities, the experience of jubilation or joyous howling, may be grasped at the local level, even by some animals. The conception of a lullaby *as a lullaby* might require a wider perspective, which is even extramusical to some extent; but its calming and soothing properties may be perceived even by an infant or a dog.

So perhaps it is better keep it simple and distinguish between a rhetorical level consisting of fairly local prosodic figures, and a dramaturgical and moral-philosophical level, consisting of more complex and long-range functions, which are not merely melodic gestalts, but products of long-range reflections and contexts as well. It may be difficult to avoid some overlapping between these categories, but the principle should be fairly straightforward.

When it comes to the musical *genres*, they might better be referred to as 'modal tonality', concerned with a relatively *static affirmation* of harmony; 'harmonically dialectical tonality', which is a more *discursive* treatment of harmony; 'dialectical tonality with a *narrative tendency*', like in some romantic and impressionistic music; and the 'musical prose' of atonality, which is *narrative* in the proper sense of the word. All of these modalities may contain both a rhetorical level, and some drama. It is true that the amount of drama is higher or more integrated in narrative music; but when the contrast between tunes, as well as the more gradual buildup of ecstasy, is taken into account, even a rock concert may involve dramaturgy. Especially at a professional level this is often thoroughly worked out.

This distinction between rhetoric as fairly basic and dramaturgy as a higher level, is also a tendency we can observe in Aristotle's thinking, if not consistently so. He is distinguishing between rhetoric and what he calls 'poetics'. His poetics, however, is basically concerned with plays, which were largely sung and written in rhyme those days; and the functions it describes are dramaturgical functions: the *complications* and *reversals* within the larger context of a drama. In his rhetoric he treats much that goes beyond a traditional idea of rhetoric, but it is also the place where more lower level characteristics, like the rhythmical and melodic aspects both of music and speech, are treated.

Chapter 6

Musical Aspects of Aristotle's *Rhetoric*

As mentioned above, it is an advantage that the concept of rhetorical gestalts is connecting to an established field of study; which, however, might not coincide entirely with the idea of a certain developmental stage or level in the hierarchy of ego-dynamic complexity. Historically the field of rhetoric has first of all been concerned with the efficacy and emotional impact of *public speaking*, which, however, is not an insignificant part of intellectual activity. To the ancient Greeks and Romans it was a major discipline, which was obviously connected with the development of democracy and a system of justice. At least there was a minority of male slave-owners or male non-slaves, who were free to enjoy these privileges. Needless to say, these societies were still cruel in many ways, and would hardly have preoccupied themselves with something like rhetoric if it did not give them an actual advantage in court or in political life.

In many ways it was a meta-cognitive pursuit, if not to the extent of being *conscious* of this consciousness, or integrating it in a gestalt psychological understanding of the self. Certainly Aristotle comes close to a gestaltist understanding of emotion when distinguishing between 'form, rationale, and matter', exemplified for instance by contrasting the *appraisal* of anger - a 'desire for revenge' - with some of its bodily symptoms - 'the boiling of the blood' - both of which, he says, are crucial aspects of such emotions.¹ Also he is arranging the nutritive, perceptive, desiderative, locomotive, intellective, and contemplative faculties in a hierarchical manner, placing human beings at the top of the hierarchy.² But it is not clear whether the desiderative and intellective functions are also recognised as a hierarchy of gestalts, organising our consciousness of personal agency and autonomy. Sometimes he seems to imagine the self as a mere onlooker or 'sailor';³ other times - indeed his rhetoric and poetics are elaborate

¹ Aristotle, *De Anima (On the Soul)* [c. 350 BC], trans. Hugh Lawson-Tancred, (London: Penguin Books, 1986), Book I, Chapter 1.

² Aristotle, *De Anima*, II.3

³ Aristotle, *De Anima*, II.1

manifestations of this - he is demonstrating an awareness of all those uniquely mental processes and 'forms' of which our self-consciousness is actually composed.

The soul is 'the first principle of living things' says Aristotle; and he is pointing to functions like *hope, desire, anger, mildness, fear, pity, joy, loving and hating*, which may always be involving physical movements and impressions, but are also referred to as 'peculiar affections of the soul'. Especially this holds for *thinking* - which is also *movement*, he says - possibly presupposing 'desire', like in 'wishing'.⁴ Yet it is not immediately clear to which extent the functions of emotion and rhetoric are thought to be organising thought on a general basis. Certainly the 'organising principles' are believed to operate even within the soul. 'There will be no advantage then in the elements being in the soul, unless these formulae and principles of composition are so too',⁵ he says for instance; but the 'principles of composition' he has in mind may be concerned with the structure of physical objects rather than the structure of lives, discourses, and articulated selfhood.

According to one of the translators, Hugh Lawson-Tancred - who is also referring to the readings of D. W. Hamlyn - the 'mentalist framework' that is sketched out in the beginning of *De Anima* was not followed up in the last parts of this work, and he is talking about 'a failure by Aristotle to realise the full difficulty of integrating accounts of mental life ... into accounts phrased quite physiologically'.⁶ The critique is pertinent, yet this is a failure that might also be on the part of the commentators in some cases, biased by the unfortunate compartmentalisation of body and soul so characteristic of 20th century materialism and nominalism. It is only quite recently that the concept of *embodiment* has gotten a revival - like in neuroscience and the sensorimotor account of cognition and thinking that was so central to James and Wundt.

Moreover, it was probably first with Freudian psychoanalysis - which was also debarred by materialism and nominalism for some time - that the self and its processes really started to acquire independent status; even if Freud is primarily dealing with some long range pathological processes: complications which are heavily, often one-sidedly, caught up with sexual instincts and drives. Freud gives little attention to aesthetic motivation or the wealth of content that is going into normal narratives of life and thought.

⁴ Aristotle, *De Anima*, I.1 and III.10

⁵ Aristotle, *De Anima*, I.5

⁶ Aristotle, *De Anima*, 89-90

As for *de Anima (On the Soul)*, some of its strongest points are rather concerned with what by some is referred to as 'the hard problems' of consciousness. Especially 'the binding problems' of consciousness are described with a clarity here that is hardly rivalled even by modern thinkers like Giulio Tononi and Christof Koch. While Tononi and Koch are making *integration* their main criterion for consciousness, they are challenging it in the next instance, when identifying it with computation, which may not be integrative at all.⁷ 'It cannot be by separate things that we discern what is separate', says Aristotle. There is an *interpenetration of opposites* in perception and temporal consciousness, a 'simultaneous difference', as Aristotle puts it; which is not digital but somehow *transcendent* or inherently paradoxical.⁸ The question of its physiological correlate, which was also vexing the mind of Aristotle, may be easier to answer today, with reference to quantum coherence and entanglement, but some of Aristotle's remarks are already indicative of a holistic or holographic model of consciousness.⁹

The problems of *temporal awareness* and *sensuous embodiment* are central both to the discussion of music and integrated conscious experience, and it is just some of the points where we can trace Aristotle's influence on Hegel's music aesthetic and general philosophy. Sounds are not independently existing objects, says Aristotle, but always 'of something against something and in something'.¹⁰ Moreover, if the sound is also 'sustained varied and articulated', this sound, even when it is produced by musical instruments, could only be accounted for as 'a sound of an ensouled thing'.

Now voice is a kind of sound of an ensouled thing, for none of the things without soul gives voice, though some are said by analogy to give voice, such as the flute and the lyre and whatever other of the things without soul have the production of sustained varied and articulated sound.¹¹

It may come as a surprise to children of 20th century mind-body dualism that Aristotle's description of vocalisation as 'sustained, varied, and articulated' has already more structure and

⁷ Giulio Tononi and Christof Koch, 'Consciousness: here, there and everywhere?', *Philosophical transactions of the Royal Society B*, Vol. 370, Issue 1668 (19 May 2015), <https://doi.org/10.1098/rstb.2014.0167>.

⁸ Aristotle, *De Anima*, III.2. See also I.5

⁹ Aristotle, *De Anima*, I.5

¹⁰ Aristotle, *De Anima*, II.8

¹¹ Aristotle, *De Anima*, II.8

substance than his description of the 'soul' of which the music is supposed to be an embodiment. And it is only a small step to Hegel's realisation that music and emotional vocalisation is actually the place where 'the self-production of the self' is taking place. Certainly this articulated dynamic is an integrated aspect of the self. The fact that such feeling is even more explicit in vocalisation than in gesticulation does not make it less mental: it makes it stronger, even to the person who is producing it.

It is not unreasonable either, to suppose that this embodied and 'articulated' dynamic plays a crucial role in what people like Wundt and Husserl are describing as the 'apperceptive' construction of reality and consciousness in general. That is to say: a sensorimotor perspective against which the inanimate world is also defined. Even relatively fundamental aspects of perception, encroaching on the so called 'hard problems', may rely on such interaction between opposites. There is no point in sensing something if you cannot react to it. On the contrary, it is probably this constant confrontation and interaction of a developing protoself with its surroundings that is carving out a sensory apparatus in the first place, at the same time as it is widening the content and consciousness both of its own self and the outside world.

Yet it is first with the hierarchy of intellectual and social emotions, which are described in such minute detail by Aristotle, that the creature really detaches itself from the immediate sequences of stimuli and response and develop a life that is autonomous even at a rhetorical and dramaturgical level. To date, there exist few treatments of these 'building blocks' of human existence which are more systematic than those of Aristotle. And it is not lacking in analysis of its physical correlates. Especially from a musical point of view it is fascinating to notice how his accounts are often exemplified by, or even modelled after, the theory of music and rhythm in many cases.

In this connection it has to be mentioned that in Aristotle's 'Poetics' - of which only the elementary matters will be mentioned in this chapter - there is a much more fleeting border between the concepts of poetry and song. The concept of 'poetry' apparently had a wider meaning in ancient Greece: usually, if not always, involving song. 'Language unaccompanied, either in prose or in verse...remains without a name',¹² Aristotle remarks. Yet the status of purely instrumental music, like that of the aulos and the lyre, is never questioned.

¹² Aristotle, *Poetics* [c. 335 BC], trans. Malcolm Heath (London: Penguin Books 1996), Chapter 1

However, his treatise on poetics is mainly about the long-range functions of *dramas*, which were partly sung, more akin to our musicals or operettas perhaps. This is the subject matter of a later chapter. But even drama is seen by Aristotle to have its origin in more immediate functions, more precisely in the dialogue between 'chorus' and soloist. Whereas the tragedy 'arose from the leaders of dithyramb' (ecstatic hymns sung in honour of Dionysos), the comedy, he says, arose from 'the leaders of phallic songs'. It was first at a later stage, with the introduction of scene-painting and several actors, that the spoken word got a more dominant role. This was also the time when 'tragedy acquired dignity', Aristotle explains, and its magnitude increased from short plots to dramas proper: 'They used tetrameters at first, because the composition was satyric in manner, and more akin to dance. But when speech was introduced, nature itself found the appropriate form of verse, iambic being the verse-form closest to speech.'¹³

As was pointed out by Aristotle, the distinction between varieties of poetry is not primarily about their 'objects' or content. Aristotle was operating with the concept of different 'modes', like the difference between *narrating* and being an *active agent* in a drama;¹⁴ and the differences are to a large extent seen to be manifested in the musical and dynamic substrates of these modalities. Especially the rhythmical terminology, but also the concept of melodic modes and composition, was highly developed in ancient Greece. This might seem strange today, when language and the self has been for a long time alienated from its kinaesthetic, rhythmical, and melodic aspects. But the knowledge about these matters was apparently higher at Aristotle's time, and it is not so strange that even in his treatise on rhetoric, which is less dramatic and 'poetic' and more concerned with dialectical reasoning, these musical and compositional aspects were still central. As a matter of fact: already in the very first sentence of the introduction of his *Rhetoric* he is drawing upon music theory, defining rhetoric as the 'antistrophe' of dialectics.

The concept of 'antistrophe' is taken from the ode, where strophe and antistrophe are sections sung by two parts of the chorus, the antistrophe serving as a reply.¹⁵ It is an allusion that is sometimes lost in translation, and it is obviously used in a metaphorical sense here; but there are also more literal examples. For instance, when he discusses the amount to which a period of

¹³ Aristotle, *Poetics*, Chapter 4

¹⁴ Aristotle, *Poetics*, Chapter 3

¹⁵ Aristotle, *The Art of Rhetoric* [c. 367-322 BC], trans. Hugh Lawson-Tancred (London: Penguin books, 2004), Chapter 1.1. Here antistrophe is translated as 'counterpart'.

diction should be divided into clauses, the concept of *antistrophes* is mentioned as an example of an *antithetic* style of diction.

Now the diction must be either *extended and conjunctively united*, like the preludes in dithyrambic verse, or *antithetic*, like the antistrophes of the ancient poets. Now the extended style is the ancient one (formerly all, now most, speakers use it), and by extended I mean the one which has no stop within itself, except when the matter spoken of should be completed. And it is unpleasant because of its unboundedness, as all men wish to see the end; runners approaching the turning point pant and grow faint, whereas when they see the end they do not weary before getting there.¹⁶

It is a problem that is common to all communication in the medium of sound, that whether the melody is accompanied by text or merely dealing with its immanent harmony and conflict, like in instrumental music, the division into clauses is just as important, and very central to the comprehensibility and effect of the utterances. As earlier mentioned, the issue is involving dynamic components like rhythm, pausing, breathing, and not to forget: the dialectic of rising and falling intonation. And Aristotle goes pretty far into the psychology of these matters. The 'contracted style', consisting of periods 'having a beginning and end in itself,' is more pleasant and easily learned, he argues for instance. 'It is unpleasant neither to anticipate nor to get through anything'. On the other hand, he says, short clauses often 'make the listener stumble'.¹⁷

These are important considerations, which have a direct relevance to instrumental music and soloing as well. Especially jazz improvisation is comparable to talking in many ways. Like many public speakers, jazz musicians may easily be overtaken by their wish to impress and show off their skills, launching into endless streams of runs and broken chords. The result is often counterproductive, as the performance has no difference within itself, neither emotionally nor by putting the virtuosity into perspective. It is simply boring. Similarly: chromaticism is an almost infinity source of emotional complexity in jazz. But there is always a danger of 'watering down' the tonality too much. The tonality might lose its dialectic then, that is to say: the functions of departing from, foreshadowing, and returning to the tonic.

In proper atonal music the lack of this dialectic and cadencing is compensated for by creating a drama or by contrasting it by periods of tonal music. But there is plenty of music existing in a

¹⁶ Aristotle, *The Art of Rhetoric*, Chapter 3.9

¹⁷ Aristotle, *The Art of Rhetoric*, Chapter 3.9

somewhat problematic no mans land between these modalities: undifferentiated and somewhat chaotic streams of sound which are neither entertaining nor complex. Certainly the perception of rhetorical gestalts also depend on aesthetic training. To a child most music and adult talk is probably chaotic. But it will never acquire meaning if a proper linguistic and musical organisation of these structures is not already in place.

Given Aristotle's influence on the development of this field, and the blossoming of 'music rhetoric' in the baroque area, it is slightly paradoxical that Aristotle was also critical of this tradition. The heydays of rhetoric in Greek culture were already over at Aristotle's time. To most lay men it consisted of little more than a repertoire of tricks and ways of manipulating a listener emotionally rather than by logical reasoning. Needless to say, this was not in harmony with Aristotle's commitment to truth and science. Consequently large parts of his rhetoric is focussing less on traditional issues of rhetorical delivery than its *content* and the invention of *proofs*. Central to this discussion was the 'enthymeme', a more informal form of syllogistic reasoning, depending less on logical necessities than on probabilities and references to character, disposition, appeals to fairness, justness, pity, the prospect of revenge and so on.

Certainly these are also emotions. As is pointed out by H. C. Lawson-Tancred, the rhetoric is the only place in Aristotle's corpus where emotion is discussed in detail.¹⁸ It is a phenomenology of emotions and values, which is both extensive and anthropological in character, discussing everything from *political ideals* to the *pleasure principle* of motivation.¹⁹ However, these are often *social emotions*, most of which are involving extra-personal relations and conditions which could never be manifested in sound or kinesthetics alone. It is fairly obvious that let's say an *insult* or an *appeal to fairness* is only partly or indirectly reflected in the delivery and intrinsic dynamics of a talk. It might be the *object* of a talk, but it is not a part of its autonomous structure as manifested in dynamic substrates like melody and rhythm. It is first in the last two sections of Aristotle's rhetoric, devoted to style and composition, that these more traditional and autonomous aspects of rhetoric are defined and treated. Especially when focussing on articulation the description is concentrating almost entirely on dynamic and *musical* matters.

¹⁸ Aristotle, *The Art of Rhetoric*, 21

¹⁹ Aristotle, *The Art of Rhetoric*, Chapters 1.7 - 1.8

The skill consists in the manner of employing the voice for each emotion, such as when one should use a loud voice, when a small, and when a middling one, and in the manner of using the accents, such as sharp and heavy and intermediate, and what speech rhythms should be used for each subject-matter.²⁰

But even the *composition* of a communicative process is reflected in its dynamic structure. In fact, such composition is what instrumental music is all about. And Aristotle is pointing to four main sections of a speech: *introduction, presentation, proof, and epilogue*.²¹

The functional self-identity and universality of this sequence is made plausible by the almost tautological statement that 'it is impossible without having stated the matter to prove it'. Aristotle also talks about a possible subdivision of discourse into *pre-narration, narration, supplementary narration, refutation* and *further refutation*. The introduction and epilogue are serving basically as 'reminders,' he says.²² Nevertheless, the epilogue is functionally subdivided into '*disposing of the listener, amplifications and diminutions, bringing the listener to emotions, and recapitulation*. 'For after one has shown that one is true and the other man false, it is natural accordingly to praise oneself, criticise the other and round off'.²³

This description of the epilogue may seem evident and prosaic, but nothing could be taken for granted in a confrontation with sophism or its modern parallel: 'postmodern relativism'. Aristotle's argument that *praise* is naturally following *triumph* is difficult to deny, though. It seems to be implicit in the very concepts of these things that praise needs something to praise. And there can be no *rounding off* if there is nothing to round off.

Moreover, the concept of *praise* is described in terms of *amplifications* and *diminutions*. 'When the facts have already been demonstrated,' says Aristotle, 'one should naturally amplify or diminish them.'²⁴ The sense in which he is using these terms may be referring less to dynamic and immanent means of insistence than to more factual matters, like invectives and belittlement,

²⁰ Aristotle, *The Art of Rhetoric*, Chapter 3.1

²¹ Aristotle, *The Art of Rhetoric*, Chapter 3.13

²² Aristotle, *The Art of Rhetoric*, Chapter 3.13

²³ Aristotle, *The Art of Rhetoric*, Chapter 3.19

²⁴ Aristotle, *The Art of Rhetoric*, Chapter 3.19

but also the sheer *amount* of points mentioned, and the illusion of enumerating many things created by reformulating the same statement.²⁵

Since instrumental music is not about factual matters at all - except its own concord and discord - it is only the latter kind of insistence and elaboration that is relevant, and it is applicable both to the local level of the music and as a distinguishing mark between sections that are more or less argumentative. Especially expositions, or presentations, which are often very argumentative, are often utilising this technique.²⁶

In fact, the importance of such amplification and diminution-techniques to music could hardly be overestimated. Not only is it an integrated part of sections and local melodic phrases, serving to affirm a melodic motif or tonal centre, it is also a central characteristic of the Classical style. As pointed out by musicologist like Alfred Brendel and Charles Rosen, there was a shift in eighteenth century music, inspired in part by the harpsichord sonatas of Domenico Scarlatti, typifying the mentioned techniques by repeating phrases over and over again while making them longer and longer, or shorter and shorter: what Brendel calls 'foreshortening'.²⁷ It is a principle that was going to radically break up the continuous, celebrating character of baroque music.²⁸ Certainly Baroque music was already rhetorical in the sense of utilising the dialectic of tonal cadences, but this dialectic was intensified, assuming almost 'revolutionary' dimensions towards the end of the eighteenth century. Most notably this was the case in some of Beethovens sonatas and symphonies, often postponing a conclusion by going into seemingly never ending chains of more and more decisive cadences, finally hammering in the conclusion as it were.

Like the above mentioned examples of rhetorical functions, even this function of extreme intensification may be seen as 'universal' in the sense of being immanent and identical with its own manifestation; which, or course, does not imply that all music has to be rounded off in this manner. On the contrary, it might not be relevant outside Beethoven's extreme rhetoric. The 'universality' is just consisting in this: that if something has to be 'hammered inn' in this extreme manner it always has to be hammered inn in this extreme manner.

²⁵ See also Aristotle, *The Art of Rhetoric*, Chapters 1.9 and 3.12

²⁶ Steinar Bang, *Psychologizing Music*, 125-130

²⁷ Alfred Brendel, *Musical Thoughts and Afterthoughts* [1976] (London: Robson Books, 1982), 42-43

²⁸ Charles Rosen, *The Classical Style: Haydn, Mozart Beethoven* (New York and London: Norton, 1972), 43 and 388

When it comes to Aristotle's concrete references to instrumental music, however, it is not this argumentative technique, or the contrast between argumentation and celebration, that is highlighted - such music did not even exist at Aristotle's time - but his description of the *introduction*. As a matter of fact, the very function of an introduction is explained here by identifying it with a *flute prelude*, and the manner in which it is 'setting the tone' and establishing a key.

The introduction, then, is the beginning of the speech, which in poetry is the prologue and in flute music the prelude; for all these things are initiatory and, as it were, prepare the way for what is to follow. The prelude is similar to the introduction of epideictic oratory; indeed flautists, by putting in the prelude whatever they should be able to play well, connect it with the tonic key, and that is how one should write in display speeches, speaking out immediately what one wants to say and so setting the tone and connecting this with the subject, as in fact all speakers do.²⁹

It is essential to stress that this comparison between the introduction of speeches and musical preludes does not imply that the introduction of speeches are 'imitations' of musical preludes, or that one of these modalities of communication are less real or less natural than the other, as is the instinct of nativists and monists to believe. Certainly the dynamic and purely emotional aspects of vocalisation developed millions of years before the utilisation of sounds as vehicles for symbolisation. This is still obvious in most animal vocalisation, which is seldom symbolic. But it does not imply that language is 'less natural' than emotional vocalisation.

Even song - the harmonious modality of such vocalisation - might have preceded the symbolic use of sounds. At least we can see indications of this among wolves and some birds - sustaining tones in a song-like manner; and it is not likely that early humans were any less sophisticated in this respect. Song is obviously a much more advanced stage of emotional vocalisation, but this does not imply that song is *better* or more *important* or *natural* than ordinary emotional vocalisation. It is just fulfilling a different function, celebrating and strengthening in different ways, the advantages of emotional and social harmonisation.

When linguistic symbolism started to evolve, it might well have started out as imitations of animal vocalisations - cuckoos and roars - yet it developed into something else, which was not imitative, but functionally different in the sense of constituting a repertoire of principally

²⁹ Aristotle, *The art of Rhetoric*, Chapter 3.14

arbitrary signifiers. By utilising spectral noises which did not interfere too much with the emotional and melodic aspects of vocalisation, text and melody were able to coexist in this manner; so there is no reason put up a hierarchy of naturalness here, or to confuse the one with the other. Nonetheless, people are particularly prone to such category mistakes; and in times obsessed with language it is often music and art that is degraded in this manner.

The reason for bringing up this discussion of 'naturalness' is the circumstance that Aristotle's thinking is highly ambiguous in this respect. In fact, his idea of 'mimesis' as a central principle of poetry and art might have inspired many of the category mistakes mentioned above. Which is more than ironical, since Aristotle is also an opponent of this way of reasoning, reckoning harmony as something natural, and the prime source of pleasure in poetry. So what exactly does he mean with 'mimesis'? And is the concept even viable?

In the case of figurative art the concept of 'imitation' seems relevant enough, since it is obviously a human depiction of material objects. 'We take delight in viewing the most accurate possible images of objects which in themselves cause distress', says Aristotle.³⁰ But it is a definition that has become highly problematic in modern times, after the invention of photography. An understanding seems to have emerged, that it is rather the artist's subtle expressive contributions that are essential. Mere *imitation* is cheap and empty, and it is discarded altogether in abstract art.

Even more problematic is its application to poetry and song. Song and lyrical poetry are easily classified as arts, but not because they are *similar* to other modalities of speech and intonation. If the point of singing was to 'accurately' imitate speech it would have been better to speak in the first place. The problem is reflected in Aristotle's ambiguous definition of poetry. While pointing to mimesis as a central requirement, he also speaks of *two separate sources* of poetry: music *and* mimesis:

Given, then, that imitation is natural to us and also melody and rhythm (it being obvious that verse-forms are segments of rhythm), from the beginning those who had the strongest natural inclination towards these things generated poetry out of improvised activities by a process of gradual innovation.³¹

³⁰ Aristotle, *Poetics*, Chapter 4

³¹ Aristotle, *Poetics*, Chapter 4

As we can see, his concept of mimesis is already presupposing its own negation, the fact that poetry and song is rather *different*. And if forced to choose between difference and imitation, it would probably be more precise to say that it is this *difference*, and the *production* of content that is the essence of aesthetics. It is the place where our subtlest and most profound experiences are *created*, often with an emphasis on states of mind which are radically different from ordinary life, like in song or ecstatic dancing. Indeed, it is difficult to see what a disco dance, a lullaby, or a wedding waltz is supposed to imitate, expect from itself.

Certainly, when having a text, or aspiring to something more than superficial entertainment, music and poetry is also *dealing with* ordinary life experiences. Especially a concern with central existential and ethical matters is often considered an important aspect of great art. The deep connection between religious sentiment, harmony, and rhythmical restfulness has earlier been mentioned, and it is precisely by providing a setting where emotional elatedness and deep truth is going hand in hand that art and human existence is reaching its highest levels.

Aristotle is clearly onto something then, when arguing that 'even if someone publishes a medical or scientific text in verse' - like Empedocles - it would not necessarily be correct to call him a poet.³² There is obviously a clash here, between something trivial and medical and the kind of elevation that is usually connected with song and verse. But he may not be correct to believe that this is due to a lack of 'imitation' or fiction. A poem might well be theoretical or philosophical if it is focussing on more existential questions. Indeed, there is a lot of great poetry that is neither fictional nor imitative.

The biggest problem with the concept of mimesis, however, is the false dilemmas it tend to encourage, often enticing theoreticians into degradations of the unique qualities of music and poetry to something unnatural, arbitrary, and artificially constructed. It is like saying that among cutlery only knives are natural, whereas forks, which might have been invented later, are merely imitations of knives. The function of a final tonal cadence may well be similar to that of falling pitch in ordinary intonation. Certainly it is an *instance* of affirmation. But that does not make it an *imitation* of other instances of affirmation.

³² Aristotle, *Poetics*, Chapter 1

Perhaps Aristotle thinks so, or perhaps his message is just to keep in touch with emotional purport and coherence, which many artists forget. In any case, it is never his intention to degrade song to something artificial and symbolic. On the contrary, he says: poetry is 'language made pleasurable', and 'by 'language made pleasurable I mean that which possess rhythm and melody, ie. song'.³³ So rather than being mere symbols of something else, melody and rhythm are also considered manifestations of something unique and pleasurable. And, as is pointed out by Aristotle on several occasions: this is also 'natural'.

Rather than forcing reality into one-dimensional dogmatic moulds or 'platonic forms' of which other things are imperfect imitations, Aristotle might better be seen as a pluralist. At least this seems to be a general tendency, and there are several chapters of his Rhetoric that demonstrate it. This whole discussion of art and ontological pluralism may seem irrelevant to the nature and employment of rhetorical functions, yet it is crucial to the analysis of music and rhetoric in general to understand how the local functions are always relating to the overall purpose of a certain type of communication. Or as Aristotle puts it: 'one should apply a term only in mentioning a species with a characteristic feature; if not, it becomes empty and futile.'³⁴

As the below discussion will show, this is true both for the composition and the character of rhetoric, even at its most immediate and fundamental level. Without going into the relevance of Aristotle's categorisations: he is dividing the field of rhetoric into three main categories, which is also 'the number of types of audiences', he says. The categories are: *forensic oratory*, which is pertaining to the court, *deliberative oratory* which is political, and *epideictic oratory*, which is also called 'display oratory', as its function is often *ceremonial* and *laudatory*, but also *denigratory* in some cases.³⁵

As examples of the mutual relationship between overall purposes and subordinate functions within these genres he mentions that the function of 'narration is least common in political or so called *deliberative* oratory, as none relates what is to come'.³⁶ Certainly politics is mostly about the future. It is a discussion of how one wants the society to develop. In novels or epic poetry, of course, the situation is different. It is primarily about narration. Even a so called *forensic* orator

³³ Aristotle, *Poetics*, Chapter 6

³⁴ Aristotle, *The Art of Rhetoric*, Chapter 3.13

³⁵ Aristotle, *The Art of Rhetoric*, Chapter 1.3

³⁶ Aristotle, *The Art of Rhetoric*, Chapter 3.16

is to a certain extent recounting and reconstructing narratives and ways in which things might have happened. Furthermore, and as a contrast to both of these genres, is *display oratory*: 'for the display orator the *present* is more important' Aristotle explains', 'for it is on the basis of how things are that all men accord praise or blame'.³⁷

As we can see: some functions, like narration, naturally lend themselves to certain types of rhetoric and vice versa. In other cases a certain rhetorical function, like *introduction*, may be relevant to several genres, but take on a different character depending on the overall function of the talk. As an example of this Aristotle points to *introductions* of display speeches, which are drawn 'from praise, from blame, from exhortation, from dissuasion, from appeals to the audience', whereas 'in forensic and epic introductions there is an indication of the story, so that it may be known in advance what the tale is about and that the intellect be not in suspense'.³⁸

As indicated in the passage on introductions earlier quoted, there is an intimate similarity between a musical *prelude* and this type of 'epideictic' introductions. It is obviously this genre of *epideictic* display speeches that has most in common with song and poetry. One might even argue that it is precisely the laudatory and celebrating aspect of display speeches that is reinforced in song and poetry by sustaining the tones. Certainly an exhortation might be sung as well, but there is little doubt that harmony lends itself more to what is pleasant and unifying than what is disruptive and negative.

It says a lot about the power of tone and rhythm that it is able to cause this kind of fundamental change in our experience. So dramatic is this change, in fact, that it becomes the main ontological criterion of a separate category, a category that is more fundamental than any differences or subcategories within the field of speech. Which is also why it is treated by Aristotle in a separate treatise: his treatise on *poetics*. It is not that poetry and song are lacking in text or in rhetorical functions and organisation - on this point the writings of Aristotle are pretty clear - it is just not rhetoric in the more restricted sense of information sharing and debate. The element of *enjoyment* tends to overshadow mere practical concerns in song. So much so that we often do not care about the text at all.

Moreover, even *within* the category of song there are subcategories that are more fundamental than any subcategories within the category of speech. At least this is how it appears from a

³⁷ Aristotle, *The Art of Rhetoric*, Chapter 1.3

³⁸ Aristotle, *The Art of Rhetoric*, Chapter 3.14

dynamic point of view. Which is why in this treatise the category of speech melody is considered *one of four possible main modalities of intonation*. Whereas in the field of tonality the largest possible opposition seems to be created by the contrast between modal harmony and dialectical harmony, the difference between speech melody and sung atonality could be seen to constitute a similar opposition between a constant negation or deflection from tonality in speech and a more dialectical or 'pantonal' atonality in atonal song.

To some people it may seem strange to classify speech melody as a subcategory of music and atonality. After all, this kind of atonal dynamic is the dominant modality of our inner lives, and it is not unlikely that it is residing in the background, as fragments of ordinary thinking, even when we are singing. But this might also be said about song when we are performing our daily chores. Anyhow, there is little doubt that the differences between these musical modalities are great, and the consequences of confusing their functions and ingredients all the greater.

The most common examples of such confusions are probably applications of the rhetorical principles of classical sonata schemes to later types of music, which were not very argumentative or harmonious at all. Certainly Beethoven maximised the argumentative potential of the tonal cadence, and his sonatas were often concluded in a very decisive and settled manner, emphatically hammering on a stable major triad. But the tendency of diluting this decisiveness and dialectic by chromaticism was already under way. And with Arnold Schoenberg's discovery of atonal music, there was nothing left of the cadence. The music was no longer about conclusiveness or the affirmation of harmony, but something entirely different and still undefined.

It was probably this lack of definition, together with the burgeoning field of technical analysis and terminology, that was starting to create an impasse in the nineteenth century. It is a problem that is known from linguistics and mathematics as well, that the abstraction of technical terms creates a false illusion of self-sufficient structure and alienation from real world entities. Unfortunately enough, it was the already bygone principles of the classical sonata and the rhetorical concepts of *exposition*, *development*, and *recapitulation* that were selected as the backbone of such structure. Yet it was somehow abstracted and detached from its original context.

Within the field of music this impasse was debated already during the nineteenth century, splitting the scene into two camps: conservative adherents of formalism and sonata form fronted

by the music critic Eduard Hanslick, and on the other hand: composers like Liszt and Wagner, who were conceptualising their music in terms of 'symphonic poems' and dramas. In a somewhat schizophrenic manner the contention was played out within Arnold Schoenberg's own atonal works. Whereas some of his instrumental works were planned in terms of sonata form, these works were undoubtedly much less successful than his vocal works, which took as their model the melodrama and a much more sensible adaptation of form to function.

In a musical idiom that is not about argumentation, conclusiveness, or return to home keys, the functions of *repeating* and *recapitulating* arguments are no longer fruitful. Certainly even atonality may make statements that can be repeated later on, but much of the repetitiveness of tonal music, as well as the typical contrast between argumentation and celebration in a sonata, is connected with the rhetorical decisiveness of the tonal cadence and the pleasure that is produced by harmony. Its purport and import is its own restfulness, the manner in which it is challenged and reaffirmed, and it is a type of import that is lacking in atonality.

There is little doubt that atonal music is approaching rather the function of certain modalities of speech melody. In as far as the tones are singing, there is a rest of harmony there that is reminiscent of the often exaggerated singsong intonation of storytelling and narration, which is pointing even more in the direction of something melodramatic. There is no better example of this than Schoenberg's own employment of recitation or 'Sprechgesang' in his monodrama *Pierrot Lunaire*. The higher amount of dissonance and conflict in atonality is also pointing in the direction of something dramatic. Indeed, the absence of harmony and tonal modulations in this type of music tend to make it very monotonous and even pointless if it is not dramatised in some manner, by building tension and contrasting sections of unrest and calm.

This is a totally different principle of organisation, which does not lend itself to repetition of whole sections. If it is organised as a story, there is no need to repeat the first chapter of this story after it has already been told. Nor is it necessary to repeat it a second or third time towards the end. Certainly there is a rhetorical level in narration as well, since it is consisting of motives, sentences, and phrases. It is just not *argumentative* in the sense of affirming and arguing for harmony.

At Aristotle's time, some of these musical categories, at least the category of functional harmony, were not yet discovered. When it comes to more atonal idioms one should think that in recitation, baby talk, and storytelling, some type of singsong intonation similar to Schoenberg's

'Sprechgesang' was nevertheless in operation, even in ancient Greece. Similarly within the parameter of rhythm there was obviously a grey zone between song and various forms of metrical speech; and it is precisely this grey zone between speech and more harmonious and rhythmically regular idioms that is traded by Aristotle in the below quoted passage.

To produce a sense of *loftiness* in a speech it should have some degree of rhythmical regularity, says Aristotle, but not to the extent of making it a poem. Metrical and 'bouncy' rhythms are clearly unsuited for this. Only the 'paean' is satisfying Aristotle's criteria. It is still speech, but like in melodramatic recitation it is also approaching something 'musical'.

All things are bounded by number, and the number of the form of diction is rhythm, of which even metres too are divisions. So the speech must have rhythm, but not metre; otherwise it will be a poem. But it should not have precise rhythm; and this will be the case if it is only up to a point. Now of the rhythms the heroic is lofty but does not admit of harmony of diction, while the iambic is itself the speech of the many (that is why people speaking most often utter iambs of all the metres), but in a speech loftiness must be produced and an elevation of the audience. The trochaic is too rumbustious, as is shown by tetrameters; for the tetrameter is a bouncy metre. There remains the paean, which speakers have used from the time of Thrasymachus, but without being able to say which it was. In fact the paean is a third kind of rhythm, with an affinity with those mentioned; for it is 3:2, and of the others one is 1:1 and the other is 2:2, and the paean's 1 1/2:1 is related to these two ratios. The other rhythms, then, are to be rejected for the reasons given and because they are metric: but the paean should be adopted; for it alone of the rhythms mentioned is not a metre, so that it is the most easily concealed.³⁹

The exact meaning of some of these terms and examples may be somewhat vague today. The so called 'paean', and formal speaking in general, might have been more metrical in ancient Greece than what is common in speeches today; or the awareness of such subtle differences may be lower today. Certainly there is something peculiar about the intonation and rhythm of a news reporter or a lecturer, which is still beyond the comprehension of modern linguistics and musicology.

It is also interesting to notice that speech is defined in a *negative* manner here, as a contrast to tonal music and poetry. Speech 'should not have precise rhythm' says Aristotle, as if rhythmical regularity was nevertheless the norm. Certainly regularity and precision is a norm for many of

³⁹ Aristotle, *The Art of Rhetoric*, Chapter 3.8

the body's rhythms, and even the harmonisation of action potentials and neuronal communication at different frequency bands in the brain. Yet the speech rhythms must avoid this, says Aristotle, or 'conceal' it.

It is as if animate life only exists as a constant negation of stasis and harmony in nature. Action is driven by desire says Aristotle, 'the movement produced by reasoning being invariably accompanied by that produced by wishing'.⁴⁰ Which is in tune with previous accounts of speech melody. Harmony is there, already in the tone of voice, as a reference and prerequisite for intonation even in animal vocalisation; but it is negated by inflection.

It is no surprise that the experience of harmony in music has such a relieving effect in our lives, and such a central role in modern society. Yet it is never devoid of conflict. That would lead to paralysis. The conflict is just temporarily postponed and relegated to a *rhetorical* level of gestalt formation. This gestalt formation and postponement of conflict presupposes a high degree of reflexivity and a highly developed lateral prefrontal cortex, which is precisely what most animals do not possess.

The unavoidability of such conflict and strife in life, and in our awareness of this life, is wonderfully reflected in Aristotle's reference to Empedocle's saying that 'God is the most unintelligent thing. For he alone is ignorant of one of the elements, namely strife, whereas mortal creatures are familiar with them all.'⁴¹ Whether the cosmic totality is characterisable as perfect harmony, as an instance of infinite strife, or a paradoxical coexistence of these is debatable. But it is probably a zero-sum game. Life is existing only somewhere in the process, and to know it one would have to undergo it, with all its troubles and complications. In humans this struggle for awareness and harmony is manifested in several new and reflexive modalities of feeling and articulated thinking, of which the field of *rhetoric* may be constituting a certain higher level of reflexivity. This rhetoric, especially when incorporating song and harmony, might be closer to something like total insight and perfect harmony, but once such 'perfection' is reached, that would also be the end, both of rhetoric and life.

⁴⁰ Aristotle, *De Anima*, III.10

⁴¹ Aristotle, *De Anima*, I.5

Chapter 7

Rhetorical Figures and Schemes in the History of Music

7.1 Ancient modal music rhetoric

Before turning to the highest levels of ego-dynamic gestalt formation - the dramaturgical and moral emotions - a little more will have to be said about the tradition of *music rhetoric*. Its general relevance to the understanding of the self may not be obvious to all; but music - especially if speech melody is also included - is a field that embraces, and radically expands, the whole spectrum of mental modalities. And, as earlier argued: it might serve as a *distillation* of the functional organisation of the self as isolated from more extrinsic and material contexts. Since instrumental music is not lexical or meaningful beyond the experience of its intrinsic dynamic, it is often concepts relating to the autonomous dynamics of the self that are cultivated by composers and music theoreticians. Thus a typology of ego-dynamic functions may also be developed and refined.

Without going into a comprehensive history of music here, it might be useful at least to point to some main theoreticians and concepts. Especially with the discovery of 'functional harmony' music got very 'cadential' and 'argumentative', and it is no wonder that many music theoreticians turned to the classical study of *rhetoric*; which is not to say that the other types of music, like modality or atonality, do not also have a rhetoric or a rhetorical level of organisation.

For thousands of years music was 'modal'. It still is, to a large extent, and will probably always be, whether here or on some other planets. It is the principle that has been governing practically all ethnic music, and it plays a central role even in contemporary pop music and jazz. Basically this music is just affirming the harmony of the harmonic series, connected and flavoured by varying sets of 'passing-tones'. Since it is just a single harmonic field, and the dissonances are merely transitory, the melodic strands could be freely and simultaneously combined in different forms of polyphony.

As a mere affirmation of harmony such music is understandably rather 'static'. Today it is often associated with encompassing moods or states like ecstasy, rave, or so called 'ambient

music', going on and on without much development or drama. Which is not to say that it is *entirely* static. If it were, it would be little more than a frozen chord; which is well and good, but it is not yet 'musical' in the sense of articulating a *melody*. It is first when harmony is also 'discussed' and challenged to some extent that we call it music.

Some intervals, like the diatonic passing tones and the chromatic 'blue notes' in blues, are challenging harmony by dint of their dissonance and remote numerical affinity; but the simplest and most effective way of 'discussing' the tonic is to introduce the interval of *the fourth*, which does not belong to the harmonic spectrum of the tonic but *challenges* its centrality, by making the tonic into a fifth. Melodically, if not yet harmonically, it is a 'subdominant', which deflective function is *diametrically opposed* to that of the 'dominant', which is located a fifth *above* the tonic. As the second-lowest partial tone of the harmonic spectrum, the sensory quality of the fifth comes close to the 'almost identity' of the octave, which, at least when preceded by more remote relations, is rather *foreshadowing* the tonic than challenging it.

These are *rhetorical functions* of a type that do not even exist in ordinary speech. They are also less relative. Certainly the pitch fluctuations of speech melody are also 'absolute' in the sense of contrasting diametrically opposed directions - rising versus falling - but the numerical relations between fixed tones are introducing some new dimensions and a realm of much more distinct qualia, some of which are even serving to make the statements *more decisive* in the sense of resolved, and much more joyful.

The understanding of poetry and song as 'speech made pleasurable' was expounded already in Aristotle's *Poetics*, and it is no wonder that it was utilised by the early Christian church as well, with its strong emphasis on the words of the bible. In contrast to many aboriginal cultures, however, the music of the early christian church was *monophonic*. At least this was so in the beginning, and it was a recurrent theme within the church whether or not polyphony detracted from the textual messages. Even the sensuous appeal of song was problematised for this reason.

To the great church father St. Augustine (354-430), this was a personal dilemma. His enthusiasm for music was not easy to ally with his piety towards the text. Nevertheless, he was able to reconcile these concerns, and specify a function for song that transcended and complemented that of speech and chanting. The type of concepts he seized on was *rejoicing*, *exultation* and *jubilation*. 'He who jubilates does not utter words', says Augustin, 'rather it is a sort of sound of gladness without words...he seems to be rejoicing indeed in his very voice but

not to be able to express what rejoices him as it were filled with too great joy.¹ Perhaps one might say that Augustin is giving an example here, of a type of rhetorical figure that is *peculiar to song*.

Augustin was undoubtedly a central figure in the development of western music. He even contributed to the development of music notation, the so called 'neumes'. And his concept of *jubilation* had a very concrete bearing on musical practice, constituting melodic flourishes on single syllables: so called 'melisma', which were systematised and even provided with text in some cases.² This system also went into the great and international tradition of *liturgical drama* in the medieval ages: a theatrical dramatisation of central religious themes, often in the shape of dialogical interactions between soloists and choirs in the church room, or right outside it.³

The element of musical dialogue and *antiphony* in European church music is reminiscent of the 'call and response' interactions so central to African and other ethnic music, which was an important element of the development of blues and jazz in America as well. So it is not that music that is concerned with harmony and jubilation is deprived of social emotion and discourse, it is just occurring within the framework of harmony and jubilation. According to John Stevens 'The salient fact is that liturgical drama has to do with celebration...There is nothing in liturgical drama resembling Joseph's anxieties about his wife's unexplained pregnancy, the shepherds comic puzzlement when they hear music in the heavens, or the painful screaming of the mothers at the slaughter of their innocent babies.'⁴

Nonetheless, even within harmonious music there is a certain room for differences in character and mood. The passing tones may consist either of small or large seconds, and the manner in which they are placed in a scale will unavoidably affect the melodic character in various ways.

As earlier mentioned, one of the main functions of rhetoric is precisely to try to manipulate the mood and moral attitude of the listener - the dimensions of *pathos* and *ethos*. As was pointed out by Aristotle, the melodic modes were concerned not only with *amusement*, *relaxation* or the

¹ St. Augustine, in John Stevens, *Words and Music in the Middle Ages: Song, Narrative, Dance and Drama, 1050-1350* (Cambridge University Press, 1986), 402.

² Richard L. Crocker, 'Melisma', in the first edition of *The New Grove Dictionary of Music and Musicians* [1980], ed. Stanley Sadie (London, Macmillan Publishers Limited, 1998), Vol. 12, 105-106.

³ John Stevens, 'Medieval drama', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 12, 21-58.

⁴ Stevens, *Words and Music in the Middle Ages*, 324.

general 'sweetness' of music. The modes were also seen to instil a certain mentality in the young. And it is no coincidence that it is precisely in his *Politics*, in a chapter about education, that Aristotle really goes into detail about the importance of music and music education. He also describes the character of different rhythms and modes: 'Some have a character of rest, others of motion, and of these latter again, some have a more vulgar, others a nobler movement'; 'Some of them make men sad and grave, like the so-called Mixolydian, others enfeeble the mind, like the relaxed modes, another, again, produces a moderate and settled temper, which appears to be the peculiar effect of the Dorian; the Phrygian inspires enthusiasm.'⁵

The idea of music 'forming character' and 'tuning the soul', as Aristotle put it, was also kept alive throughout the medieval ages; most notably perhaps, by the great roman scholar Boethius (480-526). In an introductory chapter to his *De Institutione Musica*, he talks for instance about *lascivious modes, exciting modes, representational and theatrical modes*. 'It is common knowledge', says Boethius, 'that song has calmed rages many times and that it has often worked wonders of affections of either the body or the spirit;' and he is referring to 'Pythagoras who had allegedly calmed a drunk adolescent of Taormine who had become incited under the influence of the Phrygian mode.'

'Hence it happens', says Boethius, 'that sweet melodies even delight infants, whereas a harsh and rough sound will interrupt their pleasure. 'Music is so naturally a part of us', he says, 'that we cannot be without it, even if we so wished';⁶ and his all-encompassing concepts of 'musica mundana' (cosmic harmony), 'musica humana,' and 'musica instrumentalis', is not without parallels in modern day science, often referring to music as an example of the orchestrated vibrations that are taking place both in the brain and in cosmos at large.⁷

Besides Boethius, the most influential music theorist in the medieval ages was probably Guido of Arezzo (991/992 - after 1033), the inventor of staff notation. And Guido leaves little doubt that music is organised in a hierarchical manner, much like in verse.

⁵ Aristotle, *Politics* [350 BC], trans. Benjamin Jowett (The Internet Classics Archive), Book 8, Part V, <http://classics.mit.edu/Aristotle/politics.8.eight.html>.

⁶ Boethius, 'De Institutione Musica', Book 1, in Calvin Martin Bower, *Boethius' The Principles of Music: An Introduction, Translation and Commentary* (Ph.D. dissertation, George Peabody College for Teachers, 1967), 31-44 and 4.

⁷ See for instance Anirban Bandyopadhyay, *Nanobrain: The Making of an Artificial Brain from a Time Crystal*, (Boca Ration: CRC Press, 2020). Already in the Abstract he is talking about consciousness and 'the entire conscious universe' in terms of vibration and music.

Just as in verse there are letters and syllables, parts and feet and lines, so in music there are phtongi, that is, sounds, of which one, two, or three are grouped in syllable; one or two of the latter make a neume, which is part of a song; and one or more parts make a phrase, that is, a suitable place to breathe.⁸

Much of this - especially the emphasis on *ethos* - might have seemed foreign to 20th century formalists and sceptics. At the same time the impact of music on collective mentality has hardly been stronger than during that century. It is not many years ago that rock music was banished from radio and church in Norway, and it is still forbidden in some regimes. Dictators are fearing the transformative power of music, not only because it is a vehicle for protest, but because it is working on the character of human behaviour. From an uptight and formal attitude in the first part of the 20th century, the character of human behaviour - our ways of being and talking, especially in public - were gradually transformed into something much more free and relaxed. Especially the 'vulgar rhythms', as Aristotle calls it - the swing, the syncopations, the sensual or aggressive rocking - played an important role in peoples life. So did timbral distortions and loudness.

These are major changes, which were probably only surpassed by the turn to functional harmony and the major scale during the early Renaissance; a principle that was both more intellectual and 'brighter' in terms of the purity of its cadences, often ending on a perfect major chord. Even the folk music of Norway was transformed then, and the Viking mentality was never to return. Which is not to say that modality or modes are obsolete today; on the contrary, even modality was brought back by the blues. Yet our concepts of musical character are still tied to the major-minor system, which joy-melancholy dichotomy is very pronounced, and even exaggerated in popular awareness.

Even the so called 'church modes' could be placed in one or the other of these two categories, using either a *major* or a *minor* third. However, the system of church modes has led a much more flimsy existence than many people believe. For centuries the modes were merely referred to as first mode, second mode, and so on. It was first in the 11th century that they were codified by Guido into a system of four basic modes: Dorian, Phrygian, Lydian, and Mixolydian, with

⁸ Stevens, *Words and Music in the Middle Ages*, 383.

four derivative modes a fourth below: Hypodorian, Hypophrygian and so on.⁹ The labels were Greek, but they might have been employed in a different manner than in ancient Greece, referring to other scales; which makes the discussion of ethos and character very difficult.

To derive the modes as they are *currently* conceived, one can build ascending scales on the white keys of a piano. Starting on C we get the *major scale*, sometimes called the *Ionian mode* - starting from D we get the *Dorian* - from E the *Phrygian* - from F the *Lydian* - from G the *Mixolydian* - from A the *minor mode*, also called *Aeolian* - and from B the so called *Locrian mode*. In other words: the tones of all these scales are the same, but different tones are supposed to serve as roots.

This seemingly systematic, 'merry go round' method of deriving the modes has been an object of fascination in many cultures, even in Asia; but its auditory and psychoacoustic foundations are dubious. It is a theoretical construct grounded in spatial thinking, which is only partially functional from a musical point of view. For example: the so called 'Ionian' and 'Aeolian' modes found little use before functional harmony with its characteristic 'leading tone' and chordal dialectic was established. In fact, these Greek words were introduced into musicology by Henricus Glareanus first in 1547,¹⁰ as an anachronistic attempt to integrate the major-minor music, which was not modal in the above defined sense, into the old system of church modes.

The so called 'Locrian mode' is an even more unlikely construction. Forming a diminished triad, where the fifth is replaced by a tritone, it would never create a sense of root or stability. Even the so called *Lydian mode* verges on atonality with its initial four whole tone steps, forming a tritone. Although Lydian was part of Guido's original set up, the augmented fourth was often lowered a half step; which of course is destroying the whole system. Yet this is one of the reasons why *accidentals* were introduced into medieval European music.

Like in modern times academia, the fruits of medieval scholasticism were variable. The speculations were often lacking in perceptual relevance; but at least there was an impetus for change in these activities, a possibility of running into something new and interesting, which, if its was also audible and contextually meaningful, might have a chance to survive. A particularly

⁹ Harold S. Powers, 'Mode', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 12, Ex 5, 385.

¹⁰ Powers, 'Mode', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 12, 408.

lucky strike, which was also befitting the gothic architecture and the increasing grandeur of the church, was the rediscovery of polyphony.

It was called 'Organum', and consisted to a large extent of parallel fourths; which, however, is not very original from a historical point of view. According to ethnomusicologist like Marius Schneider, modal polyphony is to be found even among the most isolated tribes of hunter gatherers both in Asia, Africa and south America;¹¹ and it has been preserved as a rich and pre-Christian tradition in Georgia. The most common version of modal polyphony, characteristic both of western pop music and the great tradition of south east Asian orchestral music, is probably *heterophony*, where all tones could be freely combined in a large field of sound. But parallel fourths and fifths, like in organum, are also common. Especially in sub-Saharan Africa there is a tradition in many cultures of singing in parallel fifths, fourths, and even thirds some places.

The practice is in perfect harmony with the principle of modality, at least in its basic forms. If for instance, we start with a minor-pentatonic scale, A-C-D-E-G-A, and supplies it with fourths below the upper voice, the resulting combinations would be: A/E - C/G - D/A - E/B - G/D.

As we can see: even if fourths are added below the tones of the scale, there is little here that is outside the 'diatonic' reservoir of tones. The only new tone is B, the ninth; which is not very dissonant, but it is making the mode hexatonic.

It is apparently all these relations of fourths or fifths within pentatonic scales that gives them a certain ambiguity with respect to roots, and encourages the kind of 'merry go round' idea of derivation mentioned above. As pointed out by psychoacousticians like Hermann Helmholtz, such 'first degree' relations might also explain the historic and melodic coherence of modal scales.¹² If most of the large melodic jumps are related by fourths, it is obviously easier to hit the tones. Even some howling wolf packs might be heard to land on a fifth once in a while, if not as often as octaves and unison. And it is no wonder that the same modal scales are found almost everywhere on the planet.

Yet we can already spot the seed of something problematic here, which is also very fruitful. The relations by fourths only hold for the pentatonic core tones of modes. In a seven tone mode,

¹¹ Marius Schneider, *Geschichte der Mehrstimmigkeit: Historische und Phänomenologische Studien* (Tutzing: Hans Schneider, 1969), 24.

¹² Helmholtz, *On the Sensations of Tone*, 259.

the parallelism would occasionally produce a tritone, which is not harmonious at all. To avoid it, one would have to consider the crossing of voices, or allow for thirds and accidentals. Which is precisely what happened. And theorists like Guido and John Cotton were legitimising the changes.¹³

It was not the modes per se, but these *chromatic modifications* that would take the music in a different direction in the following centuries. The psychology and origin of functional harmony is still not properly explained and agreed upon, but there is much that indicates that it was especially *the free use of accidentals* - # and b - and an obsession with cadential 'leading tones', that would change the music. The ramifications of this rhetoric in terms of chordal progressions might not have been conscious in the beginning, but it is a principle that would totally change the scene.

7.2 Ars Nova, and the discovery of the tonal cadence

The technical and expressive advances in French and Italian music from around 1300 and onwards were tremendous. In treatises by Johannes de Muris (1320) and Philippe de Vitry (1322) the new music was referred to as 'Ars Nova', as contrasted with the preceding 'Ars Antiqua'.¹⁴ Yet the significance of these changes is still to be properly defined. The new and 'cadential' harmony that emerged during this period has grown so familiar to us now that many people, especially classically trained musicians who are unfamiliar with the modal music that preceded it, are not even able to spot a principal difference here. It is not only an example of lacking historical and ontological perspective but of empiricist myopia in many cases: a technical focus, and a failure to deal with those higher level functions which are nevertheless governing our subconscious understanding of different types of music.

At the time of 'Ars Nova', the concepts of harmony often taken for granted today were not obvious at all; and the daring and unconventional attitude that must have gone into its creation is exemplified for instance in Johannes de Grocheo's *De Musicae* (ca. 1300). A more down to earth attitude is reflected for instance in his skepticism towards Boethius' concept of 'Musica mundana'. 'Celestial bodies make no sound', he says for instance. Instead Grocheo is describing

¹³ Stevens, *Words and Music in the Middle Ages*, 297.

¹⁴ David Fallows, 'Ars nova'. in The Second Edition of *The new Grove Dictionary of Music and Musicians*, ed. Stanly Sadie and John Tyrell. London: Macmillan, 2001.

and charting the different musical 'practices and idioms' of Parisian music around 1300, including the folk music scene. From a rhetorical point of view, his tripartite concept of melody or *tonus* is also interesting, as it is harking back to Aristotle's idea of *the whole*, distinguishing between *inceptio* (beginning), *medium* (the limit of the ascension and descent or range), and *finis* (the last tone, one of four possible tones).

Grocheo might not have been so fond of the rhythmical innovations of his time (*musica mensurata*), but he was all the more radical with respect to chromaticism and accidentals. Any tone, he argued, could be made into a semitone through the *rotundrum* sign - *b* - and any semitone into a tone through the *quadratum* sign - *#*.¹⁵ It is a practice that became known as *musica ficta* or *musica falsa*. And it was going to have a radical impact on the following centuries.

Contrary to the manner in which it is often explained in textbooks, functional harmony did not start out with a mode or scale. At least it did not start out with a major scale. The major scale was not even a church mode, and should rather be considered a *product* of functional harmony than its cause. In fact, the adherence to *church modes* was to a large extent abandoned during this period, in favour of *musica ficta* and the free use of accidentals recommended by Grocheo. Especially this was the case in polyphonic composition and the *motet*.¹⁶

At a certain point the composers must have discovered the rhetorical power of the so called 'leading tone' a half tone below the tonic. The effect is almost impossible to ignore when using parallel thirds. To understand how it works, however, it is essential to realise that the leading tone is not merely *approaching* the tonic. It is also a *dissonance*, which does not fit easily into a modal and static conception of harmony. However, the leading tone is in perfect harmony with other intervals, like the second and the fifth. Thus it creates an alternate harmonic spectrum on these intervals; and it is this interplay between different chords and harmonic spectra that creates a new dialectic, and a greater emphasis on the cadence as a rhetorical device.

The *conclusiveness* of such cadences is very pronounced, especially if moving from a dominant chord on the fifth to a major triad. And the role of the leading tone is partly to create a sense of *tension* before returning to the tonic. It is a tension that could be heightened by adding a

¹⁵ Carol Williams, '3. Johannes de Grocheo's *De Musica* as a Guidebook for Thirteenth-Century Parisian Musical Practice', in *Aesthetics and Experience in Music Performance*, ed. Elizabeth Mackinlay et al. (Newcastle: Cambridge Scholars Press, 2005), 21-38.

¹⁶ Margaret Bent, 'Musica ficta', in the first edition of *The New Grove Dictionary of Music and Musicians*, Volume 12, 803. See also Harold S. Powers, 'Mode', in the first edition of *The New Grove Dictionary of Music and Musicians*, Volume 12, 397 and 399.

minor seventh to the dominant chord; and it is especially the interval of a tritone between the leading tone and the minor seventh *within* the dominant chord which makes Rameau call the leading tone 'the source of major dissonances'.¹⁷

Needless to say; these matters were not codified in the 14th century. Nor was the harmonic dialectic as clear and streamlined as in some examples of Baroque harmonisation. But this might also be said about the music of Beethoven, not to speak of impressionism or jazz, which is often combining functional harmony with modal, chromatic, and atonal elements. There are many variants of functional harmony, and it would hardly be correct to say that Ars Nova music was devoid of cadences and contrasting chords. These chords, although analysable from a functional point of view, may seem arbitrary in some cases; but the cadences were obviously intended and even exaggerated. According to Parrish and Ohl, 14th century composers like Guillaume de Machaut (ca. 1300-1377) and Francesco Landini (1325-1397) used *two leading tones*: both to the fifth and to the root; often in the shape of a so called 'Landini cadence'.¹⁸ Yet it did not take many years before this practice was replaced by the much more pregnant and familiar dominant tonic cadences.

A source of confusion today, is the fact that the concept of *musica ficta* did not require the chromatic alterations to be explicitly notated. Conflicting with more conservative practices, only a small portion of the accidentals were notated in the beginning; yet there was a steady increase in notated accidentals throughout the 14th century, as the new conceptions of harmony were evolving.¹⁹

According to articles in *The New Grove Dictionary of Music and Musicians*, it was first in the latter part of the 15th century that the church modes started to get a 'renaissance', at least as a theoretical framework. Their practical relevance was debated from the outset. According to Sebald Heyden (1499-1561) these modes had 'almost no meaning in figural music'.²⁰ As mentioned above, it was first in 1547 that Glareanus came up with some alternative greek names - *Ionian* and *Aeolian* - for the contemporary major and minor scales, in an attempt to integrate

¹⁷ Jean-Philippe Rameau, *Treatise on Harmony* [1722], trans. Philip Gossett (New York: Dover Publications, Inc., 1971), 65 and 150.

¹⁸ Carl Parrish and John F. Ohl, *Masterpieces of Music before 1750: An Anthology of Musical Examples from Gregorian Chant to J. S. Bach* [1952] (London and Boston: Faber and Faber, 1980), 36 and 40.

¹⁹ Bent, 'Musica ficta', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 12, 804.

²⁰ Powers, 'Mode', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 12, 397.

the new music into the old system of church modes.²¹ This thinking was also central to Guiseppe Zarlino (1517-1590), a leading music theorist during the late Renaissance. The speculative and ambiguous character of this endeavour is reflected for instance in his tweaking and reordering of modes to accommodate for the major scale.

Jean-Phillippe Rameau (1683-1764), who is recognised today as the chief codifier of functional harmony, devotes many passages throughout his famous *Treatise on Harmony* to an in-depth discussion and criticism of Zarlino. His criticism is exemplary as it reveals the self-contradictions in Zarlino's thinking, showing that even if he was talking about 'modes', the music he was dealing with was not modal in the sense that was implied by ecclesiastical plain chant.

By relating this to those remarks of Zarlino which are contrary to his rules, we shall see that his conception of the modes was ill-founded. The bass, he says, is the source, the fundamental, etc., of all the other parts. Its natural progression in perfect cadences is to descend a fifth. Observe that in the examples he gives of these cadences there is always an ascending semitone between the note which precedes the final note and the final note itself. In other examples in which this ascending semitone is found, there is also a voice which descends a tone to this same final note.²²

Zarlino's music is 'cadential', but he does not recognise that the intervals of a dominant chord, so essential to the tonal cadence, are already appropriating three of the scale steps, which, according to Rameau, is eliminating all modes except the minor and major modes.²³

There is little reason to speak of 'modes' when the music is not modal and the modes are nevertheless modified and altered by chromaticism. And leading tones were not the only examples of such modifications. It is probably more correct to define the music of the time as a slightly chromatic form of functional harmony. Even the so called 'minor mode' is a dubious conception. Since it is frequently switching between melodic and harmonic minor, rising or lowering both the seventh and the sixth steps, it is not modal at all. On the contrary, the practice of ending pieces in minor with a major chord became common, making the cadences even more decisive and resolved. Thus it is the previously neglected *major scale*, containing both the

²¹ Powers, 'Mode', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 12, 407-411.

²² Rameau, *Treatise on Harmony*, 159.

²³ Rameau, *Treatise on Harmony*, 158 and 160.

dominant and tonic chords, that took the centre stage. The major scale is very much the epitome of functional harmony, and even Zarlino emphasises its centrality.

Much of Zarlino's confusion, says Rameau, is deriving from a faulty identification of roots in inverted chords: so called sixth chords and six-four chords, which, according to Rameau, are 'derived from the same source' as the 'perfect chord'²⁴ This neglect of inversions, he says, 'has given rise to an infinite number of deviations, exceptions, and ambiguities, with terms, intervals, chords and their progressions and properties, especially in terms of the modes, all being confused.'²⁵ Even today one may come across it; especially in the ethnomusicological literature, which is often weakly anchored in experience and acoustics. Rameau is pretty harsh in his critique of such mistakes. He uses words like *dogmatic*, *irrational*, and *deaf*.²⁶ And his conceptions of what is 'natural' were supported by Joseph Saveur's experimental evidences for the harmonic series published some twenty years earlier.

Certainly the references to church modes in the Renaissance had a melodic relevance. An occasional use of differently located half tones is not incompatible with functional harmony, it just gives some of this music a chromatic character. In compositions by people like Carlo Gesualdo (1566-1613) the chromaticism is getting almost expressionistic and avant-garde at times: a complex and highly expressive idiom, sometimes referred to as 'Musica reservata'.²⁷ Needless to say, this has little to do with present-day conceptions of *modality* as contrasted with functional harmony. Even Zarlino seems to have been familiar with this distinction. When Zarlino accounted for the harmony of the ancients, says Rameau, he described it as a 'perfect chord above which they sang their different sorts of airs (as with our bagpipes)'. Zarlino calls this *Sinfonia*;²⁸ which is an alternative name for the instrument *hurdy-gurdy*, which was in common use in the later middle ages.²⁹ Like the bagpipes, the hurdy-gurdy produces a sustained drone or bass tone, which is a common form of modal music, but it is a far cry from Zarlino's own compositions.

²⁴ Rameau, *Treatise on Harmony*, 140.

²⁵ Rameau, *Treatise on Harmony*, 146.

²⁶ Rameau, *Treatise on Harmony*, 125.

²⁷ Albert Dunning, 'Musica Reservata', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 12, 825-827.

²⁸ Rameau, *Treatise on Harmony*, 156.

²⁹ Curt Sachs, *Real-Lexicon der Musikinstrumente* [1913] (New York: Dover Publications, 1964).

Codification of music and nonverbal communication in general is difficult, and it is not uncommon that theorists seek secure ground in bygone traditions or some kind of semi-spatial construct, which is not functional or even perceptible from a musical point of view. Some theoretical conceptions of Arnold Schoenberg and Paul Hindemith might be seen as modern examples of this. As is pointed out by Schoenberg himself, a proper account of the *psychological* principles governing music and atonality in particular, is much more difficult to attain.³⁰

Nevertheless, something extraordinary happened during the history of tonality. An analytic tradition *did* arise, that was perfectly fitted to the organisation of this music. Whether we call it *Musica Poetica* or *Figurenlähre*, it was a systematic attempt at charting the affective and rhetorical figures in music. It might be too pretentious to say that this is an early example of *gestalt psychology* in the ego-dynamic realm, but as we will later see: some of these thinkers, especially Johann Adolf Scheibe (1708-1776), and later philosophers like Schopenhauer, were clearly aware of these deep psychological implications.

Already in the beginning of the sixteenth century, after the rediscovery of Quintillians *Institutio oratoria*, which in books 8 and 9 also contained some references to music, a more explicit reference to rhetorical principles started to be reflected in music treatises; like Galliculus (1538) speaking of 'schemata variorum colorum' (figures of varying adornment).³¹ But it was first around 1600 that the craze took off, with the combined latin teacher and cantor Joachim Burmeister (1564-1629).

'We must conclude that there is only little difference between music and the nature or oration' says Burmeister. And several of his conceptions were exemplified in an analysis of Orlando de Lassus' motet *In me transierunt*.³² As the first of a long row of treatises on music rhetoric in the seventeenth century, Burmeister's *Musica Poetica* (1606) set out to define, categorise, and gather together comprehensive lists of rhetorical and emotional concepts which he thought, were also relevant to music. For instance, his definition of 'affectio' as 'a period in melody or harmony terminated by a cadence that moves and affect the souls and hearts'³³ comes close to the

³⁰ Arnold Schoenberg, *Style and Idea: Selected Writings of Arnold Schoenberg*, ed. and trans. by Dika Newlin (New York: Philosophical Library, 1950), 209.

³¹ Dietrich Bartel, *Musica Poetica: Musical-Rhetorical Figures in German Baroque Music* (Lincoln and London: University of Nebraska Press, 1997), 75.

³² Bartel, *Musica Poetica*, 96.

³³ Bartel, *Musica Poetica*, 96.

definition of affect sketched out in this treatise, which is also emphasising the role of *behavioural gestalts*.

Although his treatises are written at the time when the so called Baroque period is later held to be starting, it is essential to point out that Burmeister and his contemporaries knew nothing about 'Baroque music'. When talking about music rhetoric these theorists were referring to earlier masters. According to Johannes Nucius (1613) it was John Dunstable (1385-1453) who started the tradition of rhetorically expressive music; and the tradition was carried on by composers like Binchois, Busnois, Clemens non Papa, Crequillon, Isaac, Josquin, Ockeghem, and Verdelot. But Orlando de Lassus (1532-1594) was the composer whom theorists most often considered the *master of musical rhetoric*.³⁴ As a matter of fact, the music of Lassus gave name to a whole class of figures called 'madrigalisms'; a form of musical 'word painting' that was not uncommon among the Ars Nova composers either.³⁵

It is probably no coincidence that both Dunstable and Lassus displayed early examples of a more *chordal* style. The harmonic dialectic is obviously more conspicuous and *thought-like* then, than when hidden in a polyphonic web of voices. Interestingly enough, the music-rhetorical nomenclature developed by Burmeister and others referred to homophonic passages within a couterpuntal work as 'noema', meaning *thought*, or *obscure thought*.³⁶ It is not entirely clear what is meant by this, but the music undoubtedly becomes more articulated and reflexive when it is homophonic, at the same time as it is 'obscure', if the music is purely instrumental, what the music is reflecting over. As earlier pointed out, it is just the ego-dynamic aspects of thought, featuring characteristics like harmony and liveliness, that are really manifested in the music.

It is crucial to observe that there is a fundamental difference between figures that are *inherently dialectical and expressive* and those that are also seeking to symbolise extramusical matters like snowfall or spatial motion. Other names for the latter category were *hypotyposis*, *imitatio*, *mimesis*, *onomatopoeia*, *assimilatio*, *homoiosis*, or more specifically, concepts like *anabasis* (ascent), *catabasis* (descent), or *fuga* (flight).³⁷ Such symbolism might have been

³⁴ George J. Buelow, 'Rhetoric and music', in the first edition of *The New Grove Dictionary of Music and Musicians*, Volume 15, 793.

³⁵ Charles Warren, 'Word-painting', in the first edition of *The New Grove Dictionary of Music and Musicians*, Volume 20, 528-529.

³⁶ Buelow, 'Rhetoric and music', 799. See also Bartel, *Musica Poetica*, 444.

³⁷ Buelow, 'Rhetoric and Music', 798.

common during the Renaissance, but it was explicitly discarded by romantic composers and theorists like Johann Nicolaus Forkel (1749-1818).³⁸ Today this kind of symbolism is first of all connected with cartoons, and what has come to be called 'Mickey mousing'.

7.3 Baroque codifications of music rhetoric

With the chordal and much more *homophonic* style characterising the Venezian school around 1550 and onwards, the harmonic functions, and the discursive dialectic of which it is a manifestation, became all the clearer. Especially Giovanni Gabrieli (1557-1612), a student of Orlando de Lassus, was a successful exponent of this style. Typically his canzonas and symphonies are utilising several brass and wind sections located in different places in the church, *alternating, overlapping, echoing, commenting, and answering* each other in a spectacular antiphonal and stereophonic manner, which is also heavily *syncopated* and, for the first time, contrasted with respect to loudness, which is a rhetorical technique in its own right.

Given the dialectical and articulated character of much baroque music, and the development of the *basso continuo* practice - the kind of chordal accompaniment and notation we are so familiar with today - it is no surprise that the concept of music rhetoric caught on, especially, but not only, in Germany.

Some caution has to be taken with regard to the employment of Greek and Latin concepts that was characteristic of much, but not all, of this tradition. It is a two edged sword. On the one hand, many of these ancient terms have contributed valid concepts and metaphors to what is now a universal musical nomenclature. On the other hand, the misconception might also ensue, that music rhetoric it is somehow *tied* to this ancient lingo, or that the functions of song and music are derived from or limited by the concepts of spoken oratory.

Even Dietrich Bartel, whose *Musica Poetica: Musical-Rhetorical Figures in German Baroque Music* is an invaluable resource when it comes to the charting of this field, may be a victim to such ideas. But the ideas are false, and it is probably fortunate that the greatest codifier of functional harmony, Jean-Philippe Rameau, was not German but French. Many of Rameau's concepts are also rhetorical; not because he is trying to impose something foreign or ancient onto the music, but because the musical discourse is so precisely described in his own native

³⁸ Bartel, *Musica Poetica*, 162-163.

language. When Rameau published his groundbreaking *Traité de l'harmonie* in 1722, functional harmony was already extremely sophisticated, and the Baroque idioms were soon to be replaced by new variants, some of which were simpler and others more dramatic and harmonically disruptive. Yet much of this was foreshadowed or even instigated by Rameau himself.

To put it very simple: the harmonic functions were classified by Rameau in compliance with the harmonic series and the roots of triads and seventh chords, even when these chords are 'inverted', that is to say: when the root is not located to the bass. Thus we arrive at a more 'abstract', but also much more acoustically and perceptually correct understanding of the dominant and tonic functions that are going into tonal cadences. Furthermore: the musical progressions are simply explained as long chains of such cadences.

As earlier mentioned, the concluding effect of a perfect cadence is very strong, and it is obviously suited for final conclusions; yet one does not want every statement to be so conclusive, 'because we desire nothing further after it', says Rameau.³⁹ The challenge then, is consisting in the differentiation of cadences according to their stage and role in the discourse. In Rameau's treatise this process is described in several chapters under the heading: 'How to avoid cadences while imitating them,' which he says, 'may be done in an endless number of ways.'⁴⁰

What is especially interesting in a psychological perspective is the manner in which Rameau describes these progressions. It is important to keep in mind that these are *egodynamic processes*, which moments and acoustical correlates could now be notated and described with a precision that has never been possible in other domains. Curiously enough, the examples are often worded *negatively*, as if existence was really a matter of postponing closure or entropy. It is a conception that is highly reminiscent of Schopenhauer and Buddhist philosophy. At the same time, it is also productive of all this content we call *music* and *life*.

The concepts of what is occurring along this road are not merely concerned with arbitrary rules and expectations as indicated by 20th century relativists like Leonard B. Meyer; they also have *content*. As for its most positive aspects, the *harmony* of the major triad in root position is obviously both a source of pleasure and the goal of a *perfect cadence*. If, however, the tonic is not in root position, the statement would still retain a certain amount of tension, and the conclusion would not be as resolved. This is the so called *imperfect cadence*, and according to

³⁹ Rameau, *Treatise on Harmony*, 63.

⁴⁰ Rameau, *Treatise on Harmony*, 82-83.

Rameau, it is already opening up for 'an inexhaustible succession of melodies and chords', which 'stirs the listener by the diversity arising from inversion'.⁴¹

Cadences may also be *irregular*, or *plagal* as they are often called, when approaching the tonic from chords on the fourth or second. Today these are called *subdominant* functions, which when returning directly to the tonic may also create a certain relief. But they are neither foreshadowing or negating the tonic in the same manner.

Yet this may not be sufficient to create a pregnant discursive process. As in other areas of life, more conflict is often needed. And again, we are talking of *actual* conflict or *harshness*. 'Dissonance seems needed here', says Rameau, 'in order that its harshness should make the listener desire the rest which follows'. This, he says, might be provided for instance by adding a large sixth or a minor seventh to a triad.⁴²

Certainly, expectation and *deception* is also part of this process, as in the so called *deceptive cadence*, resolving to the 'parallel key' or submediant a minor third below the tonic, which; although it is 'imperfect' and *interruptive*, 'does not differ greatly from the perfect cadence', says Rameau. Again we are reminded of the paradoxical nature of dialectics, always containing its own opposition. Containing a minor triad, one might add, it also creates a certain *tension*, which reinforces the feeling of deception or even some kind of *melancholy resignation*. 'Far from displeasing', says Rameau, 'it serves only to render the perfection of the perfect cadence still more agreeable when the latter, after having been temporarily suspended, finally appears'.⁴³

Yet another example of 'postponing conclusion' is *modulation*: 'straying from', and 'leading unnoticeable back to the tonic', as Rameau puts it. 'The ear does not respond with pleasure to a key which is heard too often.' A common way of bringing about such modulation is to reinterpret the function of a tonic chord by adding a minor seventh, making it a dominant chord in another key.⁴⁴

Adding to the expressive richness and functional ambivalence of these progressions are Rameau's idea of '*chords by supposition*', adding thirds or fifths *below* a seventh chord, and not merely stacking thirds on top of each other, as is the dominant practice today. Perhaps Rameau

⁴¹ Rameau, *Treatise on Harmony*, 77.

⁴² Rameau, *Treatise on Harmony*, 62 and 83.

⁴³ Rameau, *Treatise on Harmony*, 71.

⁴⁴ Rameau, *Treatise on Harmony*, 268 and 84.

was not aware that ninths and elevenths are also part of the harmonic series. A similar idea is 'chords by borrowing', created by rising the fundamental a half step. The concept of *supposition* or *borrowing* here is implying that the upper parts of a chord are treated very much like before.⁴⁵

Similar harmonic effects, postponing or interrupting conclusions, could be generated by *melodic chromaticism* in the top voice. This, he says, 'produces a marvellous effect in harmony, because most of these semitones, not in the diatonic order themselves, constantly produce dissonances which postpone or interrupt conclusions and make it easy to fill the chords with all their constituent sounds without upsetting the diatonic order of the other upper parts.'⁴⁶

Notwithstanding his slightly unfamiliar way of deriving them, Rameau is in effect opening up a vast field of very large and complex chords here; the whole harmonic repertoire, in fact, that are later utilised by romantic composers and in jazz. As a matter of fact, Rameau gives explicit examples both of 9th, 11th, and 13th chords, as well as augmented triads, so called altered dominant seventh chords, diminished and half diminished seventh chords, and suspended fourths.⁴⁷ Not only is the expressive potential vast, it is the very chromaticism that would finally - in Schoenberg's works - 'tip over', and turn into atonality and 'musical prose'.

Describing in words the feeling or sound of these chords, or the emotional expressions of which they are constituent parts, is an entirely different matter. Nevertheless, in a chapter 'on the properties of chords' this is exactly what Rameau tries, talking unashamedly about 'chords which are sad, languishing, tender, pleasant, gay, and surprising'. The consonant chords, he says, 'should predominate in cheerful and pompous music', and it is especially in this context that the preparation of dissonances is important, he emphasises.⁴⁸

It is a contextual and functional explanation, which gets even clearer when he talks about dissonance. 'Sweetness and tenderness are sometimes expressed well by prepared minor dissonances. Tender lamentations sometimes demand dissonances by borrowing and by supposition, minor rather than major...Languor and suffering may be expressed well with dissonances by borrowing and especially with chromaticism...Despair and all passions which

⁴⁵ Rameau, *Treatise on Harmony*, 88-91.

⁴⁶ Rameau, *Treatise on Harmony*, 304.

⁴⁷ Rameau, *Treatise on Harmony*,. 88-95 and 292-304.

⁴⁸ Rameau, *Treatise on Harmony*, 154-155.

lead to fury or strike violently demand all types of *unprepared dissonances*, with the major dissonances particularly occurring in the treble.¹⁴⁹

As we can see: even his demand of *preparing dissonances* is sacrificed when fury and despair is to be expressed. So what he is describing here is not set of *arbitrary* and *dogmatic* rules, as more conservative and relativistic theorists often like to claim, but *a necessary relation between form and function*. Harmony is harmonious because it is harmonious, dissonance is dissonant because it consists of dissonances. Certainly music may change; and baroque music *had* to change, when 'cheerful and pompous music' was no longer in vogue. And it was precisely this intrinsic tonal disruption and *drama* that was increased by successors like Carl Philip Emanuel Bach, Beethoven, Wagner, and Schoenberg. The necessary connection between drama and discord, and the harmonic means by which it could be created, were already described by Rameau.

To fully satisfy Aristotle's demand of synchronising form and function, rhetorical techniques and genre, one might have to go even further in this direction. The most exhaustive explanation is always the most perspectival; and as pointed out by philosophers like Spinoza and Hegel: it is always a negation. Especially the differences between emotion in Baroque music and in ordinary life would have to be clarified. And this is exactly what Rameau does, when comparing *arias* and *recitatives*, song and speech.

Certainly, a recitative is not the same as speech, but there are similarities. 'More care is required in recitatives than in airs,' says Rameau, 'for here it is a matter of narrating or reciting stories or other such things. The melody must then imitate the words so that the words seem to be spoken instead of sung.'¹⁵⁰ In other words: the main function of baroque music is *not* that of 'narrating or reciting stories or other such things'. Baroque *recitatives*, which are also baroque music, may do this, but the *arias* probably come closer to Augustin's concept of *jubilation*, if only of a more dialectical or rhetorical character than in Medieval music. The rhetorical genre of *epideictic oratory* is even more relevant now. And it should not be necessary to add that even jubilation and song are parts of our emotional make up. As earlier mentioned: recent

⁴⁹ Rameau, *Treatise on Harmony*, 155.

⁵⁰ Rameau, *Treatise on Harmony*, 178.

neuroscientific research might even indicate that song is underpinned by a separate region in the temporal cortex.⁵¹

Certainly baroque music is cheerful and even pompous in many cases. Compared to later classical idioms, it is replete with repetition and sequences going on and on. It is rhetorical at the local level, but it is not yet structured as a *lecture*. Even the baroque opera is organised like a patchwork of arias and dances interspersed with recitatives that are bringing the narrative forward. Perhaps this is also the reason why Rameau has so little to say about dramaturgy and the long-range principles of musical organisation. It is only in connection with fugue composition that he touches on these matters.

Rameau's treatise is first of all a treatise on harmonic progressions, which is somewhat in contrast to *Der vollkommene Capellmeister* (1739), written by his German friend and contemporary Johann Mattheson.⁵² While building on the harmonic principles of Rameau, Mattheson was also positioning himself against him, with his idea of melodic priority and coherence, even in the middle voices of a composition.⁵³ What came first, the chicken or the egg, harmony or melody? It is a moot question; and the difference between these theorists are more complementary than contradictory. Unlike Rameau, Mattheson systematically goes through and characterises a lot of rhetorical principles, styles and categories of composition: high, middle, and low styles; music for the church, theatre, different types of instrumental music and so on. In another chapter, 'on the Categories of Melodies and their Special Characteristics', he characterises a lot of dances and other forms.⁵⁴

In many ways, Mattheson's taxonomies are school examples of *pluralism*. While speaking of 'naturalness', this is not connected by Mattheson with a specific style or theoretical *dogma*. Proceeding in the vein of Aristotle's essentialism and his rhetorical typologies, naturalness is defined rather as the truthfulness of a style to its own affective and rhetorical function: 'If the

⁵¹ Sam Norman-Haginere, Nancy G. Kanwisher, Josh H. McDermott, 'Distinct Cortical Pathways for Music and Speech Revealed by Hypothesis-Free Voxel Decomposition', *Neuron*, vol 88, issue 6, 16. December 2015, pp. 1281-1296

⁵² Johann Mattheson, *Der Vollkommene Capellmeister: Das ist Gründliche Anzeige aller derjenigen Sachen, die einer wissen, können, und vollkommenen inne haben muss, der einer Capelle mit Ehren und Nutzen vorstehen will* (Hamburg: Herold, 1739).

⁵³ Johan Mattheson's *Der Vollkommene Capellmeister*; a revised translation with critical commentary by Ernest C. Harris (Ann Arbor, Mich: UMI Research Press, 1981.), Part II, Chapter 2, §42.

⁵⁴ Mattheson, *Der vollkommene Capellmeister*, Part I, Chapter 10, and Part II, Chapter 13.

styles do not conform with their performing persons, concepts and functions,' says Mattheson, 'then not a single one of them is natural; the pompous least of all'. And to be clear: his concept of naturalness is not limited to jubilation or the affirmation of harmony.⁵⁵ 'The business of music', says Mattheson, 'though it should mainly strive to be charming and pleasing, still serves occasionally with its dissonances or harsh passages to some measure and with suitable instruments to present not only something of the unpleasant and disagreeable, but also something of the frightening and horrible: as the spirit even occasionally derives some peculiar sort of comfort from these'.⁵⁶

The most important contribution of Mattheson, however, is probably the introduction of the whole arsenal of *dispositio* concepts: *exordium*, *narratio*, *divisio* or *propositio*, *confirmatio*, *confutatio*, and *peroratio*; which may seem strange, because his music, while rhetorical at the local level, was still rather sectional, operating with the Baroque idea of single pervasive emotions. Since instrumental music is nothing else than speech in tones or oratory in sound, it must actually be always based on 'one specific affection', he says for instance.⁵⁷ And sure enough, when Mattheson applies these concepts to an analysis of an aria by Marcello, he is focussing on a level that is probably more local than in Aristotle's examples: sentences and phrases within sections. Certainly the sections are also differentiated by Mattheson, but more as repetitions interspersed by caesuras than by large-scale applications of the mention schemes, like in a classical symphony.

His description of the 'Fantasy style' is probably the nearest he comes to the kind of meandering dramas and avant-garde idioms that emerged in the second half of the eighteenth century.

'For this style is the freest and least restricted style which one can devise for composing, singing, and playing, since one sometimes uses one idea and sometimes another, since one is restricted by neither words nor melody, but only by harmony, so that the singers' or player's skill can be revealed; since all sorts of otherwise unusual passages, obscure ornaments, ingenious turns and embellishments are produced, without close observation of the beat and pitch, though these do occur on paper; without a regular principal motif and melody, without theme and subject which would be performed; sometimes

⁵⁵ Mattheson, *Der vollkommene Capellmeister*, I, 10, §21.

⁵⁶ Mattheson, *Der vollkommene Capellmeister*, I, 3, §79.

⁵⁷ Mattheson, *Der vollkommene Capellmeister*, I, 10, §63.

fast sometimes slow; sometimes with one sometimes with many voice parts; also sometimes a little behind the beat; without meter; yet not without a view to pleasing, to dazzling and to astonishing. Those are the essential characteristics of the fantasy style.⁵⁸

Perhaps Mattheson had a premonition of what would come. Indeed, his pluralistic attitude and the richness of his affective and rhetorical categories must have been very inspiring to succeeding composers. The opera genre was going to be reformed in the direction of more integrated musical dramas. Similarly, a much more complex rhetoric and dramaturgy was soon to be realised in the sonatas of Carl Philipp Emanuel Bach, Joseph Haydn, and Ludwig van Beethoven. The similarities between Mattheson's *dispositio* categories and the sonata form as it was later to be described, are striking. The difference is just that whereas Mattheson's principles were described *before* this music was written, and studied both by Haydn and Beethoven; the sonata-allegro scheme, with its *introduction, exposition, development, recapitulation, and coda*, was codified first *after* the Classical period, by nineteenth century theorists like Anton Reicha (1826), A B Marx (1845) and Carl Czerny (1848).

Interestingly enough, since this is also the layout of this treatise, Mattheson's classifications are not only rhetorical and pluralistic, they are also very *hierarchical*. To this end he used, among other things, the ancient rhetorical concepts of *dispositio, elaboratio, and decoratio*. So let us arrange the below discussion in the following manner:

INVENTIO AND DISPOSITIO:

The five rhetorical steps of *inventio, dispositio, elocutio, memoria, and pronounciatio*, were first put to musical use by Kircher (1601-1680), but it is first of all the concepts of *inventio, dispositio, elaboratio, and decoratio* that became central to Mattheson. As possible 'sources of invention' he also discusses the somewhat obscure *loci topici: locus notationis; descriptionis; generis & speciei; totius & partium; causae efficientis, materialis, formalis, finalis; effectorum; adjunctorum; circumstantiarum; comparatorum; oppositorum; exemplorum; testimoniorum*. Admittedly Mattheson 'make no great thing out of' these *loci topici* himself,⁵⁹ but he gives some examples of how it might be done.

⁵⁸ Mattheson, *Der vollkommene Capellmeister*, I, 10, §93.

⁵⁹ Mattheson, *Der vollkommene Capellmeister*, II, 4, §20-§25.

It should be fairly unproblematic to say that it is this general *mission*, the 'causa finalis', the social and expressive function of a certain style or genre, which is the starting point and the top of the hierarchy of egodynamic gestalt formation. The process of *inventing* the music naturally comes next; and 'it is a good idea,' says Mattheson, 'to sketch it roughly, and arrange it orderly before proceeding to the elaboration.'⁶⁰

The concepts of *exordium*, *medium*, and *finis* of a composition had already been employed for instance by Johann Andreas Herbst (1643), and were obviously relevant to the common ABA forms in Baroque music and fugue composition, where the opening was also referred to as 'la propositione della fuge' by Berardi in 1690.⁶¹ Yet Mattheson was adding considerable complexity to this process by reintroducing the concepts of *Narratio* (which, following an introduction in the accompaniment, 'points out the character of the discourse'), *Propositio* (which, he says, is the 'actual discourse, simple or compound, after the first caesura'), *Confirmatio* (repetitions embellished by variations), *Confutatio* (combining, or quotation and refutation of foreign-appearing ideas: 'for through just such antitheses, if they are well stressed, the hearing is strengthened in its joy and everything which might run against it in dissonance and syncopations is smoothed and resolved'), *Peroratio* (the end or conclusion, which must produce 'an especially emphatic impression,' especially in the *Epilogue*).⁶²

Mattheson makes it very clear that all these concepts may not be conscious or even interesting to most composers. The compositional process is largely *instinctual*, he says; 'Everyone should follow his own instinct', 'this has always worked well for me'. Yet, he argues, the mentioned categories can usually be 'discovered' in clever and well disposed sequences.⁶³

An aria by Marcello is chosen as a particularly good example of a such a 'clever' and 'well disposed' sequence. And here he goes even more into detail, by distinguishing between *propositio simplex* in the bass and *propositionem variatam* in the vocal part, then combined: *propositionem compositam*. The corroboration or confirmation is varied beautifully, he says, before it is closed with peroration or conclusion.⁶⁴

⁶⁰ Mattheson, *Der vollkommene Capellmeister*, II, 4, §30.

⁶¹ Bartel, *Musica Poetica*, 44 and 111.

⁶² Mattheson, *Der vollkommene Capellmeister*, II, 14, §8-§12.

⁶³ Mattheson, *Der vollkommene Capellmeister*, II, 14, §27.

⁶⁴ Mattheson, *Der vollkommene Capellmeister*, II, 14, §14-§22.

With regard to the second part of this aria, he describes how with a new narration and an apostrophe, Marcello 'tears off so to speak a little piece of his previous main theme, elaborates it through linking and confutations (dissonant replies), until he quite nicely 'thwarts the confutation, resolves it well and brings his period to rest at the fourth of the tonic, after the manner of the Hypodorian.'

Then, he says, 'the bass takes up the full theme, through another repetition at the fourth; does something unusual with it, and is followed by the vocal part with further improvement, like an amplification and verification (*amplificacioni & argumentacioni*) through which the melody approaches the fifth.' Then 'there is a new repetition, or *repercussio* at the fifth of the tonic, which figure in the art of rhetoric as *refractio seu reverberatio* (refraction or rebounding) in contrasting motion. Finally the distinct clause ventures on to a new confutation with which the second phrase or period closes, and then it is repeated from the top.'

His analysis is similar to the kind of half technical expositions later to be found in program notes and the like; which are hardly psychologically coherent or fully comprehensible without recourse to the sounding music. Also, one might question whether the concept of *narratio* as distinguished from *propositio* is relevant to types of music that are not really narrating or recounting in the manner of a recitative. His general advice is clear enough, though: 'The cunning device of the orators is, that they present the strongest points first; then the weaker ones in the middle; and finally impressive conclusions.' This is a 'trick' that musicians can also use.⁶⁵

ELABORATIO

The elaboration is 'twice as easy', says Mattheson, because 'whoever disposes well is half done with elaboration.'⁶⁶ Many of these matters are treated in the chapter 'On the Sections and Caesuras of Musical Rhetoric', starting with a description of the hierarchy of phrase structure. Even to performing musicians it is essential to have clear concepts of the different levels of organisation; and the terms he uses are still central to the trade. He distinguishes for instance between *phrases* and *periods* which are divided by *caesuras* forming *paragraphs*, going into

⁶⁵ Mattheson, *Der vollkommene Capellmeister*, II, 14, §25

⁶⁶ Mattheson, *Der vollkommene Capellmeister*, II, 14, §32-§39

main parts of chapters. In an aria, for instance, short *statements* are going into *smaller sections* forming larger *sections*.⁶⁷

More important, of course, is the *content* of these phrases: the functions of the discourse and the varying *character* of their implementation. Interestingly enough, his account of these matters is very similar to that of Rameau, describing series of cadences differentiated by their decisiveness or unresolvedness: *formal cadences*, *full cadences*, *concise cadences*, *indecisive* or 'questioning' endings on the fourth or fifth, or on the sixth steps.

Unlike Rameau, Mattheson also operates with a whole arsenal of punctuation types: *commas*, *caesuras*, *colons*, *semicolons*, and even *question marks*, *exclamation marks*, and places for *breathing*; which seems like a good idea. These are musical aspects of speech in the first place. Or to put it differently: it is very obvious how entities like a pause, an accent, a questioning tone, a heightening of the voice, or the heavy breathing of a musician, are physically manifested in the sounds, whereas dots, letters, or words are merely *symbolising* it. The case of *parentheses* is different, says Mattheson, and much more problematic from a musical point of view.⁶⁸

As examples of how these things are integrated by Mattheson, he explains for instance how 'the concept of a period obliges me not to make a *formal* close in the melody before the sentence is finished. But the concept of a paragraph prohibits me from using a full cadence anywhere except at the end. Both cadences are *formal*: but the first is not *full*.'⁶⁹ 'If a narration is to follow, the melody must be indecisive as it were: which commonly is done through the fifth of the tonic with the 7-6, or even in another way. 'The concise cadence takes place, when a melancholy exclamation (*exclamatio*) or an imperative word (*imperativus*) occurs which truly indicates a delay or requires reflection'.⁷⁰

When it comes to *questioning*, Mattheson is pointing to a difference between speech and song, in the sense that there are more ways of realising this function in song. Whereas in speech, and often in song as well, questioning is constituted by rising the pitch at the end of sentences, tonal music may also use 'other clever melodic solutions', like an imperfect consonance, or closing on the sixth step. We are dealing with rhetorical devices here, that do not even exist in

⁶⁷ Mattheson, *Der vollkommene Capellmeister*, II, 9, §5

⁶⁸ Mattheson, *Der vollkommene Capellmeister*, II, p, §69

⁶⁹ Mattheson, *Der vollkommene Capellmeister*, II, 9, §14

⁷⁰ Mattheson, *Der vollkommene Capellmeister*, II, 9, §36

speech melody. Thus the question whether the melody is ascending or descending does not always matter in song, says Mattheson.⁷¹

Getting even more specific, and focussing on the manner in which this discourse gets an emotional character, Mattheson mentions for instance that *outbursts* or *exclamations* require 'rapid or fast sounds, large but not common intervals, or small and extraordinary intervals.' More desperate outpourings require 'nothing but confused intervals which have an unruly relationship with one another, such as major and minor thirds together, etc, and one may choose a frenzied tumult, fiddling and whistling for accompaniment for the impious, wicked scream, for which the Pyrrhic meter is well suited.'⁷²

DECORATIO

'One must add some ornamentation to one's melodies', says Mattheson, 'and the abundant figures or tropes from rhetoric can really do good service here, if they are well arranged.'⁷³ Mattheson is somewhat unclear with regard to what is constituting the actual rhetoric and what is to be defined as 'ornamentation'. The importance of the latter is also questioned. 'So-called ornaments can spoil many a beautiful melody', he says for instance, and he is pointing to the composer Josquin des Prez, who allegedly got furious when performers destroyed his music in this manner.⁷⁴

Referring to Andreas Herbst and Printz, he mentions that 'In the past our learned musicians have compiled whole books in the usual instructional style on nothing but vocal ornaments, which I call *Figuras cantionis*'. But 'Things change almost yearly', he remarks, 'and the old ornaments are out of style, are changed, or even make room for more recent fashions'. 'Yet there are some embellishments', he says, 'as for example the accents, the slides, the appoggiaturas etc., of rather more enduring longevity.'⁷⁵ The amount of ornamentation in our days jazz and soul music is just as extensive, and not necessarily very different. Even much of the terminology is living on, and to an even larger extent than was indicated by Mattheson here.

⁷¹ Mattheson, *Der vollkommene Capellmeister*, II, 9, §61-§63.

⁷² Mattheson, *Der vollkommene Capellmeister*, II, 9, §66-§68.

⁷³ Mattheson, *Der vollkommene Capellmeister*, II, 14, §40.

⁷⁴ Mattheson, *Der vollkommene Capellmeister*, II, 14, §41-§42.

⁷⁵ Mattheson, *Der vollkommene Capellmeister*, II, 14, §50-§51.

Anyhow, Mattheson lists many of these concepts; and even here they are arranged in a hierarchical manner. The *figurae sententiae*, he says, 'concern whole phrases, their variations, imitation, repetitions etc.' The *figurae dictionis* 'have a great similarity with the changes of the pitches into long and short ones, into ascending and descending ones etc.'⁷⁶ 'What is more usual than the anaphora (repetition of a word at the beginning of several sentences) in the composition of melody,' he says for instance. 'The *Epanalepsis* (repetition), *Epistrophe* (turning about), *Anadiplosis* (reduplication), *Paronomasia* (word play), *Polyptoton* (a figure of speech where several grammatical cases of the same word stand together), *Antanaclasis* (use of a word in an ultimate sense) *Ploce* (repetition of the same word in an alternate sense) etc., have such natural places in melody that it almost seems as if the Greek orators had borrowed such figures from music.'⁷⁷

'Concerning the sentence-figures, where the purpose of music is aimed at the whole modulation, who does not know of the usage of exclamations, three types of which have already been considered above as one part of the rhetoric of music? Where is *Parrhesia* (outspokenness) greater than in the composition of melody? One can almost touch *Paradoxa*, which presents something unexpected. The *Epanorthosis* or the echo takes place in almost all of counterpoint. The *Paraleipsis*, *Aposiopesis*, *Apostrophe*, etc, are all in some way at home in music.'⁷⁸

While *Der vollkommene Capellmeister* might be the culmination of 'music rhetoric' as a field of study, Mattheson was neither the first or the last to teach it. A very systematic, overview of this field is given in Dietrich Bartel's *Musica Poetica: Musical-Rhetorical figures in German Baroque Music*.⁷⁹ After a historical overview, which is probably the strongest part of this work, he goes through the biography and production of fifteen central German theorists, each with their own emphasis and way of classification. Contrary to common belief, there is no unified doctrine of rhetorical and affective figures in the Baroque. The idea of a common 'doctrine of the

⁷⁶ Mattheson, *Der vollkommene Capellmeister*, II, 14, §41.

⁷⁷ Mattheson, *Der vollkommene Capellmeister*, II, 14, §46.

⁷⁸ Mattheson, *Der vollkommene Capellmeister*, II, 14, §47.

⁷⁹ Dietrich Bartel, *Musica Poetica: Musical-Rhetorical Figures in German Baroque Music*, University of Nebraska Press, Lincoln and London, 1997.

affections or Affektenlehre', says Bartel, 'is untenable when one examines the many Baroque sources.'⁸⁰

Burmeister, for instance, distinguished between *figurae harmoniae*, *figurae melodiae*, and *figurae tam harmoniae quam melodiae* (harmonic-melodic figures); Nucius between *figurae principales* and *figurae minus principales*. Christoph Bernhard (1660) was categorising figures according to three styles: *stylus communis*, *stylus modernus*, and *stylus theatralis*, the latter of which are more suitable for *licenses* (*licentiae*) in the treatment of dissonance, like in *unconventional resolutions* (*mora*), or *intrusions* (*heterolepsis*), dramatic *intensification* (*climax*, *gradatio*), *prolonged dissonances* (*extensio*), and dissonant *passing tones* (*transitus*); *question marks* (*interrogatio*), and *interruptions* (*ellipsis* or *abruptio*).⁸¹

The lists of 'figures' set up by these authors are often overlapping, and instead of mentioning the same concepts many times, it might seem like a good idea to go straight to Bartel's own lists of figures. In a separate chapter, and in several appendixes, Bartel purports to give a comprehensive overview, both in alphabetic order and according to his own categories, which seems like a good idea. Yet one soon gets a feeling that many of his choices regarding what to list, and how to list it, are products rather of his own views, and the dogmas governing the trade of a 20th century historian. Perhaps Mattheson was right that there is really an overemphasis on ornaments and other low level entities among 17th century German theorists, but this is not the whole truth, and one gets the feeling that a lot is missing from Bartel's lists, especially the higher level entities and non-latin concepts that have already been mentioned in connection with Mattheson and Rameau.

The first two categories in Bartel's 'summary of figures by category' are 'figures of melodic repetition', and 'harmonic repetition and fugue'.⁸² It lists more than 40 terms dealing with repetition, many of which are obviously synonymous and redundant: repetitions of a bass line or repetition in general (*anaphora*, *repetitio*, and *fuga*); repetition with *gradual intensification* (*auxesis*, *incrementum*, *climax*, and *gradatio*); repetition of a conclusion in the beginning (*anadiplosis*) or *end* of a subsequent phrase (*epistrophe* and *epiphora*); repetition with more *emphasis* (*epizeuxis*, *paranomasia*); repetition of a theme (*patilogia*); repetition of a melody at

⁸⁰ Bartel, *Musica Poetica*, 30.

⁸¹ Bartel, *Musica Poetica*, 113.

⁸² Bartel, *Musica Poetica*, 444.

different pitches (polyptoton); repetition with *modification* (synonymia); repetition in *inversion* (hyppalage, antimetabole, and antistrophe). Somewhat peculiar are all the terms dealing with repetitions of so called 'noema' (mimesis, ephonia, imitatio, analepsis, and anaploce). The concept of 'noema' is hardly known today, but has had to do with homophonic, though-like passages in polyphony.

However, the concept of *repetition* is very low level. It is hardly a figure at all. And it is easy to suspect that Bartel's definition of figures is not concerned with rhetorical gestalts in general, but something much more elementary and immediate, and only those figures that have a latin label. But this is not entirely the case, because his next category is something he calls: 'figures of representation and depiction'. It is obviously a category mistake, because most of the terms listed here are not about depiction at all; but it is easy to imagine how he might have come to such a conclusion. If his basic concept of music is so low level that it has hardly any content, it is easy to classify everything else under the heading of 'representations'. Yet, the only terms denoting representation or imagery here are *assimilatio*, *homoisis*, *hypotyposis*, and *prosopoeia*; and partially those that are referring to something *ascending* or exalted (anabasis and ascensus), *descending* (catabasis or descensus), *circulation* or waving (circulatio, circulo, or kyklosis), *chasing* or fleeing (fuga in alio sensu).

Such mimicking or 'Mickey mousing' of extramusical matters was problematised and critiqued already during the Baroque. Mattheson calls it 'weak and ill-considered artificials'. 'If one will thoughtlessly never let the words: deep, high, heaven, earth, joke, suffer, joy, descending, ascending, tears and thousands of the like, pass by in the melody without having their special figures and melismas; regardless of whether the intelligence deems such as worthless: then one makes a mockery of music.' 'Losing heaven, and winning the earth, is a proposition which is not spatial or literal, but figurative, also therefore requires no special raising or lowering.'⁸³

The other words that Bartel listed under this rubric are not about imitation at all, but constituting rather the basic musical discourse as described by Rameau and Mattheson: *antithesis*, *antitheton*, and *contrapositum* (expression of opposing affections, harmonies, or thematic material); *dubitatio* (intentionally ambiguous rhythmic or harmonic progression)

⁸³ Mattheson, *Der vollkommene Capellmeister*, II, 11, §10.

emphasis; *exclamatio* or *ecphonesis* (musical exclamations); *interrogatio* (musical question created by pauses or rising pitch or imperfect or Phrygian cadences); *metabasis* or *transgressio* (crossing of voices); *noema* (homophonic passage within a counterpointal texture, like thought or obscure speech); *pathopoeia* (emotionally arousing passage). As earlier argued: it is the sounds, the rising pitch, the loudness and the dissonances, that are *creating* these antithetical, exclamatory and arousing effects; is not the text that does this. The words are *referring* to these things; but the music does not have to do that: it is already self-identical.

It may be too much to expect from a historian to be able to clearly distinguish between manifestation and representation, melody and text. Bartel's book might have been written just a little too early to benefit from the revival of embodiment theory at the end of the 20th century. Yet he refers to remarks in Johann Adolf Scheibe's music journal *Der Critische Musicus* (1737-40), focussing on figures which 'particularly belong to music' [derjenigen Figuren anmerken, welche der Musik insonderheit eigen sind]. 'The figures are themselves a language of affections', says Scheibe, without which the 'Gemütsbewegungen' could not be expressed [Kann man wohl ohne sie die Gemütsbewegungen erregen unde ausdrücken? Keinesweges. Die Figuren sind ja selbst eine Sprache der Affecten].⁸⁴

It is an understanding that was developed especially by Schopenhauer, who placed melody at the top of his ontological hierarchy, as the most direct manifestation of the Will. But Mattheson might have been an important source to both of them; at least Scheibe was inspired by Mattheson's journal *Critica musica* (1722-25). As pointed out by James van Horn Melton: Mattheson's emphasis on gesture and melody owed much to Lockean empiricism and sensationalism,⁸⁵ and there might well be a historical line here, from the enlightenment empiricists, via Mattheson and Schopenhauer, to psychologists like Wilhelm Wundt and even Damasio.

Whereas many weaker thinkers are operating with the false dichotomy between something obscure and 'inner', which is merely expressed or symbolised by something 'outer', or vice versa, Mattheson's concept of emotion, in like manner with that of William James, is fundamentally embodied; and he makes it clear that 'there is nothing in the mind which has not previously been

⁸⁴ Bartel, *Musica Poetica*, 149-150.

⁸⁵ James van Horn Melton, 'School, Stage, Salon: Musical Cultures in Haydn's Vienna', in *Haydn and the Performance of Rhetoric*, ed. Tom Beghin and Sander M. Goldberg (Chicago and London: The University of Chicago Press, 2007), 90.

in the senses.⁸⁶ The emotions are always already embodied in the sense modalities, which are differentiated in the brain, so there is no barrier here between sound and 'soul'. The ears are only 'instruments', says Mattheson, while the hearing 'dwells in the soul.': 'We thus will simply show and teach how such music would be composed, and performed, which through the instrument of the ears please the sense of hearing which dwells in the soul, and would thoroughly move or stir the heart or soul.'⁸⁷

Another aspect which has been increasingly central in the research on will and emotion is the role of kinesthetics and the motor system. And Mattheson actually wrote a separate chapter on these matters, integrating music in the wider field of nonverbal communication; more specifically, the ancient discipline of *Hypocritica* ('under-criticism'), which, with its subcategories of the *oratorical*, *histrionic* (theatrical), and *saltatorial* (relating to dance), is dealing with the postural, gestural, and mimetic underpinnings of varieties of speech and action. 'Our ancestors' - and he is referring to Cassiodorus in particular - 'called the art of gesticulation silent music'. Even this 'belongs to the office and abilities of a perfect Capellmeister', says Mattheson, and he is pointing to the composer Lully, who himself instructed his actors and dancers in the art of gesticulation.⁸⁸

The impact of sound and music is so tangible, according to Mattheson, that it might be used as 'medicine': 'All naturalists are also certain that music can not infrequently take the place of medicine because of its natural harmony and concord'. Especially depression or melancholia are thought to be cured by it, but he also gives examples of several other cases, where for instance the sounds are working directly on muscle issues.⁸⁹

As strange as this may seem to sceptics like Bartel, it is a fact that such 'medicine' or music therapy has been practiced for a long time, even by Beethoven and other composers. In fact, its importance has been growing, and it is not only concerned with emotional and social problems. With the vibroacoustic chairs and ultrasonic devices of today, sound is employed as a means of stimulating muscular and cellular tissue, both in the body and the brain. According to Thomas Heimburg and Andrew D. Jackson at the Niels Bohr Institute, the media in which the brain cells

⁸⁶ Mattheson, *Der vollkommene Capellmeister*, I, 2, §22.

⁸⁷ Mattheson, *Der vollkommene Capellmeister*, I, 2, §24.

⁸⁸ Mattheson, *Der vollkommene Capellmeister*, I, 6, §5, §2, and §26.

⁸⁹ Mattheson, *Der vollkommene Capellmeister*, I, 3, §42 and §47.

are communicating and *constituting* our experiences are partly electric, thermodynamic, and sonic by nature, that is to say: the brain waves might also be sound waves, or so called *soliton waves*;⁹⁰ which makes it easier to understand the power of music, working indirectly or directly on these waves.

However, Mattheson is probably at his strongest and most sophisticated when challenged by reductionism, the idea, which is only indirectly reflected in Bartel's low level focus, that music can be reduced to something mathematical and insentient. Somewhat paradoxically it is in a chapter *On the Mathematics of Music* that Mattheson is really demonstrating a conceptual and processual understanding of music. Rather than being limited by Humean myopia, he is approaching here the understanding of Wundt and the gestalt psychologists. While founded in physics, says Mattheson, music cannot be reduced to isolated sounds. The experience of music involves *concepts* [Begriffe] that are connected with emotional circumstances and processes. We are touched not by the sounds or mathematical ratios in isolation, he says, but by the *stories* [Geschichte] that are played out, which are not tied to words, but is 'always new and inexhaustible, fusing, interchanging, varying in application, mixing, properties, entering and leaving, heightening, depth, steps, leaps, hesitation, acceleration, delay, tranquility and thousand other things.'⁹¹

If we return to the remaining categories on Bartel's list, there are only scattered traces of such figures or gestalts: the mentioned products of histories and emotional functions. Under the rubric of *figures of dissonance and displacement* there is hardly anything of this, only low level constituents like omission (elipsis); omission of a final tone (apocope); omission of opening consonance (inchoatio imperfecta); intrusion of voice (heterolepsis); dislocation (hyperbaton); transgression of range (hyperbole); large interval (longingqua distantia); rising when falling is expected (mora).

Concerned with dissonance treatment are: dissonances that are *prolonged* (extensio, pleonasmus), *unexpected* (antistaechon), *split up* (multiplicatio), or located to the *pre-*

⁹⁰ Thomas Heimburg and Andrew D. Jackson, 'On soliton propagation in biomembranes and nerves', *Proceedings of the National Academy Sciences of the United States of America*, Vol 102, No. 28 (12 July 2005): 9790-9795, <https://doi.org/10.1073/pnas.0503823102>.

⁹¹ Mattheson, *Der vollkommene Capellmeister*, Vorrede, part 6. Some of these concepts are lost in Harris' translation (47-48) where 'connected concepts' (verbundene Begriffe) is replaced by 'ideas associated'; and the sentence about 'history' (Geschichte) is omitted.

penultimate chord (*cadentia duriscula*), or occurring in *leaps* (*saltus durisculus*); or resolving upwards (*retardatio*). Then there are so called 'improper consonances' (*consonantia impropriae*), consonances that are alternating with imperfect consonances (*congeries* or *synathromismus*); successive sixth cords (*faux bourdon*, *catachresis*, or *simul procedentia*); enharmonic rewriting (*apotomia*); and chromatic alterations (*passus durisculus*, *mutatio toni*).

What is striking, and indicative of importance, is all the terms dealing with *suspensions* and dissonant *passing tones*. There is at least five terms denoting suspension (*prolongatio*, *synaeresis*, *syncopatio*, *ligatura*, *parrhesia* or *licentia*); and the same with dissonant passing tones (*transitus*, *celeritas*, *commissura*, *deminutio*, *symblema*). And it is easy to understand why much of this became superfluous. If most of this is already covered by words like *suspension* and *passing tone*, there is little reason to use all these latin terms.

The same could be said about the category of *figures of interruption and silence* containing trivial concepts like pause (*pausa*); general pause and silencing (*aposiopesis*, *reticentia*, *abruptio*, *homioptoton*, *homiooteleuton*), omissions (*ellipsis*); interruption or fragmentation by rests (*tmesis* or *sectio*). The concept of *sighing* (*suspiratio* or *stenasmus*) is slightly higher level, and relevant to the understanding of mental processes, where breathing and weariness is always involved.

The category of *figures of melodic and harmonic ornamentation* contains a lot of what has now become standard terminology: terms like *accent*, *acciacatura*, *run* (*tirata*), *tremolos*, *trills* (*tremolo* or *trillo*, *ribattuta*, or *tenuta*), *coloratura* (*variatio*, *diminutio* or *passagio*), and *anticipations* (*anticipatio*, *praesumptio*, *prolepsis*, *superjectio*); as well as various four note figures (*Salti composti*, *Gropo*, *Messanza*, *Misticanza*, and *Bombus*) and three note figures (*corta*).

Certainly these ornaments are 'figures' of a kind; but they would require much more context to get a rhetorical or affective function. Even leaves are shaking. For a shake or trill to be a musical manifestation of *anxious trembling* or something *thrilling*, it would have to be integrated in a sequence of musical statements - which in the case of functional harmony would be the *cadences* - as well as a certain manner of executing these cadences, involving either dissonance, turmoil, or something relaxing and harmonious, like a falling sequence.⁹²

⁹² See Bang, *Psychologizing Music*, for a discussion of different kinds of ornaments in Beethoven's Opus 54.

The last category, which Bartel calls *miscellaneous figures*, contains occurrences like *diminutio* or *meiosis*, which are obviously relevant to the kind of *intensification by shortening* so essential to musical classicism and rhetorical processes, but it is not rhetorical in itself. The concept of *Paragoge* (or *manubrium* or *supplementum*) on the other hand, is certainly doing this, by denoting a *cadenza* or *coda over a pedal point*. It is one of the few examples of latin terms that might well have become viable concepts even today.

What is more interesting perhaps, and putting his lists in perspective, is everything that is omitted from them; much of which is nevertheless mentioned in his historical treatment. It indicates how much that has to be included, if the whole field of musical gestalt formation is to be reflected.

First of all, the role of the long-range functions of the discourse, the concepts of *introduction*, *discourse*, *confirmation* and *contradiction*, which are probably the most important contributions of the field of rhetoric to musical organisation are somewhat downplayed. Omitted from the lists are also Mattheson's concepts of phrase structure, *sentences*, *phrases*, *periods*, *paragraphs*, *sections*, *chapters*, as well as many *punctuation* types. The most important category of figures, however, is undoubtedly the *cadences*, providing very much the rhetorical backbone of these processes: the varieties of musical *statements*, *closes* and *half closes*, which may be *perfect*, *full*, *imperfect*, *surprising*, *disappointing* and so on. The fact that all these words are still in use is a strong evidence of their relevance. But they are not latin. These are specifically musical and relatively recently discovered functions, which of course, does not make them any less rhetorical; although Bartel might think so, because they are seldom mentioned in his book.

Then there is the *character* of this dialectic, the question whether a statement or sequence of statements is performed for instance in a dragging and dissonant or a sprightly and harmonious manner. These are also integrated elements of the figurations or behavioural gestalt formations, and the labels with which they are often endowed are words like *lament*, *laudation* and so on. In fact, all the styles and dances that are characterised by Mattheson are examples of such higher level gestalts. According to Mattheson, the music may be 'skipping', like in Gavottes, or more 'flowing and smooth' like in the Bouree, which, he says, is also a manifestation of 'contentment and pleasantness'. The Rigaudon has the character of 'trifling joking', he says. Marches, on the other hand, are 'heroic and fearless'. The Entree is similar to marches but more 'noble'. The

Gigue is 'fresh and lively'. He also speaks about 'the chant's noble simplicity', 'the melismatic style of odes' and so on.⁹³

It is easy to forget that we are dealing with actual rhetorical and behavioural entities here, which are signified by these concepts: *chant*, *ode*, *march* and so on. These are examples of higher level mental compounds, which tend to get more abstract than the concept of let us say a *trill*; but this is just a matter of degree and complexity. The low level character of Bartel's list might be indicative of a reductionist impulse, seeking to create the illusion of some insentient, quasi-material objects. But even these simple occurrences are felt and perceived as temporal gestalten, at the level of insect cognition perhaps. They all require a certain integrative grasp, which is what concept formation is all about.

Nevertheless, much of what is omitted from his lists is mentioned in his initial historical treatment. Nucius' *Musices poeticae sive de compositione cantus* (1613) and Andreas Herbst's *Musica poetica sive compendium melopoeticum* (1643) are for instance operating with categories of 'verba affectum': rejoicing, weeping, fearing, wailing, mourning, pleading, raging, laughing, pitying; 'words of motion and place': standing, running, dancing, resting, leaping, lifting, lowering, ascending, descending, heaven, hell, mountain, abyss, heights; 'adverbs of time and number': quickly, fast, soon, slowly, early, late, twice, thrice, four times, again, once more, often, rarely; and other words such as light, day, night, darkness. Herbst also included words describing 'human states and mores and temperament': childhood, youth, old age; and human mores: haughty, humble, contemptuous, inferior, odious.⁹⁴ *The four temperaments*, as formulated by Empedocles, Hippocrates, and Galen: *melancholic*, *sanguine*, *choleric*, and *phlegmatic*, also remained authoritative.⁹⁵

Another category of concepts omitted from his summarising lists is the non-latin concepts, as employed for example by the English music theorists; concepts like: *reply*, *revert*, *report*, and *counterchange of points*. Even Francis Bacon was concerned with music rhetoric, the circumstance that 'the reports and fugues have an agreement with the figures in rhetoric of repetition and traduction.'⁹⁶

⁹³ Mattheson, *Der vollkommene Capellmeister*, II, 13.

⁹⁴ Bartel, *Musica Poetica*, 23-24 and 99-103.

⁹⁵ Bartel, *Musica Poetica*, 36-39.

⁹⁶ Bartel, *Musica Poetica*, 61-62 and 280.

The omission of these English terms from his taxonomies might have been explained by the fact that his book is basically about the German baroque, yet even *German* terms are omitted from some of his lists. Scheibe and Forkel are for instance operating with concepts of Ausruf (exclamation), Verstärkung (intensification), Zweifel (doubt), Frage (question), Gegensatz (anithesis), Verbeissen (interruption or stifling), Versetzung (dislocation), Durchgang (passing), Wiederholung (repetition), Wiederkehr (return), Zergliederung (splitting), and Aushalten (sustaining).⁹⁷

It is not clear what Bartel's agenda is. It is probably a product of historicism more than a wish to promote something that could be beautiful or useful even today. A jazz improvisation or tune, for instance, is a combination of figures and dispositions that are very similar to those described by the Baroque theorists. Bartel's emphasis on latin terms, however, and terms that derive from linguistics, might have served to strengthen his conclusion that the idea of music rhetoric was a time bound convention that became 'outdated and irrelevant' and was replaced by more 'natural and individual' music in the classical period; but rhetorical principles are tied neither to latin, to linguistics, nor to certain time periods. Certainly latin fell out of fashion at that time, but that was not because of the new music. We have also seen how much of this latin terminology was redundant and covered by more familiar English and German words. Moreover, much of what was useful did not disappear at all. It is still living on.

Bartel's idea of 'a calculated and objective presentation of generally accepted affections' in baroque music is gainsaid by his own remark that no such common understanding existed.⁹⁸ Even George J. Buelow, in his article in *The New Grove Dictionary of Music and Musicians* is stressing on several occasions that this is a myth and misconception.⁹⁹ Bartel's idea of 'the natural and subjective expression of individualistic sentiments' first arising in the eighteenth century is no less questionable, as there is no necessary connection between individuality and rhetorical disorganisation. Certainly the music of the romantic period was more *narrative* and less rhetorical in the sense of being *less argumentative*. It was also less repetitive, all of which may be explaining why some earlier concepts were less relevant then. But this was not yet the

⁹⁷ Bartel, *Musica Poetica*, 154 and 164.

⁹⁸ Bartel, *Musica Poetica*, compare 30 and 89.

⁹⁹ Buelow, 'Rhetoric and music', in the first edition of *The New Grove Dictionary of Music and Musicians*, Volume 15, 794 and 800.

case with classicism. On the contrary, the classical style only grew *more and more argumentative*. Especially this is true for Beethoven. And the concepts of oratory and rhetoric were more relevant than ever before, both at the local and long-range level of the music. One might even argue that the classical style was the most argumentative and rhetorical styles of all.

7.4 The heightened rhetoric of musical 'Classicism'

In the middle of the 18th century, not long after Rameau and Mattheson had published their groundbreaking treatises, music took some new directions again. The developments are exemplified by Johann Sebastian Bach's sons, who were also famous composers. The easygoing rococo or 'gallant style' of Johann Christian (1735-1782) is in sharp contrast to the more disruptive 'sentimental' style of his elder brother Carl Philipp Emanuel (1714-1788). Especially Carl Philipp Emanuel's music contributed a lot to the development away from the somewhat static Baroque dance forms in the direction of something more processual and dramatic. It would be wrong to call it 'more natural', because dances are also natural parts of our lives. They have always been, and continue to be so even today. Yet an opening was created now, for music that was somewhat closer to the emotional meanderings of ordinary thought processes and discussions.

Even Joseph Haydn had his *sturm und drang* period in the 1770ties, before returning to a more easygoing idiom, and the Hellenist Johann Joachim Winckelmann's ideas of 'edle Einfalt und stille Grösse' might have had an influence on several of the composers later to be classified as 'classicists'. Yet it is difficult to define what is so 'classical' about the so called Classical style. Certainly it has nothing to do with Greek music. Could it be related to the consistency and roundedness of classical oratory?

The sonata scheme as described by 19th and 20th century theorists in terms of *introduction - exposition - development (Durchführung) - recapitulation - and coda*, has much in common both with the baroque *exordium - medium - finis* scheme and with Mattheson's more elaborate concepts of *exordium - narratio - propositio - confirmatio - confutatio - and peroratio*. Both are involving as a central constituent a certain drama or modulatory tension that is heightened in the *confutatio* or development section, but resolved and omitted in the *recapitulation* or *peroration*.

Yet it was only Mattheson's concepts, along with tonal key schemes like that of Heinrich Christoph Koch, that were known to composers like Haydn and Beethoven.¹⁰⁰

Dietrich Bartel tells another story. Whereas the new *Empfindsamkeit* aesthetic was 'natural and subjective', says Bartel, the Baroque rhetoric was 'calculated and objective', making it 'outdated and irrelevant';¹⁰¹ which is extremely harsh and dogmatic, especially in view of Mattheson's *undogmatic* definition of naturalness as a congruence rather between form and function. Certainly the music of composers like Gesualdo, Monteverdi, Vivaldi, or Rameau is not considered calculated, outdated, or irrelevant today. Also, most people probably find Johann Sebastian Bach's music emotionally deeper, and much more 'natural' than any of his sons.

Bartel's juxtaposition of adjectives like objective, subjective, calculated, and natural is obviously a caricature, though it is not entirely without truth. As pointed out even by Mattheson, some Baroque compositions were 'pompous' and examples of banal and unnecessary symbolism. But not all baroque music was 'pompous' and symbolic; and the occurrence of pompousness is not a reason for discarding affect in general. Similarly, the occurrence of superficial symbolism is not a reason for rejecting other, more essential and intrinsic aspects of rhetoric. But this is very much how Bartel's reasoning goes.

In any case: Bartel's diagnosis is not in harmony with leading enlightenment musicologists. Even Carl Philipp Emanuel Bach himself is figuring among these, and a large part of his *Essay on the true art of playing keyboard instruments* (published in 1753, 1759, and 1787) is a systematic treatment of 'figures'; more precisely the *ornaments*, which he calls 'Manieren'. The ornaments are supposed to add *emphasis* and life to the notes, says Bach, to make the music 'pleasurable' [gefällig], and help to differentiate between 'sad or joyful' [traurig oder fröhlich].¹⁰² The occasional abruptness and harmonic disruptiveness of his music is easily covered by Bartel's own categories of *displacement* and *interruption*, like *abruptio*, *reticentia*, *ellipsis* (omission), and *hyperbaton* (dislocation); and concepts like *dubitatio*, *interrogatio*, *antithesis*, and *antistaechon* (unexpected dissonance).

¹⁰⁰ William S. Newmann, 'Sonata', in the first edition of *The New Grove Dictionary of Music and Musicians*, Volume 17, 486.

¹⁰¹ Bartel, *Musica Poetica*, 89.

¹⁰² Carl Philipp Emanuel Bach, *Versuch über die wahre Art das Clavier zu spielen* (Berlin: Selbstverlag, 1759), Zweytes Hauptstück, Erste Abtheilung, §1.

Johann Adolf Scheibe (1708-1776) was also an avid defender of Mattheson, and is referred to by Bartel as one who was 'trying to salvage the Baroque rhetorical concepts for the new music aesthetic.'¹⁰³ Similarly J. F. Daube (1770) urged composers 'to consider carefully the rules of oratory.'¹⁰⁴ Even Friedrich Schlegel, in the famous periodical *Athenaeum* established by himself and his brother in 1798, speaks of instrumental music 'creating its own text', where a theme is 'developed, reaffirmed, varied, and contrasted in the same way as the subject of meditation in a philosophical succession of ideas'.¹⁰⁵

But the strongest proponent of music rhetoric at the end of the eighteenth century was probably Johann Nikolaus Forkel, reckoned by some as the founder of modern musicology. Forkel's *Allgemeine Geschichte der Music* (1788-1801) is the first comprehensive music history, and he is making it clear that *Der Vollkommene Capellmeister* was not the *endpoint* of music rhetoric. On the contrary, it paved the way for a much more complex and coherent rhetoric, which was also closer to the principles of classical oratory. Baroque music, while rhetorical at the local level, was still rather sectional, and it was first towards the latter parts of the century that music was able to muster 'that coherence of its parts which would result in a genuine sentiment-discourse.'

Even though a musical rhetoric is undeniably the preeminent and veritable essence of music, it is to this day scarcely mentioned... However, in his day, or rather when *Der vollkommene Capellmeister* was published, musical composition was not yet at the stage where a coherent musical rhetoric could be reflected in the music. Not only did it lack elegance and taste, but especially that coherence of its parts which would result in a genuine sentiment-discourse through the interrelated development of its musical thoughts, the unity of its style, and so on.¹⁰⁶

While recognising that 'the individualisation of emotions' lies at the heart of musical composition, Forkel also considered the figures to be pre-linguistic and 'deeply rooted in human nature.' He also made his own contributions to music rhetoric and the sonata scheme by

¹⁰³ Bartel, *Musica Poetica*, 156.

¹⁰⁴ George J. Buelow, 'Rhetoric and Music', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 15, 802.

¹⁰⁵ Friedrich Schlegel, *Philosophical Fragments*, trans. Peter Firchow, foreword by Rodolphe Gaasché (Minneapolis and London: University of Minnesota Press, 1991), Fragment 444.

¹⁰⁶ Johann Nikolaus Forkel, *Allgemeine Geschichte der Music*, 1:37 (Leipzig: Schwickert, 1788), quoted in Bartel, *Musica Poetica*, 159.

subdividing the concept of *propositio* into three sentences or paragraphs: *primary*, *secondary*, and *contrary Satz* (*Hauptsatz*, *Nebensatz*, *Gegensatz*).¹⁰⁷ Especially the concept of *Gegensatz* (confutatio or contra-diction) is interesting. It may not be very precise, but it is certainly more informative than more abstract concepts like modulation and 'development'.

To be true to the aesthetic of this period it may be advantageous to keep to a terminology with which the composers were also familiar, especially perhaps the rhetorical concepts of Mattheson; and it is precisely this confrontation of the *propositio* with confutation and doubt - *confutatio*, *dubitatio*, or *interrogatio* - which is integrated and resolved within the rhetorical process - that is characteristic of a so called 'classical' sonata. Certainly Forkel was not alone in bringing these *questioning* elements into focus. 'In the last quarter of the eighteenth century', William S. Newman remarks, 'theorists like Kirnberger, Koch, Portmann, and Daube took increasing note of the analogy between phrase syntax and such relationships as the subject and predicate in rhetoric; a favourite musical example being the question-answer complementation of a pair of phrases ending in a half- and full-cadence.'¹⁰⁸

As we can see, the analogy with spoken oratory was by no means restricted to the long-range schemes. On the contrary, and as pointed out by Charles Rosen, it was the 'short, periodic, articulated phrase', constituting 'a series of *articulated* events - at times even surprising and shockingly dramatic events' - that destroyed the 'uniform flow' of Baroque music. And it was first exemplified, says Rosen, in the harpsichord sonatas of Domenico Scarlatti (1685-1757).¹⁰⁹ Indeed, it is like Mattheson's concepts of punctuation are all put to use now: *colon*, *semicolon*, *general pauses*, *exclamation marks*, and *question marks*.

The question-answer dichotomy is part of a discursive dialectic that is reflected in all the parameters of this type of music, contrasting dynamic levels, minor-major modes, legato-staccato, squarely articulated versus jubilant and singing. When a musical statement is suddenly dampened it sharpens our attention, and when returning to forte it intensifies it in a physical manner. Perhaps one could say that it is a local and very concrete example of Wilhelm Wundt's

¹⁰⁷ Bartel, *Musica Poetica*, 161-162.

¹⁰⁸ William Newmann: *The Sonata in the Classic Era: The Second volume of a History of the Sonata Ideas*, Second edition (New York, W. W. Norton, 1972), 32.

¹⁰⁹ Charles Rosen, *The Classical Style Haydn, Mozart, Beethoven* (New York and London: Norton, 1972), 43, 57, 58, and 388.

Hegelian conception of 'antitheses' and 'intensification through contrast'.¹¹⁰ Even the use of *repetition* and *boredom* as contrasted with eruptive action is part of this dialectic. As pointed out by Rosen, the repetitions are often used now, to create a sense of *urgency* or *insistence*. Especially Beethoven exploits this technique.¹¹¹ So if the Baroque theorists operated with 40 different concepts of repetition, this is apparently still not sufficient.

Another aspect of repetition, which is even more essential to the rhetorical dialectic of this music is the contrast in phrase length; and it is probably no coincidence that Scheibe and Forkel were the first music theorists to use the word *paranomasia*, meaning *repetition with alterations for the sake of emphasis*.¹¹² The phenomenon was only indirectly mentioned by Rosen, when talking about 'the classical conception of increased animation in discrete units of 1, 2, 4, 8, etc'.¹¹³ The pianist Alfred Brendel, on the other hand, is singling it out as '*the driving force*' of Beethoven's sonata forms.¹¹⁴

However, it is first of all the *reverse* process that has caught Brendel's attention, and he calls it 'foreshortening', which is alluding to the creation of perspective in the visual arts. Understandably enough he might not have been entirely satisfied with this term, and he invites others to come up with better ones.¹¹⁵ Perhaps this is where we should seek help from the *Musica Poetica* theorists. There are already several words at hand: *meiosis*, *diminutio*, *gradatio*, *climax*, *incrementum*; some of which are also employed by Scheibe and Forkel. Unfortunately none of them have really caught on; at least Brendel was not familiar with any of them. Nevertheless, we do need such terms to explain the techniques of rhetorical intensification that were so central to musical classicism.

Perhaps some modern English expressions would serve us better. Concepts like *shortening* or *elongation* are very precise. More informative however, are expressions like *pointing something out*; *detailing*, *rehearsing*, *elaborating* or *expanding* on a statement; *underlining* it or *hammering it in*. Alternatively one might turn to Aristotle and the ancient concept of 'asyndetic endings', with its shortened sentences and omitted conjunctions. It is mentioned by Aristotle as an

¹¹⁰ Wundt, *Outlines of Psychology*, Chapter V, §24.4.

¹¹¹ Rosen, *The Classical Style*, 59, 60, 63, 75.

¹¹² Bartel, *Musica Poetica*, 164.

¹¹³ Rosen, *The Classical Style*, 388.

¹¹⁴ Alfred Brendel, *Musical Thoughts and Afterthoughts* [1976] (London: Robson Books, 1982), 43.

¹¹⁵ Brendel, *Musical Thoughts and Afterthoughts*, 9.

example of rhetorical *amplification* and *diminution*; and he is demonstrating his mastery of the technique in the composition of the very last sentence of his *Rhetoric*: 'I have spoken, you have heard, you have the facts, judge.'¹¹⁶

Many of these dialectical and rhetorical devices are demonstrated in the well known opening of Beethoven's 5th symphony, introducing a fermata or general pause (*reticentia* or *aposiopesis*) already after first exclamation (*exclamatio*); hesitating and questioning (*interrogatio*) even before there is anything to question; hammering away on a statement in a decisive and punctuated manner (*sectio*); intensifying it by making the sentences shorter and shorter (*diminutio* or *meiosis*), or longer and longer. Already in the propositional first section it is wavering between periods of nervous uncertainty, relative certainty, and tendencies towards *jubilation*. Later, before the recapitulation, the process of shortening or *meiosis* is fragmented into separate chords, pulsating back and forth a long time, as in breathing or panting (*suspiratio* or *stenasmus*), gathering strength, urgency, or courage perhaps, before exclaiming again, in a manner that is even more troubled and harmonically tense.

The section might just as well be called *confutatio* as 'development', although a musical statement can never *confute* like in counterfactual speech. It can only express doubt in the form of unresolved tension and hesitation. Even the coda is venting a lot doubt and tension; which however is abruptly interrupted (*abruptio*) by a conclusive version of the theme; literally brushing the problems aside for now and postponing a further treatment of them to the remaining movements of the symphony.

One might question the need for verbalising and putting rhetorical labels on these occurrences; but this is a doubt that quickly disappears when confronted by the lack of understanding that is demonstrated by many performances of this and similar works. It is almost shocking to witness how much of the mentioned functions are dependent on the conductor's timing. If the music is played too fast and without sufficient dwelling, the hesitations, the insistent punctuations, the dialectic between doubt and relative certainty, disappear altogether, and we are left with something utterly boring and meaningless, and a nagging feeling that something must be seriously wrong with the general understanding of this music. Fortunately

¹¹⁶ Aristotle, *The Art of Rhetoric*, 261.

there are also renditions that demonstrate the profundity of this music; like those of Furtwängler, or Carlos Kleiber and the Vienna Philharmonic.

What is needed is a terminology and understanding that could integrate this music within a larger framework of rhetorical genres and functions. Given the obvious similarities with argumentation and oratory it is strange that this has not been thematised to a larger extent by music historians. But this might well be a symptom of a formalistic trend in 20th century musicology rather than a shortcoming of the enlightenment period. According to William S. Newman's article on the 'Sonata' in the first edition of *The new Grove Dictionary of Music and Musicians*, the analogy between a sonata and the literary *ode* was drawn by several writers in the eighteenth century, including C. R. Brijon (*Réflexions sur la musique*, 1763, p. 20) Johann Nikolaus Forkel (*Musikalischer Almanach*, 1782-9, iii, 32) and Daniel Gottlob Türk (*Clavierschule*, 1789, p. 390).¹¹⁷ The ode is an example of *laudatory* or *epideictic* poetry; and especially Beethoven's setting of Shiller's *Ode to Joy* [*An die Freude*] in the last movement of his 9th symphony should be familiar to most people. It is not lacking in doubt or *dubitatio* either. The initial 'horror fanfare' is as harsh as it could possibly get, before it is negated by harmony and jubilation.

This is the mature version of musical classicism; but what about the *origin* of the sonata style. Was it rhetorical too? Undoubtedly, yes. The chief inventor of the classical sonata, and the first composer to switch entirely to the sonata concept as a label of serious instrumental works, was Joseph Haydn (1732-1809), who is known to have been studying Mattheson from an early age. A comprehensive picture of Haydn as a music rhetorician is given in Tom Beghin and Sander M. Goldberg's anthology *Haydn and the Performance of Rhetoric* (2007), and if we are to believe Beghin, his status as a 'master rhetorician' even among his contemporaries, is difficult to rival. Haydn was even compared to the great authors of the time: Shakespeare, Gellert, and Boussuet;¹¹⁸ a respect that was apparently mutual. According to Goethe, Haydn helped making the string quartet into 'a stimulating conversation between four intelligent people'.¹¹⁹

¹¹⁷ Newman, 'Sonata', first edition of *The New Grove*, Vol. 17, 485-486.

¹¹⁸ Tom Beghin and Sander M. Goldberg ed., *Haydn and the Performance of Rhetoric* (Chicago and London: The University of Chicago Press, 2007), 4.

¹¹⁹ Beghin and Goldberg ed., *Haydn and the Performance of Rhetoric*, 106.

Haydn's rhetoric was not foreign to music theoreticians of the time either. 'Champions of rhetoric's decline will in any case find little support in the career of Joseph Haydn', says Beghin and Goldberg. Both in his own lifetime and well past it Haydn's music was analysed with recourse to classical rhetoric; and they are exemplifying it by a citation of Giuseppe Carpani (1812) who found in Haydn's symphonies 'almost all rhetorical figures': 'gradatio, antitheton, dubitatio, isocolon, repetitio, congeries, epilogus, synonymia, suspensio; but very special is his usage of reticentia and aposiopsis, which, when used in one of his incomparable fast movements, create a marvellous effect.' He is probably referring to Haydn's use of general pauses and other interruptions.¹²⁰

If we are to pinpoint some of the reasons why Haydn's music speaks so well, there is at least a couple of characteristics that would have to be mentioned. Firstly: in contrast to later, more superficial and scholastic conceptions of sonata expositions, sometimes operating with two or more 'themes' as were they random objects in a box, Haydn - and often Beethoven as well - usually made it clear that there is only *one theme*. This may be more in tune with rhetorical principles and Mattheson's call for emotional consistency, but it is also logical from a musical point of view. A musical 'theme' can never be a theme in the sense of denoting external 'subjects or objects'. All that music can do is to differentiate the *character* of the statements; so it may be better in many cases to keep to the idea of a single statement, which character can be varied according to the stage of the rhetorical process: whether it is calling for decisive argumentation or is reaching the point of certainty, finality, and jubilant celebration. It is only these rhetorical and emotional functions that are differentiated in music, not any factual references; although one should not rule out the possibility that the character of the melodies are sometimes *alluding* to such content, like the contrast between something feminine and masculine.

A schematic juxtaposition of unrelated 'themes' and sections, however, will quickly create the impression of something rhapsodic and incoherent, which is also boring in the long run. Certainly there is room for contrasts in music, but these contrasts, to be experienced as logical and emotionally captivating, would always have to be integrated in a dramaturgy that is behaviourally coherent even at the deepest psychological levels.

¹²⁰ Beghin and Goldberg, *Haydn and the Performance of Rhetoric*, 4.

This is another strength of Haydn's music. His progressions were never schematic or 'symmetrical' in the manner of more amateurish and formalistic applications of the sonata scheme. It is neither logical nor necessary in a lecture to recapitulate the whole exposition in a slavish and 'symmetrical' manner. When certainty is reached, it is enough to summarise it and confirm it. Certainly the situation is different in harmonious music than in a lecture, since in music the pleasure or harmony that is affirmed is contained within the music itself. There is obviously room for much more repetition then, sustaining and *celebrating* this pleasure rather than merely repeating a factual message, which would be superfluous and annoying. Nevertheless, even music would be tiresome if it kept on arguing for something that is already thoroughly argued and settled. Haydn's recapitulations are not like that; there is always a 'reinterpretation' says Rosen, and he is referring to Donald Francis Tovey who described them as 'fully developed Codas'.¹²¹

What Rosen is pointing out is the *unsymmetrical* character of musical progressions; which is a paradox since the concept of 'symmetry' is mentioned in almost every other sentence of *The Classical Style*. Similar contradictions in terms are 'symmetrical resolution' and 'discursive melodic shape'.¹²² Tension and resolution might well be dialectical, but it is not 'symmetrical'. The role of rhetoric is also underplayed in Rosen's book, in a manner that would hardly be possible today; and one might speculate whether Haydn instead of recapitulations or codas was thinking in terms of *perorations*.

In any case, it is precisely these *dramaturgical* aspects of the sonata that are maximised in Beethoven's music; that is to say, during his so called 'heroic' period and even more so his last and 'transcendent' period, inspired by Hindu philosophy and freemason literature. 'In his music Beethoven implied - perhaps even argued -' says Maynard Solomon - 'the necessity of restoring to Classicism the fusion of Apollonian decorum and Dionysian violence that Schiller and Friedrich Schlegel had shown to have been thoroughly commingled in the ancient world, a fusion to which Nietzsche - in good part via his reading of Beethoven's Ninth symphony was to give its lapidary expression later in the nineteenth century.'¹²³

¹²¹ Rosen, *The Classical Style*, 76.

¹²² Rosen, *The Classical Style*, 83 and 407.

¹²³ Maynard Solomon, *Late Beethoven: Music, Thought, Imagination* (London: University of California Press, 2003), 8.

While earlier classical works contain little explicit trauma beyond a certain melancholy, some modulatory tensions, or a certain uncertainty and hesitation at points of transition, the musical discourse is totally transformed now, into existential dramas of vast proportions. This is not to say that Beethoven's sonatas are less rhetorical or argumentative. Quite the reverse: the gravity of the problems is only calling for stronger negations and assertions. Although Beethoven may be as dissonant and chromatic as any romantic composer and even Arnold Schoenberg in some cases, the conflicts are confuted and resolved in a manner that is rather *maximising* the effect of the tonal cadence than diluting it, often by hammering on a simple major triad for long stretches of time. Or as Charles Rosen put it: 'this insistence on stability at the beginning and, above all, at the end of each work allowed the classical style to create and integrate forms with a dramatic violence that the preceding Baroque style never attempted and that the Romantic style that followed preferred to leave unresolved, the musical tensions unreconciled'.¹²⁴

Beethoven's almost desperate argumentation in the *propositio* and *peroratio* sections, has also some dramaturgical implications. There is a limit to how many minutes his extreme rhetoric can be extended without becoming tiring. If the exposition or *propositio* section is very long and intense, the music, to keep within the limits of human vitality and concentration, would necessarily come a point where it has to *rest* a bit, to *loosen up*, and turn for a while to something more *recreational*, *free*, and *relaxing*, often in the form of repetitive, falling sequences. At least it has to slacken some of the argumentative dialectic now, and allow itself some time to prepare for a new period of argumentation.

The need for breathing, rest, recreation, and preparation is often considerable in Beethoven's sonatas and symphonies, and especially the so called 'development sections' are growing a lot in proportion. Yet this does not necessarily imply that these sections have to be relaxed in all senses of this word. A certain relaxation also opens up for *digressions*, for *unconscious impulses*, and even for a free venting of *desperation*, or feelings of *nostalgia*.

Needless to say, a period of relaxation and cathartic venting of emotion is making the articulated argumentation even more decisive and secure when it returns. But it does not have to be asserted with the same thoroughness as in the first round. Much of the freedom and the relaxing character of the recreational section could be continued in the recapitulation, with the

¹²⁴ Rosen, *The Classical Style*, 387 and 76.

exception of the final conclusion, of course, which has to muster all the decisiveness and certainty that it can possibly manage. Often this conclusion is staged as a coda with a pedal point. It is a polytonal effect, which could be described, perhaps, as a paradoxical interpenetration of alarming dissonance and the anticipation of final resolution and repose. It is a complex and dramatic rhetorical function, but as earlier mentioned, it was already covered by the concept of *Paragoge*.

It should be safe to conclude then, that music rhetoric, even in the sense of oratorical principles, was not dead in the eighteenth century. It was alive and kicking even in the first decades of the nineteenth century, at least in Beethoven's works. In his Beethoven biography Maynard Solomon even talks about a 'heightened rhetoric' in Beethoven's music, involving the development of 'a new declamatory voice for the violin' and 'a move toward dramatic oratory' in his concertos.¹²⁵ Charles Rosen is speaking of a climate of 'moral earnestness' and 'persuasive excitement' after the French Revolution.¹²⁶ Similarly Martin Cooper is pointing to a 'strong oratoric tendency' in Beethoven's music relating to the factors of post- and pre-revolutionary enthusiasm and moral idealism, as well as the popularisation of Johann Mattheson's *Affektenlehre* just before the French revolution.¹²⁷ Certainly Beethoven owned a copy both of *Der Vollkommene Capellmeister* and Carl Philipp Emanuel Bach's textbook on piano playing.¹²⁸

It might have been a surprise to some that this 'heightened rhetoric' and the deeply personal outpourings of Beethoven were also going to epitomise the idea of *musical autonomy* and even *absolute music*, as described by Wilhelm Heinrich Wackenroder, Ludwig Tieck, or in E.T.A. Hoffman's review of Beethoven's fifth symphony.¹²⁹ 'In the late eighteenth century' says Charles Rosen, all extramusical considerations, mathematical or symbolic, have become completely subordinate, and the whole effect, sensuous, intellectual, and passionate, arises from the music alone'.¹³⁰ But how come?

¹²⁵ Maynard Solomon, *Beethoven* [1977], (New York: Schirmer Trade Books, 2001), 131, 132, and 136.

¹²⁶ Rosen, *The Classical Style*, 385 and 401.

¹²⁷ Martin Cooper, *Beethoven: The Last Decade 1817-1827* (London, Oxford University Press, 1970), 431.

¹²⁸ Glenn Stanley, 'Beethoven at work: musical activist and thinker', Chapter 2 in Glenn Stanley ed., *The Cambridge Companion to Beethoven* (Cambridge: Cambridge University Press, 2000), 20.

¹²⁹ Ernst Theodor Amadeus Hoffmann. *E.T.A. Hoffmanns Musikalische Schriften*, ed. Edgar Istel (Stuttgart: Greiner & Pfeiffer, 1907), 87.

¹³⁰ Rosen, *The Classical Style*, 94.

It is certainly not because music is a *thing*. Not even Rosen believes that. The ideas presented in Eduard Hanslick's book *On the Beautiful in Music*, of music as some kind of plant or 'kaleidoscope',¹³¹ has hardly ever been entertained by composers. Not even Pierre Boulez, who experimented with spatial conceptions in the late 1940ties was able or willing to sustain such an idea. There is never any doubt that even so called 'classical' music is human behaviour. It is just behaviour of a very autonomous and self-contained kind. Certainly the sonata exposition and recapitulation has a quasi-spatial stability and appeal; but the sense of autonomy is probably deriving just as much from the freedom of an orator or lecturer to arrange the ingredients and stages of a lecture in a totally free manner. It is a line of thought that is presented to an audience, and our behaviour is never as free and autonomous as then. It is not affected or limited by a sequence of outer events, but could be structured and rounded on its own premisses. To a certain extent we have this freedom in our lives as well. But there are so many random events impinging on it - physical, economical, and social problems - that only the luckiest are able to attain the kind of climax and closure they are seeking.

It is only within thought, a lecture, or a musical work we have this freedom; but the advantages of music stretches further. Music is autonomous even in the sense of being *non-referential*, containing its purport within itself. Even more so than dance and poetry it has an intrinsic aesthetic value in rhythm and harmony. This harmony also sets up a reference for tonal relations, and as pointed out by Hoffmann: it is opening up for a range of new feelings and sublime experiences which go beyond all our standard conceptions of emotion.

This holds for all music, if not to the same extent. Already in romantic and narrative music the issue of autonomy poses a problem, since the events and occurrence of a story have to be triggered by something, and this something could only be something extrinsic or arbitrary. Certainly our encounters with this external realm might be integrated in a coherent story or life which is also rounded in some respects; but it does not produce the same sense of self-containedness as in a sonata.

The problem with the classical style and the sonata scheme, which has been pointed out by several musicologists,¹³² is not a problem with the sonata as such, but its misapplication to music that is not argumentative or decisive at the local level, but harmonically restless and deflective,

¹³¹ Eduard Hanslick, *Vom Musikalish-Schönen* [1854](Leipzig: Breitkopf & Härtel, 1910), 59-60.

¹³² Rosen, *The Classical Style*, 31-32 and 458.

and suggestive rather of some kind of narrative principle. Much of the contention, it seems, is starting with technical terms, schemes, and formalisms which are abstracted and alienated from its own rhetorical background and genre. It is a danger that was pointed out already by Aristotle and by Mattheson. So rather than discarding affective and rhetorical terminology, it should have been refined and developed to accommodate for other genres as well.

Certainly all music has a rhetorical level, a series of phrases, which, as long as the music is tonal, is still concerned with cadences and the affirmation of harmony. Finding the right balance between the argumentative principles of the sonata and the narrative principles of so called symphonic poems and other romantic forms must have been very difficult. It was a gradual process, even in Arnold Schoenberg's oeuvre. Yet it was first with atonality or 'pantonality' that music was suddenly liberated from the business of affirming harmony, to realise instead the kind of narrative or declamatory idiom which Schoenberg labeled 'musical prose.'

7.5 Narrative principles in romantic and atonal music

Nineteenth century Europe was a world in rapid industrial and intellectual transformation. New historical and scientific perspectives were opened up. Religious and other dogma started to be questioned, national states were formulating democratic constitutions and new identities. Music was implicated in all these endeavours, expressing the feelings of which it was saturated: the sense of *pride* and *collective enthusiasm*, *longing*, *nostalgia*, *irony*, and even a fascination for the *magic*, *exotic* and *historical*. The search for *national identities* was also concerned to a large extent with the character of folk music, rural dances and intonation patterns in various languages.

It is as if a realm of complex emotion and metacognition was created for the first time now; which is only a half truth. Certainly music created entirely new modes of feeling during this period: romantic and intense feelings which are saturating even our present era, especially through romantic film music. The very same romantic harmonies are to be found in jazz, not to mention the genre of epic science fiction music, like that of John Williams in films like *Star Wars*, *Superman*, and *Jurassic Park*. Strangely enough, the brain's capabilities of integrating such higher level musical and 'dramaturgical' gestalts were already hardwired in the temporal and frontal cortices; but it was apparently harnessed in a new manner now, and coordinated with the newfound principles of long-range progressions and harmonies full of chromatic tension.

Even the orchestras were growing in size during this time, expanding the palette of sound colours with new and technically improved musical instruments.

Needless to say: the business of describing music in rhetorical and affective terms did not become less relevant; on the contrary, music was more sentimental than ever before, which is partly why it is called 'romantic' in the first place. Music is 'the most 'romantic of all arts', writes E.T.A. Hoffmann in an article on 'Beethoven's instrumental music'; at the same time it is 'a realm of its own', where all concrete feelings are put aside for an infinite and 'indefinite longing'.¹³³ The paradox of referring to something 'indefinite' in the same instance at it is defined as romantic 'longing' is symptomatic of the time. Musical autonomy was celebrated at the same time as there was an increasing tendency to provide music with literary programmes and descriptive titles like *nocturne*, *ballade*, *caprices*, *lyrical pieces*, *album leafs*, *Lieder ohne Worte*, song cycles, symphonic poems, and so on.

Strangely enough, Beethoven's music was a source of inspiration to both of these tendencies. The influence of Beethoven's sonatas and symphonies was considerable throughout the whole nineteenth century, especially on more conservative composers like Schubert and Brahms; but as mentioned above: it was a misapplication in many cases, alienating rhetorical schemes from the 'heightened rhetoric' to which it was bound. Beethoven's insistence on the conclusive stability of major triads was difficult to emulate and maintain within the new and more chromatic harmonic vernacular. It was more tempting to most composers to concentrate on the sensual and somewhat restless qualities of these harmonies, which were calling for the depiction of moods, meandering and drifting into new situations rather than tracing the disposition of a lecture. In fact, the etymology of the word 'romantic' is first of all related to *epic poetry*. The German word for novel is 'Roman'; and progressive composers like Hector Berlioz, Franz Liszt, and Richard Wagner were all eager to formulate some new, more lyrical or narrative principles of musical organisation.

Of course, the idea of descriptive music was not new. Even Renaissance and Baroque composers explored it; but it was first of all Beethoven's 6. Symphony, the *Pastoral Symphony*, that became a model for the first so called 'symphonic poems'. The sweeping and more 'pictorial' implications of this concept might even be more suited for large orchestras than his otherwise

¹³³ E.T.A. Hoffmanns *Musikalische Schriften*, 86.

very argumentative style, which may seem all too articulated to be performed by such a huge mass of instrumentalists. The symphony is laid out as a 'recollection of country life', with movement headings stolen from a symphony by Justin Heinrich Knecht: First movement: 'Pleasant, cheerful feelings aroused on approaching the countryside'; Second movement: 'Scene by the brook'; Third movement: 'Jolly gathering of villagers'; Fourth movement: 'Thunderstorm'; Fifth movement: Shepherd's song. Grateful thanks to the Almighty after the storm'.¹³⁴

Especially Hector Berlioz, and his *Symphonie Fantastique* (1830) was inspired by the *Pastoral Symphony*. Berlioz was also the one who coined the term *idée fixe*; a type of *Leitmotif*, which may serve as a melodic identifier of themes or characters occurring within a drama. It is a technique that became central both to Wagner's music dramas as well as our days film music and TV-series.

Obviously the use of literary programmes is bringing up with renewed force the old problem of musical immanence and autonomy. Especially it becomes an issue whether some music is too reliant on text, loosing its autonomy, or whether the text is merely helping to inspire and understand the drama which is nevertheless immanent in the musical progression as such. Most composers tried to bring through the latter point it seems. Berlioz' emphasis on emotional expression, and his reservations about onomatopoeia and other imitative practices charted by Giuseppe Carpani, is only one example of this.¹³⁵ In the 1855 version of the program notes to his *Symphonie Fantastique* he also opened up for the possibility that this work might be performed and perceived as a concert piece, without recourse to the literary program.¹³⁶ Even Beethoven felt a need to explain - both in the score and in the program notes - that his Pastoral symphony was 'more the expression of feeling than painting' [Mehr Ausdruck der Empfindung als Mählerey].¹³⁷

While it is probably true that a drama or story may rely to a greater extent on encounters with something extrinsic, the mental and social dynamic may nevertheless shine through, especially when it is thought out by a composer or author. Like in the disposition of a lecture or oratory,

¹³⁴ Charles Rosen, *Beethoven*, 266.

¹³⁵ Jonathan Kregor, *Cambridge Introductions to Music: Program Music* (Cambridge University Press, 2015), 83-84.

¹³⁶ Louis-Hector Berlioz, 'On Imitation in Music', In *Berlioz's "Fantastic Symphony"*, ed. Edward Cone (New York: Norton Critical Scores, 1971).

¹³⁷ Maynard Solomon, *Late Beethoven*, 94 and 261. Here Solomon puts Beethoven's statement in a context of similar statements by influential theorists like Jakob Engel and Johann Georg Sulzer.

even a drama can be structured according to the emotional advance of the self: *setting out*, *getting problems*, *battling* with the problems, *reaching a solution* and so on. Other times it is more a matter of *building excitement*, *climax* and *rounding off*. This we can observe in Beethoven's Pastoral symphony as well. It starts out with a careful building of excitement, setting out with feelings of *approaching* and *gathering*, *hesitant* and at first, but increasing in vitality. The *jolly* section is also increasing in intensity, reaching a climax or *complication* which is titled 'thunderstorm'; but it might just as well have been laid out as a quarrel or a fight, which is not uncommon to the social dynamic of jolly parties. The existence of descriptive titles and concrete interpretations is not necessarily a prerequisite for recognising the logic of this dynamic.

The way Beethoven introduces the thunderstorm, with some deep rumbling sounds, and makes it subside and dwindle into a sense of serene tranquillity and 'gratefulness', is exemplary and recognisable. The whole symphony, lasting for about an hour, seems much shorter and much more entertaining when it is so well disposed. Certainly the lightning strikes, but it strikes at a perfectly chosen point, with allusions to a higher level artistic or even 'divine' order, which is very much the definition of art as opposed to a sequence of trivial life or mere entertainment.

The problem with program music is very much a pseudo-problem, deriving from the false idea of musical form as something spatial. Musical autonomy is the autonomy of the self, and if the music is too tangled up in arbitrary matters, the sense of coherence and roundedness is easily lost. Many people have no access to the literary plot, and even if they have, the experience is always much more entertaining and gratifying when we are carried along with a process that resonates with familiar and organic cycles of *activity*, *exhaustion*, *rest and recovery*; *effective and reasonable patterns of conflict management*; a *gradual building of arousal and climax*; our *susceptibility to boredom*, *restlessness*, *surprise* and so on. Our lives are consisting of a whole range of such autonomous and 'generalisable' emotional processes, many of which will be discussed in the next chapter. The question whether this dynamic is accompanied by words often does not matter much, but it might give people an easier access to the music, especially when they are unfamiliar with the genre.

This is not to say that the debate over these matters is settled. Diametrically opposed views have been voiced by Richard Strauss, Stravinsky and many other composers, although it is often difficult to detect how it relates to any differences in their music. The contention has probably

more to do with the definition of musical experience as idiosyncratic or 'expressing' something that was already there, both of which may contain an element of truth. In Arnold Schoenberg's works the problem is manifested as a certain inconsistency of his own thinking, mixing elements of formalism with an aesthetic that is first of all very emotional and intuitive.

Arnold Schoenberg was also a romantic composer, and his gigantic *Gurre-Lieder* is regarded by some as the pinnacle of late romantic orchestral composition. Meandering polyphonic and harmonic textures with chords so chromatic that the distinction between harmonic functions tends to disappear and the sense of tonal centre and repose is almost canceled out. While Wagner and Strauss were balancing on the brink of tonal collapse, Schoenberg felt obliged to perform it and explore what came out of it. Instead of maintaining a sense of tonality it became an objective now to try to cancel it out, by equidistant divisions of the octave like tritones and augmented chords, and by a balanced and pervasive chromaticism which never allows time enough to establish the feeling of a tonal centre.

Technically, the road from romantic harmony to atonality is not very long, and it is a logical development in many cases. A couple of decades later we can observe the same transitions in free jazz and the improvisations of Ornette Coleman and Eric Dolphy, playing 'outside' the chord progressions. A turning point for Schoenberg was the last movement of his second string quartet (1908), also featuring a soprano, starting with the words: 'If fühle Duft von anderem Planeten' (I sense air from other planets). First now the narrative impulse was totally freed from the business of celebrating harmony. Schoenberg sometimes referred to this as 'musical prose' or 'pan-tonality'.¹³⁸

The functional flip is fundamental; and much more so than the differences between the Classical and Romantic idioms. It is a change that must necessarily put its mark on the rhetorical level of the music as well. Since the music is no longer about jubilation and celebration, it is not very surprising that elements like repetition and ornamentation were to a large extent rejected by Schoenberg. The obvious affinity of melisma with jubilation was pointed out already by Augustin, and it has no place in a rhetoric that is no longer epideictic or laudatory. On the

¹³⁸ Arnold Schoenberg, *Theory of Harmony* [1911], trans. Roy E. Carter (London: Faber & Faber, 1978), 432-433; and Arnold Schoenberg, *Style and Idea, Selected Writings of Arnold Schoenberg* [1950], trans. Leo Black, ed. Leonard Stein (London: Faber & Faber, 1975), 284.

contrary, says Schoenberg, musical prose should be 'a direct and straightforward presentation of ideas, without any patchwork, without mere padding and empty repetitions.'¹³⁹

Which, of course, is not detracting from the importance of rhetoric as such. Even prose and storytelling has a level of rhetorical figures and functions, and Arnold Schoenberg is apparently favourably inclined towards the business of charting them. Like Mattheson, he is talking for instance of 'subdivisions into strophes, sentences, paragraphs, chapters, etc.'¹⁴⁰ In the manner of Aristotle and the German music rhetoricians he even lists a set of core rhetorical concepts; *preparing, introducing, establishing, varying, elaborating, deviating, developing, subdividing, modifying, intensifying, colouring, transitioning, and concluding*.

I wish to join ideas with ideas. No matter what the purpose or meaning of an idea in the aggregate may be, no matter whether its function be introductory, establishing, varying, preparing, elaborating, deviating, developing, concluding, subdividing, subordinate, or basic, it must be an idea which had to take this place even if it were not to serve for this purpose or meaning or function; and this idea must look in construction and in thematic content as if it were not there to fulfil a structural task. In other words, a transition, a codetta, an elaboration, etc., should not be considered as a thing in its own end. It should not appear at all if it does not develop, modify, intensify, clarify, or throw light or colour on the idea of the piece.

This does not mean that functions of these types can be absent in a composition, but it means that no space should be devoted to mere formal purposes'.¹⁴¹

What Schoenberg seems to be criticising here is precisely the kind of superficial formalism which is mentioned above: abstracting structural functions from their original rhetorical context instead of letting it develop by 'inner necessity', as he puts it. Yet it is an open question whether Schoenberg was always able to do this himself. Even if some of the above mentioned concepts, like *preparing* and *intensifying*, are also relevant to more narrative progressions, they are first of all derived from the tradition of tonal music, *introducing, varying, colouring, or elaborating* on the repeated affirmation of a tonal centre.

There is a palpable tension between an intuitive and romantic attitude and certain formalist tendencies in Schoenberg's thinking. Both at the local and the long range level of organisation

¹³⁹ Arnold Schoenberg, *Style and Idea: Selected Writings of Arnold Schoenberg*. Ed. and trans. by Dika Newlin. (New York: Philosophical Library, 1950), 72 and 87.

¹⁴⁰ Schoenberg, *Style and Idea*, 54 and 106.

¹⁴¹ Schoenberg, *Style and Idea*, 63.

this is apparent. As we will come back to in a separate chapter on the differences between temporal and spatial perception, some of his techniques of manipulating a theme - playing it *backwards*, 'upside down', or arbitrarily distributed between chords and melodies - are temporally and perceptually disintegrative, with dubious relevance even to the atonality and the thematic unity which he is aiming for. Yet there is apparently plenty of freedom within these constraints to compose in a normal and precisely controlled manner.

Similarly, in his atonal instrumental works, some of which are analysed by himself in *Style and Idea*, he continues to operate with principles like sonata form, rondo, and theme and variation, which seem to be instantiating precisely the kind of repetition of formal moulds of which he is also critical. Since the local level of atonal music is very much devoid of harmonic repose and conclusiveness, this kind of music has fewer *intrinsic* values to affirm or discuss, and little intrinsic pleasure to celebrate in the manner of a sonata recapitulation or coda. The idiom is apparently lending itself less to the business of joyous affirmation than to narrative structures, where the whole spectrum of dissonance and conflict could be put to use with the aim of telling a story.

It is not that argumentative schemes are foreign to musical prose, or to prose in general, but as a principle of musical autonomy it might get monotonous and even incomprehensible if it is merely emulating the progressions and the rhythmical regularities which are connected with tonal music and the affirmation of harmony. It is no wonder that it is some of Schoenberg's *vocal* works - *Erwartung*, *Pierrot Lunaire*, *A Survivor from Warsaw*, and the opera *Moses und Aron* - that have received most public acclaim. These works are exemplifying an alternative vein in Schoenberg's oeuvre, where the progressions are governed first of all by a text. As pointed out by Schoenberg himself, this was a possibility that dawned on him first after his initial, short-winded attempts at pantonal composition,¹⁴² and it is no exaggeration to say that it opened up a very fertile field of new and narrative music.

So natural and beautiful are these works, that some post world war II theorists have found them overly sentimental and even devoid of 'form'. The danish musicologist Jan Maegaard, for instance, finds the music strangely 'natural'; yet while pointing to Freudian dramas etc, he is nevertheless questioning whether *Erwartung* is analysable from a 'technical' point of view.¹⁴³

¹⁴² Schoenberg, *Style and Idea*, 106.

¹⁴³ Jan Maegaard, *Præstudier til musik af Arnold Schönberg* (Copenhagen: Wilhelm Hansen, 1976), 98.

Certainly, if one is looking for 'technique' and 'form' in the sense of something mechanical, spatial, or a dogmatic projection of moulds and concepts abstracted from previous styles, good music will always disappoint you; or as in the case of Maegaard: it would seem like a paradox. But as long as something is really *happening* it is always analysable.

In like manner with the process of affirming harmony in tonal music, even a narrative process has its functions and long range principles. Many of these dramaturgical principles are described in Aristotle's *Poetics*, and frequently put to use by the producers of so called 'soap operas', films and TV series. In fact, their presence on the contemporary scene is even stronger than his rhetoric; but unlike the rhetorical concepts, it may not have been integrated into the vernacular of musicology. The same is true for many of Freud's discoveries, both of which will be discussed in the next chapter.

The very concept of *Erwartung* - meaning nervous anticipation or expectation - is exemplifying such a function. Even if the murderer is not identified, Marie Pappenheim's plot is very much a school example of *repression*: a central Freudian concept, of which Pappenheim was clearly familiar. She had recently been studying it. More concretely, the monodrama is expressing the emotions and inner dialogues of a woman who is obviously in a state of *denial* and even *psychosis* after the murder of her unfaithful lover. Tumbling through the woods, fits of anxiety are surging but suppressed and explained away as shadows, until she is confronted by the dead body in the forest. Clues of a motive - deep love, unfaithfulness, and jealousy - are presented to us as she is thinking back on the previous days and months. Nostalgic escapes are interspersed with fits of angst and sudden realisation. A sense of apathy is ensuing, before a final lapse into absurdity: 'Oh there you are. I was seeking'. [Oh, bist Du da...Ich suchte...]

More interesting in this connection is the possibility of such emotions and processes to constitute an *autonomous ego-dynamic structure*, which is coherent and perceivable even in the absence of a text. The *incipient bewilderment* and *nervous apprehension* (*Erwartung*) is unmistakable. We can perceive this even without understanding what is said. Equally understandable are the growing *fits of anxiety* and the wish to *suppress* such feelings. At a certain point a *dramatic event* is taking place, which is set off in such an explosive and distinct manner that there is no doubt from a listeners point of view, that this is a turning point in terms of *realising* the disaster. A certain resignation and *acceptance* of this reality is also reflected in the following quiescence, although this is understandably a process that takes time. The following

escapes into romantic nostalgia, interspersed with sudden *flashbacks* and *fits of disgust* and *horror* when the realities are sinking in, are perfectly understandable even from a purely dynamic point of view. So is the ensuing tendency towards *apathy* and *resignation*. The occasional irrational *optimism* is unmistakable and typical. It is well known that even in a normal process of grieving there are wishful moments where the delusion arises that it was all a dream and the deceased is still alive.

The final stage of this process ('Oh, there you are') might be interpreted as the point where the woman is *turning mad*, as this delusion is getting permanent. It is the point where Freud's 'reality principle' is finally replaced by repression, dream, and escapism, which, according to Freud, are also the most common causes of psychosis. This is an interpretation, at least, which seems more plausible, and much more Freudian than Schoenberg's idea of waking up from a nightmare.

As we will come back to below, there is little doubt that such atonal singing is approaching the function of certain modalities of speech or ordinary thought, if not completely so. As long as the tones are singing, there is a remnant of harmony here, which is reminiscent of the often exaggerated singsong intonation of storytelling and narration. There is a thin line between atonal singing in Schoenberg's monodrama *Erwartung* and the melodramatic *recitation* or 'Sprechgesang' in *Pierrot Lunaire*. The intonation patterns in *Pierrot Lunaire*, while notated in the score, were originally recited by an actor. Later it has been sung by singers; but it is not always easy to tell the difference.

7.6 Speech melody and rapping

Speech is also melody. It is an explicit and very subtle manifestation of the ordinary dynamics of thought, which may also go into more artistic creations and works at times. Especially so called 'rapping' and even 'growling' has gotten popular in certain types of popular music. The rapping may be monotonous and rhythmically regular, yet it is still operating within the framework of *speech melody*, with microtonal deflections which sets it apart from song. Melodically it is even more atonal than Schoenberg's pantonality, which, with some exceptions, had still some song-like and tonal features, like sustained tones and chords.

It is first when we remove the last song-like remnants in pantonal melody and polyphony that we get back to ordinary speech melody, which is very much closing the circle in terms of possible categories of music. Like the dichotomy between modal and dialectical harmony,

dividing the field of tonality into two main categories, the contrast between atonal song and speech melody is also fundamental. Either the tones are sustained, or they are not. This is the difference between song and speech. There is little harmony in speech melody apart from the periodicity and harmonic spectrum within the tone itself. Yet this intrinsic harmony is negated by a constantly gliding melodic deflection, infusing the melody with a pervasive restlessness.

Nonetheless, even within speech melody there are subcategories. Some of these modalities are approaching song, like in *sing-song*, *motherese/parentese* (baby talk), *news reporting*, or *melodramatic storytelling*. Or perhaps it might be more correct to classify some of these functions as modalities of song approaching speech. Other idioms are combining speech-intonation with regular rhythms and harmonic accompaniment, like in *rap* or *poetry readings* of various kinds. Like in other types of music or reality, these variations in rhetorical function and character seem to be tied to their melodic character in a necessary or 'universal' manner, which is also explaining why these rhetorical modalities have a similar character in different countries and continents. A North Korean reporter extolling the 'glorious leader' of the nation sounds very similar to similar displays in other dictatorships. In addition, of course, comes the variations in *dialect*, *national character*, and *personal character*, which are probably more to liken with the melodic and timbral variations that are also occurring within different genres of tonal music.

The field of speech melody is much larger than one might think, and it might favourably be treated by musicology, once it finds its way back to its own roots in rhetoric and affective theory. In fact, the first scientific treatment of prosody, Joshua Steele's *Essay Toward Establishing the Melody and Measure of Speech to be Expressed and Perpetuated by Peculiar Symbols* from 1775, is already an example of this, utilising musical staff notation to indicate relative pitches.¹⁴⁴ Whereas tonal music is always 'dwelling' on a certain tone, the melody of speech 'moves rapidly up or down by *slides*, wherein no gradual distinction of tones or semitones can be measured by the ear', says Steele. Consequently he developed a system of five reference tones, G-B-D-F-A (a portion of the harmonic series which happen to coincide with the five lines of the bass clef), with intervals subdivided by quarter tones. Moreover: the traditional note symbols were substituted by small figures or 'accents' consisting of 'sloping or curving lines', to which the note values and bars were also added by means of more traditional symbols.

¹⁴⁴ Joshua Steele, *An Essay Towards Establishing the Melody and Measure of Speech, to Be Expressed and Perpetuated by Peculiar Symbols* (London: J. Almon, in Piccadilly, 1775), 6-7.

His method of analysis was applied to a lot of different expressions and literary examples, like for instance Shakespeare's Hamlet before and after he had experienced it live. 'Had some of the celebrated speeches been noted and accented as they spoke them,' says Steele, 'we should be able now to judge, whether the oratory of our stage is improved or debased' and it became his ambition to transmit at least the contemporary manner of elocution to posterity.

As argued by several of the commentators cited in appendixes to later editions of Steele's book, the process of recreating the intonation patterns on the basis of his notations might not be so simple as Steele had hoped for. Nevertheless, a set of important recognitions were made by Steele. First of all, he noticed that 'there is a great latitude in the slides not only of different speakers, but also of the same speakers at different times.' 'Whether the slide runs a quarter of a tone or three quarters, up and down, more or less, seems of little consequence, provided the proprieties of (the RHYTHMUS) *quantity and cadence*, are duly observed', which allowed him to simplify the notation of pitch in some cases. Steele was also drawing attention to the fact that the melodies often have beginnings, endings, and intermediate stops *between* the frets of a viola, and by imitating the intonation patterns on such an instrument, it became clear, at least, that 'the melody of speech is not monotonous', as some people had earlier claimed. On the contrary, says Steele, the melody of speech is moving up and down by more or less the interval of a fifth in most cases.¹⁴⁵

A problem with noticing these melodies, says Steele, is deriving from the fact that 'the extreme familiarity existing between a man and his native language, makes him lose all sense of its features, of its deformities, and of its beauties'. By comparing different dialects, however, like 'a native of Aberdeenshire, another of Tipperary, and the third of Somersetshire; and let them converse together in the English language, in the presence of any gentleman of the courtly tone of the metropolis; his ears will soon inform him, that every one of them talks in a tune very different from his own, and from each other.' In a later chapter Steele is even attempting to notate and classify some dialects according to some crucial melodic differences.

There is a large potential for exploration and classification here, once the proper tools and techniques are developed. Steele's idea of imitating speech on a string instrument might still be relevant. The fretboard quantifies the glides and leaps, but it would be difficult to perform

¹⁴⁵ Steele, *An Essay Towards Establishing the Melody and Measure of Speech*, 14, 30, and 16-17.

without the technique and acute hearing of a musician. Moreover, the musician must be scientifically inclined, as he would have to compare the impact of different leaps and melodic modifications on the experience of rhetorical functions and dialects. If the speech melody sounds like Aberdeenshire or 'Doric' even after the range of the intervals is diminished or dramatically increased, the essence of this dialect would have to be constituted by other aspects of the intonation patterns. Some jazz trombonists have made a gimmick out of imitating speeches on the trombone. It is a gimmick that might favourably be developed into a systematic study or even a new scientific field, but it is not an easy task.

The speech melodies, and their 'slides', 'are yet too rapid (for inexperienced ears) to be distinctly sub-divided', said Steele, yet he found himself able to conclude that they are not differentiated by 'pointed degrees', but by 'gradations that seem infinitely smaller'. Consequently, he argues: 'they must be submitted to some other *genus of music* than either the diatonic or chromatic.'¹⁴⁶

Given the above noted 'infinite gradations', variations, and limitations in our ability to pay conscious attention to these swift melodies, it is easy to understand why Steele's visions for the future science of prosody and dramatic elocution were not easily realised. Some pioneering work on regional intonation patterns and 'musical form as a process' was done by the father of Russian musicology, Boris Asafyev (1884-1949); yet there have been few attempts at *notating* speech melody after Steele, except for those of Arnold Schoenberg. A recent exception is Ivan Chow and Steven Brown's study: *A Musical Approach to Speech Melody* from 2018. Drawing, like Steele, on the advantages of music notation, if only at the resolution of semitones, their 'basic observation' was that speech is *chromatic* and that the musical 'genus' that Steele was talking about is *atonality*.¹⁴⁷

According to Chow and Steven, 'the use of a musical score ultimately has the potential to combine speech rhythm and melody into a unified representation of speech prosody, an important analytical feature that is not found in any current linguistic approach to prosody.' It is an important realisation, as we are dealing with global and emotional matters here. The chances of a sound technician explaining the essential features of dialect and emotional prosody are

¹⁴⁶ Steele, *An Essay Towards Establishing the Melody and Measure of Speech*, 34 and 80.

¹⁴⁷ Ivan Chow and Steven Brown, 'A Musical Approach to Speech Melody', *Frontiers in Psychology* (05 March 2018), <https://doi.org/10.3389/fpsyg.2018.00247>.

probably less than the chances of a wall painter creating an artistic masterpiece. A limitation of Chow and Brown's study may be that it is not addressing to a greater extent the *gliding character* of speech. The swift gliding movements are omitted; and the chromatic character of their analyses is deriving largely from the circumstance that the recorded items are converted from hertz into semitones. While elucidating many general patterns of pitch change, like the difference between imperative and interrogative statements, and the tendency of accented words and certain types of questioning to be constituted by raised pitch, their analyses are also simplified and artificial to some extent. The resolution into half steps might function well as a tool, but it is not clear whether it is reflecting in an adequate manner the core dynamics of mental processes.

As earlier reasoned, the dynamics of thought might be manifested in the constant negation of the harmony or stasis that is implicit in a tone. The tension or dissonance that is created by this negation might well be played out subconsciously, at the level of semitones, even in speech melody and thought. We can hear or *feel* this dissonance when our voices are making a very slow glissando, like when painfully *resisting* someone, or when slowly *resigning* or *sighing*; but it is not easy to pinpoint whether this dissonance is best represented by semitones. Such chromatic intervals, along with tritones and other equidistant divisions the octave, are obviously crucial to atonal song, but it is not equally evident that they are crucial to ordinary speech, which is nevertheless evading the stasis of tonality by its ever gliding movements. It is likely that such precise atonal intervals might be more important in various types of sing-song or narrative speech, which are approaching the character of atonal song. In such cases the vocalist is only *almost* dwelling on specific tones, which might increase the need for atonal intervals, while the need for gliding might be reduced.

Chow and Brown's study is also limited in the sense that it is focusing on a specific English or Canadian dialect, and the genre of ordinary speech. As remarked by the authors themselves, they are not paying attention to the possibility that other languages and dialects, sociolects, and even personal styles and specific emotional circumstances, might utilise much larger leaps, spanning larger ranges than are documented in this study. Especially it is likely that certain modalities of speech, like narration and storytelling, are lending themselves to much larger leaps as well as singsong intonation.

Arnold Schoenberg's *Pierrot Lunaire* is obviously an extreme example of the latter. Whereas Chow and Brown's examples are played out within the range of a sixth, the speech melody of *Pierrot Lunaire* is spanning several octaves. It is somewhat curious therefore, that Schoenberg, in his preface to the first printed edition specified that he did not seek the effect of 'singsong'. The difference between singsong and melodramatic recitation is not clear; but at least Schoenberg did stress that the speech tone or 'Sprechmeoldie' of *Pierrot Lunaire* should not be 'realistic'. The speech melody is marked out as 'recitation' in the score; except for some passages that are supposed to be 'sung' or 'almost sung'. Yet the speech melody is precisely notated.¹⁴⁸ It is so precise in this case, that it is possible to recreate it, if not entirely without confusion with regard to its performance. The rhythmical notation is much easier to read than that of Steele, and much more precise than in the case of Chow and Brown; yet it is only an x on the note stems, or originally: a notehead in the shape of an x, that indicates that the tones are not to be fixed, but, as Schoenberg formulated it: 'immediately left by falling and raising.'¹⁴⁹

These swift gliding movements, which Steele tried to capture in his notation of speech, are not precisely represented in the score of *Pierrot Lunaire*. Perhaps it might have been an advantage to put them into the score in the same manner as big band composers are notating falls, drops, doits, and glissandi. There is also the possibility, that the need for gliding might be somewhat reduced in cases of theatrical declamation, where the width of the intervals is nevertheless reducing the sense of tonal relations, and the quasi singing character of the speech is approaching the chromaticism of atonal song.

The work was first performed by the actress Albertine Zehme, reciting the text in a melodramatic manner. In some later renderings, however, the sections that are supposed to be recited are performed by singers, in a manner that is often closer to 'song'; which is demonstrating the often marginal difference between speech and atonal song. Sometimes it is difficult to determine what is what. Theoretically it might be a question of either-or, but it is a matter of very subtle timing. If the tones are sustained for less than some tenths of a second, the melody might not be perceived as song proper. But this is something that has to be subjected to experimental verification.

¹⁴⁸ Arnold Schoenberg, *Verklärte Nacht and Pierrot Lunaire* (New York: Dover Publications, 1994)

¹⁴⁹ Aidan Soder, with a preface by Walter B. Bailey, *Sprechstimme in Arnold Schoenberg's Pierrot Lunaire: a Study of Vocal Performance Practice* (Lampeter: The Edwin Mellen Press, 2008), 10.

Yet the status of 'song' is not a requirement for being part of a 'musical work'. Even ordinary speech and emotional vocalisation is 'music' in the broadest sense of this word. It may also go into musical *works* or improvisatory *performances* of various kinds. As long as it is presented as a performance with the aim of entertaining or expressing something to an audience, there is no doubt that it classifies as art. This art is called *cinema* or *theatre*; and when the text is removed from the melody it becomes very clear that it is not ordinary theatre, but examples of what we usually refer to as *pantomime*, *absolute music*, or even autonomous *musical works*.

Like in other types of music, however, the status as 'autonomous' might require something more. As we will come back to in the next chapter, it may be favourable in many cases to try to create a rounded drama, with some incipient activity, some intensification and complication, and some resolution or peroration; which is difficult to attain if the drama is not also *compressed* to some extent. The normal occurrence of life events is too slow to provide something entertaining to an audience. Even movies and so called 'reality shows' are unreal in this respect. They are usually heavily edited, compressed, and supplied with various types of music. But they may also keep to natural sounds and vocalisations.

Even in avant-garde jazz and art music there are many examples of the latter. One of the most well known ones is Luciano Berio's *Sequenza III for female voice* (1965), which however, may not be a pure specimen, since it is also using fragments of song and text. Especially the words 'for a woman' tend to stick out, so it is relatively obvious that the work is dealing with *womanhood* in some way or other. The original text, which itself is only consisting of a couple of sentences, is no longer complete or perceivable in the work, so there is no point in quoting it here.

To make such emotional vocalisation entertaining and coherent it might be necessary to *exaggerate* a bit, and secure that most of what is otherwise mimic or gestural is also *vocalised*. Berio's *Sequenza III* is obviously doing both. Over a time span of eight minutes the score is prescribing utterances and emotions like: *tense muttering, urgent, distant and dreamy, nervous laughter, allowing, ecstatic, whimpering, faintly, apprehensive, tense, tender, languorous, whining, gasping, coughing, frantic, desperate, extremely intense, distant, subsiding, calm, anxious, relieved*. Whether this is really behaviourally coherent and autonomous is quite another matter. Even the textual fragments are used in a somewhat random manner; yet there seems to be a tendency towards intensification and then some relaxation towards the end. Perhaps Berio

wanted to caricature the occasional *emotionally instability* of women. Interestingly enough the work was first performed and recorded by his newly divorced wife, Cathy Berberian.

An even more striking and consistent use of ordinary speech melody is exemplified by a British animated TV-series, popular in the late nineteenth sixties and seventies. It was called 'The Clangers', and described a community of extraterrestrial mice-like people, communicating solely by means of *whistled intonation patterns*. There were other creatures on the planet as well, like the 'soup dragons' - *babbling* or *gurgling* with a deep voice - and the 'froglets' and the 'iron chicken', all of which were utilising intonation patterns more characteristic of humans than of animals. Certainly there was a *narrator* as well, carefully explaining in words what was going on. The action was accompanied by a mixture of atonal and tonal music, composed by Vernon Elliott. But the communication between the creatures was purely melodic and devoid of words.

There is nothing uncommon with such wordless communication. Most animals, and even infants do it all the time. What is so interesting about *The Clangers* is not only its aesthetic qualities or its political undertones, but the fact that it is highlighting the kind of *rhetorical melodic patterns* which are characteristic of a human level of comprehension. The dialog is also very *coherent*, running like a connecting thread through every episode of the series.

Needless to say; our vocabulary has plenty of words to describe the emotions and expressions that are occurring during such ordinary dramas. The concepts are also less metaphorical in most cases. There is no need to question whether the concept of *laughter* applies to laughter or *crying* to crying, although it is sometimes difficult to distinguish between the two. The same applies to words like *singing* and *dancing* of course, as well as many melodic or harmonic concepts which are music specific; but our vocabulary for speech melody is richer, featuring expressions like *ironical tone* or *undertone*, *sarcastic tone*, *suspicious tone*, *questioning tone*, a *faint voice*, a *confident voice*, an *optimistic note*, a *note of scorn*, a *trace of scepticism*. Our voices may be *assertive*, *amiable*, *consoling*, *cheerful*, *sweet*, *vibrant*, *teasing*, *playful*, *arrogant*, *accusing*, *furious*, *threatening*, *childish*, *harsh*, *cynical*, and much more. It is the reason why we have a voice in the first place that we can *feel*, *express* and *share* all these feelings, which is even a precondition for speaking about it. Many of these subtle feelings are *constituted* here; many more, in fact, than we can even speak about. So it is not so strange that our vocabularies are rich when it comes to ordinary vocalisations.

As we have seen, many of these common words, especially the joyful ones, apply to song as well. The strength of tonal melody, however, is probably the amount of words designating different *genres* and *whole melodies*, since most people can distinguish, and *name*, hundreds of tonal melodies. It is a curious observation, with unclear ramifications for the composition of pantonal and other speech-like song, that the melodies of *spoken dialects* are utilised for the sake of regional and *national identification*, while the variations in *tonal melody* are occurring at the *individual* level, as an almost infinite resource of varying the character of similar expressive functions.

The most noticeable difference between these fields however, is probably the amount of *negative feelings and concepts*. Since tonal music and song is basically about harmony, the emotions are obviously more harmonious even when we are singing about things that are 'inharmonious'. Singing is positive and harmonious per se. So while a *blues*, a *requiem*, or an *elegy* is merely *lamenting* in the minor mode, mixing harmony with a certain *melancholy tendency*, a manifestation of ordinary intonation and emotional vocalisation may lapse into all varieties of *crying*, *screaming*, and *yelling*. All of these feelings, including the subtler tonal manifestations of melancholy, may be 'negative' within the framework they are occurring, and covered by a wide conception of 'sadness', but in reality the emotions are as different as the types of music that constitute it.

When it comes to *musical autonomy*, however, the situation of speech melody and song is pretty much the same. If it is to be considered autonomous from a musical point of view it has adjust to the same requirements as in tonal music. Only relations and interactions that are *intrinsic to the dynamic process* can be conveyed. There are no sounds that convey *jealousy*. To grasp the concept of jealousy one have to be exposed to a social context, which may also involve some *desires* and *wants*, which are not auditory by nature. An auditory display alone can only portray the dynamic fluctuations that are saturating our streams of thought. It can express *conflict*, *scorn* and perhaps even *sarcasm*, but not what the scorn or conflict is really *about*. Even when presented with Berio's *Sequenza III*, which is utilising all kinds of emotional vocalisations, we can only speculate what the woman is really crying *over*.

In the context of popular and rhythmical music, the elements of recitation, rapping, growling, and screaming are used less as ingredients in autonomous dramas than as admixtures into a predominantly harmonious and rhythmically regular idiom. In pop music, some timbral

characteristics or noises could be enough to create a style. When we add to this the possibility of combining the other idioms as well, the amount of possibilities are dramatically increased. It is not uncommon in jazz, for instance, to switch between modal harmony, romantic harmony, or even atonality, like when improvising atonal melodies on top of a tonal accompaniment. In some cases, like the occasionally disjunct harmonic progressions of Hindemith or some modern jazz composers, it may be difficult to determine whether the music is modal, functional, atonal, or something entirely new. Indeed, there might be room for much new here. In most cases, however, the mentioned categories still seem valid, and the progressions could be considered instances of modulation or *combination* rather than something fundamentally different.

So how much variety is possible? Like every field of reality, the amount of possible variety depends on which level of generality we are focussing. At the most general level one might operate with only two possibilities: song or speech. Alternatively one might consider speech a subcategory of atonality, making the dichotomy of tonal and atonal the most fundamental dichotomy. It is difficult to think up any more fundamental and all-embracing differentiations. The amount of possible variation is probably limited then, even though it is unlimited at the level of the particular.

7.7 Rhetoric and affect in standard music terminology

Even though it is living on in the vocabulary of Schoenberg and the society at large, music rhetoric as a field of study was very much forgotten in the twentieth century, at least before the interest in old performance practices towards the end of that century. One might wonder where the fields of musicology and gestalt psychology had been if Scheibe and Forkel's ideas of such dynamic figurations as necessary constituents of psyche had been integrated into gestalt psychology from an earlier stage. Certainly musicologist like Donald Francis Tovey (1875-1940) where in practice continuing the kind of rhetorical and verbal analyses that were sketched out by pioneers like Burmeister, Mattheson, and Hoffmann. There were also theorists like Hermann Kretschmar (1848-1924), who were calling for the elaboration of a coherent and objective 'musical hermeneutic'.¹⁵⁰ Yet his hermeneutic seems to be focussing more on the *expressive*

¹⁵⁰ Hermann Kretschmar, 'Anregungen zur Förderung musikalischer Hermeneutik' [1902], in *Gesammelte Ausätze über Musik*, Band II (Leipzig: Breitkopf & Härtel, 1911), 171.

character of themes than their rhetorical and dramaturgical functions. A collection of adverbs or adjectives is not sufficient to account for the organisation of musical behaviour.

Later on such analyses tended to be thrown in the background, in favour of quasi-scientific reductionism and formalism, more concerned with visual notation and spatial ideas of mysterious 'Ur-lines' and curves, than the experience of real phenomena. This skepticism towards auditory qualia and emotion in general was also implied in more relativistic, semiotic, and political 'readings' like the 'critical theory' of Theodore Adorno and the so called 'poststructuralists'. Or to be more precise: the dissociation of music from its sensory and rhetorical content was functioning rather as a precondition and materialistic 'flip side' of subjectivist readings, which were supposed to be projected onto these quasi-spatial and 'empty' structures. The contradiction of projecting meanings into phenomena which existence one scarcely recognise has been pointed out by Leo Treitler and others.¹⁵¹

Yet there were exceptions. Deryck Cooke's *The Language of Music* (1959) is one example of this, although his analogies of music with language and architecture are philosophically naive and often self-contradictory. At the same time, often in the same sentence as speaking of 'intervallic tensions', the 'inherent power' of music, or 'the absolute individuality' of specifically musical emotions like 'heavy lament' or 'restrained elegy' and so on, he is also speaking of melodic 'connotations', 'terms', and 'associations', which are arbitrary and referential by nature. Like Kretzschmar, he criticises the semi-technical and fragmented hermeneutic of program notes and the like, yet his own attempts are just as fragmented. At a certain point he simply gives up. A detailed expressive analysis of a complete work is impossible, he says, 'owing to the enormous number of words it would require'.¹⁵² And his resignation is understandable. With little philosophical schooling and no preliminary charting of the functional differences between genres, musical analysis would basically be fumbling about in a wilderness of notions and categorial confusions. There is not even an attempt in this book of defining the role of *song* as differentiated from *speech*: a distinction that was of fundamental importance to thinkers like Aristotle and Augustin.

¹⁵¹ Leo Treitler, 'The Historiography of Music: Issues of Past and Present', in *Rethinking Music*, ed. Nicholas Cook and Mark Everist (Oxford: Oxford university Press, 1999), 369-370.

¹⁵² Deryck Cooke, *The Language of Music* [1959] (Oxford: Oxford University Press, 1989), 23-24, 213, and 226.

Some ontological and taxonomic groundwork is an absolute prerequisite for coherent musical analysis. The manner in which this could be done is exemplified in earlier sections of this chapter; and as we have seen: the problem of describing music is not necessarily a lack of words. The problem is more about applying them in a relevant and consistent manner. This holds both for the description of long range progressions as well as the minute details, which principles has been exemplified above. For a more detailed and concrete exemplification of how a piece of music could be verbalised, proceeding from single tones and sounds to psychological processes stretching across several movements, see *Psychologizing Music: a psychodynamic explication of Beethoven's Piano Sonata no. 22, opus 54*.¹⁵³

Certainly our present vocabulary has to be refined and expanded, which is also the point of these discussions. And as suggested above, it might be necessary to add to musical terminology some concepts pertaining to the fields of *dramaturgy* and *psychoanalysis*. The analysis of atonal music is obviously reliant on such concepts, along with a greater emphasis on *negative* and *prosaic* day to day emotions; emotions which never really belonged to harmonious music.

When it comes to harmonious music, our vocabulary of basic concepts is already large, and it is no less rhetorical and affective than in the baroque area. On the contrary, the lists of current music expressions prevailing in textbooks and the internet are probably larger today, and even less technical than in the seventeenth century. It is true that many of the latin words have disappeared, but most of these words were redundant, overlapping, and overly simplistic. So there is not much that is lost. On the contrary, more is probably won than is lost. Whereas the lists that were put together by German theorists were available only to other German musicians and theorists, they are common property now. In fact, every music student has to learn these lists by heart.

Also, one should not forget that there is a steady production of *new concepts* today. As opposed to the power games of academia, which are played out within the virtual spheres of shifting intellectual dogma, music is a living reality to most people, and a place where brand new aspects of reality are also created and provided with new words, mostly in lucky oblivion of the academic fashions. Music is so important to many people that they orient their whole identity around certain musical styles. Especially within *rock music* the amount of categories and

¹⁵³ Steinar Bang, *Psychologizing Music*. An early version of this thesis is attainable at the University library of Oslo. The expanded, final version, if it is not yet published, could be purchased from the author.

subcategories has almost exploded, all of which is demonstrating the subtlety of emotion and character that could be communicated and even supplied with verbal labels. The precision of musical perception is always a precondition for such terminological distinctions. Especially when the concepts are *music specific* it would never be possible to apply these terms if the content was not actually perceived. Some recent examples of this are adverbs like *funky, groovy, swinging, waltzing, jazzy*, or the concepts of *lick, riff, vamp, polka, tango, rumba, boogie woogie, heavy rock, or hard bop*.

To give a rudimentary overview of current terminology, it may be useful to try to list it. For the sake of comparison, the list is organised in a manner similar to Johann Mattheson's conceptual hierarchy. As pointed out by Mattheson, the process of ideation and invention is usually starting with the 'loci topici', that is to say: the behavioural function and purpose of a composition, which is also its *genre* in most cases. Sometimes, especially when composing larger works and operas, it is a good idea to work out a disposition or dramaturgy, before the elaboration of rhetorical figures and other details going into it.

It is essential to stress, though, that this is not the whole vocabulary available to music analysis. These are just some *standard musical terms* which are established during the previous centuries of classical and popular music, and often written into the titles or scores of compositions. The headings of each category are worded in a manner which reflects that even these standard concepts are pertaining to the field of *ego-dynamic gestalt formation*. It should also be mentioned that the categories are sometimes overlapping. For instance, many of the words listed as 'styles' could just as well have been listed under character and emotion: *sturm und drang, romanticism, expressionism, blues, cool, rock, punk, soul, glam, heavy, trance, doom*, etc.

GENERAL SOCIAL AND BEHAVIOURAL FUNCTIONS

Dance music, art music, folk music, background music, elevator music, carol, lullaby, cradlesong, ballad, chorale, march, fanfare, jingle, chant, ballad, anthem, hymn, mass, requiem, elegy, threnody, overture, opera, operetta, program music, musical poem, musical, musical drama, melodrama, symphony, sonata, cantata, oratory, potpourri, rhapsody, medley, caprice, fantasy, intermezzo, interlude, nocturne, pastorale, cheer, shout, rallying call, ditty, chanty,

Christmas song, incantation, prelude, postlude, rondo, scherzo, humoresque, fugue, impromptu, cycle, suite, etude.

DRAMATURGICAL FORMATIONS

Prelude, introduction, exposition, development, recapitulation, coda, verse, stanza, refrain, improvisation, solo, aria, recitative, transition, sequences, modulation, movement, da capo, reprise, cadenza, canon, finale, obligato, motif, theme, ostinato, melody, accompaniment, phrase, strain, sentence, period, strophe, passage, variation, section,

Popular music and jazz are also operating with concepts like *intro, head, outro, bridge, fill, break, verse, refrain, chorus, riff, lick, vamp.*

RHETORICAL FORMATIONS

Harmonic figurations like *perfect cadence, deceptive cadence, interrupted cadence, imperfect cadence, final cadence, plagal cadence, inverted cadence, close, full close, half close; resolution of dissonance, going to dominant, subdominant, or returning to tonic.*

Melodic functions and figurations like *leading note, passing tone, grace notes, suspensions, turns, runs, pedal tone, appoggiatura, leaning note, mordent, coloratura, tremolo, trill, vibrato, melodies, motives, melodic figures.*

Instances of timing, pausing, interruption, and dynamic contrast, like *pause, general pause, fermata, breathing sign, break, accelerando, ritardando, subito, poco a poco, crescendo, decrescendo, diminuendo, sforzando, and accent.*

Modes of interaction and combination are *counterpoint, polyphony, monophony, homophony, antiphony, heterophony, unison, polytonality, cacophony, playing 'outside'.*

CHARACTER AND EMOTION

Major mode, minor mode, furioso, lamento, doloroso, giocoso, grave, agitato, risoluto, maestoso, amoroso, espressivo, appassionato, con anima, grazioso, lacrimoso, scherzando, misterioso.

Character of articulation, like *staccato, legato, syncopation, dolce, staccato, marcato, legato, vibrato, sostenuto, portamento, leggiero, cantabile, singing, parlando, ad lib, syncopation, grooving, swinging.*

Tempo and animation: *largo, adagio, lento, moderato, andante, allegro, presto, vivace, rubato, animato, tranquillo*.

Dynamics and timbre: *pianissiom, piano, mezzo piano, mezzo forte, forte, fortissimo, sotto voce, muted, amplified, distorted, sustained, echo*.

All of which is just a small and general selection of concepts. Even within specific genres like jazz or even big band trumpet playing, one may encounter specialised vocabularies, like *squeeze, rip, doit, fall, drop, dip, scoop, growl, flutter tongue, doodle tongue, double tongue, and multiphonics*.

GENERAL CHARACTER AND STYLE

Our concepts of *styles* are also significative of emotional idiosyncrasy, albeit of a more general character. Within so called 'art music' and the serious music tradition, there is for instance *plainchant, ars nova, renaissance, baroque, rococo, sturm und drang, classicist, romantic, late romantic, national romantic, impressionistic, expressionistic, neo-classical, futurist, minimalism, musique concrete, pling plong, and electronic*.

The field of modern popular music has subcategories like *music hall, polka, tango, rumba, mambo, chanson, gospel, singer-songwriter, rhythm and blues, rock, rap, hip hop, disco, techno, electro, house*.

Subcategories of rock music are *rockabilly, metal, rhythm and blues, new wave, black metal, industrial, indie, prog, soul, grunch, punk, funk, goth, glam, trance, acid, heavy rock*.

Subcategories of heavy rock are *black, death, djent, doom, groove, industrial, new wave, power, progressive, shred, sludge, speed, stoner, symphonic, traditional, viking, trash, folk, gothic grindcore, metalcore, etc*.

Jazz has subcategories like *ragtime, blues, dixieland, boogie-woogie, swing, bebop, cool, hard bop, fusion, jazz-rock, free jazz, modal jazz, acid jazz, latin, bossa nova, string swing, mountain jazz*.

Most cultures also have older variants of *folk music*, with their own genres, sub-genres, instruments and local terms; which, like the above mentioned terms, may also be significative of a certain emotional character or rhetorical function. On a planet with thousands of cultures and languages it is not possible to mention all these concepts. Even within a relatively small population like that of Norway there are many regional traditions, genres, and even instruments.

Within the category of vocal music there are for instance *lokk* (calling for animals), *stev*, *ballade*, *bånsull* (lullaby), *vise*, *trall*, *religious folk songs*, *working songs*, *chanties*, and *sami joiks*. As for instrumental music there are local types of horns and flutes, droned zithers, and fiddles, like the *Hardanger fiddle*, with a set of resonant under-strings, playing dances like *halling*, *gangar*, *rull*, *springar*, *pols*, *bridal dances*, *slått*, or *lyar-slått* (listening-slått), some of which could be tuned in different ways (*scordatura*), like for instance *troll-tuned*.

From the latter nineteenth century onwards strong traditions of marching bands, choirs, as well as accordion music, accompanying dances like *polka*, *waltz*, *mazurka*, and *reinlender*, where evolving; which popularity was later challenged by swing, rock, dance bands, disco, electronic dance music and so on. Nonetheless, all these genres are *coexisting* today, sometimes in mixed forms and according to individual predilections and dispositions. A rock guitarist might well have a daughter playing baritone saxophone in the local big band, or a grandson who is a national champion on the Hardanger fiddle. Even the music schools are pluralistic now; and every Norwegian town with some ambition and pride is specialising in some kind of annual music festival, be it blues, black metal, jazz, world music, classical chamber music, or opera.

Chapter 8

Melodramatic and Moral Gestalts

8.1 Soundtracks of drama and autobiography

The self has a melodic and rhythmical structure which is saturating every movement of thought and speech: asking and affirming, yelling and quelling, enacting character, dialect, sociolect, emotional tone, and state of mind. Even deaf people are musical in the sense that they experience vibration, rhythm, and dance. Their experience of agency and sense of self is similar to hearing people, even though their 'ego-dynamic melody' may be constituted by the fluctuations of proprioceptive and kinaesthetic tension primarily. So much is clear. But what about the higher level *discursive*, *autobiographical*, and *metacognitive* functions? Do the long-range 'dramaturgical' and moral emotions have a melodic structure as well? Are the contributions of sound and music less important at the autobiographical and ethical levels of gestalt formation, or are they more important?

Often, when talking about long-range temporal comprehension, it is conceived of as a video recording: a passive imprint of arbitrary stimuli. Many biologists and even psychologists are thinking along these lines, which are nothing but lines. There is no room for the self in such a picture. The self and the prefrontal cortex is eliminated, and consciousness is reduced to a lens or a camera, often described in terms of *attention* and *memory*, merely registering and replaying events. But a camera is not a conscious observer; and there is no need for a prefrontal cortex if it is not contributing anything beyond recording and crude sensation. The idea of 'observers' and 'conscious agents' requires a content of its own, and a physical medium in which it is constituted. In fact, it requires a whole hierarchy of such content, and it is the highest level constituents of this hierarchy, what might be referred to as dramaturgical and philosophical comprehensions, which have to be given special attention now.

What we often tend to forget is *the soundtrack of our lives*: the 'ego-dynamic melodies' and the kind of temporal gestalts that are produced within this stream. This is precisely where the

core content of the self is residing. Even at an autobiographical and moral-philosophical level this is often the case. In fact, the music is hardly ever more prominent than in an action film or an important religious ceremony; and, as we will come back to below, it is a fact that has ramifications even for the organisation of the brain. Research on music perception and Alzheimer's disease is indicating that regions of the *dorsomedial frontal cortex* gives melody a prominence in the moulding both of personality and mood; and several studies have demonstrated how music therapy can revive aspects of memory and personality which are otherwise absent in such patients.¹

The very experience of *song* and *dance* as contrasted with ordinary speech melody and emotional vocalisation is already a dramaturgical or autobiographical differentiation in the larger scheme of life, allowing our lives to be divided into periods of *recreational relaxation*, *festive celebration*, *partying*, and *religious worship*, as contrasted with more disharmonious, arrhythmic, and prosaic activities like *practical thinking*, *talk*, and *discussion*. So the importance of sound as a medium for feeling and personal autonomy is not lesser at the autobiographical level. Since in this case the purely proprioceptive sensations cannot muster any comparable experiences, the contributions of sound are, if possible, even *more* important at this level; at least this is true for some aspects of these processes. Unlike contrasts like noise and peacefulness, which might also be important structuring factors in our lives, the sensations of harmony are allowing for a production of fundamentally different experiences: new modalities of being, which are harbouring many of our deepest and most integrative mental operations.

Certainly speech, prose, and ordinary emotional vocalisation is already melodic, yet it is the contrast between speech melody, song melody, and other types of intonation that produces such a growth of the self and our sense of social communion. It is very much a question of long-range temporal schemes: *recurring rituals*, periods of *relaxation*, *festivities* and *holidays*. Even when performing our daily chores we undergo periods of *humming*, *whistling*, and *passive musical enjoyment*, not to forget the emotional repercussions and musical 'earworms' swirling around in our heads for longer or shorter periods of time.

It is not difficult to grasp what the music rhetorician Johann Mattheson was referring to as 'loci topici', the 'the sources of invention', or the *raison d'être* of a certain activity or prosody in

¹ Melissa Leggieri et al., 'Music Intervention Approaches for Alzheimer's Disease: A Review of the literature', *Frontiers in Neuroscience*, Vol. 13, Issue 132 (12 March 2019), <https://doi.org/10.3389/fnins.2019.00132>.

the course of life. The rhetorical genres, as described by Aristotle, are examples of this: the differences between epic and forensic *narration*, *deliberative* political oratory, and so called 'epideictic' *laudation* and *jubilation*. Especially when the context is explicit, like in a dramatic action movie, it is easy to grasp that the music is 'dramatic'. The 'dancing' character of dance music becomes very 'dancing' in comparison. But there are also cases where the auditory features are so characteristic that the functional differences are obvious even in the absence of a concrete extramusical context. The functional differences between *speaking* and *singing*, *recitative* and *aria*; the difference between a *lullaby* and a *fanfare*, a *funeral march* or an ordinary *psalm*; these musical characteristics are so easy to perceive that the associated terms are featuring as household terms even at the autobiographical and 'abstract' level, and among people in general.

The different modalities of intonation, like *ordinary prosody*, *singsong teasing*, *storytelling*, *parentese/motherese (baby-talk)*, *news reporting*, and *lecturing*, are contributing greatly to the dramaturgy and social dynamics of life. Some of these modalities of intonation are verging on *atonal song* or 'pantonality', which has previously been described as an intermediate position between tonal song and speech melody. It is a mode of being that is more harmonious than ordinary emotional vocalisation, at the same time as it is allowing for much more drama than in music dealing primarily with the affirmation of harmony. Especially in storytelling and horror music such singsong intonation and dramatisation is often utilised with great success.

Even *within* these main ego-dynamic modalities, of course, there are autobiographical differentiations. Our voices and ways of speaking change throughout life and become central constituents of the transformations in personality from childhood to old age. The development and maturation of our selves as people is manifested here, and integrated in a social dynamic where 'tact and tone' is just as important as what is said. Soothing and encouraging voices, angry voices, the sounds of playing children or adolescents with cracking voices; benevolent voices, malevolent voices, sarcastic voices, ironic tones; harsh, loud, and reprimanding voices; the voices of people we love or hate. The voices of women and men, with all its potential for tenderness and the subconscious dialectic of sexual attraction is worthy of a study in its own. These are aspects of auditory feeling that might have an impact even on value formation, akin to the conditioning or 'somatic marking' of social and other transactions which we will come back to in the last section of this chapter.

Whereas the personality of most animals has not reached even a rhetorical level of complexity, the human personality might incorporate both the *dramaturgical* and *ethical* levels of comprehension. Even though an animal may be antisocial and aggressive, it is not aggressive because it is *querulous* or engaging in a *polemic* against the establishment, like the 'negative dialectics' of an avant-garde composer, a *rebellious* rocker, or a *sarcastic* misanthrope. A dog has a *temperament*, which may be aggressive or amiable; but it is hardly *good*, *noble*, or *wise*. Certainly, it may be *traumatised* and *depressed*, so the differences between us are not as big as we might think. A pack of wolves might even be seen to engage in ritual *howling*, not so different from the jubilation and ritual preparations constituted by human music. Yet it would probably be misplaced to talk about *pessimism* or *optimism* here, or a conscious attempt at *celebration*, mutual *encouragement*, or the strengthening of collective *belief* and *resolve*.

In any case, the higher complexity of human cognition is manifested in the richer dramaturgical functionality that is implicit even *within* these harmonious modalities of being, drawing on an almost infinite realm of tonal ratios and chords for its enrichment and differentiation. Even here we can hear how different types of music are instantiating different stages or functions in life, like in *children's songs*, *teenage pop*, sexualised and *rebellious rock and rap*, *party music*, *elevator music*, *romantic music*, *wedding music*, *funeral music*, *Christmas music*, *patriotic marches and anthems*. At a more local level a TV show, a commercial, or a sporting event could be structured by introductory *jingles* and *signature melodies*, various forms of *cheering* and *clapping*, *transitional music* and *intermittent entertainment*, concluding *anthems* and *fanfares*.

The music does not merely 'express' these functions; it *creates* them, at a level of sophistication which is contributing to our deepest levels of selfhood and personality. In many ways our social and autobiographical reality is expanded by music, along with the consciousness and perceptual capabilities that are needed to experience it.

As for the dramaturgical functions that are manifested within the framework of *single compositions* or concerts, many of these higher order formations have already been thoroughly exemplified in the previous chapter on rhetorical and affective concepts in music theory, especially in connection with the 18th century introduction of *drama* in classical and romantic works, and more specifically in Schoenberg's atonal dramas. Even those aspects of rhetoric that

are classified under the categories of *inventio* and *dispositio* may already belong to the level of dramaturgical gestalt formation; concepts like *exordium*, *narratio*, *divisio* or *propositio*, *confirmatio*, *confutatio*, and *peroratio*; more modern variants like *prelude*, *introduction*, *exposition*, *development*, *transition*, *recapitulation*, *coda*; or in popular music and jazz, such concepts as *head*, *bridge*, *break*, *verse*, *refrain*, or *chorus*.

As pointed out by Mattheson, the chief codifier of music rhetoric, these functions are often *intuitional*, and not necessarily verbalised even by composers. Like most of our behaviour it is organised at a subconscious level, in accordance with impulses which might better be referred to as 'hunches', 'inklings', 'notions', or 'gists'. In the case of instrumental music, which is abstracted both from texts and from any concrete, spatial transactions, the challenge of monitoring such behaviour is obviously considerable. In fact, there is hardly any field that it is testing the limits of human perception to a higher extent than the business of coming to grips with large instrumental works, like symphonies, sonatas, and other, more free compositions.

Certainly the people who are listening to a well-composed symphony are carried along with a dynamic process that is resonating with their own *cycles of activity and rest*, reasonable *strategies of conflict management*, or the *building of arousal and climax* - this is what makes the music musical in the first place - yet it is very difficult to remember and reflect on such processes if the concepts are not properly conscious and representable in a symbolic manner by a metaphorical timeline. Even for experts this is a problem, and the mnemonic aids are often confused with the processes they symbolise. Which is precisely why it is necessary to try to refine this understanding and the vocabulary that is going into it. It is an endeavour that is common both to musicology, dramaturgy, and psychoanalysis.

The benefits of such charting are even higher at the dramaturgical level, as it is the long range processes that are most difficult to grasp and mentally retain. The concepts of rhetorical disposition and the sonata scheme, as described in the previous chapters, have already proven valuable tools, but they are restricted to the argumentative affirmation of harmony. More narrative music needs more narrative schemes, and the manner in which they might be laid out was exemplified in the rudimentary analysis of Schoenberg's 'Erwartung' in the previous chapter.

For a more elaborate explication of a musical work in 'ego-dynamic' terms, see 'Psychologizing Music', which includes a 168 pages explication of Beethoven's piano sonata Opus 54.²

To the extent that they are able to explain the intrinsic organisation of musical works, such analyses are obviously beneficial both to listeners, performers, and composers. An interesting example of this would be the possibility of developing a conceptual framework for the organisation of jazz improvisation. It is only the best musicians that are able to structure their own soloing in a captivating manner, or to engage in extensive improvisation in the first place. Yet it is not clear which principles are applied. The gradual building of intensity is a simple solution, and Wundt's law of 'intensification by contrast' is obviously a central constituent of such processes. Yet the possibilities are much richer than this.

What characterises standard jazz improvisation is the paraphrasing of an original tune, often an AABA harmonic scheme which is repeated over and over. So the dramaturgy is very much displayed at the 'elocutio' level of rhetoric, as different renderings of the original scheme. Typical sonata distinctions, contrasting a decisive exposition and conclusion with more recreational or 'hypnotising' passagework, are obviously relevant to such music. But there are also more complex possibilities, where the emotional trauma that is often reflected in such tunes might be vented, and contrasted by periods of pensive thoughtfulness, reconciliation, or morale-boosting optimism, like in a Beethoven sonata or a session of psychoanalytic 'work'. More distressful developments, like a *breakdown* or *disillusionment*, would necessarily require a disintegration of harmony and ultimately even rhythmical regularity. One do not sing and dance when deeply depressed. Yet there is a large room for conflict, dissonance, and atonality within the broader field of jazz.

An important point here - which is also the central idea of this treatise - is the status of these functions as *ego-dynamic gestalts*. It is obviously more difficult to delineate the boundaries and essential features of a behavioural gestalt when the context is larger. Whereas a cadence or melodic figure is grasped and integrated in short term memory, we are dealing now with relations between whole sections of such figures, or to be more precise: the kinds of concepts that are covering the transformations and relations between the emotional functions of these sections. The above mentioned concepts of *disillusionment* and *reconciliation* are just two

² Steinar Bang, 'Psychologizing Music: a Psychodynamic Explication of Beethoven's Op. 54'. Expanded version of Cand. Philol. thesis in musicology, (University of Oslo, 2004).

examples of such higher level compounds. And it is obvious that these compounds are also in need of more resources in the form of memorial and integrative mechanisms in the brain. There have to be some 'physical' correlates in the brain that bring all these temporal and sensory elements together as compounds and compounds of compounds. If the concept of 'physics' is seen to cover all of reality, it would not be far fetched to claim that even these ego-dynamic gestalts are 'physical objects', if only in a dynamic and holistic sense.

It is precisely these dynamic and highly *integrative* properties of nature that have often been doubted and neglected. The detachment of physics from philosophy only resulted in more naive conceptions, it seems; like the chimera of some discrete and infinitely dense balls bumping into each other, or a logical system that is limited to quantities alone. Like in linguistics, the terminological apparatus of mathematics may create the illusion of a self-sufficient system. Yet, a person would not get very far in life by talking only of numbers. As we will come back to in the last chapter of this treatise, even at the microcosmic level there are integrated gestalts, which features are not captured by numbers alone. 'Electrons', 'photons', and 'phonons' are names of such gestalts, and they are not necessarily more 'concrete', less *dynamic*, or less 'emergent' than a dramaturgical or moral concept. In many ways they are more *indeterminate* and *unreal*.

Perhaps it is not only the self that has to be redefined in musical terms. According to quantum field theory, electrons and atoms are field oscillations which are nested into higher level gestalts in a manner that is not so different from chords and harmonic spectra. Similarly, the nervous system is a dynamical system, communicating by means of electrical and mechanical pulses. Even the sense of smell has been connected with the type of vibrations that are brought about by different molecules.³ There are even scientists, like Anirban Bandyopadhyay, who are insisting, in a series of YouTube videos and books (the first of which is published in 2020), that all of reality and experience is constituted by vibrations, 'just like music'.⁴

³ Ross D. Hoehn et al., 'Status of the Vibrational Theory of Olfaction'. *Frontiers in Physics* (19 March 2018). <https://doi.org/10.3389/fphy.2018.00025>.

⁴ Anirban Bandyopadhyay, *Nanobrain: The Making of an Artificial Brain from a Time Crystal* (Boca Ration: CRC Press, 2020)

The details of how this is integrated in the brain are unknown. Even though there are indications of quantum entanglement, it is not clear how this is played out.⁵ Some researchers, like Johnjoe McFadden, are pointing to the electromagnetic fields surrounding neurones.⁶ Even these electromagnetic fields might be said to be 'integrative', at least in the sense that seemingly infinite amounts of information are contained within each and every point of space; yet it is unclear how and whether the paradoxical *interpenetration of past and present, far and near*, which is so apparent in dramaturgical and philosophical concept formation, might be contained within such a field. It becomes very obvious, as we are moving up this ladder of conscious gestalt formation, that the potential for integration must be infinite. The recognition is reminiscent of 'singularities'. But the question whether such singularities are constituted in local 'black holes' in the brain or somewhere beyond space and time altogether, in the vacuum or the core of the 'big bang', remains unresolved. According to some physicists, the big bang does not 'explode into' a preexisting space; it *creates* space within itself. If this is true, the integrative features of matter and mind might not be so different after all.

What is starting to become very clear, and a much more relevant subject for discussion, is the manner in which the different anatomical regions of the brain are nesting different aspects of experience into the totality. One by one the different dimensions are brought into existence by adding on to simpler compounds and sensory features. It is a conception that is reminiscent in many ways of Hegel's dialectical account of cosmic evolution; and it seems to be constructed in a posterior to anterior direction. At least this holds for the neocortex, which, even if it is organised in a hierarchical manner, might also be operating according to more parallel, 'apperceptive', and holistic principles, integrating elements of contextualisation and memory based anticipation even in rather elementary percepts.

The focus of this treatise has primarily been the level of *self-consciousness*, which behavioural components seem to be organised, and nested into higher level compounds in the ventrolateral prefrontal cortex. When it comes to the 'dramaturgical level' of gestalt formation, there are many indications that the so called 'pars orbitalis', or Brodmann area 47, plays a central

⁵ Christian Matthias Kerskens and David López Pérez, 'Experimental indications of non-classical brain functions', *Journal of Physics Communications*, Vol. 6, Number 10 (7 October 2022): <https://doi.org/10.1088/2399-6528/ac94be>.

⁶ Johnjoe McFadden, 'The Conscious Electromagnetic Information (Cemi) Field theory: The Hard Problem Made Easy?', *Journal of consciousness Studies*, Vol. 9, No. 8 (2002): 45-60, https://www.johnjoemcfadden.co.uk/wp-content/uploads/2014/10/mcfadden_JCS2002b.pdf.

role. Not only is it an add-on to the 'action hierarchy' in the lateral frontal cortex (Brodmann areas 6, 44, and 45), it is also overlapping with the areas dealing with value formation and the monitoring of visceral feeling in the orbital and ventromedial frontal cortex. Thus it is in a position to integrate both the temporal and visceral aspects of dramaturgical functions.

Three R-words: *reversal*, *repression*, and *revaluation*, will be central to the following chapters on Aristotle, Freud, and value-formation respectively. And the occurrence of prefixes like dis-, re-, or pre- in such words is no coincidence. It is a reflection of the metacognitive or meta-emotional level we are approaching here: the re-interpretation of past and future perspectives in the light of motivationally significant changes.

The engagement of pars orbitalis in such transactions is indicated by many studies, both on narration and motivational revaluation. Especially the *negative* aspects of value formation seem to be involving more lateral and dramatic components: so called 'punishers'.⁷ In a study by GERALYN M. SHULZ and colleagues, Brodmann area 47, in cooperation with areas in the anterior cingulate cortex and the pre-SMA, were also found to be engaged in *voiced* as opposed to *whispered* speech in autobiographic narration;⁸ which seems to confirm the emotive contributions of *tone* in such processes. Similarly, the right hemisphere pars orbitalis (BA 47) has been found to be mapping the alternation between major chords, minor chords, and more tense chords.⁹ According to Daniel Levitin and Vinod Menon, the pars orbitalis might be responsible for nothing less than 'the experience of temporal coherence and meaning in music'.¹⁰

Yet it would be wrong to say that BA 47 is the only region, or the highest region for the organisation of musical experience. Especially the *frontopolar cortex* (BA 10) might be a necessary substrate of higher level dramaturgical conceptions. A study on professional jazz improvisation even singled out this area as the most active frontal region.¹¹ Usually the

⁷ Morten L. Kringelbach and Edmund T. Rolls, 'The functional neuroanatomy of the human orbitofrontal cortex: evidence from neuroimaging and neuropsychology', *Progress in Neurobiology*, Vol. 72 (2004): 361, <https://doi.org/doi:10.1016/j.pneurobio.2004.03.006>.

⁸ GERALYN M. SCHULZ et al, 'Functional Neuroanatomy of Human Vocalization: An H215O PET Study', *Cerebral Cortex*, Volume 15, Issue 12, (December 2005): Table 1. <https://doi.org/10.1093/cercor/bhi061>.

⁹ Takashi Fujisawa and Norman D. Cook, 'The perception of harmonic triads: An fMRI study', *Brain Imaging and Behavior*, Vol. 5, Issue 2 (February 2011): Figure 11. <https://doi.org/10.1007/s11682-011-9116-5>.

¹⁰ Daniel J. Levitin and Vinod Menon, 'Musical structure is processed in "language" areas of the brain: a possible role for Brodmann Area 47 in temporal coherence', *Neuroimage*, Vol. 20, Issue 4 (December 2003): 2142-2152, <https://doi.org/10.1016/j.neuroimage.2003.08.016>.

¹¹ Charles J. Limb and Allan R. Braun, 'Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation', *PLoS One*, Volume 3, Issue 2 (27 February 2008), Figure 3, <https://doi.org/10.1371/journal.pone.0001679>.

frontopolar cortex is described as a region for *self-reflection*, *metacognition*, and the temporal *postponement of reward*. The modulation between different keys or tonal centres in music is also implying such reflection and postponement of repose, which is playing a central role in the dramaturgy both of jazz and classical music. Typically such modulations are infusing whole sections with feelings of *bewilderment*, *uncertainty*, and the promise of *reassurance*; and if we are to believe the experiments performed by Petr Janata and colleagues, the different types of modulations are manifested in characteristic activation patterns in medial frontopolar areas.¹² If the findings are trustworthy, they may elucidate the emotionality of music at a level which is both very complex and surprisingly concrete; but this is a question that will be treated in a separate chapter.

Other medial frontal areas are dealing with high level conceptions of *personality* and the experience of *self-willed action*. Especially the pre-supplementary motor area has proven central to such experience, including the experience and performance of favourite songs and dances. A study by Jörn-Henrik Jacobsen and colleagues is pointing to 'a crucial role for the caudal anterior cingulate and the ventral pre-supplementary motor area in the neural encoding of long-known as compared with recently known and unknown music'; which might also be supporting the retained aspects of musicality and personality in Alzheimer's patients.¹³ According to Pengmin Qin and colleagues, the pre-SMA and the dorsal anterior cingulate cortex are central components of a 'higher order sensorimotor integration circuit', which is 'significantly correlated with levels of consciousness', operating in tandem with temporal and ventrolateral regions, via connections like the 'aslant tract'.¹⁴

It may seem strange, at least from the point of view of reductionist researchers, that the neural correlates of 'free will' are simultaneously the correlates of our deepest and most profound musical experiences; but deep feelings, self-consciousness, and 'free will' would have to be interconnected, since our most important decisions, especially those that are dealing with romantic, moral, and existential transactions, are necessarily involving a judgement of the

¹² Petr Janata et al: 'The Cortical Topography of Tonal Structures Underlying Western Music', *Science*, Volume 298, No. 5601 (13 December 2002): 2167-2170, <https://doi.org/10.1126/science.1076262>.

¹³ Jörn-Henrik Jacobsen et al., 'Why musical memory can be preserved in advanced Alzheimer's disease', *Brain*, Vol. 138, Issue 8 (August 2015): 2438-2450. <https://doi.org/10.1093/brain/awv135>.

¹⁴ Pengmin Qin et al., 'Higher-order sensorimotor circuit of the brain's global network supports human consciousness', *Neuroimage*, Volume 231, No 117850 (1 May 2021): 1-13, <https://doi.org/10.1016/j.neuroimage.2021.117850>.

individual beauty, the worth, and the trustworthiness of other people. The degree of 'freedom' might even be proportional to such depth, as it is these profound emotional and social experiences that gives the conscious agent a deep sense of *presence* as well as *existential meaning and urgency*. If this meaning and urgency becomes bland and empty, as if nothing is at stake, the need for, and experience of freedom diminishes; and in a computer it has lost its meaning altogether. Furthermore, if the kinaesthetic and melodic structures are absent, there is probably little consciousness of an active self at all, let alone any notion of 'free will'. The moral character or 'ethos' that the ancient Greeks were ascribing to different scales and styles of musical behaviour gets a much more concrete significance in this perspective, and it is no less relevant to modern culture.

8.2 Musical aspects of Aristotle's *Poetics*

It is timely to remind ourselves again, about the mission of this chapter, which is to complete the taxonomy of ego-dynamic gestalt formation with the highest level examples of such entities. The principle that has earlier been formulated, of focussing only on those gestalts and concepts that are manifestable in sound and instrumental music, are also essential to keep in mind. By discussing how such meaning might be sufficiently manifested in a purely dynamic process, we are tracing the core autonomy of such processes, in a medium which, because of its explicit character, is also making it easier to understand how the higher level functions are nested into consciousness as combinations of subordinate entities. Not only are we dealing with the combination of melodic figures forming rhetorical and emotional compounds now, but the interrelation of these emotions at a meta-emotional and philosophical level.

Much of this has already been discussed; but especially two theorists deserve further treatment here, because of their unique contributions to a terminology and classification of such gestalts. These people may not have been conscious about the gestalt properties of the concepts they are using, let alone the physical substrates that are creating them, but their concepts are de facto labels of such gestalts. Sigmund Freud's diachronic perspective on mental processes and complications was very much the main alternative to more synchronic and sociological accounts of selfhood in the twentieth century. Although Freud's work on psychoanalytic techniques has often a specialist and even esoteric slant, it is contributing several concepts that have proven relevant to self-reflected mental processing even in healthy people. It might be missing out on

much of the high level meaning and motivation of life - everything that Maslow was referring to the need for social 'self-realisation' - but this is a shortcoming that was later remedied by so called ego psychology and self-psychology.

Aristotle's understanding is no less humanistic than even these theories; also it has a much more direct relevance to the embodied and articulated instantiation of such processes, as his reference is often to concrete rhythms in the form of verse forms as well as a hierarchy of large scale dramaturgical concepts. It is no accident that Aristotle's poetics has become a cornerstone of modern dramaturgy, even within the field of commercial cinema and television.

The kinds of drama that Aristotle is charting - the so called tragedies and comedies - are similar in several respects to what today would be called an 'operetta' or 'musical', although the role of the choir, and the interplay between soloists and choir, was even more central in ancient Greece, when orchestral music was not as developed as today. The organising principles of such dramas, especially the tragedy, were described in his '*Poetics*', which is a concept that was not limited to the recitation of verse. To a higher extent than today it was seen to integrate drama, song, and epic narration, all of which was regulated by specific rhythms, such as 'iambic' verse form (short syllable followed by long syllable) which, he says comes close to ordinary speech.¹⁵ It was essential that epic and drama should be *realistic* in the sense of 'imitating' character, emotion, and action; which, says Aristotle, is taking place either in the mode of narrative or as 'engagement in the activity'.¹⁶

So, according to Aristotle, there are two main origins of poetry: one is concerned with 'imitation', the other is concerned with 'melody and rhythm'; in fact, it is the element of *song* that is considered 'the most important source of pleasure' in tragedy.¹⁷ Both of these components - imitation and song - are 'natural', says Aristotle,¹⁸ which is also demonstrating his pluralistic attitude towards reality. At the same time as drama is dealing with, and 'imitating', ordinary life, it is played out within the mode of 'language made pleasurable', which is actual and valuable in its own right.

¹⁵ Aristotle. *Poetics* [ca.. 335 BC], trans. Malcolm Heath. (London: Penguin Books, 1996), Chapter 4, 22, and 24

¹⁶ Aristotle, *Poetics*, Chapter 1 and 3.

¹⁷ Aristotle, *Poetics*, Chapter 6 and 26.

¹⁸ Aristotle, *Poetics*, Chapter 4.

It may not be immediately obvious how the general dynamics of the self is paralleled in the structure of a Greek tragedy, but the similarities are greater than one might think. Even the ordinary dynamics of thought is basically alternating between speech melody and song melody - yes, even a chorus in many cases. Song is a natural part of us, although in our daily lives the chorus may not be more organised than the cheering of an audience at a football match, the clapping at a concert, or the intermittent music in a commercial or news review. What distinguishes a Greek drama from ordinary life is the *versification* of speech, which is also incorporating a considerable amount of harmoniousness and rhythmical regularity. Even in modern theatre or in news reporting there might be elements of such harmony, in the form of a singing and somewhat stilted prosody. It is an analogy which becomes particularly clear when Aristotle is comparing older poets 'making people speak like statesmen' with 'contemporary poets', who 'make them speak rhetorically'.¹⁹

A more general distinction between theatre and life is the fact that an artwork is requiring a considerable *condensation* of events, as well as a higher degree of autonomy, roundedness, and moral-philosophical purport even at the time scale of minutes and hours. 'What is more concentrated is more pleasant than what is watered down by being extended in time',²⁰ Aristotle says for instance. A certain 'magnitude' is necessary, but it should not be longer than it 'can readily be held in memory.' And he is talking about 'the magnitude in which a series of events occurring sequentially in accordance with probability or necessity gives rise to a change from good fortune to bad fortune, or from bad fortune to good fortune'.²¹

The 'aim' of poetry, he says, is to 'express universals'. 'The function of the poet is not to say what *has* happened, but to say the kind of thing that *would* happen'.²² By concentrating on those events that are governed by probability and necessity, the poet is not only securing a coherent and autonomous drama, he might also be providing a lesson or moral insight which, to some extent, is also universally valid. Which is probably what Aristotle means by saying that the mission of the poet is more serious and 'philosophical' than that of a historian. Aristotle does not delve deeper into these matters here, beyond providing some examples of *improper* changes of

¹⁹ Aristotle, *Poetics*, Chapter 6.

²⁰ Aristotle, *Poetics*, Chapter 26.

²¹ Aristotle, *Poetics*, Chapter 7.

²² Aristotle, *Poetics*, Chapter 9.

fortune, some of which sound rather unfair and discriminatory today.²³ What remains of his poetics, as well as other parts of his oeuvre, is somewhat fragmentary. But his insistence on universality is important, as it is pointing to the level of philosophical and moral conceptualisation, which will be discussed in the last section of this chapter.

It is precisely this constant insistence on *universality*, *necessity*, and *unified wholeness* which makes Aristotle's dramaturgy so relevant to the discussion of mental and musical autonomy. When describing the structure of a drama, Aristotle is also telling us something about the dynamic structure of the self, and the illusion which is common even in contemporary psychology, that the self is merely a body or an arbitrary stream of events. Aristotle was critical of the lesser playwrights of his time, who thought that unity was provided merely by concentrating on a specific person moving through the plot: yet 'an indeterminately large number of things happen to any one person, not all of which constitute a unity.'²⁴

Perhaps Aristotle is more of a gestalt psychologist than has earlier been indicated. 'The plot, as the imitation of an action, should imitate a single unified action', he says, and he is obviously one of the very first to emphasise that 'the structure of the various sections of the events must be such that the transposition or removal of anyone section dislocates and changes the whole. If the presence or absence of something has no discernible effect, it is not a part of the whole.'²⁵ Like the coherence and identity of a melody or drama, the coherence and identity of our selves is largely produced by such 'unified action', and it is not so strange that many of the same brain regions are also involved.

Putting so much weight on these issues, it is almost as if Aristotle has foreseen the reductionism and relativism of later times, like in post-structuralism, or the relativism of Leonard B. Meyer, where the meaning of music is taken for granted or reduced to an empty game of habituation and surprise. Certainly, Aristotle is positioning himself against the skeptics of his own time. His arguments are very much the same as in today's critique of such positions. Familiarity is not a sufficient criterion, he says for instance, since 'even what is familiar is familiar only to a few.'²⁶ Other places, like in his *Metaphysics*, skepticism is refuted on a general

²³ Aristotle, *Poetics*, Chapter 13.

²⁴ Aristotle, *Poetics*, Chapter 8.

²⁵ Aristotle, *Poetics*, Chapter 8 and 23.

²⁶ Aristotle, *Poetics*, Chapter 9.

basis, by pointing to the self-contradiction of *talking about* the entities which reality one denies. If it had not been possible to approach the truth of anything, he argues, words would have no meaning, and humans would have no advantage over mere plant life.²⁷

It is sad to observe how little progress has been made within the humanities and social sciences since the time of Aristotle. We are dealing with very basic and familiar circumstances here, which should not be difficult to agree on. Or perhaps it is precisely this *familiarity* which makes it difficult to grasp. Unlike mechanics or medicine, which is unfamiliar, and entirely reliant on prescriptions, the activities that are intuitional and incorporated in our very being are often working without such prescriptions, also in coexistence with theories that would be self-defeating, if anyone endeavoured to test them.

Perhaps the emerging field of neurophenomenology might have a better chance of correcting such errors. So far, the best evidence is probably the utilitarian value of Aristotle's prescriptions; the fact that they have actually stood the test of time. Even today his poetics is very much functioning as a textbook in dramaturgy. 'A whole is that which has a beginning, a middle, and an end', he says: 'Well-constructed plots should therefore not begin or end at an arbitrary point';²⁸ which is a crucial specification. Ending is more than stopping, which would be the relativist alternative. Besides the requirements of causal integrity and 'resolution', the various parts of a Greek drama also have a character and rhythm that is constituting its function, a function which is better reflected in the precise terminology of these parts, consisting basically of a *prologue*, *episodes*, a *finale*, as well as *choral parts*, which may be fulfilling the functions of an *entry-song*, an *ode*, or a *dirge*.

The *prologue* is the whole part of a tragedy before the entry-song of the chorus; an *episode* is a whole part of a tragedy between whole choral songs; the *finale* is the whole part of a tragedy after which there is no choral song. Of the choral part, the *entry-song* is the first whole utterance of a chorus; and *ode* is a choral song without anapaests or trochaics; a *dirge* is a lament shared by the chorus and from the stage.²⁹

²⁷ Aristotle, *Metaphysics* Book 4 (Gamma), Chapter 4.

²⁸ Aristotle, *Poetics*, Chapter 7.

²⁹ Aristotle, *Poetics*, Chapter 11.

The identity of form and function which Aristotle is stressing is best reflected in the discussion of the *chorus*. The choral parts are *transitional*, like the intermittent music in a TV series or the intermezzi of an operetta. But even the *chorus*, he says, should be integrated in the drama. More precisely, it should be handled 'as one of the actors'. The role of a *commentator* is already indicated by the concepts of *introducing*, *celebrating*, and *lamenting*. The choral parts should not be mere 'interludes' as in Euripides' or Agathon's works. This, he says, 'would be like 'transferring a speech or a whole episode from one play into another.'³⁰ It is an important recognition, which is relevant both to the eighteenth century development towards more integrated drama and musical coherence as well as our days' music and dramaturgy. Even today it is not uncommon that an intermezzo or a jazz solo - which is still going by the name of a 'chorus' - is unrelated to the context of the work in which it is occurring. Instead of commenting on the content of a song - introducing, lamenting, or celebrating it - some musicians are rattling off the same passagework in all their solos. Such a chorus is often boring and disconnected, because it is neither differentiated, coherent, nor in touch with any deeper purport.

When it comes to the drama proper - which is also containing such elements as *diction*, *spectacle*, *pathos* and *suffering* - it is mostly played out during the episodes, which is where the *plot* comes more into the picture. All the time the emphasis is on necessity and probability. Mere spectacle, without any structurally justified fear, is 'monstrous', says Aristotle;³¹ as if he had already seen the monster movies of later times. This does not mean that surprise is excluded. On the contrary, he points to Agathon's saying that 'it is probable for many improbable things to happen'. 'Astonishment gives pleasure', he says; which is why 'everyone exaggerates when passing on news'. Even *fear* and *pity* is found to be stronger when combined with astonishment, but he also points out that 'even chance events are found most astonishing when they appear to have happened as if for a purpose.'³²

Sure enough, there is little reason to be astonished by things that are random or meaningless. If preceded by a long period of silence, one might well be startled by a sudden random sound, but hardly surprised or astonished. If the whole process is chaotic and lacking in functional differentiation, a 'new chaos', if such a thing even exists, would do little to break our expectations.

³⁰ Aristotle, *Poetics*, Chapter 18.

³¹ Aristotle, *Poetics*, Chapter 14.

³² Aristotle, *Poetics*, Chapter 9, 18, and 24.

Since chaos is what we expected, it would not surprise us at all. In fact, it would not even *engage* us; so the whole idea of 'expectation' is misplaced. But this is a discussion which we will come back to in connection with Leonard B. Meyer, in the last chapter of this treatise.

As for the *structure* of a plot, it is a general requirement that after the start, or even before the start, some kind of 'complication' must be introduced. 'By complication', says Aristotle, 'I mean everything from the beginning up to and including the section which immediately precedes the change to good fortune of bad fortune; by resolution I mean everything from the beginning of the change of fortune to the end'; which is somewhat confusing. The description seems to leave little room for the actual drama: the alternation between efforts and setbacks so typical of mental processes. First there is 'complication', he says, then there is a 'resolution', which function is clarified by his reference to Theodectes' *Lynceus*, in which 'resolution is everything from the capital charge to the end'. Lynceus' capital charge was withdrawn, and the man who convicted him died instead; but our knowledge about this plot is limited.³³

The central concepts of 'reversal' and 'recognition' are obviously part of this process, at least in so called 'complex plots'. At some point, presumably before the fortune is finally determined, there may be moments - like the disclosure of unknown 'relationship or enmity' - where the whole outlook and perspective dramatically turns around; which may be involving both *recognition* and *re-cognition*. It is reasonable to think that even *after* such reversal, there might be a possibility of battling with the problems before the destiny is finally determined. But Aristotle is not very clear with regard to these matters. In some examples the reversal, astonishment, resolution, and change of fortune seems to happen more or less at the same time,³⁴ which leaves much of the plot structure in the dark. Apart from a reference to Orestes being *captured* because of *fits of madness*, and *escaping* by means of the purification or *catharsis* of madness,³⁵ there is not much discussion of detailed mental processes in Aristotles' text. His focus is on some main ingredients. But this is a lack that will be remedied during the discussion of psychoanalytic techniques in the next chapter.

In any case, the concepts of *reversal* and *recognition* are complex and important enough in their own right. They are 'the most important devices by which tragedy sways emotion', he

³³ Aristotle; Poetics, Chapter 18, and translator's note number 82.

³⁴ Aristotle, Poetics, Chapter 11.

³⁵ Aristotle, Poetics, Chapter 17.

says;³⁶ which is demonstrating a fundamental interpenetration of cognition and emotion. It is a recognition that is radical even today, and it is pointing to a level of complexity where different perspectives and their motivational implications are monitored, which is probably unique to humans. In fact, such reversal is not even found in all dramas. It is only the 'complex plots' that contain it.

A simpler and more well known way of classification is according to destiny: in *comedies* the ending is happy; in *tragedies* the ending is tragic; or the tragedy might be averted in the last moment, which would still excite the tragic emotions. There are also 'double structure plots', like the *Odyssey*, which 'ends with the opposite outcome for better or worse people.' Especially in comedy, he says, such double structure may be appropriate, as one of the characters get a happy ending.³⁷

If Aristotle's description is correctly understood, the main features of his conception of a Greek drama might be summed up in this manner:

PARTS:

Prologue

Chorus: functioning as *entry song*, and at later stages of the play: as *odes* or *laments*

Episodes: containing interaction between 'admirable' and 'inferior' characters, in the form of iambic verse, spectacle, and sometimes 'songs from the stage'.

Finale

PLOT:

Complication: everything from the beginning up to the change of fortune.

Reversal: a turning about of circumstances which is occurring only in *complex plots*, preferably involving insight and *recognition* rather than mere chance.

Resolution with change of fortune: resulting from 'probability and necessity' rather than 'theatrical devices'. In *tragedies* with tragic endings, which may be averted in the last moment. In *comedies* with happy endings, or different fortunes for different people, which is the definition of *double structure* plots.

³⁶ Aristotle, *Poetics*, Chapter 6.

³⁷ Aristotle, *Poetics*, Chapter 13 and 14.

So how much of this is manifestable in a purely ego-dynamic process, like in instrumental music? The question is topsy-turvy, since most of this is *only* manifestable in a dynamic process. Like in the earlier discussed sonata scheme, the difference between a prologue, exposition, and a chorus or episode, is the declamatory character of the former, and the singing or speech-like character of the latter. It is the melody and rhythm that distinguishes a recitative from an aria, or a declamation from a quarrel, celebration, or lament. Similarly, the distinctions between solo, tutti, antiphony, and polyphony are musical features. As previously noted, even the experience of *question* and *answer* is relying on melodic or motor tension. This tension might be symbolised by a question mark or by words like 'tension' and 'question'; but it is the nonverbal communication that constitutes its reality.

This is also true about plots. The whole emotional dynamic, which is motivating the drama, going from complication and suffering to resolution, is very much manifested in the expressive qualities of melody, as well as other vocal and sensorimotor expressions. Without these shared experiences we would hardly know the feelings of other people, let alone be able to talk about them. Our auditory and vocal apparatus is fine tuned to all kinds of expressive nuances. An otherwise neutral statement might easily be turned into sarcasm by a small melodic twist. Also, there has been made experiments with putting different music to films, indicating how film music might dramatically change, and in effect destroy, a film by turning a pleasant or neutral scene into a horror scene or a thriller.³⁸ Even in documentaries and so called 'reality-TV', which are supposed to be realistic, the action is usually accompanied by emotional music. If the postmodern semiologists were right, it is the *texts* that would provide the emotional content; yet there is little evidence that the musical audience is troubled much by incomprehensible or changing texts, or that they are paying much attention to the text in the first place.

Even the concepts of *reversal* and *recognition* as astonishing confrontations and turning points, full of conflict and ambivalence, are typically expressed in the music. In fact, there is a whole range of such effects, even stereotypical effects, that are often utilised for this purpose: suddenly the action is suspended by sharp stabbing dissonances in the strings or the brass, the

³⁸ Alessandro Ansani et al., 'How soundtracks Shape What We See: Analyzing the Influence of Music on Visual Scenes Through Self-Assessment, Eye Tracking, and Pupillometry', *Frontiers of Psychology* (7 October 2020), <https://doi.org/10.3389/fpsyg.2020.02242>.

pulse is pounding, with ensuing tumult and tremolo, screaming and sighing. Moments in Schoenberg's monodrama *Erwartung*, where the woman is confronted with the dead body in the forest, might serve as good examples of such reversal and recognition, even to those who do not understand the German text. More problematic here is the *content* of the recognition, that is to say: the insight into the *causes* of the dilemma. In so far as this causality derives from external circumstances, like a disclosure of 'kinship or enmity', which are two of Aristotle's examples, these are references which only language can tell about. It is the reason for having a language in the first place.

Nevertheless: some causal relations may come across even without it. If an instrumental work is laid out as an existential drama, our tendency to avoid or 'repress' our negative memories and experiences might dominate the first part of the work, until the point where the growing joy would be so forced and out of proportion that when in need of a contrast or break, we would be reminded with full power of the initial troubles. The confrontation with our past might be experienced as a reversal, also involving the recognition that the troubles would have to be faced or treated in a more thorough manner. In fact, such recognition and melancholy arising 'by means of memory' and nostalgic lyre-music, is mentioned by Aristotle as a main type of recognition.³⁹

The rest of the work might be organised as a fight or discussion, ultimately coming to terms with and even overpowering the troubles, which is the typical course of events in a Beethoven sonata or symphony. But there are also less optimistic scenarios, more typical of a tragedy, where the music is returning to or deepens the initial melancholy. Both of these scenarios would be plausible and inherent in the dynamic display. Since Aristotle prefers recognitions that arise 'out of the actual course of events' rather than from 'contrived tokens and necklaces',⁴⁰ such music might even serve as ideal and purified examples. The emphasis on good or bad fortunes in instrumental works might also be expressive of a certain outlook or attitude towards life; but this is something we will come back to below.

Even much social dynamics tend to follow typical patterns, which appear 'probable or necessary' even without any explicit causes. The process going from shyness to increasing socialisation to weariness and retreat is one example. We have earlier seen that in Beethoven's

³⁹ Aristotle, *Poetics*, Chapter 16.

⁴⁰ Aristotle, *Poetics*, Chapter 16.

Pastorale symphony the lightning is striking at a stage of the process when the 'gathering' might just as well have disintegrated for more psychological reasons, or developed into a quarrel. Often, when things become boring and intoxication and disinhibition occurs, people might give vent to their aggressions.

Alternatively: a composer might introduce a crisis or catastrophe in an instrumental work for no obvious reason; with the knowledge that the listener could not possibly know its cause. In such a case, the coherence of the work would be constituted entirely by the ways in which this external irrationality is defeated by the self, being engulfed by its autonomy, so to speak; which is also its source of power and control. After all, it is a fact of life that irrational accidents and illnesses are often inflicted on us from outside us, or from the inside of our bodies. The self is residing rather in the autonomy of the melodic process, and we do not necessarily need to know the cause of a problem to enjoy the manner in which it is defeated. The composer might benefit from a concrete program to provide the work with depth and a consistent emotional tone; but the listener may not need it. If the listener needs an external cause, he could project his own problems into it, or seek up the composer's program, if it is written down.

8.3 Relevant psychoanalytic concepts

8.3.1 The 'pleasure ego' and the 'reality ego'

When charting the dynamic structure of the self, and especially its dramaturgical, long-range processes, it is difficult to get around the importance of Sigmund Freud and the psychoanalytic tradition. It has brought to our attention a whole range of insights which are very much incorporated in the language by now: the fact that we are driven by *unconscious* and often *libidinal* motives; the formative influence of parental role models, childhood experiences and cultural taboos; our tendency to *repress* what is painful, retracting into our selves, or developing complexes, trauma, regressive fixations, or projections and aggressions towards other people. The haunting but often distorted appearance of trauma and forbidden wishes in dreams and fantasies may be utilised as clues to the underlying pressures, and thus a tool on the road to the conscious channeling of forces into more positive and realistic fortunes.

The point here is not to give a complete overview of psychoanalytic theory, but to focus on those higher level gestalt formations which are relevant to purely dynamic processes manifestable even in instrumental music. In the absence of a text, it is difficult to discern

whether a certain melody or work is driven by libidinal or other concrete wishes. In instrumental music we are confronted with complex dynamic processes, which are 'abstract' in some sense, but also more *general*. After all: not all people or children are obsessed with sexuality. Even Freud recognised the existence of non-sexual '*ego*, or *self-preservative*, instincts';⁴¹ and a more general description of mental processes, somewhat abstracted from specific instincts, is given especially in his so called 'metapsychological' texts, and in the articles dealing more abstractly with psychoanalytic techniques.

In an article published in 1911, Freud speaks about 'two principles of mental functioning': 'the pleasure principle' and 'the reality principle'. It is obviously a false dichotomy, since the reality principle is 'only a safeguarding' of the pleasure principle, as he puts it.⁴² The opposite of such safeguarding might better be referred to as a kind of *myopia* or *escapism*; a tendency to go for immediate pleasure and 'turn away from the unbearable', which is obviously misguided in many cases. In fact, Freud goes as far as claiming that 'every psychosis has as its result, and probably therefore as its purpose, a forcing of the patient out of real life, an alienating of him from reality'.⁴³ Much of the causes for this escapism are contingent and extrinsic to the melodic manifestations, but there are also more universal and existential problems, which are *always* relevant. It is often such existential questions that are treated in music and other works of art.

The dynamic characteristics of escapism and realism are also very different, and clearly reflected in the patterns of melodic behaviour. A characteristic tendency of the 'pleasure ego', says Freud, is to seek refuge in *day-dreaming* and *fantasy*. Fantasising and day-dreaming are sequential, digressive, and relatively effortless activities, reflected in musical terms like *fantasy*, *reverie*, *romance*, and *rhapsody*, as well as sonata development sections. Yet, there is often a considerable amount of change and creative initiative in such music. More effortless and escapist are mere *lyricism* or genres like *dance music* or *trance*, where all traces of thinking are very much removed. At a more primitive level we are dealing with mere *autoeroticism* or so called 'stimming': rocking back and forth. It is a musical activity in the sense of deriving pleasure from

⁴¹ Sigmund Freud: 'Instincts and their Vicissitudes' [1915], in *Sigmund Freud, 11. On Metapsychology: The theory of Psychoanalysis* (London: Penguin Books, 1984), 120.

⁴² Freud, 'On the two Principles of Mental Functioning' [1911], in *On Metapsychology*, 41.

⁴³ Freud, 'On the two Principles of Mental Functioning', in *On Metapsychology*, 35.

the harmony of the movements, yet it is not very constructive in the long run. On the contrary, it is often considered pathological.

The dramaturgical incoherence and lack of realism is even more prevalent in *dreaming proper*. In sleep the censorship is probably 'greatly reduced', says Freud; so the forbidden wishes are given free rein.⁴⁴ It is not entirely clear why we are sleeping and dreaming, but it has been connected with the trimming down of synapses and superfluous memories,⁴⁵ at the same time as dreams may be reconsolidating emotionally charged memories which are likely to be relevant in the future.⁴⁶ Freud is undoubtedly correct that dreams tend to contain 'residues from the previous day', if not exclusively so. After a concert or jam session, a jazz musician's dreams are often filled with wild and intense soloing, of the kind he is only dreaming of when awake. Many musicians are surprised that the brain is able to put together solos then, which are experienced as more virtuosic and emotional than they are otherwise capable of playing. Obviously we are not hampered by technical issues then, and by repeating the melodies over and over again, the brain is preparing for better achievements in real life.

Since the guard is lowered, and since the brain is storing and recalling memories on the basis of emotional intensity, even embarrassing and shameful memories would come to the fore in dreams. Often such shameful events are occurring in distorted, almost 'symbolic' forms, which might be reflective of the confusion about their causal background even when we are awake. Freud is probably correct that dreaming brings to the fore much of what the person tries to escape from or repress when awake. And, if the emotions are not properly understood or brought under control, they will keep on haunting us.

Freud considered his interpretation of dreams a main achievement, and a route to a more conscious and realistic channeling of libido, but he says relatively little about *nightmares*, *trauma*, and *sexual abuse*. Whereas some children are troubled by the fright of death, abandonment, and in some cases even abuse and mistreatment, Freud's own childhood seems to have been coloured by pleasurable incestuous fantasies about his mother, which general

⁴⁴ Freud, 'The Metapsychology of Dreams' [1917], in *On Metapsychology*, p. 232.

⁴⁵ Wei Li, Lei Ma, Guang Yang and Wen-Biao Gan, 'REM sleep selectively prunes and maintains new synapses in development and learning', *Nature Neuroscience*, Vol. 20, Issue 3 (Mars 2017): 427-437, <https://doi.org/10.1038/nn.4479>.

⁴⁶ Hongyi Zhao, Dandan Li, Xiuzhen Li, 'Relationship between Dreaming and Memory Reconsolidation,' *Brain Science Advances*, Volume: 4, Issue 2 (2 April 2019): 118-130. <https://doi.org/10.26599/BSA.2018.9050005>.

relevance is dubious.⁴⁷ Certainly some people are troubled by nightmares. Even musical works and phantasies may be nightmarish. Especially much horror music is modelled on nightmares, often capturing their maddening mix of fright, unpredictability, and lacking control. The extraordinary richness of auditory feeling is allowing for many simultaneous layers of feeling. Dissonant and twisted *undertones*, which are perceived only at a *subliminal* level, might well coexist with foreground levels that are relatively happy and unconcerned. Jerry Goldsmith's music for *Omen* (1974) is just one example of this, supplying religious and other chants with dark and vague undertones, which long range effects may be even more scary and sickening than more explicit horror.

The dynamic characteristics of the so called 'reality ego' are different. According to Freud, the reality ego is typically engaged in *thinking*. Thinking is 'essentially an experimental kind of acting', where 'discharge is postponed', he says;⁴⁸ and we have already seen how ordinary speech and thought is differentiated from song by the melodic manifestations of such postponement. Whereas song is *affirming* the pleasure of harmony by sustaining the tones, the melody of speech and thought is *evading* it by constantly sliding up or down. The long range characteristics of thinking are also more complex and *coherent* in terms of integrating past and future events into higher level *plots*, *strategies*, as well as *complex local functions*. And it is tempting to add that the complexity of such local functions is determined by the manner in which each of them are implicating the totality. In other words: it is almost impossible now, to ignore the 'holographic' character of such processes.

Even in tonal music, at least after the medieval discovery of *tonal cadences*, there is a considerable amount of such complexity in the form of *discourse* and *drama*. It is reflected in the music rhetoric of the baroque, and even more so in the slightly dramatised rhetoric of the classicist era, contrasting elements of fantasy with more discursive *expositions* and *recapitulations*. It is not irrelevant to talk about a contrast between dreaming and thinking in many cases; yet, it is essential to remember that in tonal music - and even 'pantonality', which is closer to speech - these modes of being are mixed. While containing discursive and dramatic elements, the overall character is harmonious and jubilant. Perhaps it is possible to say that all

⁴⁷ Stephen A. Mitchell and Margaret J. Black, *Freud and Beyond: A History of Modern Psychoanalytic Thought*, (New York: Basic Books, 2016), 11, 12, and 17.

⁴⁸ Freud, 'On the two Principles of Mental Functioning', in *On Metapsychology*, 38.

harmonious music is escapist to some extent, but not in a pathological manner. On the contrary, experiences of *entertainment, relaxation, religious affirmation, ritual preparation, and joint jubilation* are central features of human existence.

Music and art in general also has a certain *therapeutic* advantage which has been exploited with great success in various forms of art therapy and shamanism. Since the trauma could be called to mind within a zone of safety and pleasure, the recall becomes easier, and the problems can be vented, alleviated, and contextualised without going through any severe pain. Especially if the 'patient' is actively participating in the social activities of dance and musical performance this may have a beneficial effect. This is the 'aboriginal' way of experiencing art; and some of its benefits are also recognised by Freud. 'Art brings about a reconciliation between the two principles', says Freud. By 'turning away from reality', the artist also 'finds the way back to reality'. Since art is 'valued by men as precious reflections on reality', the master artists might also enjoy a raised status and other real life advantages.

An artist is originally a man who turns away from reality because he cannot come to terms with the renunciation of instinctual satisfaction which it at first demands, and who allows his erotic and ambitious wishes full play in the life of phantasy. He finds the way back to reality, however, from this world of phantasy by making use of special gifts to mould his phantasies into truths of a new kind, which are valued by men as precious reflections of reality. Thus in a certain fashion he actually becomes the hero, the king, the creator, or the favourite he desired to be, without following the long roundabout path of making real alterations in the external world.⁴⁹

As often, Freud's pronouncements are rather categorical, as if all artists are sexually frustrated, and as if reality was merely concerned with labour and plight, and never with leisure, play, song, and celebration. Perhaps poetry and the visual arts are more concerned with fiction and 'virtual reality' than music. Song and dance is not merely portraying or commenting on absent things, but also rejoicing in its own harmonious presence. Yet it is probably true that many artists are outsiders for various reasons. In the case of Beethoven he was often losing himself in dreaming, longing, and nostalgia. He might even seek refuge here, from his physical illnesses, his growing deafness, and his romantic failures. The music itself can not reveal with certainty what he is thinking of, but the hopeless love affairs with his aristocratic piano pupils are obviously often on

⁴⁹ Freud, 'On the two Principles of Mental Functioning', in *On Metapsychology*, 41-42.

his mind. The emotional character of some of his themes is more serene and sublime than any other person has probably ever been able to express; so while he is partially driven by libido, his romanticism is a far cry from mere reptilian instincts and brain regions.

The fact that Beethoven is dreaming of something absent or *unrealistic* is indicated by the context, and the *desperate* manner in which the themes are often affirmed. It is clear from the very beginning of the so called *Appassionata* (his Piano sonata No. 23, Op. 57), how sections of romantic *lyricism* are alternating with *strong frustration* in the form of violent and sudden outbursts, including also the dark and pondering 'destiny-motif' from the fifth symphony, which was composed at the same time. In the second movement of the *Appassionata*, the dialectic of romantic nostalgia is reflected in the ambivalence between dreamy playfulness and resignation, within a general framework of awe and solemnity. It goes on for several minutes, but it is not concluded; it is interrupted by dissonant diminished chords, hesitant pausing, and the troubled start of the last movement. It is like he is trying to *repress* the problems by sheer force and energy now, as the work is ending with a wild staccato dance, which sounds more like a *parody of joy and lovemaking* than a serious expression of hope.

Several of his most famous works seem to be struggling somewhere between these poles: his dreaming of consummated love and his trying to cope with the reality of its absence. Sometimes, like in the slow movement of the *Hammerklavier Sonata*, it seems like he is about to overcome the problems totally, and reach a thoroughly *mediated* and *transcendental* view of things. It is a sign of maturity to come to terms with life as it is; and Beethoven was well informed in this game. According to Maynard Solomon, Beethoven's diary or Tagebuch contains multiple quotations from Hindu and Brahman texts, as well as Herder's translations of the Persian poet Sa'din. He was also inspired by the ideas of speculative Freemasonry.⁵⁰ Yet, in the next, and last movement of this sonata, the struggle is retained with more desperation and *fierce determination* than ever before.

It is just that the thoroughness of his self-scrutiny, and the conviction of his final assertions are more convincing than in the *Appassionata*. It is not clear whether he is affirming a *hope of finding love after all*, or a more existential and sublimated *resolve to continue living and creating*. Since we are all social beings in need of love and attachment, it might be difficult to

⁵⁰ Maynard Solomon, *Late Beethoven: Music, thought, Imagination* (Berkeley: University of California Press, 2003), 8, 9, and 165.

distinguish between the two. The *Hammerklavier Sonata* might well be dealing to a large extent with more existential and *artistic goals*, which are more realistic and somehow underplayed by Freud. If so, these goals were undoubtedly accomplished by Beethoven. It is when his suffering and physical illness is at its worst that he produces his most beautiful and intricate works. It is a dialectic of which he is not only conscious but also consciously *staging*. 'The upward glance', says Beethoven, 'must also loose itself in the depths, there where the evil subterranean powers dwell.'⁵¹

Even after his deafness became severe, most of Beethoven's basic needs for human contact was probably met by his friends and - when his youthful idealism had been somewhat modified - even the brothels.⁵² The kind of *ideal love and bliss* which he was seeking, and effectively manifesting in his compositions, is difficult to achieve even in a relationship. Especially it is difficult to ally the demands of creative work with normal family life; and many artists, like for instance the painter Edvard Munch, would sacrifice the idea of children and marriage for the benefit of their art. Beethoven was one of the most successful composers in the history of music; and this a profession that involves difficult negotiations about publications as well as performances; so even if there are unrealistic aspects of his love life, he was not a pathological escapist. He escaped more and more into his own artistic sphere of reality, but it was a new and deeper reality, which was also his livelihood and source of fame. His libido, to the extent that it was involved in the making of some of his music, was successfully sublimated into some of the highest achievements of mankind, conveying ideals of optimism, joy, and human solidarity. Even today, works like the third, the 5th, and the 9th symphonies, are very much serving as paragons of these values. As we will come back to below, Beethoven was also engaged as a *music therapist*, at a time when the concept of psychotherapy was not even coined; so he was not lacking in social engagement and real world impact.

⁵¹ Solomon, *Late Beethoven*, 100.

⁵² Maynard Solomon, *Beethoven* [1977] (New York: Schirmer Trade Books, 2001), 284 and 339-340.

8.3.2 Complications and resolutions

Since this is also an attempt to provide Aristotle's plot structures with more detail, it may be practical to stick to some of Aristotle's terminology and his dichotomy of *complication* and *resolution*, which, even if it is used in a slightly different sense here, will serve to divide the further discussion into categories of symptomatology and the psychotherapeutic treatment that is thought to normalise these conditions.

As pointed out by Aristotle: much of what is happening to a person is accidental and devoid of structural 'probability and necessity'. It might not be obvious how our chaotic lives could be satisfactorily charted in psychoanalytic terms, which are centred around psychopathology in most cases. But to the extent that the processes are organised and autonomous, such organisation always derives from the organism and the self. There are no alternative integrative mechanisms. The kind of structures that are organising both our selves and dramatic plots are *psychodramas*, *melodramas*, and *narratives*; and as pointed out by Freud himself: many of the pathological conditions he describes are just 'extreme forms' of normal functions: 'A normal person has to pass through the same repressions and has to struggle with the same substitutive structures; the only difference is that he deals with these events with less trouble and better success'.⁵³

A *simple plot or life* may well have a quasi-sequential causal structure, like the process of trying, failing, and failing better, the amassing of money and power, or the gradual building of interest and ecstasy in courtship and lovemaking. Some musical styles and works are also modelled on such processes; basically building intensity and ecstasy. But there are also more *complex* processes or plots, involving more intricate complications and the metacognitive treatment of these. Freud's metapsychological ambitions were not inferior to those of Aristotle, and in his article on *Instincts and their vicissitudes* ('Triebe und Triebschicksale'), he even sketches out a taxonomy of such complications: 'Observation shows us that an instinct', and here he is first of all thinking of sexual desires, 'may undergo the following vicissitudes:

Reversal into its opposite.

Turning round upon the subject's own self.

⁵³ Sigmund Freud, 'On Psycho-analysis' [1913], in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*. Volume 12 (1911-1913): The Case of Schreiber, Papers on Technique and Other works, trans. James Strachey, in collaboration with Anna Freud (London: Vintage books, 2001), 210.

Repression.

Sublimation⁵⁴

If this was not enough, Freud is also dividing these categories into subcategories, which come about by moving along, or flipping between, one or several sets of polarities. Freud is really liberating his inner dialectician now, as he is metaphorically feasting on oppositions. He might have discovered an essential ontological principle here, although the higher level aspects of this dialectic - the rhetorical, dramaturgical, and social gestalt formations - are somehow taken for granted. As we come back to below, the hierarchy is questionable, and the categories are often overlapping; yet 'the mental life as a whole', he claims, 'is governed by three polarities, the antitheses:'

subject (ego) - object (external world)

Pleasure - Unpleasure, and

Active - Passive⁵⁵

If we go through the first list then, with an eye to the manner in which it is subdivided by the polarities on the second list, the first concept is that of *reversal*; which is probably more general than is indicated by Freud here, since it is merely denoting a shift or overturn, which is characteristic even of the other concepts on this list. We have already seen how the concept of 'reversal' was Aristotle's main criterion of 'complex plots', but it is used in a slightly wider sense by Freud. It is not limited to a decisive twist of fate, caused by information about 'kinship' and similar things. It is exemplified by a row of psychosocial functions, which are even more complex and autonomous since they are emerging from the mental and social life itself.

A stereotypical example of such reversal is *the reversal from love to hate*, which is flipping along the pleasure-unpleasure dimension, at the same time as love and hate also contain elements of the subject-object and active-passive dialectic which is obviously implicit in the very distinction between the sexual instincts. Since we invest so much in love, it is easy to understand why a break up or quarrel will trigger anger or even hate in some cases. 'If a love-

⁵⁴ Freud, 'Instincts and Their Vicissitudes', in *On Metapsychology*, 123.

⁵⁵ Freud, 'Instincts and Their Vicissitudes', in *On Metapsychology*, 131.

relation with a given object is broken off', says Freud, 'hate not infrequently emerges in its place, so that we get the impression of a transformation of love into hate.'⁵⁶

This flip may not be a one-time occurrence, it may flip back and forth several times, and even make the opposites mix and interpenetrate, which is the situation of *ambivalence*. The concept of ambivalence was introduced by Eugen Bleuler, distinguishing between three kinds: an 'affektive Ambivalenz', a 'voluntäre Ambivalenz', and an 'intellektuelle Ambivalenz'.⁵⁷ But 'the most important example of ambivalence of feeling,' says Freud, is that of love and hate.⁵⁸

According to Freud, loving also admits of two other main opposites: loving versus *indifference* and loving versus *being loved*. These dichotomies he puts in connection with the more pathological dichotomies of exhibitionism-scopophilia, scopophilic gazing versus narcissistic self-gazing, and sadism-masochism, all of which are prone to reversal.⁵⁹ Apparently the male-female dichotomy is ambivalent or reversed in homosexuality and bisexuality as well, although these conditions are more hardwired and dependent on hormonal and organic irregularities in the brain. Since these opposites are implicitly relating to their own negations, they are already halfway to reversal, and especially Freuds descriptions of *masochism* are convincing examples of this. 'Analytic observation', he says, 'leaves us in no doubt that the masochist shares in the enjoyment of the assault upon himself; partly because the pain 'trench upon sexual excitation', as he puts it; which may be reversed into 'the sadistic aim of *causing* pain', and vice versa.⁶⁰ It is also an example of the paradoxical interpenetration of pleasure and pain. Certainly, when the pleasure gets very intense, or when the pain is mild, it is sometimes difficult to distinguish between the two. Even laughter and crying are similar to each other and prone to reversal; which may be one of the reasons why Freud is sometimes operating with a single spectrum.⁶¹

The problem for music is that the subject-object dimension, so central to some of these dichotomies, is largely lacking. At least to the extent that material and visual percepts are involved, these cannot be reproduced in a purely instrumental work. Also it is difficult without

⁵⁶ Freud, 'Instincts and Their Vicissitudes', in *On Metapsychology*, 130 and 137.

⁵⁷ Eugen Bleuler, 'Vortrag über Ambivalenz', *Zentralblatt für Psychoanalyse*, Vol. 1 (1911): 266-268.

⁵⁸ Freud, 'Instincts and Their Vicissitudes', in *On Metapsychology*, 128-130.

⁵⁹ Freud, 'Instincts and Their Vicissitudes', in *On Metapsychology*, 124, 131, and 138.

⁶⁰ Freud, 'Instincts and Their Vicissitudes', in *On Metapsychology*, 124 and 126.

⁶¹ Freud, 'Beyond the Pleasure Principle' [1920], in *On Metapsychology*, 275.

words to manifest in sound the circumstances giving rise to grudge or hate. In real life, of course, or in an opera, which is integrating visual experience, ordinary emotional vocalisation, as well as atonal music which is liberated from the business of affirming harmony, the sensations of sound are involved in all kinds of emotions. Sounds are even central features of sexual identity, personal character, as well as expressions of hate and disgust. It is just that purely melodic or instrumental music, which does not incorporate any text or visual factors, has to be organised according to a more abstract and *egocentric* dynamic, which, however, may still be activating the other dimensions mentioned by Freud: the temporal dimension, of course, as well as contrasts between active-passive and pleasure-unpleasure, which are much more variegated and multidimensional than is indicated by Freud here.

Since the intrinsic components of *femininity* and *masculinity* are not merely visual or organic, but also behavioural and vocal to some extent, it is even possible to manifest some of these characteristics in a purely melodic display. Even without engaging the female voice, a female element is often indicated in Beethoven's sonatas by the graceful and swinging rhythm of a *minuet*, which is softened by legato, piano, and adorned by fancy ornaments and trills. As previously argued: these sonatas do not illustrate the interaction between different people. They are coherent rhetorical processes, where the masculine protagonist is revealing his identity rather in the forcible and desperate affirmations of the feminine theme. Even if it is not entirely explicit, it is relatively safe to conclude that the protagonist is often celebrating and struggling with love. Especially in the mentioned *Appassionata* sonata, and the preceding sonata no. 22, Op 54, the idea of a contrast between something feminine and masculine becomes relatively clear when the soft and feminine elements are offset by something square and *forcibly hammering*, or by powerful explosions of frustration.

The *emotional ambivalence* in some of Beethoven's works is so extreme that some people have suggested that he might be suffering from manic depression. There is little substance in this claim, however, and, as we will come back to in the next section, it is more likely that some of the ambivalence is deriving from more concrete and biographical factors: a set of unclear and shifting circumstances in his love life. In the last of his so called 'Immortal Beloved' letters from 1812, he speaks of a love that 'made me the happiest and unhappiest at the same time'. It is a type of ambivalence that is not concerned with hate, but rather with a fluctuation between *hope* and *hopelessness*. Such ambivalence is also connecting to, and highlighting, a dialectic which is

much more universal and existential. As pointed out by Arthur Schopenhauer and the Buddhists alike: we are all longing for some kind of 'nirvana': a state of maximum bliss and satisfaction, which is seldom reached, and never permanently. So our lives are deemed to be fluctuating between such oppositions, if not as dramatically and frequently as in some of Beethoven's piano sonatas.

It is an *existential struggle*, which is not reliant on any *specific* circumstances or drives. Thus it is also an ideal subject matter in musical works. When hope is unrealistic and exaggerated, or when longing and nostalgia becomes too intense to be bearable, the situation may easily flip into resignation and apathy. When apathy and resignation has got enough time to play itself out, providing rest and forgetfulness, the ground may be prepared for new bouts of dreaming and fighting. When the frustrations are sufficiently vented, a sense of temporary satisfaction and *catharsis* may be experienced and so on.

It is also intrinsic to the abstract an universal logic of such processes, that at a certain level of maturity and philosophical reflexion - which is also reflected in the so called 'transcendental' phase of Beethoven's oeuvre - one may realise that one can never escape the ups and downs of life; which even if they can be regulated to some extent, have also to be accepted and sought. It is a realisation that is both trivial and 'metacognitive' that even in a marriage or a successful career, nirvana is never stable. Such a realisation might also influence the character of a person or work of art.

As for the second main concept on Freud's list - that of 'turning round upon the subject's own self' - it is already covered by the general category of *reversal*; flipping, even in this case, along the subject-object dimension. *Introjection* as opposed to *projection* is one example of this, the ego 'taking into itself' the sources of pleasure, while it 'expels whatever within itself becomes a cause of unpleasure'.⁶² Freud is also talking about the obsessive compulsive 'desire to torture turning into self-torture and self-punishment', which, he says, is similar to masochism, but lacking the element of passivity.⁶³

Again, this is far too material to be reflected in the purely dynamic display of music. An exception to this may be the concept of *narcissism*, which is typified to a larger extent by its

⁶² Freud, 'Instincts and Their Vicissitudes', in *On Metapsychology*, 133.

⁶³ Freud, 'Instincts and Their Vicissitudes', in *On Metapsychology*, 125.

character and its temporal vacillations. Even narcissism might be entailing a regressive self-love and turning of the gaze towards oneself.⁶⁴ More interesting in connection with music are the elements of *grandiosity* and *megalomania*. Such grandiosity is often rooted in experiences of *insecurity*, where the grandiosity is serving as 'a compensatory adaption to overcome and cover up low self-worth'.⁶⁵ According to Mary Kowalchuk's and colleagues at least, the so called 'vulnerable' type of narcissism is usually entailing such vacillations. Since this insecurity could also be manifested in the auditory display in the form of frail and hesitant moments, harmonic ambiguity and dissonance, the kind of *complex perceptual gestalt* of which the word 'narcissism' is a label, might also be reproducible within the context of a musical composition; which is obviously narrower than, let us say, a textbook in psychology. There is a reason why 'narcissism' is not a typical musical term, while terms like 'grandioso', 'maestoso', or 'furioso' are common performance directions.

The music that is most frequently mentioned in connection with such narcissism and grandiosity is probably Richard Wagner's gigantic opera projects. Judging from Wagner's correspondence and other biographical literature, his life was not lacking in self-doubt, suicidal tendencies, and economical problems caused by his own vanities, which are some of the flip sides or downsides of narcissism.⁶⁶ Yet these vulnerabilities are not very prominent in his music. Certainly, it would not be compatible with the purpose of 'covering up low self worth' to overtly express it. A musical portrayal of narcissism might only be possible in the form of satire; more like Franz Liszt's *Mephisto-Waltzes* perhaps. Even Liszt had grandiose ambitions, and succeeded in becoming a pianistic superstar. But he also revealed more vulnerable and humble sides of himself. Especially his late period is remarkably ascetic, dark, and 'impressionistic'.

This is not to say that Liszt's music is better, or that Wagner's grandiosity is necessarily negative or pathological. Superhuman achievements require superhuman ambitions, and a talent for self-promotion and manipulation in some cases. Even the *parents* of such stars are sometimes narcissists. There is little doubt that Mozart and Beethoven owe much of their success to their

⁶⁴ Freud, 'Instincts and Their Vicissitudes', in *On Metapsychology*, 129.

⁶⁵ Mary Kowalchuk et al, 'Narcissism through the lens of performative self-elevation', *Personality and Individual Differences*, Vol. 177 (July 2021), <https://doi.org/10.1016/j.paid.2021.110780>.

⁶⁶ Frank M. Lachmann, 'Richard Wagner: Grandiosity, Entitlement, and its Metastases', *Psychoanalytic Inquiry*, Vol. 34, Issue 5 (2014): 498-512, <https://doi.org/10.1080/07351690.2013.846028>.

'parents narcissism born again', as Freud put it: coaching their children for stardom.⁶⁷ At the same time, many children are traumatised or driven into psychosis by such coaching. Even *one-dimensional pomp and grandiosity*, which is probably the clearest musical manifestation of narcissism, is not without its consequences.

Except from some antisemitic tendencies, it might be to go too far to say that Wagner's grandiosity is intrinsically unhealthy. The cult that was erected around his operas, and many of the people that were drawn to it, certainly were; and the links between the music and their nationalistic attitudes were not accidental. The condition of Adolph Hitler - an unemployed art school reject, who was also troubled by flatulence and other embarrassing health problems - was pathetic and potentially explosive, and he found nourishment for his narcissist compensations in Wagner's operas, which he attended as fast as he had saved up enough money to buy a ticket.

Adolph's fantastic ideas of a germanic empire of super-humans, with himself as the supreme 'Führer', was probably inspired both by Wagner's fairytale mythology, the character of his music, as well as simplistic interpretations of Friedrich Nietzsche's philosophy. And the real life consequences were going to be of apocalyptic proportions. It is a mystery how the German nation could be fooled by such a figure. The German sociologist Theodor Wiesengrund Adorno, who, like Nietzsche, was also a composer, put forward the idea of a *collective narcissism* on the part of the Germans: a collective sense of humiliation after the defeat in the first world war. Adorno's remedy was partly artistic and musical. The vulgar and conservative Nazi aesthetic should be replaced by complex and atonal music.

But replacing one totalitarian regime with another is seldom a good solution, and the chaos and sense of alienation that was the product of many post war formalist musical experiments was neither particularly complex nor humanistic. Adorno's favourite was Arnold Schoenberg; and there is little doubt that some of Schoenberg's sentient atonal works, like for instance 'A Survivor from Warsaw', had a therapeutic potential. But Schoenberg's humanism was probably connected more with his personality and unique skills than with atonality per se. Virtue and profundity is not tied to a specific genre, and the abolishment of *entertainment* is about as counterproductive

⁶⁷ Freud, 'On Narcissism: an Introduction' [1914], in *On Metapsychology*, 85.

as abolishing joy itself. Both Schoenberg and Luciano Berio disliked Adorno because of his rejection of Stravinsky and jazz music.⁶⁸

Contrary to Adorno's predictions, it was probably the post war popular music and jazz that came closest to the kind of thoughtfulness of which he might have been thinking. It is no coincidence that many jazz musicians, like for instance John Coltrane and Herbie Hancock, were drawn to spiritual traditions which were not characterised by aggressive and narcissist clan mentality, but much more altruistic and open mind sets, more like in Buddhism and transcendental meditation. In San Francisco, John Coltrane's 'A Love Supreme' revelations, and the sense of transcendence in his solos, even gave rise to a christian church, the St. John Coltrane African Orthodox Church.

The third main concept on Freud's list is *repression* (Verdrängung); and the relevance to emotional vocalisation and music is relatively clear in this case, since it is largely manifesting itself as a temporal phenomenon. It is not uncommon that sorrow or doubt may be temporarily repressed only to return in the form of moaning or sobbing. Even during a sonata or a rock or jazz concert, such flashbacks and fits of realism may occasionally occur; especially, it seems, when some initial melancholy has been counteracted for some time, and the compensations have become tiring and out of proportion.

The phenomenon is by no means new, and the term had already been used in a similar manner by Johann Friedrich Herbart. Still Freud held it to be his own discovery, and the cornerstone of his psychology.⁶⁹ Like the concept of reversal, repression is obviously much more general than is reflected on the above list. Introjection and projection, the obsessive compulsive recourse to ritual behaviour, the narcissist covering up of insecurity etc., may all be seen as instances of repression. In fact, the concept may also be covering more concrete aspects of a life or plot: the neglect of economical obligations and consequences, procrastinations, postponements and so on.

If it is true, as Freud was claiming in the article on the pleasure principle and the reality principle, that most mental problems are escapes or flights from the painful aspects of reality, it is easy to understand why the concept of 'repression' is getting such an important role. Since

⁶⁸ Max Paddison, 'Stravinsky as devil: Adorno's three critiques', Chapter 10 of *The Cambridge Companion to Stravinsky*, ed. Jonathan Cross (Cambridge: Cambridge University Press, 2003), 192.

⁶⁹ Freud, 'Repression' [1915], in *On Metapsychology*, 141 (editors note).

these processes are organised by some general patterns of avoidance, pleasure-seeking, recurring troubles, final calamities, or in less tragic cases: moments of recognition, improvement, and success, it is also easier to understand how the abstract dynamic of musical works can serve as general representations of so many mental processes and struggles.

According to Freud, repression has also a *quantitative dimension*. An instinct may be 'altogether suppressed, so that no trace of it is found'. He also speaks about 'unconscious memories.'⁷⁰ This idea of a *total repression* of drives and memories has often been exploited as a defence in the court; but except from cases of brain damage and extreme intoxication, there is little scientific agreement about its reality. The somewhat weaker form of repression, which Freud describes as affect 'qualitatively coloured', appears more plausible, especially if the experiences are thought to have some influence on the psyche and a potential for recall and treatment. In *anxiety* this emotional remnant is obviously stronger.

As realised by Freud himself, repression is not caused by the drives per se, but some unpleasant 'circumstances', with which they have come to be associated.⁷¹ And it seems increasingly unlikely in modern societies, that this unpleasure is a product of taboos or a cultural condemnation of normal phenomena like female lust or homosexuality. More common causes of repression today may be traumas concerned with sexual abuse, guilt, parental negligence and denigration, bullying, anxiety, and even the difficulty of establishing a normal romantic relationship.

Certainly such experiences and traumas are hampering normal sexual and social functioning in many cases, and repression is seldom a good solution. Like an aggressive dog triggered by the insecurity and weakness of frightened people, the traumas keep on haunting us, both in our dreams, and in more convoluted ways in our lives. This might well happen even when the traumas are *not* repressed; still it is not unthinkable, what Freud is arguing, that repression is sometimes causing a 'damming up of frustrated satisfaction', 'a proliferation of pathological sexuality in the dark', and even the formation of *phobias* in some cases.⁷² Similarly the repression of financial and social obligations will cause a growth of debts and social problems;

⁷⁰ Freud, 'Repression' [1915], in *On Metapsychology*, 153; and 'The Unconscious' [1915], in *On Metapsychology*, 178.

⁷¹ Freud, 'Repression', in *On Metapsychology*, 145.

⁷² Freud, 'Repression', in *On Metapsychology*, 148 and 155.

and it seems to be a general aspect both of psychoanalytic therapy and more cognitive approaches, that it is first by consciously facing and coming to grips with the causes of ones problems that it is possible to modify the anxieties and carve out a new and more constructive path. Even in music such battles or discussions might have to be performed before the conflicts are sufficiently treated and resolved.

Yet, it would be wrong to say that repression and flight is always bad. Flight and forgetfulness are important survival mechanisms, and there are many examples of overthinking and therapy increasing and even *inducing* problems rather than solving them. Even Freud is pointing to cases where repression is a *solution* rather than a problem. Especially after his introduction of the so called 'death instinct' and the 'dual instinct theory', where *aggression* got a similar status as *libido*, the cultural regulations and taboos came to be seen as important mechanisms serving to keep aggressive tendencies in check.⁷³

As mentioned in connection with the initial discussions of volition, people are habitual creatures, who are often afraid of the unknown and unfamiliar; and the idea of music serving as a *civilising* factor, regulating and curbing certain attitudes, while promoting others, is going back to the ancient Greeks. A certain amount of musical aggression, like in 'black metal' music, have gradually become more accepted, as it may serve to vent, and give cathartic outlet to aggressive impulses without causing much real harm. Whereas in the ancient world, a repression or flight from troubles might be resolved by returning to the scene and killing all ones enemies, this is no longer acceptable. Instead, music and art, in like manner with gaming and sport, may serve as relatively harmless *substitutes* for such aggression. As such, they are also examples of *sublimation*.

Even *sublimation*, which is the last main concept on Freud's list, might function both as complication and resolution. In some cases Freud mentions sublimation as an example of pathological projection, in other cases as a conscious form of treatment and channeling of libido into more available and constructive directions.⁷⁴ As mentioned above, the field of music may serve to control and sublimate both libidinal and aggressive impulses. Whether it is intentional

⁷³ Freud, 'Civilization and its discontents' [1930], in *The Standard edition of the Complete Psychological Works of Sigmund Freud*, Vol. 21, 59-145.

⁷⁴ Freud, 'Recommendations to Physicians Practising Psycho-analysis' [1912], in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, Volume 12, 119.

or not, there are many musical works or sections within works that resemble sexual intercourse. The last movements of Beethoven's Piano sonatas No 22 and 23, may contain examples of this. Yet this concept is hardly immanent in the works in the sense that the dynamic similarities are sufficient to say with certainty that the music is sexual.

Even if musical activity may sometimes function as sublimation in the greater scheme of life, one should not forget that music may be pleasurable and ecstatic even in the absence of such associations. Especially the performance of some *ecstatic* types of music and dance may produce experiences that are similar to sexuality without replacing it or aiming for it; experiences that are intensely enjoyable even to children and asexual people. Even musical activity and listening may trigger the release of so called *happiness hormones*. Especially when involved in the *production* of music, the vocal, muscular, and respiratory systems are engaged, releasing oxytocin, dopamine, serotonin, and endorphins, which are connected with vocalisation, bonding, intense pleasure, and pleasurable muscular activity.⁷⁵ When playing a brass instrument the tones are produced by the lips, which is an erogenous zone in its own right.

The mentioned examples of musical catharsis, sublimation, beneficial flight and repression are already examples of *resolution*. Yet it is the symptomatology, the charting of *complications*, that seems to be the main focus of Freud. Freud's plans for a book about psychoanalytic techniques was never realised, and he might have been reluctant to the idea of revealing too much of his secrets to his patients.⁷⁶ It is a pity, and a metapsychological deficiency, since resolution and treatment are also parts of reality, even in plot construction and life in general. Even in our daily lives we use such techniques when battling against various problems. Nevertheless, Freud wrote some articles about his techniques, which general principles should be clear enough. The below presentation is focussing on three essential aspects of the treatment, which may also be relevant to the organisation of musical works:

⁷⁵ Jason R. Keeler et al., 'The neurochemistry and social flow of singing: bonding and oxytocin', *Frontiers in Human Neuroscience*, Vol. 9, Article 518 (23 September 2015): <https://doi.org/10.3389/fnhum.2015.00518>. See also: Abhishek Gangrade, 'The Effect of Music on the Production of Neurotransmitters, Hormones, Cytokines, and Peptides: A Review', *Music and Medicine*, Vol 4, Article 1 (January 2012): 40-43, <https://doi.org/10.1177/1943862111415117>.

⁷⁶ Freud, 'Papers on Technique: Editors Introduction', in *The Standard Edition of the Complete Works of Sigmund Freud*, Vol. 12, 85-87.

1. 'Psychical work': the overcoming of repression and resistance

While the repression and fleeing from problems might sometimes be a good solution, it is often backfiring, and a permanent solution is seldom achieved without a more developed consciousness of causes and effects. To prevent future problems, traumatic or shameful memories would have to be confronted and appeased; harmful habits and desires would have to be discerned and admitted; or as formulated by Freud himself: the 'illness' of a patient 'must no longer seem to him contemptible, but become an enemy worthy of his mettle, a piece of his personality, which has a solid ground for its existence and out of which things of value for his future life have to be derived'.⁷⁷ It is a *struggle*, says Freud, which is not lacking in setbacks and 'resistance': 'Where the investigations of analysis come upon the libido withdrawn into its hiding-place, a struggle is bound to break out; all the forces which have caused the libido to regress will rise up as 'resistances'. Also, 'one must allow the patient time to become more conversant with this resistance with which he has now become acquainted, to *work through* it, to overcome it, by continuing, in defiance of it, the analytic work according to the fundamental rule of analysis'.⁷⁸

The clues about what is bothering a person may be indirect at first, and detectable only through so called 'Freudian slips' or the content and character of body language, phobias, and dreams. It is the therapist that is supposed to 'interpret' these clues. At the same time, this authoritarian regime, and the somewhat one-sided treatment of patient objections as pathological instances of 'resistance' or aggressive 'transference', is already speaking volumes about the potential for *misinterpretation* and error. Especially the idea of 'suggestion' has proven problematic.

'We take care of the patients final independence by employing suggestion in order to get him to accomplish a bit of psychical work which has as its necessary result a permanent improvement in his psychical situation', Freud asserts.⁷⁹ It is a practice that is very much giving free rein to analyst speculation and dogma, which may be relevant in some cases, but also a recipe for disaster. Especially the danger of implanting so called 'false memories' in a patient has

⁷⁷ Freud, 'Remembering, Repeating and Working-through' [1914], in *The Standard Edition of the Complete Works of Sigmund Freud*, Vol. 12, 152.

⁷⁸ Freud, 'The Dynamics of Transference' [1912] and 'Remembering, Repeating and Working-through' [1914], in *The Standard Edition of the Complete Works of Sigmund Freud*, Vol. 12, 102 and 155.

⁷⁹ Freud, 'The Dynamics of Transference', in *The Standard Edition of the Complete Works of Sigmund Freud*, Vol. 12, 106.

been a problem.⁸⁰ Such 'suggestion', and the idea of *breaking a suspect down*, has also been a common method of police interrogation; and it was first with the introduction of more secure proof in the shape of DNA analysis that the extent of false memory inducement was detected. First then the false accusations and confessions, which have often been tragic consequences of the mentioned methods, could be corrected. A related problem has been the dogmatic projection of problems of sexual abuse and 'bad mothering' onto diagnoses that have later been proven to have a purely organic or genetic origin, such as autism or attention deficit disorders.

It is not the mission of this treatise to go into detail about misdiagnosis or the unhealthy power-imbalance between therapists and patients. So called 'absolute music' is only with difficulty incorporating such 'object relations'. A more democratic and *cooperative* kind of interaction might well be tested and cultivated in music like jazz or free improvisation; yet it is first of all the dynamic or *melodic* structure of the self that is manifestable in sound. Since the external objects are not integrated into the self to the same extent as its own body and activity, it is also these *dynamic behavioural gestalts* that are forming the central part of the self, which is very much explaining the possibility of deriving even from Freud's descriptions a certain autonomy and abstract ego-dynamic coherence. Already the above quotations are providing a set of relevant ideas and terms, which when put together, is starting to resemble a complex musical work:

The illness must be made into an enemy, an enemy worthy of ones mettle. For this to take place, the repression of the 'contemptible' aspects of the illness must be lifted in a processes of familiarisation. It is a struggle, requiring psychical work, conscious analysis, and the seeking out of repressed passions. The endeavour might experience moments of resistance and even regress, which have to be overcome in a process of working through and continuing in defiance. The emerging understanding of implicate elements and processes is making for a more conscious and integrated personality, which is also a prerequisite for improvement and future value judgements.

2. Abreaction and catharsis

The insight that is gained by confronting and talking about the problems may go a long way towards resolving the troublesome issues. Obviously such analysis might remove or modify the

⁸⁰ Elizabeth F. Loftus, and Jacqueline E. Pickrell, 'The Formation of False Memories', *Psychiatric Annals*, Vol. 25, Article 12 (December 1995): 720-725.

personal sense of shame and guilt, which is often a debilitating factor. In many cases the guilt is better placed elsewhere, or it may be normalised and ascribed to a set of unfortunate circumstances of which a person has seldom full control.

At a more immediate and 'musical' level, the mere venting of the anxieties and frustrations may provide a certain release, which is often referred to as *abreaction* and *catharsis*. As mentioned above, aspects of such catharsis are described by Aristotle, even as ingredients of dramatic plot construction. Freud mentions it mostly in connection with Josef Breuer's technique, which is nevertheless central to the psychoanalytic tradition and Freud's development. At the end of Freud's article on 'remembering and repeating', *abreaction* is also put in connection with the process of 'working through'.⁸¹

As has become increasingly clear, there are also mechanisms in the brain that may serve to make the effects of such abreaction and 'working through' more lasting. Every time a memory is recalled, like when talking about it and voluntarily venting the emotions that are attached to it, the memory traces may be susceptible of a certain reprogramming and change.⁸² Both the content of the memory and its emotional valence and intensity, which is very much determining its prominence in the mind, might be modified then.⁸³ When recall is made in a setting of supportive understanding and safety, the painful memories might be associated with something positive, making them less painful. The aspect of *control* in voluntary recall might even make them less susceptible of attacking and bothering the person. Again, the analogy with a wild beast seems relevant. By *exerting dominance* over it, or even *care* and *love*, it becomes possible to control it. The beast is still a beast, but the danger of attack is very much removed.

Such recall and reprogramming is not always easy to perform. In cases of severe post traumatic stress, like that of war victims and warriors, the feelings may be all too painful and overwhelming to bring forth. The capacity of the brain to deal with and 'work through' the emotions might even have physically deteriorated. Executive and emotional circuits might have

⁸¹ Freud, 'Remembering, Repeating and Working-through', in *The Standard Edition of the Complete Works of Sigmund Freud*, Vol. 12, 147 and 156.

⁸² Iiona D. Scully et al., 'Does Reactivation trigger episodic memory change? A meta-analysis', *Neurobiology of Learning and Memory*, Vol. 142 (PtA) (1 July 2017): 99-107, <https://doi.org/10.1016/j.nlm.2016.12.012>.

⁸³ Roger L. Redondo et al., 'Bidirectional switch of the valence associated with a hippocampal contextual memory engram', *Nature*, Vol. 513, Article 7518 (18 September 2014): 426-430, <https://doi.org/10.1038/nature13725>.

been hijacked by lower level limbic and subcortical fright mechanisms, which have grown out of proportion, and started to terrorise and cannibalise the brain.⁸⁴

Psychotherapy in the style of Freud is hardly sufficient to deal with such complexes. More powerful methods, and even pleasure inducing drugs, might be necessary. Recently MDMA-assisted psychotherapy has shown some promise.⁸⁵ A more established treatment, especially of children, is *art therapy*, where the traumas could be approached and 'worked through' in an indirect and symbolic manner in a setting that is also safe and pleasurable.⁸⁶ According to Nora Landis-Shack and colleagues, a similar beneficial effect may be provided by music therapy, engaging powerful musical effects like *increased pleasure, anxiety reduction, emotion regulation, and community building*.⁸⁷

Such treatment is similar to, or even coincidental with, the kind of treatment that is provided by some *shamanic rituals*. Jon-Håkon Shultz and Lars Weisæth, who have investigated the effect on shamanic rituals on former child soldiers, conclude that such treatment might even be 'more powerful than Western-style therapy'. Especially they are pointing to 'the collective mobilisation of social support and forgiveness and strength of psycho-education'.⁸⁸ The persuasiveness and realism of such forgiveness is probably stronger in the setting of an actual community than in the therapy room.

Humans are social beings, and experiences of forgiveness and support from their own community may be a just as effective changes for the better as social condemnation and stigmatisation are changes for the worse. It is a process that does not seem to rely so much on a correct factual analysis as an individual sense of *resolution, reversal*, and 'change of fortune'. It may not necessarily matter if the troubles are ascribed to something *irrational*, like a demon, a

⁸⁴ Konstantinos Bromis et al., 'Meta-Analysis of 89 Structural MRI studies in Posttraumatic Stress Disorder and Comparison With Major Depressive Disorder,' *The American Journal of Psychiatry*, Volume 175, Issue 10 (1 October 2018): 989-998. <https://doi.org/10.1176/appi.ajp.2018.17111199>.

⁸⁵ Jennifer M. Mitchell et al., 'MDMA-assisted therapy for severe PTSD: a randomized, double blind, placebo-controlled phase 3 study', *Nature Medicine*, Vol. 27 (June 2021): 1025-1033. <https://doi.org/10.1038/s41591-021-01336-3>.

⁸⁶ Francie Lyshak-Stelzer et al., 'Art Therapy for Adolescents with Posttraumatic Stress Disorder Symptoms: A Pilot Study', *Art Therapy: Journal of the American Art Therapy Association*, Vol. 24, Issue 4: Art Therapy with Trauma (2007): 163-169, <https://doi.org/10.1080/07421656.2007.10129474>.

⁸⁷ Nora Landis-Shack et al., 'Music Therapy for Posttraumatic Stress in Adults: A theoretical Review', *Psychomusicology: Music, Mind, and Brain*, Vol. 27(4) (2017): 334-342, <https://doi.org/10.1037/pmu0000192>.

⁸⁸ Jon-Håkon Shultz and Lars Weisæth, 'The power of shamanic rituals in dealing with traumatic stress symptoms: cleansing rituals for former child soldiers in Northern Uganda', *Mental Health, Religion & Culture*, Vol. 18, Issue 10 (2015): 822-837, <https://doi.org/10.1080/13674676.2015.1094780>.

god, or the 'Oedipus complex'. If the resolution is acceptable to the individual, at the same time as social stigma and guilt is removed, it may be possible to leave the problems behind. In such cases it is first of all the social, dramaturgical, and musical aspects that counts. In a setting of collective song, dance, and perfectly timed *shock treatment*, like crushing an egg on the forehead of a person, the shaman might create a moment of transformative significance: a *turning point* or sense of *cleansing*.

Even if it is not so institutionalised, we can observe many of the same healing mechanisms in modern societies as well. When stability is threatened by hostile powers and terrorists, the musicians and singer-songwriters closest to the heart of the nation mobilise. The darkness and evil is treated in a framework of harmonious communion, providing catharsis at the same time as it appeases the emotions and exemplifies a better world. Like in other transition rites where music and dance are central elements, the ceremonies and rituals become memorable and unique turning points, providing permanent healing and hope.

The effect is as real as it is necessary, and it is probably a main reason why our musical talents evolved in the first place. The music reduces the conflicts and problems by putting our lives in a perspective of surreal realms of harmony and ecstasy - realms of being which hardly exist elsewhere. The idea of 'spirits' or 'gods' in 'heaven' may not be very appealing or even understandable without it. Never is the sense of communion stronger than in such rituals and times of collective healing, thus it is a dialectic that may not only restore a person or community to the normal order, but even serve to *strengthen* the person and the community in the long run.

3. Correction and guidance

When repression is abrogated, and shame is removed from passions and taboos, the libido is liberated, and it is not uncommon, says Freud, that it is directed towards the therapist, with whom the client has already started to develop a trusting relationship. Or the client may try to boost his self-worth by *identifying* with the therapist. Yet Freud is warning the therapist against engaging in a personal or erotic relationship with the patient. Instead these feelings should be treated as 'unreal' and temporary 'transferences', and the patient should be taught 'to give up a satisfaction which lies to hand but is socially not acceptable, in favour of a more distant one,

which is perhaps altogether uncertain.⁸⁹ It is a process that might require a considerable amount of patience and *sublimation*; but as he is pointing out himself: 'not every neurotic has a high talent for sublimation; one can assume of many of them that they would not have fallen ill at all if they had possessed the art of sublimating their instincts.'⁹⁰

Freud has little to say about the possible roads out of such an impasse; let alone any methods of changing the automated reactions and habitual ways of thinking that are often hampering a person. Which is precisely why a whole range of new approaches have recently emerged, like 'cognitive behavioural therapy', 'positive psychology', and all kinds of self-improvement literature. Many problems would probably be targeted more effectively by changing the society, securing equal rights and opportunities. Even dating opportunities might be easy to arrange, if this is really a common problem. A healthy local community and amateur cultural life is also essential. Undemocratic power structures - nepotism, corruption, discrimination, and slavery - would obviously have to be uprooted and discarded. Unfortunately, much religious, academic, and corporate life is still dominated by such primitive mechanisms, even in societies which are otherwise democratic.

A more general approach to healing and improvement is to try to work on the attitudes and moral values of oneself and the society; and here we are approaching one of the core missions of art. Traditionally it has been the business both of fairytales, opera, and theatre, to critique what is evil and unjust, and emphasise the benefits of doing good and helping others. Another example is Aristotle's emphasis on finding a 'golden middle way'; a notion which becomes almost absurd when we know that such 'wisdom' was also applied to the murderous colonialism of Aristotle's pupil, Alexander 'the great'. The ancient acceptance of violence, revenge, and stigmatising generalisations, has not stood the test of time. Especially the European countries did learn some hard-won lessons in the twentieth century, and the United Nations' declaration of universal *human rights* is one of the highest manifestations of this.

One should not underestimate the contributions of *music* to such resolution and peacefulness. By transcending all linguistic borders, at the same time as it is expressing feelings at the deepest and most personal level, it is serving to unite cultures and people across all national and

⁸⁹ Freud, 'Observations on Transference-love' [1915], in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, Vol. 12, 166 and 170.

⁹⁰ Freud, 'Recommendations to Physicians Practising Psycho-analysis' [1912], in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, Vol. 12, 118-119.

economic divides. Even, or especially in the USA, the integrative effects of Afro-European musical amalgams are easy to observe. Musicians like Louis Armstrong and Ella Fitzgerald grew up in poverty, in an utterly racist apartheid society. Yet, thanks to the optimistic and *forgiving* qualities of their music, they became national treasures, international stars, and missionaries of peace and understanding on a global scale. Music is a universal form of communication, which is often centred around harmony and communion. At the same time the purely *emotional* character of such content is occasionally making it vulnerable to misinterpretation and abuse by totalitarian regimes and ideologies.

Even Beethoven's enthusiasm and 'greatness' has been misinterpreted and turned against him. The epistemology of so called 'post-structuralist' relativism has opened up for all kinds of subjectivist 'readings', often with a sexist or race-oriented agenda. A more thorough investigation of Beethoven's life and music may reveal something else. Besides his commitment to the revolutionary ideals of freedom and equality, his thinking was inspired to a large extent by Hindu and Persian writings. With his broad nose and relatively dark look, Beethoven was not foreign to nicknames like 'Spaniard' and 'Moor'. Beethoven was also a handicapped man, troubled by escalating deafness, life-threatening sickness, and the impossibility, in an aristocratic society, of marrying the woman he loved. It is largely the battle against these demons - and the option of resignation and suicide - that is fought so heroically in his music.

8.3.3 Beethoven as psychotherapist

Terms like 'psychotherapy' and 'music therapy' may be of recent origin, but the practice is not. Shamanic treatment - incorporating song, dance, and various dramaturgical effects - has already been mentioned. A central figure in the Jewish *Bible* or 'Old Testament' is David (1040-970 BCE), who became a king himself, but was first serving as a musician and even 'inventor of new musical instruments' at the court of Samuel. According to the book of Samuel, Samuel was tormented by 'evil spirit from the Lord', and as a remedy his servants recommended harp music. Samuel requested the best musician around, and Yishai's youngest son, David, was brought in from Bethlehem. Subsequently, whenever the 'evil spirit' came upon Samuel, David played the harp, after which Samuel felt 'refreshed and well'.⁹¹

⁹¹ *Old Testament*, Book of Amos, 6:5 and Book 1 of Samuel, 16:15-23.

Less well known is the fact that Ludwig van Beethoven was also active as a music therapist. Beethoven was not only a composer of written music. He was also a great improviser, known for his unique ability to stir and work on the emotions of his listeners. 'His playing is so different from the usual styles of performance', said the music critic Carl Ludwig Junker, 'that it looks as he has attained the height of perfection on which he now stands by a path of his own'.⁹² His methods of self-renewal and programming of his own ego-dynamic repertoire is connecting to the problem of free will discussed in part one; a discussion that is also relevant to the remoulding of habitual behavioural patterns in cognitive behavioural therapy. Very much like the Baroque catalogues of melodic figures, which even had its own nomenclature, or the note books of the exceptional jazz saxophonist Michael Brecker, Beethoven systematically developed a catalogue of new figures or 'licks', which were programmed into the motor regions of his own brain by means of 'exercises'. In fact, a modern edition of this material covers about 90 pages of such exercises.⁹³

By internalising the emotional tone of these behavioural gestalts, and the intervals and keys by which they could be combined in new ways, a tremendous potential for emotion regulation and transcendence of the ordinary was opened up, which could also be utilised in psychotherapy. In a sense, this is what Beethoven always did; but as far as more typical instances of therapy is concerned, the manner in which these sessions were arranged is described in letters and interviews by his friends and acquaintances.

It is a topic that will be filtered here, through the writings of Maynard Solomon, an American Beethoven-biographer and co-founder of Vanguard Records, whose interest in psychoanalytic methods and terminology is of particular relevance to these discussions. Especially his *Late Beethoven* is rich in high level psychological concepts and analytic narratives; and the last chapter of the book: 'The Healing Power of Music', is devoted to music therapy and Beethoven's therapeutic work in particular.

The most reliable story mentioned by Solomon here, is probably the treatment of Beethoven's friend Antonie Brentano, as described in an interview with the biographer Otto Jahn in her late eighties: 'Frau Antonie Brentano was often ailing for weeks at a time, suffering to such an extent that she withdrew to her room'. On such occasions Beethoven would come in, seat himself at a

⁹² Lewis Lockwood, *Beethoven: The Music and the Life* (New York and London: Norton, 2003), 284.

⁹³ Lockwood, *Beethoven: The Music and the Life*, 64.

piano in her antechamber, and improvise until he had 'said everything and given solace'. A similar story is told in a letter to her sister-in-law Bettina in 1811.

His whole nature is simple, noble, good-natured, and his tender-heartedness would grace the most delicate woman. It speaks in his favour that few know him, and even fewer understand him. He visits me often, almost daily, and then he plays spontaneously because he has an urgent need to alleviate suffering, and he feels that he is able to do so with his heavenly sounds.⁹⁴

Another example, which is no less telling of his popularity among influential women of the time, is the help he offered Dorothea von Ertmann. Ertmann was a great pianist and the leading exponent of Beethoven's piano music in the early nineteenth century. Beethoven met her first in a music shop, where she was testing out some of his new works; and the sonata No. 28, Op. 101 was later written for her. However, she lost her only child, and found herself unable, for some time, to weep. She was also somewhat set back by the initial lack of support from Beethoven. Nevertheless, Beethoven came to her house, and thanks to his improvisations she was finally able to grieve and weep. According to the actress Antonie Adamberger, Beethoven played for Ertmann until at last 'she began to sob and thus her grief found both expression and relief'.⁹⁵ Ertmann might have given slightly different versions of the story to different people; but the version that is quoted in the book of her niece, the famous vocal coach Mathilde Marchesi, is probably reliable.

It appeared very strange that he did not come to see me when I lost my only child, only making his appearance after many weeks had elapsed. He then silently greeted me, sat down to the piano, and extemporized for a long time. That music sounded like a chorus of angels welcoming my child into the world of Light. Then he rose, pressed my hand, and left in silence, as he had come.⁹⁶

Some of the healing mechanisms that are brought into play by Beethoven in these examples are summed up by Solomon: Beethoven heals the depressions of Brentano and Ertmann by 'countering the effects of depression, grief, and mourning', and by providing them with

⁹⁴ Solomon, *Late Beethoven*, 229-230.

⁹⁵ Solomon, *Late Beethoven*, 230.

⁹⁶ Mathilde Marchesi, *Marchesi and Music: Passages from the life of a Famous Singing-Teacher* [1897] (Cambridge: Cambridge University Press, 2013), 13.

'consolation that words could not achieve'. His improvisations enabled Ertmann to 'find cathartic tears', and reached Brentano's desolation by establishing 'a bond of sympathy, understanding, and love', which also provided 'reasons for her to return to the world from the edge of despair.'⁹⁷

Less individual or 'anecdotal' instances of healing, says Solomon, may be exemplified by the closing chorales of many Bach cantatas, crowning narratives of sin or suffering by 'reaffirming shared beliefs, restoring sinners to grace', and 'enfolding worshipers in the embrace of the congregation.'⁹⁸

Many of these functions - centred around catharsis, forgiveness, supportive communion and the experience of ecstasy and harmony - have already been mentioned in connection with research on post traumatic stress as treated in art therapy and shamanic rituals, but Solomon's concepts are also highlighting the much more *discursive* potential of functional harmony. Unlike the modal idiom, which is functioning more like a constant affirmation of harmony, the harmonic progressions of functional harmony have a much more dialectical and argumentative character, which questioning elements are also applicable to long range discourses, opening up for a treatment of all kinds of doubt, desperation, and hopefulness on the road to final *reaffirmation* and *reassurance*. 'There seem to be numberless conditions', Solomon says, 'to be healed through music and countless ways that music can heal. Indeed, it may be inherent in music's structural and rhetorical properties that it can serve as a metaphor for many forms of recovery and restoration, renewal and resurrection.'⁹⁹

As earlier mentioned, the *re-prefixes* in words like reaffirmation, reassurance, recovery, resurrection, restoration, and even re-cognition, are typical of many 'dramaturgical' functions, reflecting the connection between past experience and future promise, so characteristic of advanced human cognition and planning. The richness of Solomon's vocabulary at this level of gestalt formation is precisely why he is so relevant to these discussions. Not only is he contributing to a language of music and music therapy, his descriptions, while overly dense and lofty at times, might also add to a general nomenclature of mental functions at this level of human self-consciousness.

⁹⁷ Solomon, *Late Beethoven*, 233.

⁹⁸ Solomon, *Late Beethoven*, 234.

⁹⁹ Solomon, *Late Beethoven*, 235.

So let us simplify a bit, by pointing to some of the central concepts of psychoanalysis, by which Solomon's concepts and ideas are obviously inspired: concepts like *catharsis*, *struggle*, *familiarisation*, *clarification*, *overcoming*, *rebeginning*, and *transcendence*. Already, or especially, in the prologue to his *Late Beethoven* he is speaking of 'endless forms of transcendence over hostile energies'; 'narratives of return, refinding and rebeginning'; the forging of a channel to 'a forbearing deity'; the overcoming of 'extreme odds', declaring us 'victors in every deadly game'; and the creation of 'ecstasies so powerful that they momentarily eradicated fear - or at least made it endurable'.¹⁰⁰

Such processes may also be plumbing into the reaches of *haunting dreams*, so central to Freud's thinking. Beethoven does this, says Solomon, in the openings of the fourth, fifth, Seventh, and Ninth symphonies, 'not to affirm the chaotic and the strange but to demonstrate more powerfully the importance of overcoming them, in scenarios of desire, estrangement, and humiliation that eventuate in fulfilment, reconciliation, and convalescence'. Such works, he says, are often structured according to 'the ineluctable logic of clarification and familiarization', which is in stark contrast with other classicist music, starting out in the sphere of the familiar.¹⁰¹

Solomon also attempts to incorporate these concepts in more extensive analyses, and even some attempts at a coming to grips with some general plot structures in Beethoven's works. In the first chapter, called 'the end of a beginning', Solomon speaks of 'two formal structures in Beethoven's late works: one arc begins from a dangerous or unfamiliar state and makes its way to safety by a circuitous route, the other takes its point of departure in the familiar, which is then disassembled, and defamiliarised before it, in turn, rediscovers an ultimate state of concord'.¹⁰²

A topic that is often brought up by academic skeptics and ordinary people alike, is the variability in precision and interpretation between different analysts and interpreters, giving rise to the nominalist idea of all concepts and categories being fundamentally detached from reality. If it had been true that the concept of a deceptive cadence could be projected onto an authentic cadence, or a disharmonious tritone could be confused with a harmonious fifth, that would be the case. But then there would be no point in talking about music at all. Nor would it be possible to

¹⁰⁰ Solomon, *Late Beethoven*, 7.

¹⁰¹ Solomon, *Late Beethoven*, 15.

¹⁰² Solomon, *Late Beethoven*, 16.

develop a language in the first place. We would all live in our solipsistic spheres of hallucination.

Certainly Solomon's descriptions, at least most of the above examples, are not hallucinatory. It may not even be correct, as Solomon does, to call them 'metaphorical'. On the contrary, he is probably keeping closer to the 'structural and rhetorical properties' of the music here than most other analysts, who - due to materialist, semiotic, or other types of indoctrination - are trying to project something spatial or extramusical onto the works. The narrative of *affirmation, chaos, defamiliarization, and re-affirmation*, is little more than a precise description of the auditory events. Similarly, the concepts of *reassurance, grace* and 'worshippers enfolded in the embrace of the congregation' are nowhere more pertinent than to a congregation united in harmony by singing a Bach chorale in tune. In fact, the calm, the resolve, and the sense of communion provided by this music is its own unique contribution; it is not a symbol of something else.

Slightly more complex are concepts like 'transcendence' and channels to 'forbearing deities'. It would not be an exaggeration to say that 'deities' are something extramusical or even non-existent. But the experience of religious calm, resolve, and communion, is not dependent on something non-existent for its expression. Especially when occurring after a long period of turbulence and seemingly irresolvable trouble, a switch to such a mode of resolve and calm might be very noticeable and understandable even in a purely musical context. Similarly, the experience of 'transcendence' is related with the experience of something 'higher' or 'deeper', which emotional reality might favourably be constituted within the medium of sound.

There is little doubt that Beethoven was able to 'transcend' the course of history and cosmic evolution by creating a sphere of new and 'sublime' feelings. The reality of Beethoven's 'sublimity' and 'transcendence' is manifested in a very concrete manner in the new and complex harmonies, integrating intense discord and concord in a manner which is also typical of much jazz music. By putting the pain in such a perspective, the pain is simultaneously recognised and negated. This also has its temporal equivalent, in the manner in which a wise person is integrating pain and joy by raising above or 'transcending' the petty misfortunes of life. So it is easy to understand why there is so much agreement among Beethoven interpreters concerning the location of 'transcendence' in his works and his oeuvre.

Equally complex, but much more prone to variations in interpretation, are concepts of *humour* and *satire*. These sentiments seem to depend to a larger extent on subtleties in the manner of

playing - a certain stiltedness or exaggeration - which is difficult to notate in a score. There are very small margins between the enactment of friendly humour and satire, wicked sarcasm and ridicule, dark humour, mere desperation and craze, or a respectful portrayal of *trouble* or *clumsiness*, which, while being awkward in character, may not be humorous at all. Many musicians and interpreters know little about emotional coherence, and do not hesitate with inserting a little humour here and there, in performances that may otherwise be relatively detached; as if musical works were neutral containers or incoherent rhapsodies containing all kinds of whims and jumbled emotions. Such an approach would not be very successful if the work is not a rhapsody. On the contrary, the emotional narrative, which is so essential to the experience of natural behaviour, understandability and enrapture, would be totally destroyed.

A good example of these problems is the reception of Beethoven's Op. 120, the monumental *Diabelli Variations*. Since this is a so called 'variation work', and since the opening theme is not Beethoven's own, but a waltz by Anton Diabelli, which is described by many critics as slightly clumsy and bland, it is difficult, before investigating the context of this work, to determine whether this clumsiness is ridiculed - making the work into some kind of comic satire - or whether the awkwardness is treated as a human weakness or problem, which is deserving rather of care, understanding, and therapy.

What makes Diabelli's theme so clumsy, is the lack of congruity between the happy-go-lucky start of the theme and the dissonant and effortful endings of the phrases. It is easy to understand why Beethoven initially hesitated with accepting the commission. The waltz might be ridiculed as a jolly clown encountering comic difficulties. At the same time: the manner in which the theme is affirming something pleasurable and feminine which is met with a certain difficulty or desperation, bears a clear resemblance with Beethoven's own themes and works. As mentioned above, it is precisely this dialectic between romantic dreaming, harsh reality, and the possibility of mediating it, that seems to be the topic of many of Beethoven's works. The difference between Diabelli's theme and Beethoven's own themes is only that the consciousness of this dialectic is not integrated. The start of the theme is all too bland and shallow; or as Solomon put it: it is 'unaware'.¹⁰³

¹⁰³ Solomon, *Late Beethoven*, 179.

This mental split is a common weakness of many people. Not all people have a thoroughly integrated outlook, and many depressed people may appear much more jolly than a melancholy person who has managed to incorporate the darker aspects of consciousness into a more stable personality. Even Beethoven might have had his jolly and unaware moments, out of which his troubled condition did only gradually come to attention. Diabelli was probably a serious man; and it seems like Beethoven is respecting his shortcomings. This is confirmed in the first variation, where the dichotomy between dream and reality is taken serious and set off in a clearer and much more credible manner. The stern and dark march-like affirmations are repeatedly contrasted with equally tense, dreamy and frail elements; neither of which are in tune with the idea of humour and ridicule.

Nonetheless, the pianist Alfred Brendel's interpretation of this work is centred around the idea of Diabelli's theme being parodied and even ridiculed: 'instead of being confirmed, adorned and glorified,' he says, 'it is improved, parodied, ridiculed, disclaimed, transfigured, mourned, stamped out and finally uplifted.'¹⁰⁴

The difference between 'glorified' and 'uplifted' is illusory and semantic. Also, there is no explanation here why something that is first ridiculed and parodied should later be 'mourned' and 'uplifted'. Brendel's description is not a narrative, it is a jumbled list of incompatible emotions. His idea of something light and fun is very unlikely in view of the desperation that is manifested already in the theme. Brendel diminishes these conflicts by playing the waltz very fast and by smoothing out the sforzandi. Yet this is an approach that becomes impossible to prolong during the following much darker and desperate variations. In variation 6, marked 'Allegro ma non troppo e serio', it is almost like the protagonist is repeatedly banging his head against the wall. Beethoven's ambivalence between heartbreaking lyricism, dissonant desperation, periods of resignation, and more or less hopeful attempts, is nowhere more acute than in this work, and even Brendel has to admit that a sense of 'nagging doubt' is expressed already in the repeated bass ostinato in variation 3.¹⁰⁵

Certainly there may be elements of humour even in grave music and difficult life situations. It is often in our most desperate moments that we resort to dark humour. In variation 22, there is

¹⁰⁴ Alfred Brendel, 'Must Classical Music be Entirely Serious?', in *Music Sounded Out: Essays, Lectures, Interviews, Afterthoughts* (London: Robson books, 1990), 38.

¹⁰⁵ Brendel, 'Must Classical Music be Entirely Serious?', in *Music Sounded Out*, 51.

clearly some *sardonic humour* when Beethoven is quoting, in a bizarre manner, a fragment from Mozart's opera *Don Giovanni*, originally containing a remark about the thanklessness of labour. The most extreme form of such black humour is *Gallows humour*, and there is much to show that the Diabelli variations, rather than being a comic work, is concerned with this gravest situation of all. At the end of the work, from variation 24 and onwards, all this despair is resolved in a plethora of half religious manoeuvres, involving emulations of Mozart, Bach fugues, and the 'transcendent' lyricism so typical of Beethoven's late period. Yet in the variations leading up to this religious turn - that is to say: in variations 21-23 - there is a display of wild craze which is not commonplace. Understandably enough, it is first when the desperation has risen to an acute level, that the idea of giving oneself over to religious devotion is presenting itself as the only option.

Maynard Solomon's interpretation, filling several chapters of his *Late Beethoven*, does not mention parody and ridicule at all, yet it is only slightly more coherent than that of Brendel. Solomon's understanding of the rhetorical organisation of this type of music, while reflected in several of his general remarks, is not particularly consistent or well developed. And rather than keeping close to the musical events by describing how the cadential affirmations are differentiated by varying amounts of conflict, hesitation, or resolve, he is often relapsing into arid technical paraphrases so typical of much music analysis. The emotional labels he occasionally attaches to the music are both lofty and relevant enough, yet they are not particularly well connected. His metaphors of a 'journey', a 'wayfarer', or a 'pilgrimage', are all too visual and sequential to be precise descriptions of Beethoven's integrated rhetorical processes. Yet Solomon is undoubtedly correct that Beethoven's protagonist is undergoing a process here, a struggle, which is aiming for the highest reaches of resolve and transcendence.

Beethoven's wayfarer 'entered the ascending path,' says Solomon, 'reached toward perfection, encountered loss and the prospect of death, and was overcome by homesickness of the beginning as the last days came dimly into view.' Other places he is talking of 'a narrative route, of obstacles on the path to virtue, salvation, or a safe resting-place.'¹⁰⁶

¹⁰⁶ Solomon, *Late Beethoven*, 25 and 186.

If, for a moment, we allow ourselves to take into consideration some biographical evidence, deriving from recent research on Beethoven's life and correspondence, Solomon's story of death and nostalgia might acquire a much more precise meaning; a meaning that is also in tune with the mentioned love-frustration ambivalence, and the intrinsic dialectic of dream, desperation, and overcoming so typical of Beethoven's rhetoric. The theme, especially in the final 'nostalgic' variation 33, is strikingly similar to the so called 'Josephine motif', occurring in Beethoven's *Andante Favori* as well as his piano sonata no. 22, both of which are written in 1804.¹⁰⁷ In the *Andante Favori* the motif has four tones or syllables: Jo-se-phin-e. Other places, like in no. 22, and the start of the *Appassionata sonata*, no. 23, it has only three syllables, making it Josephin or Josepha.

As documented in a series of love letters published first in 1957, Josephine Brunsvik, a devoted piano pupil of Beethoven, was also his greatest love.¹⁰⁸ The love letters, speaking of eternal love and truthfulness, were written in the same period as the above mentioned works: between 1804 and 1809, right after the death of her first husband; and it is really heartbreaking to learn how much Beethoven put into this relationship. According to her sister, Therese, Josephine and Ludwig were 'soul mates' and 'born for each other';¹⁰⁹ but Josephine was persuaded by her mother to marry a much older count. Some years later, in January 1804, she became a widow, which gave Beethoven new hope in what was also to become one of his most important compositional phases. Yet, being a countess, Josephine knew that her children might be taken away from her if she married a common man.

After a couple of other relationships she lost her children anyway; and In 1821, at the age of 42, she died. Around this time - from 1819 to 1823 - Beethoven was working on the *Diabelli Variations*. Several of its variations, including the first one, were added after her death;¹¹⁰ and supplied with the above information, it is now possible to notice how Beethoven, between the stern affirmations in the first variation, is repeatedly whispering Jo-se-phi-ne. The motif is also

¹⁰⁷ Marie-Elizabeth Tellenbach, *Beethoven and His "Immortal Beloved" Josephine Brunsvik* [1983], trans. John E. Klapproth (North Charleston: CreateSpace, 2014), 179-185.

¹⁰⁸ Ludwig van Beethoven, *Dreizehn unbekannte Briefe an Josephine Gräfin Deym geb. von. Brunsvik*, ed. Joseph Schmidt-Görg (Bonn: Beethoven-Haus, 1957), 23.

¹⁰⁹ Therese Brunsvik, 'Diary, 4. February 1846', in Harry Goldschmidt, *Um die Unsterbliche Geliebte. Ein Beethoven-buch*. (Munich: Rogner & Bernhard, 1980), 296.

¹¹⁰ William Kinderman, *Beethoven's Diabelli Variations* (Oxford: Clarendon Press, 1987), 73.

recognisable in many of the following variations, which assume a much more secure meaning in this perspective.

Variation 8 is the first of several instantiations of relaxation and afterthought in this work, and the Josephine syllables are stretched out as a descending lament marked 'soft and tenderly'; as if it is first now that Beethoven is able to realise and mourn her death. Understandable enough, this is a fact that is difficult for Beethoven to arrive at and fully accept. It is a realisation that needs 'psychical work'. In the following variation 9 the motif is fragmented, as if everything is *falling apart*. It is also the first variation that is *bewildering* in the sense of modulating between different keys. The love for Josephine was apparently a central part of what had inspired him and kept him going through these years; and the fragmented and tonally elusive character of the variation is a very concrete manifestation of his sense of desolation. Yet already in variation 11 some of the tender feelings return. He will not let go; or to put it differently: there is a lot of 'resistance' here, that has to be 'overcome' and 'worked through'. Even if the biographical facts are left out of account, these may be discernible functions of the rhetorical process.

Beethoven must try to reconstruct his whole existence now; and in variations 15-19, right after a slow 'Grave e maestoso' variation, he is repeatedly groping for light and hope. These attempts are followed by a new period of inactivity and resignation in variation 20, only to be followed by more desperate and crazed attempts in variation 21-23.

The whole work might favourably be interpreted as an acute working through of his sorrow, as well as his own life situation, mortality, and future outlook. And it is first when everything is at its darkest and most hopeless that Beethoven finds a solution. It is a solution that is typical of his late period: a sense of *religious transcendence and resolve*, which is evolving first towards the end of the works. And even in this case, the idea of a religious turn might be strengthened by the talk of *immortality* and *spiritual realms* in some of his letters to Josephine. Whether Beethoven really believed in life after death is not clear, but it is undoubtedly a possible narrative.

The exact moment of reversal and 'salvation' is variation 24: a quiet fughetta, clearly reminiscent of Johann Sebastian Bach's most hopeful and reassuring sentiments. The fughetta is followed by several variations exploring in a tentative and soft manner, feelings of sweetness and calm. There might even be moments of joy and crazed enthusiasm here, like in variations 27 and 28, when the reality of the fantastic option is starting to sink in. Variation 31, marked

'Largo molto espressivo', is instantiating the kind of calm and blissful state of mind which we remember from the *Hammerklavier Adagio sostenuto*; but the allusions to Mozart's passage work are clearer here.

Like in the *Hammerklavier Sonata*, the slow and 'transcendent' section is followed by a very resolute fugue, which, it is natural to presume, will resolve the whole drama in some kind of ecstatic triumph. Yet this is not what happens here. The fugue is suddenly halted by a grand cadenza - which is followed by a very slow, frail, and harmonically faltering sequence of chords. It feels like we are standing on the brink of something important and unknown now, perhaps death. Yet, instead of coming to rest, an E flat chord is alternating with directionless augmented chords, before resolving into a tonally remote E minor chord. Something unprecedented and strange is happening here; which has also left a strong impression on many of the commentators on this work. Suddenly we are transported right into a dainty and nostalgic minuet in C major. The theme seems to have taken the guise now, of an inverted version of his piano Sonata no. 22 minuet, which was probably reflecting his love for Josephine. The dainty ornaments are exactly the same, but slightly slower, like a reminiscence of solemn rococo processions.

The character of this minuet, and the way he arrives at it, is exemplifying transcendence of a different kind. It is like suddenly slipping through a cosmic worm hole in time and space. Whether this is merely the inner world of nostalgia or a ghostly procession into the place in heaven where Ludwig was hoping to meet Josephine, is difficult to tell. It is certainly a ghostly procession, so the latter interpretation is not implausible. Yet, it is not necessary to turn to something 'irrational' to be astounded by it. Reality, especially the integrations that are happening in our brains, are mysterious enough, and closer to travels in time and place than one might think. Beethoven really goes somewhere high here, and with the help of true spiritual 'media' like Maurizio Pollini and Sviatoslav Richter, it is possible for us to join him.

Some people, even Alfred Brendel, have argued that it is his greatest piano work, which is somewhat peculiar given Brendel's incoherent interpretation. Certainly the coherence and integrity of this work is not inferior to his sonatas, which is probably why Beethoven preferred the term 'Veränderungen' (transformations). Even the theme and content is similar. His last two piano sonatas were written at the same time, and both Op. 110 and Op. 111 may be seen to be dealing with the Josephine theme. Like in the *Andante Favori*, the *Piano Sonata No. 22*, and the final variation of the *Diabelli variations*, the second movement of Op. 111 has the character of a

minuet, only slower; and the sonata has even been interpreted, by scholars like Marie-Elizabeth Tellenbach and Rita Steblin, as Josephine's requiem.

Such biographical information, and speculation, is extrinsic to the purely dynamic and musical processes which constitute the subject matter of this treatise; but it confirms the conclusions that could be inferred from the music itself. The kind of drama we can observe in the *Diabelli Variations* is not a parody, but a dead serious struggle, torn between libidinal dreaming of a woman, extreme frustration and apathy, repeated constructive attempts fluctuating between hope, resignation, and desperate craze; which is finally salvaged by religious devotion and otherworldly nostalgia. Certainly Beethoven learned how to treat himself by *venting* and *working* on his own traumas. He also learned how to get *catharsis*, generate *new hope*, and a sense of *coming to terms with his destiny*, even if it was an escape into *religious fantasy*, *nostalgia*, and *artistic sublimation*.

The lives and love stories of Ludwig and Josephine were turbulent and hopeless in many ways. If it is true what rumours and some researchers are indicating, Beethoven did not even get to know the 'illegitimate' product of his encounter with Josephine in Prague 1812: a wilful and musical girl named Minona. At the same time, it is this constant *ambivalence* between hope and hopelessness that made Beethoven's music so beautiful and rich. Like all life, or even thermodynamics, it is a dialectic, where ups and downs go hand in hand. And it is a circumstance that should be subjected to more scientific investigation, whether the peaks of happiness and ecstasy are involving with necessity a complementary dip and downside. To become a great artist with depth and intensity, it is essential to have a personal relationship with the darker aspects of existence. Also, it is not uncommon that the most expressive artists experience a terrible vacuum after peak performances. It is an extreme dialectic, which many of these artists have not been able to handle without succumbing or resorting to drugs.

8.4 Schema-theory and self-psychology

One of the most significant contributions to psychotherapy in recent years is probably the school of so called *cognitive therapy*, which was instigated by Aron T. Beck. It is not that Freud's three-partite scheme of *recognition*, *abreaction*, and *correction* has become irrelevant. On the contrary, Beck's conception of 'cognitive restructuring' is building on such schemes. Yet the emphasis is somewhat different now. Instead of dwelling on the past, with the risk of creating false memories, or reinforcing trauma and established dogma, the emphasis is much more *pragmatic* and oriented towards future solutions: the formulation and implementation of constructive attitudes and patterns of behaviour. In cooperation with the therapist, the client is engaged in the development of concrete life strategies, selecting the best among these strategies, and implementing it.¹¹¹

It is a method that is inspired by so called 'Socratic questioning', along the lines of: 'what is the worst that could possibly happen'. As earlier mentioned, our behaviour is habitual to a large extent, and it is not easy to leave ones comfort zone, even if it is not optimal. Especially if a person is caught up in negative thinking, a change for the better is often difficult to attain, and Aaron Beck is speaking of 'automatic thoughts' and 'negative self-schemata'.

The concept of 'schemata' was introduced into psychology by the child psychologist Jean Piaget,¹¹² and Piaget's use of the term has several similarities with the conception of ego-dynamic gestalt formation in this treatise. According to Piaget, reality is a dynamic system of 'transformations', requiring 'operative intelligence', and 'states', requiring 'figurative intelligence'. Like in this treatise, but relating to a higher extent to child development, Piaget is operating with a hierarchy of developmental stages: a 'sensorimotor stage', establishing a sense of 'object permanence'; a 'preoperational' stage; a 'concrete operational' stage, implying the use of inductive reasoning; and a 'formal operational stage', which is similar to what has been labeled here as metacognition and self-reflection.

The conceptualisation of these stages was developed and reformulated in different ways by so called neo-Piagetian theorists. Especially we will come back to Lawrence Kohlberg's charting of different levels of moral development in the next chapter. As for the concept of 'schemata', it was

¹¹¹ Aaron T. Beck et al., *Cognitive therapy of Depression* (New York: Guilford Press, 1979); and Aaron T. Beck and Emily A. P. Haigh, 'Advances in cognitive theory and therapy: the generic cognitive model.' *Annual Review of Clinical Psychology*, Volume 10 (2 January 2014): 1-24, <https://doi.org/10.1146/annurev-clinpsy-032813-153734>.

¹¹² Jean Piaget, *The Language and Thought of the Child* [1926] (London and New York: Routledge Classics, 2002).

popularised first of all by Frederic Bartlett. An article by Brady Wagoner is very useful, as it is describing how Bartlett was struggling with this concept, and gave it meanings which are similar in many ways with the concept of ego-dynamic gestalts. Much of this was lost in later schema theory, relapsing instead into the kind of linear thinking to which Bartlett was very much opposed.¹¹³ The contention, it seems, is related not only to the necessity of gestalt comprehension, but a deep-rooted difficulty of distinguishing between habitual processes, which are individual and *learned*, and the field of general concepts and dichotomies, which is more limited and *universal*.

The concept of 'schemata' might be lending itself to the description of mere individual habits, like a store house of computer programmes or automated scripts. But according to Brady Wagoner, Bartlett's conception was fundamentally different. He rejected the 'trace theory of memory': the idea of memory as a mere copy of experience, which could be stored and retrieved on demand. Instead Bartlett was talking of a much more 'creative' and 'constructive memory'. A central, but often neglected aspect of this process, said Bartlett, is the element of 'agent causality'. The concept was inspired both by Henry Head's lesions studies, evidencing a 'postural model' of the 'self-schemata', and by George Herbert Mead who was describing for instance 'how I can take the perspective of the other towards myself through the vocal gesture, because I have heard it from both sides of a social act.'¹¹⁴

For exemplification Wagoner is pointing to Naohisa Mori's research on 'agent causality' in relation to the evaluation of interrogations and *police testimonies*. According to Mori, the true testimonies were distinguished from confabulated and fabricated accounts by their interactive character, telling a story of mutual responses or 'perception-action cycles'. The confabulated accounts were just linear 'agent-successions': I did that, then I did that, and so on.¹¹⁵ Mori's research is highlighting a feature of the ego-dynamic process, which even in this treatise is given the central role in the apperception of reality. As pointed out by William James, there is not only a *core self* that is distinguishing itself from something *other* by means of its own sensorimotor

¹¹³ Brady Wagoner, 'Bartlett's concept of schema in reconstruction'. *Theory & Psychology*, Vol. 23, Issue 5 (October 2013), 553-575. <https://doi.org/10.1177/09593543500166>.

¹¹⁴ A. Gillespie, 'The social basis of self-reflection.' In *The Cambridge handbook of socio-cultural psychology*, ed. Jaan Valsiner and Rosa Alberto (Cambridge: Cambridge University Press, 2007): 678-691. <http://eprints.lse.ac.uk/id/eprint/38683>.

¹¹⁵ Naohisa Mori, 'Styles of remembering and types of experience: An experimental investigation of reconstructive memory.' *Integrative Psychological and Behavioral Science*, Vol. 42, Issue 3 (September 2008): 291-314. <https://doi.org/10.1007/s12124-008-9068-5>.

experience; there is also an 'extended self', which is drawing even inanimate objects and memories into its own sphere of existence. Our lives and our understanding is in constant development, so even the significance of memories is shifting to some extent, or as Bartlett put it: 'it is an imaginative reconstruction or construction, built out of the relation of our attitude towards a whole active mass of organised past reactions or experience.'¹¹⁶

According to Bartlett, this construction is not a mere linear accumulation: it is a simultaneous involvement in past and present: a 'turning around upon own schemata'. Certainly, if the 'schemata' engaged by such imagination are not integrated gestalts it is difficult to see how they could contribute anything to consciousness. The conception of behavioural *functions* is a reflection of such consciousness. Indeed Bartlett was subscribing to a form of 'functionalism', which is probably bringing his understanding closer to the holistic, 'holonomic' or 'integral' models of David Bohm and even Ken Wilber, than to computer analogies like that of Marvin Minsky.

Nevertheless, it was precisely this *holistic* understanding that was lost in later generations of schema theory and the first generation of cognitive psychology. As pointed out by Brady Wagoner: Marvin Minsky's conception of 'frames' is one example this; so is Shak and Abelson's 'scripts', and Mandler and Johnson's 'story grammar'. The idea of schemata was very much deprived of Bartlett's conception of feelings, moods, styles, interests, and rationalisations, says Wagoner, and reduced to 'a set of expectations about the internal structure of stories which serves to facilitate both encoding and retrieval'.

The latter conceptions of 'schemata' and 'scripts' might be seen to open up for 'scepticism' and 'relativism' of a kind that has also been applied to music aesthetics. Especially Leonard B. Meyer's *Emotion and Meaning in Music* is an example of this, and it will be criticised in the last chapter of this treatise. At the same time, it would be wrong to say that 'conventional' and even 'arbitrary' elements do not exist. Even Bartlett spoke of 'plastic cultural patterns', and showed for instance, how foreign stories tend to be reconstructed in the direction of familiar social conventions. Mary L. Northway's experiments on the recounting of stories by children later confirmed how a 'less stable social group' of children produced more modifications and importations than a group of private school pupils. Similarly, younger children tended to import

¹¹⁶ Frederic C. Bartlett, *Remembering: A study in experimental and social psychology* (Cambridge, UK: Cambridge University Press, 1932), 213.

their own ideas into stories, and recast the form more abruptly and at an earlier stage; whereas older children were more prone to *rationalisations*, reversing or substituting phrases to create a more reasonable and coherent story.¹¹⁷

This is an aspect of psyche that is also reflected in more psychoanalytically inspired thinking, like that of Harry Stack Sullivan and Roy Schafer. Sullivan is speaking for instance of 'multiple self-organisations' which are modified according to the shifting 'interpersonal context'. Similarly Schafer is speaking about multiple narratives or 'interpretative storylines'.¹¹⁸ Our lives are obviously fluent, situated, and open to different perspectives, which does not make it *unreal*, yet it is obviously depending on what we are focussing on, and the role we are playing at a certain moment of time. Depending on the circumstances, we might assume the role of a child, a spouse, a subordinate, a lover, or a party animal. More arbitrary factors, like cultural fashions, prevalent dogma, or pure luck, are also affecting our lives to a large extent.

While some autobiographies and narratives, like those of the ancient Greeks, might highlight typical 'masculine' qualities like heroism, courageousness, control, and success, it is sometimes considered a strength today to admit ones weaknesses and subscribe to conditions of victimhood, discrimination, or popular diagnoses like autism, attention deficits, or 'gender dysphoria'. Much of this is real enough, and probably always has been. Even pleads for pity and the blaming of others is well known. It is just a different tactic in the power games we are all playing. A person who calls for respect, attention, and care in one moment, might well be a cruel boss in the next.

Perhaps one might say that sometimes, like in shamanic ritual treatment, the concrete content of a narrative is less important than its purely *musical* and *dramaturgical* aspects, and the fact that it is accepted by the community. A narrative that is convincing in the sense that it is swaying the emotions and giving a sense of *catharsis*, *treatment*, and *resolution*, at the same time as it is 'politically correct', may be much more effective than a narrative that is true but *painful*, *confusing* and *taboo*. In most cases, however, the content is not so irrelevant. It is just reliant on the context.

¹¹⁷ Mary L. Northway, 'The influence of age and social group on children's remembering,' *British Journal of Psychology, General Section*, Vol. 27, Issue 1 (1 July 1936): 11-29. <https://doi.org/10.1111/j.2044-8295.1936.tb00813.x>.

¹¹⁸ Stephen A. Mitchell and Margaret J. Black, *Freud and Beyond: A History of Modern Psychoanalytic Thought*, (New York: Basic Books, 2016). 84 and 185.

What might have confused Bartlett - indeed it was a source of confusion both to William James and the postmodernists - is the seeming conflict between the fleeting and individual and the existence of *general* functions and concepts. Yet there is no conflict between these aspects of reality. What is individual can also be categorised in more general terms; and the terms are not arbitrary or indefinite; on the contrary, they are defined and limited both by physiological factors and by their own negations at various ontological levels.

At the 'dramaturgical' or 'melodramatic' level we have already seen how a dramatic structure might be classified in terms of ancient dichotomies like *prologue* and *epilogue*, *prelude* and *postlude*, *exposition* and *development*, *episodes* and *interludes*, *complication* and *resolution*, *good* and *evil* characters, *comic* and *tragic* genres; and the continued use of these words is confirming their general relevance and universality. The concept of 'introducing' is not universal because all people in the whole world are continuously making introductions and nothing but introductions, it is universal because it is functionally *self-identical* and delimited by its contrast with concluding and *rounding off*. As pointed out in Freud's metapsychological writings, there are only two main strategies: either we are *fleeing from reality* - which, according to Freud, is the source of most mental diseases - or we are *facing the realities*, which is also a clue to the solution of such diseases.

At a more detailed level, a person, or even half of the population, might be classified as *perpetrators* or *victims*, *friends* or *foes*, *heroes* or *cowards*; which is obviously false in many cases. Or a person might be employing strategies like *confrontation* or *submission*, *speaking out* or *remaining silent*; being *tolerant* or being *critical*, *forgiving* or full of *grudge*. Being good and fair, and fairly tolerant towards other people, is usually beneficial in the long run. Even monkeys are starting to understand that. It might well be a habit, and the individual is free to do something else: but it is not inconsequential.

The concept of 'schema' is somewhat unfortunate, because it is often connoting an empty outline or mere sequence, devoid of content. It does not reveal much of its gestalt character, let alone the element of 'agent causation' and the idea of general functions. Even concepts like *ego-dynamic gestalts*, *structures* and *patterns* might be suffering from such shortcomings. The idea of a 'gestalt' is certainly more holistic, but it might also be confused with a shape. As was also remarked by Brady Wagoner: 'What is needed are powerful new metaphors to guide theory and

research'; especially the Bergsonian conception of 'qualitative and accumulative change', he says, would have to be brought back into the studies.¹¹⁹

The concept of *concepts* may be better in the sense of capturing definite meanings and categories; indeed it is the reason for the systematic development of a nomenclature of ego-dynamic functions in this treatise. There is no doubt that we have these concepts, and that we are able to grasp and share them. They are so familiar to us that they are often taken for granted and ignored. Sometimes they are explained away as properties of the language as such; which, as we will come back to in a separate chapter, is far too much to ascribe to the medium of sound. The concept of *war* is not a combination of arbitrary sounds; it is nested into being in the brain, most probably engaging simulations of human battling, bombing, a certain geographical and temporal extension, and a process of *generalisation* or *abstraction* which is still mysterious.

The concept of *ideas* might be seen to be less contaminated by this association with language. Even animals have ideas or notions of various kinds, and it should be sufficiently pointed out by now, how the ideas are pertaining to different levels of comprehension. The classes of ideas that exist at the 'melodramatic' level are the above treated *discursive* and *dramaturgical* functions as well as *strategies*, *tactics*, and *plans*. Instead of speaking of 'schemata', it might be more meaningful in many cases, to use these words. Complex mental abilities like humour, irony, forgiveness, patience, resilience etc., obviously rely on a similar ability to comprehend, compare, and conceptualise complex processes. And even if such strategies are often variable and optional, there is little doubt that they are real and crucial to our lives as social beings. We would never have developed these capabilities if they were not highly beneficial, and we will later see how a damage to their neural correlates is often detrimental.

But the consequences are also evident in clinical psychology. Especially the schools of so called *ego psychology* and *self psychology* deserve special mention here, since they are focussing to a large extent on the organisation of *individual processes*, of a type that might be manifested even in purely auditory and instrumental works. Rene Spitz is speaking both of 'organisers of the psyche' and the importance of *nonverbal communication*;¹²⁰ and as will be detailed below, the specifically *auditory* and *musical* features are often central elements of such organisation.

¹¹⁹ Wagoner, 'Bartlett's concept of schema in reconstruction', 570.

¹²⁰ Mitchell and Black, *Freud and Beyond*, 42.

Strangely enough, the most devastating and heartbreaking examples of lacking such 'organisers of psyche' are also the most musical. Rene Spitz' research on orphans who were left to themselves in dormitories was going to be a radical corrective to previous materialist conceptions of infants as mere objects. The fact that these orphans remained very quiet was long taken as a sign that they were satisfied. In reality they were *dying*, starved of love and stimulation. Their development was blocked before it had even started.

The reason why these children died, Spitz reasoned, was not due to a lacking possibility of 'libidinal discharge', but the absence of emotional connections and *loving care*; and the main channel of such contact is *nonverbal communication* (body tension, posture, motion, rhythm, and tone).¹²¹ A loving connection does not come automatically. It is built by *interactions*, especially between the mother and the child. During the process of *mutual vocalisation*, singing, smiling, and mimicking, the child is gradually developing a sense of personal contact and attachment: a pleasurable and stimulating way of being, without which the existence of the child would be empty, depressing, and ultimately mortal, because it is also in conflict with emotional and instinctual needs.

By interacting with the child, the child is also learning to organise the feeling states into sequential categories with beginnings and endings: an ability to deal with the mother's absence, and the experience that when feeling upset and *crying*, it will also be *lulled*. There is obviously a beginning sense of *patience* and *trust* here, as well as an experience of *worth*, *power*, *control*, and the possibility of *manipulating* other people. The mother is central to the development of these abilities. Indeed Spitz spoke of the mother functioning as the child's 'auxiliary ego' during the first years. By soothing, shielding, and mediating every event, she is gradually building recognisable systems of meaning. Spitz called it 'ego-capacities', which at later stages are also including more metacognitive capabilities, like dealing with 'stranger anxiety', authorities, and 'the mastery of the no'.¹²²

The idea of the mother as the sole caregiver is typical of the age of industrialisation, when the father was working outside the home, and the mother often stayed home with the children, and it is first in recent years that the father is reintroduced as a caregiver. Yet the point of Spitz with regard to the centrality of parents and nonverbal communication is clear enough.

¹²¹ Mitchell and Black, *Freud and Beyond*, 41.

¹²² Mitchell and Black, *Freud and Beyond*, 41-42.

One should not underestimate the role of sound in these processes. It is the purely nonverbal elements, like touch, voice and melody, that are creating the initial affective climate; impressions that are also triggering the secretion of oxytocin at the level of the brain stem periaqueductal gray. And as we will come back to in the chapter on lesion studies, it is not only *whining*, *sobbing*, *lulling*, *gabbling*, and *babbling* that is important: even the modality of *song* and regular *rhythm* might be hardwired into the brain. The tradition of singing to infants is long-standing, and manifested in universal categories like *lullabies*, *cradle songs*, *nursery rhymes*, *ditties* and *jingles*; and it is not less important today. Recent research has shown that even unborn children are able to experience and remember a song, and the idea of singing to the foetus is growing in popularity.¹²³ Even at this *prenatal* stage it is possible to start the establishment of attachment and loving care.

Spitz' idea of 'organisers of psyche', and the role of emotional and nonverbal communication in these processes, might also be seen to be reflected in later stages of development. The bond that is created between the child and parents through baby talk and singing is not so different from the teenager's sense of building friendship and identity through musical activities and the sharing of music. It is an experience that is maximised in the participation in various forms of organised musical activities: choirs, bands, cheerleading, dance, etc. Even the cognitive benefits may be similar. If the link between crying and sooting is structuring the life of the infant, the lives of juveniles are structured by the alternation between schoolwork, partying, dancing and the possibility of self-stimulation and solace in music.

At a metacognitive level, the dealing with authorities and the 'mastery of the no' might be seen to be reflected in the various social transactions that are also taking place in music: the *courage* and self-confidence needed to play a solo; the *humility* to be quiet when playing 'the second violin'; the importance of *playing in tune* and *listening* to fellow musicians; the necessity of *paying respect* to band leaders and conductors; the ability to be *precise* and *careful*. Participating in a choir or orchestra may not be essential to the lives of modern westerners, but it was, and still is, central to the cultural life of hunter gatherers. Life today is often much more fragmented, and dominated by passive consumption of TV shows and short snippets of music. The individual is isolated in an excruciatingly complex world, where support from other people

¹²³ Sangeeta Ullal-Gupta et al., 'Linking prenatal experience to the emerging musical mind,' *Frontiers in Systems Neuroscience*, Vol. 7, Article 48 (3 September 2013), <https://doi.org/10.3389/fnsys.2013.00048>.

is more important than ever, but not bestowed in equal amount. The individual is *expected* by successful people to take care of everything by itself. But that is seldom how the success of these people has come about. It is a delusion, or in the worst case: an example of conscious trickery.

Several of these problematic aspects of the modern world and the later stages of human development are treated by Heinz Kohut. The manner in which Spitz, Kohut, and other post-Freudian psychotherapists are simultaneously building on Freud's psychology and supplementing it with an attention to more personal and existential levels of reflection, is excellently treated by Stephen A. Mitchell and Margaret J. Black in the book *Freud and Beyond*. 'While Freud construed life as a 'battle between animal appetites and civilised standards', they remark, Kohut 'spoke not of battles but of isolation - of painful feelings of personal alienation, the existential experience anticipated and so hauntingly captured in Kafka's *Metamorphosis*, where a person is terrifyingly separated from a sense of his humanness and feels himself to be a "nonhuman 'monstrosity'".¹²⁴

Like in the case of Freud, Kohut's understanding grew from clinical therapy, but his style of counselling was different. In contrast to Freud's authoritarian, all-knowing, and even esoteric praxis, Kohut developed a concept of 'emphatic immersion' and 'vicarious introspection'; techniques that enabled him to put himself in the patient's shoes, and 'perceive meanings' that were earlier neglected.¹²⁵

The main contribution of Kohut is probably his reinterpretation of *narcissism*. According to Mitchell and Black, 'Kohut was struck by a missing element in Freud's formula: the ability to feel joyful and proud'. He was even speaking of a healthy form of narcissism: a healthy desire for attention and praise. At the same time Kohut was acutely aware of the danger of derailment into more pathological forms, like a *protective narcissism*, where feelings of superiority are serving as a cover up of inadequacy and humiliation, and the person is alternating in an ambivalent manner between these poles.¹²⁶ Indeed, Kohut's psychology is very much concerned with the measures that have to be taken to prevent a person from getting into this position.

¹²⁴ Mitchell and Black, *Freud and Beyond*, 149.

¹²⁵ Mitchell and Black, *Freud and Beyond*, 157.

¹²⁶ Mitchell and Black, *Freud and Beyond*, 155.

His ideas are similar to those of Spitz, with the exception perhaps, that Kohut is considering *vitality, exuberance, and a robust self-regard* as innate properties of the child. According to Mitchell and Black, Kohut saw in early childhood not 'infantile fantasy' and 'immature irrationality' but 'a vitality, an exuberance, an expansiveness, a personal creativity that were often missing in adults who led lives devoid of excitement and meaning'.¹²⁷ In Kohut's view, the problem is first of all concerned with the challenge of preserving these traits in a healthy form, which is requiring both life experience and the assistance and exemplification from other people.

Kohut operated with three types of experiences with 'self objects' that he thought were essential to the evolution of a healthy self. First of all the child needs support from people who 'respond to and confirm the child's innate sense of vigour, greatness and perfection', although this sense of 'greatness' might have to be whittled down by experience, gradually assuming more realistic proportions. The second condition is concerned more with the development of life strategies and more complex aspects of the self. While Spitz was speaking of the mother as an 'auxiliary ego', installing 'organisers of psyche' into the child, Kohut is speaking of 'transmuting internalization': a process of learning from *role models* 'to whom the child can look up and with whom he can merge as an image of calmness, infallibility, and omnipotence'.¹²⁸ The child learns to *soothe itself* rather than collapsing in despair, and starts to develop a resilient and robust self, capable of enduring disappointments and adjusting to the realities of life. The third condition is experiences with selfobjects who evoke a sense of *likeness*.

There is little here that transcends the mechanisms that are already described by Spitz. It is first when talking of *ambitions, creativity, idealised goals, and personal meaningfulness*, that Kohut is reaching a level that is truly existential and personal. According to Mitchell and Black, it was first of all with Kohut that 'the self became "the core of the personality", the center of human initiative with its own motivational force aiming toward "the realization of its own specific programme of action",¹²⁹ which is Kohut's own formulation.

Kohut is speaking of many needs and functions that are common to, or even *typical of* tonal music: the necessity of pleasurable excitement, creativity, self-regulation, calm, the creation of

¹²⁷ Mitchell and Black, *Freud and Beyond*, 159.

¹²⁸ Heinz Kohut and Ernest S. Wolf, 'The disorders of the self and their treatment: An outline,' *International Journal of Psycho-Analysis*, Vol. 59 (1978), 414.

¹²⁹ Mitchell and Black, *Freud and Beyond*, 165.

social bonds, a 'participation in the divine', and not to forget: a sense of meaning and 'internal coherence'.¹³⁰ The intimate connection between music and religious experience has already been treated. And the need for 'internal coherence' is an essential feature both of personal and musical autonomy. All of the above mental functions, including narcissism, have been exemplified in previous paragraphs on Wagner, Liszt, and Beethoven. Especially in Beethoven's late piano sonatas and symphonies there is a struggle for coherent meaning in a life that is confusing and fraught with disease, suicidal thoughts, and political turmoil. Beethoven was clearly deriving meaning and beauty from his love stories and a general sense of creativity and exuberance, but he also had to develop and confirm his strategies of dealing with the devastating aspects of these love stories. Despite of many losses and ailments, he managed to retain a relatively stable and resilient self grounded in past successes, a meaningful and creative life, and effective strategies of dealing with his situation and his fate.

By formulating these strategies in the universal 'language' of music, Beethoven is effectively staging his own inner struggles and victories as models for all humankind, which is precisely the kind of status his works have achieved. As we will come back to in the next chapter, it is very much the mission of art to formulate such reflected attitudes; although it is only the greatest of artists, like Beethoven and the painter Edvard Munch, who have managed to establish an iconic status for their artworks which is universal even in the sense of addressing and reaching people all over the world.

One might think that all these aspects psyche, which are manifested even in harmonious music, might bring about a closer contact between musicology and the psychoanalytic tradition, and establish some kind of mutual exchange between these fields. Certainly Maynard Solomon has done a great job in this regard. Even Kohut himself contributed to such an alliance. The problem is just that Kohut is sacrificing his own theories here, relapsing into a primitive and sexually oriented interpretation which not even Freud would have subscribed to. In an article called *Observations on the Psychological Functions of Music*, Kohut is referring to 'repressed infantile sexuality', 'mastery of threatening sounds', and 'the formal demands of the superego.'¹³¹ Certainly these factors might be connected with musical experience in some way

¹³⁰ Mitchell and Black, *Freud and Beyond*, 159-165.

¹³¹ Heinz Kohut, 'Observations on the Psychological Functions of Music', Chapter 2 in *Psychoanalytic Explorations in Music*, ed. Stuart Feder, Richard L. Karmel, and George H. Pollock (Madison, Connecticut: International Universities Press, 1990), 21.

or another. Some aspects of sexuality have already been mentioned in connection with Beethoven's sonatas; but they are not immanent or essential aspects of the ongoing musical discourse. Nor is sexuality the only type of excitement in our lives. There is also song and dance; but, for some reason, Kohut is not acknowledging its independent status.

The implications of Kohut's concept of 'formal demands' are not explicitly stated in his article - they might be confused with spatial organisation and social conventions - which, as we have already seen, is not particularly relevant in the case of Beethoven. On the contrary, especially Beethoven's latest works are as unconventional as it is possible to get. They are highly 'structured', but hardly according to social conventions. And, as we will come back to in separate chapters, the idea of music as some kind of spatial construct is false altogether.

8.5 The composition of values and ideals

It is timely now, to take a closer look at the highest products of the mental hierarchy: the composition of ideals and personal values, which importance has also been emphasised by more existential and ego-oriented psychologists. The brain is largely top down governed, and especially activities like art and religion, both of which are musical to a large extent, have been found to be motivated by *existential* frustrations and desires. The uniquely peaceful sensation of harmony and tone has little impetus in itself. It is first in the perspective of *dialectical affirmation* - and a certain *collective worship* - that it gains much meaning, which is probably the reason why it is performed first of all by human beings. To make this as clear as possible, the below discussion of such 'humanism' will concentrate on two main points: the first is concerned with the level of *reflection* that is required for the formation of cultural and personal ideals, the second is concerned with the feeling of *values* which is necessarily going into such reflection; especially it is essential here to stress the unique contributions of rhythm and tone.

The tendency of Freud and some other psychiatric practices mentioned above, to relegate the treatment of mental problems to an esoteric clique of authoritarian and 'all knowing' patriarchs, is seldom an optimal solution - not even in those cases when the patriarchs are right. On the contrary, a society of *clients* - in like manner with a society of *passive consumers*, mere *subordinates*, or *gullible lambs* goaded by an all knowing ruler - would soon develop into a disaster. It is a very dangerous scenario, which is not at all in tune with the highest realms of strategy formation or societal development. All people have philosophical and artistic talents,

and it is of crucial importance that they develop them. A society without responsible and informed individuals who are also engaged in public debate and historical interpretation will never develop into a democracy; nor will it be able to maintain it. Even if it is already a democracy, it will soon be modified and destroyed when it is no longer defended by the majority of the people. Once the people are getting disengaged, indifferent, and misinformed, there is little that can stop the development of tyranny.

It is an argument against reductionism. Like the lower levels of socio-emotional gestalts and concepts, this metacognitive and existential level has its own sets of integrated entities, which could not be 'deconstructed' or explained away without relapsing into a lower stage of consciousness. The grasping of concepts like *democracy* and a *welfare state* with equal opportunities and *equality*, require personal reflection, conscious understanding, and continuous demonstration. The justification and stability of these concepts would also require a systematic charting of *antithetical scenarios* and conceptual categories, which is largely alien to the traditions of relativism, scepticism, or even materialism in many cases. If the minds of people are reduced to arbitrary *mechanisms*, 'schemas', 'scripts', 'basic emotions', *partial views*, or *subjectivistic fantasies*, without any basis in reality and a comprehension of the contexts in which the ideals are defined, the ideals would simply disappear, and the existence of people would be reduced to something like a hive of worms.

It is essential to stress that these concepts would have to be grasped sufficiently and repeatedly, and there is no other way to grasp them than to engage in reflection and debate. The concept of 'democracy' is a good example, because even though it is hard to grasp, it is also easy to observe today, how it is constantly under pressure. We have repeatedly witnessed how it cannot be reduced to a simple concept like 'election'. If the population is misinformed and without knowledge about the existence, the advantages, and the vulnerabilities of democracy, the call for strong leaders and easy solutions would usually result in a corrupt and totalitarian state. People are habitual creatures, and even an unjust and corrupt status quo may seem safer than embarking on the unfamiliar and disruptive process of political debate and religious reformation.

The concept of democracy might have to engage the metacognitive realisation that progressive taxation not only alleviates exploitation, but works for the benefits of the whole society - giving everybody a happier life, as well as a free press, and an educational system which is a prerequisite for stability and productivity in the long run. *Freedom of speech* is

another central component of democracy, and it is easy to observe today, how it is weakened and challenged. It is tempting to censor, 'cancel', or stigmatise people who are critical of popular dogma, and the scene is open to governance that may be based on good intentions, but are often narrow-minded, biased by special interests, and productive of unforeseen and potentially disastrous consequences. Communism is based on the idea of equality and fairness, but if it is not upheld by democratic participation and control, it will ultimately give free rein to the mistakes and the greed of people in power.

Another and more *sensual* aspect of reality is covered by the field of 'axiology', that is to say: the philosophy of *values*. Moral discourse is not purely logical, like in mathematical calculus. Without love and liking, and a sense of communion and compassion, there is nothing to defend or strive towards. What we love about people is not only the way they look or stimulate our sexual drives, but much more so their whole *personality* as expressed in the sound of their voices, the actual tone and timbre, the melody of their dialect, and their personal idiosyncrasies. As pointed out by William James, the mimicry, the style of dressing and acting, and even personal possessions are contributing to this personal aesthetic field. And the resultant sense of beauty and sublimity is resonating with the depths of our own sense of being. As a general principle we seem to prefer a partner that is mysterious, stimulating, and pleasant rather than boring, predictable, and harsh.

Art is precisely this place where the deepest and most refined instances of feeling and self-expression are produced. Music has the additional benefit of opening up unique realms of harmony and ecstasy, which are also productive of a unique sense of communion and depth of feeling. It is no wonder that it plays a formative role in the life of infants, and even more so in the group dynamics of young people: the formulation of identity and style and the sharing of transformative experiences like partying, dancing, and going to concerts, all of which is reinforcing the sense of friendship and deep belonging. The concept of a 'soul' is often considered problematic and ephemeral, but it has an almost tangible meaning in the field of music. Personal authenticity and depth of feeling is crucial to a convincing performance, and musicians are often talking about a presence or absence of 'soul'. The concept might also denote a style of music, which is concerned with ecstatic emotions, often of a religious kind.

Even when seemingly outside the field of music, in the speeches of dictators, the reference to cultural values like language, art, and music is common. The music of Pyotr Ilyich Tchaikovsky is so close to the heart and soul of Russian people, that even though his homosexuality was condemned both by previous and current regimes - making him kill himself - his music is hailed, even by the dictators, as a national treasure and a main reason for protecting the nation.

Art is also a medium for the *discussion* of values, or even the value of values. Yet even if the music is intentionally cynical or critical, like in some post war musical modernism inspired by the 'negative dialectics' of Theodor W. Adorno, the music may still be expressive and value-oriented in the sense of constituting the emotional substance of such cynicism and protest. In some cases one might rather speak of a demonstration of pubertal 'toughness' among composers; a fright of being 'softer' than ones colleagues, which is hardly a positive or well-reflected value. Other music may be more thoughtful and courageous, conveying optimism, honesty, humour, religious conviction, or in more complex music like that of Beethoven: a reflected stance of hopefulness, solidarity, combativeness, and the ability to transcend and leave behind what is difficult and devastating. Intentionally or not, an artwork or artistic oeuvre is always constituting a certain general attitude towards life. A preoccupation with improvised music like jazz, for instance, might reflect an insistence on living in the moment, in a free, friendly, and cooperative manner.

Even if it is not always the case, the field of fine arts is supposed to be acutely aware of such values, and convey a message that is consciously refined and under constant revision. It is solemnly presented on a stage or the walls of a gallery, so it is natural to expect something serious from it. Often it is created with the intention of having a certain critical function, or a positive impact on the society and the wellbeing and self-healing powers of people. Especially in challenging times, and in countries that are ruled by dictators, such nonverbal performances and discourses may provide hope, a heightened sense of communion, and even circumvent the censorship of the dictators in many cases. Some of Mozart's operas and Beethoven's third and ninth symphonies may be examples of this. Even today we can observe how certain theocracies are fearing the power of art, music and architecture to such an extent that the art is destroyed, forbidden, and referred to an underground existence.

It is the *combination* of instinctual, aesthetic, and intellectual faculties that produce our personal and cultural values and ideals; and it would be wrong to say that it is restricted to the highest levels of gestalt formation. There is a whole hierarchy of such value formation. The hierarchy of values is very much reflected in Maslow's hierarchy of needs. Another version is Piaget's hierarchy of cognitive development mentioned above. A particularly relevant outgrowth of this tradition, and an important contribution to the field of ethics, is Lawrence Kohlberg's six stages of moral development.

Kohlberg's six stages are somewhat confusing since, for instance, already at the first stage he is bringing in social concepts like 'obedience' and 'punishment', which is supposed to arise first at the level of social contracts and law.¹³² Similarly, it seems to be more confusing than necessary to bring in questions of abstraction and levels of egoism and altruism. Even at low levels of perception there may be abstraction, and even at the highest level of moral development the ideals may be grounded in egoism and personal interest. The existence of 'altruism' might well be a myth. Indeed, the people who are most eager to subscribe to it - in questionnaires and other kinds of self-report - might just as well be the people that are most prone to opportunistic dishonesty, poor self-reflection, and compliance with dogma.

Phenomena like personal sacrifice and *vegetarianism* might well be examples of genuine care, but it is not very common. Perhaps these are examples of a seventh level, of which Kohlberg did only speculate.¹³³ In any case, it seems to be better to keep to the main strategy of this treatise, and focus on the *levels of behavioural comprehension*. The main gist of this approach is also in tune with Kohlberg's three main categories, consisting of a 'pre-conventional', a 'conventional', and a 'post-conventional' level of moral development.

It is first of all the *post-conventional* stage that is interesting here, since it is very much identical with the level of metacognitive and artistic reflection. Kohlberg's hypothesis that this highest level is also representing a possibility of more responsible and consistent behaviour, and a more stable society, is perfectly in tune with the above reasoning about the conditions of democracy. It is also reminiscent in many ways of Freud's trichotomy of *instincts* (the 'It'), a

¹³² Lawrence Kohlberg, 'The Claim to Moral Adequacy of a Highest Stage of Moral Judgment'. *The Journal of Philosophy*. Vol. 70, No. 18 (25 October 1973): 630-646. <https://doi.org/10.2307/2025030>.

¹³³ Lawrence Kohlberg, Clark Power. 'Moral Development, Religious Thinking, and the Question of a Seventh Stage'. in Lawrence Kohlberg (ed.), *Essays of Moral Development Vol. 1: The Philosophy of Moral Development* (San Francisco, CA: Harper & Row, 1981).

culturally instituted 'super-ego', and the 'ego'; although the ego is poorly developed by Freud, especially when it comes to its highest philosophical and aesthetic products.

Somewhat simpler than the idea of altruism is the concept of 'universality', which Kohlberg associates with this highest level of moral development. Immanuel Kant's so called 'categorical imperative': 'act only according to that maxim whereby you can, at the same time, will that it should become a universal law' is the most well known example of this. Without the concepts of truth and objectivity, the ideals would have no justification. We would have no arguments against societies that are unfair and discriminatory. Even today there are societies that advocate slavery, the repression of women, and ordains death penalty for homosexuality, atheism, and infidelity. If moral relativism and the 'tolerance' of all cultures were viable principles, we would have no reason for criticising these practices; nor would there be any reason for striving towards something better in our own lives.

The United Nations charter of human rights is one example of such values and ideals. So are national laws and regulations, which is always implying a certain element of dogma and chance. This is not to say that the amount of categories is infinite, that everything is equally good, or that the meanings of words like 'kind' and 'cruel' are not even distinct. As earlier argued, the concepts of universality and diversity would have to be reinterpreted according to a more *realistic* and *pluralistic* way of thinking. Like in the earlier mentioned examples of musical genres and opposite strategies, even the field of ideals have contrary categories, which are universal because they are *self-identical* and exhaust the amount of possibilities at a certain ontological level. The most general ones are dichotomies like *constructive* versus *destructive*, *kind* versus *cruel*, *fairness* versus *favouritism*, *freedom* versus *slavery*, or *democracy* versus *dictatorship*. Human physiology and basic needs are very much the same in all people although our individual predilections might also vary to some extent.

As is stressed by thinkers like Hegel, the goal is always to arrive at a better and more complete picture of reality. We have for instance seen how knowledge about sexual anomalies have enriched the total picture of sexuality; which again is leading on to the idea of relativism, but not necessarily so. Experiences of sexual *identity* and *attraction* are not linguistic rules but *actual feelings*. They only allow for a limited amount of combinations, which is reflected even in the vocabulary of nominalist gender theorists. Fashionable acronyms like 'LGBT' sum up the possibilities, but are also reflective of some shortcomings. Heterosexuality is excluded or even

stigmatised, as well as the distinction between transvestitism and trans-sexuality. Unlike trans-sexuality proper, which is affecting both the identity and attraction poles, it is only the *identity* of transvestites that is different, so the difference between the two is just as radical as between heterosexuality and homosexuality. The distinction is easy to miss, but it may have unfortunate consequences for individuals that are misunderstood as mere 'crossdressers'.

Even if sexual identity and attraction is variable to some extent, it is not arbitrary like symbols, or voluntary and free like the combination of colours and tones. It is rooted in subcortical drives, instincts, and hormones. Children born with ambiguous sexual organs may be surgically modified, most easily in the direction of femininity. In fact, this was previously a common form of treatment; but it was often traumatic for the children whose sexual instincts did not match the body they were getting. After a while, this was also apparent to the doctors, and the practice of making all the children into girls was abandoned, at least in Norway.

Perhaps one might say that sexual instincts, like hunger and lust in general, are examples of *pre-conventional* values. Homosexuality is common even among animals. At the *conventional* level, the concept of *law and order* as opposed to *anarchy* is obviously a central dichotomy, which is susceptible of the problems described above. But even a dogmatic and totalitarian regime might be better and more advanced than the alternative of pure *anarchy*, which is opening up for all kinds of murderous and violent impulses. The dichotomy of *democracy* versus *autocracy* is already discussed. Given the complexity of the concept of democracy, and the emphasis on *freedom*, it is clearly belonging to the *post-conventional* level, which is also the theme of this chapter. The logic of gestalt-formation at this level might be described in the following manner:

Combinations of dramaturgical or socio-emotional gestalts = comprehension of philosophical
ideals and concepts

The manner in which such philosophical concepts are put together, played out, and confirmed by the organisation of the brain has already been indicated in the beginning of this chapter, and it will be discussed in detail in separate chapters on the lateral and medial prefrontal cortices. So let us concentrate on the differences between the Freudian 'It' (Das Es), the 'super ego', and the 'ego' here. Is new research confirming this division? Is the sphere of the ego larger and more

developed than is indicated by Freud? And does neuroscience really confirm the above association between music, art, and the 'post-conventional' level of value formation?

The picture given by neuroscience is not yet complete, but it is definitely developing in the direction of an extensive functional map, which may serve as a corrective or confirmation of phenomenological distinctions. The structures in the brain that are dealing with various kinds of instincts and reflexes, what Freud called 'das Es', have been convincingly located to the brain stem and the limbic system. Some of these, like hunger, and the breathing reflex, are unavoidable; others, like sexual and violent impulses, are possible to control to some extent. Some of these control mechanisms are cultural and 'conventional', others are more individual and 'post-conventional', but they are all activating the executive regions of the prefrontal cortex.

If any of Freud's predictions have proven valid, it is probably the concept of a 'super ego'. The reality of its existence, and the consequences of its absence, might be seen to coincide to a large extent with the functioning or malfunctioning of the *ventromedial prefrontal cortex*, or more specifically, the *orbitofrontal cortex*, located to the underside of the frontal lobes. At least there are studies that have indicated such an association.¹³⁴ It is here that action schemes and socially instigated rules are connected with various types of reward values or what Damasio called 'somatic markers'. According to Edmund T. Rolls and colleagues, 'rewards are represented medially, and punishers and non-reward laterally' in the orbitofrontal cortex.¹³⁵ It is a view that it challenged by other studies, like that of Quipin Cheng and colleagues, who located aspects of goodness and beauty even to the lateral orbitofrontal cortex.¹³⁶

The formation of values in the orbitofrontal cortex is often a purely 'conventional' association; a prolongation perhaps, of the kind of conditioning that is also taking place in the amygdala. Edmund Rolls is very much describing it as an outgrowth of the amygdala, with similar connections and functions, and a more dominant role in humans. It is much more susceptible of control and modification than the amygdala. Being located to the prefrontal cortex, it is engaging

¹³⁴ Elliot D. Cohen, 'Freud's Brain: Neuroscience suggests that the brain has "id", "ego", and "superego" substrates', in *Psychology Today* (18 Mars 2020), <https://www.psychologytoday.com/us/blog/what-would-aristotle-do/202003/freuds-brain>.

See also Amir Ramezani et al., 'Neuroanatomical and Neurocognitive Functions of the Structure of the Mind: Clinical and Teaching Implications', *Current Opinions in Neurological Science*, Vol. 2, Issue 6 (26 September 2018): 577-579. See especially Figures 2, 3, and 4. <https://scientiaricerca.com/srcons/pdf/SRCONS-02-00079.pdf>.

¹³⁵ Edmund T. Rolls et al., 'The orbitofrontal cortex: reward, emotion and depression', *Brain Communications*, Vol. 2, Issue 2 (November 2020): Figures 4 and 5. <https://doi.org/10.1093/braincomms/fcaa196>.

¹³⁶ Qiuping Cheng et al, 'Neural underpinnings of morality judgment and moral aesthetic judgment', *Scientific Reports*, Vol. 11, Article 18232 (14 September 2021): <https://doi.org/10.1038/s41598-021-97782-7>.

to a higher extent in a cooperation with mental processing and thought. According to Rolls, the lateral orbitofrontal cortex, more specifically Brodmann area 47/11, is not only connected with non-reward, but the ability to *rapidly change rules*; and he is pointing to lesion studies on macaques where the capability of *re-valuation*, *reversal*, and *extinction* is impaired. Conversely, he claims, an *over-connectedness* of this region with more posterior regions, like the precuneus and the angular gyrus, might lead to 'rumination' and depression.

It is reasonable to speculate whether vocalisation has a central role in such punishment and value formation, since it is often the medium in which reprimands, criticism, praise, and encouragement is conveyed. Moral imperatives are often experienced as being voiced by authoritative figures, by our inner voices, by the voice of God, or more sinister hallucinations going awry in psychiatric conditions like Schizophrenia, which is characterised precisely by an uncontrolled hallucination of commanding and criticising voices. As we will come back to in the chapter on lesion studies, research on macaque monkeys has shown that Brodmann areas 45 and 47, which may also be essential to human music,¹³⁷ are full of auditory neurones, some of which are also charting the repertoire of calls in these monkeys.¹³⁸ Another study is showing that even dogs are motivated more by *vocal praise* than by food, and it would be strange if the importance of such vocalisation was any less in humans.¹³⁹

The orbitofrontal cortex might not be responsible for all aspects of a 'super ego', but as far as it is dealing with conditioning and rule-formation in the manner that is described by Rolls, it might be providing much of what Lawrence Kohlberg described as the 'conventional level' of value formation. Being located to the bottom of the frontal lobes, however, it might better be called the 'sub ego' or 'subconscious' ego. Certainly it is not the highest level, neither of value formation nor the self, so the concept of a 'super ego' is somewhat misleading. In as far as the brain is top down governed, it is rather the 'post-conventional' field of philosophy and aesthetics that should be at the top of the hierarchy. And there is much to show that this hierarchy is reflected even in the topological organisation of the prefrontal cortex. Both the frontopolar and dorsal regions of

¹³⁷ Levitin and Menon, 'Musical structure is processed in "language" areas of the brain: a possible role for Brodmann Area 47 in temporal coherence.'

¹³⁸ Elizabeth M. Romanski, Representation and Integration of Auditory and Visual Stimuli in the Primate Ventral Lateral Prefrontal Cortex, *Cerebral Cortex*, Volume 17, Suppl. 1 (1 September 2007), i61-i69. <https://doi.org/10.1093/cercor/bhm099>.

¹³⁹ Peter F. Cook et al., 'Awake canine fMRI predicts dogs' preference for praise vs food', *Social Cognitive and Affective Neuroscience*, Vol. 11, Issue 12 (December 2016), 1853-1862. <https://doi.org/10.1093/scan/nsw102>.

the prefrontal cortex have been associated to a larger extent with conscious, metacognitive processing.

This is where the shortcomings of Freud are also reflected, even in his description of the brain. The role that Freud is ascribing to the self is too small. Certainly, he connects it with reasoning, but the wealth of content that is constituting the self in the process of reasoning is largely neglected. Freud likens it with a 'surface', or the *homunculus*, dealing merely with the intersection between the body and the external world: 'The ego is first and foremost a bodily ego', he says, 'it is not merely a surface entity, but is itself the projection of a surface. If we wish to find an anatomical analogy for it we can best identify it with the 'cortical homunculus' of the anatomists'.¹⁴⁰

Freud is right to connect the core self with sensorimotor experience, but the concept of a 'surface' is not sufficient. It is negligent of the content that is also pertaining to the self: a consciousness of movements, emotions, strategies, and at higher levels: a sense of personality and personal worth that is not limited to extrinsic rewards. There is much to show that the whole prefrontal cortex is involved in the construction of such content; that it is the mission of the prefrontal cortex to create it. As should be sufficiently demonstrated in this treatise, it is a hierarchy that is not limited to the sensorimotor strip, but engaging the whole lateral prefrontal cortex from the premotor areas to the frontopolar cortex. Especially the chapter on lesion studies will discuss a collection of studies which are demonstrating that BA44, the right hemisphere homologue of the so called Broca's area, is a crucial nexus, not only for musical experience, but for emotion recognition, empathy, and the so called 'mirror neurone system'.¹⁴¹

Yet it is first at higher, more personal and metacognitive levels of the hierarchy, that true moral reasoning is enabled. The *medial* aspect of the prefrontal cortex, located to the walls between the frontal lobes, is apparently a crucial add on to this hierarchy, and it is engaging both its ventral and dorsal regions. According to a study by C. Daryl Cameron and colleagues, damage to the ventromedial prefrontal cortex is associated with impairments in both

¹⁴⁰ Sigmund Freud, 'The Unconscious' (diagram in 'Appendix C'), and 'The ego and the Id', in *On Metapsychology*, 221 and 369.

¹⁴¹ Simone G. Shamay-Tsoory et al., 'Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions', *Brain*, Vol. 132, Issue 3 (March 2009): 617-27, <https://doi.org/10.1093/brain/awn279>.

spontaneous and deliberative moral judgements.¹⁴² Other studies are focussing on more *dorsomedial* prefrontal regions. Adam Waytz and colleagues are claiming for instance that 'activity in the dorsomedial prefrontal cortex - a region consistently involved in understanding others' mental states - predicts both monetary donations to others and time spent helping others.'¹⁴³

A lesion study by Elisa Ciaramelli and colleagues, seeking to avoid stereotypical and conventional situations, found that lesions in the medial BA10, 12, 24, and 32 prevented the patients from identifying 'socially inappropriate actions for which there are not formal societal prohibitions but which typically induce negative emotions in observers (e.g. intimately touching another's child), and arguably are detected based on an anticipation of such emotional responses.'¹⁴⁴ They are speaking here, of a failure to anticipate 'the emotional, self-focused, long-term consequences of their choices', feelings like 'regret, guilt, or an automatic emotional identification with the victim.' The lesions were classified as 'ventral', but they are clearly dorsal to the orbitofrontal cortex. The correlated functions of *mood prediction* and identification are also different from the kind of behavioural empathy that is enabled by the ventrolateral prefrontal cortex, so it is understandable that it requires a special correlate or region in the brain.

This *monitoring of moods* also seems to be central to different aspects of musical experience, like in the modulation between different keys.¹⁴⁵ According to Nora Heinzelmann and colleagues, focussing on the experience of visual art, 'aesthetics and morality judgments share cortical neuroarchitecture', and they are pointing to 'a common cluster in the medial frontal pole, insula, and the orbitofrontal cortex.'¹⁴⁶ There is obviously something to the eighteenth century association between the true, the good, and the beautiful,¹⁴⁷ and the latter connection has been

¹⁴² C. Daryl Cameron, 'Damage to ventromedial prefrontal cortex is associated with impairments in both spontaneous and deliberative moral judgements', *Neuropsychologia*, Vol. 111 (Mars 2018): 261-268. <https://doi.org/10.1016/j.neuropsychologia.2018.01.038>.

¹⁴³ Adam Waytz et al., 'Response of Dorsomedial Prefrontal Cortex Predicts Altruistic Behavior,' *Journal of Neuroscience*, Vol. 32, Issue 22 (30 May 2012): 7646. <https://doi.org/10.1523/JNEUROSCI.6193-11.2012>.

¹⁴⁴ Elisa Ciaramelli et al., 'Selective deficit in personal moral judgment following damage to ventromedial prefrontal cortex', *Social Cognitive and Affective Neuroscience*, Volume 2, Issue 2 (June 2007): 84-92. <https://doi.org/10.1093/scan/nsm001>.

¹⁴⁵ Janata, 'The Cortical Topography of Tonal Structures Underlying Western Music'.

¹⁴⁶ Nora Heinzelmann et al., 'Aesthetics and morality judgments share cortical neuroarchitecture', *Cortex*, Volume 129 (August 2020): 484-495. <https://doi.org/10.1016/j.cortex.2020.04.018>.

¹⁴⁷ John Levi Martin, 'The birth of the true, the good, and the beautiful: toward an investigation of the structures of social thought', *Current Perspectives in Social Theory*, Vol. 35 (2017): 3-56. <https://doi.org/10.1108/S0278-120420160000035001>.

investigated amongst others by Quiping Cheng and colleagues.¹⁴⁸ They even operate with a category of 'moral aesthetic judgment', which they define as 'the appraisal of moral behaviour's capability to provide aesthetic pleasure', exemplified by Haidt and Keltner's concept of 'moral elevation', and the notion that people are 'ugly' or 'beautiful inside'. Performing fMRI measurements during the rating of beauty or ugliness in morally challenging situations, which were illustrated by cartoons, they found that so called moral aesthetic judgment activated especially the anterior cingulate region to a much larger extent than in less aesthetic cases of moral judgment (Figure 3).

The precise division of labour between the orbital, ventral, and dorsal regions of the medial frontal cortex is by no means sufficiently clarified. It might not be as simple as a conventional and conditioned region in the orbital prefrontal cortex, versus a higher, superordinate, and 'free' dorsomedial region. The whole medial prefrontal cortex might be concerned with what Edmund Rolls describes as 'holding mood states online'. Nevertheless, there seems to be a tendency for the dorsomedial prefrontal cortex, as well as the dorsal cingulate region, to be connected to a larger extent with cognition and the monitoring of personality, especially that of other people; whereas the ventral regions are often concerned with more visceral and conditioned rewards.¹⁴⁹ Since our visceral feelings are not voluntarily regulated, and since the most subtle and voluntary aspects of the self are manifesting themselves in more articulated media, like vocalisation and mimicry, it is not surprising that the dorsal regions of the medial frontal cortex are more central to music and dance.

As we will come back to in separate chapters on the medial prefrontal cortex, there are special areas for vocalisation both in the anterior cingulate cortex and the medial pre-supplementary motor area,¹⁵⁰ which are intimately connected with more self-reflexive and behavioural faculties in the frontopolar and ventrolateral cortices.¹⁵¹ Especially the medial pre-SMA is central to

¹⁴⁸ Quiping Cheng et al., 'Neural underpinnings of morality judgment and moral aesthetic judgment', *Scientific Reports*, Vol. 11, Article 18232 (14 September 2021): Figure 3. <https://doi.org/10.1038/s41598-021-97782-7>.

¹⁴⁹ David R. Euston et al., 'The Role of Medial Prefrontal Cortex in Memory and Decision Making', *Neuron*, Vol. 76, Issue 6 (20 December 2012): 1057-1070. <https://doi.org/10.1016/j.neuron.2012.12.002>.

¹⁵⁰ Michael A. Arbib and Mihail Bota, 'Neural homologues and the grounding of neurolinguistics', in *From Action to Language via the Mirror Neuron System*, ed. Michael A. Arbib (New York: Cambridge University Press, 2006): 156 and 162.

¹⁵¹ Franz-Xaver Neubert et al., 'Connectivity reveals relationship of brain areas for reward-guided learning and decision making in human and monkey frontal cortex', *Proceedings of the National Academy of Sciences*, Vol. 112 (6 May 2015): E2702. <https://doi.org/10.1073/pnas.1410767112>.

human vocalisation, song and dance, and there is little doubt that it is associated with the highest levels of volition and feeling. The same areas have proven central to voluntary decision making and the evaluation of authenticity or 'truthfulness' in laughter,¹⁵² which is obviously a crucial factor both in high level artistic and moral evaluations.

The idea of a vertical hierarchy in the medial prefrontal cortex and in the brain at large is strongly reminiscent of Maslow's pyramid of needs, although the details of Maslow's pyramid may not be entirely correct. Certain aspects of love are clearly higher than mere bodily desire. Feelings of deep personal connection and sympathy are probably closer to the kind of beauty and transcendence that is experienced in great art and music; experiences which Maslow correctly associates with the highest levels of self-actualisation and meaning. Even in animal interaction, like the singing and dancing of birds, it is reasonable to suppose that their attraction might be associated with 'transcendental' experiences, being impressed and overwhelmed by the artistic display of male courtship.

Being concerned with the comparison of personalities and the aesthetic experience of unique works of art, these experiences are not 'conditioned' but arising from relations that are largely intrinsic to the display. The values that are going into such displays are so called 'intrinsic values' or feelings; feelings that are flexible, individual, and unique to different people and artworks. We are drawn to, or longing for, a person or an artwork not only because we have learned to associate it with money or various material benefits, but because we find the person or artwork beautiful and pleasant. We are longing for musical climax and resolve not because it promises something outside itself, but because the unique dramaturgy and content of the work is demanding a certain development or treatment.

This is not to say that musical and aesthetic experience is isolated from visceral feelings; but the connection might be less concerned with 'conditioning' than in the amygdala and the orbitofrontal cortex. Especially the *nucleus accumbens* in the ventral striatum is often described as a 'pleasure centre' in the brain, which is also playing a central role in the kind of overwhelming musical experiences referred to as 'chills'.¹⁵³ It might be connected with sound at

¹⁵² C. McGettigan et al., 'Individual Differences in Laughter Perception Reveal Roles for Mentalizing and Sensorimotor Systems in the Evaluation of Emotional Authenticity'. *Cerebral Cortex*, Vol. 25, Issue 1 (January 2015): 246–257. <https://doi.org/10.1093/cercor/bht227>.

¹⁵³ Anne J. Blood and Robert J. Zatorre, 'Intensely pleasurable responses to music correlate with activity in brain regions implicated in reward and emotion', *Proceedings of the National Academy of Sciences USA*, Vol. 98, Issue 20 (25 September 2001): 11818–23. <https://doi.org/10.1073/pnas.191355898>.

more regular and 'hardwired' levels as well, since people with musical anhedonia have been found to have 'selective reduced responses in that system', as well as decreased functional connectivity between the right auditory cortex and the ventral striatum, including the nucleus accumbens.¹⁵⁴ Again, the analogy with bird song seems relevant, since bird song often seems to be concerned with overwhelming and impressing of females with hypnotic complexity and intensity. Even in humans, there is little that evokes more ecstasy and idolisation in females than the concerts of stars like Paganini, Sinatra, or Elvis Presley.

Newness and surprise is forming part of such experience as well, if not in all cases, or in isolation from other meanings. We need variation to experience life as meaningful. Unlike the amygdala, the nucleus accumbens seems to derive pleasure from not only learned associations but from new and unique experiences as well. There are studies indicating that the nucleus accumbens responds more to unpredictable rewarding stimuli.¹⁵⁵ Concepts like *interesting*, *fascinating*, *curious*, and *wonderful* all seem to possess a component of newness. Yet it is not obvious that any pleasurable arousal would occur if the stimuli were not already rewarding.

A study of surprise and music-induced pleasantness by Ofir Shany and colleagues is starting out in a typical hardheaded manner, with remarks about 'abstract stimuli' without a 'clear physiological or material benefit'; but their findings are pointing in a different direction. The experience of pleasurable surprise is found to be 'interacting with' the 'pleasantness' and 'positive valence' of the music as such.¹⁵⁶ Moreover: a study by Valorie N. Salimpoor and colleagues is indicating that the dopamine inducing reactions of the nucleus accumbens are not limited to unpredictable experiences, but also concerned with *pleasurable anticipation* and musical 'peak experiences' in general.¹⁵⁷ Even if arousal may sometimes be triggered by surprise, this is not always the case. The people that are most frequently experiencing chills and other ecstatic reactions to music are often fans that know the music by heart.

¹⁵⁴ Noelia Martínez-Molina et al., 'Neural correlates of specific musical anhedonia,' *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 113, No. 46 (31 October 2016): E7337-E7345. <https://doi.org/10.1073/pnas.1611211113>.

¹⁵⁵ Gregory S. Berns et al., 'Predictability Modulates Human Brain Response to Reward,' *The Journal of Neuroscience*, Vol. 21, Issue 8 (15 April 2001): 2793-2798. <https://doi.org/10.1523/JNEUROSCI.21-08-02793.2001>.

¹⁵⁶ Ofir Shany et al., 'Surprise-related activation in the nucleus accumbens interacts with music-induced pleasantness.' *Social Cognitive and Affective Neuroscience*, Volume 14, Issue 4 (4 April 2019): 459-470. <https://doi.org/10.1093/scan/nsz019>.

¹⁵⁷ Valorie N. Salimpoor et al., 'Anatomically distinct dopamine release during anticipation and experience of peak emotion to music.' *Nature Neuroscience*, Volume 14, Number 2 (February 2011): <https://doi.org/doi:10.1038/nn.2726>.

Before concluding this survey of egodynamic gestalt formation, some reservations would have to be expressed concerning the connection between moral and mental capacities. The circumstance that higher brain regions are engaged is not a guaranty for higher truth or goodness. A humble pig, who is living its miserable short life in the meat industry and still does not resort to violence, is probably a better person than a highly educated brain surgeon destroying the minds of his fellow beings with an ice axe through the eyeholes. Similarly, a rat bringing up her children in a city who despises her, may be much more caring and successful than a philosopher who is only contributing error and confusion. The philosopher might be a winner in the local power games, but the societal harm is potentially much bigger. Philosophy of the enlightenment kind has undoubtedly bettered the condition of humans, but there are also anti-humanistic and mechanistic models from the same time period, which might have worsened it in many cases.

A similar caution should be exercised against the negative aspects religion. While some varieties of religious practice might entail an openminded seeking of transcendent awareness and knowledge, like in Buddhism or Taoism, the concept is also associated with dogmatic rules, which are often repressive, discriminatory, and unresponsive to scientific development. The positive elements of spirituality, like musical ecstasy and dance, might even be forbidden by some extreme cults, so that what is left is a totalitarian system: the idea of *submission*. Do as we say, or we kill you! The rule is very easy to grasp and uphold. There is little room for doubt and discussion here, which might seem like an advantage, but it is also opening up for abuse. The big and small patriarchs, who are maintaining the system, might enjoy their freedom and power, but the situation for those who are controlled, forced, enslaved, or mutilated, is not so good.

We need the metacognitive faculties to change such ideologies; but using ones frontopolar cortex is not an argument in itself. Like in science, what counts is only the results, the demonstration of progress and success. Democracies will never be perfect, but they are undoubtedly more successful than theocracies. The United Nations' 'world happiness report' and other international surveys, are presenting annual statistics about the level of reported happiness in different countries, and also tries to relate the results to factors like income, healthcare, freedom, corruption, and the generosity of the nation towards other nations. Typically, the nordic social democracies often get the highest scores in these rankings.

Whether this is the whole truth or only a half-truth, these societies sometimes tend to be conceived as utopias and models of perfection. Even people from repressive theocracies come here to enjoy the benefits of the welfare state. After a while, the benefits are taken for granted and expected to solve all problems between heaven and earth. The ideals of care, justice, fairness, and solidarity - on which people like to pride themselves - are not limited even by national borders, and if people and political parties are failing to imagine the economic consequences of their generosity, the national economy might well collapse when these parties are getting into power.

The boarder between political and individual problems is also muddled. Many young people are protected and cared for to such an extent that even aspects of the normal and necessary dynamic between people are perceived as intolerable; something they expect the authorities to forbid, censor, or cure. Perhaps the influx of more totalitarian cults might also be a good thing, in the sense of putting these minor problems into perspective, provoking debate, and reinvigorating the capability for contextual reflexion that is so essential to democratic societies? To some extent this might be true, but it is a dangerous game, which has already led to serious problems in many countries. When the critique of totalitarian ideologies is met with threats and accusations of racism, the debate might easily be deadened. If religious freedom and tolerance is confused with *the tolerance of intolerance and unfreedom*, the repressive theocrats are given carte blanche.

Certainly all people and cultures have a potential for moral development. Exemplary individuals from all cultures demonstrate that. And when combined with the *positive* aspects of their cultures, there is hope for the future. But the changing of habits and mindsets is a slow process. Europe needed many centuries to liberate itself from its theocratic and aristocratic roots. The status quo is very complex, and it is a complexity that is not only concerned with reflection. On the contrary, it is often the bureaucratic and *technical* demands that are increasing. Indeed, these demands are getting almost inhumane in many cases; and for certain youngsters who are excluded from the workforce, the mafia is calling.

Whether it happens this way or another, one might fear that democracy is doomed to collapse, or enter into a cycle of collapse and renewed struggle. It is difficult to see how the level of 'post-conventional' reflection could be maintained in a stable and lasting manner. The educational system is often entrusted such tasks; but a traditional education is often authoritarian, coloured

by academic dogma, and not necessarily engaging the kind of curiosity that is needed to arrive at a personal and reflected stance. Even the axiological aspect is sometimes lacking; or to put it in a simpler manner: school is often *boring*. And if the humanistic subjects are removed from the curriculum, and the good old tradition of singing together is removed from the daily routines, the whole enterprise is very much meaningless, and bereft of its integrative and creative potential.

This is precisely why the field of art and leisure activities is so important. What might have saved the nordic democracies is not only the school system and free higher education, but just as much the amount of freedom and *free time*. Orchestras, choirs, sport clubs, and festivals are largely organised and driven by voluntary work and by parents, all of which is producing a strong sense of meaning, social communion, as well as social and organisational skills. When the communities are small and the competition is lower, the opportunities for individual participation and development are better. The possibilities of personal growth in local newspapers, labour unions, political parties, and summer jobs, are high; all of which is contributing to life experience and understanding: an ability to compare and cope both with autocratic and democratic styles of leadership.

When this freedom is curbed and institutionalised, when the jobs are reserved for specialists, and the schools and administrative units are centralised, aspects of the civil society might also crumble. Yet even more isolated forms of existence - like the gamer sitting in front of his computer - might be able to attain a certain experience and reflected understanding. It is unclear to which extent this is really happening, but theoretically at least, the field of computer gaming might have been an arena for the simulation of different societal models in a manner that is both engaging, interactive, and productive of understanding. The advantages of democracy might be contrasted with the terrors of tyrannic regimes without having to undergo the process of real suffering and war. It is a potential that is obviously underdeveloped both in schools and in gaming. So far, it seems to be the commercial companies that have been leading on; often appealing to the lowest instincts in humans, associating murderous shooting with pleasurable music in a manner that is more grotesque than constructive.

It might well happen soon; but the field of gaming has not yet risen to the status of art. It is only in the arts that the deepest realms of existence are engaged; and it is always springing from the depths of *individual* feeling and thinking. By engaging the feelings in a discursive or dramatic manner, a literary or musical work is manifesting the beauty we protect. At the same

time it might produce a certain reflection and understanding without having to repeat the cycles of trial and error, which, in the case of war and tyranny, is obviously devastating. Certainly it has been a central mission both of folk songs, mythology, fairytales, and Greek dramas, to convey such truths. Dystopias, like those of Aldous Huxley and George Orwell, have been popular for some time, but we also need positive models; if not exactly utopias, then at least a description of viable compromises and 'golden middle ways' which are also stable, resilient, and possible for a normal human being to navigate.

It is questionable whether the fields of fine art and classical music are strong enough today, to have any widespread impact. Much of its popularity and aesthetic appeal was destroyed by the formalist experiments in the nineteen fifties, and by the nominalism of poststructuralist philosophy. The field of dramatic music is overtaken by film music, TV series, and the more limited kinds of drama that may be played out during a pop concert. Yet the formative potential of these formats should not be underestimated. The role of such films, series, and concerts, is no less important than the Greek dramas. Like in the Greek dramas, there are villains and heroes, tyrants and saviours. The impact of actors, playwrights, or musicians like Paderewski, Bob Geldof, Arnold Schwarzenegger, Vaclav Havel, or the Ukrainian Volodymyr Zelenskyy is considerable, and sometimes spilling over into the political sphere.

The level of reflection would obviously have to be developed a lot, and it is not lacking in destructive tendencies. Misogynistic gangster music may not be very constructive, but when integrated into a cultural sphere that is predominantly tolerant and kind, this kindness may also be reflected back on the gangsters. Whereas the USA was for a long time the dominant deliverer of popular music, European and Oceanic countries have now entered the scene in a scale and manner that is also reflective of shifting political ideals. While some 'feminists' are cultivating the power of victimhood, other women are powerful in a more constructive manner: leading the nations or dominating the cultural sphere. Hordes of young and beautiful singer song writers are singing their hearts out, while conveying values like freedom and love. Older and less beautiful debutants might be 'unsystematically' discriminated, but nothing is ever perfect.

At a larger scale yet, there are song contests like *Eurovision*, or *The American song contest*, unifying the continents in a context where the states might enjoy a due amount of pride at the same as they are reinforcing the narrative of friendly competition, tolerance, and communion. This is a tradition that is also associated with the sports, especially the olympic Greek ideals,

which are still thriving. At the same time, the sporting associations are sometimes assuming the character of totalitarian and corrupt regimes; sometimes turning their blind eyes towards the repression that is taking place in some of the participating countries, and the poor workers who have died during the construction of their arenas. These are not acceptable cultural differences, but crimes that must be investigated and punished.

Chapter 9

Taxonomy of Ego-dynamic Gestalts in the Medium of Sound

9.1 Principles of ego-dynamic autonomy

The self has its own structure, which has been defined in the previous chapters as a hierarchy of ego-dynamic gestalts. As will be argued in later chapters, this structure is also a precondition for the exploration and consciousness of 'otherness', like 'inanimate' objects or other creatures. By putting together a nomenclature of such ego-dynamic gestalts, the existence and richness of this field may be highlighted in a more graphic manner. It might also contribute to the project that was started by baroque musicology, of providing a tool, especially for the analysis of music. While mimetic, kinaesthetic, and tactile social transactions are also central to this field, the below lists are limited to content that is either manifested or reflected in auditory and rhythmical gestalts. This is limiting the amount of content, but also highlighting the core dynamic of the self, unblemished by extrinsic matters.

Before listing some of the functions and gestalts that may go into melodic processes, it might be enlightening to pinpoint the main organising principles, that is to say: the factors that are contributing to ego-dynamic autonomy and closure at various levels of consciousness. It is not pretending to be a complete list, but a suggestion of how the principles that have earlier been mentioned as sources of personal autonomy might be systematised. To simplify a bit, it is divided into categories of *organic and attitudinal*, *rhetorical*, *dramaturgical*, and *moral-philosophical* principles of organisation; which, unlike some of the previous lists, is presented in a bottom-up order. While many organic factors, like hunger and libido, are not traceable in auditory and melodic complexes, factors like breathing, tiredness and excitement are. The vocal and auditory stream is much more central at the attitudinal and rhetorical levels, as reflected both in animal cries and the intonation patterns of human communication. This is also true of the dramaturgical and philosophical levels. Building on and dramatising the rhetorical level, the individual is detaching itself even more from the animal needs, making harmony a core

ingredient both of entertainment, religious worship, existential reflection, and the reinforcement of cultural communion.

1 ORGANIC AND ATTITUDINAL PRINCIPLES OF EGO-DYNAMIC AUTONOMY

Periodicity of breathing

- Breathing inn and out: a source of phrasing and timing (as reflected in vocalisation)
- Cycles of calm breathing, panting, and return to normal breathing; loosing ones breath and catching ones breath (as reflected in vocalisation and instrumental music)

The unitary organisation of (vocal) acts

- Cycles of initiation, execution, and completion
- Cycles of stimuli and response (like the calming of screaming children)
- The teleology of seeking pleasure and avoiding pain
- Cycles of conflict reduction, confusion, ambivalence, hesitation, decision, timing, enactment, achievement, resolution

Main modalities of behaviour:

- *Atonal and/or rhythmically irregular modes of being*: typical of ordinary problem-solving and interaction (like animal body language and vocalisation)
- *Tonal and/or rhythmically regular modes of being*: typical of calming animal self-stimulation and joy, like purring, tail wagging, copulation, the synchronisation of labour, marching, as well as entranced states like dancing and clapping which are displayed even by some animals.

Cycles of vigour, exhaustion, restitution, and revitalisation

- Cycles of vigour, exhaustion, rest, and recovery of normal vigour (as reflected in heart beat, heavy breathing, loudness, tempo, pitch, timbre, focus, and activity level)
- Cycles of loosing and regaining focus/concentration
- Intensity curves: building flow and ecstasy, and returning to normal

- Cycles of normal activity and relaxing self-stimulation (alternating between purring, tail wagging, rocking, copulation, and ordinary behaviour and vocalisation)

The cycle of life, growth, ageing, and death

- Cycles of immaturity, maturation, and ageing (as reflected in vocal timbre and vigour)
- Masculine-feminine transactions (as reflected in vocal pitch, timbre, and the character of behaviour: the battle between strong/virile and tender/hesitant)

Cycles of learning, forgetting, boredom and stimulation

- Cycles of trying, failing, learning, failing better, and succeeding
- Cycles of learning, forgetting, and recalling
- Cycles of expectation, surprise, and the remoulding of expectations
- Cycles of boredom, curiosity, and hunger for optimal stimulation and flow (also auditory and rhythmical)
- Cycles of meeting, getting to like, loosing, missing, and reuniting
- Cycles of departure, approaching, arrival, meeting, and returning

Tension and resolution in attitudinal interaction

- Vocal 'shadowboxing' between aggressive and defensive attitudes, assessing power balance and preventing real fights
- Vocal demonstrations of power and dominance, aiming to *scare away* the opponent, get advantages, and *discourage* physical attacks, versus expressions of *submissive attitudes*, aiming to deflect physical attack and *demotion*
- Mild (vocal) provocations, aiming to engage pleasurable play
- Vocal 'shadowboxing' between masculine and feminine subjects, revealing interest or disinterest while preventing physical defence or rape
- The interplay of crying and empathetic appeasement of perceived shrillness in fellow beings

Individual character and temperament in animals

- Character of voice and behaviour, deriving from anatomy, unconscious copying, positive or negative prehistories, inborn dispositions, and levels of intelligence

2 RHETORICAL PRINCIPLES OF EGO-DYNAMIC AUTONOMY

Manipulative dialogues of higher animals

- Reciprocity of begging-rejecting and intensified begging-giving in
- Reciprocal exchange of services like grooming-being groomed (like in seductive purring)
- Manipulative solicitation in lamentation and demonstrative crying
- Reciprocity of consolation and care, building alliances with favoured individuals
- Reciprocity of warning-being warned
- Mating games with manipulative seduction and calculated inaccessibility (only indirectly reflected in music, by masculine and feminine subjects and by ecstatic rhythmical behaviour)
- Disrespect or ignorance of others, challenging their rank; meeting indignation and vocal reprimand (angry barking)
- Trickery of fooling and pretending
- Manipulative intensification of courtship by expressive contrasts (like in advanced birdsong, alternating between loud-soft, fast-slow, sudden captivating stops or surprises, overwhelming complexity versus underwhelming monotony)

Dialectical celebration of harmony in animals and humans

- Howling wolves, alternating between sustained tones and 'tumbling strains' for the sake of social bonding and ecstatic experience
- Human song and jubilation, deflecting from and returning to the harmony of the fundamental tone and the regular rhythm
- Melodic dialectic of tonic-subdominant and dominant-tonic within a static harmonic mode

Question-answer sequences in human dialogues

- Cycles of stating-doubting and questioning-answering, as reflected in melodic tension and relaxation, aiming towards greater certainty (and the sharing of information about absent and non-musical matters via linguistic symbols)
- Elementary deductive logic: the dynamics of conflict, hypothetical solution, doubtfulness, revised hypothesis, and confirmation
- Chordal dialectic of closes, half closes, disappointing closes, and full closes, aiming towards greater certainty and a more decisive rebuttal of conflict and doubt

Main prosodic modalities:

- **Modal song:** affirmation of harmony produced by the fixation of tone within a harmonically static framework; suited for the affirmation of harmony, like in collective ecstatic and religious utterances and even in some wolves and birds, typically in pentatonics and modal styles of polyphony like heterophony, monophony, parallel intervals, all of which are common to most ethnic music, as well as popular styles like 'techno' and 'house'.

- **Harmonically functional song:** harmonically dialectical affirmation of harmony, with heightened sense of conflict and conclusion. Suited for dialectical argumentation and decisive affirmation of harmony, like the affirmation of religious faith and the negation of doubt; like in homophony, polyphony, and styles like renaissance, baroque, classicism, romanticism, and modern folk music.

- **Atonal song:** speech-like song, no longer concerned with the affirmation of harmony, but retaining a song-like calm that is negated by pervasive chromaticism, preventing the establishment of roots. Suited for song with a speech-like, narrative character, like in Schoenberg's melodramas and what he called 'musical prose', as well as styles like free jazz and the classically oriented free improvisation scene.

- **Speech melody:** total negation of harmony by glissandi and chromaticism, never dwelling on the implicit harmony of tone. Suited for mental states that are not celebrating harmony but dealing with problems and social relations, like in discourse, quarrelling, or the social seeking, warning, and emotional 'shadow-boxing' between animals. Characterised by monophony, dialogue, or cacophony.

- **Transitional and combinatory idioms:**
 - Song-like speech: *baby talk, sing song, narration, recitation, news reporting, storytelling.*
 - Chromatic harmony approaching atonality; like in late romantic music, or modern jazz, almost dissolving the harmonic dialectic by chromaticism

- Juxtaposition of distantly related tonal melodic fragments, creating an overall impression approaching narratives and ordinary life, like in Paul Hindemith's compositions, some modern jazz, and impressionistic compositions that are frequently modulating between different keys

Regional, personal and artistic styles

- Local and personal styles deriving from the consciousness of public impressions, image, socio-emotional relations, roles, and identities
- Dialects and musical styles serving to unite communities, nations, and sub-cultures, giving them aesthetic value and identity

3 DRAMATURGICAL PRINCIPLES OF EGO-DYNAMIC AUTONOMY

Planning of strategies

- Simulation of procedures leading to greater happiness in imagined future scenarios
- Drilling of techniques and cooperative actions (also in music)
- Therapeutic, pedagogical, and cooperative strategies
- Theories of composition and rhetoric, aiming towards optimal closure, entertainment, and therapeutic resolution of trauma
- Organisation of lives and days
- (Many of the societal institutions and security measures that emerge at this level of consciousness either require language or material transactions that are not reflected in purely dynamic processes)

Pedagogical and cooperative strategies

- Strategy of daring, failing, failing better, daring again, and succeeding
- Method of taking many small steps leading to a great result
- Strategy of not worrying too much and dealing with one thing at a time
- The building of 'ego-capacities' in children, like attachment, trust, love, humour, self-confidence, independence, reciprocity, responsibility, and patience (partly by engagement in musical communion, songs, ditties, play, interchange, and taking turns)
- Consciousness of being a role model to other people: a main function of art and music

- Cooperative strategies in band playing, orchestras, and choirs; demonstrating flat structures or tolerance of leaders, the ability to play solos, listen to others, learning how to give constructive critique, and stand up against bad leadership
- Strategies of collaboration, arranging stimulating competitions and games in a friendly manner, being a good loser or winner
- Strategies of professional conflict management: greeting, listening, mirroring positive attitudes, showing respect, giving (forced) options, preserving the honour of the other, closing in a friendly manner

Dispositions of discourse and oratory

- Dialectical principles of doubt reduction, often closing with unrealistic levels of certainty, like the hammering on a tonic chord in root position
- Long range disposition of introduction, exposition, development, recapitulation, and coda
- Modulation between tonal keys: deflection from tonic key, periods of tension and tonal confusion, and return to even more stable tonic key

Composition of dramas and narratives

- Dialectical principles of conflict reduction, often with unrealistic closure: 'and then they lived happily ever after'
- Dramas containing introduction, episodes, musical interludes and postludes (like in Greek dramas and contemporary 'soap operas')
- Plots with complication, reversal, and resolution, good and evil characters, having good or bad fortunes, like in comedies and tragedies, or different fortunes for good and bad characters
- Teleology of pleasurable longing, pleasurable enjoyment of the moment, and pleasurable nostalgia (like in classical music)
- Planning of musical works and concerts, gradually building ecstasy by intensifying contrasts, calming down and rounding off
- Large scale strategic combinations of genres, like speech, song, tonality, or atonality; integrating narration, discourse, and celebration, like in eclectic works, concerts, and shows

Dysfunctional and pathological strategies

- Repression of problems growing in the dark
- Flights from reality in unrealistic dreaming, isolation, and perversion
- Dissolution of coherent reality in nihilism, madness, and psychosis (as demonstrated in Schoenberg's *Erwartung*)
- Narcissist compensation of insecurity by grandiosity, cynicism, and pompous music
- Psychopathic cynicism and sadism (like in horror music and negative dialectics)
- Category errors and narrow-mindedness (like in reductionism, semiotics, and musical formalism)
- Paranoia (reflected in instability and irritability) and extreme hate
- Depression, destructive self-doubt, and negative thinking

Psychotherapeutic treatment and closure

- Shamanic and musical treatment; creating narratives of forgiveness, reversal and social acceptance in a setting of ecstasy, memorable communion, and love (like in rituals and religious ceremonies, implying singing, dancing, and church music)
- Reduction of frustration by harmless musical abreaction and catharsis
- Removal of repression and taboo by repeated confrontation and normalisation
- Treatment of trauma by changing the valence of haunting memories, recalling them in a setting of pleasurable harmony and communion
- Treatment of depression and ambivalence by positive thinking or manoeuvres like artistic sublimation, trivialising contextualisation, resignation, and indulgence in nostalgia or religious hope and devotion (like in Beethoven's late piano sonatas)
- Reconstruction of coherent reality and constructive mindsets through self-reflection, education, and the experience of art and music
- Reduction of negativity and depression by joyous music, or integrating the sorrow in more positive perspectives, like pleasurable nostalgia, melancholy, and hope (as manifested in chromatic harmony, melancholy song, and religious music)

Cycles of events during life

- Cycles of holidays and rituals, celebration, partying, dancing, and commemoration, as manifested in the contrast between speech/work and different types of song/dance
- Journeys to foreign cultures, as manifested in different intonation, dialect, character, and musical styles; and the closure of homecoming, hearing the familiar dialect and music
- Periods of work, interspersed with memorable contemplative experiences, like concerts and performances; giving a new perspective of life, while escaping from the struggles of life (as described by Schopenhauer)

Cycles of events during a day

- Interplay between speech melody, ordinary emotional vocalisation, and mood-regulating humming, whistling, listening to music, and musical 'ear worms'
- Balance of socialisation and solitude, sound and silence, work and rest
- Morning music, background music or muzak, ring tones and alarms, music to relax by, music to jubilate and dance to, music for consolation and mood regulation, concerts and shows to contemplate and escape from reality; music to calm down, like lullabies and nocturnes
- Jingles and transitional music in television and advertisement
- Functionally coherent use of prosodic modalities in argumentation, news reporting, storytelling, and epideictic/laudatory singing

Cognitive and affective styles

- Ways of relating to future and past challenges, like pre-cautiousness, thoughtfulness, thoroughness, patience, curiousness, exploratory mindsets; as opposed to carelessness, recklessness, passivity, fatalism, impatience, bitterness, ambivalence; or pathological mindsets like paranoia, neuroticism, and grandiose self-confidence

4 MORAL-PHILOSOPHICAL PRINCIPLES OF EGO-DYNAMIC AUTONOMY

Metacognitive comprehension, prioritising, and transcendence

- Stoic transcendence of the ups and downs of ordinary life
- Calm and consolation deriving from viewing problems in the perspective of more important or worse problems

- The principle of the golden middle way
- Insights and ideals resulting from weighing all pros and cons; like the long term benefits of hope, goodness, positivity, and honesty
- Insights into the long term benefits of fairness and democracy

Musical demonstrations of moral ideals and constructive behaviour

- Moral of the superiority of goodness in battles between good and evil in dramas, operas, and instrumental music
- Demonstrations of the possibility of overcoming terror and evil; like in Arnold Schoenberg's *A Survivor from Warsaw*
- Demonstration of ideals by the consistent emphasis on these ideals in the life or artistic oeuvre of a person
- Principles of equality and democratic power distribution as demonstrated in musical polyphony and free improvisation
- Ideals of social communion and harmony conveyed by harmonious polyphony and dance
- Ideals of patience and struggle, with payoff in the form of accumulating wisdom, acceptance, and transcendence, as demonstrated in Beethoven's sonatas
- Demonstrations of the benefits of honesty, tolerance, and forgiveness in the long run

Sublation of false dilemmas and pseudo problems

- Pluralistic sublation/resolution of the 'unhappy consciousness' of dogmatism/nihilism
- Pluralistic acceptance of all genres, as reflected in the coherent (musical) use of these genres
- Pluralistic acceptance of artistic and emotional styles
- Acceptance of some imperfection, error, sorrow, and anger as unavoidable parts of life
- Acceptance of the 'coincidentia oppositorum' of paradoxes, as manifested for instance in romantic harmony and the interpenetration of sorrow and joy, pain and pleasure

The universality and symmetry of tautologies

- Being good is good; being constructive is constructive; what is functional is functional
- Constructive critique is constructive critique
- Total freedom is also freedom to exploit, suppress, and assault, which is bad

- Total control and enforcement is total control and enforcement, which is bad
- No engagement and participation of people = no democracy
- No individual wisdom = no collective wisdom

The teleology of infinite longing

- The striving for nirvana, absolute knowledge, and total presence
- The striving for musical sublimity, flow, bliss, ecstasy, depth, communion, and transcendence of the ordinary
- Religious longing and awe

Personal and moral integrity

- Post-conventional self-control, stability, and moral conviction based on meta-cognitive self-reflection and wisdom as opposed to habit and indoctrination
- Balancing between and serving as a role model in the balancing of strategies like forgiveness/reproach, tolerance/complaint, confidence/humility, patience/pro-action, spontaneity/thoughtfulness, humour/seriousness, talking/listening, responsibility/critique, modesty/greed

9.2 Ego-dynamic gestalts in the medium of sound

Like the above mentioned principles of autonomous behaviour, the list of content that may go into these processes is by no means complete or perfect. It might not even be a complete summary of previously mentioned ego-dynamic gestalts. It should be noted, however, that when complex concepts like 'celebration', 'disillusionment', or 'goodness' are listed here, a dissection of these concepts into their essential sensory and behavioural constituents, and a discussions of how such functions might be constituted by auditory gestalts is usually given elsewhere.

Again: there is no room here for extra-musical visual associations or symbols. The concept of a *cradle song*, for instance, is not included, since the connotations of cradles, sleep, and the sending of children to sleep cannot be constituted by tonal behaviour as such. A sense of suggestive calmness, naive simplicity, and even the process of *lulling* and *soothing*, may nevertheless be manifestable, especially if contrasted with something unruly to be soothed, and it is a type of content which, qua its self-identity and autonomy, has proven universally communicable.

It is also crucial to remember that the type of content that may go into a specific activity is to a large extent dependent on its overall function and genre. While it is obviously fruitless to look for fright, disgust, or enmity in behaviour that is concerned with the joint affirmation of harmony, the situation is entirely different in ordinary intonation and horror music. Similarly, whereas in modal polyphony there is plenty of room for individual improvisation and social interaction within a static harmonic field, a narrative or discursive process, like in a sonata or a symphony, is temporally much more complex and dependent on the coherent reasoning of a single protagonist, usually that of a composer.

Nevertheless, the list is organised less according to these idioms than the different hierarchical levels of memory and reflexion: the levels labeled here as *elementary*, *rhetorical*, *dramaturgical*, and *moral-philosophical*. Each of these levels are subdivided according to principles described in Chapter 3 and 4, distinguishing between a) *general ego-dynamic concepts* that are abstracted from valence, mood, and arousal, b) *ego-dynamic concepts that incorporate valence and arousal*, usually referred to as emotions and moods, and c) *ego-dynamic concepts that are also socio-dynamic* to some extent.

A problem with such an approach is deriving from the top-down government of human behaviour. Much of the activity that is natural to describe at the elementary or rhetorical level is already impregnated by the top levels: the existential and religious dilemmas. Especially the celebration and rhetorical affirmation of harmony is often a manifestation of the need for existential or religious reassurance. So the list might not be tracing the evolutionary process in an entirely precise manner. Nevertheless, it is not impossible that once these idioms are created, they might also be enjoyed at a local level by lower creatures. Research on animals has already shown that some birds and dogs may understand and respond to questions, even if they never feel the need to generate their own questions. Similarly, some animals and even humans may enjoy and perform music that they are never able to compose.

When it comes to the objectivity, universality, or immanence of sensory qualities and other elementary percepts, a relatively thorough discussion of pitch, intervals, and timbre, connecting to Herman Helmholtz' treatise 'On the sensations of sound' as well as more recent psychoacoustic theories, will be carried out in Chapter 13.2. For an analysis and concrete exemplification of the manner in which these elements may go together to form integrated motives, themes, phrases,

sections, and musical works, confer the previous treatise *Psychologizing music: A Psychodynamic Explication of Beethoven's Op 54*.¹

1: ELEMENTARY AND ATTITUDINAL AUDITORY GESTALTS

Sensory descriptions applicable to sound

- General sensory characteristics like softness, smoothness, richness, intensity, vibration, stability; or conflict, roughness, harshness, hollowness, poorness, tension (see discussion of pitch and tension in Chapter 13.3)
- More temporal sensations like fluidity (legato), abruptness (staccato), restlessness, swiftness, shivering, trembling, wavering, shaking, fluttering, stasis
- Composite feelings like agreement, disagreement, contrast, clash, attraction, ambivalence

Uniquely auditory sensations

- Uniquely tonal sensations like sound, tone, harmony, loudness, quiescence, noise, pitch, bass, treble, dissonance, consonance, discord, concord, being in tune, being out of tune, resonance, silence, monotony
- Uniquely timbral sensations, like for instance ring, chime, buzz, jar, peep, purr, chirp, tweet, chirr, warble, hum, purr, hiss, beep, bleep, alarm, siren, ring, tingle, ding, bang, boom, splash, clap, knock, clonk, thump, clunk, bam, kaboom, wham, whomp
- The vast field of timbre characterising different musical instruments and personalities, as well as age, sex, and mood-related quality of voice, like sonorous, muted, toneless, guttural, nasal, raspy, hoarse, shrieking, croaky, whispering, shrill, soprano, bass, tenor, baritone
- More temporally extended sensations like vibrato, trill, echo, reverberation, rumble, chatter, twitter, murmur, staccato, legato, portamento
- Uniquely tonal composite feelings like octaves, fifths, thirds, sevenths, or ninths, with varying sense of harmony, fundamental tone, dissonance, jarring, and tonal affinity (see discussion in Chapter 13.3); or the sensations of atonal ambivalence and suspense in equidistant divisions of the octave like tritones and stacks of similar intervals; and the almost infinite and indescribable shades of composite feelings in chords, polytonality, and textures

¹ Steinar Bang, *Psychologizing music: A Psychodynamic Explication of Beethoven's Op. 54*, Cand Philol thesis in musicology, University of Oslo, 2004. The thesis also exists in a revised and expanded version.

1a) Neutral acts manifestable in sound

- General conceptions of movement, like tensing, leaping, falling, relaxing, rocking, shaking, faltering, tumbling, rushing
- Unconscious reflexes, like startling, freezing, and autonomic reactions like the slackening of the diaphragm in panting (as reflected in pitch, rhythm, and timbre)
- General conceptions of reactions and states, like deflecting, sliding, responding, hesitating, deciding, acting, repeating, returning, intensifying, accelerating, clumsiness, firmness, ardency, vigorousness, sluggishness
- Breathing and panting, as manifested in phrasing, pitch, loudness swells, and the sound of air in breathing people and musicians
- Acts which are simple but seldom occur in isolation from higher level functions and consciousness, like rhythmical regularity, syncopation, and dance

Neutral acts unique to the medium of sound

- Emotionally neutral or relatively neutral conceptions of auditory acts, like vocalise, utter, whistle, grunt, play, howl, bawl, squawk, cry, whisper, gabble, babble, mutter, mumble, hush
- Melodic runs and leaps in tensing or relaxing direction, glissando; and dynamic and timbral acts like crescendo, diminuendo, fortetpiano, shouting, subduing, banging, whispering, clapping
- Elementary melodic acts which seldom occur in isolation from higher level functions like song or narration, confirming or negating tonal gravitation, moving in small or large steps, leaps, runs, appoggiaturas, grace notes, leaning notes, passing tones

1b) Acts and moods with strong hedonic tone (constituting affects)

- Activity with *negative or positive valence*, like frightened acts, extreme effort, tense panting, sighing, pleasurable release, joyful rhythmical activity and dance
- Moods, like depression, extreme fatigue, restlessness, instability, agitation, agony, insecurity, uncertainty, gloom, pleasurable calm, joy, elatedness, playfulness

Acts with uniquely auditory hedonic tone (constituting uniquely auditory affects)

- Auditory acts with *negative valence*; like wailing, shrieking, whining, yelping, growling, squealing, sobbing, bellowing, moaning
- Auditory acts with *positive valence*; like purring, animal giggling, and joyful howling
- Auditory acts with *extreme intensity or aggression*, like roaring, yelling, screaming, barking, and shouting
- Melodic leaps and motives characterised by the valence of tonal intervals: energetic and optimistic leaps (large harmonious intervals with rising pitch); leaps with purity and naive simplicity (like fifths, fourths, and octaves); leaps with harmony (like major thirds); leaps with dissonance and tension (blue notes and suspensions); leaps with melancholy (like minor thirds); large and tense leaps; relaxing and resolving leaps (like dominant-tonic relationships and falling intervals)
- Timbre and register colouring intervallic movements and motives with 'darkness' or 'brightness' due to degrees of dissonance, jarring, and lower energy
- Moods, like major and minor chords, being joyful or melancholy

1c) Elementary social interaction manifestable in the medium of sound (constituting social affects and attitudes)

- Dominate, overpower, interrupt, react, respond, intrude, ignore, fight, scare away, being aggressive, give in; turmoil, chaos, stridency, intrusion, submission; and positive coaction like rhythmical synchronisation, collective rocking, playfulness, and agreement

Elementary social interaction only manifested in sound (uniquely auditory attitudes)

- Auditory social relations with positive valence, like social interplay in antiphony, collective harmony, unison, euphony, and heterophony; or in calls, and the welcoming rhythmical breathing of dogs
- Auditory social relations with negative valence, like cacophony, discordance, making noise, outcry, and yelling at someone

2: RHETORICAL GESTALTS MANIFESTABLE IN SOUND

2a) Relatively neutral rhetorical gestalts manifestable in sound

- Figures of thought and argument, like stating, asserting, pronouncing, declaring, affirming, questioning, begging, wondering, doubting, suspending, answering, resolving, restraining, confirming, preparing, arguing, thinking, insisting, resolving, deciding, foreshadowing, repeating, confirming, emphasising (when these figures are manifested in rising or falling pitch, cadences, the dialectic of harmonic functions, intensification by shortening or elongation, or by rhythmical insistence and emphasis)
- Elementary phrase structure, like periods, phrases, caesuras, paragraphs, cadences, themes, commas, places for breathing
- Figures of greek and roman oratory, like thesis, antithesis, exclamatio, dubitatio, interrogatio, abruptio, suspiratio, epistrophe, antistrophe, anadiplosis (repetition of a conclusion at the end or in the beginning, common in jazz soloing), hyperbole, apocope and elipsis (omission), allusion, hyperbaton (separation or reordering for the sake of emphasis), noema (thought-like homophonic figures), amplificatio, gradiatio, incrementio.

Uniquely auditory rhetorical gestalts with relatively neutral hedonic tone

- Speech melody, tone, intonation patterns, coloratura, melisma, prosodic functions, recitative, song, melodic motifs and themes, riffs, hemming and hawing
- Tonal cadences, like the perfect cadence, 'imperfect' or inverted cadences, the authentic cadence, full close, Phrygian cadence, irregular or plagal cadences (approaching the tonic from the subdominant), half closes (halted on the dominant), interrupted or deceptive cadences (concluded by the closely related minor chord or submediant)
- Articulated tones and dialects, constituting regional, national, and personal differences in character within relatively neutral states of mind (combining fluctuations in pitch with rhythmical and timbral effects, making it optimistically bouncing, bombastically heavy, melancholy dragging, tensely nasal and rolling, open and warm, unemotionally flat, and so on)

2b) Rhetorical gestalts with strong hedonic tone (constituting emotions)

- Declarations of uncertainty, doubting, devastation, intense questioning and agonising; intense affirmation and assertiveness like in belief and faith; intense reactions of shock, surprise,

perplex astonishment, chaotic bewilderment, and local suspense; melancholy statements; bombastic and pompous confidence; hesitant and frail insecurity (which may go into dramatic musical works or the intersections of more harmonious works)

- Declarations of joy, like amazement, thrill, extolment, gaiety, burlesque, fun, slapstick humour, and dancing
- Articulated dances, like waltz, polka, gig, disco, salsa, tango (which are sufficiently manifested in rhythmical gestalts)
- Emotional character signified by common musical terms, like *maestoso*, *vivace*, *grave*, *rubato*, *animato*, *con brio*, *con fuoco*, *furioso*, *doloroso*, *giocoso*, *grazioso*, *expressivo*, *rubato*, *lamento*, *animato*

Rhetorical gestalts with uniquely auditory hedonic tone (constituting uniquely auditory emotions)

- Jubilation, cheering, rejoicing, singing with joy, lamenting, laughing, sneering tone, ironic tone, sardonic tone
- Character and emotional potential of rhythmical music, like punk, rock, blues, funk, ragtime, dixieland jazz, bebop, cool jazz, baroque, galant, rococo, *sturm und drang*, classicism, romanticism, impressionism, expressionism, futurism
- Valence and mood of modes: minor and major modes, dorian, phrygian, mixolydian, lydian

2c) Socio-rhetorical gestalts manifestable in sound (constituting social emotions)

- Emotional solicitations and reprimands, like indignation, angry lashing, intense begging, salute, scornful sarcasm, ardent denial, quarrel, annoy, irritate, mob, express disbelief, scare, sooth, lull, stridency
- Pronouncements of emotional gratitude, like applause, ovation, appreciation
- Less intense solicitations, like warn, demonstrate, show, greet, notify, nag, refuse, dismiss, accept, fool or consciously surprise, trick, interrupt, answer, echo, suppress, mimic, contest, challenge, ignore, give notice to, accompany, alternate, give attention to, address, disturb, perform, render, communicate with audience and fellow performers, deny, respect, convince, discuss, alternate, share, surprise, inform, beg, question, reject, seduce; consciously intensify courtship by spellbinding contrasts and vocal display, entice, hold back, release, build

Uniquely auditory social rhetoric (constituting uniquely auditory social emotions)

- Talking with someone, laughing at someone, scoffing, manipulative crying, alarming, hushing, subduing someone, be in dissonance with, be in discordance with, join in unison, in parallel intervals, homophony, counterpoint, antiphony, the interplay of jamming, and vocal emotional dialogues, affirm collective harmony in the shape of rhythmical synchrony and polyphony, give a concert for someone

3: DRAMATURGICAL GESTALTS MANIFESTABLE IN SOUND

3a) General dramaturgical gestalts manifestable in sound

- Workaday precautions, like customs, rules, conventions, techniques, consistency, routines, learning, studying, practicing
- Retrospections, like remembrance, recall, recollection, learning, flashbacks, amnesia
- Prospections, like planing, training, teaching, drilling, polishing, exercising, warming up, building up, looking ahead, preparing, strategies, imagination, coming to grips with
- Reversals, like setback, reorientation, reevaluation, reinterpretation
- Rituals and celebrations, like holidays, partying, dancing, commemoration, confirmation, ritual preparation, convalescence, dreams, journeys, entertainment, shows
- Oratorical dispositions and procedures, like introduction, exposition, proposition, narration, elaboration, celebration, development, argumentation, confutation, confirmation, recapitulation, conclusion, peroration, dream, fantasy and digression, phrase, section, verse, movement, transition, summary, traditions
- Dramaturgical plots and episodes, like prologue, complication, reversal, recognition, changes of fortune, climax, transition, diction, spectacle, flashbacks and summaries, happy endings, tragic endings, resolutions that are probable and necessary
- Psychopathological escapes and confusions, like repression, psychosis, resistance, denial, ambivalence, bewilderment, negative thinking, depression, narcissist compensation, regression
- Psychotherapeutic techniques, like analysis, working through, seeking out the repressed, confrontation, overcoming, struggle, familiarisation, acceptance, normalisation, clarification, resolution, come to terms with, positive thinking, sublimation, correction, guidance, overcoming

- Works and larger dramaturgical gestalts, like plots, narratives, poems, rituals, ceremonies, stories, periods of ordinary life, mental process, maturity, journeys, parodies, comedies, tragedies, thrillers

Uniquely auditory but emotionally neutral dramaturgical gestalts

- Musical sections with differentiated dramaturgical functions, like prelude, interlude, postlude, bridge, trio, coda, cadenzas, leit motifs, pedal tones, refrain, chorus, primary and secondary themes, fugues, recitatives, intermezzo, fantasy, improvisations, jingle, entry song, pastorale, chanty, suite, etude
- Compositions with differentiated functions in concerts or the narrative of life, like overture, rhapsody, symphony, sonata, cantata, opera, oratory; combinations of idioms and works going into musicals, operettas, concerts, the soundtracks of theatre, cinema, TV, and Greek drama, mixing speech melody and song

3b) Dramaturgical gestalts with strong hedonic tone (constituting dramaturgic emotions)

- Retrospective emotions, like nostalgia, grief, regret, trauma, triumph, defeat, celebration, success, come to terms with, give inn, acceptance, disappointment, disturbing flashback
- Prospective emotions, like hopefulness, longing, belief, determination and resolve, uncertainty, strong expectation, long range suspense, hopelessness
- Perspectival emotions below the level of metaphysics, like happiness, contentment, disillusionment, awe, be at peace with, joke, irony
- Emotional reversals, like anticlimax, discouragement, disenchantment, resignation, change of heart, change of tune, reassurance, backlash (after overjoy)
- Bottom stages, like crisis, bewilderment, hysteria, despair, desperation, frustration, apathy, bleakness
- Peak stages, like trance, flow, enthrallment, entrancement, rapture, climax
- Intense psychopathological states, like trauma, depression, neurosis, shock, delirium, struggling with the overcoming of trauma, reconciliation, catharsis

Dramaturgical gestalts with uniquely auditory hedonic tone (uniquely musical dramaturgic emotions)

- Threnody, requiem, fanfare, hymn, ode, anthem, chorale, psalm, carol, cheer, elegy, nocturne, lament, dirge, humoresque, horror music
- Modulatory effects, creating the experience of long range relaxation, tension, renewal and departure; sudden, disruptive, or gradual modulations, to remote or related tonal regions.

3c) Social dramaturgy manifestable in sound

- Unification, battle, loss, reunion, isolation, challenge, counterattack, rituals, collective improvisation of dramas and situations, competitions, friendly battling, embrace of congregation, inclusion, cooperation, upbringing, teaching, consolation, encouragement; the building of love and attachment, flirt, foreplay, climax, trust,

Uniquely auditory social drama

- Operas, operettas, musicals, requiems, anthems, lullabies, band rehearsals

4: MORAL-PHILOSOPHICAL GESTALTS

4a) Moral-philosophical reflections manifestable in the medium of sound

- Philosophical systems that are still incomplete or one-sided, like monism, relativism, materialism, or subjectivism, as demonstrated in (musical) formalism, conservatism, or modernism
- Philosophical systems that are approaching completeness, like dialectics, realism, and the sublation of false dichotomies and category errors, as demonstrated by the embrace of musical pluralism and humanism
- Personal virtues, like wisdom, self-reflection, profundity, balance, honesty, conscientiousness, the stoic transcendence of petty problems, tolerance, patience, modesty, determination, ambition, realism
- Dubious ideals, like like hedonism, vacuous virtuosity, fanaticism
- Artistic and personal qualities and the critical judgement of these, like complexity, depth, superficiality, profundity, consistency, truth

Uniquely auditory philosophies

- Worship of music as a universal language
- Worship of musical pluralism, as a sublation of dogmatism, relativism, and ethnocentrism

4b) Moral-philosophical reflections with strong hedonic tone (constituting moral and existential emotions)

- Constructive ideals, like goodness and kindness (in the form of friendliness and respect); love, optimism, as demonstrated and emphasised in works and dramas, and the (musical) upbringing of children
- Destructive ideals, like evil, brutality, cynicism
- Errors of thought in the process of reaching a metaphysical level, becoming conscious of their self-contradictions, like the 'unhappy consciousness' of relativism/dogmatism and reductionist encounters with emotion and consciousness (as reflected in the ambivalence between construction and expression in formalist works)
- Existential emotions, like wonder, angst, alienation, and fright

Uniquely artistic and auditory moral-philosophical emotions

- Ideals of peace and harmony as manifested in musical rituals and works, especially if contrasted with and demonstratively replacing aggression and terror, like in Beethoven's 9. Symphony
- Stylistic attitudes to life, like classicist balance and harmony, romantic sublimity, expressionist dissonance and realism, impressionist fantasy and reverie, futurist mechanism and alienation, dadaist chaos and fatalism
- Religious conviction and wonder as manifested in chorales, carols, and the calm and meditative character of chanting
- Sublation and transcendence of sorrow and angst by romantic harmony and lament, integrating angst in a perspective of joy, sublimity, and pleasurable melancholy

4c) Social ideals manifestable in the medium of sound

- Ideals of cooperation, friendliness, social harmony, negotiation of strife and chaos, individual freedom, mutual respect and understanding, helpfulness, solidarity, support, humility, friendly competition and play
- Constructive ideologies, like democracy, equality, democracy, as manifested in discussions, dialogues, and dancing
- Destructive ideologies, like repression, totalitarian militarism and war, as reflected in rhythmical and tonal interaction with extreme emphasis on subordination, fanatical shouting, commanding, parodical marching and parading, and explosions

Uniquely auditory social ethics

- Ideals of universal understanding and communion in harmony, as conveyed by collective singing, playing, symphonies, operas, and operettas
- Ideals of freedom and creativity within emotional communion, highlighted in collective improvisation and jamming, especially in heterophony, but also in free pantonal improvisation, polyphony and the collective paraphrasing of harmonic schemes

Part Three
Evidence from Neuroscience

Chapter 10

The Representation of Sound in the Frontal Cortex

10.1 Helen Barbas on the dominance of sound in executive circuits

As argued in previous parts of this treatise, the suprasegmental dynamic that is saturating discursive processes is a central aspect of our selves, which is probably also the reason we do not always notice it. Whether we are communicating with others or engaging in internal speech, it is right there, in the rising or falling inflection, the sharpness or dullness of the voice, or the accentuations produced by loudness and rhythm. As pointed out by William James: it is there when we are concluding and 'cadencing', when we are hesitantly 'hemming and hawing', and when we are 'whistling to keep up courage'. Yet it is a phenomenon that seems to be easier to discern in people from other nations or regions. Not because it is incomprehensible, but because it is characterised by a different emotional style or attitude than, which might be essential to our conception of different regional or national mentalities in the first place. In other cases people might say of us - the citizens of Oslo - that we are 'singing'. This is often said about Swedes as well, although Swedes, from their point of view, do often find us cheerful; probably because our vowels are more open, and our speech melody is often jumping upwards at the end of phrases. But we seldom notice this singing and jumping ourselves. It coincides with our character as people and the dynamics of our own thinking process, so we have no outside perspective from which to view it.

There seems to be a considerable amount of evidence now, that it is the *frontal cortex*, which has been found to be dealing with different levels of action-chunking and attitudinal gestalt formation, that is also dealing with the articulated aspects of prosody and vocalisation.¹ Both in humans and in monkeys, which have a more limited voluntary control of their vocalisations, this

¹ Luciano Fadiga et al, 'Broca's Area in Language, Action, and Music', *Annals of the New York Academy of Sciences*, Volume 1169, Issue 1 (24 July 2009): 448-458. <https://doi.org/10.1111/j.1749-6632.2009.04582.x>.

is the case.² Moreover, these regions are located right in front of the motor area for vocalisation, and might even be considered premotor extensions of this area. To determine the role of the specifically *auditory* qualia in these circuits, however - and their importance to the experience of selfhood and thinking - more evidence in the shape of musically oriented studies might be needed. One should even be open to the possibility that certain assumptions, like for instance the earlier mentioned idea of a right hemispheric specialisation for prosody and music, might have to be modified or even falsified during the course of these investigations.

If we start by considering the *anatomical connectivity* between the auditory and prefrontal cortices, a chapter by the neuroanatomist Helen Barbas and colleagues in Stuss and Knight's *Principles of Frontal Lobe Function* is almost shocking in its clarity. Not only is the auditory cortex connected with the prefrontal cortex, says Barbas, there is no modality that is as 'completely and richly' represented in the prefrontal cortex as the auditory modality.

The rich representation of the auditory modality in the prefrontal cortex attests to its significance in cognitive control. More than any other modality the auditory one impinges on prefrontal cortices on the lateral, medial, and orbital surfaces through pathways from auditory association cortices. In fact, every area of the prefrontal cortex has at least some connections with auditory association cortices'.³

The inter-connections between the auditory and prefrontal cortices are illustrated in Barbas' article by a diagram of the Rhesus monkey brain, so it is hardly possible to ascribe it to the development of speech in humans. At least this seems to be true for the majority of auditory representations in the frontal cortex. The auditory modality would not have been so richly represented there, if it had not already a central role in emotional monitoring and complex gestalt formation.

Even in the frontopolar cortex - which might be considered the apex of the 'action hierarchy' - the auditory modality plays a central role, says Helen Barbas. So much so that 'projections from

² Gino Coudé, Pier Francesco Ferrari, Francesca Rodà et al., 'Neurons Controlling Voluntary Vocalization in the Macaque Ventral Premotor Cortex', *Plos One*, Vol. 6, Issue 11 (2 November 2011): e26822, <https://doi.org/10.1371/journal.pone.0026822>.

³ Helen Barbas, Jamie G Bunce, and Maria Medalla, 'Prefrontal pathways that control attention', Chapter 3. in *Principles of Frontal Lobe Function*, second edition, ed.. Donald T. Stuss and Robert T Knight. (New York: Oxford University Press, 2013), 32.

See also Maria Medalla and Helen Barbas, 'Specialized prefrontal "auditory fields": organization of primate prefrontal-temporal pathways', *Frontiers in Neuroscience*, Vol. 8, No. 77 (16 April 2014), <https://doi.org/10.3389/fnins.2014.00077>.

auditory cortices to area 10 are the strongest among prefrontal areas,' and 'comparable with projections from visual and visuomotor cortices directed to the frontal eye fields.⁴ If it is true that the frontopolar cortex, with its metacognitive functions, is largely specific to human beings, the contributions of auditory symbolism in the form of speech should not be ruled out; it is obviously central to our development as thinking and social creatures. But even the sensory and emotional characteristics of sound - the ability of melody to express in a very explicit and articulated manner the dynamic substrates of the thinking process - and the fact that it is already a main medium for animal communication of emotion, might be reasons for the centrality of sound in these processes.

Certainly, the frontopolar cortex is not limited to language and speech. It is central to multitasking and value-oriented reflection in general, even in purely musical works. As we will come back to in Chapter 11 and 12, it is activated, amongst other things, by expressive versus non-expressive musical performance,⁵ by harmonic modulations,⁶ as well as musical improvisation. According to a study by Limb and Braun, it is so central to musical improvisation that while other prefrontal structures are silenced and automated during improvisation, the frontopolar cortex is very much reigning supreme.⁷ This does not rule out the possibility that some parts of the frontopolar cortex, especially in the left hemisphere, might be concerned with texts; but it is more likely that it is monitoring the suprasegmental and melodramatic aspects of emotional vocalisation.

The importance of such *ego-dynamic* substrates, which core functions are going under names like *willpower* and *conation*, seems to be confirmed by the engagement of the anterior cingulate cortex, which is a medial and 'paralimbic' structure, but nevertheless central to cognitive control and executive functions. It is often described as an interface between the limbic system and the prefrontal cortex, providing dopaminergic reinforcement especially in cases of conflict, at the same time as it is playing a central role in the inhibitory suppression of noise. Or as Barbas puts

⁴ Barbas, 'Prefrontal pathways that control attention', 32.

⁵ Heather Chapin, Kelly Jantzen, J.A. Scott Kelso, Fred Steinberg, Edward Large, 'Dynamic Emotional and Neural Responses to Music Depend on Performance Expression and Listener Experience', *PLoS ONE*, Vol. 5, No 12 (16 December 2010): e13812. <https://doi.org/10.1371/journal.pone.0013812>.

⁶ Petr Janata, Jeffrey L. Birk John Van Horn, Marc Leman et al., 'The Cortical Topography of Tonal Structures Underlying Western Music', *Science*, Vol. 298, No. 5601 (13 December 2002): 2167-2170, <https://doi.org/10.1126/science.1076262>.

⁷ Charles J. Limb. and Allan R. Braun, 'Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation', *PLoS One*, Vol. 3, No. 2 (27 February 2008), <https://doi.org/10.1371/journal.pone.0001679>.

it: it may 'enhance excitation in area 10 to allow attention to be directed to a secondary goal, and at the same time enhance inhibition in area 46 to suspend temporarily the main goal.' Barbas is pointing especially to a study by Christoph Muelert and colleagues here, which is also incorporating the auditory cortex.⁸ Not only are we dealing with cognitive noise here; this noise is often a 'literal' noise, as the pathways from the anterior cingulate cortex to the auditory association areas may help direct attention to relevant auditory stimuli while suppressing others, allowing communication even in a noisy environment.⁹

And it is the integration of these functions - the intimate connection between intellectual effort and vocalisation - which is so central to the understanding both of music and the self. We seem to be dealing with a closely integrated circuit here, which may suggest a 'pivotal role' both for feeling and sound in the stream of thought.

The convergence of ACC and auditory pathways in area 10 suggests a pivotal role of both motivational context and the auditory modality in the high-order cognitive processes mediated by area 10, such as multi-tasking, reasoning and abstract thought.

It is a connection that is logical and necessary even from a phenomenological point of view, since there is hardly any task that is more in need of mental effort than the voluntary introduction of *conflict* for the sake of hypothetical future gains. The precise contribution of sound to thought is not explained by Barbas, but she is indicating that it may play a central role in the monitoring and control of cognitive processes.

The importance of the voice to our inner dialogues may not be immediately evident, since it is almost always there; but it is all the more noticeable when something goes awry. A testimony to its presence in the mentioned circuits is provided by the prevalence of *auditory hallucinations* in schizophrenia, typically in the shape of speech, but also song and other sounds. It is as if the monitoring of the inner voice is somehow disconnected from agency and the self-other perspective here, turning into an uncontrollable polyphony of voices, which are nevertheless *commanding* and in constant dialogue with the self; a self which is blurred and fragmented

⁸ Christoph Muelert, Gregor Leicht, Oliver Pogarell, Roland Mergl et al., 'Auditory cortex and anterior cingulate cortex sources of the early evoked gamma-band response: relationship to task difficulty and mental effort,' *Neuropsychologia*, Vol. 45, No 10 (11 June 2007):2294-306, <https://doi.org/10.1016/j.neuropsychologia.2007.02.020>.

⁹ Barbas, 'Prefrontal pathways that control attention', 38.

because of this confusion. The details of this defect may not be entirely clear, but the anterior cingulate cortex shows 'hypofunction' in schizophrenia, says Barbas, which may affect its bidirectional pathways with auditory association cortices, on the one hand, and with dorsolateral prefrontal cortices, on the other hand.¹⁰

We seem to be approaching a picture here, which is highly reminiscent of Schopenhauer's identification of melody with will. It is also in line with James' conception of these matters, ascribing such exteroceptive feedback a central role not only in the monitoring and control of behaviour, but also in the constitution of a sense of self in these processes. A similar role is also indicated by Barbas, even if she may not have integrated in her theoretical framework the perspectives of these thinkers. She actually goes as far as indicating that area 10 'may use auditory signals as internal representations for organized thought sequences'. More specifically she is suggesting that 'auditory input in prefrontal cortices may be used for the symbolic representation needed to sequence information that must be kept in mind for cognitive operations that allow flexible behavior.'¹¹

It is not entirely clear what Barbas is aiming at here. Her conception may well be more linguistic than musical: something along the lines of sound-labels attached to 'information,' making it easier to remember and manipulate this information. There might well be some truth in this, although the need for temporal sequencing in thought may be less than we think. It is first of all the *communication* of thought that depends on such sequences and symbols, and as was noted even by Ferdinand Saussure - to whom we will come back to in a separate chapter - the sequence of words in speech is little but an 'amorphous stream' of noises if detached from the concepts that it is representing. The sounds of words and texts are arbitrary and chaotic, and hardly able to organise neither the external or internal dialogues.

It is the rhetorical functions and dramas that are organising the words, not vice versa; and the organising capabilities of sound and vocalisation might be seen to be concerned rather with the *suprasegmental* aspects of thought, what we call *prosody, intonation, rhythm, stress, melody and song*. Especially the possibility of manipulating and monitoring emotional interaction - like *question and answer, certainty and doubt, praise, reprimand, irony and scorn*, as well as the *postponement and anticipation* of such vocality - may be central to the frontopolar cortex.

¹⁰ Barbas, 'Prefrontal pathways that control attention', 42.

¹¹ Barbas, 'Prefrontal pathways that control attention', 38 and 32.

Barbas says little about these matters here, except that the processes are motivational. As is so often the case, the sensory aspect of feeling is strangely omitted from the discussion, as if feeling proper is reduced to some mysterious inner 'mind stuff;' and the possibility that sound may contribute to it, is still beyond the imagination of most scholars. The element of prosody and tension and release in intonation may be covered by her concept of the 'symbolic representation needed to sequence information.' But to the extent that melodic experience is actually *contributing* to the emotional interactions and the feelings of thinking, it is more than a symbol of such sequences. It would probably be more correct to say that central parts of our selves are *constituted by melody* in these cases. At least this is true for many aspects of our character: the constitution of *dialects, tones, personal styles*, and not to forget: the question whether we are *singing* or *speaking*.

Perhaps the concept of 'representation' is justified by the fact that the dynamics of thought may also be 'represented' by other sensory modalities, such as kinaesthetic and tactile feedback. Yet it would still depend on such feedback for its existence; so its role is never purely 'symbolic'. Indeed, it is difficult to imagine how these streams may be thought to represent or symbolise something that did not even exist prior to their expression. The cingulate cortex, which is often involved in these processes, is hardly contributing any feeling by itself. For this it depends on other sensory media; and if Barbas is correct that sound is the most prominent sensory modality in the prefrontal cortex, it is more likely that the voice is partaking in the *constitution* of these feelings than merely 'representing' the other modalities. Certainly there is nothing preventing it from being heard - softly or deafeningly loud - and many of its products are not even paralleled in other sensory media. In fact, the seemingly infinite riches of emotional vocalisation, including *prosody, dialect, tone, song, singsong, or melodramatic intonation* - which are just a few examples of the different modalities of this dynamic - are often so different and unique to the medium of sound that it is hardly possible to understand them as a representations of something else.

Whether this makes the medium of sound more important to thought than the proprioceptive sensations is difficult to tell. Certainly the kinaesthetic sensations, the experience of raising ones eyebrows or wrinkling ones nose, are serving well even in the absence of sound. If not, deaf people would hardly be able to think or perceive themselves as thinking. The basic 'atonal' dynamic is still intact in deaf people; yet the experiences of tone, harmony, and melody are

denied them. While our imaginations of muscular tension may be stronger in some cases, and even serve as intensifying factors in multisensory amalgams of muscular effort and pitch, the sensations of sound are undoubtedly richer in other respects, especially in the domain of harmony. The sounds are also much more *explicit*, in the sense that the vibrations of which they are consisting are manifested not only in the oscillations of neuronal circuits within our brains, but also in the gaseous substance which is filling the spaces between us. To the extent that our mental capacities are moulded by an interactive process which is also *dialogical* and 'co-productive', this explicit character of sound might go a long way towards explaining its prevalence in executive circuits.

It is probably this that Helen Barbas is also thinking of when pointing to the advantage that sound is 'spatially unconstrained.'¹² It certainly liberates us from looking at each other all the time. Even when we are far apart or preoccupied with other things we can send out calls and warnings, which will immediately grasp the attention of our fellow creatures. Unlike a visual grimace or smile, the screaming and singing is implicit in the very screaming and singing, and it is not easy to close ones ears. In mono renditions, or when the intonations and songs are internally imagined, the experience may even transcend the sense of location altogether. It may not even be located to our vocal cords then. Much more so than any other sensations, it seems to exist beyond the dimensions of space, as if located to this empty core of ourself, which was also where Hegel was positing it. In fact, it would not be wrong to say that it is more 'interoceptive' then, than many of the interoceptions proper: the awareness of our intestines and other things that are going on out there, in the different body parts.

10.2 Cortical reverberations and rhythms

It is essential to stress that there are no conflicts between the above mentioned aspects of reality. The sensory modalities are not rivals; nor are the operations of signification and feeling precluding each other. A problem arises first when these phenomena are confused, and when some categories of reality are favoured at the expense of others. Especially *conation*, *feeling*, and the contributions of *sound* are often erased from the picture; and it is a paradox that it is often the

¹² Barbas, 'Prefrontal pathways that control attention', 31.

musicologists and even some musically oriented neuroscientists who have been the most eager exponents of such anti-aesthetic views.

Within the field of neuroscience one can for instance observe how people like Stefan Koelsch and Steven Brown have few objections to the reduction of musical experience to something relative or linguistic, like 'iconic signs' and syntax. Even if their experiments are often confirming the dominance of right hemisphere activation, which is hardly indicative of something linguistic, it is as if they can not imagine any other governing principles than those of semantics and syntax. It is not clear at first, whether they are talking metaphorically in these cases, or in a manner that is ignorant of the the standard definition of syntax. Typically syntax is consisting of conventional rules for the combination of words or signs for common categories like objects versus actions, specific versus abstract, female versus masculine, past versus future, in ways that are significative of what belongs to whom, who does what to whom and so on. Obviously this is hardly even remotely analogous to the organisation of melodic phrases.

The danger of category mistakes is acute, and sure enough: looking into Koelsch's 'review and updated model' from 2011, one is confronted with a bewildering amalgam of theories, many of which have only dubious empirical foundations. There is even an example in this article, of the identification of linguistic 'reference' with 'the combination of formal elements';¹³ as if the signification of meaning in language and the combination of musical elements were parallel phenomena, and as if the musical progressions were merely 'formal' in the absence of any extramusical meanings.

Koelsch's conceptions are clearly inspired by Leonard Meyer's *Emotion and Meaning in Music*, which was also endeavouring to introduce a relativistic component into a spatio-linguistic theoretical amalgam. But it is a model that gives little credit to the sensations of sound and harmony. Even less so than in Meyer's own book, which pointed to an abundance of immanent content, and even the need for 'musical mood gestures,' as he called it.¹⁴ Koelsch does little to pinpoint neither the essence of music nor its legendary power. If irregularity and surprise was the essence of music, which is hardly the case, then everything that was equally irregular and surprising would also be music, which is not the case at all.

¹³ Stefan Koelsch, 'Toward a neural basis of music perception - a review and updated model.' *Frontiers of Psychology*. Vol. 2 (9 June 2011): <https://doi.org/10.3389/fpsyg.2011.00110>.

¹⁴ Leonard B. Meyer, *Emotion and Meaning in Music* (Chicago and London: The University of Chicago Press, 1956), 268.

The issue is not that music is devoid of surprise and even irregularity in many cases. Certainly we get surprised, or rather bemused, when the expected moment of release in a cadence is displaced by a glaring dissonance, as in some of Koelsch' experiments; but there would be little surprise if there were no intrinsic differences between consonance and dissonance at all, or if cadences and resolutions did not have any functional meaning in the first place. Perhaps we might be startled by someone having changed their telephone number also, while going through a list of such numbers; but the startle would be bigger if someone were banging aggressively on our door. Without such qualia and behavioural functions - like the experience of extreme loudness, unpleasant noise, and the rhythmical insistence of someone banging away - we would never be able perceive these things, let alone muster any motivation for listening to it.

Certainly the interplay between loud and soft, noise and tone, dissonance and harmony, exist; and there is nothing precluding us from enjoying it. But it is as if these phenomena, and the rhetorical functions of which they are constituting a non-verbal and prosodic substrate, are repressed from the consciousness of many researchers; perhaps because they do not fit into the cybernetic and semiotic paradigms that were dominant during their study years. To suggest that we are rejoicing in the harmony of song, that we are evading this harmony during speech melody, or that we are narrating with a melodramatic tone of voice because this is an idiosyncratic feature of melodrama, is apparently still tabu in some circles.

Some of the phenomenological and 'epistemological' arguments against such views have already been mentioned; but there are also new empirical findings, or empirical findings of a new kind, that may serve to elucidate these matters. If it is not obvious that the sensations of sound are powerful enough to serve as a medium for feeling, the field of neurodynamics - which will be represented here by Edward W. Large - may very well end up turning these things on its head.

Not only is sensory information in the brain communicated by so called 'spike trains,' which, like sound, are consisting of rhythmical pulses; the different circuits in the brain are also synchronised and activated by means of collective oscillations at different frequency bands. An article from 2023, by Takako Fujioka and colleagues, is even talking of large scale patterns of 'standing waves' in the brain, which are also correlated with conscious experience. The origin of these waves is still unknown. Fujioka and colleagues are suggesting that *arteriole vibrations* might be involved; but the resemblance with resonance chambers and the reverberation of

musical instruments is striking.¹⁵ And it is precisely these similarities between neural and acoustic oscillation and resonance that may turn out to grant the phenomena of sound an even more direct access to the neural correlates of consciousness than some of the other sensory modalities.

The time scale of many of these neural oscillations and rhythms is similar to the time scale of music, and according to Large it is also possible to observe how the neural 'action potentials' and rhythms are phase-locked and entraining to the musical sounds and rhythms in different ways. 'The theoretical picture that emerges', says Large, 'is one of communication, through bursts of high-frequency activity, between different neural areas as they resonate to rhythmical patterns'¹⁶ At least it is possible to observe, in one of Large's studies, how the mere passive listening to periodic tonal rhythms is triggering periodic patterns of beta band activity in an extensive circuit of motor and premotor areas, involving also the striatum and the cerebellum; possibly reflecting 'the internal representation of the predictable time interval' between the tones.¹⁷

Whether musical rhythm is always associated with movement in an external and *bodily* sense is not clear, but the findings of Large and others leave little doubt about the fact that it is perceived in terms of *conscious activity*, which may be all that is needed, especially if it is combined with the other dynamic and sensory properties of sound. But there is also the possibility that it may trigger involvement of a more bodily character, perhaps via the so called 'mirror neuron system': our automatic propensity to internally simulate the actions and attitudes of other people. Especially the bodily sensations involved in vocalisation, breathing, and dancing are often engaged when listening to music.

Certainly there are powerful mechanisms involved here, making even infants rock and twist. Large is pointing to the startle reflex in this connection, as a possible precursor or instinctual component of this ability; but this does not explain the enjoyment of rhythmical regularity which is going into such involvement. It is not that regularity is difficult for for brain to conceive; the

¹⁵ Joana Cabral, Francisca F. Fernandes, and Noam Shemesh, 'Intrinsic macroscale oscillatory modes driving long range functional connectivity in female rat brains detected by ultrafast fMRI,' *Nature Communications*, Vol. 14, Article 375 (6 February 2023), <https://doi.org/10.1038/s41467-023-36025-x>.

¹⁶ Edward W. Large, 'Chapter 7: Neurodynamics of Music', in *Music Perception*, Springer Handbook of Auditory Research, ed. Mari Riess Jones, Richard R. Fay, and Arthur N. Popper, Vol. 36 (New York: Springer, 2010), 225., https://doi.org/10.1007/978-1-4419-6114-3_7.

¹⁷ Takako Fujioka, Laurel J. Trainor, Edward W. Large, Bernhard Ross, 'Internalized Timing of Isochronous Sounds Is Represented in Neuromagnetic Beta Oscillations.' *Journal of Neuroscience*. Volume 32, No. 5 (1 February 2012): 1795, <https://doi.org/10.1523/JNEUROSCI.4107-11.2012>.

nervous system is full of clocks and beats; it is just that such regularity seems to have little emotional relevance before it is related to some kind of higher level need for harmonious solace and social communion. Apparently some parrots, or other gifted animals, like some of the members of the famous *Thai elephant orchestra*, are also able to engage in rhythmical self-stimulation, and even catch on to the rhythmical patterns of music, getting a kick from listening to it, which seems to trigger their own rhythmical wiggling and banging; but their neural systems are not yet optimised for the collective synchronisation of such rhythms. It might not be wrong to call it *dancing*, but the level of cooperation and metacognition needed for the cultivation of these states is not very well developed.

Equally relevant, but not as well documented perhaps, is Large's theory of tonality and the phenomenon of *tonal attraction* in music. Even earlier theories, like those of Reinier Plomp¹⁸ and Ernst Terhardt,¹⁹ have provided partial explanations of this, by comparing it with the phenomenon of 'virtual pitch,' which is deriving from our ability to assign a certain pitch to complex tones, even in cases when the lower regions of the harmonic spectra are missing. In fact, these fundamental tones may even be generated by the hair cells in the ear, by a mechanism called 'otoacoustic emission', which is detectable by microphones and regularly used to test for hearing defects in newborn babies.²⁰ The reality of root perception should be obvious enough then, and even if other aspects of hearing may still be unclear, the phenomenon of tonal attraction may be better explained in terms of neural resonance than by purely computational mechanisms.

We are often talking about electrochemical pulses and harmonisations in this connection - at least this has been the prevailing model of neural communication - but there is also evidence of a type of sound-waves in nerves: so called 'solitons' or 'Heimburg-Jackson pulses', in nerve membranes and 'lipid controlled interfaces'.²¹ According to Thomas Heimburg and his colleagues at the Niels Bohr Institute, the soliton theory might be complementary to, or even a better model

¹⁸ Reinier Plomp, *Aspects of Tone Sensation, a Psychophysical Study* (London, New York, San Francisco: Academic Press, 1976), 140.

¹⁹ Ernst Terhardt, 'The Concept of Musical Consonance: A Link Between Music and Psychodynamics,' *Music Perception*, Vol 1, No 3 (Spring 1984): 276-295.

²⁰ D. T. Kemp, 'Stimulated acoustic emissions from within the human auditory system', *The Journal of the Acoustical Society of America*, Volume 64, Issue 5 (1. January 1978): 1386. <https://doi.org/10.1121/1.382104>.

²¹ Shamit Shrivastava and Matthias F. Schneider, 'Evidence for two-dimensional solitary sound waves in a lipid controlled interface and its implications for biological signalling,' *Journal of the Royal Society Interface*, Vol. 11, No. 97 (6. August 2014), <https://doi.org/10.1098/rsif.2014.0098>.

of neural communication than the well known Hodgkin-Huxley model, with its electrical pulses instigated via voltage-gated ion channels. On some occasions these electrical pulses have even been explained as secondary 'piezoelectric' effects. If the Hodgkin-Huxley model had been correct, these researchers have argued, there would be a dissipation of heat in nerves, which is not experimentally observed. By contrast, the soliton model is arguably explaining a number of observations, such as changes in the thickness of the nerve membranes during signal transmission, as well as the effect of anaesthetics, modifying the melting point, and thus the acoustic properties of lipid membranes.²² We seem to be faced with a hypothesis here, which is as radical as it is astounding from the point of view of music, that *the brain waves are partially explainable as sound waves*, and that the silencing of these sound waves is also putting consciousness to an end.

The understanding of neural communication, and the transductions between sonic, thermodynamic, and electrical pulses in the cochlea and elsewhere in the brain, is apparently still in its infancy, but it is a field that is rapidly growing now. Whereas in the spirit of poststructuralism many musicologist were eager to reduce the music to an indirect symbol of something else - be it visual, visceral or something 'purely relative' - it is often these other modalities which are explained in terms of sound and vibration now. Even aspects of taste and tactile sensation, not to mention some properties of matter and the space-time geometry, have been shown to be mediated by vibrations.²³ Szechuan pepper, for instance, is shown to be tingling at an average frequency of 50 cycles per second.²⁴

As for the experience of tonal attraction and gravitation towards roots, a particular advantage of this neurodynamic account, says Large, is the circumstance that the 'nonlinearity' of neural resonance, although it relies on simple integer ratios as 'attractors,' does not seem to require a precise calculation of these ratios. This has been a problem in other models, and has sometimes been mentioned by relativists as an argument against a universal acoustical foundation for music theory. But it is a controversy that may well be resolved now, by the circumstance that the

²² Revathi Appali, Ursula van Rienen, Thomas Heimburg, 'A Comparison of the Hodgkin-Huxley Model and the Soliton theory for the Action Potential in Nerves', Chapter Nine in *Advances in Planar Lipid Bilayers and Liposomes*, Volume 16 (2012):277 and 295, <https://doi.org/10.1016/B978-0-12-396534-9.00009-X>.

²³ See for instance Theodore A. Jacobson and Renaud Parentani, 'An Echo of Black Holes', *Scientific American*, Volume 293, No 6 (December 2005): 70-75. <https://doi.org/10.1038/scientificamerican0407-12sp>.

²⁴ Nobuhiro Hagura, Harry Barber, and Patrick Haggard, 'Food vibrations: Asian spice sets lips trembling', *Proceedings of the Royal Society of Biological Sciences*, Vol. 280, No. 1770 (7 November 2013). <https://doi.org/10.1098/rspb.2013.1680>.

resonances also establish patterns of 'resonant neighbourhoods,' producing a sense of attraction 'even if resonance centre frequencies do not precisely match.'²⁵

As should be well known, the frequencies hardly ever precisely match. Especially within the established system of 'equal temperament' this is seldom the case; so we are undoubtedly in need of some more refined theories here, accounting both for the stability and 'fuzziness' of roots and intervals and for their microtonal colouring and 'sourness', which is not fuzzy at all. The theory that Large is proposing may not have been fully proven, and the workings of auditory feeling and gestalt formation in the brain are obviously much more complex than anybody have hitherto been able to demonstrate; but if Large is correct, the mechanism of 'nonlinear resonance' is traceable in the auditory system 'all the way from the cochlea to the primary auditory cortex.'²⁶

It is a model that seems to give sound a much more concrete and powerful presence in the neural and emotional economy of the brain than has often been the case. Especially if the soliton model is correct, the medium of sound may be more fundamental and intrinsic to the language of the brain than are some other sensory modalities. The potential for emotional intensity and refinement in music is theoretically limitless in such a perspective, and restricted only by what is sensible and practical. As long as we are not suffering from synesthesia perhaps, it is not practical that sound should be putting us in states of severe pain. The amount of automatic visceral arousal would also have to be regulated. Certainly such arousal is triggered by sound and music. Carl Jung's troublesome hypersensitivity to music has already been mentioned, and it is not difficult to come up with similar examples - but it would be impractical, and all too easy to abuse, if we had no resistance whatsoever to its power.

It is also possible to observe how the earlier mentioned 'principle of actuality' is evoked by Large, by his insistence on the self-identity of auditory qualia with their neurodynamic constitution. At least this seems to be the case with phenomena like rhythm, harmony, the direction of tonal attraction, and the canceling out of such attraction by numerical equidistance in the tritone and other equidistant tonal combinations. Some of these dichotomies are even exemplifying the 'law of the excluded middle', that is to say: either the upper tone is the root, or the lower, or none; either the chord is pertaining to the harmonic series of the fundamental tone,

²⁵ Large, 'Neurodynamics of Music', 218.

²⁶ Edward W. Large, 'Musical Tonality, Neural Resonance and Hebbian Learning,' in C. Agon, E. Amior, M. Andreatta, G. Assayag, J. Bresson, J. Manderau Eds., *Mathematics and Computation in Music* (Berlin: Springer, 2011): 117-118.

or it is challenging it. Certainly these experiences need a physical correlate, which is self-identical with, and therefore universally tied to, the experienced effects. The experience of 'high' or 'low' pitch as isolated from ratio and interval is more relative to time perception in different animals; but the *alternation* between these transformations, the switching between increasing and decreasing frequency, is not relative or gradual at all: either it is increasing, or it is decreasing.

It is probably not entirely wrong then, to conclude, as Large is doing in the summary of the mentioned article, that 'in music, our experiences of fundamental universals, including pitch, tonality, and rhythm, can be readily conceived in relation to neurodynamic universals, including limit cycle oscillation, resonance, and rhythmic bursting.'²⁷

²⁷ Large, 'Neurodynamics of Music', 225.

Chapter 11

The Lateral Frontal Cortex

11.1 Melodic gestalt formation in pars opercularis and pars triangularis

It is uncertain whether the above upgrading of the status of auditory qualia is sufficient to alter the partly semiotic and relativistic conceptions of Koelsch and others. For this to occur it would probably have to be integrated in a total revamping of their theoretical framework, incorporating both the perspective of embodied cognition, ego-dynamic gestalt formation, and a recognition of the unique contributions of tone and harmony to our emotional lives. This is not to say that their empirical findings are not interesting and pointing in a correct direction. Especially Kolsch's attempt to pinpoint the neural correlates of some aspects of harmonic progressions is highly relevant, as it is focussing on the kind of dialectical reflection which is probably precisely what sets human music apart from that of animals.

More specifically, one of these studies of Koelsch and colleagues was investigating the effect of the Neapolitan subdominant chord, both when occurring at its normal position in time and when replacing a tonic triad at the end of cadences. Reasonably enough, given its acoustically remote relationship and incorporation of the dissonant minor second above the tonic, the illogical location of the Neapolitan chord to the moment of expected resolution and conclusion was productive of a certain surprise or sense of bewilderment in the listeners, magnetoencephalographically registered as a distinct so called 'magnetic early right anterior negativity'. When occurring at its 'normal' position, as a subdominant, the reaction to the Neapolitan chord was much weaker. In both cases, however, the effects were located to *pars opercularis* (BA44), with a right hemisphere weighting in four of the six subjects.¹

The findings are in tune with the previous discussions of action chunking and attitudinal reorientation located to this area; yet it is not as high up in the 'action-hierarchy' as could be

¹ Burkhard Maess, Stefan Koelsch, Thomas C Gunter, and Angela D. Friederici, 'Musical syntax is processed in Broca's area: An MEG study.' *Nature neuroscience*, Vol. 4, No. 5 (May 2001):540-545. <https://doi.org/10.1038/87502>.

excepted, given the fact that harmonic progressions are uniquely human phenomena, which are also instantiating the kind of question-answer dialectic which has earlier been associated with the lateral frontopolar cortex.

There may be several ways to explain this. A positivistic impulse might be to conclude that no higher areas are required, and that Brodmann area 44 is indeed the neural substrate of musical organisation or 'syntax', as the authors prefer to call it; but this would have to stand up to other studies, which, as we will come back to below, are highlighting the role of more rostral areas, especially the so called *pars orbitalis* (Brodmann area 47), but also the frontopolar BA10.

A more perspectival interpretation would be that, given that the mentioned study is also technically sound, the findings may be recognised as valid, but limited to some basic perceptual mechanisms that were strongly activated in this experiment.² The neural activity correlating with the experience of 'inappropriate chords' may well be strong, but this does not imply that this experience of 'inappropriateness' is an essential component of 'appropriate' musical perception. And if aspects of ordinary music are occurring below the baseline of this study, one could not rule out the possibility that there is activity at higher levels as well. In any case: what is studied in this experiment is merely a collection of isolated fragments or cadences. The perceptual task of comprehending these gestalts may be complex enough, and there are many indications that it may be performed in BA44; but if it does not also involve a certain engrossment in the ongoing activity, a sense of the emotional purpose of what is going on, it might not even qualify as music.

Certainly such higher level involvement and sense of meaning was crucial to the *evolution* of this kind of behaviour, but it is not necessarily required for the perception of its constituents. As we have earlier seen, it is not that animals are totally unable to imitate and react to the questions and songs of human beings; they simply do not have the metacognitive resources, and the existential perspective, to understand the context within which it is generated. Even humans, when unfamiliar with a certain style or type of music, may experience this; and it is first when the overall purpose or gist of the activity is also grasped that it starts to get an ontologically meaningful status.

² It is not clear whether it is an issue that is relevant to Koelsch' study, but it has been a problem in magnetoencephalography that signals may occasionally average to zero when oscillating between positive and negative deflections. Especially this has been the case in so called 'gamma oscillations' (between 25 and 100 Herz), which have been associated with complex stimuli processing in gestalt formation. See Ingrid S Johnsrude and Olaf Hauk, Chapter 14, 'Neuroimaging', in Nick Braisby and Angus Gellatly, ed., *Cognitive Psychology*, Second edition. (Oxford: Oxford university Press, 2012.): 435.

It is a recognition that seems to be shared by more and more researchers within this field, that experiments should try to reconstruct a level of complexity which is not only *necessary*, but also *sufficient* to the phenomena under discussion, evoking instances of 'real music', at the same time as it is limited to the bare essentials of such experience. Even the above mentioned study may satisfy some of these requirements, as it is limiting itself to ordinary people with little or no musical education. However, it is still too fragmented and passive to count as real or realistic music.

It is a deficiency that is remedied to a certain extent by a study by Steven Brown and colleagues. At least the musical context was slightly larger in this case, and the subjects much more active. Employing the technique of 'positron emission tomography' (PET), the study was aiming to compare the generation of 'language and music,' asking subjects to improvise the second half of either spoken phrases or 'digitised piano tunes', the latter of which were taking the form of half closes or incomplete cadences.³

Except for the issues of lateralisation, and fact that the spoken phrases were predominantly activating the left hemisphere, the activity patterns were very similar in the two cases, with core areas for melody generation in the right BA44, left BA45, as well as important motor and premotor areas like BA6 and the so called pre-supplementary motor area (pre-SMA). Besides these prefrontal structures there was also activation in regions like the bilateral temporal planum polare, the anterior insula, putamen, globus pallidus, caudate nucleus, the ventral thalamus, midbrain, pons, and the posterior cerebellum. Parieto-occipital areas, often connected with visuospatial and bodily mapping, were found to be largely deactivated in the performance of these tasks.

In other words: the activation was slightly higher up in the 'action hierarchy' in this study, incorporating also *pars triangularis* (BA45) and the boarder areas between BA45 and BA47, which is also to be expected, given the difficulty and more elaborate character of the task. The degree to which the left hemisphere, and BA45 in particular, was also activated by the wordless melodies, is more surprising. It might be seen to reflect a bi-hemispheric activation pattern in music. But this is a problem that is complicated by the fact that Brown's subjects were amateur musicians, with a considerable amount of musical schooling. As Brown is mentioning himself,

³ Steven Brown et al., 'Music and language side by side in the brain: a PET study of the generation of melodies and sentences', *European Journal of Neuroscience*, Vol. 23, No. 10 (May 2006): 2791-2803, <https://doi.org/10.1111/j.1460-9568.2006.04785.x>.

there is often much more bihemispheric activation in musicians, possibly because they are also activating a technical approach to the performance.⁴ It is also reasonable to speculate whether the experimental situation - lying supine in a PET scanner - might have contributed to a certain detachment. An experimental setting is not necessarily advantageous to creative musical expression, if it is not actively tweaked in this direction by the researchers incorporating it in some kind of playful interplay or larger musical context. Perhaps the sense of high level involvement in melody generation might have been stronger, and more right hemisphere dominant, if the sung melodies had also been supplied with words. Even the sense of emotional purport might have been clearer to the subjects then.

It is also important to bear in mind that this study was limited to the task of *answering* or *completing* phrases; which is not necessarily among the most creative or demanding mental capabilities. As was noted in the chapters on animal vocalisation, there are many indications that the task of *questioning* is cognitively and emotionally more demanding, since it is requiring the subject to construct a hypothesis, to anticipate an answer, and generate instances of cognitive dissonance which may not seem very advantageous or pleasurable from an immediate point of view. It is a crucial difference, which has been proposed, by musicologist like Joseph Jordania, as a distinguishing mark of human music and vocalisation. And it could easily have been targeted even in Brown's study, if the experimental setup had be slightly changed. Once the subjects had been familiarised with the procedure, they could have been asked to improvise the first, more questioning, parts of the melodies as well. It is a task that might even have triggered a greater sense of involvement in the subjects, setting the conditions for a real interaction among the participants. Moreover, the experiment might have been expanded to include a sense of development and dramaturgy as well, which is undoubtedly a central aspect of music and musical interaction. One could only speculate which areas of the brain would have been activated in this case. The rostromedial BA10 has already been suggested.

Another, and much more serious problem with Brown's study, is its confusion of language with speech. Since speech is also containing some musical and melodic components, what the study is in effect investigating is the difference between ordinary 'atonal' prosody and tonal prosody, in a setup where only one of these melodic modalities was supplied with words. If his

⁴ Kentaro Ono, Akinori Nakamura, Kenji Yoshiyama, et al., 'The effect of musical experience on hemispheric lateralization in musical feature processing', *Neuroscience Letters*, Vol. 496, Issue 2 (1 June 2011): 141-145. <https://doi.org/10.1016/j.neulet.2011.04.002>.

intention was really to pinpoint the difference between music and language, he would have to strip the language of all its musical and aesthetic attributes, which is easier said than done. Even written words are necessarily evoking many aspects of rhythm, tone, visual aesthetics and so on. Then, as a next step in the distillation of some purely *linguistic* functions, the operation of *signifying* would have to be dissociated from what is signified, which is still beyond the imagination of most researchers.

An approximation to some of these conditions is nevertheless provided by another PET study, by G.M. Schulz and colleagues, in an experiment comparing voiced and whispered storytelling. Even if the focus is not on song or tonal melody here, it highlights in a much clearer way the impact of voice and prosody on the human brain. In fact, the activation patterns in Schulz' study are considerably different from that of Brown, which is speaking volumes about the importance of proper study designs.

While the motor demands were apparently higher in the case of whispering, activating larger parts of the motor cortex, the activity in some other, more frontal and temporal regions of the brain were significantly higher in the case of vocalisation. According to Schulz, many of these areas were 'functionally coupled' to subcortical activity in the periaqueductal grey (PAG), a primeval centre for instinctual vocalisation, which was still active, but only in the case of voiced speech. Certainly the Broca's area was activated in both cases, but more ventrally in the case of voiced speech, which is also reasonable, given the higher degree of valence in voiced speech, and the proximity of these ventral regions to the visceromotor insular cortex.

The anterior medial temporal gyrus, and the posterior superior temporal sulcus were also more active in voiced speech, making Schulz speculate whether it plays a role in the 'self-monitoring of one's own voice'.⁵ More interesting yet, and possibly a better candidate for such monitoring, was the activation of the anterior cingulate cortex - BA24 and BA32 - and the contiguous medial prefrontal cortex - BA8, 9, and 10, which also seemed to incorporate the mentioned frontopolar cortex here (See Figure 1 in Schulz' article). These are areas which have often been associated with aspects of volitional focus and effort, and in the case of the dorsomedial prefrontal cortex: the monitoring of mental states. It was 'robustly' activated in voiced, but not in whispered speech, which is giving an indication at least, that it is first of all the

⁵ G.M. Schulz, M. Varga, K. Jeffries, C. L. Ludlow, A. R. Braun, 'Functional Neuroanatomy of Human Vocalization: An H215O PET Study,' *Cerebral Cortex* .Vol. 15, Issue 12 (December 2005): 1835-1847. <https://doi.org/10.1093/cercor/bhi061>.

musical aspects of speech - the contributions of voice, tone, and intonation - that are monitored in these regions. From a one-sided semiotic point of view - which is the position of many modern scholars - the addition of tone should not make any principal difference; but it does; and it is a finding that speaks strongly in favour of its immanent, aesthetic qualities.

11.2 Drama and revaluation in *pars orbitalis*

The above mentioned article by Schulz also singled out a lateral region that was particularly responsive to the sensations of tone: the *pars orbitalis* or Brodmann area 47. Like the medial regions of the frontal cortex, it was more active in voiced than in whispered speech - in this case even with a slight right hemisphere dominance (see Table 1 in Schulz' article) - all of which is suggestive of a more emotional or ego-dynamic role for this area, rather than some kind of semantic-syntactic rule-making. If this had been its primary function, the activation would probably have been equally strong while whispering. Furthermore, the area is located right in front of BA 45, so it is probably even higher up in the action hierarchy. It was connected with the vocal aspects of *autobiographic narration* in Schulz' study, which is incorporating precisely the kind of contextual complexity and higher level involvement that seemed to be lacking in the previously mentioned studies.

As regards the level of involvement, it is apparently related to another important feature of Brodmann area 47: the fact that it is also stretching beneath the prefrontal brain. Thus it is also forming a part of the so called *orbitofrontal cortex*, which is often associated with a monitoring of more visceral and autonomic aspects of emotion, in conjunction with the behavioural appraisals in the lateral prefrontal cortex. The connections with the limbic system are very strong in the orbitofrontal cortex. In fact, it is sometimes reckoned to be a part of it. More specifically it is often suggested that 'the OFC has a specific role in monitoring the reward values of stimuli and responses so that reward value can be used to choose appropriate actions in a flexible and purposeful manner, particularly in situations of novelty and uncertainty,'⁶ which is also the essence of Damasio's 'somatic marker' hypothesis.⁷

⁶ Rebecca Elliott, Raymond J. Dolan, and Chris D. Frith, 'Dissociable Functions in the Medial and Lateral Orbitofrontal Cortex: Evidence from human Neuroimaging Studies', *Cerebral Cortex*, Vol. 10, Issue 3 (1 March 2000): 308-317. <https://doi.org/10.1093/cercor/10.3.308>.

⁷ See for instance Antoine Bechara, Hanna Damasio, Antonio Damasio, 'Emotion, Decision Making and the Orbitofrontal Cortex', *Cerebral Cortex*, Vol. 10, Issue 3 (1 March 2000): 295-307. <https://doi.org/10.1093/cercor/10.3.295>.

This is how Rebecca Elliott and colleagues are formulating it, and one should not forget that what is described here - a system for the updating of reward values in situations of novelty and uncertainty - is a central aspect of the content and even *raison d'être* of consciousness: the reason why we are conscious and not purely automatic. Some of its higher level products are better known as *conscience* and *intuition*; in fact, the orbitofrontal cortex seems to be a necessary substrate for such emotions, putting the shame into shamefulness, and the sense of goodness into what is considered good, promising, and right. Like the action schemes, these are feelings that would have to be automatically activated to play any role in ongoing behaviour. Being part of changing social and autobiographic processes, however, they would also have to be apperceived or monitored as such; if not, they might just as well have remained in more primitive regions of the limbic system. Yet they are seldom subjected to 'transcendental apperception' or to consciousness in any intellectual sense.

Anyway, it is the *lateral* parts of the orbitofrontal cortex - including the *pars orbitalis* or BA 47 - that is usually seen to provide the *inhibitory control* of such feelings. Or to be more precise: it is rather the *actions* or action tendencies connected with these feelings that are inhibited here. Especially, says Elliott, this would be the case in 'unpredictable situations', when a 'suppression of previously rewarded responses' is called for. Elliot is opposing these situations of unpredictability to 'normal situations,' driven by 'rational reasons,' as she puts it; which does not seem very reasonable from a phenomenological point of view. All reasons are necessarily motivated to some extent, and the different activation patterns might just as well be due to the opposite reason, that in 'normal' cases, when we are on autopilot to a higher extent, the motivations are secured by lower, more limbic structures like the amygdala, which do not require the same amount of imagination and awareness.

It is probably this combination of visceral imagination and high level 'action chunking' that is performed by *pars orbitalis*, forming thus the composite content of a certain class of emotions and values. Examples of urges that have been found to be suppressed in BA47 are *angry faces*,⁸

⁸ Elliott, 'Dissociable Functions in the Medial and Lateral Orbitofrontal Cortex', the section on 'Response to Angry Faces'.

sadness,⁹ aggression, and belief bias.¹⁰ Studies on stuttering have also shown that it is involved in the maintenance of vocal fluency,¹¹ which, it is reasonable to speculate, may not be unaffected by impulses of uncertainty which have also to be held in check. As demonstrated by phenomena like laughter, crying, nervousness, and depression, our voices are intimate manifestations even of our subconscious impulses and dispositions, and it is not surprising that the lateral orbitofrontal cortex, and BA47 in particular, is found to be central, or even crucial, to the control of voice and affective prosody. The above mentioned study by Schulz is one example of this, another is provided by Michel Belyk and Steven Brown.¹²

The findings are intriguing, but also problematic from the point of view of music and the self. It is intriguing, because it provides such a concrete correlate for many Freudian concepts - *repression, suppression, dissociation, sublimation*. It might not be a sufficient correlate for the kind of total repression that is often associated with psychoanalytic theory, but it is undoubtedly central to the mediation between subconscious values and actions.¹³ And to the extent that music is also activating these areas, it would provide a very concrete link between these fields. Even the concept of 'psychodynamics', with its allusions to the psychoanalytic tradition, might be easier to apply then.

The problem is just that many of the main ingredients of Freudian metapsychology - the emphasis on libido and social emotions like shame and guilt - are far too material, long-range, and spatially mediated to organise a purely dynamic stream of sounds. The experience of music is first of all a local and prosodic dynamic. And as far as we are dealing with melodies, tunes,

⁹ Johanne Levesque, Fanny Eugène, Yves Joanette, Vincent Paquette et al., 'Neural circuitry underlying voluntary suppression of sadness', *Biological Psychiatry*, Volume 53, Issue 6 (15 March 2003):502-510, [https://doi.org/10.1016/S0006-3223\(02\)01817-6](https://doi.org/10.1016/S0006-3223(02)01817-6).

¹⁰ Christine I. Hooker and Robert T. Knight, 'The role of lateral orbitofrontal cortex in the inhibitory control of emotion,' Chapter 12 in David Zald and Scott Rauch, eds., *The Orbitofrontal Cortex* (Oxford University Press, 2006):317 and 319.

¹¹ It should also be noted that in the right orbitofrontal and inferior frontal cortices, as well as in the sensorimotor and auditory areas bilaterally, there was found 'significant extra activation.' Sowman, Paul F., Stephen Crain, Elisabeth Harrison, Blake W. Johnson, 'Reduced activation of left orbitofrontal cortex precedes blocked vocalization: a magnetoencephalographic study,' *Journal of Fluency Disorders*, Vol. 37, Issue 4 (December 2012):359-65, <http://dx.doi.org/10.1016/j.jfludis.2012.05.001>.

¹² Michel and Steven Brown, 'Perception of affective and linguistic prosody: an ALE meta-analysis of neuroimaging studies', *Social Cognitive and Affective Neuroscience*, Vol. 9, Issue 9 (September 2014): 1395-1403. <https://doi.org/10.1093/scan/nst124>.

¹³ Robin L. Carlhart-Harris, Helen S. Mayberg, Andrea L. Malizia and David Nutt, 'Mourning and melancholia revisited: correspondences between principles of Freudian metapsychology and empirical findings in neuropsychiatry,' *Annals of General Psychiatry*, Volume 7, Article 9 (24 July 2008): <https://doi.org/10.1186/1744-859X-7-9>.

and intonation patterns in general, these entities are also in need a certain suprasegmental coherence and autonomy to distinguish the experience of the active self from the chaotic sequence of extrinsic motivations and associations which are also impinging on our lives.

Like in the Freudian 'object cathexis' there is an element of arbitrariness in the somatic marker hypothesis; which is not wrong, it is just too narrow and external to account for emotional processes in general. If conditioning was all there was to our emotional lives, there would be little left neither of music nor the autonomous self, but a simple organism driven from situation to situation. This alternation between stimuli and conditioned responses is apparently a favoured model of biologists, which may also be filtering and steering their research to some extent. The answers one gets are limited by the questions one asks, and the phenomenological perspective of biologists is seldom proportional to their mastery of neuroanatomical detail. Without claiming that Helen Barbas is particularly guilty of this, the example she uses to illustrate the emotional processes that are mediated by the orbitofrontal cortex: man hearing sound - fearing bear - seeing fawn - calming down, is very rudimentary.¹⁴ It might not require a prefrontal cortex at all. The reptilian brain might well suffice.

Even the reptilian brain is flexible and able to adapt to new situations to some extent, but this may not be sufficient for what we usually call emotion. What the prefrontal cortex is also adding is an ability to imagine and plan our own actions and interactions, and it is first in this social and personal perspective that most of what we refer to as emotions seem to emerge. The consciousness and degrees freedom that are provided by the prefrontal cortex are different aspects of the same phenomenon, as it is enabling us to mould our own character, our favoured strategies, our ways of dealing with moods and even visceral arousal to some extent; which is exactly the autonomy that is driven to its high point in art, drama, rhetoric, and music. Rather than being bound up with external events, the governing principles of these activities - which have been described in detail in previous chapters - are first of all posited *against* them.

Certainly the interoceptive aspects of our lives are also difficult to control. In some cases of headache or nausea they may not be controllable at all. Thus they belong neither to the self nor the field of emotions. In other cases the visceral responses may be conditioned by earlier experiences, but there are also cases where the interoceptive sensations may be hardwired with,

¹⁴ Helen Barbas, 'Flow of information for emotions through temporal and orbitofrontal pathways,' *Journal of Anatomy*, Vol. 211, No. 2 (September 2007): 237-239. <https://doi.org/10.1111/j.1469-7580.2007.00777.x>.

following from, or even overlapping with the volitional aspects of emotion. Smiling is a possible example of this, as it seems to trigger some kind of visceral response, which is very difficult to re-wire. Dancing and singing are other activities that may be intrinsically related to or overlapping with certain visceral feelings. Both sound, warmth, and many aspects of touch, are produced by mechanical vibrations and integrated in different parts of the insular cortex.

Especially in play or sport it is relatively obvious how the autonomic excitations, the changes in pulse and respiration, are following directly from the activity. It is not merely attached to the activity as a conditioned association or 'marker'. And when it comes to the control of this excitement - putting in rests and modulations of tempo and effort - it is not an associative or symbolic play; rather we are dealing directly with the activation of visceral feelings here.

Music is similar to sport in this way; it is also incorporating activity, weariness, and resting, as well as concord, discord, tension and release. Like sport, music is also regulating the autonomic involvement to some extent. In fact, it is one of our most effective mood regulators. Some of the autonomic responses to music are purely subjective and irrelevant to the study of music as such; some are 'relative', but loosely controlled by the contrasts and surprises in a piece. In other cases the bodily sounding board may be resonating more directly with the emotional content and aesthetic charm of the music, or it may be a direct consequence or entrainment to the perceptual events, like when the pulse is increasing as a consequence of increasing musical pulse and loudness. In the case of harmony, noise, and loudness, the visceral reverberations might even be hardwired to or overlapping with the auditory sensations in different respects, even as physical vibrations in the body and the brain.¹⁵ As in physical exercise and play, these excitations and relaxations do not need to be 'markers' of anything beyond its own enjoyment; but we might well need the *pars orbitalis* to control them.

The orbitofrontal cortex is a multifaceted region, and our understanding of it is still in its infancy. Its function might well be wider than what is posited by the somatic marker hypothesis. Perhaps it might be better explained as dealing with the conceptual integration of all kinds of reward values, whether they are naturally connected or more loosely associated with the sensorimotor and behavioural processes. At least the lateral parts of the orbitofrontal cortex,

¹⁵ Cases of musical anhedonia seem to confirm the existence of such connections. See for instance Noelia Martínez-Molina, Ernest Mas-Herrero, Antonio Rodríguez-Fornells, and Josep Marco-Pallarés, 'Neural correlates of specific musical anhedonia,' *PNAS*. Vol. 113, No. 46 (31 October 2016): E7337-E7345. <https://doi.org/10.1073/pnas.1611211113>.

which are also neighbouring the anterior insular cortex - may do more than altering conditioned responses: it may be responsible for the juggling of visceral feelings and viscerally driven action in general.

This is not to say that the connection between vocal and visceral regions is unique to pars orbitalis. Even the posterior regions of the ventrolateral frontal cortex - pars opercularis and pars triangularis (BA44 and BA45, also called the Broca's area and its right hemisphere homologue) - have such connections, as they are neighbouring, or even overlapping with both the orbitofrontal cortex and the anterior insula.¹⁶ It seems to be a prevailing view now, that the *anterior insula* is very much the core hub for visceromotor integration as well as integration between visceromotor and more exteroceptive sensations. The connection between visceromotor integration, vocalisation, and action planning in the frontal operculum, is very tight then, and very much in tune with the descriptions of William James.¹⁷ The consciousness of effort and release in thought is incorporating both the respiratory system, the whole vocal apparatus, as well as the auditory sensations of which it is productive. When we furthermore observe how this opercular region is also reckoned a part of the so called *cingulo-opercular network*, engaging also the cingulate cortex, often associated with the reinforcement of will and attentional focus, the picture that was sketched out by James becomes very concrete indeed.

This network may not be a sufficient emotional correlate of the kind of intellectual reasoning which James was talking about, but it provides a basis for it, which is present even in animal behaviour and vocalisation. Not even BA47 may be said to be metacognitive or intellectual in the sense of accounting for the dynamics of hypothetical reasoning. Even in the orbitofrontal cortex there are more frontal regions, like BA11, which have proven significant in studies of intuitive sentence completion, hypothesis testing, and story comprehension. According to Rebecca Elliott, this anterior region of the orbitofrontal cortex is also connected to a higher extent with the dorsolateral prefrontal cortex,¹⁸ which, one might add, is even higher up in the hierarchy of contextual apperception and 'creative synthesis' of emotional compounds. Nevertheless, the BA47 might be seen to be higher in the action hierarchy than BA44 and 45,

¹⁶ See Elliott, 'Dissociable Functions in the Medial and Lateral Orbitofrontal Cortex',

¹⁷ A bilateral damage in the frontal operculum is grave, as it is typically eradicating both the ability to vocalize, swallow, and control the tongue. See for instance Aysel Milanlioglu et al., 'Ischemic Bilateral Opercular syndrome', *Case Reports in Medicine*, Article ID 513572 (18 February 2013). <https://doi.org/10.1155/2013/513572>.

¹⁸ See Elliott, 'Dissociable Functions in the Medial and Lateral Orbitofrontal Cortex', the section on the 'Connectivity of the OFC'.

providing at least a nesting of attitudinal relations, and a formation of higher level prosodic and rhetorical gestalts. The amount of temporal mediation is obviously higher in rhetorical interaction, which is putting a considerably higher demand on the monitoring of the autonomic feelings that are also involved.

As earlier remarked, there is a considerable amount of reflexivity and emotional complexity already at the basic level of tonal music. The sense of *harmony* established by the harmonic spectrum is strong, but unbearable in its stasis and lack of dynamic impetus. It is an intrinsic quality, which might have to be reinforced by visceral resonance to be experienced as a pervasive centre of repose. No less immanent, and correspondingly confusing in its emotional orientation, is the *challenging* of this harmony by a related but harmonically *deflective* harmonic spectrum, especially the subdominant or fourth. If it is not quickly replaced or suppressed it would make the tonic into a dominant. The dominant proper is preventing this deflection by bringing the progression within the providence of the still remembered tonic spectrum, setting up a 'promise' or *hope* of return, which may still be fraught with uncertainty and anticipatory tension. When supplied with the characteristic tension of a minor ninth or other dissonant alterations it may be a manifestation of intense romantic *longing*, typical of romantic music. Furthermore, this expectancy or urge towards resolution may be inhibited by postponing it or by staging a 'disappointing' return to the closely related but slightly melancholy tonic submediant; or it may be partly resolved, by a so called imperfect cadence, preparing the ground for much more complex and long-range discourse.

These are some of the attitudes and higher level emotional gestalts that are constituting the basic organisation of the tonal rhetoric. We are talking about specifically tonal emotions here, which are nevertheless covered by some general emotion concepts; and in the case of romantic longing this is a concept that has been connected with music all along. In some historical accounts, the origin of this phenomenon is even set to the age of the medieval troubadours and their love songs. The heydays or romance in late eighteenth century romanticism and onwards are if possible even more strongly connected with music. So in many ways, these feelings, or at least a particularly fruitful realm of such feelings, might be seen to be *produced* here, in the music itself.

Whether these tonal and harmonic feelings require visceral resonance, or whether they are strong enough in themselves even as 'reward values', the chords or local tonal centres have to be

established and kept 'resounding' in memory, in a manner which makes it possible to monitor them and combine them as differentiated functions in higher level harmonic progressions as well; which may put a considerably higher demand on our cognitive and affective capabilities than the perception of melodic activity which is merely taking place *within* the individual chords or spectra. It has not yet been subjected to scientific research whether *modal* harmony is different from more dialectical harmony in this respect, but even modal music is based on a such a dialectic, if only melodically; and there are lesion studies indicating that BA47 is essential to the perception of these matters. In a famous study by Petr Janata, aspects of harmonic modulation - the experience of changing keys - were located to the *dorsomedial* prefrontal cortex, which is a midline structure often connected with the apperception of personal character and emotive memories; but even in this study the 'rostral inferior frontal sulcus' (BA45, 46, and 47) 'extending to the lateral orbital gyrus', was found to be of crucial importance.¹⁹ This we will come back to in the following chapters. But let us first take a look at some other imaging studies focussing on the role of B 47 in music.

Some very concrete examples of BA47 activation in music are provided by Peter Vuust and colleagues, in a series of fMRI studies of the experience of *polyrhythm*. One of these studies was focussing on the maintenance of steady pulse while being exposed to polyrhythmic music. A later study focused on the *active generation* of polyrhythm by musicians, tapping with the right index finger while listening to rhythmically regular music.²⁰ In the first study the increased activation of BA47 was found to be bilateral, while in the case of active generation it was found to activate especially the left hemisphere pars orbitalis. The reasons for this discrepancy are not clear, but it is tempting to speculate whether this latter task might have been more 'technical' than the former task, where the polyrhythms were integrated in the musical discourse. It might have been experienced as less of a musically motivated activity than as a technical challenge. To create the illusion of two competing pulses, musicians are typically superposing a prescribed sequence of note values on the main meter; a technique that might involve both counting and the

¹⁹ Petr Janata, 'The Neural Architecture of Music Evoked Autobiographical Memories, *Cerebral Cortex*. Vol. 19, Issue 11 (November 2009): Figure 5. <https://doi.org/10.1093/cercor/bhp008>.

²⁰ Peter Vuust, Mikkel Wallentin, Kim Mouridsen, Leif Østergaard, Andreas Roepstorff, 'Tapping polyrhythms in music activates language areas,' *Neuroscience Letters*, Vol. 494 (2011): 211-216. <https://doi.org/10.1016/j.neulet.2011.03.015>.

visual imagination of musical notation. It is supposed to result in the impression of two independent pulses, although it is not necessary to perceive both of these pulses at the same time.

Since in this experiment the meter of the background music was 4/4, against which a competing 4/4 meter was distributed over 3 of its beats, it does not even seem plausible what the researchers indicate, that the experience might have vacillated between waltz and march here, like in the famous Rubin's vase. It might easily have done this in a different setup, but it is difficult to see how it is happening in the given study, where both of the meters were 4/4. Yet the task of maintaining an even counter pulse against a dominant reference pulse has apparently created a tension or sense of wavering between competing pulses in the subjects, and it is no wonder that two clusters of voxels in the right anterior or anterior middle cingulate cortex (BA 32), which has been associated with cognitive attention and conflict driven volition, were also highlighted.

Whether some *visceromotor* activity is also intrinsic to the experience of pulse - involving also a need for visceromotor suppression when the attention is shifting between competing pulses - is unclear, but it would not be very surprising if the compelling and uniquely restful experience of groove, swing, and rhythmical regularity was also visceral to some extent. Like tonal harmony, the experience of rhythmical regularity is more than a habit or 'formal property', as the formalists and relativists are often putting it. We are dealing with intrinsically harmonious phenomena here, with a capability of entraining and harmonising not only the different parts of a human body or brain, but a collection of humans as well, as in tribes, armies, or arenas.

Vuust says nothing about medial orbitofrontal or insular cortex activation here, as a potential basis for the nesting of visceromotor rhythmical experiences in BA47. The highlighting of different regions in such studies is probably affected both by interest, by technical limitations, and what a certain activity is contrasted with in different studies. At least there are several other studies registering activity in the mentioned regions during rhythmical regularity and irregularity.

In a fMRI study by Grahn and Rowe, for instance, the experience of regular pulse or 'beat' was compared with irregular, 'jittered' rhythms without a pulse. The experience of rhythmical regularity was found to trigger peaks of activation in several premotor and cingulate regions but also in bilateral medial orbitofrontal and frontopolar Brodmann areas 10 and 11, which, as mentioned above, might be connected with the monitoring of higher level reward values and 'gut

feelings'.²¹ A *core area* for the maintenance of rhythmical regularity, however, was detected in the bilateral putamen in the basal ganglia, which is engaged especially in habitual behaviour and the automated performance of movement sequences. Interestingly, the putamen activity was connected first of all with the *maintenance* and possibly 'internal generation' of the pulse, especially when the rhythms were also repeated; it was not particularly active when detecting or adjusting to the beats.

In the case of non-beat 'jittered' sequences the pattern was different, with peaks in the *right frontal operculum* - which is partially in tune with Vuust's findings - and in the cerebellum, the right parietal cortex, and the anterior insula. Something similar also happened during tempo changes, engaging even the right BA47. We are obviously dealing with phenomenally distinct experiences here. While the experience of rhythmical regularity is pleasurable, linear, and possibly more left hemisphere, the experience of irregularity - at least when regularity is actively sought for and contrasted with irregularity, as in this study - seems to be connected more with the juggling of conflicting behaviour and visceromotor involvement in the ventrolateral prefrontal cortex. This was also the conclusion of a similar fMRI study by Monika Jungblut and colleagues, that 'only irregular groupings making the highest demands on attention, working memory, and sequencing capabilities resulted in additional activation of pars orbitalis and insula more distinct in the left hemisphere, as well as bilateral cingulate gyrus, and parietal lobes.'²²

It seems to be a general pattern in such studies that the insular cortex, especially in the right hemisphere, is connected more with conflict and distress than harmony. So also in tinnitus related distress, which was the subject matter in an EEG study by Sven Vanneste and Dirk De Ridder. More specifically this study was focussing on the control of *heart rate variability* during tinnitus induced distress, which may also be relevant to the discussion of auditory and rhythmical experience in general. According to Vanneste and De Ridder, the amount of distress is correlating with an 'EEG alpha network', engaging both the insula, the amygdala, the parahippocampus, and the anterior cingulate cortex.²³ Especially, they say, the anterior insular

²¹ Jessica A. Grahn and James B. Rowe, 'Finding and Feeling the Musical Beat: Striatal Dissociations between Detection and Prediction of Regularity'. *Cerebral Cortex*. Vol. 23, Issue 4 (April 2013):Table 2 and Figure 3. <https://doi.org/10.1093/cercor/bhs083>. Oxford Journals.

²² Monika Jungblut, Walter Huber, Monika Pustleniak, Ralph Schnitker, 'The impact of rhythm complexity on brain activation during simple singing: an event-related fMRI study,' *Restorative Neurology and Neuroscience*. Vol. 30, Issue 1 (2012):39-53. <https://doi.org/10.3233/RNN-2011-0619>.

²³ Sven Vanneste and Dirk De Ridder, 'Brain Areas Controlling Heart Rate Variability in Tinnitus-Related Distress,' *PLoS One*. Vol. 8, No 3 (22 Mars 2013): e59728. <https://doi.org/10.1371/journal.pone.0059728>.

and dorsal anterior cingulate cortices are 'important in the central control of heart rate variability in tinnitus patients', and they are pointing to research which is indicating that activity in these regions is also correlating with the conscious awareness both of pain and sound.²⁴

They even found reason to conclude that 'the right insula controls sympathetic activity' - often associated with fight-or-flight responses - whereas 'the left insula controls the parasympathetic activity' - promoting bodily calm - so that an *increase* in right insula or a *decrease* in left insula would go together with an increase in distress. The finding is corroborated by several other lesion and electrical stimulation studies, they say, which, if is correct, is certainly an interesting contribution to the valence hypothesis of hemispheric specialisation. It might even shed some light on the slightly divergent results of music research with regard to hemispheric specialisation. In any case, there is reason to suppose that the orbitofrontal cortex and the lateral pars orbitalis (BA47) may be central to the higher level monitoring and nesting of such feelings into conscious emotional compounds and processes.

If returning to the previous discussion of whether BA47 is primarily manipulating conditioned responses or visceromotor activity in general, even in autonomous musical processes, which are abstracted from any concrete or externally triggered problems, it is essential to point out that even in the case of polyrhythm and rhythmical irregularity the conflict is immanent. It is not due to conditioning alone. Certainly the performance of polyrhythm becomes less difficult with practice; this is pointed out both by Vuust and by Grahn and Rowe. Yet the difficulty does not disappear, as the relativists would like to think. The experience of syncopation and polyrhythm is always challenging and off balance to some extent; it cannot be reduced to mere prediction coding and the experience of surprise and relative familiarity. Nor is it a product of associations with snakes or other troublesome things.

It is a dispute which has not gone unnoticed by Grahn and Rowe either, who added as a last part of their study and discussion an investigation of putamen activation at different stages of familiarisation with the rhythms. The expected increase in familiarity in the second exposure to the rhythms did not increase the activation of the basal ganglia in this study; nor did it decrease, as in examples of so called 'repetition suppression' or neural adaptation. So it might not be the experience of *familiarity* that is generated here, which is raising the question of what is really

²⁴ Sepideh Sadaghiani, Guido Hesselmann, Andreas Kleinchmidt. 'Distributed and antagonistic contributions of ongoing activity fluctuations to auditory stimulus detection.' *Journal of Neuroscience*. Vol. 29, No 42 (21 October 2009): 13410-13417. <https://doi.org/10.1523/JNEUROSCI.2592-09.2009>.

going on in the putamen. Is it a substrate for the uniquely human propensity for rhythmical regularity in music, the ability to keep it regular? Or is it a hardwired reinforcement of this experience? Certainly the putamen is involved in the regulation of dopamine and other neurotransmitters. There is also evidence of multisensory integration in the basal ganglia, even in single neurones.²⁵

In any case, these are simple examples of *qualia*, which are universal, and central to all harmonious modalities of behaviour, whether we call it poetry, dance, or music. At a fundamental level the dichotomies may be limited, yet it is easy to observe how the amount of qualia is increasing as they are nested into higher level gestalts. Already the phenomena we call *meters* or *dances* are examples of this. The contrast between waltz and march, for instance, is not due to a difference in habituation alone. It is a difference between odd and even numbers, which has also a phenomenal correlate. It is particularly easy to notice this in music, yet it is probably common to all aspects of reality, even the field of mathematics and geometry itself. Whether we are dealing with a triangle or a waltz, it always comes down to a relationship, or identity, between experienced gestalts and numerical relations, which are all subjective or all objective depending on ones point of view. The relative distance between accented beats is objectively higher in waltz. It is also less symmetrical; thus it is also experienced as more irregular, more bouncing perhaps, and less decisive than a march.

In music we are playing with such attitudes, because, like life itself, it is intrinsically rewarding. Especially the celebration of harmony when confronted by conflict and disagreement is pleasurable. It may also have evolutionary benefits, adding new emotional modalities and perspectives on human existence, and improving the wellbeing and social-emotional harmony of peoples and communities. Whether the music is also associated with something *conditional* - like a rat or a cookie - is seldom of crucial importance. At least, it is not important in instrumental music. The pars orbitalis or BA47 might be less concerned with conditioned responses then, than the nesting of attitudes into higher level emotions and ego-dynamic processes.

²⁵ Ramon Reig, and Gilad Silberberg, 'Multisensory Integration in the Mouse Striatum'. *Neuron*. Vol. 83, No 5 (3 September 2014): 1200-1212. <http://dx.doi.org/10.1016/j.neuron.2014.07.033>.

See also Attila Nagy et al., 'Multisensory integration in the basal ganglia', *European Journal of Neuroscience*, Vol. 24, Issue 3 (14 August 2006): 917-924. <https://doi.org/10.1111/j.1460-9568.2006.04942.x>.

The most general evidence of this role of pars orbitalis in music is probably provided by some studies by Daniel Levitin and Vinod Menon. As a matter of fact, these researchers even went as far as concluding that the pars orbitalis is responsible for 'the experience of temporal coherence and meaning in music'.²⁶

The temporal resolution of the fMRI technique is not very good, to say the least, but this is a problem that was circumvented in this study, by contrasting 'ecologically valid' classical music with music that had been artificially scrambled, while retaining much of the local character of its low level constituents. Thus they claimed to be transcending the scope of most earlier neuroimaging studies, focussing on 'local structural incongruities' and a 'narrow notion of musical structure and expectation', pointing especially to the earlier discussed study by Koelsch and colleagues from 2002.

The highlighting of BA47 and the adjoining anterior insular cortex was significant in this study. It was bilateral, but more extensive in the left hemisphere. Other areas that were found to be more active during the experience of real music were the *anterior cingulate cortex* (BA24), the *nucleus accumbens*, and areas in the brainstem and posterior vermis of the cerebellum. This is different from language, which tends to have a much more unilateral basis. Yet there was a striking ambivalence in their discussion of these matters. On the one hand they were talking of 'language areas', even in the title of the study. On the other hand they were also emphasising that these areas may not be specific to language after all, but subserve the processing of temporal coherence in general.

However, in a similar study by the same researchers ten years later, now with Daniel A. Abrams as the lead author, both the terminology and the results were different. Symptomatically there was no more talk of 'language areas'. It is a concept that seems to have been loosing ground in recent years, as the regions subserving language use have been found to be much more distributed and diffuse, and far more multifunctional than previously thought. More surprising yet was the difference in results, indicating a significant *right hemisphere dominance* now, positing the whole right inferior frontal gyrus (BA44, 45, and 47) as a core region for 'natural music'. The region is an integrated part of the right hemisphere 'fronto-parietal attention network,' they say, which, one might add, is contributing to the picture of the frontal operculum

²⁶ Daniel J. Levitin and Vinod Menon, 'Musical structure is processed in "language" areas of the brain: a possible role for Brodmann Area 47 in temporal coherence,' *Neuroimage*, Vol. 20, Issue 4 (December 2003): 2142-2152, <https://doi.org/10.1016/j.neuroimage.2003.08.016>.

as a central hub for several important networks. The cingulo-opercular network has already been mentioned, and especially the mid-cingulate cortex was highlighted in this study. The premotor areas were also central. The frontopolar cortex was not explicitly mentioned by the researchers, although it was represented in several of their figures showing inter-subject synchronisation during natural music.²⁷

The reasons for these discrepancies were not discussed by the authors themselves, but the technical and statistical execution of the experiment was different now, in the sense that the regions of importance were highlighted by taking into account the amount of 'inter-subject synchronization' over time. Even the activation of subcortical auditory areas, like the *right inferior colliculus* in the midbrain and the *medial geniculate nucleus* of the thalamus, were synchronised across the participants, and much more so in the case of natural music; which is certainly challenging more subjectivistic conceptions of musical experience. It is also consistent, they say, with work showing that subcortical auditory structures are influenced by context, learning, and memory.

More relevant to the discussion of hemispheric lateralisation perhaps, was the fact that the musical extracts were much longer and somewhat different in this study. The contrasting of natural music with scrambled 'pseudo-music' was retained, but whereas the first study used extracts from classical 'hits', including works that were both familiar and 'unfamiliar' to the subjects, the new study was restricted to symphonies by the baroque composer William Boyce, which might have been even more unfamiliar. At least it was considerably longer than the 23 second extracts in the previous study, which was central to the idea of increased ecological validity in this experiment. The experience of whole works and contrasting movements might have been much more likely to involve the experience of long range rhetorical and dramaturgical functions, which makes a considerably higher demand on ego-dynamic integration than a single phrase or section.

The findings seem to be in tune with a study by Gabriel Donnay and colleagues, of interactive jazz improvisation, which is indicating that technical oriented and scale-based improvisation is activating especially the left ventrolateral prefrontal cortex, while more 'ecologically valid'

²⁷ Daniel A. Abrams, Srikanth Ryali, Tianwen Chen, Parag chordia, et al., 'Inter-subject synchronization of brain responses during natural music listening', *European Journal of Neuroscience*, Vol. 37, Issue 9 (11 April 2013): 1458-1469. <https://doi.org/10.1111/ejn.12173>.

performances, like in free improvisation, are activating primarily the right hemisphere. This was not explicitly pointed out in this study, but their Table 2 is speaking for itself.²⁸

This is not sufficient, of course, to settle the discussion of hemispheric specialisation in music. More studies are needed, although the issue is not simply solved by *meta-studies*. If the differences in focus and the varying 'ecological validity' of different studies is not discussed on an individual basis, the overall picture given by meta-studies will still be wrong. Nevertheless, if it turns out to be correct that both the left and right hemispheres are essential to ecologically valid music, some kind of Hegelian sublation might be required, accepting all the findings as equally valid within a larger picture of distributed functions, which would still require a phenomenological charting of these functions to provide any new understanding.

Music is obviously also positive, linear, autobiographical, and even technical in some respects. The experience of harmony, pleasurable chills, and rhythmical regularity in music is clearly related to positive motivation and parasympathetic functions, possibly subserved by the left cingulate and insular cortices, promoting bodily calm, love, and pleasure. A study by Jacqueline N. Wood, is particularly interesting in this regard, in the sense that it is extending the valence hypothesis of hemispheric specialisation to the pars orbitalis and the manipulation of attitudes, so central to the previous discussion, indicating that the left hemisphere BA47 is involved in the inhibition of *negative* attitudes, while the inhibition of *positive* attitudes is correlating with the activation of the right Brodmann areas 47, 11, and 10.²⁹ It is in line with a view that has been promoted especially by A.C (Bud) Craig, sketching out the picture of a comprehensive balancing between right hemisphere sympathetic and left hemisphere parasympathetic functions throughout the whole human forebrain. Craig is also pointing to music, as an example of a phenomenon which is engaging both the right and the left hemispheres.³⁰

²⁸ Gabriel F. Donnay, Summer K. Rankin, Monica Lopez-Gonzalez, Patpong Jiradejvong, Charles J. Limb, 'Neural Substrates in Interactive Musical Improvisation: An fMRI Study of 'Trading fours' in Jazz', *PLoS ONE*, Vol. 9, Issue 2 (19 February 2014): e88665. <https://doi.org/10.1371/journal.pone.0088665>.

²⁹ Jacqueline N. Wood, Stephen G. Romero, Kristine M. Knutson, Jordan Grafman, 'Representation of attitudinal knowledge: role of prefrontal cortex, amygdala and parahippocampal gyrus', *Neuropsychologia*, Vol. 43, Issue 2 (2005): 253. <https://doi.org/doi:10.1016/j.neuropsychologia.2004.11.011>.

³⁰ A.D. Craig, 'Forebrain emotional asymmetry: a neuroanatomical basis?', *Trends in Cognitive Sciences*. Vol. 9, Issue 12 (December 2005): 566-571. <https://doi.org/10.1016/j.tics.2005.10.005>.

Certainly music is not restricted to any of these mechanisms, yet it is difficult to understand how a distribution of emotional functions between the hemispheres would be integrative enough to secure a coherent nesting of emotional gestalts. If forced to choose one of the hemispheres, the right hemisphere might nevertheless be more essential to music, in the sense that it seems to be necessary for the autonomous and conflict-processing aspects of musical behaviour. It is the strategic dealing with *conflict* that lies at the foundation both of discursive processes and psychological dramas. Even some studies of verbal narratives seem to indicate that the task of comprehending obscure texts without the aid of a title is drawing heavily on the right temporal and ventrolateral prefrontal cortex to gain some kind of global coherence.³¹ Paradoxical as it may seem, it is probably this confusion and disruption that is also promoting wholeness and self-reflection; at least in a context of conscious apperception. Whether this is also in keeping with lesion studies of these regions is something we will come back to in the last section of this chapter.

11.3 Metacognition and apperception in rostral and dorsolateral areas

When it comes to the comprehension of the long-range aspects of musical dramas, not to speak of the philosophical dimensions of the art, the activation of pars orbitalis (BA47) may still not be a sufficient correlate. Even the *dorsolateral prefrontal cortex*, or at least a fronto-parietal network might have to be involved, to get some kind of inner map of the processes: a consciousness not only of actions and interactions but of whole sections of past and future activity as located on metaphorical timelines perhaps. The metacognitive capability of generating hypotheses and cognitive dissonance for the sake of future reward or release, which has been associated especially with the *right rostromedial prefrontal cortex*, would also be central to such processes. Especially in advanced forms of improvisation the demands on emotional daring and forecasting are high, so it is almost unthinkable that the lateral frontopolar cortex would not be activated. But is this confirmed by neurobiological investigations?

To find out, more studies have to be considered. It is essential to focus on experiments which are likely to trigger the mentioned prospection and emotional multitasking, but even basic

³¹ Marie St. George, M. Kutas, A. Martinez, M. I. Sereno, 'Semantic Integration in reading: engagement of the right hemisphere during discourse processing,' *Brain*. Vol. 122, Issue 7 (1 July 1999): 1317-1325. <https://doi.org/10.1093/brain/122.7.1317>.

melodic and harmonic progressions should be considered, to determine whether the question-answer dialectic which is constituting this activity is also requiring the rostrolateral prefrontal cortex, if only when it is creative, active, or deeply felt. If it is not, some of the earlier proposed hypotheses concerning music rhetoric and the frontopolar cortex might have to be revised.

If continuing our ascent upwards through the hierarchy of mental and musical organisation then, even the dorsolateral prefrontal cortex, traditionally incorporating Brodmann areas 46 and 9, is fitting into this hierarchy, if not exactly as an extra level of action-nesting. Certainly we have already entered the realm of reasoning here - the imagination and manipulation of conceptual gestalts - but the area has some other properties as well, which seem to be related to the incorporation of a spatial dimension into prefrontal memory cells and loops. Needless to say, this is a perspective which is making a great difference to our ability to reason about the world at large.

It is a feature which is also reflected in its placement within the frontal cortex. The dorsolateral prefrontal cortex is not stretching further ahead than the earlier discussed ventrolateral cortex, it is first of all located above it, and parallel to it, in the *middle frontal gyrus*. Among its posterior parts is *the frontal eye field*, which is concerned with visual attention and certain aspects of saccade formation, but even its more frontal parts are often considered to be involved in spatial imagination.³² This is also reflected in its connections - via the so called 'dorsal stream' - with the parietal cortex towards the back of the brain; a region that is commonly held to be mapping the human body in relation to its spatial environment, like in manual tasks and phenomena like finger-counting, social perspective-taking, saccadic eye movement, stereophonic experience and location of sound in space.

There are several advantages of this spatial-behavioural integration. Not only does it unite the spatial and behavioural components of social, societal, or even sociological concepts. Even purely dynamic phenomena, like music or emotion in general, might benefit from such an alliance, allowing temporal processes to be charted and compartmentalised according to metaphorical timelines or schemes. As we will come back to in a separate chapter on behavioural versus spatial organisation, the sense of 'non-simultaneousness', so central to the experience of

³² See for instance Alexander T. Sack and Teresa Schuhmann, 'Hemispheric differences within the fronto-parietal network dynamics underlying spatial imagery,' *Frontiers in Psychology*. Vol. 3, Article 214 (28 June 2012): <https://doi.org/10.3389/fpsyg.2012.00214>.

See also Aron K. Barbey, Michael Koenigs, and Jordan Grafman, 'Dorsolateral prefrontal contributions to human working memory', *Cortex*. Vol. 49, Issue 5 (May 2013): 1195-1205. <https://doi.org/10.1016/j.cortex.1012.05.022>.

temporality and temporal functions, is local in character, and contained within the so called 'specious presence'. This non-simultaneousness may have to saturate even the idea of past and future behavioural gestalts to provide a sense of stage and development; yet it may be difficult to imagine a whole series of such functions without some kind of spatial metaphorical representation. It is not surprising at least, that the dorsolateral prefrontal cortex is also connected to the hippocampus and the associated retrosplenial cortex, which have been found to be involved in the establishment of long-range episodic memory as well as the mapping and cataloging of such memories according to spatial grids and 'grid cells'.³³

It has to be remarked though, that the dorsolateral prefrontal cortex may not be of crucial or fundamental importance to the experience of music. Indeed it was not highlighted by Levitin, Menon, and Abrams' investigations into the neural correlates of natural, non-scrambled, music. Yet there have been other studies, even by the same researchers, that gave a slightly different picture. It is a fact that might seem strange to some, yet it is not in conflict with truth nor with the possibility of finding it. Like life in general, the phenomena of rhythmical and auditory emotional communication, which might be classified under the single concept of *music*, are not restricted to a single condition, but comprising rather a vast field of actions and interactions at different levels of complexity. It may be subconscious, subcortical, and instinctual, like in cells or in animal vocalisation. It may be ecstatic and intuitive, without much reflection beyond its basic rhetoric. In much instrumental music it might well be restricted to some purely ego-dynamic processes, without requiring any spatial conceptualisations at all; but there might also be cases where spatial perspectives are involved, if only metaphorically or as representative of some kind of social exchange or battle, as in antiphonal music or in interactive improvisation.

A fMRI study by Sara Bengtsson and colleagues is often referred to as indicative of dorsolateral prefrontal activation during musical improvisation (more precisely in slice 39 on the rostral-caudal y-axis), but its ecological relevance could be questioned since the participants were classical pianists, who are not necessarily accustomed to improvisation. More problematic yet was the fact that the participants were asked to elaborate on a 'visually displayed melody', that is to say: the focus was to a large extent on the reading and manipulation of visually imagined notes. Such imagination is not a necessary part of musical or creative behaviour, but it

³³ See for instance Steven A. Marchette, Lindsay K. Vass, Jack Ryan, and Russel A. Epstein, 'Anchoring the neural compass: coding of local spatial reference frames in human medial parietal lobe.', *Nature Neuroscience*, Volume 17 (5 October 2014): 1598-1606. <https://doi.org/10.1038/nn.3834>.

might well have been the reason for the dorsolateral activations in this case. Symptomatically even the visual cortex, as well as premotor and temporal areas, were highlighted in this study.³⁴

The findings were not in tune with a study of somewhat freer, chord based jazz improvisation by Limb and Braun, published one year later. On the contrary, these researchers were presenting as their main finding that the dorsolateral prefrontal cortex is rather *deactivated* during jazz improvisation, like in states of flow and non-lucid dreaming, where the self-evaluative glance is supposed to be turned off.³⁵ Nevertheless, the frontopolar cortex (BA10), stretching even into some rostral areas (coordinate -27 on the left-right x-axis), was very active in this experiment, which is not ruling out some kind of self-reflection.³⁶ Certainly the improvisations of the professional jazz musicians might have been much more intuitive and even automated than the tentative figurations of classical pianists, but the deactivation of the dorsolateral prefrontal cortex might also be explained as an absence of visual or *externally directed* reflection.

These spatial factors might have been more prevalent in a later fMRI study of jazz improvisation by Gabriel Donnay, also involving Limb. Besides a massive activation of the ventrolateral prefrontal cortex, a small region of the left dorsolateral prefrontal cortex was also highlighted, which the researchers attributed to the 'additional social context' of 'trading fours' in interactive jazz improvisation. Taking turns, the individual demands on long-range planning might also have been lessened, which might explain the weaker activation of the frontopolar cortex in this experiment.³⁷

Even the Menon lab has produced studies that are seemingly pointing in different directions. Whereas the previously discussed comparison of natural music with scrambled music did not highlight the dorsolateral prefrontal cortex, an earlier study, also focussing on the experience of 'naturalistic music' by 'musically untrained participants,' presented as its main discovery the

³⁴ Sara L. Bengtsson, Mihály Csikszentmihályi, and Fredrik Ullén, 'Cortical Regions Involved in the Generation of Musical Structures during Improvisation in Pianists,' *Journal of Cognitive Neuroscience*, Volume 19, No. 5 (May 2007): 830-842. <https://doi.org/10.1162/jocn.2007.19.5.830>.

³⁵ Charles J. Limb and Allan R. Braun, 'Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation,' *PLoS One*, Vol. 3, Issue 2 (27 February 2008), <https://doi.org/10.1371/journal.pone.0001679>.

³⁶ See for instance Kalina Christoff, Justin M. Ream, Leo P. T. Geddes, John D. E. Gabrieli, 'Evaluating Self-Generated Information: Anterior Prefrontal Contributions to Human Cognition,' *Behavioral Neuroscience*, Vol. 117, Number 6 (December 2003): 1161-1168. <https://doi.org/10.1037/0735-7044.117.6.1161>.

³⁷ Gabriel F. Donnay, Summer K. Rankin, Monica Lopez-Gonzalez, Patpong Jiradejvong, Charles J. Limb, 'Neural Substrates of Interactive Musical Improvisation: An fMRI Study of 'Trading fours' in Jazz,' *PLoS ONE*, Vol. 9, Issue 2 (19 February 2014): e88665. <https://doi.org/10.1371/journal.pone.0088665>.

activation of a whole *dorsal fronto-parietal network* (BA9 and BA40), if only at the points of transition between symphonic movements.³⁸ So what was the difference between these experiments? In both cases the music was composed by William Boyce (1711-1779), so this could not have been the source of the discrepancy; yet the music was *manipulated* in the newest study. More specifically the pauses between the movements had been removed from the recordings; and it was exactly in these pauses that the dorsolateral network had kicked in in the earlier study.

The authors do not say much about the reasons for this omission, beyond the remark that 'the movement boundaries were removed in order to ensure that event transitions were not driving inter-subject synchronization'. They might have wanted to focus, in the newest study, on the core substrates of musical behaviour, which is well and good. The long-range developments of which pausing is often an integrated part, may not be essential to dramaturgically simple music or to the relatively isolated movements of baroque compositions. Yet they may be essential to more dramaturgically complex music. Especially in post baroque 'Sturm und Drang' and classical sonatas, such pausing is sometimes introduced for dramatic effect even within movements. In some cases even the movement transitions and contrasts should be considered integrated functions of the overall musical discourse. Contrary to what is indicated in Sridharan's article, these functions could not be reduced to mere 'event-segmentation' or chunking of a 'stream'. To account for musical experience - and for emotional and self-conscious experience in general - we also have to take into account the nesting of complex rhetorical and dramaturgical gestalts, of which the pausing is often an important part.

It might at first seem like nothing is going on in a pause, but as is well known to any conductor or soloist: the location and timing of pauses makes a big difference to the emotive effect of the music. Even without any music or context whatsoever this would be the case. 'The idea of *absolute* duration', says Wundt, 'that is of time in which no change takes place, is strictly speaking impossible in time-perception itself. The relation to the subject must change continuously.'³⁹ In fact, it is a requirement for the very idea of time and duration. We do not consciously reflect on these processes, yet they are there, just below the surface of attention.

³⁸ Devarajan Sridharan, Daniel J. Levitin, Chris H. Chafe, Jonathan Berger, and Vinod Menon, 'Neural Dynamics of Event Segmentation in Music: Converging Evidence for Dissociable Ventral and Dorsal Networks,' *Neuron*, Vol. 55, Issue 3 (2 August 2007): 521-532, <https://doi.org/10.1016/j.neuron.2007.07.003>.

³⁹ Wilhelm Wundt, *Outlines of Psychology*, §11.2a.

Given that the context of the work is also supporting this interpretation, a short *hesitation* may be experienced as a *passing insecurity*; something that is easy to forget or repress. In fact, there might be too little time for us to give it any meaning beyond the vague idea of some kind of passing disruption or friction. A slightly longer pause would be different in the sense that it would be much more salient. It would be experienced as an instance of *stopping up*, if only momentarily, which is also giving a certain time for *afterthought*. Typically, if not consciously, we would be urged to search through our previous experiences then, to make some sense of this stopping. Especially we might search for *previous conflicts* and hesitations, which if they are very dominant, might make the choice of *resignation* seem like a relevant option. If this is happening too early on, the effect would certainly be *comical*. Even to naive listeners this would probably be the case. It would be more natural to try to face and battle with these conflicts, before moving on. Conversely, if the 'clues' are pointing in a positive direction, or if the conflict is already sufficiently treated, it would be more logical from a behavioural point of view, to embark on, or experience as musically meaningful, some kind of celebration or happier turn.

Furthermore, if the pausing is even longer, its function would have to be reinterpreted again. Although we might first be going through the mentioned stages of hesitation or afterthought we would come to a point where we would have to realise that OK, the movement is now about to be concluded. Yet it might not be certain whether the music will start anew.

It is probably these moments of reorientation that are captured in Sridharan's study. Whereas in the first part of the transition it is not yet clear that the movement is ended, in the later part one comes to a point when the idea of long-range conclusion, overall closure, and the possibility of a new bulk of musical behaviour is suddenly coming to mind; which is opening up a much larger perspective on the mental timeline.

It is dangerous to interpret too much into the findings of a single study, but it has to be mentioned that, like in their previous study, the authors are speaking of a 'strikingly right-lateralised network' here, which is confirming the hypothesis that ego-dynamic autonomy and strategy formation is maintained especially by the right hemisphere. And it is not the only study that is pointing in this direction. Even more spatially oriented research, like in Sharlene D. Newman's study of problem solving and planning, there is evidence of such a dorsal and right-

lateralised network.⁴⁰ More relevant to ordinary musical activity is Sridharan's finding that this right hemisphere dominance also characterises a 'ventral fronto-temporal network' (BA44/45/47 and BA21/22), which was particularly active right before the pauses; probably because it was engaged in the business of slowing down and rounding off. Other regions that were found to be tracking the changes during movement transitions were the anterior cingulate and insular cortices.

Even the *frontopolar cortex* might be expected to be active during transitions, especially when some uncertainty with regard to the development of different scenarios is evoked. The frontopolar cortex was represented in the study of natural versus scrambled music, so why is it not mentioned in Sridharan's study of movement transitions? Judging by their *Figure 2* some medial and even lateral frontopolar regions might well be active. It may also be that the music fails to set up any strong expectancies during these transitions, or that the experience is simply too passive. As earlier mentioned, the business of asking questions, or voluntarily exposing oneself to uncertainty during exploration, is probably demanding more than merely perceiving these matters.

Another confounding circumstance in many studies is the somewhat blurry boundaries between the different regions of the prefrontal cortex. The frontopolar cortex is bringing together both the superior, middle, and inferior gyri, as well as the orbitofrontal cortex below it. It is also stretching backwards along the inside walls between the cerebral hemispheres, constituting an important part of the medial prefrontal cortex. Cytoarchitecturally it is a very large region, characterised by a low density of neurones but a high density of dendritic arborisation and spines.⁴¹ Quite unlike more caudal regions of the dorsolateral prefrontal cortex, says Michael Petrides, the Brodmann area 10 and even parts of BA9 are not directly connected with the visuospatial and externally oriented mappings of the parietal or occipital cortices, rather they are 'preferentially connected with the midsection of the auditory superior temporal cortex and the multisensory processing region of the superior temporal sulcus.' Additionally the area exert

⁴⁰ Sharlene D. Newman, Patricia A. Carpenter, Sashank Varma, Marcel Just, 'Frontal and parietal participation in problem solving in the Tower of London: fMRI and computational modelling of planning and high-level perception,' *Neuropsychologia*, Vol. 41, No. 12 (February 2003): 1676-1677. [https://doi.org/10.1016/S0028-3932\(03\)00091-5](https://doi.org/10.1016/S0028-3932(03)00091-5).

⁴¹ Bob Jacobs, Matthew Schall, Melissa Prather, Elisa Kapler et al., 'Regional Dendritic and Spine Variation in Human Cerebral Cortex: a Quantitative Golgi Study,' *Cerebral Cortex*, Volume 11, Issue 6 (1 June 2001): 558-571. <https://doi.org/10.1093/cercor/11.6.558>.

influence on other parts of the prefrontal cortex, like the orbitofrontal cortex, as well as areas important to memory and motivation, such as the retrosplenial cortex, the cingulate cortex, the ventral insula, and the amygdala.⁴²

So how is it activated by music? As for its medial parts, which we will come back to in a separate chapter, its role is undoubtedly of central importance to music. It is part of a larger medial prefrontal region where music and musical memory may be kept intact in Alzheimer's patients, when almost everything else is gone. But if we keep to its lateral, more executive regions now. How important is it?

A study by Vinoo Alluri and colleagues might shed some light on this. Not because they are focussing on this region, but by dint of the amount of data gathered, and the presentation of this data in a video animation (*The Tango brain*) put out on Vimeo and YouTube by co-author Petri Toiviainen.⁴³ While Alluri's article was focussing on some rather low-level timbral and rhythmical experiences - extracting low-level sensory features from high-level musical experience as it were - Toiviainen's animation is more interesting as it gives a comprehensive view of what is going on in the brain when we are listening to music. Whether it is correct is difficult to tell, but he seems to have managed to synchronise the fMRI data with the music in a plausible manner. We can observe here how the whole brain, including even the occipital cortex, is apparently seething with activity, represented by red and blue blobs, morphing and pulsating in tune with major and minor changes in the music.

Whereas the auditory and sensorimotor areas are highly 'active' especially at the moments when striking timbral contrasts are introduced, the frontal cortex is apparently concerned with higher level functions and expectations, which may be going on even in the pauses. Especially the top midline regions of the prefrontal cortex, stretching from the supplementary motor area to the frontopolar cortex, are almost constantly glowing. Judging from the animation, at least, the frontopolar cortex was very active in this experiment, and the activity was not restricted to its medial regions. During the last seconds of the piece, for instance, when anticipating the end and applause, the frontopolar cortex was the only region that was highly active.

⁴² Michael Petrides and Deepak N. Pandya, 'Efferent Association Pathways from the Rostral Prefrontal Cortex in the Macaque Monkey' *The Journal of Neuroscience*, Vol. 27, No. 43 (24 October 2007): 11573-11586. <https://doi.org/10.1523/JNEUROSCI.2419-07.2007>.

⁴³ Vinoo Alluri, Petri Toiviainen, Liro P Jääskeläinen, Enrico Glerean, Mikko Sams, and Elvira Brattico, 'Large-scale brain networks emerge from dynamic processing of musical timbre, key and rhythm,' *Neuroimage*, Vol. 59, No 4 (15 February 2012) 3677-3689. <https://doi.org/10.1016/j.neuroimage.2011.11.019>.

It is a circumstance that may be related to the emotional intensity and depth of this music - Astor Piazzolla's *Adios Nonino* - but also the mounting tensions in the long transitional sections, making the listener yearn for release and return to the main theme. It probably requires some time for this captivation and yearning to be set up in the listener, which might explain the fact that the frontopolar cortex was more active towards the end of the work. The dorsolateral-parietal network, as pointed out in Sridharan's study, is also easy to spot, especially during the transitions, when the demands on retrospective and prospective orientation are increasing.

A more precise targeting of prefrontal involvement when listening to this music is presented in a study by Iballe Burunat, which was also supervised by Petri Toiviainen. More precisely the study was focussing on 'working memory-driven activations' during the repetition of musical motifs and themes. Although the study was taking as its object of investigation the same tango by Piazzola, the focus was much higher this time, even subtracting the acoustically related activations in Alluri's study from some of its results; which, as Burunat also remarked, is not unproblematic. Even at sensory or sensorimotor levels there is memory and vice versa. Nevertheless 'a rightward asymmetry comprising ventral and dorsal areas in the prefrontal cortex was observed.' Especially Burunat emphasises the importance of right dorsolateral BA10 and ventrolateral BA47 for musical working memory; and she is pointing explicitly to the similarities with Sridharan's study.⁴⁴

Other regions that were found to be related to musical working memory were BA44 and 45, the cerebellum, the basal ganglia, and certain regions in the right hippocampus and parahippocampal gyrus (BA34). It is a finding that has later been presented as remarkable and new, because the hippocampus - usually associated with the imprinting of long-range episodic memory - has not been known to be engaged so early on in the listening process. Burunat herself is wondering whether it might have to do with the emotive power of music. Especially this work of Piazzolla, a tribute to his father who had newly passed away, is profoundly moving. Our memory for tunes and the capability of music to evoke autobiographical memories is truly extraordinary, and it is a circumstance that, far from rendering music as something secondary, is confirming its intrinsic emotional and motivational power; because it is precisely this emotional

⁴⁴ Iballe Burunat, *Dynamics of brain activity underlying working memory for music in a naturalistic condition*. Master thesis. University of Jyväskylä, November 2012, 41.

factor that is so central to the imprinting of memory in the hippocampus and the limbic system in general.

It is not possible to go more into detail about Alluri or Burunat's studies here, let alone their treatment of the data, involving techniques like 'statistical modeling,' 'computational acoustic feature extraction,' as well as 'behavioral psychology'. Yet there are many aspects of these studies that may stimulate a further discussion of these matters. Especially the intricate picture of hemispheric differences as related to valence and auditory qualia in Burunat's study is interesting. Similarly the illustration of low and high BOLD signals by blue and red blobs in Toiviainen's animation is thought-provoking and difficult to interpret. Certainly the low, or negative, BOLD signals could not be ascribed to the reduction of typical resting state activity alone.

There is apparently a host of factors that might be affecting the blood-oxygen-level-dependent signals in fMRI: purely metabolic demands, the neuromodulatory impact of neurotransmitters, the size and depth of the neuronal populations, the different mechanisms of inhibition and excitation, and not to forget: the effects of habituation and training, which are sometimes considerable. Whereas there seems to have been a general tendency to identify both excitatory and inhibitory activity with *positive* BOLD signals, there is a growing awareness now, that even *negative* BOLD signals may be indicative of inhibitory neural activity. According to Martin Lauritzen 'activations of both excitatory and inhibitory neurons produce rises in CBF and positive BOLD signals, while negative BOLD signals under most conditions correlate to excitation of inhibitory interneurons, but there are important exceptions...'⁴⁵ In Nikos Logothetis' view 'the BOLD signal is primarily affected by changes in excitation-inhibition balance', which 'may be controlled by neuromodulation more than by the changes in spiking rate of a small set of neurons.'⁴⁶ In fact, there are studies indicating that dopamine, which plays an important role in the executive networks of the prefrontal cortex, may be increasing the activity

⁴⁵ Martin Lauritzen, Claus Mathiesen, Katharina Schaefer, Kirsten J. Thomsen, 'Neuronal inhibition and excitation, and the dichotomic control of brain hemodynamic and oxygen responses,' *NeuroImage*, Vol. 62, Issue 2 (August 2012): 1040-1050. <https://doi.org/10.1016/j.neuroimage.2012.01.040>.

⁴⁶ Nikos K. Logothetis, 'What we can do and what we cannot do with fMRI,' *Nature*, Vol. 453 (12 June 2008): 876-877. <https://doi.org/10.1038/nature06976>.

and metabolism of neurones to such an extent that even if the blood flow is also increasing the BOLD signals are nevertheless going down.⁴⁷

How a more detailed knowledge about these matters will be affecting the interpretation of old and new fMRI studies is difficult to say. While Burunat did incorporate a discussion of left parahippocampal negative BOLD, she made no mention of the metabolic peculiarities of the hippocampus, which may also lead to negative BOLD during increased activity.⁴⁸ As for now, one cannot rule out the possibility that many fMRI studies may be incomplete and even misleading in some respects. It might be a good idea then, to try to focus on the big picture here, and complement it with other imaging techniques as well as lesion studies.

As regards the activation of the frontopolar cortex in Burunat's study, it has to be said that while the repetition of musical motifs and themes did already engage a region of the rostralateral prefrontal cortex ($x,y,z = 32, 50, 20$, in MNI-space) which has earlier been associated with self-reflection,⁴⁹ the mere repetition of motifs may not have engaged the kind of meta-emotional monitoring of hopes and premonitions which in David Badre's study of uncertainty-driven exploration was also involving a more *ventral* rostralateral cluster ($x,y,z = 30, 52, -14$ and $36, 56, -10$).⁵⁰ Certainly her study also highlighted the involvement of pars orbitalis (BA47), which has earlier been connected with the nesting of viscerally reinforced attitudes. And there is no doubt that even the repetition of motifs, perhaps with some harmonic alterations, may contribute significantly to such changes. A highlighting of the more long-range meta-emotional functions and evaluations, however, would probably have required a different experimental design.

A fMRI study by Amber Leaver and colleagues comes close to this, by focussing on the association and conscious imagination of tunes, or to be more precise: the anticipatory imagination of tracks on favourite CD recordings, which the subjects were used to hear in

⁴⁷ Daniel Zaldivar, Alexander Rauch, Kevin Whittingstall, Nikos K. Logothetis, Jozien Goense, 'Dopamine-Induced Dissociation of BOLD and Neural Activity in Macaque Visual Cortex,' *Current Biology*, Vol. 24, Issue 23 (1 December 2014): 2804-2811. <https://doi.org/10.1016/j.cub.2014.10.006>.

⁴⁸ See for instance Ulrich Schridde, Manjula Khubchandani, Joshua E. Motelow, Basavaraju et al., 'Negative BOLD with Large Increases in Neuronal Activity,' *Cerebral Cortex*, Vol. 18, No. 8 (August 2008):1814-1827. <https://doi.org/10.1093/cercor/bhm208>.

⁴⁹ Taylor Schmitz, Tisha N. Kawahara-Baccus, Sterling C. Johnson, 'Metacognitive evaluation, self-relevance, and the right prefrontal cortex', *Neuroimage*, Vol. 22, No. 2 (June 2004): 941-947. <https://doi.org/10.1016/j.neuroimage.2004.02.018>. Here $x,y,z = 26,52,16$ is connected with the monitoring of self versus other.

⁵⁰ David Badre, Bradley B. Doll, Nicole M. Long, and Michael J. Frank, 'Rostralateral Prefrontal Cortex and Individual Differences in Uncertainty-Driven Exploration,' *Neuron*, Vol. 73, Issue 3 (9 February 2012): 595-607. <https://doi.org/10.1016/j.neuron.2011.12.025>.

succession. Especially the right rostralateral prefrontal cortex (BA10) was found to be very active during such anticipation. And although the rostralateral activity was located to the superior frontal gyrus, the Talairach coordinates indicate that it was more 'ventral' than in Burunat's study ($z = -3$. See Figure 4).⁵¹ The hypothesis of an affinity between musical meta-reflection, hypothetical reasoning, and human self-reflection in general, seems to be confirmed then. The brain is probably dealing with these matters in the same right rostralateral regions.

Leaver and colleagues also included in their study a second experiment, investigating the associative chunking and anticipation of shorter and unfamiliar melodic fragments at different stages of learning. The experiment went a long way toward confirming the idea of a musical 'action hierarchy' in the right frontolateral cortex, with the basal ganglia being more active in the early or middle stages of learning. They even spoke of the basal ganglia 'training frontal networks'. Even the supplementary and pre-supplementary motor areas at the top of the frontal cortex conformed to this hierarchy, as SMA was recruited during earlier stages, whereas the pre-SMA was 'involved in retrieval of more complex learned representations (i.e., musical phrases or "chunks" of sequence material)'. It might also be noted that the experience of *familiarity* was located to the posterior cingulate cortex (BA23) and the parahippocampal gyrus (BA35/40), which might be connected with autobiographical memory, if not in the same manner as in Burunat's study. The frontopolar regions however, were only highlighted in the first experiment, dealing with the prospective memory of familiar tunes.

Nevertheless, some questions could be raised regarding the ecological validity of this study. The juxtaposition of CD tracks does not make for integrated musical works. It is true that the ordering of tunes on a record may be, and probably sometimes are, part of a plan, setting up some contrasts and even a certain development in some cases. But this is not always so. To be ecologically valid and relevant to the discussion of musical organisation, the relations should be intra-musical, like the contrast between *verse* and *refrain* in a song. There comes a moment in a song where the business of stating or narrating in the verse becomes trite and boring, and variation, in the shape of a more jubilant refrain, is welcomed. This is the kind of anticipation that should be investigated. It is not unlike the transition to a more recreational or free development section in a symphonic movement, or the expectation of final resolution before the

⁵¹ Amber M. Leaver, Jennifer Van Lare, Brandon Zielinski, Andrea R. Halpern, Josef P. Rauschecker, 'Brain Activation during Anticipation of Sound Sequences,' *The Journal of Neuroscience*, Vol. 29, No. 8 (25 February 2009): 2477-2485. <https://doi.org/10.1523/JNEUROSCI.4921-08.2009>.

coda. Such anticipations do not necessarily rely on any concrete associations, they are implied by the process, like the circumstance that when something is thoroughly stated and recapitulated it is also ready for a conclusion.

It would probably be clearer then, that we are dealing with meta-emotional gestalts here, which are not only mutually interpenetrating, but integrative of the lower levels as well. The refrain is not an independent object, it is an emergent function of the rhetorical process. If the gist of such functions are not grasped, it is not only the meaning of these concepts that would be lost, even the function and coherence of the music would be lost, and it would not help a bit to associate it with something else, like the tracks on a CD record. To determine experimentally the extent to which we depend on these functions, however, one would have to find a method of stripping an auditory sequence of all its emotional and rhetorical purport, be it conscious or subliminal. First then it could be contrasted with real music. Levitin and Menon's study of scrambled versus normal music is already doing this, but more studies of this type are undoubtedly needed.

To researchers who do not want to grapple with ontology or the 'binding-problem', it may seem like a safer option to subscribe to some kind of atomism or 'billiard ball' conception of reality, where everything is discrete and conditional. There is little room for higher level mental functions or categories in such a world view, let alone a conscious self. The eighteenth century associationalism so fiercely criticised by Hegel, Wundt, and Koehler is still alive in many quarters. It is similar in several respects to postmodern relativism and deconstructionism, which is sometimes, even by the postmodernists themselves, presented as the antithesis of science. As pointed out by Antony Steven Dick and Willis Overton: 'The knowing system - the system of concepts and reasoning...cannot be understood apart from the functioning of the executive system' - or vice versa - yet there is still a tendency, they say, to 'eschew mental concepts' and focus instead on the purely neurobiological and 'subpersonal functional level of analysis'.⁵² This is a problem because it is precisely these conceptual gestalts that differentiate our selves from a bloodstream or an electrical current. One might peel off the highest layers of this emotional

⁵² Antony Steven Dick and Willis F. Overton, 'Executive Function: Description and Explanation.' Chapter 1 in Bryan Sokol, Ulrich Müller, Jeremy Carpendale, Arlene Young, and Grace Larocci eds., *Self and social Regulation: social interaction and the development of social understanding and executive functions*. (New York: Oxford University Press, 2010), 22.

gestalt formation, but if the premotor regions, and the grasping of attitudes, acts, and agency is also gone, there is very little left of a person.

Certainly the reductionists are aware of their own emotions. The emotions are just taken for granted and repressed from the field of science. Notable exceptions are phenomena like *lying*, *irony*, or *sarcasm*, which seem to have been peculiar enough to get the attention even of some neurobiologists. These are also meta-emotional or 'second-order' mental states, and there are many indications that if regions especially in the right hemisphere frontopolar and dorsolateral cortex are damaged or disrupted, like in severe cases of autism, these gestalts are also disappearing.⁵³ The phenomena of irony and sarcasm are simply erased from the existence of these people, and it is reasonable to suppose that the same would happen to many higher level musical gestalts; even if music seems to depend to a lesser extent on the contextual and social perspectives monitored in more dorsolateral regions.

It is not possible, or even reasonable, to claim that Leaver and colleagues are unsupportive of these recognitions, any more so than the previously mentioned researchers. Yet when both the terminology and the experimental setup bears marks of reductionist conceptions, one is easily running the risk of circular reasoning. At least there is a parallel here between their saying that 'music consists of cued associations' and the experiment focussing on 'conditioned associations' between CD tracks, which are not even intra-musical phenomena.

Even the low level chunking of melody pairs in their second experiment was constructed and combined by the researchers themselves. Their intuitive understanding of music apparently kicked in here. The melodies were written in either C or F major, they say, and ended either on the tonic or fifth; which is pretty much how the ordinary dialectic of tonal music goes. These melodic sequences would not serve as examples of mere 'cued associations' then, although such fragments constructed by researchers tend to be rather awkward, and may not register in the same manner as real music. One should not forget that functioning music is composed by functioning composers, according to considerations that are usually much deeper, and subjected to the constant test of public acclaim.

⁵³ Simone G. Shamay-Tsoory, R. Tomer, and J. Aharon-Peretz, 'The Neuroanatomical Basis of Understanding Sarcasm and Its Relationship to Social Cognition', *Neuropsychology*, Vol. 19, No. 3 (May 2005): 288—300. <https://doi.org/10.1037/0894-4105.19.3.288>.

See also Oshin Vartanian, Peter Kwanter, David R. Mandel, Fethi Bouak, Ann Nakashima, Ingrid Smith, and Quan Lam, 'Right inferior frontal gyrus activation as a neural marker of successful lying', *Frontiers in Human Neuroscience*, Vol. 7, No. 616 (3 October 2013): <https://doi.org/10.3389/fnhum.2013.00616>.

The reductionist mentality is characterised by a tendency to conceive of everything in terms of spatial and static objects, as if immovable and dead objects are somehow more real than living ones. Leaver is talking not only of *imagination*, but of 'imagery'; which is misleading, first of all because there are no visual elements in the music. The experience is not an instance of static viewing, nor is it hallucinatory in character. Rather one might say that the prospectations are *active mental rehearsals*. The subject is not a spectator to this activity. He might 'imagine' other instruments performing it, or project it outside himself. But it is the subject that is performing the simulation. Like in other cases of nonverbal communication, it takes a functioning ego to grasp and simulate the ego-dynamic processes of other people, and it is no coincidence that such simulations are activating the same brain regions which are also active when the subject is explicitly acting out this behaviour. In fact, this is a circumstance that was highlighted and confirmed in Leaver's study, as the subjects were asked to consciously take time to try to 'imagine' the following tune.

Rather than defending any kind of formalism here, it was the conclusion of Leaver's study that 'learning sound sequences recruits similar brain structures as motor sequence learning', and that the musical prospectations may be related to the 'efference copy' proposed in so-called 'emulator (or "forward") models'. The confusion between visual and auditory cognition then, might well be explained as a linguistic ambiguity in this case; which does not exclude the possibility that behaviour may also be objectified. Talking of musical behaviour as 'sequence material' is neither humanistic nor particularly enlightening.

A study by Mihai Popescu and colleagues may be better in this respect. At least these researchers had the courage to speak of their object of study - the first eight bars of Franz Liszt's *Etudes d'exécution transcendante d'après Paganini*, s. 140, No. 5 - in rhetorical terms. 'The motif is divided into two parts,' they say, 'defined by their melodic narrative (question and answer) and harmonic structure'.⁵⁴ Which may still be indicative of a false dichotomy here, between the 'question and answer' and the 'harmonic structure'; as if the harmonic progression was nevertheless some kind of spatial object.

Anyhow, a strong point of this study is the magnetoencephalographic technique (MEG), which is not dependent on blood flow or blood oxygenation levels. It has a temporal resolution

⁵⁴ Mihai Popescu, Asuka Otsuka, and Andreas A. Ioannides, 'Dynamics of brain activity in motor and frontal cortical areas during music listening: a magnetoencephalographic study', *Neuroimage*, Vol. 21, Issue 4 (April 2004): 1622-1638. <https://doi.org/10.1016/j.neuroimage.2003.11.002>.

that is much higher than fMRI. In fact, it was high enough to register activity in motor and premotor regions of the brain which was synchronised with and phase locked to the anapaestic rhythm of the music, consisting basically of two sixteenth notes and one eighth note repeated twice in each of the four bars. Whereas the left motor and premotor areas were correlating with the rhythmic periodicity, this dominance was skewed to the right hemisphere when the performance tempo became more uneven during the half close, midway through the theme. (See Fig. 11) Moreover, the subjects were merely *listening* to the music, and they had 'no formal musical training', so it is unlikely that it was their experience with playing an instrument that was activated here.

More important to the current discussion is the fact that the music also activated the frontopolar cortex, both in orbital, medial, and lateral regions, but with a different development than in the motor regions (see Fig. 5 and 7). Unlike the motor regions, the activity in ventrolateral and frontopolar regions was found to be gradually increasing during the course of the theme, presumably reflecting the buildup of 'higher-order patterns', which is perfectly in tune with what has already been said about this region. And, except from the medial prefrontal cortex, the dominance of the right hemisphere was clear in this case, which the researchers found 'consistent with previous findings that circuitry related to emotional processes (including emotional components of music) are mainly localised in the right hemisphere.'

What is peculiar about this study is that they say it is a study of rhythm, whereas the rhythm is almost completely monotonous during the given bars. The only aspect of the music that is really *evolving* during these bars is the harmonic progression. The researchers admit that they have 'ignored' the possible impact of melody in this experiment, but the harmonic dialectic, to the extent that it is possible to isolate from the melody at all, is more fundamental, forming a salient half close in bar three and four, which is resolved by a full close in bar eight. It seems more likely then, that it is the harmonic-melodic progression that is triggering the frontopolar cortex in this case.

If this is true, it would confirm the hypothesis that even the basic question-answer dialectic of tonal music is involving BA10. The agogic and temporal deviations of the performer might also have influenced these results. According to the researchers, this was a central aspect of the study; yet it is uncertain if such small changes during a period of ten seconds are complex enough to trigger this kind of frontopolar activation. A possible way of checking these things might be to

try to remove the harmonic functions from the music and melody. If the rostrolateral prefrontal activation disappeared it would be a strong indication that the harmonic functions are partially constituted here, in the same region that is dealing with other instances of hypothetical reasoning.

As for the contributions of the performance agogic, a possible way to check for this would be to contrast it with performances that are completely mechanical. This is exactly what is done in a fMRI study by Chapin and colleagues, comparing a 'mechanical' recording with the recording of the expressive rubato playing of an 'expert pianist'.⁵⁵ It has to be said, however, that the experiment is rather different from that of Popescu in the sense that the chosen piece of music is much longer here, giving the performer much more time to evoke to the kind of uncertainty-related metacognition which has been connected with the rostrolateral prefrontal cortex.

At the same time the study is somewhat naive in the sense that it is assuming any 'expert pianist' to be able to bring this about. This is not automatically the case. Even 'expert pianists' may be prone to mannerism, which is not always in tune with the work. It is easy to gloss over a drama or discourse by focussing on virtuosity or by inserting 'beautiful' vibratos and swells where the context of the work - if one take one's time to analyse it - is rather suggesting something humble or sinister. In fact, one should not even take for granted that the composition has the potential to realise the requested emotional depth. This should not be a problem in this case, however, since the music is composed by Chopin. His rather dramatic *Etude in E major, Op 10, no. 3.*, with the nickname 'Tristesse', has undoubtedly stood the test in this regard.

The study is focussing on an aspect of music which is often crucial to its realism and emotional impact. The situation of a musician, an actor, or even a news reporter is similar in this sense, that if they are not imparting the emotional and agogic aspects of narration - the timing and the accentuations that indicate that what is expressed is really *meant* and *felt* - the behaviour is not very likely to add up to something convincing and psychologically coherent. If an agitated passage is not agitated even in detail, it is hardly agitated at all, and the whole causal chain of the work might easily collapse. Determining the general impact of such emotional involvement then, would also reveal whether there is something meaningful at stake in music, beyond the relativist conception of mere sequence prediction.

⁵⁵ Heather Chapin, Kelly Jantzen, J.A. Scott Kelso, Fred Steinberg, Edward Large, 'Dynamic Emotional and Neural Responses to Music Depend on Performance Expression and Listener Experience,' *PLoS ONE*, Vol. 5, Number 12 (16 December 2010): e13812, <https://doi.org/10.1371/journal.pone.0013812>.

And sure enough, the neural activation pattern was very different in the case of the expressive performance. Especially it highlighted what the researchers were referring to as the 'mirror neuron system', represented by the ventrolateral prefrontal and anterior insular region, as well as the primary sensorimotor areas, the pre-SMA, the inferior parietal cortex, the cerebellum, and the anterior cingulate; with BA47 and the right anterior cingulate being more active in the most experienced listeners. Many subcortical and limbic structures were also involved, like the parahippocampus and the amygdala. More important to the present discussion, however, was the fact that the frontopolar cortex (BA10 and BA9) was also highlighted by the expressive performance, in similar regions as in Popescu's study (x,y,z , = 10, 59, 32 and -22, 59, 16; and more medially: -2, 67, 4).

The most lateral of the frontopolar activations were correlated with tempo fluctuations in the performance (see Figure 6 and Table 3), which is not surprising, as there are few other factors that are able to stir our expectations as much as an *accelerando* or *ritardando*. Such buildups or slowdowns are often accompanied by dramatic variations in dissonance and loudness, building suspense and expectations of release; all of which is likely to involve the kind of emotional and behavioural metacognition that is often associated with the frontopolar cortex.

The pattern of heightened frontopolar and motor involvement is similar to that evoked by jazz piano improvisation in the earlier mentioned study by Limb and Braun, which is yet another indication of the similarity between creative playing and mere listening. Perhaps the frontopolar activity does not have to be self-generated as Kalina Christoff has suggested. Rather it may be necessary for metacognition in general: in Chapin's experiment the grasping of the musical dramaturgy enlivened by the *rubato* performance; in Limb and Braun's study: the extemporaneous narrative considerations of professional jazz musicians.

Limb has another explanation, however, which is related less to the frontopolar engagement than to the silencing of more dorsolateral frontal regions during jazz improvisation, which, he argues; 'may be associated with defocused free-floating attention that permits spontaneous unplanned associations, and sudden insights or realizations'. The ideation process may even take place 'outside conscious self-monitoring', he says, like in daydreaming and hypnotic states.⁵⁶

⁵⁶ Charles J. Limb and Allan R. Braun, 'Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation', *PLoS One*, Vol. 3, Issue 2 (27 February 2008), <https://doi.org/10.1371/journal.pone.0001679>.

There is undoubtedly much truth in this. The capacity of conscious attention is limited, and the aptitude for autonomous emotional self-production even more so. If the lower levels of action planning and the business of handling ones instrument are not somehow automated and freed from conscious attention, there would not be enough attentional resources left to create a captivating and coherent performance. More extramusical, mnemonic and socially related aspects of self-assessment, might also have to be silenced; capabilities which have all been associated with dorsolateral prefrontal regions.

In jazz improvisation this automatisisation, even of relatively high levels of action planning, is very clear, since at the elementary level it is typically composed of a repertoire of scales, arpeggios, melodic figures or 'licks', which the musicians spend years learning and integrating in their motor memory. Such improvisation may not necessarily be very original or deeply felt. The drive towards social acceptance and stylistic conformism is even working against it, which is standing in a paradoxical relation to the drive to be unique. In any case: to be able to entertain and captivate the listeners one would have to combine the licks in a way that is interesting and dramaturgically coherent.

The question then, is whether Limb has stretched the analogy with dreaming a bit too far. Without a conscious and extremely focussed attention to the ego-dynamic process, any 'unplanned associations, insights and realizations' pertaining to this realm would hardly come about. Music is more than an intuitive splattering of paint on a canvas. It has a dramatic structure, and it is difficult to see how it would be possible to make any original decisions about such matters while being inattentive to what is going on. On the contrary, certain aspects of self-awareness might have to be heightened to secure a coherent handling of such dramas.

If the soloist is not one step ahead of the listeners, imagining the effect of succeeding moves in relation to the preceding narrative, he would not be able to avoid repeating himself, or combine the licks in a manner that is interesting and contrary to what is expected. The playing would be chaotic, with no development towards high points or even harmonic progressions. Nor would he be able to cover his own blunders or straddle the boarder between allusions and copying, daring and control, cheesiness and coolness. In more advanced forms of improvisation, where the focus is not only on showing off, or producing adequate jazz, but the creation of a consistent mood or drama as well, the meta-emotional demands would be even higher, all of which is probably putting a lot of strain on the frontopolar cortex.

As a defence of their idea of dream-like detachment in jazz improvisation, Limb and Braun tend to speak of the frontopolar activations as pertaining to the *medial* prefrontal cortex, which has been associated rather with the monitoring of more static or slowly pacing aspects of the self, like personal qualities and aesthetic liking, which is bringing up the issue of the functional and anatomical divisions of the frontopolar cortex. The medial frontopolar cortex is stretching backwards along the inside walls between the hemispheres, towards the anterior cingulate cortex; yet it is not given that these more medial regions are doing the same thing as the frontalmost areas of the frontopolar cortex, which are bordering and extending into the lateral prefrontal cortex.

Interestingly enough, Limb and Braun are referring to a PET study by Braun from 1997, which is registering medial activity as far ahead as the frontopolar cortex ($x, y, z = 6, 56, 16$) even in REM sleep.⁵⁷ Other studies show a slightly different pattern. A meta-study by Kieran Fox on dreaming and mind wandering is also documenting medial prefrontal activity, but it is associated with 'loose narratives', and located to a core region in more posterior parts of the medial prefrontal cortex (see Figure 1, illustrating the neural substrate of REM sleep).⁵⁸ Other studies again are pointing to increased activity in the dorsolateral prefrontal cortex as a sign of lucid dreaming.

A metastudy by Sam Gilbert and colleagues might shed more light on this. It confirms the observation that the lateral regions of BA10 tend to be associated with 'episodic memory retrieval', whereas the most medial regions are connected with the monitoring of *mental states*, whether they belongs to oneself or other people. What is so enlightening about Gilbert's study, however, is that he is also pointing to a functional differentiation along the rostral to caudal axis in the medial frontopolar cortex, where the frontalmost area of this region is concerned rather with 'multiple task coordination'.⁵⁹ This is precisely the area that Limb found to be active in improvisation. Moreover, some of the frontopolar coordinates in Limb's study (like $x, y, z = -27,$

⁵⁷ Allen Braun, T. J. Balkin, N. J. Wesensten, R. E. Carson, M. Varga et al., 'Regional blood flow throughout the sleep-wake cycle. An H2(15)O PET study,' *Brain*, Volume 120, Part 7 (August 1997): 1173-97. <https://doi.org/10.1093/brain/120.7.1173>.

⁵⁸ Kieran C. R. Fox, Savannah Nijeboer, Elizaveta Solomonova, G. William Domhoff, and Kalina Christoff, 'Dreaming as mind wandering: evidence from functional neuroimaging and first-person content reports,' *Frontiers in Human Neuroscience*, Vol. 7, No. 412 (30 July 2013). <https://doi.org/10.3389/fnhum.2013.00412>.

⁵⁹ Sam J. Gilbert, Stephanie Spengler, Jon S. Simons, J. Douglas Steele et al., 'Functional Specialization within Rostral Prefrontal Cortex (Area 10): A Meta-analysis', *Journal of Cognitive Neuroscience*, Vol. 18, No. 6 (July 2006): 943. <https://doi.org/10.1162/jocn.2006.18.6.932>.

53, -2 or -27, 63, 15) are even defined as *lateral* by Gilbert, which places them well within the region for multiple task coordination.

The conclusions of Gilbert's study are reminiscent in many ways of Etienne Koechlin's findings from 2000, that the lateral and medial parts of the frontopolar cortex are dealing with unpredictable and predictable behavioural sequences respectively.⁶⁰ The frontalmost frontopolar region however, is dealing *both with predictable and unpredictable tasks*, which may also explain the findings of Braun.

Even the most frontopolar cortex might be classified as part of the lateral 'action hierarchy' then; which is not precluding that the type of action coordination that is taking place here may be more intuitive than in more lateral regions. There is little time for much trying and failing or extensive reflection in improvisation. It is a paradox of human level existence that the most complex emotions, often induced by musical performances, are also subconscious in many respects. At the pinnacle of such events, experiencing transcendent bliss or 'smiling through tears', we perceive as immediate what is rather a metacognitive synthesis of a long row of emotions. We are goaded from moment to moment by the symphony or the concert, and although the feelings we experience are products of this whole development, we are not able to describe how it came about.

It is important to remember then, that we are not merely dealing with associations between 'sequence material' in the frontopolar cortex. Rather we are dealing with a process of meta-emotional integration, which is also productive of the functional 'gestalts' or 'abstract concepts' of such functions. Even the formation of moral judgements and concepts might be located to this region of the brain.⁶¹ Certainly these entities and processes have to be constituted somewhere in the brain, and there is hardly a better candidate than the frontopolar cortex. As earlier remarked, research on these matters is still in its infancy. Some studies are pointing to a conceptual hierarchy in the brain, where the most complex and abstract concepts are produced in the frontal cortex. A problem in some of these studies is the tendency to confuse concepts with

⁶⁰ Etienne Koechlin, Gregory Corrado, Pietro Pietrini, and Jordan Grafman, 'Dissociating the role of the medial and lateral anterior prefrontal cortex in human planning', *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 97, No 13 (13 June 2000): 7651-7656. <https://doi.org/10.1073/pnas.130177397>.

⁶¹ Jorge Moll, Paul J. Eslinger, Ricardo de Oliveira-Souza, 'Frontopolar and anterior temporal cortex activation in a moral judgment task: Preliminary functional MRI results in normal subjects', *Arquivos de Neuro-Psiquiatria*, Vol. 59, No. 3-B (September 2001): 657-658. <https://doi.org/10.1590/s0004-282x2001000500001>.

semantics and *words*, which may or may not favour the left hemisphere.⁶² The fondness of many researchers for low level concepts like 'dog' or 'animal' is not very enlightening either, as it tends to ignore the fact that even higher level entities, like 'enlightenment' or 'ignorance', are ontologically real.

To pinpoint the role of the right hemisphere, beyond the constitution of functions like sarcasm, lying, and advanced humour - which have already been associated with the right prefrontal cortex - more such studies are undoubtedly needed. Since some lesion studies indicate that the right prefrontal cortex is essential to *discourse planning*⁶³ - which is very much the epitome of autonomous ego-dynamic processing - it might also be central to the gist or concept formation going into the perception of such processes in music. The findings of Popescu and colleagues may be taken as an indication that aspects of the question-answer dialectic in tonal music are monitored in the right frontopolar cortex, but it is impossible to draw any decisive conclusions about these matters until more studies are made. To make sure that we are talking about the same things, one would also have to secure that the subjects in such studies are not relying too much on routine or mannerisms, but are engaged in a truly emotional and creative process. It is not entirely clear whether this was the case in Limb and Braun's experiment.

11.4 Lesion studies: a possibility of proof and falsification

If the main hypothesis of this treatise is correct, that the self has a melodic or 'egodynamic' structure which is essential to the formation both of social emotion and general consciousness, one would expect that variants of *amusia*, *aprosodia*, and *akinesia* would be comorbid not only with each other, but with *dementia* in many cases, or at least, some deficits in emotional or discursive comprehension. Indeed, the search for such comorbidity might perfectly exemplify the hypothetico-deductive method, which is often identified with the so called 'scientific method'. If the experiences of selfhood and melody are mutually dissociable and retained even in the case of a malfunctioning inferior frontal gyrus, the theory might be falsified.

⁶² See J. R. Binder, C. F. Westbury, K. A. McKiernan, E. T. Possing, D. A. Medler, 'Distinct brain systems for processing concrete and abstract concepts', *Journal of Cognitive Neuroscience*, Vol. 17, Issue 6 (June 2005): 905-917, <https://doi.org/10.1162/0898929054021102>.

⁶³ Rachel Mitchell, Tim J. Crow, 'Right hemisphere language functions and schizophrenia: the forgotten hemisphere?', *Brain*, Vol. 128, Issue 5 (May 2005): 128. <https://doi.org/10.1093/brain/awh466>.

The path to truth is seldom so straight forward. The brain has two similar hemispheres, a considerable capacity for reorganisation, and studies differ widely with regard to both the size and location of lesions. Many researchers give little attention to comorbidity or the question whether a certain correlate is *sufficient* or merely a necessary but *subordinate* element of a more complex function. Needless to say, the results of these studies are often too different to be lumped together in the statistics of metastudies. And even if the amount of participants in metastudies is reduced to a set of relatively similar studies - like for instance in Rajamanickam Yuvaraj's *Review of Emotion Recognition in Stroke Patients*⁶⁴ - Yuvaraj and colleagues also point to the fact that even the relevant studies may be methodologically problematic, since they are often entailing *forced choices*, like the identification of mimicry or other *dynamic* phenomena with static and stereotypical photographs, or the classification of complex emotional behaviour according to simplistic ideas of so called 'basic emotions'.

Concentrating on a few 'high quality' studies, on the other hand, might be rejected as subjective 'cherry picking'. Yet there is no way out of this impasse other than a discussion of individual studies - a discussion where even challenging findings should be taken into account and integrated into a more comprehensive understanding. Something resembling consensus will emerge only from a larger discourse. Certainly there are already general tendencies within this field, which by and large are confirming the theories of this treatise. Even Yuvaraj's metastudy is concluding that 'deficits in emotion perception were more frequently observed in individuals with right brain damage', especially with regard to 'the facial and prosodic channels'; and they *do* appear to be correlated with 'a variety of interpersonal difficulties'.

If we start with some lesion studies focussing on melody and prosody then, the hypothesis of a generation of melody and other discursive negotiations in the right ventrolateral prefrontal cortex is certainly confirmed; to the extent, in fact, that several lesion studies, including a study by Aleksí J. Sihvonen and colleagues, are pointing to the right inferior frontal gyrus as a '*critical hub*' for prosody and music.⁶⁵ As earlier noted, this is also the region that has been found to be

⁶⁴ Rajamanickam Yuvaraj, Murugappan Murugappan, Mohamed Ibrahim Norlinah, Kenneth Sundaraj, Mohamad Khairiyah. 'Review of Emotion Recognition in Stroke Patients.' *Dementia and Geriatric Cognitive Disorders*. Vol. 36, No 3-4 (July 2013): 179-196. <https://doi.org/10.1159/000353440>.

⁶⁵ Aleksí J. Sihvonen, Teppo Särkämö, Antonio Rodríguez-Fornells, Pablo Ripollés, Thomas F. Münte, Seppo Soynila, 'Neural architectures of music - Insights from acquired amusia', *Neuroscience & Biobehavioral Reviews*, Vol. 107 (December 2019): 104-114. <https://doi.org/10.1016/j.neubiorev.2019.08.023>.

essential to emotional comprehension in general, as a core region for the so called 'mirror neurone system', all of which is in tune with the hypothesis of sound as a medium for emotional gestalt formation.

The study by Sihvonen and colleagues - utilising a whole arsenal of modern lesion-mapping techniques - is explaining amusia in the light of what they call a 'dual stream model in the right hemisphere'. A common cause of acquired amusia, they say, is stroke afflicting the right middle cerebral artery region, disrupting especially the *ventral stream* - the so called 'inferior fronto-occipital fasciculus' - which is connecting the inferior frontal cortex with auditory areas in the temporal cortex. Such lesions are also involving the insular cortex in many cases: a part of the brain which is central to visceromotor sensation and multisensory integration; and one might speculate whether hedonic properties like vocal or tonal warmth are also afflicted in these cases. The musical abilities were shown to be recoverable as long as the other main route between the temporal and frontal cortices, the so called *dorsal stream* or 'arcuate fasciculus' was intact. At least this was true for the aspects of music perception that were tested by Sihvonen and colleagues in a previous study; yet they found reasons to conclude that 'if both the dorsal and ventral streams are damaged, due to larger lesion size or location, it is unlikely that acquired amusia recovers'.

The hypothesis of right hemisphere dominance in music perception was by and large confirmed here. The lesion patterns giving rise to *aphasia* versus acquired *amusia* showed 'clear lateralisation, clustering in left and right hemispheres respectively'. Stroke afflicting the left inferior frontal gyrus, the so called Broca's area, was associated with a more transient form of amusia, with better later recovery. Amusia was found to have an occasional comorbidity with aphasia, which was explained by pointing to 'a shared network' for language and melody in the left and right inferior frontal gyrus. This might also explain why the experience of *sung lyrics* was spared in the cases studied by Sihvonen and colleagues. In the case of verbal song-perception, but not instrumental music, the right inferior frontal gyrus was actually over-active, which may indicate that the right hemisphere is stimulated by the left hemisphere in such cases, most likely via the corpus callosum.

The study is similar to an earlier study of fronto-temporal disconnection by Hyde, Zatorre, and Peretz, both of which are in agreement about the fact that amusia does not require any temporal or auditory cortex damage. Rather 'what may distinguish the amusic brain from the

normal brain', says Hyde and colleagues, 'is a reduced connectivity between the auditory cortex and the inferior frontal gyrus that would be required to consciously or cognitively process pitch in a sequential context.'⁶⁶

The assertion is somewhat curious, as there is little doubt that even auditory cortex lesions may disrupt music perception, albeit in a manner that should never be confused with the problems with melodic and discursive organisation in the frontal cortex. As a matter of fact, Hyde and Zatorre have themselves made a contribution to the understanding of different correlates for song and speech in the temporal cortex. The production of speech and song rely on 'different processing systems', they suggest. While speech melody is described as 'coarse grained' and less dependent on precise tonal relations, song melody is 'fine-grained and possibly unique to music'.⁶⁷ In an earlier study they concluded that 'there is consistent evidence for a relative advantage of right auditory cortical structures compared to left for fine-grained spectral processing'.⁶⁸

Other studies have delineated more precise neural correlates of these abilities. Sam V. Norman-Haignere and colleagues are speaking of 'distinct cortical pathways for music and speech' in the temporal cortex,⁶⁹ and they are pointing to neuropsychological studies by Isabelle Peretz and colleagues that have reported selective deficits in music perception after focal lesions to the auditory cortex.⁷⁰ Similarly, Adam Tierney and colleagues are speaking of 'multiple pitch-selective areas' in the auditory cortex; some of which are responding more strongly to song-like speech as compared to ordinary speech, making 'increased demands on pitch processing and

⁶⁶ Krista L Hyde, Robert Zatorre, and Isabelle Peretz, 'Functional MRI Evidence of an Abnormal Neural Network for Pitch Processing in Congenital Amusia', *Cerebral Cortex*, Vol. 21, Issue 2 (February 2011): 292-299. <https://doi.org/10.1093/cercor/bhq094>.

⁶⁷ Robert J. Zatorre, Shari R. Baum, 'Musical Melody and Speech Intonation: Singing a Different Tune', *PLoS Biology*, Vol. 10, No. 7 (31 July 2012). <https://doi.org/10.1371/journal.pbio.1001372>.

⁶⁸ Krista L Hyde, Isabelle Peretz, Robert Zatorre, 'Evidence for the role of the right auditory cortex in fine pitch resolution', *Neuropsychologia*, Vol. 46, Issue 2 (2008): 632-639. <https://doi.org/10.1016/j.neuropsychologia.2007.09.004>.

⁶⁹ Sam Norman-Haignere, Nancy G. Kanwisher, and Josh H. McDermott, 'Distinct Cortical Pathways for Music and Speech Revealed by Hypothesis-Free Voxel Decomposition', *Neuron*, Vol. 88, Issue 6 (16 December 2015): 1281-1296. <https://doi.org/10.1016/j.neuron.2015.11.035>.

⁷⁰ Isabelle Peretz, Isabelle, Régine Kolinsky, Mark Tramo et al., 'Functional dissociations following bilateral lesions of auditory cortex', *Brain*, Vol. 117, Part 6 (December 1994):1283-1301. <https://doi.org/10.1093/brain/117.6.1283>.

auditory-motor integration'.⁷¹ There are even studies claiming that the 'monkey auditory cortex contains neurones with response properties related to harmony'.⁷²

Since some of these sensory adaptations for harmony seem to be unique to humans and possibly some animals, they may well be evolutionary late, but this is not to say that they are particularly high up in the hierarchy of gestalt formation in the brain. Although the harmonious sensations are necessary constituents of higher level human institutions like cradle songs, work songs, ecstatic rituals, religious sermons, entertainment etc., this is not to say that the sensory regions of the brain are sufficient for the *organisation* of the components into such complex behaviour. Contrary to the views that may be harboured by music researchers focussing entirely on the auditory cortex, musical experience may not even exist as such in the temporal cortex. The auditory areas themselves may not have the resources to constitute the kind of dialectical interactions between attitudes going into social emotions and discursive melodic processes. For this to take place, the prefrontal cortex seems to be required, and especially its behaviourally oriented *ventrolateral* regions have been shown to be essential.

But the same argumentation may be directed against a narrow-minded limitation to the inferior frontal gyrus. Even if this is a 'critical hub' for conscious emotional interaction, which may be foundational in the formation of higher level processes and functions, it is not a *sufficient* correlate for all these functions. The tasks that are studied in investigations like the ones mentioned above are often relatively simple, fragmented, and even artificial in some cases. Only seldom do they take into account more complex emotional and dramaturgical processing, let alone the level of existential and ethical reflection in the fine arts. As we will come back to in the next chapter, these are functions that are also engaging areas - even specifically auditory areas - in the frontopolar and dorsomedial frontal cortex. Also, one should not forget that the performance of music may be drawing heavily on the left hemisphere for the handling of musical instruments and the symbolic mapping of fingering, notes, and scales; which is probably why the corpus callosum is sometimes enlarged in musicians. Especially during the reading and rehearsal of music, these functions may be crucial. During the actual performance, the emotional

⁷¹ Adam Tierney, Fred Dick, Diana Deutsch, 'Speech versus Song: Multiple Pitch-Sensitive Areas Revealed by a Naturally Occurring Musical Illusion', *Cerebral Cortex*, Vol. 23, Issue 2 (February 2012): 249-254. <https://doi.org/10.1093/cercor/bhs003>.

⁷² Hiroki Terashima and Haruo Hosoya, 'Sparse codes of harmonic sound and their interaction explain harmony-related response of auditory cortex', *BMC Neuroscience*, Vol. 11, Issue 1:019 (July 2010): <https://doi.org/10.1186/1471-2202-11-S1-O19>.

coherence and creativity going into melodic expression should always be the prime concern, which is why both classical and jazz soloists are usually playing 'by heart' or in a state of intuitive 'flow'.

Musical behaviour is activating the whole brain, and it is reasonable to suppose that damage to any of its higher level correlates would often be comorbid with the processing of similar rhetorical and dramaturgical gestalts engaging faculties like mimicry and gesture. Thus one should think that even more extensive grey matter lesions in the inferior frontal gyrus, or lesions in regions like the frontopolar or medial frontal cortex, would also give rise to amusia, perhaps even more severe cases of amusia than those discussed by Sihvonen and Hyde. Yet they seem to be eschewing this idea by focussing on connectivity issues and relatively simple tasks.

It is unclear whether this strategy is chosen because such connectivity failures are very common, or because they want to focus on cases where the perception of 'music' is selectively impaired. Sure enough, in the introduction to the above mentioned article, Sihvonen and colleagues are defining amusia as a condition that is 'not caused by general cognitive functions, perceptual, or motor disability'. But this is exactly what the importance of the inferior frontal gyrus is disproving, so the definition is clearly too narrow. This is unfortunate, because it may exclude from consideration a plethora of amusia cases, which comorbidity with deficits in the perception of gestures, discourse processing etc., might also shed light on the commonality, or *identity*, of melodic organisation with such processes. As noted by Sihvonen and colleagues, it is a problem that amusia is 'not routinely evaluated in clinical practice and therefore remains underdiagnosed'; but it is unclear to which extent they are themselves correcting or obscuring this picture.

Even Sihvonen and colleagues do recognise that 'amusia is often coupled with problems in linguistic or emotional prosody', and according to an earlier study by Teppo Särkämö and other colleagues of Sihvonen, 'amusia patients both with and without auditory cortex damage performed worse than the non-amusia patients on tests of working memory, attention, and cognitive flexibility.'⁷³ Similarly, William Forde Thompson and colleagues, conclude that 'congenitally amusic individuals were significantly worse than matched controls at decoding

⁷³ Teppo Särkämö, Mari Tervaniemi, Seppo Soynila, Teina Autti et al., 'Auditory and cognitive deficits associated with acquired amusia after stroke: a magnetoencephalography and neuropsychological follow-up study', *Plos One*. Vol. 5, No 12 (2 December 2010), <https://doi.org/10.1371/journal.pone.0015157>.

emotional prosody' and 'understanding emotional prosody in their daily lives';⁷⁴ all of which is certainly implying 'general cognitive functions'.

A problem in many of these studies is the amount of levels and abilities involved, which when speaking of 'amusia' are easily mixed up and confused. Certainly, one needs a very sophisticated phenomenological and anatomical understanding to keep all the different 'amusias' from each other. First of all: melody, and egodynamic consciousness in general, is much more complex than the kind of temporal 'sequence' that might be put together in the temporal cortex. As argued in part two, it is probably better understood as a *nested hierarchy*, where movements related to movements are forming composite actions - actions related to actions are forming attitudes - attitudes related to attitudes are forming rhetorical functions - rhetorical functions related to rhetorical functions are forming discourses or dramas - all of which may have different hedonic tones and intensity. The problem is that these *discursive* gestalts are still not properly integrated in the understanding of emotional behaviour, so the conceptual apparatus of many researchers is still remaining at a basic level.

So let us focus on the kind of melody that is called *prosody* or *intonation* now. Expect that it is simpler and more robust in the sense of being less dependent of fine grained pitch perception and exact interval ratios, there is no indication that it is principally different from other melody. Yet it has the advantage that it is penetrating almost all our interactions with other people, so it is much harder to neglect than song or the appreciation of musical works. Its absence should be a very conspicuous symptom even in the case of seemingly unrelated emotional and social problems. Indeed, it might shed some light on the manner in which melody is rather *constituting* such functions and problems. Since speech melody is so ingrained in our mental processes, and seldom notated on paper, it is also less prone to being dissociated from these processes, or confused with visual objects like notes, 'contours', and the like.

There is already a vast amount of research on this topic, and much of it was summed up in an article by Elliott D. Ross and Marilee Monnot in 2007.⁷⁵ Their study of affective prosody was

⁷⁴ William Forde Thompson, Manuela M. Marin, and Lauren Stewart, 'Reduced sensitivity to emotional prosody in congenital amusia rekindles the musical protolanguage hypothesis', *PNAS*, Vol. 109, No. 46 (29 October, 2012): 19027-19032. <https://doi.org/10.1073/pnas.1210344109>.

⁷⁵ Elliott D. Ross, Marilee Monnot, 'Neurology of affective prosody and its functional-anatomic organization in right hemisphere', *Brain and Language*, Vol. 104, No 1 (January 2008): 51-74. <https://doi.org/10.1016/j.bandl.2007.04.007>.

published twelve years earlier than the above discussed study of Sihvonen and colleagues, and there is little doubt that it had an influence on it. It is also complementing it in several ways. Indeed they found reason to conclude that 'injury to the right frontal operculum produces with extraordinary robustness, acute deficits in the spontaneous production of affective prosody'; which, if it is correct, is certainly documenting the commonality of these types of melody. Like in Sihvonen's study, some of the patients (9 out of 21) had lesions involving even 'deep structures' like the basal ganglia and thalamus, but according to Ross and Monnot, these lesions were not necessary or dominant causes of aprosodia in this cohort. Nor was an injury to the anterior insula found to be required.

The picture of hemispheric specialisation is even clearer here, as affective prosody is distinguished from linguistic intonation, and located entirely to the right hemisphere. The aprosodia caused by left hemisphere lesions was found to be diminishing when instead of words the sequences were replaced by a repeated monosyllable (*ba ba ba ba*) or an asyllabic articulation (*aaaaahhh*). Moreover, the prosodic deficits resulting from left hemisphere lesions were found to be related not to the severity of aphasic deficits but to the lesions involving the deep white matter adjacent to the corpus callosum, causing a loss of callosal integration with the right hemisphere. Unlike Sihvonen and colleagues, they were also looking into frontal opercular lesions of various sizes; and it was the largest lesions that were found to be most detrimental. Strangely enough, the medium small lesions did not have the same impact on the *repetition* task as the smaller and bigger lesions. Perhaps these lesions were big enough to trigger some reorganisation. The left hemisphere may be more prone to repetition than the right hemisphere. Also, the limited number of participants in this and similar studies is making them random to some extent.

Nevertheless, Ross and Monnot went so far as to speak of the organisation of prosody in the right hemisphere as 'analogous to the organisation of propositional language in the left hemisphere'. Whereas the right hemisphere homologue to Broca's area was found to be required for the 'spontaneous production' of prosody, the right homologue to the so called Wernicke's language area was found to be important to the *comprehension* of prosody. They even speak of a 'non-verbal lexicon' for prosody here, which is a contradiction in terms.

It does not seem very likely that the parietal cortex is responsible for perception of the kind of rhetorical dialectic which is obviously involved even in the perception of prosodic cadences and

phrases, but again: the kind of comprehension that was investigated here, was the identification of 'basic emotions' (*neutral, disinterested, happy, sad, angry, surprised*). These emotions, to the extent that they transcend the level of mere instinct, mood, and visceral feeling, may well be simple enough to be captured even by limbic regions in cooperation with auditory areas, or by hierarchically lower motor or premotor areas, like the dorsolateral regions of Brodmann area 6. Certainly, the auditory areas, and even the temporal pole, is involved in the provision of components, but this is not to say that they are sufficient; at least not in the case of more complex emotions expressed by prosody.

As earlier argued, the field of 'emotion' is much more variegated and subtle, and integrated with behaviour in most cases. Even primitive reactions and attitudes are involving behaviour. Aggression is *jagged*, like the barking of a dog. Joy is *harmonious*, like a dog rhythmically wagging its tail. Fear is *recoiling* and *retracting*, like in yelping etc. But these are instinctual behaviours. The lateral frontal cortex, even in animals, may be dealing with much more complex and flexible behaviour than this.

To get a better understand of what these cortical regions are doing, it would be beneficial if the terminology and experiments could also highlight more complex and *discursive* aspects of prosody. Even if it is not yet implemented by researchers, our languages are full of such concepts, which are also easy to speak about; that is to say: before they are disrupted by brain damage. One might favourably look into the neuropsychological differentiation of *questions, answers, assertions, contentions* and the like. At a more detailed level one might ask the subjects to determine whether a question is *polite, sarcastic, rude, rhetorical, or sincere*. Similarly, an *assertion* may be *optimistic, destructive, hateful, ironical, convincing, sly* etc. At a more fundamental level, the answers might be differentiated into categories like *definite* answers, *preliminary* conclusions, *faltering* answers, *reluctant* answers, *humorous* answers and so on.

Musical melodies and cadences, in like manner with the melodies and cadences of ordinary speech, are actually differentiated by such functions, so it is a mystery why they are not investigated to a larger extent. Certainly these functions are also coloured or *valenced* in different directions, albeit in a manner that is infinitely more flexible the so called 'basic emotions'. In harmonious music the feelings may not be captured by basic emotions at all. The musical discourse is taking place within a generally *harmonious, jubilant, and cooperative* mode of being, so there is never any anger, disgust, or acute sadness here. If forcing the participants to

classify the music according to such terms, the results would be random at best. To the extent that tonal music is 'sad', this is an experience of *relative melancholy* within the general framework of *jubilation*, combining elements both of *consolation* and *desolation*. Such experiences are better captured by idiosyncratic concepts like the *minor mode*, a *lament* or a *funeral march*; and in these cases, there is little doubt that people are able to perceive and label the functions if requested to do so. The *actuality* of these specifically musical feelings, and their location to a core region for emotion and empathy, is evidencing that melody and emotion is more than the communication of primitive and fixed categories: it is exploding this field, in a manner that has been of tremendous importance to human life and culture.

Yet researchers are only reluctantly giving up their reductionist attitude. Even Ross and Monnot are speaking of prosody in terms of basic emotions and 'intonation contours'. So let us take a look at the conceptual apparatus of researchers dealing with other functions located to the same cortical regions. Ross and Monnot are pointing to the fact that earlier neurological studies of aprosodia were 'always' initiated after patients were evaluated because of 'substantial psychosocial difficulties'; but, except for the fact that some of their own patients suffered from *hemispatial neglect*, they did not themselves look much into these matters.

An article by Sara M. Szczepanski and Robert T. Knight from 2014 purports to give an overview of knowledge accumulated from research into prefrontal lesions.⁷⁶ Their initial historical reflections speaks volumes about the kind of eliminative materialism which earlier dominated this field. Studies of human and monkey brains gave the impression that the prefrontal cortex was 'cognitively silent', and that large portions could even be removed without severe losses of mental capacity. In fact, the cruel and devastating practice of 'lobotomy' was to a large extent upheld by such beliefs. It is first in recent decades that a conceptual apparatus has emerged, that is able to capture some of the functions and functional differentiations of prefrontal structures.

If we concentrate on the lateral and frontopolar regions now, their review of recent lesion studies is very much confirming the picture already given by neuroimaging, of a hierarchy stretching from posterior to anterior parts of the frontal cortex. Lesions in the *ventrolateral prefrontal cortex* (BA44, 45, and 47), are often found to be disrupting functions like 'the

⁷⁶ Sara M. Szczepanski, Robert T. Knight, 'Insights into Human Behavior from Lesions to the Prefrontal Cortex', *Neuron*, Vol. 83, Issue 5 (3. September 2014): 1002-1018. <https://doi.org/10.1016/j.neuron.2014.08.011>.

inhibitory control and flexible adjustment' of 'movement plans', the 'overriding of prepotent motor responses', and the 'resolution of internal conflict'. Both in humans and monkeys this is demonstrated. In addition there are symptoms like hemispheric visuospatial and motor neglect: so called 'directional hypokinesia'. Especially in the case of right hemisphere damage such problems are common, while more language related problems have been connected with the left hemisphere.

Damage to the *dorsolateral prefrontal cortex* is connected here mainly with such functions as the conscious manipulation and retrieval of episodic memory and the 'linking of facts to previous contexts'; all of which are obviously central features of our almost unfathomable capacity for contextualisation; an ability which may be further enriched and 'updated' in the medial areas of these regions.

Their account of *frontopolar* or *rostral* lesions is conceptually richer, with interesting reflections. Like in the case of the whole prefrontal cortex, they say, the function of the polar regions 'remained unspecified for many years', because damage here 'often do not exhibit deficits on traditional neuropsychological testing batteries'. At the same time the patients with lesions in this region displayed disorganised behaviour in their daily lives; and it is first during the latter decades that researchers have begun to link these behavioural impairments to underlying functions. Some of the concepts that are mentioned here are: *multitasking*, *metacognition*, *analogical reasoning*, *cognitive branching* and *switching*, *prospective memory*, *time estimation*, *creativity*, *introspection*, *self-judgment*, *mentalising*, and *theory of mind*.

Curiously enough, the authors, while pointing to the importance of looking more into the correlations between different problems and functions, are themselves ignoring the considerable amount of research on melody, prosody, discourse processing, and the co-location of melody and emotional behaviour to the lateral prefrontal cortex. Consciously or unconsciously, because of brevity concerns or a false dichotomy between emotion and behaviour, they seem to downplay the ego-dynamic aspects of the self, which according to Wilhelm Wundt and William James are essential to the consciousness of the self in the process of thinking and acting. The prevalence of melody and other ego-dynamic processes might even give some hints of the *general function* of the prefrontal cortex, which Szczepanski and Knight are explicitly asking for.

The mentioned concepts of 'movement plans' and 'internal conflict resolution' are obviously intimately related to melodic and emotional behaviour, but the picture is a bit too technical to

give a coherent picture of consciousness and conscious behaviour. It is a fact that is often obscured by linguistic and computational approaches, that our whole reality is basically *a stream of sensations*; and as pointed out by James, Wundt and even Freud: it is those streams of feeling pertaining to the *volitional process of thinking and acting* that are dividing the larger field of sensations into self and other, inanimate objects and fellow beings. Certainly some aspects of the thinking process are captured by conceptions of 'meta-cognition' and 'self-judgement' in more rostral regions, but the manner in which it is also building on the lateral hierarchy is still not clarified.

Perhaps some research into *discourse processing*, like Andrea Marini's 'Characteristics of Narrative Discourse Processing after Damage to the Right Hemisphere',⁷⁷ might serve to complement this picture. A group of patients with *anterior right hemisphere ischemic lesions* were not aphasic; or as she put it: the 'microlinguistic' level was intact. But they had problems with the construction of stories from picture sequences. Unlike the healthy control group, their accounts were full of 'tangential errors' as well as irrelevant, detail oriented digressions and 'conceptually incongruent utterances'.

The deficits are described as 'macrolinguistic'; which is problematic, as it seems to presume that the comprehension of temporal events and stories is a product of *linguistics*. On the positive side, the study is giving an indirect clue to the *gestalt character* of such comprehension, which is often expelled from the consciousness of reductionist researchers. The patient's descriptions were not only incongruent but lacking in *informative words*, which may indicate that the kind of conceptual gestalt formation normally taking place in the right lateral prefrontal cortex was deficient. Marini also speaks about lacking 'gist', which is not a verbal category; and by taking into account such conceptual deficits, it indirectly confirms the gestalt character of experience of which concepts and gist-formation obviously depends. As we will come back to below, it may be more convenient to *explain away* such entities as parts of language than to recognise the perceptual integration and hierarchical nesting of behavioural elements that is necessarily going into it. But the experiment is unconsciously *confirming* such gestalt formation; and the location to the *anterior right hemisphere* might rather give a hint of its *independence* of linguistics.

⁷⁷ Andrea Marini, 'Characteristics of Narrative Discourse Processing after Damage to the Right Hemisphere', *Seminars in speech and language*, Vol. 33, Issue 1 (February 2012): 68-78, <https://doi.org/10.1055/s-0031-1301164>.

Certainly, narrative comprehension is not limited to verbal communication, it is also central to musical works, to ballet and pantomime, silent movies, animal cognition, and even the kind of *cartoon picture stories* that were investigated in Marini's own study. She also refers to studies that have pointed to problems with the comprehension of humour, nonliteral meaning, unconventional indirect requests, and new metaphoric expressions; all of which are shown to be caused by right hemisphere lesions.

A study by Tiziana Zalla and colleagues into *story processing* is slightly more concrete when it comes to the anatomical location of lesions.⁷⁸ The lesions, and correlated problems with story comprehension, were involving Brodmann areas 6, 44, 45, 11, and 10 in most of the patients - which are the levels of the lateral prefrontal 'action hierarchy' earlier posited - but also anterior cingulate areas like BA24, 32, and 12. All of these regions may be central to melody and ego-dynamic gestalt formation, although the functional hierarchy is not detailed here. Nevertheless they found reason to point out that this pattern of deficits was occurring at 'an early stage of story comprehension' which was not due to working memory deficits, but rather a 'specific impairment in establishing inferential links among complex events'. The question of hemispheric specialisation was not addressed.

Even more anatomically specific is a study of *empathy* by Simone G. Shamay-Tsoory and colleagues.⁷⁹ The concept of 'empathy' may seem unrelated to narrative discourse processing, but it is relying on the very same structures and functions. The understanding of another person's emotions and problems is obviously involving an ability to put oneself in the same situation, simulating their local emotional behaviour, as well as the past and future dilemmas in which they are entangled. It is the very same abilities that are activated when we are *touched* or *excited* by melancholy or joyous music, or when we engage in the kind of long range deliberations and sense of *drama* and *suspense* that is created by musical works.

According to Shamay-Tsoory and colleagues, there is a 'double dissociation' in the brain, between 'emotional empathy' produced by an emotional 'contagion system' in the frontal operculum, and 'cognitive empathy' produced by metacognitive 'perspective taking' in the medial

⁷⁸ Tiziana Zalla, Michael Phipps, and Jordan Grafman, 'Story processing in patients with damage to the prefrontal cortex,' *Cortex*, Vol. 38, Issue. 2 (April 2002): 215-231. [https://doi.org/10.1016/s0010-9452\(08\)70651-8](https://doi.org/10.1016/s0010-9452(08)70651-8).

⁷⁹ Simone G. Shamay-Tsoory, Judith Aharon-Peretz, Daniella Perry, 'Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions,' *Brain*, Vol. 132, Issue 3 (March 2009):617-627, <https://doi.org/10.1093/brain/awn279>.

frontopolar cortex (Brodmann areas 10 and 11). Most notably, they found reason to conclude that lesions to BA44 in the frontal operculum produced 'extremely impaired emotional empathy and emotion recognition', which is perfectly in tune with earlier theories of this area as a core region both for melody, prosody, and the so called 'mirror neurones'. Here they are referring to Preston and De Wall's 'perception action hypothesis' and the idea of a 'mirror neurone system' in the human inferior frontal gyrus and the monkey F5 region presented by researchers like Vittorio Gallese, Giacomo Rizzolatti, and Michael Petrides.

The deficits were produced both by right and left hemisphere lesions, but it was the left hemisphere BA44 lesions that were found to produce the most severe deficits in this case. The results are both confirming and contradicting the above mentioned studies locating melody and prosody to the same areas in the *right* hemisphere. But this might be a product of the visual and visceral character of the two experimental tasks: answering questionnaires about ones ability to experience 'tender', 'concerned,' or 'tense' feelings, or inferring emotions from a series of photographs of eyes. Curiously enough, the location of emotional *comprehension* to this area, was clearer than in Elliott D. Ross and Marilee Monnot's research on affective prosody. But again, the tasks were different. An advantage of Shamay-Tsoory and colleague's experiment is that they also included more complex emotions, like *interested, worried, confident, fantasising, preoccupied, friendly* and *suspicious*. Perhaps these emotions were more relevant to the functions of this region and the photographs that were supposed to express them.

More problematic is their concept of 'cognitive empathy' in the frontopolar cortex. It is a well known fact that there are cases of psychopathy where the 'somatic marking' normally connected with moral and situational appraisals is more or less lacking from emotional concept formation, making for a much more cynical and dry personality, at least in terms of visceral involvement. Yet it is not clear that this was the case here, as the lesions studied were to a large extent located to the ventromedial aspects of the frontal pole, which are part of the orbitofrontal cortex where somatic marking is usually found to take place. It is more likely that the contrast they are constructing is concerned with a difference in *complexity* and the nesting of long range past and future elements. It is difficult to imagine empathy without any kind of emotional engagement. The three tasks that were thought to highlight the rostral functions - the answering of questionnaires about perspective taking or fantasy, and a so called 'second order false belief task' - did not correlate well with each other. The occasional inclusion of areas like BA47 and BA11

in the group of rostral lesions here, might also have blurred the transition between lateral and frontopolar functions, and the picture of a system that is more hierarchical than divided by a 'dual' contrast between cognition and emotion.

Especially pars opercularis or Brodmann area 47 might better be considered an intermediate level of complexity between BA45 and the frontopolar cortex, which is 'cognitive', but also very emotional. Similarly, parts of the dorsolateral prefrontal cortex might well be more 'cognitive', but, except for its rostral regions, it is not necessarily 'metacognitive' or isolated from the sensory-motor stream of feeling. There are many studies highlighting the intermediate roles of these regions, or at least, their participation in a larger hierarchy. A lesion study by And U. Turken and Nina F. Dronkers, investigating 'the neural architecture of the language comprehension network', concludes that 'patients with lesions in frontal regions BA46 and BA47 were impaired only for the most complex sentence structures.'⁸⁰ An interesting aspect of this study is that it is also investigating the white matter connections between these areas. The regions that were most closely integrated with BA46 and BA47 were BA44, BA6, and the temporal pole, which is confirming the picture of an integrated 'action hierarchy' in the lateral frontal cortex. A description by Michael P. Alexander might be linguistically biased, but it is a good description of this hierarchy.

The progression of clinical disorders from transcortical motor aphasia to dynamic aphasia to discourse impairments represents a progression of procedural deficits from basic morpho-syntax to complex grammatical structures to narrative and a progression of lesions from posterior frontal to polar and/or lateral frontal to medial frontal.⁸¹

As earlier mentioned, some of the first models of such a caudo-rostral action hierarchy were presented by Etienne Koechlin and colleagues; and even these researchers have turned to lesion studies to test their their hypotheses. The main author of the lesion study where Koechlin did

⁸⁰ And U. Turken and Nina F. Dronkers, 'The Neural Architecture of the Language Comprehension Network: Converging Evidence from Lesion and Connectivity Analyses', *Frontiers in Systems Neuroscience*, Vol. 5, No 1 (10 February 2011), <https://doi.org/10.3389/fnsys.2011.00001>.

⁸¹ Michael P. Alexander, 'Impairments of procedures for implementing complex language are due to disruption of frontal attention processes', *Journal of the International Neuropsychological Society*, Vol. 12, Issue 2 (22 Mars 2006): 236-247, <https://doi.org/10.1017/S1355617706060309>.

also participate, was Carole Azuar.⁸² In a set of experiments that will be described below, the hierarchy was very much confirmed. They are even speaking here, of a 'cascade model of cognitive control', where the higher levels depend on the lower ones, but not vice versa. The lesions in the the dorsolateral regions of Brodmann area 6 were found to produce deficits in the simplest behavioural tasks - which they call 'sensory' - but also the more complex tasks, which were depending on the simplest functions for its composition. Similarly, damage to Brodmann area 45 produced deficits in the performance of tasks at the intermediate level of complexity - which they call 'contextual' - but also at the so called 'episodic' level. Damage to Brodmann area 47 and a nearby region of BA46, however, did only disrupt the episodic level of comprehension. The findings are somewhat contrary to the study by Shamay-Tsoory, where a frontopolar 'cognitive' level of empathy was found to be operative even in the case of BA44 lesions disrupting 'emotional empathy'; but these studies are difficult to compare as the tasks are different, and the frontopolar cortex was not even involved in Azuar's study. Anyhow, Azuar and colleagues found reason to conclude that 'higher control processes involving more anterior prefrontal regions rely on the integrity of lower control processes in more posterior regions, whereas lower control processes can operate irrespective of the integrity of higher control processes.'

The lesions were 'unilateral', that is to say: they were located either to the right or left lateral prefrontal cortex. Yet, there was 'no significant difference' between the performance of these groups; which, according to Azuar and colleagues, is speaking against the influence of verbal material here. Bilateral lesions, with focal damage to similar areas in both hemispheres would probably have produced much more intense deficits, they say, but such cases are 'extremely rare'.

A slightly problematic aspect of this study is their conceptualisation and labelling of the mental functions. Conceptions of 'cognitive control' at a 'sensory' or 'contextual' level reflect little of the behavioural or discursive character of the tasks, let alone the emotional and ego-dynamic engagement that is necessarily going into demanding cognitive operations. One might even speculate whether Azuar's idea of complexity and 'context' is limited to spatial objects and contexts, like in the case of some materialists and eighteenth century associationalists. Surely, Azuar is not consistently materialistic since she is also speaking of 'structured action plans',

⁸² Carole Azuar, P. Reyes, A. Slachevsky, E. Volle et al. 'Testing the model of caudo-rostral organization of cognitive control in the human with frontal lesions', *Neuroimage*. Vol. 84 (1 January 2014):1053-1060. <https://doi.org/10.1016/j.neuroimage.2013.09.031>.

which seems like a more precise description of the 'contexts' that were tested in these experiments. Yet there is something to this suspicion, as Azuar is also contrasting her conception with more 'temporal models' earlier put forward by Koechlin.

Cognitive processes, if they are really conscious, are hardly reducible to insentient series of minuscule operations like in a computer. The processes are much more integrated, engaging different levels of behavioural comprehension as well as experiences of tension and resolution. The personal performance, while charting the technical aspects of a challenge, is simultaneously monitoring both the level of challenge, ease, and promise, a flexible allocation of attention and effort, as well as personal strategies of various kinds. The location of melodic, prosodic, and emotional comprehension to the same cortical areas that are tested in this study should be sufficient proofs of James' and Wundt's conception of the articulated and embodied *sensations of self* that are necessarily going into such processes. Especially the right hemisphere might be preoccupied with such autonomous narratives. Even if the tasks constructed by Azuar are very prosaic, technical, and possibly left hemisphere dominant, they are implicitly containing both *questions or problems*, the process of *answering or resolving* these problems, the integration of *subordinate goals*, the combination of memories, as well as *awkward rule changes*.

The simplest task might be described as: 'if a green disk is presented then push the right button', and the left one in the case of red. Azuar describes it as case of 'sensory motor association', but it is clearly more demanding than the overlearned associations of stimulus and response that may be performed even by some subcortical areas. The so called 'contextual' task might already be said to be *discursive*, in the sense that upon the presentation of a coloured letter, the subjects are expected to remember one of two questions or discrimination tasks associated with this colour: the circumstance whether the letter is a vowel or a consonant, or in the other case, whether it is upper or lower case. The question is answered by pushing one of two buttons, which association with the correct answers must also be remembered.

The so called 'episodic' level tasks contained the same questions or discrimination tasks, only that the colour clues were repeatedly changed by an instructor. This task is undoubtedly making high demands on the combination of short term memories, attention, and the ability to inhibit the tendency to answer according to previous rules. The sense of peril, increasing control, and final resolution, must be all the stronger now; not to speak of the experience of bewilderment and failure in the patients that were not able to perform these tasks. One might even imagine that the

subjects are entertaining inner monologues or strategies in these cases, like 'since green is now presented, I must be very cautious not do the same thing as I did the last time when this colour was associated with vowel/consonant discrimination, then I must concentrate on pushing the button that is associated with the correct answer'. The location of these abilities to Brodmann areas 47 and 46 is perfectly in tune with what has earlier been said about these areas. Whereas BA47 is often found to be dealing with emotionally taxing reversals and revaluations, more dorsal regions are dealing with the retrieval and manipulation of episodic memory.

The same picture is given by David Badre and Evan Nee in a review of the literature up to 2018.⁸³ The hierarchical model of 'cognitive control' is confirmed. But their conception of the human mind and brain is no less 'robotic' than that of Azuar and colleagues. Certainly they are mentioning functions like reward prediction and conflict monitoring in connection with the anterior cingulate gyrus; but even when talking about the medial frontal cortex they are referring to 'computation'.

It is not that computational architectures are entirely irrelevant to mental operations, but they are also very different from the operation of the brain. Unlike a computer, the brain is much more than a tool for the manipulation of things according to human made scripts. The brain is creating the very humans that are writing these scripts. It creates our sense of *being*, as well as our *conceptual understanding* even of abstract concepts like 'cognitive control'. In like manner with our concepts of inanimate objects, which elementary features may be put together already in parietal and temporal lobes, the concepts of human relations, ideals, and cultural issues are also nested into being in the brain. Melody and tone of voice, in alliance with more visual and spatial transactions, are all media for the production of such content, and especially when it comes to conscious articulated behaviour - our consciousness of thinking and communicating with other people - there is no better candidate for the comprehension of such behaviour than the inferior frontal gyrus.

The computational camp is not the only one that takes this content for granted. Linguists, psychologists, and musicologists are guilty of the same error. As mentioned above; the manner in which linguists are sometimes talking about narrative is reflecting the unconscious belief that the discursive functions are somehow present in the symbols. As we will come back to in a separate

⁸³ David Badre and Derek Evan Nee, 'Frontal Cortex and the Hierarchical Control of Behavior', *Trends in Cognitive Sciences*, Vol. 22, Issue 2 (February 2018): 170-188. <https://doi.org/10.1016/j.tics.2017.11.005>.

chapter on language, this is not the case. Linguistic symbols are central to human communication and development, but the ideas are not inside the words. Certainly the *combination* of words, in as far as the sequence of words is not simply paralleling the order in which things are happening, might require some simple syntactic rules; but the implementation of these rules is not claiming the whole left frontal cortex. Even in the left frontal cortex, most of the content must be produced by *actual percepts* and *actual ego-dynamic gestalts*.

A weightier argument perhaps, is the fact that the brains of dogs and primates are very similar to our own brains, even with regard to the impact of sound on the frontal cortex. Even if such animals are able to understand some human speech, their brains are not adapted for it. Certainly the division of labor in the human brain might already have developed in a different direction than in animals. The amount of technical procedures, tools, and symbols in our lives might have skewed the field of ego-dynamic gestalt formation, personal autonomy, and emotional vocalisation even more to the right hemisphere. Nevertheless, the study of animal brains might give a supplementary picture of the factors that have been shaping our brains.

An article by Marcello Siniscalchi and colleagues sums up some of the research on animal brains: 'regarding the auditory system', they say, 'both behavioural and lesioning studies suggest that the brain processes acoustic stimuli in an asymmetrical way.'⁸⁴ A general tendency is that the left hemisphere 'uses learned patterns and responds to familiar stimuli', and they are pointing to research on Macaque monkeys which is indicating that they use the left hemisphere preferentially to process their species-typical vocalisations. The right hemisphere is often found to be dealing with *novel stimuli* and *intense emotions*, such as aggression, escape behaviour, and fear. Their own experiment, inferring hemispheric dominance from the head and ear orientation of dogs while exposed to various sounds, seems to confirm this pattern: 'dogs usually process their species-typical vocalisations using the left hemisphere and the thunderstorm sounds using the right hemisphere.' Nevertheless, they say, 'the conspecific vocalisations are not always processed by the left hemisphere, since the right hemisphere is used for processing vocalisations when they elicit intense emotion, including fear'.

⁸⁴ Marcello Siniscalchi, Angelo Quaranta, Lesley J. Rogers, 'Hemispheric Specialization in Dogs for Processing Different Acoustic Stimuli', *PLoS ONE*, Vol. 3, Issue 10 (9 October 2008): e3349. <https://doi.org/10.1371/journal.pone.0003349>.

The study does not tell how the hemispheres would perform if the the dogs were themselves barking or whining. The stimuli lasted for only 3 seconds, which is not a very realistic situation, at least not in the case of *whining*, which can go on for hours. The sense of desperation and sadness that is so articulated and touching in the case of whining is hardly conveyed by a short audio clip. Nor did this study look into an even more interesting and complex example of canine vocalisation: their singing or *howling*, which for some reason is more prevalent in wolves. It is a very flexible and articulated type of vocalisation, which is even harmonious and polyphonic in some cases.

In a study focussing, amongst other things, on cortisol levels in howling wolves, Francesco Mazzini and colleagues explicitly 'challenge simplistic explanations of animal calling behaviour' and conclude that 'howling in wolves is not necessarily a byproduct of increased stress hormone level, but instead may be under flexible control of the signaller and used selectively to facilitate reassembly with important individuals'.⁸⁵ Yet this study says nothing about hemispheric specialisation.

When it comes to hemispheric specialisation, there is little doubt that the right hemisphere is central to human song and music. Music is often unique and individual. We are dealing with extremely complex behavioural gestalts here, which however, are also familiarised and stored in the brain. An average person probably knows thousands of songs, even by name; which, for all we know, might also alter their hemispheric representation. At least in the case of *metaphor formation* there are such changes. While familiar metaphors might reside in the left frontal cortex, the formation of *novel* metaphors and figurative expressions has been found to require the right hemisphere. A study by Nira Mashal and colleagues is pointing especially to the right posterior superior temporal sulcus and the right inferior frontal gyrus, which are the same areas that are central to music perception.⁸⁶

The complexity and unfamiliarity of some new music is in sharp contrast to linguistic intonation and accent, which is so familiar and stereotypical that it is not even noticed in many cases. It is not surprising then, that a phenomenon like the 'foreign accent syndrome' is expressed

⁸⁵ Francesco Mazzini, Simon W. Townsend, Zsófia Virányi, Friederike Range, 'Wolf Howling Is Mediated by Relationship Quality Rather than Underlying Emotional Stress', *Current Biology*, Vol. 23, Issue 17 (9 September 2013): 1677-1680, <https://doi.org/10.1016/j.cub.2013.06.066>.

⁸⁶ Nira Mashal, M. Faust, T. Hender, M. Jung-Beeman, 'An fMRI investigation of the neural correlates underlying the processing of novel metaphoric expressions', *Brain and Language*, Vol. 100, Issue 2 (February 2007):115-126. <https://doi.org/10.1016/j.bandl.2005.10.005>.

differently in the brain than amusia or aprosodia, and caused especially by left hemisphere damage. It is not a common syndrome, but it seems to be harming aspects of rhythm and speech production in the left hemisphere. According to Peter Marien and colleagues, the impairments have earlier been connected with a specific form of 'dysarthria' characterised by a disturbance of the rhythm of speech, and their own research on stroke patients is confirming that the impairment is affecting both the 'planning and execution stages of the speech production process'. The lesions might involve the left inferior frontal gyrus and other motor and premotor areas, but also areas of the brain that project to these regions, like the temporal cortex, the basal ganglia, and the cerebellum.⁸⁷

A neurophysiological and anatomical study by Lizabeth M. Romanski is very relevant to this discussion as it is focussing on the ventrolateral prefrontal cortex of our closest relatives, the macaque monkeys. It is not a lesion study, but it is drawing on the advantage that animal research allows more invasive procedures, like the injection of tracers and measurements from single neurones both in the auditory and the frontal cortex. Thus the results are detailed enough to shed some light even on the sometimes confusing symptoms of focal lesions in these cortical regions. As for their interconnection or *wiring*, the macaque frontal cortex was found to be innervated by a 'cascade' of projections from auditory areas. The density was increasing as it approached the most rostral areas of the prefrontal cortex. These rostral areas were also connected with the most anterior and complex areas of the auditory association cortex, but there were also parallel projections from more primary auditory areas.

The stimuli consisted of movie clips, which is ecologically very realistic. It also allowed Romanski to compare the responses to stimuli that were either lacking their sound tracks or images and stimuli that combined all these elements. Especially Brodmann area 47/12 was found to be 'robustly responsive' to auditory stimuli, with local specialisations for different call types. This area was found to be adjacent to a more visually responsive Brodmann area 45. But there was a grey area between BA45 and 47, where these modalities were overlapping. In both of these regions there was also a large amount of 'multimedia' cells, which were found to be intrinsically 'multimodal', reacting to the combined video and soundtracks. The responses were

⁸⁷ Peter Mariën, Stefanie Keulen, Jo Verhoeven, 'Neurological aspects of foreign accent syndrome in stroke patients'. *Journal of Communication Disorders*, Volume 77 (December 2018):94-113, <https://doi.org/10.1016/j.jcomdis.2018.12.002>.

strongest to vocal and facial stimuli, which, according to Romanski 'may indicate a specialisation for face/voice integration'; and she is pointing to similar functions in the human BA47.⁸⁸

The above mentioned studies of nonverbal creatures like dogs and monkeys are indicating that, while having similar cortical regions as us, these regions are not primarily concerned with *linguistics*. Similarly, the collocation of 'cognitive control' with emotional vocalisation, empathy, and discourse processing is evidencing that conscious cognition can never be reduced to mere computation. On the contrary, it is created rather by a *dynamic sense of self*, which is carving out the meaning of the sensory influx by its volitional and personal engagement. Even the objects we encounter or produce are integrated into this ego-dynamic perspective: as fellow sentient beings, as tools, or as natural objects; all of which are conceptually connected with a certain activity, a certain resistance, and a certain role in our lives. The dynamic 'core self' that is lying at the heart of such cognition is not always *melodic* in the sense of engaging our internal and external voices, but it is always 'melodic' in the sense of a volitional stream of feelings, which is also organised as a hierarchy of behavioural gestalts.

The lateral prefrontal cortex seems to be fundamental to the nesting of these 'melodic' gestalts into being - indeed it might be its main function - but it might not constitute the highest level of integration. There are regions in the *medial* frontal cortex that might be seen to add to or update the sense of self with various types of content, especially perhaps, the experience of *mood*, *willpower*, and relative *value*. And even here - especially in the animal anterior cingulate cortex and the human medial pre-supplementary motor cortex - there seems to be specifically auditory areas concerned with vocalisation and music; areas which may produce vocalisations when artificially stimulated, and variants of amusia or aprosodia if damaged. This is the subject matter of the following chapter.

⁸⁸ Lizabeth M. Romanski, 'Representation and Integration of Auditory and Visual Stimuli in the Primate Ventral lateral Prefrontal Cortex', *Cerebral Cortex*, Volume 17, Suppl. 1 (1 September 2007): i61-i69, <https://doi.org/10.1093/cercor/bhm099>.

Chapter 12

The Medial Frontal Cortex

12.1 Modulations of tonality and mood in the medial BA10

The self has a presence that is much broader than the actions and thought processes that are organised in the lateral frontal cortex. Even when we are not thinking or acting much - that is to say: when we are in a so called 'resting state' or 'default mode' - we are often attentive both to our selves and our surroundings. The valence, duality, and intensity of such attention, what Freud was sometimes referring to as 'cathexis', may be monitored in the anterior and posterior cingulate cortex, directing its attention to the internal and external realm respectively; at least this is a division that is suggested by some studies.¹ As we will come back to in a separate chapter: even our material surroundings are conceptualised in the perspective of the self - a paradox that may be reflected especially in some posterior cingulate regions. But this dialectical principle is never cancelling out the reality and idiosyncrasy of its opposite. Even mental states are phenomena in their own right, and the medial frontal cortex is apparently central to the constitution of some of its aspects; especially, it seems, to more pervasive aspects of personality, mood, motivation, and value formation over time.

It is not a problem that seems to bother more reductionistic and computationally oriented researchers, but some medial frontal lesions, including some variants of frontotemporal dementia, are indicating that we would be both apathetic, antisocial, and morally deprived without it.² Experiences of *willpower*, *relative certainty*, the *facial expressions and mental states of other people*, *beauty*, *love*, *hopes and worries*, *demands*, *restrictions*, and *taboos*; our

¹ See for instance Judson Brewer, Kathleen A. Garrison, Susan Whitfield-Gabriel, 'What about the "self" is processed in the posterior cingulate cortex?', *Frontiers in Human Neuroscience*, Vol. 7, Article 647 (2 October 2013). <https://doi.org/10.3389/fnhum.2013.00647>.

See also John M. Pearson, Sarah R. Heilbronner, David L Barack, Benjamin Y. Hayden, Michael L. Platt. 'Posterior Cingulate Cortex: Adapting Behavior to a Changing World'. *Trends in Cognitive Science*, Volume 15, No 4 (April 2011). <https://doi.org/10.1016/j.tics.2011.02.002>.

² Simone G. Shamay-Tsoory, R. Tomer, B. D. Berger, D. Goldsher, J. Aharon-Peret, 'Impaired "affective theory of mind" is associated with right ventromedial prefrontal damage', *Cognitive and Behavioral Neurology*, Vol. 18, No. 1 (Mars 2005): 55-67. <https://doi.org/10.1097/01.wnn.0000152228.90129.99>.

existential *presence*, perhaps even our depth of consciousness, depends to a large extent on such feelings. Of course, these experiences are also drawing on a lot of subcortical, sensory, and motor regions of the brain, but the resulting compounds are greater than the sum of their elements, and they are often found to be monitored in various regions along the midline walls between the hemispheres. Even some aspects of music have been found to be strongly present here. A central question is whether this is also contributing to the dramaturgical and ethical levels of ego-dynamic gestalt formation in life and art.

The question is relevant because it is not immediately apparent how a cortical region that has often been characterised as 'task-negative' is contributing to autobiographical and musical processes. Certainly the *lateral* frontal cortex, and the frontoparietal network, is also central to autobiographical memory; after all this is where our emotional behaviour is organised.³ But the *medial* cortex is different - even in terms of neural connectivity⁴ - and a couple of musically oriented studies might shed some light on what it is doing. Especially a fMRI study by Petr Janata and colleagues, locating experiences of musical *key changes* to the medial frontopolar cortex, is almost too concrete to be true.⁵

There is little doubt that such modulations, contrasting different tonal centres, are central to the organisation and *dramaturgy* of some types of music. In the eighteenth century the organisation of sonatas were often conceived almost entirely in terms of such key schemes. Even in popular music and jazz such modulation is often a central dramaturgical feature, constituting the so called *bridge*, before the last repetition of the verse, sometimes in the shape of a 'falling' or 'rising sequence', straying through a whole sequence of tonalities before returning to the home key.

What is so astounding about the study by Janata and colleagues is that the experience of changing keys were found to be topologically reflected especially along a vertical axis in the medial frontopolar cortex (BA10), although ventrolateral and orbital regions, BA44, 45, and

³ A. A. B. Jamjoom, P. Gallo, J. Kandasamy, J. Phillips, D. Sokol, (2017) Autobiographical memory loss following a right prefrontal lobe tumour resection: a case report and review of the literature, *Child's Nervous System*, Vol. 33, Issue 7 (21 Mars 2017): 1221-1223. <https://doi.org/10.1007/s00381-017-3380-7>.

⁴ See for instance: Franz-Xaver Neubert, Rogier B. Mars, Jérôme Sallet, and Matthew F. S. Rushworth. 'Connectivity reveals relationship of brain areas for reward-guided learning and decision making in human and monkey frontal cortex'. *PNAS*, Volume 112, Issue. 20 (6 May 6 2015): E2695-E2704. <https://doi.org/10.1073/pnas.1410767112>.

⁵ Petr Janata, Jeffrey L. Birk John Van Horn, Marc Leman et al., 'The Cortical Topography of Tonal Structures Underlying Western Music.' *Science*, Vol. 298, No. 5601 (13 December 2002): 2167-2170. <https://doi.org/10.1126/science.1076262>.

especially the pars orbitalis (BA47) were also very prominent. When a melody modulated through all the different keys, the activation patterns within different 'voxels' in the medial frontopolar cortex were also found to be changing. Indeed, the study is entertaining the idea of a 'tonotopical' mapping of specific tonalities within these voxels. They even talk about this mapping in terms of a three-dimensional 'torus' analogous to the conception of a 'circle of fifths' in music theory (figure 1). Furthermore, the study purports to demonstrate a tendency for ventral or dorsal regions of the frontopolar cortex to emphasise different key regions according to their degree of *relative affinity*, that is to say: the so called parallel major and minor keys as well as keys related by fifths were seen to cluster together, while more remotely related keys, with less tones in common, seemed to be located further apart (see figure 3).

The activation patterns were largely individual, varying from trial to trial, and not without ambiguity; so it is difficult to conclude from this study whether the neural correlate of let us say the 'home key' is located more to ventral regions while a more tense and 'foreign sounding' key is more dorsal, or whether the idea of key mapping in the medial frontopolar cortex is even justifiable. There is a vast amount of parameters involved in such experience, which makes the results susceptible to manipulation, and much more dependant on the setup of the experiment. Besides the question of the validity of the mentioned tonality-mapping voxels, such studies would rely to a large extent on the manner in which the keys are contrasted. If a tonal centre has not enough time to establish itself, it would not be experienced as a 'home key'. Similarly, if the modulations are too long, the home key would not be remembered, and the sense of 'return' or repose would not be experienced as such. Furthermore, the character of such modulations depends to a large extent on the abruptness of the contrast, the relationship between the keys, and the question whether the modulation is going in a relaxing or tensing direction. So it is not unthinkable that a different setup and a more precise phenomenology might have yielded different and even better results.

In any case, the study might be seen to demonstrate a relationship between tonal modulation and some 'consistently activated' regions in the medial frontopolar cortex; which should not come as a surprise. According to Maria Medalla and Helen Barbas, having performed some very detailed connectivity studies of the frontopolar cortex, the role of this region, while 'understated in the functional literature', is partly that of serving as the 'the main auditory field' in the frontal

cortex.⁶ The density of its interconnections with auditory association areas, they say, is only challenged by the anterior cingulate cortex. Admittedly their research is focussing primarily on macaque monkeys, whose frontopolar cortex is much smaller and restricted basically to what is making up the human *medial* frontopolar cortex. Nonetheless, says Medalla and Barbas: the 'auditory pathways make up the largest component of the extrinsic connections of area 10, suggesting a specific relationship with the auditory modality'.

Given the generally recognised centrality of BA10 to high level thought and reflection, it is difficult to find a better proof of the importance of vocalisation and music to these faculties. Kalina Christoff, whose understanding of the self-other dichotomy comes very close to the one presented in this treatise, is talking of a 'self-specifying' hierarchy of sensorimotor experience, carving out - through its interactions with the surroundings - the experience of being a cognitive-affective agent; a hierarchy in which the rostrrolateral frontal cortex is constituting a metacognitive level. More precisely, she says, the rostrrolateral frontal cortex is enabling a metacognitive comparison of *selfgenerated* experience.⁷ The *medial* prefrontal cortex may be dealing with another main aspect of such self-reflection, which she relates to *emotion* and *homeostatic regulation*.⁸ But the cognition-emotion dichotomy may not be as clear-cut as is indicated here. We have already seen how the content of many so called 'emotions' are implicating a *behavioural* hierarchy, which is organised to a large extent in the lateral prefrontal cortex. As for the medial aspects of the self, homeostatic regulation is obviously at the core of motivation, yet it is open for discussion whether concepts like *moods* and *values*, in the sense of *frames of mind* and the 'somatic marking' of ideas, may be a more precise description of the level of experience that is monitored here.

And harmonic modulation is certainly concerned with such frames of mind. Typically it is producing an experience of *intensification*, partly deriving from a sense of *newness* or *freshness*, which would also be *waning*. When several modulations are combined, like in a sonata

⁶ Maria Medalla and Helen Barbas, 'Specialized prefrontal "auditory fields": organization of primate prefrontal-temporal pathways', *Frontiers in Neuroscience*, Vol. 8, No. 77 (16 April 2014): <https://doi.org/10.3389/fnins.2014.00077>.

⁷ Kalina Christoff, Justin M. Ream, Leo P. T. Geddes, John D. E. Gabrieli, 'Evaluating Self-Generated Information: Anterior Prefrontal Contributions to Human Cognition,' *Behavioral Neuroscience*, Vol. 117, No. 6 (December 2003): 1161-1168, <https://doi.org/10.1037/0735-7044.117.6.1161>.

⁸ Kalina Christoff, Diego Cosmelli, Dorothée Lebrand, and Evan Thompson, 'Specifying the Self for Cognitive Neuroscience', *Trends in Cognitive Sciences*, Vol. 15, Issue 3 (March 2011): 104-112, <https://doi.org/10.1016/j.tics.2011.01.001>.

development section, feelings of *bewilderment*, *digression*, or even *uncertainty* may be produced. Its emotive character is depending to a large extent on the circumstance whether the modulations are abrupt, gradual, violating or yielding to 'tonal gravity'; producing either a sense of *tension*, *disconnectedness*, or a sense of *relaxation*, *returning stability*, or even *return of the home key*, if the main tonality is still resounding as faint a memory trace. Such modulations are loading whole musical passages with feelings that are fairly local, but nevertheless at a timescale that is considerably longer than the local chordal dialectic.

What distinguishes the medial frontopolar region from more lateral regions, is the circumstance that the lateral frontopolar cortex is concerned rather with *thinking*; and it is important to remember that even these *lateral* regions are activated by music. A study by Limb and Braun on professional jazz improvisation is demonstrating a very pronounced engagement of the frontalmost, and somewhat laterally extended part of the frontopolar cortex, while other areas of the prefrontal and limbic cortices were 'deactivated'.⁹ As earlier argued: thought and self-reflection is saturated by a kinaesthetic or melodic dynamic, which autonomy is structured especially in the right lateral frontal cortex. The self-reflexive character of jazz improvisation is very concrete and explicit, as it is often, even in the case of Limb and Braun's experiment, functioning as a spontaneous *paraphrasing* of a melody and its affective content. Or to be more precise, the improvisation is *commenting* on and adding to this content, sometimes even in the shape of *irony* or *allusions* to other music; all of which is requiring a metacognitive entertainment of several simultaneous melodic thoughts. Like the medial regions, it might also be concerned with the monitoring of harmonic progressions and dramaturgy, but the conceptions may be more articulated, and less visceral than the effects of the meta-harmonic modulations which are occurring at the intersection between certain dramaturgical stages of a work.

It is important to remember that we are dealing with *actual sensations* and *ego-dynamic gestalts* here, which require a neural and physical correlate in the brain. Often, like when Janata and colleagues are talking of modulation, they seem to 'put the cart before the horse', by speaking of music as were it 'a formal geometric structure'. Already in the first sentence of their article they are asserting that 'Western tonal music relies on a formal geometric structure that determines distance relationships within a harmonic tonal space.' They may be correct that

⁹ Charles J. Limb and Allan R. Braun, 'Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation', *PLoS One*, Vol. 3, Issue 2 (27 February 2008), <https://doi.org/10.1371/journal.pone.0001679>.

tonality is topologically charted in the cortex, yet there is little spatial about key and tonal affinity per se. A tone or chord may be distant in terms of pitch but closely related in terms of affinity and vice versa. The physical correlate of these experiences is concerned rather with mathematical ratios and the derivability of a vibrational frequency from other frequencies. As we will come back to in a separate chapter on these matters: pitch and intervals are not about a spatial dislocation of identical objects. When the pitch is changing, the tones are also changing, and in a manner that is dynamic, not spatial.

Even more detached from empirical reality are didactic constructs like 'the circle of fifths'. Most people have no knowledge about such systems. Nor is the relationship by fifths so crucial as Janata and colleagues are indicating. Beethoven often alternated between more distantly related keys, avoiding the 'gravitational pull' of fifths and fourths. His *Hammerklavier Sonata*, for instance, is instantiating rather a 'circle of thirds'.¹⁰ He did not 'rely on' the circle of fifths. In any case, the character of such modulations are determined first of all by their different acoustic affinities, not by any preconceived associations. If the key changes had no intrinsic perceptual properties, they would neither be heard nor would they engage the cortex in such a distinct manner. Or to put it differently: we would have no idea of what a key or a home key is, nor would the idea of modulation make any sense. But it does; in fact, modulation is often put into popular music of the simplest kind, as a refreshing change and heightening of the emotional temperature.

Rather than reducing them to something 'formal' we should embrace the emotive power of these progressions. We are dealing here with pervasive, overlapping feelings of harmonic relief and uncertainty, or uncertainty within relative relief, arising, lingering, and waning in a manner that is truly astonishing. And their location to one of the highest regions of the brain is confirming rather the impact that sound may have on the dynamics of the self; or as Helen Barbas imagine it: the idea that melody is somehow aiding thought.¹¹

The ego-dynamic structure of thought is as necessary as it is to a large extent melodic and harmonic, and it is about time to recognise it. Some might argue that harmonic modulation is too new or too complex, and it is strange that it should even be experienced. Yet *it is experienced*.

¹⁰ Charles Rosen, *The Classical Style: Haydn, Mozart, Beethoven* (New York and London: Norton, 1972): 407-413.

¹¹ Helen Barbas, Jamie G. Bunce, and Maria Medalla, 'Prefrontal pathways that control attention'. Chapter 3, in *Principles of Frontal Lobe Function*, second edition, ed. Donald T. Stuss and Robert T Knight. 31-48. (New York: Oxford University Press, 2013): 42.

The experience is created in the brain; and it is not so strange that this is happening in a cortical region that is optimised both for sound and the long-range monitoring of certainty and mood. Even modal song and atonal speech produces effects by veering from tonal centres in different ways. Indeed, the effect of speech melody and animal vocalisation may derive from such veering from harmony. Similarly: sing-song or off-key singing is also straying from tonality in different ways. The comparison of one's own tone of voice with contrasting tones of voice at different stages is also requiring a considerable amount of meta-monitoring; so is the comparison of song and speech. In any case, the experience of key-changes would have to be drawing upon these older functions for its effect.

As earlier mentioned, the experience of harmony and song is central to the regulation of mood and the feeling of *repose*, *cadential closure*, and *religious belief* in most cultures; which is obviously connecting to a more general monitoring of mood and feeling of certainty in the medial frontal cortex. A fMRI-study by Sam Harris and colleagues, for instance, is focussing on 'the neural correlates of religious and nonreligious belief', highlighting similar ventromedial and dorsomedial areas as in Janata's study of tonal keys, if only in the left hemisphere.¹² Both when rejecting and affirming statements this was the case, and it did not matter much whether the convictions concerned religious issues or not. In the case of the rejection or acceptance of 'blasphemous' statements, this was even less significant. In this case, the paracingulate cortex, the ventral striatum, as well as more lateral frontopolar regions were more active; presumably because these issues were more *engaging* and even 'pleasurable' both to the believers and the nonbelievers.

Harris' study is just one of many studies focussing of the medial prefrontal cortex, and it is mentioned here first of all because it illustrates the importance of phenomenological precision when charting the brain; which is also actualising what has earlier been said about tonal cadences. The cadences are *assertive*, but it is not possible to determine *what* they assert, or whether they confirm or deny. The conviction that something is *untrue* is also a conviction. The real opposite of belief then, is not assured 'disbelief', but rather the feeling of uncertainty, hesitation, confusion, protest, or disbelief in the sense of shock, astonishment, offence etc, which is often more behavioural and lateral. Erik Asp and colleagues even go as far as saying that 'we

¹² Sam Harris, Jonas T. Kaplan, Ashley Curiel, Susan Y. Bookheimer, Marco Lacoboni, Mark S. Cohen, 'The Neural Correlates of Religious and Nonreligious Belief'. *Plos One*, Vol. 5, No. 1 (1 October 2009), <https://doi.org/10.1371/journal.pone.0007272>.

are perpetually-moving belief machines with feeble doubting brakes'. Beliefs, they say, 'are inherent in the associative process of thought, while disbelief is retroactive, difficult, and governed by a distinct neural process.'¹³ Even Harris' experiment is confirming something along these lines, as the instances of 'disbelief' are also engaging more motor and dorsolateral regions (see their Table 2).

Another dichotomy thematised in the mentioned study is the difference between *religious* and *nonreligious* assertions. Religious *faith* is not only about factual issues and convictions - the question whether something is true or false - but also the fact that religious sentiment is sometimes evoking an encompassing sense of *trust* and *pleasurable devotion*, more akin to *love* and *aesthetic pleasure* perhaps. According to Bartels and Zeki, such feelings may be monitored rather in some anterior cingulate areas, in closer proximity to the insular cortex and structures like the striatum, which are administering pleasure-promoting hormones in the brain. In the case of love, especially *vasopresin* and *ocytocin* seem to play an important role.¹⁴ And even Harris' experiments confirmed this tendency. Besides the mentioned areas, which were similarly activated by the believers and disbelievers, the religious statements activated areas like the anterior cingulate cortex, the anterior insula, the ventral striatum, as well as the posterior medial cortex.

Of course, mental states and moods are not about sound alone. Especially facial expressions are important to social communication and feeling. Right behind the above mentioned medial frontopolar BA10 are BA9 and BA8, which are stretching even into the *lateral* prefrontal cortex. Like the dorsolateral regions of these areas, their *medial* aspects are often connected with the experience of *social context*, only that in the medial regions the emphasis is often found to be on the evaluation of *facial expression, personality, and personal chemistry* related with facial expressions; or as formulated in an article by Dylan D. Wagner and colleagues: 'the ability to reason about other people's mental states and form impressions of their character'. Their fMRI scans are interesting as they are focussing on more ecologically valid stimuli than is often the

¹³ Erik Asp, Kenneth Manzel, Bryan Koestner, Natalie L. Denburg, Daniel Tranel, 'Benefit of the doubt: a new view of the role of the prefrontal cortex in executive functioning and decision making', *Frontiers in Neuroscience*, Vol. 7, Article 86 (24 May 2013), <https://doi.org/10.3389/fnins.2013.00086>.

¹⁴ Andreas Bartels, Semir Zeki, 'The neural correlates of maternal and romantic love', *Neuroimage*, Vol., 21, Issue 3 (March 2004): 1155-1166. <https://doi.org/10.1016/j.neuroimage.2003.11.003>.

See also Tomohiro Ishizu and Semir Zeki, 'Toward A Brain-Based Theory of Beauty', *PLoS ONE*, Vol. 6, No. 7 (6 July 2011), <https://doi.org/10.1371/journal.pone.0021852>.

case: the reasonably naturalistic task of watching an 'audiovisual narrative', that is to say: a movie. In conclusion, the whole dorsomedial frontal cortex was found to be the most strongly activated region, but only during periods of social interaction; not so much when there was a single person or no person at all in the frame.

One might have wished that the researchers had taken into consideration the possibility that the actors were simply expressing or *feeling less* when operating alone. If so, it would not be so clear that it is sociability per se, or the monitoring of several people, that is performed in medial BA9. Similarly, the aspects of expression that are contributed by these medial areas are not sufficiently defined. It is reasonable for instance, to think that the components of *reasoning*, *talking*, and *acting* in social interaction might have been contributed first of all by the lateral prefrontal areas, like Broca's area (BA44), which were also shown to be very active during such moments (see their figure 3).¹⁵ What is very clear however, is the finding that the dorsomedial areas are not concerned with basic facial perception; this is performed by structures like the fusiform gyrus in the temporal cortex.

According to comprehensive lesion studies by J. Hornak, E. T. Rolls, and colleagues, not only facial expressions but also vocal emotional expressions may engage the medial BA9.¹⁶ While many of these lesions were also involving ventromedial or orbital prefrontal regions, these researchers especially point to BA9 and a region stretching from the so called 'affective' anterior cingulate cortex (BA32) to BA9, as being central to the comprehension of vocal and facial expressions; the latter of which were presented in the somewhat unnatural shape of static images. Also, it is reasonable to question whether the 'basic emotions' referred to in the questionnaires were phenomenologically refined enough to catch the subtle experiences of personality and mood in these high-level regions of the brain. Nevertheless, even in the case of unilateral lesions here, there were deficits in the identification of voice expression; that is to say: the subjects were less likely to notice when the vocalisations were sad, angry, or disgusted. Some of the lesions in this region were also found to have an impact on self-reported temperament and factors like

¹⁵ Dylan D. Wagner, William M. Kelley, James V. Haxby, and Todd F. Heatherton, 'The Dorsal Medial Prefrontal Cortex Responds Preferentially to Social Interactions during Natural Viewing', *The Journal of Neuroscience*, Vol. 36, No. 26 (29 June 2016): 6917-6925. <https://doi.org/10.1523/JNEUROSCI.4220-15.2016>.

¹⁶ J Hornak, J. Bramham, E. T. Rolls, R. G. Morris, J. O'Doherty, P. R. Bullock, C. E. Polkey, 'Changes in emotion after circumscribed surgical lesions of the orbitofrontal and cingulate cortices', *Brain*, Vol. 126, Issue 7 (1 July 2003): 1691, <https://doi.org/10.1093/brain/awg168>.

empathy, cooperativeness, impulsivity, and sociability, as judged by family members or friends; the most significant changes being caused by bilateral lesions.

Control studies were confirming that the mentioned areas are dealing with emotion and emotional expression, not the mere identification of environmental sounds or familiar voices; nor did dorsolateral lesions produce similar deficits. Not only in the medial BA10, but in most parts of the medial frontal cortex, the sounds seem to have a presence which is making them a constituent part of the emotions, moods, and values. Or as Edmund Rolls put it in his book on the orbitofrontal cortex: vocal and facial expressions may be acting here as 'primary reinforcers'.¹⁷

Even Petr Janata was intrigued by these parallels between melody, facial expression, and narratives, and in a article from 2009 he was seeking to unite the previous findings of tonal modulation in the medial frontopolar cortex with other functions that are served by nearby regions of the medial frontal cortex.¹⁸ In particular this study was motivated by the well known phenomenon that Alzheimer patients are enlivened by music. It is a disease that is characterised by the gradual eradication of memory; yet certain aspects of memory sometimes seem to be revived by exposure to music, which is often ascribed to the fact that parts of the medial frontal cortex are often spared in Alzheimer patients.

Again his hypotheses seem to be driven in part by with a visual bias. It is not that Janata is a formalist or subjectivist; but if one is not conscious of the dynamic substrate of selfhood, and the contributions of music and vocalisation to the organisation of personal autonomy, it is easy to think of human beings as mere objects, driven from situation to situation by a sequence of extrinsic occurrences and episodes. Even if most composers distance themselves from concrete extramusical programmes, it is not uncommon among lay people to think of musical dramaturgy in this manner; or as Janata puts it: 'A piece of familiar music serves as a soundtrack for a mental movie that starts playing in our head. It calls back memories.'

If some music is likely to activate memories it must be popular music from peoples own youth, which is also what Janata focussed on. And some of the participants reported having such memories, which correlated with activity in dorsomedial BA8/9. Certainly, it is not unlikely that

¹⁷ Edmund T. Rolls, *The Orbitofrontal Cortex* (New York: Oxford University Press, 2019): 142.

¹⁸ Petr Janata, 'The Neural Architecture of Music Evoked Autobiographical Memories, *Cerebral Cortex*, Vol. 19, Issue 11 (November 2009): 2579-2594, <https://doi.org/10.1093/cercor/bhp008>.

certain melodies are associated with memorable activities or the faces or voices of friends. The subjects were even asked to concretise these memories. The answers were omitted from the publicly accessible part of the article; but in his book about the self Janata specifies them as being about 'friends and periods in their lives'; which is still quite vague.¹⁹ It is not sufficient to organise music as a 'mental movie'.

Nor is it plausible that melody depends on such 'films'. Especially popular melodies are enjoyed in all kinds of settings, at parties, in shops, or on the car radio during different times of the day. In some cases, like for instance in wedding songs, widely different texts might even be set to the same melody, so it is not that melodies are intrinsically tied to any concrete circumstances or events. This is even clearer, of course, in the case of instrumental music. Erik Satie's *Gymnopaedie No.1* must be the most commonly used soundtrack ever, and it is applied to all kinds of contexts, without taking any note of its original allusions to nude dancing.

If the music had really triggered a 'movie in the brain', such content would have conflicted strongly with other content when applied to a new context. The temporal cortex and the hippocampus would also have to be activated. But, as admitted by Janata, this was not the case in this experiment. The medial temporal lobe and hippocampus was not activated by the melodies. So the idea of music being tied to some kind of extramusical imagery is rather weakened than strengthened.

A more positive finding of this study is the neural correlates of melodic *familiarity*. When identifying their favourite melodies, a much more posterior region of the medial frontal cortex became very active: the so called *pre-supplementary motor area* (BA6), forming part of a larger region often found to be stretching down to, and connecting with the dorsal anterior cingulate cortex right below it. It is a region that has been connected with everything from romantic love to free will and the last moment timing of conscious actions, and it is especially the activation of this area by music that has been found to have such an invigorating effect on the personality and even memory of Alzheimer patients. So what is uniting these phenomena? Are we dealing with the ultimate integration of the self here, uniting desires and wants with personalised figures of speaking and singing?

¹⁹ Petr Janata, 'Music and the self'. Chapter 8 in R. Haas and V. Brandes eds., *Music that works* (Vienna: Springer, 2009): 131, https://doi.org/10.1007/978-3-211-75121-3_8.

12.2 Free will and musical memory in the medial pre-SMA

The medial pre-supplementary motor area, which has been pointed out as a site for vocalisation and *melodic familiarity* in more studies than that of Janata,²⁰ is not any one area. In alliance with the anterior cingulate cortex it has been found to be a correlate of conscious decision-making and personal agency, but also various high level abilities such as the judgement of authenticity in laughter and the intentions of other people.²¹ As we will come back to below, the co-occurrence of these phenomena might be seen to confirm, in an almost sensational manner, the earlier maintained interpenetration of these faculties, even at the highest levels of 'ego-dynamic gestalt formation'. In fact, the central tenets of William James and Wilhelm Wundt, requiring the thinking experience to be embodied in sensory media like vocal and facial expression, might be up for yet another level of verification now; which is also confirming the importance of the sensorimotor 'core self' to general consciousness. In a study by Pengmin Qin and colleagues, the SMA, the ACC, in addition to bilateral supramarginal gyrus and the left middle temporal gyrus, are found to be forming a 'higher-order sensorimotor integration circuit', which is 'significantly correlated with levels of consciousness'.²²

First of all, the pre-SMA is where the so called 'readiness potential', foreshadowing conscious actions, has been measured, and it has been posited by Marcell Brass and Patrick Haggard as the endpoint in a 'funneling model of volition', generating and timing what they call 'when decisions' - before they are implemented by the primary motor cortex and the muscles.²³ The 'what and whether decisions' - the ability to mediate and inhibit different choice options - are hypothesised by Brass and Haggard to take place in the rostral cingulate cortex and the dorsomedial BA9 respectively. Yet there is little consensus about these matters. According to Felix Hoffenstaedter and colleagues, the *what decisions* should rather be localised to the pre-

²⁰ Carina Freitas, Enrica Manzato, Alessandra Burini, Margot J. Teylor, Jason P. Lerch, Evdokia Anagnostou, 'Neural Correlates of Familiarity in Music Listening: A Systematic Review and a Neuroimaging Meta-Analysis', *Frontiers in Neuroscience*, Vol. 12 (5 October 2018). <https://doi.org/10.3389/fnins.2018.00686>.

²¹ Carolyn McGettigan, C., E. Walsh, R. Jessop, Z. K. Agnew, D. A. Sauter, J. E. Warren, S. K. Scott, 'Individual differences in laughter perception reveal roles for mentalizing and sensorimotor systems in the evaluation of emotional authenticity', *Cerebral Cortex*, Vol. 25, Issue 1 (January 2015): 246-257. <https://doi.org/10.1093/cercor/bht227>.

²² Pengmin Qin, Xuehai Wu, Changwei Wu, Hang Wu, Jun Zhang et al, 'Higher-order sensorimotor circuit of the brain's global network supports human consciousness', *NeuroImage*. Vol. 231, No. 117850 (1 May 2021): <https://doi.org/10.1016/j.neuroimage.2021.117850>.

²³ Marcel Brass and Patrick Haggard, 'The What, When, Whether Model of Intentional Action', *The Neuroscientist*, Vol 14, Issue 4, (August 2008): 319-325. <https://doi.org/10.1177/1073858408317417>.

SMA, and timing to the SMA, whereas the aMCC is dealing both with what decisions and the strength of the intention.²⁴

It is not possible here to go into detail about all the experiments supporting these conclusions, but it is fairly obvious that the varying results are related both to differences in the phenomenological conceptualisation of decision-making as well as the design of the experiments. For instance, Kennerley and colleagues - taking account of the personal autonomy going into conscious decision making - found that 'the role of the pre-SMA in sequence initiation is only discerned when subjects must retrieve the sequence from memory as a superordinate set of movements without the aid of a visuomotor association.'²⁵ Studies that focus merely on simple, over-learned, or externally prompted actions, would not produce such results.

Much is still unclear concerning the stages of decision-making. Some studies may locate the moment of no return later than Haggard and Brass. Their general account is not implausible, however, and in an article from 2013, Marcel Brass and colleagues goes more into detail about the different stages and areas involved. The anterior prefrontal cortex is thought to provide an 'informational background', they say, which is funnelled back to the 'rostral cingulate zone', which is dealing with 'choices between response options'. More specifically the rostral cingulate zone is thought to deal with 'effort'. It is connected, and often co-activated, with the anterior insular cortex, which is concerned with visceral and interoceptive awareness, putting the anterior cingulate cortex in a position to regulate the 'willpower' that is invested in a specific choice. This information, they suggest, is transferred to brain areas more closely related to the motor system, namely the pre-SMA and the SMA, which generate the impulses to act. More controversial perhaps, is their idea of an even more frontal dorsomedial area being responsible for intentional inhibition by 'downregulating' the pre-SMA and SMA.²⁶

Inevitably Schopenhauer's idea of melody as 'the most direct manifestation of the will' springs to mind, and it is not weakened by the fact that the dorsal ACC and medial pre-SMA is also a region that is highlighted in many studies on Alzheimer's disease and music, showing how *the*

²⁴ Felix Hoffstaedter, Christian Grefkes, Karl Zilles, Simon B. Eickhoff, 'The "What" and "When" of Self-initiated Movements', *Cerebral Cortex*. Vol. 23, Issue 3 (Mars 2013): 520-530. <https://doi.org/10.1093/cercor/bhr391>.

²⁵ Steve W. Kennerley, K. Sakai, M. F. S. Rushworth, 'Organization of action sequences and the role of the pre-SMA', *Journal of Neurophysiology*, Vol. 91, Issue 2 (February 2004):978-993. <https://doi.org/10.1152/jn.00651.2003>.

²⁶ Marcel Brass, Margaret T. Lynn, Jelle Demanet, Davide Rigoni, 'Imaging volition: What the brain can tell us about the will', *Experimental Brain Research*, Vol. 229, Issue 3 (September 2013): 301-312, <https://doi.org/10.1007/s00221-013-3472-x>.

personality of these patients are vitalised by familiar music. And music is more than *associated* with these areas. In many studies, both of monkeys and humans, these areas are specified as central 'vocalisation areas'.

Charting the neural correlates of human and macaque vocalisation, Michael Arbib and Mihail Bota speak of two vocalisation-areas in the macaque cingulate cortex: a caudal cingulate vocalisation area (CVAc), forming part of the motor network for vocalisation, and a rostral cingulate vocalisation area (CVAr), also concerned with the 'regulation of internal states'. In non-human primates these areas have been reported to produce vocalisations when electrically stimulated, says Arbib. In humans, however, it is only stimulation of the SMA region than has produced such effects, although lesions of the pre-SMA decrease the number of spontaneous vocalisations even in animals. In humans, says Arbib and Bota, 'lesions invading anterior cingulate gyrus as well as SMA and/or pre-SMA usually are characterised in the beginning by an akinetic mutism which, after some time, changes into transcortical motor aphasia.'²⁷ The amount of spontaneous utterances is reduced, and they are 'spoken in a monotonous manner'. The ability to produce emotional intonation is lost; and they are pointing to studies by Uwe Jürgens, who is referring these differences to the heightened importance of motor learning in the vocal behaviour of humans.²⁸

The different demands that are put on monkey and human brains might also be reflected in prefrontal connectivity. According to Franz-Xaver Neubert and colleagues, the connectivity between the frontopolar cortex and the pre-SMA in humans is not paralleled in the macaque brain,²⁹ which might be seen to strengthen the idea of a superordinate role for the pre-SMA in humans, and explain some of the differences in the ability to integrate complex perspectives in awareness and decision-making.

The research literature on these matters is extensive; so is the amount of metastudies and overviews, like for instance that of César F. Lima and colleagues, pointing to the fact that grey

²⁷ Michael A. Arbib and Mihail Bota, 'Neural homologies and the grounding of neurolinguistics'. In *From Action to Language via the Mirror Neuron System*, ed. Michael A. Arbib (New York: Cambridge University Press, 2006): 156 and 162.

²⁸ Uwe Jürgens, 'Neural pathways underlying vocal control,' *Neuroscience & Biobehavioral Reviews*, Vol. 26, Issue 2 (March 2002): 235-258. [https://doi.org/10.1016/S0149-7634\(01\)00068-9](https://doi.org/10.1016/S0149-7634(01)00068-9).

²⁹ Franz-Xaver Neubert, Rogier B. Mars, Jérôme Sallet, and Matthew F. S. Rushworth, 'Connectivity reveals relationship of brain areas for reward-guided learning and decision making in human and monkey frontal cortex.' *Proceedings of the National Academy of Sciences*, Vol. 112, Issue 20 (6 May 2015): E2695-E2704, <https://doi.org/10.1073/pnas.1410767112>.

matter in the pre-SMA of opera singers and other musicians has been found to be greater than in other people. Similarly, so called ear-worm experiences are longer in such cases. Conversely, a lesion here might result in everything from *dysfluent speech* to *foreign accent syndrome* and loss of regional accent. Resections in the pre-SMA also seem to correlate with impairments in the ability to *mentalise* and evaluate the *authenticity of social laughter* and other emotions, as well as the *inference of intention* in others (see Box 2).³⁰

The amount of functions associated with the pre-SMA is truly bewildering, and it is essential to try to simplify the picture and determine what exactly the pre-SMA is contributing to these phenomena. Yet there are few if any studies that are able to provide a satisfactory solution to this conundrum. César Lima and colleagues suggest that the pre-SMA may be 'facilitating spontaneous motor responses to sound'. It is somewhat unclear what they mean by this, but to the extent that conditioning and multi-sensory integration is happening, it is probably more likely to occur at lower levels, like the amygdala, or the temporal and insular cortices. Much of the intervals, chord progressions, and other sensory transformations of which intonation and song are composed, are not even paralleled by kinaesthetic feelings; and the combination of these elements into higher level *gestalts* obviously entails an extremely high level of integration and emergence. Composite rhetorical functions, moods, emotions, and social implications that are to a large extent *unique to music*, are all integrated into concepts of *styles*, *tunes* and *compositions*; and if all these meanings come together in the medial frontal cortex, they have to be monitored as *dynamic gestalts in their own right*. They cannot be reduced to 'motor responses'.

Parashkev Nachev and colleagues associate the pre-SMA with 'control over voluntary actions', 'coherent behaviour', and the 'inhibition of competing motor plans',³¹ which is well and good, but what is often missing from these accounts is the perspective provided by James and Wundt. To be conscious of such 'control', that is to say, of *the thinking process*, it has to be grasped and felt. We are dealing with a stream of feelings here, which is often constituted by what is usually regarded as their 'expressions'. It is a perspective that is almost totally lacking in César Lima's overview, sometimes referring to music as 'sound' or 'auditory objects'. But melody

³⁰ César F. Lima, Saloni Krishnan, and Sophie K. Scott, 'Roles of Supplementary Motor Areas in Auditory Processing and Auditory Imagery', *Trends in Neurosciences*, Vol. 39, Issue 8 (August 2016): 527-542, <https://doi.org/10.1016/j.tins.2016.06.003>.

³¹ Parashkev Nachev, Henrietta Wydell, Kevin O'Neill, Masud Husain, and Christopher Kennard, 'The role of the pre-supplementary motor area in the control of action', *Neuroimage*, Vol. 36, Supplement 2 (1 January 2007): T155-T163. <https://doi.org/10.1016/j.neuroimage.2007.03.034>.

and tone of voice is no less dynamic and mental than are kinaesthetic sensations. Especially in people suffering from *akinesia*, the experience of an *inner voice* might constitute their main access to mental agency and articulated self-awareness.³² Certainly, it is problematic to speak of any *self-generated* activity while ignoring the content of the self, which is constituted to a large extent by our own voices and vocalisations. Perhaps it is time to recognise that the self is largely auditory, with a structure and autonomy that is not merely sensorimotor but also melodic.

To some extent our thoughts and inner voices might even be operating independently of motor and kinaesthetic feelings - or at least: as a correlate of thinking and imagination more than overt and practical behaviour. But this is not the whole truth, since even familiar *dances* are monitored in the pre-SMA.³³ So the general function of the pre-SMA might better be defined as a correlate of *autonomous ego-dynamic gestalt formation*.

But this is precisely the function that has earlier been ascribed to Broca's area, or more precisely, to its right hemisphere homologue specialising in melody and sensorimotor autonomy. Traditionally it is this *lateral* part of the frontal cortex, usually referred to as the 'ventrolateral prefrontal cortex', or the 'inferior frontal gyrus', that has been connected with complex action planning, agency, and the emphatic *mirroring* of other people's emotional behaviour. So the definition of the pre-SMA is not complete without distinguishing between these regions.

There is little doubt that the ventrolateral prefrontal cortex and the pre-SMA are close allies in this construction of the self. They have recently been found to be closely interconnected via the so called 'aslant tract';³⁴ but their roles cannot be identical. Given the above mentioned evidence, there is much that point in the direction of an even higher level of integration and gestalt formation in the pre-SMA, which is also incorporating the motivational and metacognitive perspectives of the medial and rostral prefrontal cortex. Such a superordinate role for the pre-SMA is suggested by D. E. J. Linden, in an article fittingly called 'The brain's voices: comparing nonclinical auditory hallucinations and imagery'. A central finding in this study was the circumstance that pre-SMA activation seems to *precede* activation of the Broca's area in auditory

³² Oliver Sacks, *The Man Who Mistook his Wife for a Hat* (London: Picador, 1986): 47-62.

³³ Emily S. Cross, Antonia F. de C. Hamilton, Scott T. Grafton, 'Building a motor simulation de novo: observation of dance by dancers', *Neuroimage*. Vol. 31, Issue 3 (1 July 2006): 1257-1267, <https://doi.org/10.1016/j.neuroimage.2006.01.033>.

³⁴ Anthony Steven Dick, Dea Garic, Paulo Graziano, Pascale Tremblay, 'The frontal aslant tract (FAT) and its role in speech, language and executive function', *Cortex*, Vol. 111 (February 2019): 148-163. [10.1016/j.cortex.2018.10.015](https://doi.org/10.1016/j.cortex.2018.10.015).

imagination but not in auditory hallucinations, which per definition are devoid of personal agency.³⁵ Conscious vocalisation and imagination is obviously at a higher level than hallucination, and since the pre-SMA activity is preceding the activation of the ventrolateral cortex in this case, it is natural to assume that the pre-SMA is also higher in the hierarchy of executive functions and the integration of consciousness.

For our sense of volitional freedom to be experienced as maximally 'free', it has to spring from our depths of self-awareness. But what is this 'freedom'? It is something philosophers speak about, but they are seldom able to define it. It has to be connected with the level of consciousness, which is also concerned with our depth of understanding. An insect is under the spell of its instincts. There is an element of freedom, or perhaps rather chance, in the hovering between options even in animals and plants; which transcendence of the moment is already containing aspects of paradox and infinity. Yet it is only when the perspective grows, and the animal is conscious even of the necessity of questioning instinctual impulses, social conventions, and moral doctrines, that something like true freedom and responsibility emerges. As pointed out by Hegel: when we are conscious of a limit or conundrum, we are already beyond it; and it is probably this ability to reflect on freedom, its limits, and the very concept of 'free will' that sets humans apart from animals. The more informed, the more free the person seems to be; yet this is a matter of degree, and the question of freedom is not resolved before this infinite regress is somehow 'encapsulated'. The very concepts of 'infinity' and 'free will' are already instantiating such encapsulation, yet it is hardly ever absolute. Nor can it be separated from issues of emotional intensity and sensitivity.

As earlier argued, the feelings of drive, love, compassion, and communion, are necessary components of social and moral decision making. Especially in romantic transactions, but also in political and corporate decision making, the friendliness, the authenticity, and the trustworthiness of the Other are often decisive factors. Many of these high-level aspects of personality are manifested in the timbre and tone of voice, and the mirroring of prosodic and melodic behaviour which is taking place when listening to another person. As for the medial prefrontal cortex, it is probably the place where personality, as well as effort and mood, is added to ego-dynamic

³⁵ David E. J. Linden, Katy Thornton, Carissa N. Kuswanto, Stephen J. Johnston, Vincent van de Ven, Michael C. Jackson, 'The brain's voices: comparing nonclinical auditory hallucinations and imagery', *Cerebral Cortex*, Vol. 21, Issue 2 (February 2011): 330–337.

processing in the ventrolateral prefrontal cortex; and the connection of these two regions via the aslant tract and other dorsal and ventral pathways is confirming their mutual relationship.

Especially in the social and romantic sphere, which is the sphere in which human beings are often operating, the importance of vocalisation and vocal identity might have dramatically increased the prominence of sound in prefrontal circuits. This we can observe already in monkeys and other mammals. But the complexity of human culture, with all its talks and rituals, songs and dances, requires much more of vocalisation. As we will come back to below, research on Alzheimer's disease and music therapy has started to take these matters into account, but it is a perspective that should also be integrated into the general understanding of the self and the prefrontal cortex. Human beings should no longer be conceptualised in terms of primitive mechanisms of stimuli and response. Our conscious activity is largely top-down driven, which is implying that our whole personality, spirit, or 'soul' must be taken into account. The precision of these terms might be discussed, but we would have no awareness of them if they did not matter.

There is little doubt that the constitution of personal integrity requires resources beyond the cingulate cortex. But the functional difference between the the anterior cingulate cortex and the pre-SMA is still unclear. The anterior cingulate cortex has often been associated with conflict monitoring, which is probably an intrinsic feature of conscious volition. According to Fei Wang and colleagues, at least, the dorsal anterior cingulate cortex is concerned with *dialectical thinking* and the interpenetration of opposites, like in the idea of extraverted versus introverted people.³⁶ The findings of Parashkev Nachev and colleagues are pointing rather towards the pre-SMA. When controlling for level of arousal they did not observe such activity in the ACC. Instead, they say, 'it is likely that conflict-related activity in the medial frontal cortex is more attributable to pre-SMA'.³⁷

We might be dealing with different aspects of dialectical comprehension here; and whether they are located to the ACC or the pre-SMA, there is obviously something paradoxical about volition; so let us take a closer look at how the tones are contributing to it. Besides their explicit

³⁶ Fei Wang, Kaiping Peng, Yang Bai, Rul Li et al., 'The Dorsal Anterior cingulate Cortex Modulates Dialectical Self-Thinking', *Frontiers in Psychology*, Vol. 7, No 152 (11 February 2016), <https://doi.org/10.3389/fpsyg.2016.00152>.

³⁷ Parashkev Nachev, Christopher Kennard, and Masud Husain, 'Functional role of the supplementary and pre-supplementary motor areas', *Nature Reviews Neuroscience*, Vol. 9 (October 2008): 862, <https://doi.org/10.1038/nrn2478>.

and 'objective' assets - and the fact that they are liberated both from practical manoeuvres and the necessity of *looking* at other people - tones and tonal relations have several sensory properties that might serve to assist the thinking process. When we are fleeing from something bad, or towards something good, there is always a glimpse of hope in the aversion and flight, and a sense of frustration in the hope. The sense of positive motivation can never be isolated from the frustration that is also manifested in the drive; and there is no negative motivation unless it is also aiming for something better and more pleasurable.

This dialectic is nowhere more explicit and immediate than in melody and rhythm. Whereas the melody of speech and thought is always negating the harmony of tone by gliding to another tone and avoiding the stasis of regular rhythms, it is largely this reference of harmony and rhythm that is producing the sense of dissonance and mental tension. During voluntary wondering, questioning, cursing, sighing in frustration, or screaming in anxiety, the intrinsic harmony of tone is always there as a paradoxical interpenetration of harmony with tension and shrillness. Conversely, the sense of repose in harmonious music is always produced in the perspective of dissonant evasions, relieving returns, or at least: the effort that is needed to maintain the attention and keep the activity going. Even a dog, when rhythmically wagging its tail, is simultaneously bubbling over with impatient restlessness, eagerness, and expectation. It is a dialectic that is often overlooked, but its manifestations are easy to spot; and it is not very surprising that the medium of sound and rhythm has a strong presence in the regions of the brain where experiences of willpower, volition, and hope are coming together.

A similar curious interpenetration of emotional expression and decision-making might be found in other parts of the dorsomedial frontal cortex. As we have already seen, the dorsomedial Brodmann area 9 has been found to be dealing largely with facial expression, but also aspects of decision-making. According to Haggard and Brass, at least, it is the site of 'whether decisions' as well as voluntary inhibition and stopping, which they connected with the feeling of *frustration*, and the involvement of the ventral insula and the superior temporal sulcus,³⁸ the latter of which is also concerned with vocal processing. The possibility of uniting these seemingly disparate phenomena might be doubted, but it is in total harmony with the reasoning of William James: we

³⁸ Marcel Brass and Patrick Haggard, 'The What, When, Whether Model of Intentional Action', *The Neuroscientist*, Vol. 14, Issue 4 (August 2008): 319-325, <https://doi.org/10.1177/1073858408317417>.

would have little awareness of such decision making if it was not embodied in facial, auditory, or visceral sensations.

The sensations of *vocalising* are obviously a central part of such volition, and the circumstance that this is not restricted to its kinaesthetic and visceral-motor aspects is demonstrated by a comparison between voiced and whispered speech. According to Schulz and colleagues, the PET responses to *voiced speech* were much stronger than whispered speech, especially in the medial prefrontal Brodmann areas 8, 9, and 10. Also the pre-SMA and ventral anterior cingulate responded more strongly to voiced speech; and as for the BA47, in the ventrolateral prefrontal cortex, it was also greater in voiced speech during the speech tasks, which consisted in the recounting of a story. Several other areas, most notably the periaqueductal grey, which is receiving descending projections from the medial prefrontal cortex, was also found to be coupled with these prefrontal regions during voiced speech.³⁹ Thus the study seems to confirm that the sensory properties of tone really matter. If they had not, whispering would have served equally well.

Of course, the self, and the prefrontal cortex is also dealing with external and non-emotional matters. Even in the Broca's area, that is to say, in the left inferior frontal cortex, we can observe how some sequences are organised not according to the principles of ego-dynamic autonomy but the meanings that are signified by combining word classes according to certain *rules*. Even if these rules are behaviourally complex and generated by people, their functions are not *immanent* or *autonomous* like the fluctuations of melodic tension and release. There is a dominance of arbitrariness and pure convention in syntax and semantics, which is similar to the often accidental connection between circumstances in the outer world, and the conditional linking of events and rewards that is taking place in the amygdala and the orbitofrontal cortex.

The question then, is whether this dichotomy between conventional and autonomous behaviour is also observable in the left and right pre-SMA. According to Anthony Steven Dick and colleagues, the left pre-SMA plays a more central role in speech.⁴⁰ There is also an

³⁹ GERALYN M. SCHULZ ET AL., 'Functional neuroanatomy of human vocalization: An H215O PET study'. *Cerebral Cortex*, Volume 15, Issue 12 (March 2005): 1835-47. <https://doi.org/10.1093/cercor/bhi061>.

⁴⁰ ANTHONY STEVEN DICK, DEJA GARIC, PAOLO GRAZIANO, PASCALE TREMBLAY, 'The frontal aslant tract (FAT) and its role in speech, language and executive function', *Cortex*, Vol. 111 (February 2019): 148-163, 10.1016/j.cortex.2018.10.015.

interesting meta-analysis by Carina Freitas and colleagues, which is concluding that the left pre-SMA is concerned with *familiar melodies*, while the right anterior cingulate cortex is concerned with *unfamiliar melodies*.⁴¹ This is also the pattern that has been observed in studies of animal vocalisation and the lateralisation of functions in the inferior frontal gyrus.⁴² One might speculate whether the sense of familiarity is located to the left side here, because it is based on personal associations rather than immanent relationships, like the dialectic of functional harmony. A better explanation might be that these familiar melodies are more internalised and *habitual* components of the standard ego-dynamic repertoire. The grasping of *unfamiliar* melodies obviously requires more in terms of attention and the ability to comprehend complex ego-dynamic processes.

It is a tantalising hypothesis that the prefrontal cortex, and its right hemisphere in particular, is basically concerned with *selfhood* and the construction of ego-dynamic and socio-emotional content. At the same time, the self is also dealing with the material world and courses of events which are neither autonomous nor self-generated. Examples of such content are inanimate objects, routes, recipes, and accidental courses of events. The question then, is whether the idea of such extrinsic and episodic sequences are also stored in the prefrontal cortex, or whether they are located only to the temporal, parietal, retrosplenial and hippocampal regions of the brain. Their organisation is fundamentally different from the ego-dynamic hierarchies that have been described in this treatise, so it is likely that the neural correlates are also different.

While a sequence of events, like a route or recipe, is linear and often chaotic in terms of intrinsic order, the structure of the self might be seen to rely on a functional hierarchy of ego-dynamic gestalts which is extremely complex in terms of temporal integration, self-reflexivity, and internal coherence. Even with regard to the macaque brain we have seen how prefrontal regions like the pars orbitalis is basically concerned with the monitoring and charting of emotional vocalisation and facial expressions,⁴³ which is very much the media in which these

⁴¹ Carina Freitas, Enrica Manzato, Alessandra Burini, Margot J. Taylor, Jason P. Lerch, and Evdokia Anagnostou, 'Neural correlates of Familiarity in Music listening: A Systematic Review and a Neuroimaging Meta-Analysis', *Frontiers in Neuroscience*, Vol. 12 (5 October 2018). <https://doi.org/10.3389/fnins.2018.00686>.

⁴² Marcello Siniscalchi, Angelo Quaranta, Lesley J. Rogers, 'Hemispheric Specialization in Dogs for Processing Different Acoustic Stimuli', *PLoS ONE*, Vol. 3, Issue 10 (9 October 2008): e3349, <https://doi.org/10.1371/journal.pone.0003349>.

⁴³ Lizabeth M. Romanski, 'Representation and Integration of Auditory and Visual Stimuli in the Primate Ventral lateral Prefrontal Cortex', *Cerebral Cortex*, Vol. 17, Supplement 1 (1 September 2007): i61-i69, <https://doi.org/10.1093/cercor/bhm099>.

ego-dynamic and socio-emotional functions are produced. The amount of integration and reflexivity that is required to constitute these functions seems to be manifested both in the extreme *interconnectivity* of prefrontal regions as well as our rich conceptual apparatus for social interaction, thought, and emotion. Especially the frontopolar cortex is primarily connected with other areas in the prefrontal cortex.

If it is correct, the dichotomy between an autonomous ego-dynamic sphere in the prefrontal cortex - producing the content of *the self* and possibly even 'the extended self' - and a sphere of simple, extrinsic, and contingent matters in more posterior lobes, would simplify the picture of the brain. The types of conditioning and convention that are brought about by the orbitofrontal cortex and Broca's area might be seen to gainsay such a hypothesis, yet it may not be irrelevant to other, higher, and more right hemisphere regions of the prefrontal cortex. As earlier mentioned, there is a ventral to dorsal hierarchy both in the brain at large and in the medial frontal cortex, where the dorsal regions are responsible for more 'post-conventional' and personal levels of decision-making. A similar dichotomy is even more evident along the posterior-anterior axis.

As pointed out in a comprehensive study by Silvia Seghezzi and colleagues, there is a rostro-caudal gradient even in the SMA region, where the SMA proper, along with the middle insula, is more concerned with the implementation and outcome of overt movement than with more cognitive processes. The 'cognitive system', she says, and more specifically, the sense of 'intention', is governed by the pre-SMA in close alliance with the inferior frontal cortex and the anterior insula.⁴⁴ It is a picture that seems to align well with Wilhelm Wundt's conception of volition discussed in chapter one. These areas - and the dorsomedial prefrontal cortex in general - have also been proven to be central to musical creativity, like in a study of rhythmical improvisation by Marcella Pereira Babosa de Aquino and colleagues. Especially in professional musicians the activation of the SMA was very strong during improvisation; whereas non-professionals were found to rely somewhat more on subconscious and insular activity. More

⁴⁴ Silvia Seghezzi, Eleonora Zirone, Eraldo Paulesu, Laura Zapparoli, 'The Brain in (willed) Action: A Meta-Analytical Comparison of Imaging Studies on Motor Intentionality and Sense of Agency', *Frontiers in Psychology*, Vol. 10, No 804 (12 April 2019). <https://doi.org/10.3389/fpsyg.2019.00804>.

posterior regions, like the precuneus, the angular gyrus, and the left middle temporal gyrus were also more deactivated in the group of musicians.⁴⁵

As indicated by the last example, the rostro-caudal gradient becomes much clearer when looking at the whole brain. It is a fact that simple percepts like shapes, objects, and even episodic memory is located to more posterior lobes. This is reflected even in medial regions like the posterior cingulate cortex and the retrosplenial cortex. According to Adam Miller and colleagues, damage to the retrosplenial cortex 'severely impairs allocentric representations of the environment, including the ability to derive navigational information from landmarks'. It also plays 'a key role in contextual and episodic memory', exchanging sensory, contextual, and mnemonic input with the hippocampus.⁴⁶

The neighbouring posterior cingulate cortex has been associated with similar topographical⁴⁷ and autobiographical functions, like the memorising of new *routes*;⁴⁸ yet researchers have difficulty with pinpointing its core function. Judging from some studies, it seems to be connected with attention, but not *focussed* attention; and one might speculate whether it is dealing rather with a broader, and externally oriented attention, like *vigilance*.⁴⁹ Certainly such vigilance, being *on guard*, would be crucial even in a state of rest. A study by John M. Pearson and colleagues, associates it with 'change detection', especially the detection of 'large-scale environmental changes'.⁵⁰ In another study, by Judson Brewer and colleagues, it is suggested that 'the mPFC may subserve more cognitive elements of self, while the PCC functions to evaluate or judge how

⁴⁵ Marcella Pereira Barbosa de Aquino, Juan Verdejo-Román, Miguel Pérez-García, Purificación Pérez-García, 'Different role of the supplementary motor area and the insula between musicians and non-musicians in a controlled musical creativity task', *Scientific Reports*, Vol. 9, Article 13006 (September 2019). <https://doi.org/10.1038/s41598-019-49405-5>.

⁴⁶ Adam M. P. Miller, Lindsey C. Vedder, L. Mataathew Law, David M. Smith, 'Cues, context, and long-term memory: the role of the retrosplenial cortex in spatial cognition', *Frontiers in Human Neuroscience*, Vol. 8, No. 586 (5 August 2014). <https://doi.org/10.3389/fnhum.2014.00586>.

⁴⁷ Kaoru Katayama, Nobuyoshi Takahashi, Kazue Ogawara, Takamichi Hattori, 'Pure Topographical Disorientation Due to Right Posterior Cingulate Lesion', *Cortex*, Vol. 35, Issue 2 (1999):279-282, [https://doi.org/10.1016/S0010-9452\(08\)70801-3](https://doi.org/10.1016/S0010-9452(08)70801-3).

⁴⁸ Richard. J. Maddock, A. S. Garrett, M. H. Buonocore, 'Remembering Familiar People: The Posterior Cingulate Cortex and Autobiographical memory retrieval', *Neuroscience*, Vol. 104, Issue 3 (14 June 2001): 667-676. [https://doi.org/10.1016/s0306-4522\(01\)00108-7](https://doi.org/10.1016/s0306-4522(01)00108-7).

⁴⁹ Giovanni Piantoni, Bing Leung P. Cheung, Barry D. Van Veen, Nico Romeijn et al. 'Disrupted directed connectivity along the cingulate cortex determines vigilance after sleep deprivation', *Neuroimage*. Vol. 79 (October 2013): 213-222. <https://doi.org/10.1016/j.neuroimage.2013.04.103>.

⁵⁰ John M. Pearson, Sarah R. Heilbronner, David L. Barack, Benjamin Y. Hayden, Michael L. Platt, 'Posterior Cingulate Cortex: Adapting Behavior to a Changing World', *Trends in Cognitive Science*, Vol. 15, No 4 (April 2011). <https://doi.org/10.1016/j.tics.2011.02.002>.

one *relates* to one's experience: how much they are caught up in it;⁵¹ but they do not define the concept of 'experience'. As noted by Brewer and colleagues, the posterior cingulate has been found to be deactivated both during meditation and more cognitive and focussed tasks, so it is reasonable to think that it is concerned rather with the *environment*.

Certainly, the frontal, temporal, and parietal lobes are interconnected and interdependent in many ways. According to David R. Euston and colleagues, even the medial prefrontal cortex is informed, in an unidirectional manner, about past external and conditional matters via the hippocampus.⁵² Indeed, the autonomous self is defined and generated by its interactions with its diametrical opposites: the experience of material resistance, disorganised chance, and inanimate stasis. Conversely, the consciousness of such inanimate matters is both produced and informed by the exploratory actions of the self, charting the outer world at the same time as it is composing itself and the very distinction between something inner and outer.

This dialectical interpenetration of the self and inanimate matters seems to be highlighted in episodic memory. The concept of 'episodic memory' was coined and developed by Endel Tulving, and unlike later, more reductionist researchers, he always emphasises the role of the self in memory retrieval. There is no time travelling without a traveler, says Tulving: episodic memory is not only concerned with events in time and space: 'The essence of episodic memory lies in the conjunction of three concepts - self, auto-noetic awareness, and subjectively sensed time.'⁵³ And it is reassuring to find that it was precisely the 'musical areas' BA 45/47 in the right hemisphere - which role in discursive and dramaturgical processes have been charted in this treatise - that in a PET study by Tulving and Lepage were shown to be most important to such retrieval.⁵⁴ Other areas that were found to be central to episodic memory retrieval were the dorsolateral BA 8/9, which in this treatise have been connected with contextualisation and apperception, and the medial frontopolar BA10, which may be crucial to the self-reflexive monitoring of mood.

⁵¹ Judson A. Brewer et al., 'What about the "self" is processed in the posterior cingulate cortex?', *Frontiers in Human Neuroscience*, Vol. 7, Article 647 (2 October 2013). <https://doi.org/10.3389/fnhum.2013.00647>.

⁵² David R. Euston et al., 'The Role of Medial Prefrontal Cortex in Memory and Decision Making,' *Neuron*, Vol. 76, Issue 6 (20 December 2012): 1057-1070. <https://doi.org/10.1016/j.neuron.2012.12.002>.

⁵³ Endel Tulving, 'Episodic Memory: From Mind to Brain', *Annual Review of Psychology*, Vol. 53 (February 2002):1-25. <https://doi.org/10.1146/annurev.psych.53.100901.135114>.

⁵⁴ Martin Lepage, Omar Ghaffar, Lars Nyberg, Endel Tulving, 'Prefrontal cortex and episodic memory retrieval mode'. *Proceedings of the National Academy of Sciences*, Vol. 97, No. 1 (4 January 2000):506-511. <https://doi.org/10.1073/pnas.97.1.506>.

As argued in previous chapters: the prefrontal cortex is constituting our *conceptual grasp* of behavioural and developmental functions, stages, mental attitudes and interactions, and in the left hemisphere: our grasp of tools and rules. This is the perspective in which the outer world is 'apperceived', and it is obvious that these aspects of the self are also essential to the recall and interpretation of past experience. To bring about such recall, and to incorporate it into our lives and 'lifeworlds', even these prefrontal areas might have to retain a trace of the outer objects and places. The manner in which this is happening is by no means clear, but there are indications that the traces of episodic memories that are harboured in the prefrontal cortex are relatively sketchy and *conceptual*, while the extended region of the hippocampus and the parietal and temporal cortex is storing much of the *concrete details* of different scenarios and events, even on a permanent basis.⁵⁵ If this was not the case, we would hardly suffer retrograde amnesia with a loss of all episodic memory after hippocampal lesions.

The dialectical interpenetration of opposites is reflected even in the circumstance that the hippocampus, in alliance with the amygdala, is storing traces of the emotional value of different scenarios, as an index of their relative importance. Yet it would be false to say that there is no difference between these worlds. On the contrary, the purely ego-dynamic capacities in the prefrontal cortex might be seen to have their own memory systems, that are independent of the hippocampus, and preserved even in the most severe cases of amnesia. Tulving's research and reference to cases of brain damage, is evidencing that musical memory, conceptual memory, and working memory may operate independently of episodic memory and the hippocampal system. Even when all episodic memory and retrospection is gone, the person may retain his intelligence and musical capabilities.

One of the most severe and best documented cases of such amnesia is that of the accomplished musician Clive Wearing, leading a life that was trapped within, and created from scratch, during every time span of 30 seconds. His retrograde and anterograde amnesia allowed no memories of his past autobiography or any events taking place more than 30 seconds ago. Still he was able to play complex works on the piano and organ, sight-read new pieces of music, and even conduct choirs; which should be sufficient evidence that the experience of music does

⁵⁵ Signy Sheldon, Can Fenerci and Lauri Gurguryan. 'A Neurocognitive Perspective on the Forms and Functions of Autobiographical Memory Retrieval'. *Frontier in Systems Neuroscience*, Volume 13 (29. January 2019): Figure 1., <https://doi.org/10.3389/fnsys.2019.00004>.

not rely on autobiographical associations.⁵⁶ The same proof is evidenced by Alzheimer patients and other cases of amnesia. It is not the evocation of autobiographical memory that is producing the experience of music. Especially in late stages of the disease, these memories are gone. Still the music may have an invigorating effect on these patients, which is obviously relying on other memory systems, or a system of its own.

What makes the case of Alzheimer patients so enlightening, is that the medial prefrontal cortex - the anterior cingulate and the medial pre-SMA - remains relatively intact during even the late stages of the disease. According to Jörn-Henrik Jacobsen and colleagues, these very same areas are correlated with the experiences of *familiar tunes*. In a set of fMRI experiments, comparing brain activity connected with long-known melodies, recently known melodies, and unknown melodies, it was the caudal anterior cingulate cortex and the ventral pre-SMA that correlated best with the highest degree of familiarity, both in healthy and demented people.⁵⁷ And there is little doubt that the experience of such familiar music has a dramatic and invigorating effect on Alzheimer patients, making them sing and dance and thus 'improving the patient's sense of self and personal autonomy'.⁵⁸

Since the temporal regions are very much destroyed in such patients, one might even suspect that the tunes are *stored* in the medial prefrontal cortex. Such conceptions have been described in this treatise as the highest level of egodynamic gestalt formation: holistic behavioural entities, where even aspects of mood are integrated. So it is not unlikely that it is a product of so called 'semantic memory'. Since there is little 'semantic' or even 'declarative' about musical experience, however, it might seem like music is relying on a separate type of memory. Yet it might be a better idea to rebrand this whole category of memory as 'conceptual memory'. Aphasic people and animals have it as well, and they are not particularly verbal.

Even if the rhetorical and dramaturgical functions of music can be made 'explicit' and verbalised - in a manner that should be sufficiently demonstrated in this treatise - they do not *rely* on such verbalisation and explication. It is probably the other way round: the gestalts and ideas

⁵⁶ Oliver Sacks, *Musophilia: Tales of Music and the Brain*. (London: Picador, 2007): Chapter 15: In the Moment: Music and Amnesia.

⁵⁷ Jörn-Henrik Jacobsen, Johannes Stelzer, Thomas Hans Fritz, Gael Chételat, Renaud La Joie, Robert Turner, 'Why musical memory can be preserved in advanced Alzheimer's disease'. *Brain*, Vol. 138, Issue 8 (August 2015): 2438-2450. <https://doi.org/10.1093/brain/awv135>.

⁵⁸ Melissa Leggieri, Michael H. Thaut, Luis Fornazzari, Tom A. Schweizer, Joseph Barfett, David G. Munoz, and Corinne E. Fischer, 'Music Intervention Approaches for Alzheimer's Disease: A Review of the literature', *Frontiers in Neuroscience*, Vol.13, Issue 132 (12 March 2019), <https://doi.org/10.3389/fnins.2019.00132>.

are necessary for the naming. Even the influential study of Itzhak Fried from 1991 indicated that electrical stimulation of an area anterior to the left medial SMA produced hesitation or speech arrest for *naming* of objects.⁵⁹ Yet even if the holistic entities we call songs or tunes could be given a *title*, these titles are not necessary or even referring to something musical in most cases. It is clearly possible to recognise a song without remembering or even knowing its title. When hearing familiar tunes on the radio, it often takes some time to remember even titles and texts that are well known; so it is a category mistake to equate our conceptual capacities with language.

Other classes of memory that are central to musical experience are *sensory memory*, *echoic memory* and *procedural memory*. Sensory memory is obviously at the core of consciousness, producing the sense of *duration* that is essential to our experience of being. It is not restricted to a discrete 'moment' - that would eliminate it immediately - nor is it a sequence of such moments. It is expanding the moment in a manner that is both paradoxical and transcendent. Yet this is not specific to the prefrontal cortex. It might be seen to arise already in subcortical and sensory regions of the brain. Procedural memory is automated, and located to the cerebellum and the striatum. It is sometimes described as 'muscle memory', the experience that when playing the piano, the hands are moving by themselves, while the pianist is concentrating on higher level expression and dramaturgical coherence.

It is the mission of this treatise to show that consciousness cannot be restricted to automated processing; it is produced by *gestalts*, which are also concepts or nonverbal ideas. Even our selves, and the very concept of our self, are products of such *gestalts*. At the elementary levels the self is constituted by simple acts and attitudes, like the tones and motives constituting a musical theme. At higher levels, like in the phrases and cadences of speech and song, the motives are integrated into a whole hierarchy of rhetorical and dramaturgical functions. At the highest levels, the brain is assembling the components into experiences of selfhood, lives, personalities, ideologies, and musical works with a certain style and message; and it is precisely these high level *gestalts* that might be seen to be completed in the vicinity of the pre-SMA, in

⁵⁹ Itzhak Fried, Amiram Katz, Gregory McCarthy, Kimberlee J. Sass, Peter Williamson, Susan S. Spencer, and Dennis D. Spencer, 'Functional organization of human supplementary motor cortex studied by electrical stimulation', *The Journal of Neuroscience*, Vol. 11 No. 11 (November 1991): Figure 3., <https://doi.org/10.1523/JNEUROSCI.11-11-03656.1991>.

close cooperation with other high level regions in the rostral, ventrolateral, and medial prefrontal cortex.

Part Four
Principles of Perceptual Organisation

Chapter 13

Differences Between Melodic and Spatial Organisation

13.1 Wundt's 'law of heterogony of ends'

If the behavioural sphere of gestalt formation is a neglected part of reality, it is no wonder that the differences between behavioural and spatial gestalts are also neglected. Yet it is shocking. After all, these may be the most fundamental categories of our reality.

So what exactly are these differences? And which are the consequences of confusing them? The below discussions will hopefully give some indications of this, and a better definition of the principles that have been outlined in previous chapters. Determinateness is necessarily engaging its own negations claimed Spinoza and Hegel.¹ And it is more than a test of falsifiability. Besides the reality of 'coincidentia oppositorum', the interpenetration of opposites, it is probably first when categories are compared with and differentiated from contrasting categories that the so called 'natural consciousness' gets intellectual, and much more immune towards confusion. As we will come back to below, especially some twentieth century music and musicological formalism has been productive of such confusions. But there have also been contrary voices: thinkers like Wundt, Bergson, and even the quantum physicist David Bohm.

The problem is succinctly formulated and exemplified by the 'neuro-musicologist' Daniel Levitin in the introduction to an article on the neural substrates of temporal coherence in music.² The example is emulated by the letters below. It is an extract from a famous piece of music, but which?

?aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaat at-at-aT .aaaaaaaaaaaaaat at-at-aT

¹ Hegel's *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences* [1830], trans William Wallace. (Oxford: Clarendon Press, 1975): 153, § 91.

² Daniel J. Levitin and Vinod Menon, 'Musical structure is processed in "language" areas of the brain: a possible role for Brodmann Area 47 in temporal coherence,' *Neuroimage*, Vol. 20, Issue 4 (December 2003): 2142-2152. <https://doi.org/10.1016/j.neuroimage.2003.08.016>.

The example is backward; and with recourse to the visual imprint of these letters, it should be easy to see which piece it is. Music, and life, is not normally experienced like this. To a person listening to a record or the radio there is nothing to see, nor are the elements simultaneously presented like above. They are always proceeding from start to end. However, this would not matter much if the music had been organised and grasped like a shape. Whatever direction or order the elements are heard, the hypothetical overall shape would in all cases sum up to be the same shape. And the above example is about as simple as it gets, so if the music cannot be perceived as a shape in this case it probably never can.

We know how shapes are perceived, because when watching our selves in the mirror and comparing it with a photograph, it is difficult to notice any difference, except for the fact that the parting of the hair has moved to the opposite side of the head. Shapes are often *symmetrical*, which is a source both of visual beauty and material stability. And even when they are not so symmetrical, this does not necessarily alter much. A stone or a knife is a stone or a knife whatever direction these things are seen or held.

Yet this is not true for music, says Levitin. While the chord progression IV-V-I 'resolves', its backward version I-V-IV 'sounds unresolved'. Similarly, he says, the above musical example 'takes on a completely different meaning' than the original. He gives no further explanation of this, but we are obviously presented with a long static tone with three sudden 'jerks' at the end. The articulation is peculiar, to say the least, with a strange noise - here represented by the letter T - at the end of each element. Then the motif is repeated, with a shorter first tone. From a behavioural perspective it makes little but pathological sense. Are we dealing with a paralysed creature with breathing problems or some kind of spasms? Or is the creature suddenly waking up? And what are the noises at the end of each spasm? Some kind of hiccup?

If heard in the right order, the experience is very different: more like three *preparatory upbeats* followed by a *downbeat*, which is dramatically emphasised by being sustained for several seconds. Even the elements are different now, and much more logical from a behavioural point of view: they all have an *attack*, T, which seems to be in compliance with physical causality as well. And if we put text to it, it becomes clear how the motif may function as a *statement*, which, if we take the harmonic progression into account, is rather like a *question*, or at least something unresolved, since it is ending on the minor third of the not yet established

tonic, and the second time: the third of the dominant chord, which is challenging the tonic at the same time as it is anticipating its introduction.

Ta-ta-ta taaaaaaaaaaaaaa. Ta-ta-ta taaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa?

According to Beethoven's secretary Anton Schindler, Beethoven had told him that the opening of his 5th symphony was alluding to 'fate knocking at the door'. But Schindler's memory and trustworthiness has been doubted by some, like Beethoven's biographer Alexander Wheelock Thayer,³ as Beethoven was seldom so open about these matters. Anyhow, we do not need this information. It is sufficient to experience how the symphony is battling with a problem - approaching resolutions, celebrating local victories, experiencing setbacks, doubts, and final triumph - which is how a Beethoven symphony or sonata often evolves.

What we *can* know, or feel already from the start, is that the theme is relatively somber and stern. So stern, perhaps, that only important and existential problems might come into question. At least this might be the case if it is also played in a 'stern' manner. Which is all we *need* to know. The initial statements of the theme are fortissimo, in c minor, in a low register for the instruments, and they are emphatically set off by some long fermatas. The exact length depends on the conductor; but the longer one holds them, and the more intensely they are played, the more intense they will appear. Usually the second one is held longer, since this would serve to *intensify* the first statement, *round off* the initial presentation, and *prepare* for the long process that is to come. This is also indicated in the score by an extra bar.

As we can see; the manner of organisation could hardly be more different from that of a shape. Far from being an indirect representation of some kind of static building or panorama that can be contemplated from many angles, the music displays the dynamic substrates of rhetorical figures, going into higher level functions and dramaturgical processes, often referred to as *teleological* or 'goal-seeking'. And it is apparently this ancient concept of 'teleology' that Wundt is alluding to when seeking to formulate the principles of music and mental processes; they follow, he says, 'the law of heterogony of ends [Zwecke]'.

³ Beethoven, *Symphony No. 5 in C minor: An Authoritative Score; The Sketches, Historical Background, Analysis, Views and comments*, ed. Elliot Forbes. (New York and London: W. W. Norton & Company, 1971):185.

The *law of heterogony of ends* is most closely connected with the law of relations, but it is also based on the law of resultants, which is always to be taken into consideration when dealing with the larger interconnections of psychical development. In fact, we may regard this law as a principle of development which controls the changes arising, as results of successive creative syntheses, in the relations between the single partial contents of psychical compounds. The resultants arising from united psychical processes include contents that were not present in the components, and these new contents may in turn enter into relation with the old components thus changing again the relations between these old components and consequently the new resultants that arise from them. This principle of continually changing relations is most striking when an *idea of ends* is formed on the basis of the given relations. Here the relation of the single factors to one another is regarded as an interconnection of means which has for the end aimed at, the product arising from the interconnection. The relation between the actual *effects* in such a case and the ideated ends is such that secondary effects always arise that were not thought of in the first ideas of end. These new effects enter into new series of motives, and thus modify the old ends or add new ones to them.⁴

As is pointed out by Wundt, the 'law of heterogony of ends' is basically a teleological reformulation of his 'law of creative synthesis';⁵ yet it is not clear at once, why this 'law' should focus more on the 'ends' than the transformation of the ongoing activity, and the local functions and stages of such processes. However, the translation of *Zwecke* as 'ends' is open to discussion, since *Zwecke* could also be translated as 'purposes', which is less connoted with *Ziel* or goal. This may not necessarily be an advantage, as even an element of a picture may be said to fulfil a certain purpose or function. It is not specific to behavioural processes. Which brings us back to the concept of ends or aims.

What is so confusing about the idea of 'heterogeneous ends' is that ends and goals are sometimes pretty stable. Especially long term goals are sometimes permanent. One might have instilled as the purpose of ones life the search for fame, without ever reaching it. For a person who really succeeds and get famous, however, even this goal of becoming famous will be replaced. The person might be thrown into some kind of unpredictable chaos which might lead to anything, even death and suicide in some cases.

The case of long range goals never reached may be more of a special case or exception then; and to illustrate his point, it might be clearer if we focus on the transformation of more local

⁴ Wilhelm Wundt, *Outlines of Psychology*, §24.3.

See also Wundt, *Grundzüge der Physiologischen Psychologie*, Volume 3, Chapter 22, 765.

⁵ Wundt, *Grundzüge der Physiologischen Psychologie*, Volume 3, Chapter 22, 765-766.

ends. Wundt's description in *Grundzüge* may be clearer in this respect, talking about 'a context of volitional acts [Willenshandlungen], forming a succession of ends [Beweggründe], so that this row of purposes [Zweckreie] generally gets richer and richer, as new motives [Motive] grow out of the achieved results.'⁶ And it is probably correct that behaviour is organised in this forward fashion. Our lives are all about predicting and dealing with upcoming events, on the basis of experience.

This is also how some neuroscientists describe the process. Gabriel Dippel and Christian Beste speak about serial processing and the 'cascading' of actions in ventrolateral prefrontal areas. When stimulated or blocked by experimental theta burst stimulation especially BA 47 was shown to play an important role; in a manner which was not paralleled by the parietal cortex or more dorsal regions of the lateral frontal cortex.⁷ Also, they claim, the process is found to proceed in a serial manner, without much parallel processing; which at best, is a truth with modifications. As we come back to below, a behavioural gestalt is necessarily retaining previous moments, which are implicated in its temporal function. Perhaps this is what they mean by 'cascades'. Our capacity for multitasking may well be limited, at least at the local level, but the local ends are undoubtedly going into hierarchies of tasks, if not in the same cortical regions. As noted by people like Badre and Koechlin, the action chunking hierarchy may be distributed along a caudal-rostral axis in the ventrolateral prefrontal cortex.

If connecting to the above example of the opening bars of Beethoven's fifth symphony, *the first purpose or goal* may be to attack or intone a tone properly and in synchrony with the other musicians and the conductor. *The second goal* may be to make a convincing statement, which is also articulated and emphasised in a convincing manner. *The third goal* may be to intensify this statement, in a manner which is also suggestive of uncertainty and anticipation. Going up a step in the hierarchy of ends, the whole sequence is going into the function of an opening or 'exposition'; a presentation of statements of which later sections may have as their purpose to develop, celebrate, or recapitulate in conclusion. At an even higher, or more long-range level of goals, the opening movement of a symphony has usually another, more square and discursive, function than the second or third movement. (Bang, *Psychologizing Music*) Similarly the whole

⁶ Wundt, *Grundzüge der Physiologischen Psychologie*, Band 3, Chapter 22, 765.

⁷ Gabriel Dippel and Christian Beste, 'A causal role for the right inferior frontal cortex in implementing strategies for multi-component behaviour', *Nature Communications*, Vol. 6, No 6587 (8 April 2015), <https://doi.org/10.1038/ncomms7587>.

symphony may have a different overall function or aim than other symphonies or pieces on the same concert - like for instance his fourth symphony which is expressing more pastorage or joyous sentiments. Some of Beethoven's works - like for instance his military marches - may not have as their goal a performance in such concerts at all, but serve a different purpose in what might be seen as an even larger scheme of meanings, stretching beyond the concert hall.

As for the 'heterogony' and unpredictability of functions in pre-composed music, the situation is obviously different from daily life. Here the unpredictability lies first of all in the composition process, and at a subtler level, in the performance. Changing a detail of a melodic motif may take a work in a completely different direction. And given the amount of pieces in existence, the potential for variation is apparently tremendous. Yet free improvisation is probably closer to the unpredictability of real life stories.

Wundt seems to be emphasising this unpredictability when talking of unthought of 'secondary effects' that occur and alter everything that follows; and it is an important point. Life would be rather absurd if we always knew what comes next. As listeners to precomposed music and stage plays, however, we often *do* know what comes next. Some of these dramas we repeat and enjoy, time and time again. So perhaps, the point is not so much the mere *unpredictability* of the process, as the circumstance that the behavioural functions are variegated and unique to the different *stages* of a rhetorical and dramaturgical process.

The concept of 'stages' is remarkable because it reflects the uniqueness of a situation, and it is a uniqueness that is related to the amount of prehistory and future of the situation. The concept of stages may be too passive to serve as a general term for behavioural functions. Even a flowering plant or chemical reaction could be said to undergo stages. What it reflects, however, is the accumulative nature of organic processes; the circumstance that every moment is a totally new situation, with a prehistory and outlook that changes from moment to moment. Or as Wundt formulates it: In time-ideas 'it is always the *impression of the present moment* in relation to which all the rest are arranged in time.'

It is this teleological transformation and temporal heterogony of life-situations that is lacking in spatial constructions. Whatever order the elements of a picture is painted, or whatever order ones eyes are moving around in a visual scenario, the totality or the situation is the same. The scene is 'immediately present as a single whole', says Wundt. It is just the the 'fixation point' that varies.

The members of a temporal series *a b c d e f*, can all be immediately presented as a single whole, when the series is reached just as well as if they were a series of points in space. In the latter case, however, they would, on account of original ocular reflexes, be arranged in relation to the point of fixation, and this fixation-point could, at different times, be any one of the impressions *a to f*. In time-ideas, on the other hand, it is always the *impression of the present moment* in relation to which all the rest are arranged in time. When a new impression becomes, in a similar manner, the present impression, even though its sensational contents are exactly the same as that of the earlier, still, it will be apprehended as *subjectively* different, for though the affective state accompanying a sensation may, indeed, be related to the feelings of another moment, the two can never be identical.⁸

The last sentence of this paragraph is interesting, because it extends 'the law of heterogony of ends' to cover also such cases where 'the sensational contents are exactly the same' and nothing seems to happen. Even when we are listening to a metronome, tapping a monotonous rhythm, or glaring out in empty space, it is possible to feel how time goes. And these 'feelings of another moment' have to be created by something. The feelings have to change. Without such change we might not be able to experience time at all.

The somehow abstract representation of such a process by a series of letters from *a to f* is not very illustrative. The letters reflect nothing of their stage in the progression. It might even have misled Wundt to think that that 'when the series is reached' even temporal progressions may be laid out as simultaneous aspects of shapes. As we will come back to in the next chapter, this is hardly the case in teleological processes. A temporal function or stage could not be deprived of its temporality, even in retrospect. And to illustrate it, it would be better if the process could be formulated in behavioural terms, where the shifting stages and feelings are incorporated in the concepts.

It might not always be reflected in a person's outward acts, but even during such a simple experiment as tapping rhythmically or listening to a metronome, there is more going on than simply feeling. Our ego, our thoughts, and the so called 'resting state network' of the brain, is always active to some extent, especially when from a behaviouralist point of view we are 'doing nothing'. Neuroscience has shown that much of this inner life is quieted when focussing on

⁸ Wundt, *Outlines of Psychology*, §11.10, 153-154.

demanding tasks. But hardly entirely so. Some aspects of the self must also be concerned with the tasks, and the mental stages and challenges going into the performance.

Thus there is no daydreaming in the below example. It is restricted entirely to functions related to the task of tapping a monotonous rhythm or following a metronome. More precisely the letters *a* to *f* are specified as different egodynamic challenges and stages in a 'heterogony of ends': the growth and transformation of feelings like *weariness* and *impatience*, but also more active efforts like *concentrating*, *deciding*, *resisting* etc.

f) finish off

e) finding the right moment to finish

d) resisting the growing temptation to finish

c) trying to keep it going in spite of growing weariness

b) concentrating on being attentive or steady

a) getting started

To make sense, the progression has to be read bottom-up, with the first task - 'getting started' - at the bottom, and the last task - 'finishing off' - at the top. The example is presented in this backward manner to highlight the absurdity of reversing the stages. Still the example does not give justice to the extent of the problem. The fact is that if such a process had been reversed or distorted, even the local actions would be backwards and scrambled. Moreover, the mentioned functions and efforts would not even exist in such a case, since it gives no sense to label the last stage of a process as a start. The functions would dissolve completely, and to the extent that it is possible to imagine at all, it would be all chaotic and meaningless.

A better, and more true exemplification of this situation would be to reverse even the components, in this case the words and sentences:

f) ffo hsinif

e) hsinif ot tmemom thgir eht gnidnif

d) hsinif ot noitatpmet gniworg eht gnitsiser

c) sseniraew gniworg fo etips ni gniog ti peek ot gniyrt

b) ydaets ro evitnetta gnieb no gnitartnecnoc

a) detrats gnitteg

At least this should serve to illustrate the absurdity of reversing or disrupting the order of mental stages and functions. And it is even more absurd in music than in ordinary behavior or even dance. A dancer or a person walking around could also be seen to create a trajectory in space. A musical progression, on the other hand, is purely dynamic and invisible. It relies *entirely* on the dynamic functions; and the law of heterogony of ends is reigning supreme. There might well be cases, like in cartoons, where melodic runs are *symbolising* upward or downward movements - but this is a topic that will be discussed below.

The above illustration may also tell something about the way we are comprehending texts. Except from the isolated *letters*, which are spatial symbols, and therefore may retain their identity even when mirrored, the words do not seem to do this; so perhaps our perception of words is not so immediate and visual as some researchers claim (ref). Words are first of all spoken, and might better be likened with tiny snippets of music, which are temporal gestalts. The onomatopoeic words, like cuckoo or bang, are special, perhaps primeval, cases of this.

But this musical analogy would hold only for the words or basic components of words, not the sentences. A crucial difference between text and music, is that words are arranged according to the referential meanings, not the dynamic properties of the sounds themselves. So if we have no recourse to lexical meanings, it will always be chaotic and meaningless. In music, which is arranged according to its intrinsic properties, this is not a problem. On the contrary, it is the strength of nonverbal communication to transcend such barriers.

The difference between verbal and non-verbal communication will be addressed in a special chapter. Here the focus is on spatial versus ego-dynamic structure; and the situation of confusing it would be equally bad for either of these categories. Certainly there are mysteries and paradoxes here - or, as Hegel might have put it: opposites are always interpenetrating. The occipital cortex, for instance, is constructing spatial experience on the basis of rhythmical pulses streaming through the axons. Yet the idea of organising a tower or a bridge as a rhythm or melody, with no concern for spatial principles, is hardly an option.

Nonetheless, these principles are often confused. Especially by scholars it seems. One should think that scholars would be aware of the metaphorical origin of words - and the fact that

concepts like structure, shape, and form may refer to highly different phenomena - but this is not always the case. Even the concept of 'heterogony of ends' is vague and misleading in some respects. So it would have been a great advantage if we could find a formulation that was clearer, and also reflect the kinaesthetic-melodic meandering and gestalt formation at the core of mental processes.

The concept of 'teleology' and 'teleological processes' is good, and familiar at least to philosophers. But even this concept has some unfortunate connotations. It is often associated with Aristotle's concept of 'final causes', which is even more detached from the local level. There is even a tinge of determinism or fatalism about it, which is not necessarily in tune with reality. Not that it is unfamiliar to scholars of today. Darwinians and biologists in general often speak of animals or even 'selfish genes' as seeking procreation; as if animals and genes had a human-like consciousness of such matters. A similar dissociation from local functions and necessities we find in nativism and historicism, in this case 'explaining' the behaviour by pointing to its origin sometime in the distant past, as if behaviour was somehow detached from, and arbitrarily related to, its local concerns.

The concept of 'causality', which is probably the most well known conception of temporality and temporal irreversibility, seems to suffer from the exact opposite problem: it is too much tied to the local level. At least this is how it is often described, as it is usually referring to mechanistic sequences of immediate cause and effect. There seems to be little room for consciousness here. Which is not to say that mental processes are not also causal, if only in a different manner. At least it stands to reason that everything has a cause.

The executive regions of the brain are obviously drawing on a myriad of factors, related both to our prehistory, our intelligence, personality, mood, and what we ate for breakfast. The generation of actions may even incorporate an element of whim and chance, which makes it difficult to predict in detail. In other cases we may be victims of subconscious influences and priming, affecting our decisions in a manner that is even possible to steer and control by people that are skilled in such manipulation. But even in those cases when it is impossible to predict, there is always a competition going on at the neuronal level, which will ultimately push the action or 'readiness potential' in a certain direction.

Amedeo Giorgi describes it somewhat differently. And it might be useful to devote some time to his ideas. As a pioneer in phenomenological psychology, and the founder of *The Journal of*

Phenomenological Psychology, his general views are very close to those of this treatise. Which makes him a relevant discussant when fine-tuning a conception of mental dynamics. Giorgi also highlights a couple of concepts that may be useful in this connection: the concept of 'motives' and 'meanings'. His version of 'heterogony of ends' then, would be the 'unfolding of motivational relations over time'. This, however, he contrasts with causality and the 'universal laws' of forces, as if the 'unfolding of motivational relations' was neither causal, universal, lawful, or consisting of forces.

Thus, one may perform cause-effect analyses with things and one may come up with universal laws about the behavior of forces. But one would have to speak of the unfolding of motivational relations over time with humans and of the role of meaning in determining the value of a human life. Causes and motivations cannot be lumped together; neither can forces and meanings. However, all of them can be approached in the light of the criteria of scientific knowledge, but differently so.⁹

'The unfolding of motivational relations over time' may seem like a good alternative formulation of the principle under discussion. The words may be simpler and easier to grasp. But again, it is a problem that the concept of 'motives' focuses more on intentions and results than the character of the ongoing activity.

Certainly Giorgi is talking about mental acts; but, like Husserl - to whom Giorgi is constantly referring in this article - the acts are mostly mentioned as being instrumental in dealing with spatial objects, real or imagined. When attending to the mental and 'inner' - and this is especially true for Husserl's earlier works - the focus is often on the imagination of 'outer' objects, not the structure of our emotional lives, and the kind of ego-dynamic autonomy which, as we have seen, is also 'outer' in the sense of being embodied and even manifest to others in many cases. Especially music and emotional vocalisation is very autonomous and explicit.

This neglect of ego-dynamic autonomy and the dynamic structure of the self may be due to a general neglect in psychology. But even Husserl's inner-outer dualism may lead to unfortunate results. The concepts of 'inner' and 'outer', 'immanent' and 'transcendent', are bewildering as they have several different meanings, and it is easy to get caught up in false dichotomies and impose limitations on one's research which are not really necessary. Especially if dissociating experience

⁹ Amedeo P. Giorgi, 'Phenomenological Psychology', in *Rethinking Psychology*, ed. Jonathan A. Smith, Rom Harré, and Luk Van Langenhove (London: Sage Publications, 1995): 27.

from its constituent structures and universality in the sense of the *identities* of these, one might easily end up in some kind of post-Husserlian relativism: a half 'surreal' and non-committing discipline, which is also self-contradictory: talking to others about subtle matters which on other occasions are deprived both of objectivity and identities in terms of principles and specific constituents. One should not speak about universal laws in connection with motivational relations, says Giorgi, but is this really correct? And what does he mean by 'universal laws' in the first place?

Obviously it has nothing to do with legislation or divine decrees. Only humans follow such laws and rules. Inorganic nature is not conscious or social, and does not follow rules in this sense. So is Giorgi engaging in some kind of anthropomorphism here? If this is the case, he is not alone. Even many physicists seem to think along these lines. Especially when phenomena or regularities are logically implausible and unresponsive to analysis it is easy to explain them away as God-given 'laws'; like 'the law of gravity'.

When things are understood, and even resolved into logical necessities and tautologies, we might not use this denomination, at least not in the above sense. The fact that two plus two is four is not usually called a law. Nonetheless, even in such purely logical or 'eidetic' disciplines there are principles in the sense of different patterns and categories emerging. The discipline of addition is different from other mathematical disciplines like multiplication or geometry; and it might even be possible to speak of mathematical laws.

We are dealing with sets of a priori logical principles here, which have been seen to have a bearing even on physical nature. But such principles are by no means restricted to physics. One might think that conscious beings are different from nature in the sense that we are more free or historical, while the physical universe is static and fixed. This is a category error, confusing general principles with the idea of something concrete which always stays the same. But even in this primitive sense it is false. Nothing is more violent, chaotic and historical than the creation of atoms in supernovas and in the big bang; yet the products of this chaos are falling nicely into the periodic table of chemical elements, as established by a priori 'eidetic' reasoning. Even the dimensions of space and time, which are also dichotomies, may have been created in this manner: falling into categories of what is logically necessary and possible. There might be no other options.

If there is a difference between this process and the evolution of human behaviour like music, it is not that behaviour is more chaotic and less organised. In some senses behaviour is rather *more organised*, since it is always seeking meaning and order. 'The law of heterogony of ends' is already mentioned. And we have earlier seen how emotional behaviour is organised by complex hierarchies of attitudinal, rhetorical, and dramaturgical functions, which principles and regularities were charted already in Aristotle's *Poetics*, *Rhetoric*, and *De Anima*.

Examples of this are the principles of speech and prosody as distinguished from the principle of song, which are 'universal' even in the primitive sense of existing in all human cultures. Basically there are only two options here: either the tones are sustained or they are not. This is also true for modal music as distinguished from functional harmony. Either the harmony is static, or it is affirmed dialectically by contrasting chords; and the scales and melodic patterns that follow from this are basically identical in all cultures.

If going more into detail about music theory, there is nothing more organised and lawful than a classical textbook in counterpoint or harmony, the latter of which is traditionally devoted to the principles of choral harmonisation. For instance: it is strictly forbidden in choral harmonisation to lead the voices in parallel fifths or parallel octaves. Certainly it is possible to violate it, and many dilettantes do; but then one is destroying the relative independence of the voices, and the result sounds terrible, even to lay people. In other types of music, where the voices are not so independent, like the block harmonisations of big band compositions, such parallels will not sound terrible at all.

To the extent that it is possible to speak of psychological and musical laws then, they are not instances of the one-dimensional idea of everything being similar everywhere anytime. What is lawful is rather the necessary relation between ends and means, effects and their effects, which is basically a version of 'the law of identity' or 'the law of noncontradiction' in classical logic; the circumstance that things are what they are.

It is true that the 'law of non-contradiction' is violated both by Hegel and the post-structuralists. But the identities are always preserved in Hegel's thinking, if only in a paradoxical manner, which is also empirically precise. The relativist rejection of identities is much more problematic and nihilistic, as it is difficult to see how a reality without identities could be productive of anything.

So much for the *organisation* of behaviour. Experience also needs *substance* and *constituents* of different kinds. Giorgi has a good point when criticising the quasi naturalism especially of behaviouralism and cognitive psychology, which was based on the analogies of machines and computers. And the unsatisfactory theorising of many experiments is still making for false conditions and interpretations in many cases. Especially we have seen how a primitive and prosaic selection of emotion concepts is making questionnaires about musical experience erroneous before they are even tested. But it may not be correct, as Giorgi does, to connect this misfortune which Freud and 'early introspectionists' like Wundt and James. Unless, or course, he means that there is a real opposition between forces and meanings.

It is easy to take the meanings for granted, as if they existed in some kind of supernatural vacuum, but it is hardly a scientific attitude. While Giorgi is right that forces are not meanings, it would be a cardinal sin to forget that *meanings do consist of forces*. We have already seen how concepts like behaviour, agent, and object depend to a large extent on the kinaesthetic feelings of moving, and the feelings of resistance, friction, imbalance, and weight, which are ascribable both to our surroundings and our own bodies. These are *gravitational* and *mechanical forces*, as registered by the auditory, vestibular, and sensorimotor systems of the brain, some of which are providing the media of music and emotional vocalisation.

But there are also *electrodynamic forces*: the light waves and the heat that confronts our eyes and bodies, constituting the substance of visual meanings, even as imaginations. In fact, all meanings depend on it, since these forces are also the means by which the neurones are communicating. It is a complex dynamical system in constant flux and vibration.

The *chemical forces* are no less central. Our whole lives, even music and the perceptual faculties, are centred around our metabolism: the fact that we get tired and hungry both for food and air and stimulation of various kinds. The heart is constantly pumping energy around in our bodies, fuelling the cells and neurones. Like the other energies, the chemical energies are also neurotransmitters and constituents of our motivational systems. As a matter of fact: what we often refer to as the 'deeper meanings' of life: the feelings of being aroused, happy, sexually attracted, or in love, are produced to a large extent by different neurotransmitters and hormones. Without it we would not have the faintest idea of these phenomena.

It may not be correct, as Freud did, to speak of a general 'libidinal' principle. Our motivational apparatus is much more variegated and complex than this. But it is undoubtedly following a

'pleasure principle', which levels and functions the neurosciences are charting in great detail now.

Giorgi says he wants to be scientific in a different manner, but by dissociating meanings from laws and forces he is running the risk here, of throwing the baby out with the bath water, and confirming the view of mind he rejects: the idea of some kind of supernatural realm beyond the 'real things' which are inanimate objects. There is little difference between materialism and subjectivism in this sense. Even materialists must talk about emotions. They just refer it to some kind of virtual supernatural realm.

Giorgi even lists some criteria he thinks are important: 'Scientific knowledge', he says, 'is knowledge that is (1) systematic, (2) methodical, (3) critical and (4) general.' He also talks about 'underlying psychological structures.'¹⁰ But it is difficult to see how a science could be systematic or structured if its structures and constituents were devoid of identities and lawfulness in the sense of going into general categories and principles. Similarly, its foundations would be very shaky if the meanings could not be analysed into their physical components. Talking of meaning in music is often challenged by subjectivists and formalists; and it would be difficult to counter it if the meanings could not be dissected into its mathematical, neurobiological, and psychoacoustic constituents.

There is hardly anyone who traverses these disciplines as well as Herman Helmholtz. While Helmholtz is probably best known for his work on thermodynamics, he was also a psychologist and a musicologist. His monumental 'On the Sensations of Tone: as a Physiological Basis for the Theory of Music' is still a cornerstone in the musicological literature, and the title tells a lot of what he is up to.

As we will come back to in the following chapters, Helmholtz also holds what he promises in many ways. Epistemologically he is undoubtedly more refined than some later authors of such textbooks. Unlike some of his followers, he is aware of the fundamental difference between these disciplines: the difference between dealing with 'psychical motives' in musical analysis and mere physical and physiological circumstances in acoustics.¹¹

¹⁰ Amedeo P. Giorgi, 'Phenomenological Psychology', in *Rethinking Psychology*, ed. Jonathan A. Smith, Rom Harré, and Luk Van Langenhove (London: Sage Publications, 1995): 26, 27 and 40.

¹¹ Hermann Helmholtz, *On the Sensations of Tone: as a Physiological Basis for the Theory of Music* [1863], trans. Alexander J. Ellis (New York: Dover Publications Inc., 1954): 235 and 371.

Nonetheless, Helmholtz was not entirely able to resist his formalist impulses, and try to account for the interval of the fourth as a symmetrical equivalent of the fifth, the latter of which has a unique status as the second partial tone of the harmonic series.¹² This is in contrast to an ego-dynamic account of melody, explaining the fourth as a melodic *deflection*, forming part of a tonal dialectic; which is also physically more correct, since it is recognising both the temporality of music, and the fact that there exist no 'subharmonic' series. In other words: there is never a *conflict* between 'meanings' and their physical constitution. A large part of our reality is consisting of behavioural and emotional gestalts. Failing to take account of this dynamic and transactional character of reality does not not only distort it, it might eliminate it completely; which is the subject matter of the last section of this chapter.

13.2 The dynamic properties of sound

13.2.1 Pitch and loudness

The above discussed examples from Beethoven's 5. Symphony were predominantly rhythmical, but what about melody, and the spurious notion of 'melodic contours' which many scholars seem to accept as an established fact? Is there anything to this, or is it a blatant confusion of music with graphic notation and metaphors of height and depth?

It is probably safe to say, even before this discussion has started, that no: pitch is not about the location of dots on a piece of paper. A pitch is not a dot. Nor is it a line. Moreover, tones are not identical objects moving up and down, as musical notation and spatial metaphors tend to suggest. The case is rather the opposite: that tones are *invisible*. They are not differentiated according to location or spatial distance; they do *not* move up and down; on the contrary, they are vibrational sensations, undergoing *change* or *transformation*.

The concept of *fluctuating tension* probably comes closer to what we experience when the pitch is changing. 'Tensions' are also what the ancient Greeks and Romans called the tones. In a way we call them tensions too, since we use a similar word - tone - originating from the Latin word *tonus*, which means tension, or the Greek *tonos*, which means 'act of stretching', akin to *teinein*, which means 'to stretch'¹³ Tension is also what produces it in many cases: the tension of a string, the vocal cords, or the tightened lips of a horn player.

¹² Helmholtz, *On the Sensations of Tone*, 258- 259.

¹³ *Longman dictionary of the English Language* (Essex: Merriam-Webster Inc., 1984), 1581.

Changes in vibrational frequency, in like manner with muscle tones and the feeling of muscular tension and relaxation, are dynamic phenomena. They are also common features of 'ego-dynamic functions', like the earlier treated experiences of mental outcry, questioning, answering, and harmonious resolve. Being invisible, vibrant, and differentiated by sensory transformations rather than differences in spatial location, they could hardly be equated with the symmetrical buttressing of a building or a mountain. Some might nevertheless argue that tones might symbolise such things. If it had been possible to illustrate the dimensions of space by something tonal, and if the listener had been able to retain these images in his or her mind long enough to perceive some kind of overall visual beauty, this might have been an option. Whether such symbolism is even possible and combinable with the 'law of heterogony of ends' governing emotional behaviour is a question we will come back to below. For now it is more important to try to determine what tones are in their own right. Is it correct to say that tension is really inherent in the tones?

It is an important question, as it relates to the idea of sound as an independent medium for feeling. Yet it is essential to stress that the question at stake is not whether frequencies have qualia or intensity. If they had not, we would not hear them. We would neither be able to distinguish between different pitches nor between sound and other sensory modalities. The fact is that there is a large spectrum of such qualia, and we call it *pitch*. The modulation of these qualia is closely integrated with our own vocalisations and even our inner mental dynamic, so it is never devoid of emotional significance. The question, however, is rather how strong these sensations are, how much they contribute in their own right, and if they are really akin to something like tension or intensity.

According to some people, the problem of understanding such qualia is so 'hard' that it is hardly approachable. But again, the properties of sound may be more accessible to understanding than some of the other sensory modalities. It has already been demonstrated by people like Hermann Helmholtz how phenomenology, when combined with acoustics and physiology, may come pretty close to an understanding of such matters. Phenomenology might not have been his strongest point though; at least his idea of 'a close analogy' between pitch and 'motive forces in space', is not entirely precise.¹⁴ Moving things around does not make them

¹⁴ Helmholtz, *On the Sensations of Tone*, 370.

different. Not even gravity contributes to this. Lifting requires only a constant amount of power. The object does not necessarily get heavier as it gets higher.

Certainly there is room for better explanations of pitch. A particular advantage of tone is its relatively slow timescale. In many cases we can even observe how the sensation of tone emerges from isolated beats via buzzing, turning gradually into tones when the pulses accelerate. Around 20 Hz the buzzing is very rough; around 100 Hz it is getting more smooth and continuous, at the same time as we experience that the pitch is gradually 'rising'.¹⁵ Would it not be correct then, to say that pitch could be described as an experience of varying density or smoothness? Certainly these matters are closely related. The neural correlates of touch are also mechanoreceptive and vibrational. When our fingers are gliding over a surface, like the skin of our partner, it is the characteristic vibrational frequencies we are registering: spike timing with millisecond precision.¹⁶

Even Carl Stumpf, a pupil of Franz Brentano and the teacher of Wolfgang Köhler, draws analogies between touch and tone when trying to account for the experience of pitch. In his *Tonpsychologie* from 1883 he speaks for instance about the increasing smoothness or 'Glätte' of high pitches versus the 'Rauhigkeit' or roughness of lower tones, which he ascribes partially to the dissonances among partial tones.¹⁷ But such roughness or dissonance is not peculiar to the low tones. Even high tones could be dissonant and shrill. Also, the concept of smoothness or density seems a little too static and visual, more like an abstract notion of clusters and things put closely together than a dynamic sensation. When the vibration has already transformed from a buzz into a tone proper it may be difficult to discern any further differences in smoothness. Yet our experience of tones and pitches is very pronounced, subtle, and even unique to audition.

This problem becomes even clearer when Stumpf examines another factor that might be involved in tone perception, that of size. It is a fact that low tones resonate with large objects or parts of our bodies, in a manner which seems to incorporate even a certain notion of largeness or smallness into our experience of pitch; and the discussion of these analogies in Stumpf's

¹⁵ Arthur H. Benade, *Fundamentals of Musical Acoustics* [1976] (New York: Dover Publications, 1990), 14.

¹⁶ Emily L. Mackevicius, Matthew D. Best, Hannes P. Saal, and Sliman J. Bensmaia, 'Millisecond Precision Spike Timing Shapes Tactile Perception', *Journal of Neuroscience*, Vol. 32, Issue 44 (31 October 2012): 15309-15317, <https://doi.org/10.1523/JNEUROSCI.2161-12.2012>.

¹⁷ Carl Stumpf. *Tonpsychologie*, Erster Band (Leipzig: S. Hirzel, 1883), 203-206.

Tonpsychologie is a good example of how it is possible if not exactly to explain these sensations, then at least to circle it in and differentiate it from what it is not.

'We could not possibly achieve the 'breath' of deep tones by an union of several high tones', says Stumpf, 'neither subtraction nor addition is possible'.¹⁸ There is obviously something else about low tones; they are not akin to high pitches spread out. High pitches, says Stumpf, have 'grössere Empfindungsstärke', a more *intense feeling*. To further capture it he compares it with the tactile pain caused by *sharpness*: 'Die stechenden Schmerzen der höchsten Töne..., die mit dem Gefühlseindruck des Spitzigen beim Hautsinne durchaus verwandt sind'.¹⁹

According to Helmholtz this 'pain' derives partly from a favouring of our nervous system of tones between e''' and g''' (2640-3168 Hz), providing them with a 'peculiar cutting effect', 'helping to give the voice a screaming effect'.²⁰ Certainly this might be an important survival mechanism. Yet it is peculiar to a very limited register and may not explain our ordinary sensation of high pitch. Nor is intensity or 'Empfindungsstärke' a very precise description of these qualia. Stumpf points to the fact that high tones are perceived as louder than low tones given the same level of sound pressure.²¹ But a high tone is still a high tone if the dynamic level is pianissimo. Certainly a higher pitch is not a mere intensification of the same tone, it is a different tone. The parameter of intensity is already occupied by *loudness*, which is consisting precisely in such an intensification of similar tones. Pitch is something else.

It is true that the concept of intensity may have different meanings and apply to different parameters. One might even speculate, like Bergson is doing in the first part of his *Essai sur les données immédiates de la conscience* (1889), whether degrees of loudness and intensity are even perceivable if isolated from changes in quality and extension - a question which just as well could be reversed, since qualitative changes often seem to be equally difficult to isolate from changes in intensity.

In some cases, intensity might even be understood as *intense tension*. The English word *pitch* is good, as it designates a higher level of something without being too specific. Even the words *high* and *low* are precise enough, since they are not necessarily denoting something spatial, only

¹⁸ Stumpf, *Tonpsychologie*, Erster Band, 58.

¹⁹ Stumpf, *Tonpsychologie*, Erster Band, 222.

²⁰ Helmholtz, *On the Sensations of Tone*, 116.

²¹ Stumpf, *Tonpsychologie*, Erster Band, 367.

See also Benade, *Fundamentals of Musical Acoustics*, Fig. 13.4, 232.

a high or low *level* of something. If we are to specify *what is intensified* or raised, however, the concept of *tension* is probably better and more dynamic than concepts like size or smoothness. Unlike pitch, smoothness is hardly *intense* and *penetrating*. Similarly, a melodic fall is experienced more as a *release* or *relaxation* than as a swelling or fragmentation. This is partially due to the association and neural integration of pitch with related feelings of tension and relaxation deriving from the larynx and the vocal apparatus. Multisensory integration is undoubtedly a common feature both of hearing and the nervous system in general, but it is not the whole story. The piercing feeling of high tones, and the more relaxed feeling of low tones is probably real enough, even in isolation from such associations. After all, there is a reason why high tones are often used as alarm signals, while low frequency sound is utilised for relaxation, like in massage chairs or the calming of spastic patients in so called *vibroacoustic beds*, utilising frequencies below 100 Hz. The Norwegian doctor Olav Skille has been a pioneer in the development of such therapy, which is common practice in many hospitals around the world by now.²²

Indeed this component of sensory tension or relaxation may be an intrinsic feature of all sensory modalities, if not as pronounced as in sound. Even blue and green colours might be experienced as more tense, conflicting, or 'cold' than the 'warmer' reddish ones. According to Paul Bousfield,²³ which was also mentioned in James Hillman's excellent book about different theories of emotion, all sensory stimuli might be seen to reside on a spectrum of such tension or pain. The function of emotion then, would partly consist in the increase or neutralisation of this pain. According to Hillman, these are ideas that can be traced back to Schopenhauer, Kant, and even the ancient greek philosopher Anaxagoras²⁴

If we try to abstract away from pitch the sensory qualities of intervals, which are also formed when pitches are related, this sense of being tense or even painful is relative and depending to a certain extent on which instrument you are playing and the register in which you are used to operate. This is totally different from colour, where the brain is somehow projecting qualia into

²² Olav Skille, Tony Wigram, and Lyn Weekes, 'Vibroacoustic Therapy: The Therapeutic Effect of Low Frequency Sound on Specific Physical Disorders and Disabilities'. *British Journal of Music Therapy*, Vol 3, Issue 2 (1 December 1989): 61-77, <https://doi.org/10.1177/135945758900300202>:61-77.

²³ Paul Bousfield, *Pleasure and Pain: A Theory of the Energetic Foundation of Feeling*, (New York: Routledge, 1926), 66, 261.

²⁴ James Hillman, *Emotion: A Comprehensive Phenomenology of Theories and their Meanings for Therapy* [1960]. (Evanston, Illinois: Northwestern University Press, 1992), 66.

specific parts of the spectrum of light. It is a circumstance that seems to be playing into the hands of postmodern relativists and other sceptics. Yet it is not as simple as this. What matters in melody is the alternation between tension and relaxation, that is to say: the switching of direction, which is not relative at all. This is also the case with aspects of tonal ratio and attraction in tonal music, creating the feeling of moving *away from* or *back to* the root; but this we will come back to below.

What is entirely clear is it that pitch is not a symbol on a piece of paper. Nor is it inferior to other sensations. On the contrary, pitch has many advantages. Especially its objectivity is unique. Unlike feelings of visceral or muscular tension, which are private and manifestable only indirectly, by wrinkles in our faces, the transformations of pitch are explicit. Also they are extremely subtle and precise. If such objectivity and precision is a criterion of objectivity, there is hardly anything as objective as pitch and tonal relations.

Like any qualia, the experience of pitch may be difficult to define, but this does not make it imprecise or weak. On the contrary, its intensity can be turned up. In fact, there is almost no limit to how much it could be turned up. We call it *loudness*, and it is a tremendous spectrum of intensity. It is unclear whether loudness has a sensory quality in itself, but it is undoubtedly magnifying the sensations of tone and pitch. Even in cases where loudness is the only parameter that changes, it may communicate a lot. To some animals, and even humans in many cases, being loud and eruptive is an intrinsic feature of emotions like *exasperation*, *alarm*, *rage*, *scaring*, and *attacking*; sometimes shocking or paralysing its prey.

There is no question that we are dealing with a dynamic parameter in this case. It is *brute force* that impinges on the molecules in our ears and bodies. It is a force that may be shaking the atoms of all things within the circumference of several miles. It is true that there is a limit to loudness in air. If it is going beyond the threshold of 194dB, the energy is turning instead into *shock waves*. Similarly, when the pitch is rising above the limits of human hearing it is turning into *ultrasound*. The physical impact of these tones, however, is all the greater. High power ultrasound may be used in the surgical breaking up of kidney stones or the tendering of meat.²⁵

²⁵ S. D. Jayasooriya, Bhesh Bhandari, Peter Torley and Bruce Robert D'Arcy, 'Effect of High Power Ultrasound Waves on Properties of Meat: A Review'. *International Journal of Food Properties*, Vol. 7, Issue 2 (December 2004): 301-319, <https://doi.org/10.1081/JFP-120030039>.

But even within the perceivable range the impact of sound is extreme enough; enough to cause desperation, pain, and severe injury to our eardrums.

Some formalists and postmodern nominalists tend to detach themselves from these realities and consider sound and music as a bleak formal game, with little intrinsic meaning or qualia beyond that which is associated with it in a cultural 'play of words', which ironically enough, is also auditory by nature. Presumably these people have no fright of the power of sound, so it might be a good idea to use them as 'guinea pigs' when testing the extremity of sound perception.

The experiment could be carried out in the following manner: Put a group of formalists and nominalists in a small room equipped with a stadium sound system, turn up the volume to a relatively high level, and ask the scholars if they still maintain their beliefs. To investigate the effect of parameters like high pitch, low pitch, and dissonance one might alternate between high pitch sirens, or low pitch sounds like the alarm signal of a tanker; or one might play ordinary rock music at a stadium level of intensity. If the scholars maintain their nominalist and formalist views after the first session, simply repeat the experiment at twice the volume and so on. There is a good chance that the participants will change their opinion in good time before the volume is maximised. And best of all: they will do it on purely empirical grounds.

13.2.2 Timbre, dissonance, and tonal attraction

Like the fluctuations of pitch, and the loudness that may dramatically magnify its impact, the experience of harmony, disharmony, conflict and resolution are also central components of ego-dynamic processes. The medium of sound is particularly rich in such qualia, which are often pulling in many different 'directions' at the same time. It is easy to be fooled to believe that musical intervals are somehow analogous to spatial distances, and that for instance the interval of a fifth could be symbolised by some kind of spatial ratio. But this would not capture the fact that the lower tone is strongly experienced as the *root* of the compound. A tritone - lying in 'the exact middle' of the octave - is about equally 'wide' in terms of pitch, but with no such attraction or root at all. And in the case of the fourth, which is also similar in terms of width, the direction of tonal attraction is the *opposite* of the fifth.

Already at this elementary level we can observe how spatial metaphors collapse. A major third turned 'upside down' is a minor sixth, which is not functionally equivalent or symmetrical. The harmonic series is not an object that could be rotated in space. And when the complexity

rises, with chordal progressions, polyphony, and the teleological irreversibility of behavioural and rhetorical processes discussed above, the idea becomes even more absurd. As a matter of fact, even single tones are complexes of such dynamic tendencies, going into the experience of *timbre*, which is a microcosm of expression in its own right. And the physiological mechanisms creating these phenomena are similar in several respects to the mechanisms that produce the experience of chords and roots. So let us take a look at some of these factors.

First of all, a tone is produced by periodic pressure oscillations. It is apparently this intrinsic *harmony* and *periodicity* that creates the peculiar *repose* and *centeredness* which is so characteristic of song and tonal music. Without going into the reasons why light and colour is not experienced in the same manner - different time scales and other physical and physiological conditions might have to be considered - the experience of harmony or repose is obviously essential to song, which *affirms* it by sustaining and repeating the tones.

The role of tone in ordinary prosody and animal vocalisation is not as simple and obvious. It would probably have been easiest, when speaking, to keep the tones straight at all times, as do some people suffering from dysprosody or aprosodia. But to reflect the dynamics of daily life - or not to contradict it by the 'stasis' of harmony - the implicit harmony of tone has apparently to be negated at every moment by constant evasions, letting the tone glide or glissando. The idea might seem unfamiliar, yet it is not unreasonable to think that this constant negation of repose is also there to heighten the dynamic impetus of prosody, providing it with a sense of restlessness which is even stronger than in atonal song.

More central to the discussion of the fundamental dynamic of sound is the fact that tones are usually more than simple sinusoids. Within a tone there is usually a spectrum of partial tones. If such a complex is to be experienced as a unitary tone, and not some kind of noise, these partials have to be harmonically related, that is to say: the frequencies have to be arranged according to the series of whole numbers. At the same time, there is a room for weighting or distorting the arrangement partials in different ways, creating *timbre*. Even here the parameter of pitch is central.

If pitch might be described as a peculiar type of perceived tension, there would also be tension or tension complexes *within* the tone; or to put it differently: there is tension within tension. At least this seems to be confirmed by exclamations like *yipie*, *wee*, or *aye* - which are dominated by vowels like ee and y. These exclamations are undoubtedly more screaming than

they are roaring, and much more tense than exclamations like *uch* or *oh*. And it is not only the general pitch level that produces this effect. It is not impossible, at least, to say yipie in a low voice, and oh with a high voice; all of which is illustrating the multidimensionality of auditory communication, even at the level of single tones.

It has to be noted though, that the role of pitch in formants is somewhat different from other instances of timbre, as formants are much more reliant on absolute pitches and resonances within the cavities of our mouths. Yet these phenomena, pitches and formants, seem to shed light on each other. The below passage by Renier Plomp - one of the most prominent psychoacousticians of the twentieth century - is interesting because it reverses the ordinary manner of viewing these phenomena, comparing the pitches or qualia of simple sinusoid tones with the 'dull' or 'sharp' qualities of different vowels.

The dependence of timbre upon frequency would imply that simple tones are also characterized by a specific timbre, to be distinguished from their pitch. Low-frequency tones do indeed sound dull and high-frequency tones sharp, as was shown by von Bismarck (1974 b). The observation that simple tones have some resemblance, depending upon their frequency, with particular vowels also supports this view. Subjects appear to be able to label simple tones rather well in terms of vowels (e.g. Fant, 1959). This resemblance is related to the frequency of the most characteristic formant or combination of formants.²⁶

It would not be wrong to say that even a text like this is consisting *basically of timbre*, that is to say: if it is not red but merely heard. The sounds of the words are either formants or different kinds of white noise, with peculiar attacks and resonance properties. Even if the text had been whispered, without any form of melody and intonation, the information would still be preserved, except perhaps for question marks and other elements of punctuation, which are indirectly symbolising rising or falling pitch.

But the field of timbre is even richer than this. At the same time as vowels and consonants are uttered, people also constitute and reveal many aspects of *mood* and *personality* through the timbre of their voices. According to Helmholtz, a tone with little overtones is experienced as 'soft', 'dull' and 'free from all roughness'. Tones with moderately loud partials up to about the

²⁶ Reinier Plomp, *Aspects of Tone Sensation, a Psychophysical Study* (London, New York, San Francisco: Academic Press, 1976), 109.

sixth partial are experienced as 'more harmonious and musical'. Compared to the simple sinusoid tones they may be 'rich and splendid' or 'sweet and soft' depending on the amount of upper partials; or if the partials above the sixth or seventh are particularly distinct: '*cutting* and *rough*'. The latter phenomenon is due to the dissonances among the partials, says Helmholtz. Especially 'the braying tones of brass instruments' are 'extremely penetrating', giving 'the impression of great power'.²⁷ Other aspects of timbre seem to derive more from *numerical ratios* and the weighting of *even* or *uneven* numbered partials, producing qualia like *hollow*, *nasal*, *rich*, or *poor*.

If only the unevenly numbered partials are present (as in narrow stopped organ pipes, pianoforte strings struck in their middle points, and clarinets), the quality of tone is *hollow*, and, when a large number of such upper partials are present, *nasal*. When the prime tone predominates the quality of tone is *rich*; but when the prime tone is not sufficiently superior in strength to the upper partials, the quality of tone is *poor*.²⁸

Relating to numerical ratios and the dominance of fundamental tones are also the phenomena of *differential tones* and 'virtual pitch', which may seem obscure, but are essential to the experience of complex tones and roots. It turns out that even if the fundamental tone, or other parts of a harmonic spectrum, are missing or distorted, the brain is nevertheless able to fill in this gap, and experience the compound as a *complex tone* which may not even be represented in the spectrum of partial tones.

It is not entirely clear how such 'virtual tones' are produced the brain - whether it is due to some kind of computation or, as is suggested by Edward W. Large, a product of neurodynamic resonances and simple ratio 'attractors'.²⁹ Yet it seems to provide a clue to how the roots of chords are also perceived. Even if a chord is inverted, and the fundamental frequency is located to the treble, the tone that is experienced as the root is always the fundamental frequency, that is to say: it is the frequency from which the other frequencies can be derived by whole number multiplication. It is precisely this similarity between virtual tone perception and the perception of roots in chords that provides the basis of Ernst Terhardt's theory of harmony.

²⁷ Helmholtz, *On the Sensations of Tone*, 118-119.

²⁸ Helmholtz, *On the Sensations of Tone*, 119.

²⁹ Edward W. Large, 'Chapter 7: Neurodynamics of Music', in *Music Perception*, Springer Handbook of Auditory Research, Eds. Mari Riess Jones, Richard R. Fay, and Arthur N. Popper, Vol. 36: 201-231 (New York: Springer, 2010), https://doi.org/10.1007/978-1-4419-6114-3_7.

The psychoacoustic foundations of harmony can be concisely summarized by the notion that the principles of harmony (i.e., tonal affinity, compatibility, and fundamental-note relation) merely are products of certain features of auditory processing, which are specific to virtual-pitch perception and are by now fairly well understood. Thereby, harmony has found a solid psychoacoustic basis, so that any cultural-historical hypothesis is dispensable.³⁰

Without going into detail about mathematics, physiology, or the later developments of Terhardt's theory, it provided a much sought after explanation of phenomena that have been laying at the core of musical practice and theory for several centuries. Especially Rameau's *Treatise on Harmony* must be mentioned in this connection, as it served to reorient harmonic notation and terminology in relation to the roots of chords, which was already an integrated part of musical practice, but not reflected in the notational system of general bass. As is reflected in all later harmonic analysis and notation, whether it is Riemann's functions, the roman numerical system, or the alphabetic labelling system that is used in all popular music today; the root is always the fundamental tone, and it does not have to be located in the bass. In many cases what we call a G7 chord does not even contain the G.

Nonetheless, it is precisely this dynamic and temporal interaction between different *roots* that provides the dialectic of tonal music: deflecting from or returning to the chords contained in the fundamental spectrum. While the subdominant type of chords on the second or fourth steps are challenging the tonic by turning it into a dominant, the dominant proper is foreshadowing the tonic, by having the closest relative of the tonic, the fifth, as its root. At least this is experienced as the most decisive cadence; which, however, is not always what is sought for. Especially in modal music, which is less cadential but characterised instead by a harmonically static mood or 'mode', the movements away from and back to the root are merely melodic, creating tension and suspense by straying to the fourth or even inharmonious 'blue notes' like the tritone.

Even these inharmonious or *atonal* intervals may be put forward as an evidence for the importance of roots and numerical ratios. If it were not for the perception of roots we would not have been able to distinguish between a fifth and a tritone. What is so characteristic of the tritone and other equidistant divisions of the octave - whole tone scales, augmented triads, and

³⁰ Ernst Terhardt: 'The Concept of Musical Consonance: A Link Between Music and Psychoacoustics'. *Music Perception*, Vol. 1, No. 3 (Spring 1984): 292, <https://doi.org/10.2307/40285261>.

diminished seventh chords - is that it is not possible to derive a fundamental frequency from the compounds. None of the tones would serve; which is obviously also what produces the peculiar qualities of these chords. The feeling could be likened with some kind of limbo - up in the air, hovering. It is a central characteristic of atonality, but also exploited as a transient feature in tonal music. Especially Debussy's music is full of it.

As central as root perception is to musical practice, it is not in proportion with the small amount of attention it has received by acousticians. At least this was the case before Terhardt's influential theory entered the scene. Physicists and physiologists are often reductionists, accepting as real only those phenomena that have a certain mechanistic or spatial appeal. Like in the field of neuroscience, where many researchers neglect the prefrontal cortex because they don't have a clue about high level cognition, the dialectic of chords and melodies, let alone the mental functions and emotions of which it is productive, is apparently far too elusive and 'spiritual' to most acousticians. Instead the focus has often been on *consonance* and *dissonance*; often evoking the banal and subjective aesthetic of immediate pleasure, displeasure, liking and disliking; nothing of which is unreal, but it is often ignorant of the rhetorical and dramaturgical context of different works and genres.

Even to Hermann Helmholtz, who was not a reductionist, at least not intentionally, it was precisely this aspect of *dissonance* that became so central to his theory of harmony: 'the continuous or intermittent sensations of the auditory nerves.'

The physiological processes which make the difference sensible between consonance and dissonance, or, in Euler's language, orderly and disorderly relations of tone, ultimately bring to light an essential difference between our method of explanation and Euler's. According to the latter, the human mind perceives commensurable ratios of pitch numbers *as such*; according to our method, it perceives *only the physical effect* of these ratios, namely the continuous or intermittent sensation of the auditory nerves.³¹

It is not that Helmholtz was ignorant of roots and the fact that musical progressions are governed by 'psychical motives.'³² On the contrary, he even gave a historical account of the tonic in musical writings from ancient times and the role of the 'middle string' in Greek writings, and the

³¹ Helmholtz, *On The Sensations of Tone*, 231.

³² Helmholtz, *On the Sensations of Tone*, 371.

Indian term 'Ansa', up to Fetis' modern concept of 'tonality'; a system where the tonic acts 'as the link which connects all the tones of a piece.'³³ Neither the interval *C-F* nor *C-Ab* is able to conclude a piece in *C*, says Helmholtz; because '*f* is not an element of the compound tone *c*, and hence the closing chord would contain something which was not the tonic at all;'³⁴ which is undoubtedly correct. The question is just whether this is a sufficient explanation of intervals.

In the case of the dissonances or 'intermittent sensations' to which Helmholtz is pointing, it is produced by what is commonly referred to as 'beats'. When different frequencies are combined, their peaks will at times coincide and reinforce each other, producing beats and roughness which can be unpleasant at certain frequencies. Helmholtz compares it with the impact of flickering light on our eyes. It is certainly a dynamic and temporal experience, and the effect seems to be biggest when the number of beats are about 20-30 in a second. The minor second *b'-c''* for instance, gives 33 beats in a second and sounds quite jarring - the *b''-c'''*, one octave above, not so much.³⁵

It is a fact that is well known to musical arrangers that this jarring effect depends to a large extent on register, as the difference between the combined frequencies is big in the high register, and much smaller in the low register; which is also one of the problems with Helmholtz theory. It is difficult to see how it is possible for intervals to retain any kind of identity under such a regime. An interval that is dissonant or jarring in the low register would be much less jarring in the high register. Furthermore, there is nothing in the degree of beating of the interval *C-F* which indicates that this interval cannot conclude a piece in *C*. In fact, it beats less than the 'imperfect consonance' *C-E* which belongs to the chord of the tonic. Not even the amount of common partials, which is another aspect of Helmholtz' theory of tonality, may be enough to provide such attraction and identity. According to the music psychologist Geza Révész, at least, a corollary of Helmholtz theory would be that 'the twelfth *g* should show a greater similarity to the fundamental *C* than a remote octave, since the twelfth has more partials in common with the fundamental than for instance three-line *c*.'³⁶

³³ Helmholtz, *On The Sensations of Tone*, 240.

³⁴ Helmholtz, *On The Sensations of Tone*, 291.

³⁵ Helmholtz, *On the Sensations of Tone*, 171.

³⁶ Geza Révész, *Introduction to The Psychology of Music* [1946]. Trans. G.I. C. De Courcy (Norman, Oklahoma: University of Oklahoma Press, 1954), 60.

The same problem would apply to sequentially presented intervals as well as the perception of intervals of sinusoids, which have no partials at all. If beating and common partials were the only relevant factors, it would be practically impossible to perceive whether an interval consisting of sinusoids is a tritone or a fifth, or whether it is a major seventh or an octave. Examples of sinusoid intervals are easy to get across these days, so the problem, once spotted, should be easy to put to the test. The problem of 'missing fundamentals' and the unitary pitch of complex tones may be better researched, and according to Reinier Plomp, it is not explained by Helmholtz' pitch theory.

Von Helmholtz's (1863) pitch theory, in which pitch is considered to be determined by the fundamental, was generally accepted and maintained its leading position until about 20 years ago. After 1955 it was increasingly realised, however, that this theory is unable to explain the unitary pitch of complex tones.³⁷

It may be difficult to exclude the impact of ratios or some kind of numerical computation then. Or to be more precise: there seems to be a need for other theories, which, of course, would be equally 'physical', if not as simple as those of Helmholtz. A possible answer to the conundrum might be provided by the promising field of neurodynamics and dynamical systems theory. As is observable even in EEG and MEG measurements, the brain is oscillating at various frequency bands, which 'phase-lock' or 'mode-lock' to the features of music at many levels. According to Edward W. Large, 'neural pattern completion based on nonlinear resonance may explain the perception of pitch in missing fundamental stimuli, and the perception of pulse and meter in rhythmic patterns'. He is also pointing to experiments indicating that 'nonlinear resonance predicts both memory stability of small integer ratios and tonal attraction among sequentially presented frequencies.'³⁸

An argument that has been directed against the idea of numerical inference, is that it depends on exact mathematical ratios, which would be immensely complicated once the intervals are slightly out of tune, which of course, is always the case in tempered instruments like pianos. Yet oscillatory neurodynamics 'does not require mathematical purity' says Large; 'regions of stability

³⁷ Reinier Plomp, *Aspects of Tone Sensation: A Psychophysical Study* (London, New York, San Francisco: Academic Press, 1976), 111.

³⁸ Large, 'Neurodynamics of Music', 209-211 and 218.

around integer ratios can explain the considerable latitude in interval tuning found in different styles, which has been used to discredit simple-ratio theories, and the well-established finding that intervals are perceived categorically.³⁹

It is essential to remember that, at the same time as intervals are categorised, the potential mistuning or 'sourness' of these intervals is also perceived; it is not smoothed or cancelled out. This 'sourness' might even be exploited as an expressive microtonal *flavouring* of intervals. Even the American blues is operating with intervals between the major and minor third; which is not to say that blues cannot be played on a tempered instrument like a piano. Most notably, the orchestras in Indonesian villages, so called *gamelans*, are known for their local variations in tuning. Yet the basic intervals and scales, *slendro* and *pelog*, are the same throughout Indonesia, so a much more *general* notion of intervals must necessarily be in play even in Indonesia. According to Large and colleagues, neurodynamics may also account for findings of earlier studies, indicating that stability-ratings of intervals by Western listeners 'correlate strongly with those of Indian listeners' during the perception of Hindustani music.⁴⁰

The complexity of auditory perception, even at this fundamental level, is immense, and obviously in need of further theoretical and experimental work. Even if we are still discussing isolated intervals here, there is already a plethora of dimensions in play. If we are to give a preliminary overview of these dimensions, at a phenomenological level of description, it might look like this:

PERCEPTUAL PROPERTIES OF TONAL INTERVALS:

1. **Pitch contrast** due to differences in frequency and perceived tension.
2. **Degree of harmonic affinity**, going from a sense of almost identity in octaves, via strong affinity in fifths, to remote affinity in thirds and even a sense of conflict in minor seconds.
3. **Presence versus absence of attraction**: the difference between equidistant and non-equidistant divisions of the octave, which is central both to harmonic progressions and to the contrast between tonal and atonal melody.

³⁹ Edward W Large., Ji Chul Kim, Nicole Kristine Flaig, Jamshed J. Bharucha, Carol Lynne Krumhansl, 'A Neurodynamic Account of Musical Tonality,' *Music Perception*, Vol.. 33, Issue 3, 319-331 (1 February 2016): 324 and 328, <https://doi.org/10.1525/mp.2016.33.3.319>. 324 and 328.

⁴⁰ Large, 'A Neurodynamic account of musical tonality', 322.

4. ***Direction of attraction*** due to numerical derivation: could be 'up' (like in a fourth), 'down' (like in a fifth), or directionless (in tritones).
5. ***Emphasis and duration*** as factors of in the establishment of roots, sometimes overriding even the factors of harmonic affinity.
6. ***Dissonance due to interferential beating between fundamental frequencies.***
7. ***Dissonance due to interferential beating between partial tones*** produced by the combination of different spectra and timbres.
8. ***Melodic potential energy***, creating a potential for leaps and falls.
9. ***Microtonal flavouring*** like sourness, temperedness, or expressive modifications which do not alter the main identity of an interval.
10. ***Contextual flavouring*** due to the participation of an interval in chords, textures, melodic progressions, modulations between different keys and so on.

13.3 Examples of formalist misconceptions of music

First it has to be said that spatial thinking and manipulation is not a common compositional technique. Certainly some baroque composers and some cartoonists have occasionally used melodic leaps, chromatic runs and the like, as symbolic representations of succumbing, rising, climbing spiral stairs and the like. In the lingo of film composition this is often referred to as 'Mickey mousing', and it is just a minor component of such music. It does not necessarily destroy the dramaturgy of the music, to the extent that such music is really in need of independent dramaturgy in the first place. Also, many of these runs and leaps could just as well be understood as *prima facie* expressions of the falling or rising tension that is also intrinsic to experiences like sighing or strenuousness climbing. Even the harmonic confusion caused by chromaticism might be an expression of the dizziness that is often involved in strenuousness running up or down stairs.

The analogy between spatial and melodic movement is faint, and it seems to be limited to the parameter of pitch. When *intervallic* relations and chords come into consideration, like in the idea of 'vertical' inversion and symmetry, the analogy is much more dubious. For instance, the inversion of a major third would produce a minor sixth, a fourth would produce a fifth, and a C major triad would produce a F minor triad. It should be obvious enough that these intervals or chords are not functionally equivalent or 'symmetrical' in a tonal context, and it would probably

be correct to say that a composition that is a product of such 'inversion' would be functionally chaotic and arbitrary in many ways.

Even more problematic is the idea of *horizontal* symmetry deriving from temporal reversal. The technique is occasionally used in fugue composition, or as a humorous ingredient in some eighteenth century symphonies, incorporating backward versions of 'God save the King' and the like. Yet it is not as simple as reversing an existing melody. The melodies would have to be put together or integrated in a context in a manner which would make them sound fairly natural in both directions. Still the common audience might not even discover what is going on. The procedure might better be seen as an example of scholastic trickery, intended to impress fellow composers and other specialists. In many cases only these expert listeners and analysts would be able to discover that something is actually reversed.

What is preventing us from perceiving music in such a spatial manner is obviously the dynamic nature of sound and the amount of symbolic translation that would have to be involved. First one would have to translate the tones into something visual, like distances and shapes, then these symbolic objects would have to be kept in memory, until the point that our inner glance could discover some kind of overall shape or symmetry. There is little evidence that this is possible; and once the music psychologists become aware of the problem, it might be easy to test it. In fact, there is already a study by Zatorre focussing on certain aspects of such reversal. The study was involving eighteen professionally trained musicians. Four of these had to be excluded from the experiment because they were not able to mentally reverse even the simplest of themes;⁴¹ so it is doubtful whether lay people, which have no access to symbolic representations like notes, would perform any better.

Even if it had been possible to imagine a melody as a shape, it would be in conflict with the 'law of heterogony of ends' in mental processes, where each occurrence acquires meaning by constituting a certain stage of a behavioural or rhetorical process. And there is little doubt that musical behaviour is also perceived as behaviour. Even when the behaviour is slightly awkward this might be the case. Just like in the field of visual perception, there may be mechanisms for

⁴¹ Robert J. Zatorre, Andrea R. Halpern, Marc Bouffard, 'Mental Reversal of Imagined Melodies: A Role for the Posterior Parietal Cortex', *Journal of Cognitive Neuroscience*, Vol. 22, Issue 4, 775-789 (May 2009). <https://doi.org/10.1162/jocn.2009.21239>.

episodic pattern completion in the hippocampus; so even when the process is slightly chaotic and ill conceived, we tend to interpret it in the best possible way.⁴²

When composers have occasionally violated some of these principles, these are not necessarily 'misconceptions' in a strict sense of this word, for the composers knew that what they were doing was musically dysfunctional and out of the ordinary. More serious misconceptions are harboured by some theoreticians and philosophers, believing in earnest that music is something spatial. Certainly music is *performed* in rooms and spaces, by material beings, even involving stereophonic or antiphonal effects in some cases; but the location of musicians in a room is seldom an important organising factor in music. If so, it would not be possible to enjoy it in mono recordings.

Nonetheless, it is not uncommon among theorists and philosophers to liken music with spatial objects like buildings and plants. The fading into oblivion of the study of music rhetoric in the nineteenth century and onwards has already been mentioned; and it is not surprising that some critics, who were unsympathetic to the newfangled symphonic poems and musical dramas of Berlioz, Liszt, and Wagner, were attempting instead to connect the concept of musical autonomy with spatial structures, like in 'kaleidoscopes' or blossoming flowers.⁴³ Especially Eduard Hanslick is often mentioned as an early representative of such formalism.

Even Hermann Helmholtz, who is talking of feelings and 'psychological motion' in music, systematically equates ascending and descending intervals when trying to account for major scales and harmonic progressions; which was also the core of Carl Dahlhaus' criticism of Helmholtz: 'The series', he says, 'is according to Helmholtz distinguished by the rising, not the falling fifth.'⁴⁴ According to Dalhaus, however, this is an evidence for historical relativism and the failure of psychoacoustic explanations of music. His reasoning is a school example of 'false dilemmas'; for an alternative explanation did not occur to neither of them: that the scales and chords might be products rather of a *temporal dialectic*, questioning and answering, leading away from and back to the tonic. Also when questioning and deflecting from harmony, the *effect* of this deflection is obviously resting on psychoacoustic laws. In fact, dissonance is an acoustic

⁴² Edmund T. Rolls, 'The mechanisms for pattern completion and pattern separation in the hippocampus', *Frontiers in Systems Neuroscience*, Vol. 7 (30 October 2013). <https://doi.org/10.3389/fnsys.2013.00074>.

⁴³ Eduard Hanslick, *Vom Musikalisch-Schönen* [1854] (Leipzig: Breitkopf & Härtel, 1910), 59-60.

⁴⁴ Carl Dahlhaus, *Die Musiktheorie im 18. und 19. Jahrhundert*, Zweiter Teil: Deutschland (Darmstadt: Wissenschaftlich Buchgesellschaft, 1989), 254.

phenomenon which is just as common and natural as consonance. There is nothing about acoustics that requires a constant sounding or 'mirroring' of the harmonic series.

At the turn of the nineteenth century these matters were still not properly clarified, and even if several leading theorists at the time were thinking in more 'dynamic' terms, this was in many ways a 'mechanistic' dynamic. In contrast to theorists like Donald Francis Tovey, who carried on with verbal analysis in the tradition of E.T.A Hoffmann and earlier music rhetoric, theorists like Ernst Kurth and Heinrich Schenker were shunning such descriptions and attempting instead to 'connect the dots' by projecting waves and lines into the scores.

The tendency to identify all organisation with spatial structure has been, and still is, very strong; so strong that most people, even today, are unable to imagine any alternatives. Even when it is empirically wrong and compositions and scores bear no evidence of any shapes and symmetries, some theorists are unwilling to give up this belief, but fabulate instead of hidden 'deep structures' which could be excavated from the score as it were. The most well known example of this is Schenker's concept of the 'Ur-line', which in the key of C is hypothesised to be the melodic line E-D-C.⁴⁵ But it is difficult to understand how this fragment of a whole tone scale is thought to do the job. The dominant-tonic dichotomy, so central to tonal music, may not even require it. On the contrary, the tonal cadence is characterised by a combination of tonal attraction with the dissonance of the 'leading tone', which is resolving into the tonic at the same time as it is approaching it in terms of pitch. It is a combination of several dynamic parameters which are in reality impossible to convey in a visual representation. If a linear approach to the tonic was all it took, then any such 'lines' would do.

Some of the same problems and formalist proclivities are observable in Victor Zuckerkandl's theory of tonality. Zuckerkandl was clearly more verbal than Schenker. His conception of harmony in terms of 'arrival, departure, further removal, return home' even seems to approach a rhetorical or narrative description of musical organisation.⁴⁶ Yet he was not able or willing to accept this process as an organising principle in its own right. On the contrary he was arguing for the necessity of a 'third stage', what he called 'the miracle of non-spatial building.'⁴⁷ On closer

⁴⁵ Heinrich Schenker, *Free Composition [Der Freie Satz]: Volume III of New Musical Theories and Fantasies*. Trans. and ed. Ernst Oster (New York: Longman, Inc., 1979), 4.

⁴⁶ Victor Zuckerkandl, *Sound and Symbol: Music and the External World*, trans. Williard R. Trask (New York: Princeton University Press, 1956) 93.

⁴⁷ Zuckerkandl, *Sound and Symbol: Music and the External World*, 242.

inspection it becomes apparent how Zuckerkandl's attempts to explain the major scale by projecting a symmetrical shape or *curve* into it - a curve starting on the tonic and ending on the octave, having the fifth as a 'turning point.' The fourth, he maintains, 'points toward 3 and, across 3, toward 1...Tone 7, on the other hand, is unmistakably and wholly under the spell of 8;'⁴⁸ which is hardly empirically precise. When it comes to affinity with the tonic, the fifth is not the most remote tone, it is the most closely related tone. The fourth, on the other hand, does not belong to the spectrum of the tonic at all. On the contrary, it challenges it; and the major seventh, even though it approaches the tonic in terms of pitch, is more dissonant and remotely related than any of these tones.

It should be obvious by now, that the tonal cadence is not a mere curve. Nonetheless: this proclivity towards spatial thinking is apparently so ingrained in people that even those theorists who have been known to defend an emotional and psychological approach to music were not able to escape it. A relatively recent example of such confusion is provided by Susanne K. Langer. It is difficult to understand how she was able to identify her concept of a 'life of feeling' with spatial structure; but this 'life of feeling', especially as manifested in rhythmical music, was associated with 'organic forms' and 'growth'. 'The growth of a musical composition' - and here she was quoting Basil de Selincourt - was thought to be comparable with 'that of a flowering plant.'⁴⁹ Instead of embracing the qualia of rhythm and harmony, and the unique states of jubilation and social communion of which these experiences are productive, they were explained away as 'unconsummated symbols'.⁵⁰

But these are just philosophical blunders. How much harm could they do if they had no impact on the musical practice of their time? Luckily most music, especially popular music, is existing in total oblivion of academic shortcomings and fads. And even if these fads had an impact on musical practice, their shortcomings would be self-defeating in the long run. What is dysfunctional and imperceptible has hardly any future; especially not in the entertainment business. Nevertheless, there might be more marginal groupings, where such experiments could be kept artificially alive for other than musical reasons. Avant-garde ideals like constructivism,

⁴⁸ Zuckerkandl, *Sound and Symbol: Music and the External World*, 97.

⁴⁹ Susanne K. Langer, *Feeling and Form: a Theory of Art* (New York: Charles Scribner's Sons, 1953) 129-130.

⁵⁰ Susanne K. Langer, *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite, and Art* [1942] (Cambridge, Massachusetts: Harvard University Press, 1979), 240.

complexity, and critique may be examples of this; the question is just how complex and 'constructive' it is.

So called 'serialism' is the very epitome of such construction; and it is often seen to be initiated by Arnold Schoenberg. It is a truth with modifications, since such serial thinking was only a minor aspect of Schoenberg's compositional practice. Actually, it was not even part of his first period of atonal composition. As we have earlier seen, Schoenberg's framework was basically rhetorical and dramaturgical. Even after he had started with twelve tone series and the permutations of these, there was plenty of room to create chords and progression according to his expressive needs. The music sounded pretty much as it did in his period of free atonality, and there is hardly any music that is more sentimental and melodramatic than Schoenberg's later monodramas and operas. So where does the 'serialism' come into the picture?

Certainly this was a formalist impulse on the part of Schoenberg: an attempt to provide some kind of 'system' to what was intuitive and emotional. First of all: using all the twelve tones might be seen to ease the avoidance of tonality and tonal stasis so alien to speech melody and 'musical prose'. It may not be a necessary or sufficient precondition for atonality. A mere tritone or an augmented major triad is also atonal; and a twelve tone series could also accommodate the composition of tonal chords and progressions. Anyhow, Schoenberg was also seeking to secure a certain thematic unity. A certain intervallic consistency might well have been secured by this practice. But, as mentioned above, the practice of inversion and reversal may also destroy the themes. According to Reginald Smith Brindle, at least, the utility of 'serial unity' is 'a chimera of questionable value'.⁵¹ It is ironical that, while Brindle's influential textbook in atonal composition was called 'Serial Composition,' it was in reality criticising it and advocating instead the kind of free and non-serial atonality which is also the dominant practice today.

The so called 'integral serialism' of the 1950ties was quite another beast, and a much more short-lived one. The leading figure of this 'movement' was the French composer Pierre Boulez. Inspired by Schoenberg, Webern, and his teacher Olivier Messiaen's *Mode de valeurs et d'intensités* from 1949, he sought to apply the idea of tone row permutations, like *inversion* and *retrogradation*, not only to pitches, but to the other parameters of sound as well. To accomplish something along this road he organised parameters like duration and loudness in tables, which

⁵¹ Reginald Smith Brindle, *Serial Composition* [1966] (London, Oxford, New York: Oxford University Press, 1982), 193

could be read horizontally, vertically, or diagonally. The question is just how much of this was perceptible. To the extent that the spatial principles were traceable only in the tables and procedures, it might be more precise to characterise the project as some kind of *numerical mysticism*, or at best: a method of generating chance. The spatial ideas were much more explicit at the level of long-range musical progressions, where Boulez was operating, amongst other things, with ideas of *spirals*, *labyrinths*, and ‘compartments to visit’.

The naivety of the project is striking - not only because incompatible parameters were subjected to identical treatment - Boulez must have been completely unacquainted with the recognitions of Wundt, Bergson and others concerning the dynamic nature of sound and the teleology of temporal experience; which is strange, since some of Bergson's books were released in up to 156 editions in France alone. Symptomatically, some of the most condemning criticism came from Boulez himself, and the whole project was very much given up in favour of his career as conductor of classical works. Already in 1960 he published confessions like the one beneath, reflecting both the seriousness with which the project was carried out, and its absurdities.

Were we not set on a course that could lead only to what might seem to be a perfect ‘technological’ rationality but was in fact a monumental absurdity? It would be an understatement to say that we went very near to this absurdity on many occasions. Looking back on this ‘ride to the abyss’, I can see that more than once we crossed into the territory of the absurd without in other respects any awareness of a mass of contradictions, many of them of a hair-raising nature.⁵²

The fact is that, even in his most farfetched attempts at ‘constructing’ music, such as his *Structures Ia* from 1951, there was at the same time a considerable room for selection and censorship based on musical and dynamic criteria - not to mention that this piece was composed for a traditional instrument (the piano), within a preexisting chromatic tonal system. In the succeeding works by Boulez, this idea of allowing for freedom and *control* gradually became more central. Whereas the methods of deriving material grew increasingly arbitrary and absurd - in *Messagesquise* from 1976, for instance, the rhythms were derived via morse code - the formative and communicative factors were secured now, by an express ‘freedom to choose, to

⁵² Pierre Boulez, ‘Putting the Phantoms to Flight’ [1964], in *Orientations*, ed. Jean-Jacques Nattiez, trans. Martin Cooper (London and Boston: faber and faber, 1986), 66

decide and to reject', an ambition to 'absorb and tame chance,' and a traditional way of thinking in terms of 'gestures.'⁵³ One might even argue that, to the extent that Boulez' music really functioned as music, it did not function *because of* serialism, but *in spite of* it.

Still the reminiscences of chaos and chance in this music were putting the listener in a difficult situation. When confronted with something partly incomprehensible, the brain has two options: either it could interpret it as something difficult and complex, or it could reject it as chaos or failure. The methods and aesthetic effects of integral serialism were similar in many ways to more explicitly 'aleatoric' and chance based music of the time - the spastic banging on pianos with boxing gloves and the like - so we might well be dealing with some kind of 'placebo effect' here, rather than true complexity.

Anyhow, the aesthetic of the avant-garde was legitimated in many cases by the 'negative dialectics' of Theodor W. Adorno, seeking to counter government aesthetics and propaganda with harsh reality and elitist 'complexity'. If the goal of this music was alienation and distress, it was a success. If the goal was an emotionally neutral 'construction' of music, much less so. The dense chromaticism and the clusters of harsh dissonances in much of this music, in combination with the somewhat dehumanising idea of constructed behaviour, was hardly pleasurable or embraced by many people. Ironically, it would not have survived at all if it were not artificially kept alive by government funding.

The music that served as the soundtrack of the rebuilding of Europe was of a different kind. It was dominated instead by positive, life enforcing marches, swing, and dance music. After all, the basic function of a musical and emotional modality is not inherently tied to any ideology. Going on with life without joy and optimism is hardly a possible option. On the contrary, it is pathological and counterproductive. What seemed to escape the attention of Adorno was the fact that even jazz and rock music posed a challenge to the establishment; but it was a different challenge: a manifestation of unrestrained joy, sensuality, and freedom. Certainly there was plenty of room for realism, criticism, and anger even in these types of music, but it was not the dominant sentiment.

⁵³ Pierre Boulez, *Conversations with Celestin Deliege* (Paris: Ernst Eulenburg Ltd, 1975), 66.

Chapter 14

Differences Between Musical and Verbal Communication

14.1 Syntax, semantics, and the ambivalence of Saussure

Language may seem like a fundamental category, but it is not fundamental either to animate or inanimate existence. Even our human ancestors managed without it for millions of years. It has turned out to be a great communicative tool, but also a source of confusion in many cases. Much of this confusion is deriving from the metaphorical origin of words; and we have just seen how melodic and ego-dynamic 'structure' is falsely identified with *spatial* structure. Now, if structure is also identified with *syntax* and the dubious notion of 'linguistic structure', then pretty much everything is muddled up in a jumble which is impossible to defend without contradicting oneself. The distinctions between these categories would disappear and the concepts would lose their meaning.

But the confusion goes further than this. Once language is internalised, it is often confused with thinking as such, and the content of what it represents. Everything is language or a 'play of signification', some postmodern philosophers have proclaimed, and it is often the ambiguous and arbitrary features of signs and symbols that are projected onto our social world, in a manner that has already been a cause both of moral relativism, subjectivism, and skepticism towards aesthetic experience. Jacques Derrida was talking, for instance, of 'a system of differences', where 'the absence of the transcendental signified extends the domain and the play of signification infinitely';¹ and there is a potential for aesthetic and moral indifference here, which is possibly even more harmful than the consequences of materialism and musical formalism.

Whereas spatial principles of organisation could be excluded from the composition of melody on perceptual grounds alone, the sensory constituents of language and nonverbal emotional communication are often similar. This is the case both with speech and sign languages. They are

¹ Jacques Derrida, *Writing and Difference* [1967], trans. Alan Bass (Chicago: The University of Chicago Press, 1978), 280.

parasitising the vocal and gestural apparatus that was originally developed for emotional communication. And their functions are intertwined in many cases. Even if the task of combining semantic meanings into sentences makes speech intrinsically chaotic and meaningless as a dynamic process, words do have aesthetic qualities; and sometimes elements of prosody and melody have also semantic functions, like in so called 'tonal languages'. The diametrical opposition between these functions might already be confirmed by neuroscience, locating ordinary prosody and emotional vocalisation to the right hemisphere, while the use of melodic fragments as signs to a higher extent is activating the left hemisphere.² But we must also try to delineate some principal differences here, which may be easier done than said.

It is a fact that speaks louder than words, that emotional vocalisation and music communicates at a universal basis, and that musicians, even from the most secluded cultures of the world, often have great success with travelling around the globe performing in their native style. Even animals communicate by means of vocal utterances; including at least the kind of intonation that does not rely on harmonic functions and the level of self-reflection and fine-grained pitch perception on which harmonic functions depend. Language, on the other hand, is consisting of principally arbitrary signs or symbols, which denotations and connotations are resting entirely on convention and dictionary definitions. Absolutely nothing of this is understood by foreign language users.

As simplistic as it seems, it is a distinction that will not be modified during this discussion, although the concept of 'direct emotional expression' is challenged by some subjective, relative, and biological factors that will be discussed in the last sections of this chapter. As for language, it has some grey zones as well; and the prevalent understanding of syntax is truly bewildering, which is surprising given the amount of research going into this field.

The so called 'structuralist' movement in continental philosophy and linguistics was inspired by Ferdinand Saussure. And there is no doubt that his 'Course in General Linguistics' did blur the

² See for instance Robert J. Zatorre and Jackson T. Gandour, 'Neural specializations for speech and pitch: moving beyond the dichotomies', in *The perception of Speech: From Sound to Meaning*, edited by Brian Moore, Lorraine Tyler, and William Marslen-Wilson (New York: Oxford University Press, 2009): 288.

See also Patrick C. M. Wong, Lawrence M. Parsons, Michael Martinez, Randy L. Diehl, 'The role of insular cortex in pitch pattern perception: the effect of linguistic contexts.' *Journal of Neuroscience*, Vol 24, Issue 41 (13 October 2004): 9153-9160. <https://doi.org/10.1523/JNEUROSCI.2225-04.2004>.

Or see Vinoo Alluri, Petri Toiviainen, Torben E. Lund, Mikkel Wallentin, Peter Vuust, et al. 'From Vivaldi to Beatles and back: predicting lateralized brain responses to music,' *Neuroimage*, Vol. 83 (2013): 627-636. <https://doi.org/10.1016/j.neuroimage.2013.06.064>.

concept of language in some respects, opening up for the possibility that language might also *structure* and *alter* experience to some extent. Yet this idea is not taken as far by Saussure as some of his followers, which are tending to reduce all of reality, even aesthetic experience, to an idea of subjective or cultural semiotic constructs. On the contrary, we will see below how Saussure's conception of syntax is rather going against such views, since it tends to reduce it to instances of semantics or lexicology.

When syntax is deviating from the emulation of natural temporal sequences, it is not because the manner of placing words in different parts of a sentence has a 'structural' significance, it is just another way of signifying or *labelling* things. By comparing different languages, Saussure was able to observe that it does not matter much whether a concept is represented by a word, by an ending of a word, by a combination of words, or by a certain temporal order of such elements. These are just different, often arbitrarily chosen, methods of signification. It is an important and often overlooked point, but it is a point that may dramatically simplify our whole understanding of language.

But let us first take a look at his notion of linguistic structure. It is much more marginal and problematic than one might think. In fact, the only productive aspect Saussure could think of was the 'non-coincidence' of signs with each other; which seems more like a renunciation on behalf of linguistics than the opposite, since we are not talking about any *actual* differences or productive *relations* here. 'What characterises those units is not, as might be thought, the specific positive properties of each', Saussure remarks, 'but simply the fact that they cannot be mistaken for one another.'³

The practical consequences of this should be obvious enough. What the differences between signs might indicate is just that different concepts are involved. They do not tell what these concepts, or the relations between them, actually consist in. It is a truly elementary point which is overlooked by many thinkers, and in some cases even by Saussure himself. Especially the passage defining his notion of 'linguistic value' is inconsistent. Here he compares words, and the relations between words, with *coins*, which on the one hand, he says, 'can be exchanged for a certain quantity of something different, e.g. bread', and on the other hand 'can be compared with

³ Ferdinand Saussure, *Course in General Linguistics* [1916], translated and annotated by Roy Harris (London: Duckworth, 1995), 117.

another value in the same system, e.g. that of a one-franc coin.⁴ What he fails to notice is that even the system of monetary values belongs to the realm of real priorities, that is to say: all those things which, like bread, are different from coins. The values are neither created by nor sufficiently reflected in the material properties or contrasts between different coins. The coins could be changed, or replaced by paper money; but the system of priorities would remain.

But even this may be a too optimistic view of language. Doesn't the existence of *synonyms* imply that even if signs are different, they do *not*, at least not necessarily, indicate that different concepts are involved? Curiously enough Saussure manages to utilise the special case of synonyms for the direct opposite purpose. In fact, it becomes his only genuine attempt at exemplifying what he means by 'linguistic structure'. First he points to the fact that synonyms do seldom have entirely identical meanings. A new phonetic difference, he says, will inevitably tend to acquire significance.⁵ Secondly, and more importantly, he argues that:

In a given language, all the words which express neighbouring ideas help define one another's meaning. Each of a set of synonyms like *redouter* ('to dread'), *craindre* ('to fear'), *avoir peur* ('to be afraid') has its particular value only because they stand in contrast with one another. If *redouter* ('to dread') did not exist, its content would be shared out among its competitors.⁶

And it is probably true that there is a tendency for synonyms to acquire different nuances in meaning. They may be used in slightly different contexts; in some cases probably influenced even by their different musical qualities, which Saussure does not say much about. It is also true that when several signs are covering a limited field, the concepts they signify are likely to be more specific than in those cases where there is only one sign covering the same field. This however does not prevent a sign like 'afraid' from preserving its original and very general sense, even when similar words, such as 'dread', are added to the language. Similarly, it is not difficult to imagine how a more specific term, like 'dread', could exist alone in the language, if the signification of very strong fear was the only needed or acceptable one.

In any case, the signs as such tell nothing about the nature of fear, or the relations between different types of fear, or even the fact that they all, in spite of their differences, are signifying

⁴ Saussure, *Course in General Linguistics*, 113-114.

⁵ Saussure, *Course in General Linguistics*, 119.

⁶ Saussure, *Course in General Linguistics*, 114.

something having to do with fear. This they cannot do. What they might indicate, if they really can, is only that the ideas involved are not identical. There is nothing in Saussure's argumentation evidencing that we need these words to be able to conceive of phenomena like fear or different types of fear, or that we would fear nothing if we had no word for it. The situation may very well be the opposite: that most of the distinctions we make and think of do *not* have a sign of their own.

The hypothesis that signs are constituting 'systems of differences' structuring our thinking has been the earmark of structuralist and poststructuralist theory; but it is difficult to imagine how it might work. It is this lack of productive mechanisms that is referred to by Leonard Jackson as 'the poverty of structuralism,' which is also the title of his first book in a sequence of three books on the foundations of modern literary theory. One of his main arguments is addressing the problem of a 'difference semantics'. In such a semantics, he says, 'our representation of the meaning of 'aunt' will be:

not-father, not-mother, not-sister, not-brother . . . not-man, not-woman . . . not-boy, not-girl . . . not-panther, not-elephant . . . not-motor-cycle, not-bus, not-aeroplane . . . not-planet, not-electron . . . not-hypothesis, not-value . . . and so on, through the entire vocabulary of the language.⁷

We are dealing, here, with 'a logical impossibility', says Jackson; since to create such a semantics, 'it is possible to show that we need a fairly large number of semantic primitives, of several different logical kinds - for example elementary logical relations like "or", basic semantic oppositions like *physical substance* versus *abstraction*, and so forth'.⁸

Notice however, that even if Jackson's arguments convey the absurdity of a system with no 'actual' properties or productive relations, he nonetheless speaks as if language did, or had the possibility of, containing at least *some* immanent conceptual content. It is not clear that this is true. Not only is it disproven by linguistic practice, and the possibility of arbitrarily exchanging any signifier with a different one; in most cases it is simply impossible, since sounds are not concepts, neither of sounds nor of all those things, including *aunts* or *ants*, which have nothing to do with sound at all. Still we can observe, in the second part of his argumentation, how

⁷ Leonard Jackson: *The Poverty of Structuralism: Literature and Structuralist Theory* (London and New York: Longman, 1991), 215-216.

⁸ Jackson: *The Poverty of Structuralism*, -216.

Jackson manages to switch almost unnoticeable from a discussion of signs and their differences to a discussion of concepts and their definition, which is a completely different matter.

As we can see: the confusion between language and thought is not peculiar to structuralism or poststructuralism. Even in writings which attack it there seems to be a tendency, sooner or later, to do the same mistakes. But how come? Perhaps it has less to do with the *similarities* between speech and thought than with the *dissimilarities*, and our tendency to notice only those things which *differ* from our own thinking process. Whereas speech could be described as a relatively slow and chaotic sequence of noises, meaningless in themselves, the actual cognitive process is much more difficult to notice. According to Rudolf Arnheim, there is often a big difference between the 'linear strings of concepts' in 'intellectual thinking' and all those percepts which are grasped almost instantaneously (like the simultaneous relations within or between objects), or extremely rapidly or continuously (like ideas of actions and events).⁹ As we can see: even Arnheim confuses 'intellectual thinking' with the vehicles for communication: the 'strings' of written symbols, which are often so different from thought that they fool us instead into focusing on everything that thought is not.

Another explanation is probably to be found within the science of language itself, or rather: in the *belief* that it is an independent field of study and structure. Operating with a set of *grammatical* terms, such as *nouns* and *verbs*, which are concealing their original meanings behind their 'technical' guise, linguistics is leading us to the belief that the categories in question somehow belong to or are created by 'language itself'; as if language was an independent organism or thing. It is not. Nor is there any reason to believe that so-called *syntactical* and *morphological* devices, denoting concepts like *specificity-generality*, *past-present*, *singular-plural*, *possession*, *sex*, etc. are principally different from other signs.

The fact that the signifying of *possession* is called *genitive* and classified as *grammatical* for instance, does not imply that it is reflected in or bound to the sounds, or to the contrasts between sounds, to any higher extent than other signs. If this had been the case, this concept could not have been represented in a language by several radically different signs, in the manner which Saussure is showing an example of below.

⁹ Rudolf Arnheim, *Visual Thinking* (Berkeley, Los Angeles, London: University of California Press, 1969), 246-247.

As noted previously, association may connect words linked by meaning only: e.g. *enseignement* ('teaching'), *apprentissage* ('apprenticeship'), *éducation* ('education'), etc. The same must apply in grammar. The three Latin genitives *domini* ('of a master'), *regis* ('of a king') and *rosarum* ('of roses') have three different endings, -i, -is, and -arum, which afford no phonetic basis for association. None the less, these endings are linked by one's awareness of their common value, which prescribes identical uses for them. That is sufficient to set up an association, in the absence of any material support. And that is how the notion of 'genitive', as such, takes its place in the language.¹⁰

Notice also how this example, besides demonstrating how 'synonyms' (*i*, *is*, and *arum*) really *can* have identical meanings (which is in contradicting with his previous notion of synonyms) is also showing how a concept which in Latin is signified by a word with a special *ending* (*domini*), could also be signified by a *phrase*: 'of a master', and one might add: 'a master's'; which is yet another example of lacking 'phonetic basis for association.' In fact; it is very much thanks to Saussure that one can characterise even these aspects of signification as arbitrary. Not only does he show examples of endings which meanings could equally well have been signified by words or phrases; even *syntactical devices* could be numbered among these options.

A language sometimes uses the order of elements to express an idea which another language will express by means of one or more concrete terms. English, in types of syntagma like *gooseberry wine* and *gold watch*, uses word order to express relations which French marks by prepositions (*vin de groseilles* 'wine of gooseberries'; *montre en or* 'watch in gold'). French, on the other hand, renders the notion of direct object simply by placing the noun after the transitive verb (*je cueille une fleur* 'I pick a flower'); whereas Latin and other languages do this by using an accusative case form with special endings.¹¹

It might be a disappointment to those believing in 'linguistic structure', but the fact is that Saussure goes so far as to implicitly call for a reduction of the whole category of grammar, syntax and morphology included, to lexicology.

Thus from a functional point of view, lexicological and syntactic devices overlap. Moreover, any word which is not a single, unanalyzable unit is essentially no different from a phrase, syntactically speaking. For the arrangement of smaller constituent units obeys the same basic principles as govern the formation of groups of words.

¹⁰ Saussure, *Course in General Linguistics*, 136-137.

¹¹ Saussure, *Course in General Linguistics*, 137.

To summarize, the traditional divisions of grammar may have some practical utility, but they do not correspond to natural distinctions and are not unified by any logical principle. Grammar needs a different basis, and a better one. The interpenetration of morphology, syntax and lexicology is explained by the fact that all synchronic features are ultimately of the same kind. No boundary between them can be laid down in advance.¹²

Having thus reduced the status of grammatical devices to signs, a question which becomes pressing is the question why we operated with the notion of 'grammar' in the first place. Or to put it differently: why are certain concepts signified by endings or placements rather than separate words?

One plausible explanation is that these concepts are occurring much more frequently than other concepts; or as Saussure puts it: they are 'particularly important'.¹³ A more substantial explanation - which is also explaining their frequency - is that the grammatical signs are denoting *more general categories*; so general in fact, that a very limited set of concepts are covering or involved in everything we talk about. Since all ideas about things or topics could be either of *specific* things (*the* things) or things *in general*, it is useful, or in most cases even necessary, to tell which of these options one is thinking of. Similarly it seems to be necessary, every time we speak about *actions*, to tell whether they are taking place *now*, in the *past* or in the *future*.

A completely different problem is the Kantian skepticism concerning the objectivity of natural categories and his idea of a subjective world of 'unreal' realities which are believed to be produced by thought and human biology. It is a problem that will be discussed in the last sections of this chapter. All that is needed to say about these categories for now, is that they do not derive from 'systems of signs', or language as such. If the above simplified view of language is correct, the main function of a language is to serve as a *communicative tool*, consisting of a collection of labels *standing for something else*.

The ordinary definition of a sign as *something which stands for something else* is still intact in Saussure's thinking. As we have just seen: he *emphasises* the otherness and arbitrariness which

¹² Saussure, *Course in General Linguistics*, 134-135.

¹³ Saussure, *Course in General Linguistics*, 119.

is implied by this operation, simply stating that ‘the sign is arbitrary.’¹⁴ He admits that some symbols, as well as onomatopoeic words, display at least a certain degree of natural connection with the concepts they refer to; but these are ‘marginal phenomena’, he says, and ‘their symbolic origin is to some extent disputable’. His main contention, that signs are arbitrary and conventional still stands.¹⁵

It should be added, that the fact that signs are ‘conventional’ is not a sufficient definition of signification. The fact that we learn to express ourselves in a conventional manner, though for instance colours, tones, or cookery, does not automatically make the products into signs of something else. If a part of a painting is to be perceived as symbolic, there probably have to be either an established conventional way of understanding certain constellations, or a certain ‘unnatural’ relation between elements, which makes us suspect, at least, that some kind of symbolism is in play. As long as this convention of ‘symbolising’ things in paintings is established and well known, and as long as the idea of representing something *different* is obvious enough, the symbolism might work; thus Saussure was probably correct when including symbols within the sphere of linguistics, characterised by a principal arbitrariness. ‘Even though languages represent only one type of semiological system’, says Saussure, ‘linguistics serves as a model for the whole of semiology.’¹⁶

Speaking of arbitrariness, Saussure also calls attention to the fact that ‘It must not be taken to imply that a signal depends on the free choice of the speaker.’ ‘The term implies’, he says, ‘simply that the signal is *unmotivated*: that is to say, arbitrary in relation to its signification, with which it has no natural connection in reality.’¹⁷ This might well seem obvious; yet this talk about arbitrariness seems to have been a source of confusion, especially in some poststructuralist writings, tending to locate the arbitrariness not to the relations between sounds and concepts - the latter of which are believed to be products of language - but to the relation between concepts and the world. It is a form of nominalism or solipsism which, if it had been realistic, would have rendered the whole idea of perception and communication redundant and impossible. And even

¹⁴ Saussure, *Course in General Linguistics*, 68.

¹⁵ Saussure, *Course in General Linguistics*, 68-69.

¹⁶ Saussure, *Course in General Linguistics*, 68.

¹⁷ Saussure, *Course in General Linguistics*, 68-69.

if Saussure keeps clear of such absurdities he nevertheless prepares them, by his somewhat self-contradictory tendency to identify thought with language.

An indication of such an identification we find already in his definition of the sign as 'a combination of a concept and a sound pattern.' 'In current usage the term *sign* generally refers to the sound pattern alone', he says; 'It is forgotten that if *arbor* is called a sign, it is only because it carries with it the concept "tree"'.¹⁸ This inference, however, is not as obvious as it seems. On the contrary, it would dramatically alter the usual definition of signification. Not only would the signs represent something, they would *be* what they represent; which is not consistent with Saussure's own assertion that the sign, being arbitrary, is *not* what it represents.

The fact is, that it is possible to conceive of signs without knowing what they mean. One only has to know that they refer to *something*. It is this instrumental function of standing for something which it is *not*, which constitutes the idea of a sign. Consequently *arbor* should be considered a word which *stands for* the idea of a tree. It is not itself the idea of a tree. A label is something we put on a jar or a bottle; but it does not *include* the jar, the bottle, or its contents. Nonetheless, Saussure's definition of signs as composites including both a *signifier* and something *signified* does not alter the more important fact that the two sides involved in signification are arbitrarily related. It is this disconnection which is so central to the question whether musical elements are acting as signifiers *standing for something else*, or simply *are what they are*; a possibility somewhat contradictorily referred to by Saussure - or the students who noted down his lectures - as 'signs that are entirely natural'.¹⁹

14.2 Denotation versus actual sensation

But Saussure also talks about entirely natural 'modes of expression', which semiological status is explicitly questioned. Saussure mentions *mime* as an example of such expression; but any perceivable phenomena would have sufficed as examples. They are all expressive in the sense of being complexes of sensations or feelings. It is the operation of *standing for something else* which is peculiar and new; not the case of *being* or *being perceived*. And when it comes to direct expressions of human feelings, emotional vocalisation and music are probably better examples.

¹⁸ Saussure, *Course in General Linguistics*, 67.

¹⁹ Saussure, *Course in General Linguistics*, 68.

As already mentioned, mime can only manifest some spatiotemporal aspects of behaviour. While a proper experience of mime requires a simulation of the muscular tensions involved - possibly involving so called 'mirror neurones' as well as some instinctual responses to facial expression, facilitated by structures like the amygdala - the perception of sound is richer both in terms of immanent valence and intensity. Sound is also unique among the sensory modalities, in the sense that its qualia are so easy to identify with their vibrational constituents and the mathematical relations between these. Of course, there is always an identity between sensory qualities and the manner in which they are constituted in the brain, but it is more explicit or easy to understand in music.

This is also reflected in the way we speak of music. For example: we don't say that music is an *indication* of or a *symbolisation* of dissonance, harmony, or loudness. We say that the music *is* dissonant, harmonious, or loud. Even a word like *expression* seems misplaced in this connection. The music really *is* harmonious, it does not need to *express* it. In fact, the core components of this experience exist no other places than here, in its acoustical manifestation. Certainly colours may be harmonious in a slightly different sense of this word, but there are no fundamental tones, cadences, or songs in visual experience.

Similarly, we don't say that music *symbolises* resoluteness or hesitancy. If it is hesitant, it *is* hesitant. A deceptive cadence does not symbolise deception, it really *is* deceptive. And it is the concrete effect it has on us which makes us say so. A corollary of this principle of actuality is also the circumstance these are not fixed symbols, but individual, often highly unique, occurrences, which to a certain extent could be described by means of words and conceptual abstractions, but not easily so. In many cases we have no precise words for the qualitative and functional entities manifesting themselves in music. The words are very useful, but they are not *required*, as long as the music really is present to us as actual occurrences and sensations.

This fundamental distinction between actual and signified content is confirmed by some simple comparisons of their products and the manner in which they are received. A very conspicuous difference is concerned with the question of communicability across cultural, historical, and geographical borders. It is very easy, for instance, to prove that many Chinese people take great pleasure in American music, or even in 18. century Viennese sonatas. To some of them - especially those who are devoting most of their time to the performance of such music - this music may instantiate the most profound spiritual experiences of their lives. When

confronted in a similar manner with the German language on the other hand, or even with the languages of their neighbour countries, the situation is totally different. In fact, they probably would not find it interesting at all, since it would come down to little more than the incomprehensible gibberish a German person would experience when confronted with the Chinese language.

As we can see: the difference is just as dramatic as expected for actual compared with signified content: that of comprehensibility on an extremely subtle level of communication, versus no comprehensibility at all. And it is the same circumstance which explains the fact that newborn babies, or even unborn ones, take pleasure in music, but not in reading. They also take pleasure in the sounds of speech. There is evidence showing that they are already learning the intonation patterns.²⁰ But this is owing to the immanent sensual, melodic, and rhythmical aspects of vocalisation; not to any linguistic or referential procedures.

Another symptom of the difference between actual and signified content is the occurrence of *repetitions*. Especially in popular music, but also in classical music, we can observe how various elements, sections, or whole pieces are repeated again and again and again and again; and it is not a bit more strange than the circumstance that after having tasted a tasty cake one wants to prolong the experience by tasting more of it. *Saying* cake, on the other hand, does not produce very much pleasure or new information. Once the word has done its job of signifying or standing for something else, there is no point in repeating it.

Since the main function of a sign is not to produce perceptual content, but to *stand for something already known*, it could always be replaced by different kinds of vehicles. The sign is arbitrary. And this is more than a hypothesis; it is confirmed by the almost taken for granted possibility of *translation*, not only between languages of the same kind, but also between those based on vehicles as different as gestures, graphic objects, and sounds. When it comes to real phenomena of course, the situation is the exact opposite. One can never translate one part of reality into another. One cannot, for example, translate cakes into cattle or cutlery. One can *alter* a cake; but then one does not translate it, one distorts it or destroys it. It is also possible, at least

²⁰ Sangeeta Ullal-Gupta, Christina M. Vanden Bosch der Nederlanden, Parker Tichko, Amir Lahav, and Erin E. Hannon, 'Linking prenatal experience to the emerging musical mind', *Frontiers in Systems Neuroscience*, Vol. 7, Article 48 (3 September 2013), <https://doi.org/10.3389/fnsys.2013.00048>.

to a certain extent, to 'describe' it in words, by employing metaphors or signs denoting similar types of tastes; but this would never be a satisfactory replacement of the cake itself.

This also seems to be true for music. It is simply unthinkable that one type of music could be translated into another type of music, or into another medium than that of tones, harmonies, and rhythms. This would be equally absurd as believing that a lecture on popular culture could substitute for a dance band. Which, as a matter of fact, is exactly what some researchers seem to believe. Anyway; the status of music as something untranslatable still seems to be recognised by most musicologists, even by those who are sympathetic to semiotics and the concept of musical 'signs'.

'In their most extensive analytical demonstrations of semiotic method' says Kofi Agawu, Ruwet and Nattiez 'employ the notion of musical units rather than musical signs, thus neutralising the notion of sign and domesticating it for an art that many believe to be foundationally asemantic.'²¹ Thus he is forced to conclude that 'music is finally not a language.'²²

*While the essence of music is play, play forms only a special part of language use. By denying music an essential semantic component and by stressing its untranslatability - indeed, its autonomy - one is forced to conclude (somewhat tautologically) that music means nothing but itself.'*²³

Indeed, it is difficult to understand how anybody could claim that music functions on the terms of extrinsic, *referential*, meanings. If this had been the case, it is reasonable to suppose at least, that we *knew* these meanings, and that a practise of teaching them to others, involving the use of dictionaries, had evolved. This, however, is not the case. Sometimes this fact is explained away by the hypothesis that signs may operate at a subconscious level; which is not a likely hypothesis. It is difficult to imagine acts of denotation that do not occupy our centre of attention. This is exactly what distinguishes denotations from *connotations* or associations. There is no doubt that connotations and associations are vague notions at the fringe of conscious attention;

²¹ Kofi Agawu: 'The Challenge of Semiotics', in *Rethinking Music*, ed. Nicholas Cook and Mark Everist (Oxford, New York: Oxford University Press, 1999), 147.

²² Agawu, 'The Challenge of Semiotics', 146.

²³ Agawu: 'The Challenge of Semiotics', 145.

but then the attention must be centred on something that is clearer, like an object or musical sequence which is meaningful in its own right.

But even if it had been possible to argue that music functioned, at least partly, on the basis of such vague associations, it would hardly be a satisfactory argument. Because if these connotations were *crucial* to the experience of music, they would quickly enough *become* conscious. This would happen once the meanings were forgotten, or not understood because of geographical or historical distances. Then the experience would be equally meaningless and frustrating as the experience of any complexes of signs or symbols we do not understand; and the need for translations and dictionaries would be equally strong. As a matter of fact; the more obscure the symbolism, the stronger this need for dictionaries would be, unless of course, the music relied entirely or predominantly on another and nonlinguistic principle. Then the symbolism could be as obscure as anything; in fact, one could interpret exactly what one wanted into it. It would in any case be irrelevant to the experience of the music as such.

According to Leo Treitler, this is precisely the condition of so called 'postmodern' hermeneutical practices. Like so many earlier attempts at seeking extramusical programs and referential meanings in music, says Treitler, these postmodern practices are simply another way of deciphering autonomous musical works against the background of shifting cultural and political patterns: 'then Faustian aspirations, struggles, and conflicts, now politics and gender issues. Neither can support a claim to reveal what music is *really* about, a notion that would make no sense from a postmodern viewpoint in any case.

From a postmodernist perspective music as it has been conceived of by musicology simply does not exist,' writes Kramer in 'The Musicology of the Future'. As effortless as such new exegesis has been, it nevertheless entails the analysis of the interior of works, the music itself. This leaves the interpreters in a contradictory position, for they must, at least temporarily, entertain the very conceptions that they programmatically reject.²⁴

An essential tenet of this movement, which is also its dead end, is the belief that when music is removed from its original context, as is so often the case, it is 'assigned' new meanings, or as Gary Tomlinson put it:

²⁴ Leo Treitler, 'The Historiography of Music: Issues of Past and Present', in *Rethinking Music*, ed. Nicholas Cook and Mark Everist. 356-377 (Oxford, New York: Oxford University Press, 1999): 370.

It is clear as well that the artefacts of cultures exist for us only insofar as we perceive meanings in them by tangling them in a cultural web of our own construction. And this holds alike for Balinese shadow-plays, the puppets used in them, the poem that Monteverdi set to music, and Mozart's G-Minor Symphony.²⁵

The absurdity of assigning new and different meanings to communication is relatively obvious. If such arbitrary constructions had been essential to the experience of music, they would have eliminated the music itself as the source of such experience. But then it would have been pointless to subject it to any analysis, interpretation, or perception in the first place; equally pointless as trying to assign new meanings or meaningful experiences to a foreign language, to a stone, or to pure nothingness. Nonetheless; this contradiction is very much the crux of postmodern thought, which is seldom made clearer than by John M. Ellis in his book *Against Deconstruction*. Just by recognising a text as English rather than Turkish, says Ellis, 'we are immediately sharing a convention with others'; a convention that is not reconcilable with the solipsism of so called reader-response criticism.

If it tries to see *any* meaning in a text, it will have had to concede that meaning is constrained and not infinitely variable; but if it tries to argue that there are no constraints, it will be forced to abandon meaning - *all* meaning, not just fixed meaning but infinitely variable meaning, too.²⁶

The circumstance that poststructuralist thinking has nevertheless managed to gain a foothold in musicology must probably be understood, at least partly, on the background of the preceding formalist and 'positivist' tendencies within the same branch; tendencies which were particularly evident in all those papers and journals on music analysis issuing from the USA in the twentieth century. As shown in the previous chapter, these analyses were not scientific or 'positivistic' in the sense of concentrating on empirical data. Quite the contrary. It was only by projecting mystical curves and lines into the music - by concentrating on visual notation and technical terms - and by ignoring the qualitative and behavioural dimensions of live experience that they

²⁵ Gary Tomlinson, 'The Web of Culture: A Context for Musicology', in *19th-Century Music*, Vol. 7, No. 3, Essays for Joseph Kerman (3 April 1984): 357-358. <https://doi.org/10.2307/746387>. 357-358.

²⁶ John M. Ellis, *Against Deconstruction* (Princeton, New Jersey: Princeton University Press, 1989), 122.

managed to create the illusion that they were dealing with spatial 'structures' detached from meaning and emotion.

Since the illusion of music as something *intrinsically meaningless* was already created by the formalists, it became very easy for the semiotically inclined theorists to jump to the conclusion that the *experience* of music, its 'meanings', are all *extrinsic* or signified. 'In reviews of New Musicological writings', Leo Treitler remarks, 'it has become almost ritually binding to explain that such writing has been made possible by the release of music study from two formerly controlling strategies of thought, formalism and positivism.'²⁷

Paradoxically enough, in view of Treitler's massive attack on postmodern thinking, it was partly Treitler himself who triggered this revolt in musicology, by his criticism of so called 'positivist' approaches especially in history writing. As a matter of fact; the above mentioned article by Gary Tomlinson contained no less than 14 quotations from Treitler's writings. To try to indicate a way out of this impasse - the entrapment between arid formalism and postmodern subjectivism - Treitler is arguing that formalism was not originally opposed to meaning or interpretation. The idea of musical autonomy, says Treitler, 'must be understood as complementing, in this project, the philosophy of transcendentalism'.²⁸ It was first in the middle of the twentieth century, says Treitler, that formalism was separated from its former symbiotic relationship with transcendentalism.²⁹

Yet even Treitler's account is somewhat misleading. It is hardly precise to identify the idea of musical autonomy with the kind of formalism that was defended only by Eduard Hanslick. The classical notion of musical processes, which was dominant even in the eighteenth century, was concerned rather with shifting emotions and rounded rhetorical schemes, which were complemented, in the nineteenth century, with more dramatic principles, like symphonic poems, operatic dramas, Schopenhauer's 'story of the Will', and by Hegel's notion of personal autonomy manifesting itself in the melodic and rhythmical dialectic. These principles had little to do neither with formalism nor with transcendentalism. If anyone should be called 'transcendentalists', it is rather those theorists who were projecting mystical and nonexistent shapes, lines, and symbolisms onto the music.

²⁷ Treitler: 'The Historiography of Music: Issues of Past and Present', 376..

²⁸ Treitler: 'The Historiography of Music: Issues of Past and Present', 373.

²⁹ Treitler: 'The Historiography of Music: Issues of Past and Present', 377.

The empirical reality of music does not consist of shapes, forms, or symbols. It is concerned with emotional communication and intonation. There are few empirical facts that have a stronger presence to us than the tone and melody of our own voices, the scream of a child, or the repose of harmony and rhythmical self-stimulation. Yet these are realities that were repressed from the minds of twentieth century materialists and semioticians.

14.3 Denotation versus actual gestalt formation

Although the above discussion, centred primarily around questions of reference or *semantics*, may be sufficient to reject the idea of music as depending on extrinsic content, it might be useful as well, to focus on a second way of attacking this problem, centred more on the co called *syntagmatic* aspect of language, or rather: on the *organised* character of real phenomena as contrasted with the earlier mentioned *lack* of such organisation in a sequence of signs. In fact; this approach, focusing on the character of the processes, may be even simpler and more objective than those arguments relying on reports about whether or not music is experienced as universally meaningful.

In all real phenomena the organisation is intrinsic; which is a strange way of putting things, since it is this organisation which to a large extent *constitutes* a phenomenon, in addition to its material or sensory medium, that is; which provides the premises upon which the combinations are based. The principles of combining smells in *perfume* are obviously different from the principles of combining movements in *ballet*; which again, are very different from the erection of stable structures in a building, the alignment of moving mechanisms in a cell or a machine, or the relationship between family members or employees in a company. The only thing these structures have in common is their difference from language: their actuality and *immanence*.

The argument may seem strange, since language is often thought to have or even provide structure and context. But as we have seen in the first section of this chapter: even the syntactical or 'syntagmatic' aspects of language are arbitrary. Like words, they represent something absent; and it does not matter much whether a meaning is represented by a word, an ending, or a certain way of ordering the words. The reason why some signs are occurring as endings in every other word, is that they represent fundamental categories, which are by and large universal and in diametrical opposition to the chaotic and shifting appearance of languages. As was indicated by

Saussure himself: the function of language might be boiled down to representation or lexicology; which is 'unreal' not because it does not exist, but because its meanings are not immanent. Certainly language makes it possible to talk about meanings and relationships, but these meanings and relationships are not immanent in the language as such.

By dint of its explicitness and emotive power, there is hardly any part of reality that is more different from language than music. The experienced qualities are both immanent and unique, and this also holds even for its organisation. Especially it is easy to show how it is *differentiated* at various levels, and how the processes function on the terms of their sensory constituents, which is in direct opposition to the principal arbitrariness of signs. Factors like tension, dissonance, quickness, and forcefulness are all employed according to their qualitative properties, for instance as means of intensification, or in sequences like tension-relaxation or discordance-resolution; which again is adding up to more complex functions or situations, like articulateness, amorphousness, turbulence, tranquillity and so on. Furthermore; it is easy to observe how sequences of musical events constitute dramas or progressions going for instance from calmness to excitement, from insecurity to triumph, or from melancholy to elatedness.

But even if one is not yet willing to accept descriptions like these, one nevertheless has to accept that music is differentiated according to factors which are inherent in the music itself. By way of easily observable contrasts and transformations it is constituting processes which are not only differentiated; they are differentiated at all hierarchical levels, that is to say: at the levels of motives, phrases, sections, and movements. Even between different works and different types of music we find characteristic functional and qualitative contrasts. This circumstance, that music is constituted by intrinsic hierarchies of relations, is also noted by Kofi Agawu, focusing especially on 'the continuities across formal boundaries', 'the complex hierarchies of closure in tonal music', which is in contrast with verbal texts which, he says, 'rely more on virtual or physical rests.'³⁰

In reality, however, the difference between music and language is much more fundamental than Agawu indicates here. We are not dealing with differences in *degree* or *amount*, but about two distinct and diametrically opposed parts of reality. We are dealing with the difference between actual and signified gestalt formation, or, between 'reality proper' and language. The

³⁰ Agawu, 'The Challenge of Semiotics', 143.

fact is that apart from the traces of organisation reflected in its division into letters, words, and paragraphs, the visual image of a text is not really organised at all. If one takes a look at any foreign, or even native text, one quickly discover that each line looks very much alike, as do each page. Furthermore, there are few differences between a page taken from let's say Plato and one from Poe.

This *unorganised* nature of language is even more evident in real speech than in writing. Here even most of the divisions, spaces, or virtual rests which Agawu speaks of, are absent; and if we do not know the lexical meanings of the elements, they tend to merge into the experience of a continuous and completely chaotic stream of sounds. Curiously enough, in view of the fact that he is sometimes regarded as the inaugurator of the opposite view, this circumstance is never made clearer than by Saussure himself. A spoken sequence detached from its meanings, he says, is just 'an indistinct mass', or a 'shapeless ribbon' of sounds.

In itself, it is merely a line, a continuous ribbon of sound, along which the ear picks out no adequate or clearly marked divisions. In order to do so, recourse must be had to meanings. When we listen to an unknown language, we are not in a position to say how the sequence of sounds should be analysed: for the analysis is impossible if one takes into account nothing more than the phonic side of the linguistic event. But when we know what meaning and what role to attribute to each segment in the sequence, then we see those segments separated one from another, and the shapeless ribbon is cut up into pieces. But the analysis involved is in no way a material analysis.³¹

And the reason why it is not, and why it *cannot* be a 'material analysis', is obvious. It follows directly from the arbitrariness of signs; or from the fact that in languages, the vehicles for signification are never identical with what they stand for. In a sequence of signs therefore, neither the single ideas nor the context of ideas are present in the sounds. One can talk about 'context', 'of', and 'ideas', but as sounds these words bear no resemblance neither to the complex concepts they label, the differences between them, nor the situation they are combined to describe. Neither can such sequences of signs create any *musical* order. For this to be possible, the sounds would have had to be chosen because of their own character as related to other auditory events in the sequence. But as long as the sounds are tied up with the signification process this is seldom possible.

³¹ Saussure, *Course in General Linguistics*, 102.

If the meanings signified in the sequence ‘context of ideas’ always occurred in the same order, then one could have created some new sound-labels which sounded meaningful in combination as well, such as *shooby-dooby-doo*. But the words do not always occur in this order; on the contrary, they occur in infinite amounts of contexts, which is necessarily destroying this well-sounding combination. In one case the combination might happen to result in *shooby-dooby-doo*; in another case the result might be *chaos-dooby-sounds*, which is much less satisfying from a musical point of view.

It is true that to a certain extent we *do* take rhythmical and sensual aspects into consideration when selecting the words we utter or write. This is particularly evident in lyrical poetry, which is distinguished from prose by a more regular rhythm and by rhyme. By means of synonyms and the possibility of formulating things differently, one could attain at least a certain degree of musicality. This is by no means an easy undertaking though; since it occurs not *because of* language, but *in spite of* it. And the result is by no means comparable to a piece of music. If it had been comparable to music, the experience of a poem in a foreign language would have been equally interesting as the experience of a foreign piece of music, which is not the case.

This absence of intrinsic organisation is not peculiar to speech. It is characteristic of all kinds of signification. Even the kinds of symbols that tend to comment upon what they signify by means of their intrinsic qualities are different from what they stand for. If they had not been different, they would not have been symbols, but a presentation of individual qualities and relations. Serving as signifiers, they are operating on behalf of the concepts they are representing; not primarily on the terms of their own qualities as related to other qualities, like in music.

When this is said, it has to be added that the immediacy and autonomy of music does not exclude the possibility that pieces of music, or even fragments within pieces of music, occasionally could function as signs or symbols. Like all other phenomena, music could be imbued with all kinds of associations, some of which would be more common than others and therefore available for communicative purposes. There are also cases of more explicit signification or symbolism, like military signals, jingles, leitmotifs in operas or films, or the symbolism of spatial movement in some Renaissance and Baroque music, where ascending scales could be employed as symbols of such things as sunrise and resurrection. At least this is possible

if the music is accompanied by a text, compensating for the lack of institutionalised lexical meanings.

In all these cases, however, the music would still be music. It would only take on an additional, signifying, function; which would be problematic first when the symbolism was made to govern the actual make-up and organisation of the progressions. One might imagine a progression of musical fragments which were combined on the terms of their associations, for instance with birthdays, movies, marriage ceremonies, or Christmas celebrations. It would be a drama based on symbolised *extrinsic* content, which is not impossible; but it would suffer from all the shortcomings of languages mentioned above. Being dependent on connotations of external circumstances it would not be meaningful outside its own culture and time. Nor would it possess that intrinsic coherence and unity which is characteristic of good music. If the sequence of references was made very dense, the melodic wholes would simply disintegrate, and turn into some kind of language, which, as pointed out by Saussure, is both 'shapeless' and 'indistinct'.

Even this circumstance is commented upon by Kofi Agawu, pointing to a situation in Händel's *Messiah* (bars 46-48) where such symbolism comes into apparent conflict with the 'extended tonal structure', and its 'approaches to closure on immediate, intermediate, and remote structural levels.' 'The melismas on the word "astray" and the distinctions among voices conveyed by the phrase "everyone to his own way", must eventually yield to a cadence,' says Agawu; 'and when Handel brings the voices together in homophonic texture to cadence on "to his own way", the effect is faintly comical because of the blatant contradiction between words and music.'³²

Agawu even speaks of an 'ongoing tension between words and music' in song; which is hardly correct if it is intended as a general observation. It is only in such untypical cases as the above one, where the melody is interfering with the text, that such problems occur. Under normal circumstances there are no conflicts between melody and text. Rather we are dealing with different aspects of communication here, which have opposite but complementary roles.

There is a fundamental difference between *what one says* and *the way one says it*. The first aspect deals with *the content of speech*, which could be conveyed by words or signs, whereas the

³² Agawu, 'The Challenge of Semiotics', 158.

other aspect has to do with *emotional attitudes, rhetorical functions, and the dynamics of thought*, which is manifested in intonation, loudness, rhythm, pausing, and the general quality of voice. One may perfectly well make a decisive statement - ending with a full close - about utter confusion and 'everyone to his own way'. This is not a contradiction. On the contrary, it is a normal thing to do, as long as the sentence is an assertion and not a question. Rhetorical functions are not concerned with *what* is argued, but the stages of the argumentative process as such, which are musical and 'abstract' in the sense that they are seldom tied to concrete issues or view-points.

The best proof, perhaps, of these different yet complementary aspects of speech, is the fact that they are always accompanying each other. Still it is always possible to say the same thing in a different manner, with a different intonation. It is a well-known fact that the same melody could be set to different texts and vice versa. If both the melody and the text relied on semantic meanings, such substitutions would necessarily have caused some terrible contradictions and clashes of content; but, since the melody is only concerned with tone, attitude, and rhetorical function, there is no necessary contradiction here.

It is true that, in special cases, the manner of speaking or singing may contradict what one is saying, like when one delivers a compliment with an ironical or sarcastic tone, or say something tragic while laughing and singing. But these are intended effects, which are easy to avoid. They are not principal problems or 'ongoing conflicts', but opportunities, which are rather confirming the complementary role of intonation and text. They are not comparable to the situation of two people speaking at once about totally different things. On the contrary, they are amalgams of tone and text, often producing new and more complex meanings.

However, if the music is to function on an independent and autonomous basis, it has to function *entirely* on the terms of the emotional or rhetorical dynamic, which have to be organised according to some intrinsic and generally understandable principles of development and closure. It is fairly obvious that if this intrinsic organisation of music is destroyed in favour of symbolic operations - like when a final cadence is replaced by the symbolisation of 'astray', 'snake', or whatever - this is not only a category error, it is totally destroying the comprehensibility and coherence of the music; in the same manner, in fact, as when a crucial passage of a textbook is replaced by *tam-tara-taa*.

When symbolism is occasionally integrated even in some instrumental works, this is seldom done at the expense of the music, but rather as an addition to it. As was documented in the chapters on music rhetoric and melodrama: the composers have usually been stressing, and making sure, that the music functions primarily on a musical and emotional basis. At least this is the only music that has survived and not faded into oblivion, which is the ultimate destiny of all those evanescent and local means of communication we call languages.

14.4 The concept of actuality

14.4.1 Semantic homonymy as a source of false dilemmas

'When the concept of actuality is adopted, a question upon which metaphysical systems of psychology have been long divided is immediately disposed of', says Wundt.³³ It is a pronouncement that seems to resonate with what has been argued in the above sections: concord and discord are real phenomena, which is why music and emotional vocalisation is understood everywhere. Harmony is harmonious because it is a manifestation of the harmonic series. If the harmony is *challenged* by dissonance and rival roots, and *reaffirmed* by return; *challenge* and *reaffirmation* is also what we experience. Language, on the other hand, is a set of shared symbols, making it possible to talk about absent phenomena. The linguistic sound combinations function as symbols of other things. To function well as a language, this symbolism has to be firmly fixed by cultural conventions or dictionaries, yet the meanings are not inherent in the words.

As obvious as it seems, this is not obvious to all people. On the contrary, the realism it entails has been doubted by many through the history of philosophy, like in various forms of *skepticism*, *relativism*, *nominalism*, *solipsism* and *irrationalism*. A common implication of these views is the alienation and detachment of content from its constitution: an irrational dissociation of meaning from the type of structure and substance of which it is created. So common is this dissociation that it became a central project to many of the thinkers mentioned in this treatise - Aristotle, Hegel, Wundt, and Husserl - to try to correct it. To little avail, it seems, because the issue is more blurry than ever.

³³ Wilhelm Wundt, *Outlines of Psychology*, Part 5, §22.8.

Typical of many isms is the positing of themselves as part of dichotomies, which may be examples of *false dilemmas* in many cases: if things are not mechanical - such reasoning may go - they must be irrational or purely nominal, like in so called 'poststructuralist' theory, which is often contrasted with materialism, both of which are flip sides of the same type of reasoning. Certainly not all examples of skepticism and relativism are nominalistic in the sense of blurring the distinction between reality and language. Yet they are often deriving from language in the sense that a confusion is often caused by *semantic homonymy*. It is not that the meanings of words are ambiguous - dictionaries are precise enough in most cases - but when there are multiple meanings of the same words, these meanings may easily be confused. It is a typical trait of language formation that the description of new phenomena engages metaphors: an application of words from related fields to things which may be closely related in certain ways but diametrically opposed in other ways. Thus there are often several meanings of a word, which, as we will see below, is often a source both of category mistakes and false dichotomies.

The confusion of concepts like *reference*, *relation*, *representation*, and *denotation*, has already been discussed. The meaning of the word 'meaning' could be *linguistic reference* but also *actual qualities and gestalts*, which are diametrically opposed phenomena. 'Structure' could refer to *spatial symmetry*, but also diametrically opposed principles like *temporal development* or *linguistic syntax*. 'Law', in the judicial sense of this word, is based on *legislation*, which is culturally determined and sometimes *arbitrary*; but the word also applies to regularities and patterns having the character of logical and universal *necessities*, like in nature or mathematics. The concept of universality is often confused with things that are *widespread*; but even errors and accidents may be widespread, whereas the existence of truly universal circumstances, *logical limitations and possibilities*, might not even have been realised or discovered in many cases.

In some languages, 'science' means *reductionism* or *technology*; in other languages it covers *all systematic knowledge*. *Emotional awareness* is often, even by some psychologists, identified with *visceral feeling*. On closer inspection, and according to other definitions of emotion, most emotion concepts may be seen to rely on *socio-behavioural cognition and appraisal*, where kinaesthetic and melodic gestalt formation plays a crucial role.

These are all concepts relating to ontology and actuality in different ways. And when the different meanings of the words are confused, or when only one of the senses are observed, it

typically gives rise to so called 'category mistakes', which are often engaging false dichotomies and dilemmas. If meaning is equated with linguistic symbolisation, the world becomes a very chaotic and meaningless place without it. If science is equated with technology and spatial structure, then everything that is not technological or spatial is automatically relegated to the field of the epiphenomenal, irrational, and unscientific. If law and universality is equated with godly decrees, the absence of such a god would result in chaos and lawlessness.

Even the dichotomy of cognition and emotion might be considered a false dichotomy, deriving in part from semantic homonymy. If the concept of emotion is restricted to visceral feeling, then cognition and thought would be reduced to insentient computation. Yet it has been a main objective in this treatise to show how conscious cognition is always felt and embodied. Especially the thinking process is saturated by sensorimotor and melodic awareness, which is incorporating with necessity a large arsenal of feelings and emotions, such as lust, hope, frustration, conflict, bewilderment, complication, struggle, patience, fatigue, clarification, resolution, final satisfaction, or resignation.

It is reasonable to question whether the problems concerning actuality are in reality *pseudo problems*, which could be eradicated once the category mistakes are revealed. As is pointed out by philosophers of science like Thomas Kuhn and others, this battle of truth is also involving some deep-rooted *power structures* in academia, which are seldom hospitable to falsification. In many cases we are dealing with totalitarian regimes here, which would have to be modernised to resemble something like democracy. Nevertheless, the below discussions will try to shed some light on these matters.

Approaching the conclusion of this treatise, the following reflections are not limited to language and language use. As earlier noted: a central point in this treatise has been to highlight the importance of ego-dynamic gestalt formation, even to our general consciousness and sense of actuality. It is only through the interaction between a self and its surroundings that the different sensory modalities and percepts emerge. And it is only through a dramatic growth of the self that entities like intellectual strategies, social relations, and cultural objects like furniture, homes, and vehicles are actualised as real phenomena. As will be argued below: the neglect of the content of the self might be caused in part by false dichotomies like the idea of a fixed and lawful physical sphere versus a free and lawless mental sphere, but there are also more impenetrable remnants here, which are not so easy to resolve by logical reasoning.

The concept of actuality is relating not only to high level principles of organisation but also to some fundamental ontological problems concerning the integrative binding of constituents, both in perception and in matter. If atomistic and mechanistic models are not able to solve the binding problem, a new type of physics may be needed, or a physics which is more accepting of the paradoxical nature of quantum physics, dialectics, and human experience. Rather than defining or explaining away the paradoxes as 'problems' which ought to be solved or 'renormalised', the paradoxes might be seen as instantiations of the interpenetration of opposites and the infinite unruliness which is so characteristic both of matter and higher level consciousness. Perhaps linguistic homonymy and the differential meanings of words like 'paradox', 'antinomy', and 'dialectics' might explain some of our problems even at this level of knowledge. It is a discussion that might be seen to transcend the issue of melodic structure; yet the field of *vibrations*, and the temporal 'superposition' of melodic functions, are phenomena to which quantum physicists are often pointing; sometimes as examples of entanglement or superposition, and other times, as a correlate of consciousness and reality in general.

14.4.2 The false dichotomy of dogmatism and nihilism

The most common of the above mentioned fallacies, and the easiest to diagnose and correct, is probably the idea of laws and identities as something concrete and arbitrarily fixed; which is what Hegel is referring to as 'monochromatic formalism', 'dogmatism', and 'stoicism'.³⁴ When this objectified idea of laws is challenged by the observation of difference and change, the conclusion is drawn, that reality, or a field of reality, like subjective experience, is devoid of laws and identities, which is leading to 'skepticism' and finally what Hegel calls 'the unhappy consciousness'.

Hegel's *Phenomenology of Spirit* is very much laid out as a phenomenology of such isms, charting the different stages on the road to 'absolute knowledge'. And the obscurity of this text is not the only sign that Hegel is himself struggling with these matters. The preface, which is a later addition to the work, and a chapter called 'stoicism, skepticism, and the unhappy consciousness' is more lucid. But what he calls 'skepticism' might just as well be referred to as

³⁴ G. W. F. Hegel, *Phenomenology of Spirit* [1807], trans. A. V. Miller (Oxford: Oxford University Press, 1977), 9, §15; 23, §40; and 122, §200.

relativism or *nihilism*, because what Hegel is discussing here is first of all the failure to accept and integrate *change*.

The simple Unchangeable it takes to be the *essential* Being; but the other, the protean Changeable, it takes to be the unessential. The two are, for the Unhappy Consciousness, alien to one another; and because it is itself the consciousness of this contradiction, it identifies itself with the changeable consciousness, and takes itself to be the unessential Being.³⁵

The problem with these modes of reasoning, says Hegel, is that they are inherently self-contradictory. Since identities are prerequisites for difference, at the same time as differences are only adding definition and perspective to what they differ from, any talk of 'unessential Being' is only confirming what it denies:

It affirms the nullity of seeing, hearing, etc., yet it is itself seeing, hearing, etc. It affirms the nullity of ethical principles, and lets its conduct be governed by these very principles...Point out likeness or identity to it, and it will point out unlikeness or non-identity; and when it is now confronted with what it has just asserted, it turns round and points out likeness or identity.³⁶

Hegel's diagnosis is similar in many ways to Leo Treitler's critique of poststructuralist hermeneutics in musical historiography, which, he says, 'must, at least temporarily, entertain the very conceptions that they programmatically reject.'³⁷

A favourite among poststructuralist musicologists is a book by Leonard B. Meyer called *Emotion and Meaning in Music*. The book may also serve as a school example of the self-contradiction that Hegel is pointing to. By focussing entirely on *change*, as abstracted from all concrete content; and a single emotion, which is seen to be the product of such change, the book gives hope of saving the relativist conception of music and reality. The emotion Meyer is talking of is *surprise*, or as he puts it himself: 'Emotion or affect is aroused when a tendency to respond is arrested or inhibited.'³⁸

³⁵ Hegel, *Phenomenology of Spirit*, 127, §208.

³⁶ Hegel, *Phenomenology of Spirit*, 125, §205.

³⁷ Treitler: 'The Historiography of Music: Issues of Past and Present', 370.

³⁸ Leonard B. Meyer *Emotion and Meaning in Music* (Chicago and London: The University of Chicago Press, 1956), 14.

There is no doubt that surprise is an important aspect of musical communication; and there are probably more examples of this than are mentioned in Meyer's book. The experience of *modernity* and *fashion* is undoubtedly relying on such contrasts; so is the experience of being impressed or overwhelmed by music. Virtuoso song birds and Charlie 'Bird' Parker have this in common, that they are challenging the predictability of the music, keeping the attention of the listener, and building excitement, by means of contrasts and increasing complexity. But the effect is not existing in isolation from the aesthetic and rhetorical makeup of the music.

If Meyer had been pointing to surprise as one among several aspects of music, his account would have been unproblematic. But he is not. Instead he is advocating some kind of wholesale relativism here, where different genres and styles are considered 'artificial constructs' serving merely as 'probability relationships'. 'The studies of comparative musicologists,' he says for instance, 'have made us increasingly aware that the particular organisation developed in Western music is not universal, natural, or God-given.'³⁹ Which is a perfect example of the above mentioned dogmatism-nihilism dilemma, where universality and 'naturalness' is falsely identified with something conventional, restricted, and immovable.

It is not the only example of category errors and false dilemmas in Meyer's book. The concepts of musical structure and 'absolutism' are frequently confused with spatial 'shapes' and symmetries, as contrasted with 'the extramusical world of concepts, actions, emotional states, and character', whose proponents are referred to as 'referentialists'. Indeed, the concept of meaning is explicitly confused with 'reference'.⁴⁰ His own position, if not explicitly stated as such, might better be described as a form of relativism and skepticism.

The element of skepticism is particularly evident in his initial discussion of tone. For, he says, 'while the relationship between mental sets and physiological changes has been demonstrated beyond doubt, the effect of "tone as such" has not.'⁴¹

Already in this short citation, the self-contradictions intrinsic to scepticism are starting to present themselves: speaking of what it denies. How can we hear or even talk about a tone if it has no intrinsic quality? 'Tone' is the name of a unique type of experience that is often contrasted with the experience of 'noise'. It lays the foundation for all music, which emotive power has been

³⁹ Meyer, *Emotion and Meaning in Music*, 60 and 6.

⁴⁰ Meyer, *Emotion and Meaning in Music*. See especially 4, 89, 157, 163, as well as 1, 8, and 34 on 'referentialism'.

⁴¹ Meyer, *Emotion and Meaning in Music*, 11.

documented even by ancient philosophers. Much of the psychoacoustic and physiological foundations of tone experience were described in Hermann Helmholtz' massive work *On the sensations of Tone*. Even the further neurophysiological 'repercussions' of tone experience have been demonstrated now, like in studies focussing on the positive benefits of religious chanting.⁴² Other research on tone experience is showing how the removal of tone from speech is radically reducing the activity of affective areas of the brain;⁴³ and it is not even possible here to go into detail about all studies of the effects of harmonious music on the brain and mind. The fact that new fields of therapy - like music therapy, musical pain relief, or vibroacoustic and ultrasonic therapy - have been established, is speaking for itself.

The main problem of relativism, however, is much more general: it is the problem of talking about *difference* in isolation from any kind of identities. It is essential to realise that nothing related to nothing produces nothing. Chaos related to chaos does not create much contrast, let alone any surprise. Perhaps one can imagine oneself reading the telephone catalogue, and that the sudden introduction of a new prefix would be experienced as a particularly emotional and meaningful moment. In reality, such change would amount to little surprise or interest if it was devoid of aesthetic and hedonic values, like the kind of values often identified with tone and harmony.

Even if such an anhedonic and contentless game had been possible, there is nothing about mere change, surprise, or 'inhibition of response' that is *specifically musical*, or that defines music in relation to other phenomena. Such a game would be similar to all occurrences involving 'inhibition of response', and it is a mystery why some musicologists are so eager and willing to denigrate, and in reality obliterate, their own field.

However, Meyer is not referring to a chaotic sequence of numbers. His examples are actual music, and it is interesting to notice how he is starting now, to talk about and take for granted all the qualia and inherent higher level content which he has initially rejected. In some initial chapters he is able to avoid these self-contradictions by speaking abstractly about similarity and change. Even the concept of 'tone' is avoided here. Inspired by various semiologists he is talking

⁴² Junling Gao, Stavros Skouras, Hang Kin Leung, et al., 'Repetitive Religious Chanting Invokes Positive Emotional Schema to Counterbalance Fear: A Multi-Modal Functional and Structural MRI Study', *Frontiers in Behavioral Neuroscience*, Volume 14 (24 November 2020), <https://doi.org/10.3389/fnbeh.2020.548856>.

⁴³ GERALYN M. SCHULZ et al., 'Functional neuroanatomy of human vocalization: An H215O PET study'. *Cerebral Cortex*, Volume 15, Issue 12 (March 2005): 1835-47. <https://doi.org/10.1093/cercor/bhi061>.

instead of 'sound-terms'. Yet when it comes to concrete analyses, the self-contradictions become impossible to avoid. On some occasions, like on page 158, he seems to totally forget his initial position and starts to defend the existence of 'identities to be contrasted, compared, or otherwise related'.

'Certain musical relationships appear to be well-nigh universal', he now states: 'In almost all cultures, for example, the octave and the fifth or fourth are treated as stable, focal tones toward which other terms of the system tend to move.' He even talks about 'restful, consonant intervals' representing the element of 'normalcy and repose'.⁴⁴ This is contrasted with intervals and chords which have no root, but are characterised by 'intervallic equidistance.' 'Whole-tone scales and augmented and diminished triads all involve intervallic equidistance', he correctly explains, 'they create uniformity and produce ambiguity....often used to express intense emotion, apprehension, and anxiety.' Somewhat less ambiguous are the non-harmonic tones and added sixths in subdominant chords, which he correctly describes as instances of 'indefinite tension' or 'relative uncertainty' on the road to the 'complete certainty' of the 'final cadence'.⁴⁵

It is essential to notice that, contrary to what some relativists might believe, many of these qualia are not purely relative or gradual, but *diametrical oppositions*, which are undoubtedly contributing to the kind of multidimensionality which Hegel puts at the foundation of existence. Another source of qualia, says Hegel, are the 'quantitative ratios,' and he is pointing to music and chords for exemplification.⁴⁶ The experience of sound and tone might be similar to the rest of reality in this respect. For example, the idea of atoms as infinitely dense balls orbited by other dense balls is very much discarded by now. Instead the physicists are often explaining the atom and its electron shells in musical terms, as the vibration and 'spherical harmonics' of integer ratios.

But Meyer's recognitions of identity and actuality are not limited to such qualia or fundamental building blocks. Even the higher order functions and progressions, which are emerging from the interplay of these identities, are described in great detail. In his analyses of Beethoven's piano sonata Op. 81a or Chopin's prelude Op. 28, No. 2, for instance, he talks about

⁴⁴ Meyer, *Emotion and Meaning in Music*, 63 and 231.

⁴⁵ Meyer, *Emotion and Meaning in Music*, 164 and 96.

⁴⁶ G. W. F. Hegel, *Hegel's Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences* [1830]. Translated by William Wallace (Oxford: Clarendon Press, 1975), 156, §105.

alls sorts of cadences: full closes, half closes, plagal cadences, and irregular resolutions.⁴⁷ Like the sensory constituents, these are not artificial 'probability relationships' which are only aiming towards the experience of surprise, they are behavioural and *rhetorical functions*, which identities are diversified according to the different stages of the musical discourse. All this content is unique to tonal music, so it is not resting on the symbolisation of something 'extramusical'. It is actual and real, both to the people that are producing and perceiving it.

The same is true of the *character* of these progressions. Meyer is talking, amongst other things, about the 'affective character' of chromatic appoggiaturas, 'the roguish and spirited playfulness' of Haydn, and 'the flowing lyricism' of Beethoven.⁴⁸ As a matter of fact: his descriptions are pretty much *identical* with those of Baroque theorists like Jean-Philippe Rameau and Johann Mattheson. The question at stake, is whether Meyer is able to integrate all this content as actual and formative parts of musical and emotional experience.

In the last chapter of his book, it seems like he is approaching such an understanding. "Musical mood gestures" may be similar to behavioural mood gestures', he says. Since 'moods and sentiments attain their most precise articulation through vocal inflection', he reasons, 'it is possible for music to imitate the sounds of emotional behaviour with some precision';⁴⁹ and it is not unlikely that a deeper understanding of embodied affect and cognition, along the lines of Wundt and James, might have widened his understanding of emotion, and enabled him to welcome even song and dance into the field of reality. What we like so much about harmonious music is precisely what is *different* about it: the fact that it is harmonious and rhythmically regular. This harmony and regularity is strongly experienced. Even Aristotle reckoned it 'a source of pleasure'; beyond mere 'imitation'. We are dealing with 'behavioural mood gestures' in their own right here; and there is little doubt that they have played a central, or even crucial role in the evolution of modern humans.

Instead Meyer is retaining his dogmatic and limited view of 'naturalness', which is getting particularly acute when confronted by other types of music. His understanding and appreciation of music seems to be limited to functional harmony, so it is even more difficult in this case to embrace the true diversity of reality. If it had not been for ethnomusicology and intellectual

⁴⁷ Meyer, *Emotion and Meaning in Music*, 50-57 and 95-96.

⁴⁸ Meyer, *Emotion and Meaning in Music*, 101 and 171.

⁴⁹ Meyer, *Emotion and Meaning in Music*, 268.

fashions like structuralism and cybernetics, he might well have remained in a conservative and dogmatic position. Now he is forced to leave this position. And it is probably his lacking understanding of the function and meaning of other types of music that makes him unable to escape the 'unhappy consciousness' and integrate the differences in a pluralistic conception of reality.

Examples of such pluralism are Aristotle's charting of different rhetorical genres, where song might be associated with the 'epideictic' genre of rhetoric, which is concerned with ceremonial matters, like in laudation and jubilation.⁵⁰ Another example is Johann Mattheson's extensive classification of different musical genres and styles, which 'naturalness' is defined as 'conforming with their concepts and functions'. It is a pluralistic conception of music, which embraces even the 'disagreeable, frightening and horrible'.⁵¹

Mattheson's conception of 'naturalness' as something that is true to its notion is also a feature of Hegel's philosophy and conceptual realism. Natural laws are not limited to a set of privileged objects located somewhere in the distant past. They are comprising the totality of everything that is logically possible, and Hegel is talking of a '*plurality* of categories'.⁵² In a broader context, everything in this universe is new and changeable, and the truth is just the totality of what exists. Or to be more precise: it is a hierarchy, where dimensions interpenetrate and build upon each other, and gain actuality in relation to everything they are not. Truth and science, says Hegel, 'is only possible as a universe or totality of thought'. It is a 'system', which is 'not narrow and to be distinguished from others', but 'makes it a principle to include every particular principle'. This is the message that is brought about in the introduction to his *Logic*, and is encapsulated in legendary formulations like:

What is reasonable [vernünftig] is actual [wirklich]; and what is actual is reasonable⁵³

⁵⁰ Aristotle, *The Art of Rhetoric* [c. 367-322 BC], trans. Hugh Lawson-Tancred (London: Penguin books, 2004), 80, Chapter 1.3.

⁵¹ Johann Mattheson, *Der Völkommene Capellmeister* [1739], Documenta Musicologica Faksimile, ed. Margarete Reimann (Kassel und Basel: Bärenreiter-, 1969), Part I, Chapter 10, Paragraph 21 and 79.

⁵² Hegel, *Phenomenology of Spirit*, 142, §235.

⁵³ Hegel's *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, 9, §6.

Hegel might have been better off by talking about what is *possible* or *thinkable*, since the word 'vernünftig' (reasonable) has different meanings. It could be taken as a justification of everything that is actual, including war, crime, and error. Conversely it might be taken as a relegation of those destructive parts of reality to a field of 'unreality', which is the fallacy of dogmatism, irrationalism, and nihilism; although Hegel is partially saving himself by describing such things as 'on the way to ruin'.⁵⁴ The dysfunctional practice of musical constructivism may be one example of this, which while existent for a short period of time, was hardly musical in the sense of organising temporal phenomena in a meaningful manner.

Another question related to the discussion of relativism is the question whether Hegel's system is 'open' or 'closed'. Even here there is a dialectic which might be somewhat under-communicated by Hegel, that each time a new category or opposition is introduced, it is 'opening up,' in the sense of increasing the amount of content, at the same time as it is creating *closure* in the sense of dividing a field into two halves. Examples of such dichotomies, which are also mentioned by Hegel, are the categories of *inanimate* versus *animate* being, and the categories of *plants* versus *animals*, which are obviously creating a very closed system. At least it is closed in one end of the system. Like a tree, it is closed at the bottom and branching out at the top, by opening up for subcategories and an infinite amount of individual differences.

Within the field of *ego-dynamic* modalities, which is the subject matter of this treatise, examples of such dichotomies are *song-melody versus speech-melody*, which seems to divide the field of melodic content and structure into two halves. At the same time it is doubling, or perhaps more than doubling, the amount of content pertaining to the dynamic self, by adding a field of reality concerned with *celebration*, *entertainment*, *religious worship*, and so on. Moreover, this fundamental dichotomy is opening up for several subcategories, like *speech melody versus atonal song*, or *modal versus dialectical harmony*, as well as an infinite amount of differences in terms of styles and individual expression. Undoubtedly, the potential for stylistic and functional dichotomies has been proven to be larger in the field of sound than in the visual arts, which is simultaneously a proof that the categories are not arbitrary, but connected with their actual medium.

⁵⁴ Hegel's *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, 276, §213 (Zusätze)

As became clear in the chapter on his music aesthetic and his *Philosophy of Mind*,⁵⁵ Hegel was not able to integrate all this content in an entirely consistent model of the self; yet his philosophy is demonstrating a manner of thinking which while being open to, and a prerequisite for differentiation, is also very systematic. It is a way of thinking that is more abstract, and might require more of the brain than a dogmatic positing of concrete Platonic forms and the like; yet when Leonard B. Meyer is not able to embrace this pluralism, it is not necessarily due to mental limitations. At least his discussion of the naturalness of the minor third is indicating that he has the mental capacity to grasp it.

It is a classical problem of music aesthetics whether the minor mode should be considered 'natural' when it cannot be derived from the harmonic series of a fundamental tone. It is an argument that is used for instance by the famous music historian Carl Dalhaus, against the idea of a psychoacoustic basis for music theory.⁵⁶ Since a minor triad is not directly copying the harmonic series, which is serving as the dogmatic concretisation of laws here, it is taken as evidence for historical relativism.

Yet Meyer is much more advanced than Dalhaus at this point. Since the effect and function of the minor third is precisely this, to create a sense of tension by *deviating* from the maximum harmony of the harmonic series, it is not in contradiction with acoustics. On the contrary, it is depending on acoustics for its effect, instantiating a lawful relationship between form and function. Or as Meyer is putting it himself: 'the association between the minor mode and emotional states depicting sadness and suffering is a product of the deviant, unstable character of the mode and of the association of sadness and suffering with the slower tempi that tend to accompany the chromaticism prevalent in the minor mode.'⁵⁷

If Meyer had been able to apply the same logic to his account of different styles, he would easily have escaped the pseudo-problem of musical pluralism. When some music is modal and harmonically static, like in most ethnic music, it is not because it is an 'artificial construct'. It is just affirming harmony in a more static manner than the dialectical and more discursive manner

⁵⁵ G. W. F. Hegel, *Aesthetics: Lectures on Fine Art* [1820s], Vol. 2, trans T. M. Knox (Oxford, New York: Oxford University Press, 1998); and G. W. F. Hegel, 'Die Philosophie des Geistes', Vol. 3 of *Enzyklopädie der philosophischen Wissenschaften im Grundrisse* [1830] (Frankfurt am Main: Suhrkamp Taschenbuch Wissenschaft, 1986).

⁵⁶ Carl Dahlhaus, *Die Musiktheorie im 18. und 19. Jahrhundert, Zweiter Teil: Deutschland* (Darmstadt: Wissenschaftlich Buchgesellschaft, 1989), 252.

⁵⁷ Meyer, *Emotion and Meaning in Music*, 228.

of dealing with harmony which developed in late medieval Europe. If music had been an 'artificial construct', whatever that is supposed to imply, or a language consisting of arbitrary signs, the musics of the world would be equally different and prone to disappearance as languages. But modal harmony never disappeared. It continued to exist on the streets of Europe, and it is still existing in identical form in almost every culture on this planet.

As pointed out by Johann Mattheson: the fact that the music of his own time was often 'pompous' did not make it less natural. It was just more pompous. It is a fact that must be increasingly difficult to deny it in the pluralistic cultures of today. Vulgar popular music and horrible horror music exist side by side, and they are not 'doing the same thing', as the relativists are obliged to believe. As the jazz drummer Max Roach formulated it in an interview with Bill Brower: 'I do believe that one culture serves more than one purpose; it is for enlightenment; it is for entertainment; it is to relax by; it is to think by - all these things - it is to worship by, and so forth'.

If we want to prove or disprove the lawfulness or universality of music in an experimental manner, it is obviously futile what many music psychologists have tried, to categorise the music in terms of dogmatic and severely restricted notions of 'basic emotions' and the like. Especially if a certain activity is basically concerned with jubilation, celebration, dancing, or soothing, it goes without saying that words like disgust, anger, or sadness would never be relevant or consistently applied descriptions of this activity. Instead one should be open to the totality of sentient experience, including even the specifically musical modes of being, and try to investigate whether there is a lawful connection between this content and its constitution.

One example of such research is documented in an article by Samuel A. Mehr and colleagues, titled 'Form and Function in Human song.'⁵⁸ The experiment showed 'near uniformity of form-function inferences for dance songs and lullabies across the geographic regions from which the songs were sampled, with weaker results for healing songs.' The results for 'healing songs' are hardly surprising, since the idea of 'healing' can never be communicated by sound alone. *Dancing* and *soothing*, however, can, and the connection between content and constitution, which is more like an *identity* in this case, would have been even easier to ascertain if the researchers had focussed on differences like *song-melody* versus *speech-melody*. It is a

⁵⁸ Samuel A. Mehr, Manvir Singh, Hunter York, Like Glowacki, Max M. Krasnow, 'Form and Function in Human Song', *Current Biology*, Vol. 28, Issue 3 (5 February 2018): 356-368. <https://doi.org/10.1016/j.cub.2017.12.042>.

functional dichotomy that seems to be universal in all senses of this word. When we do not always sing, it is not because it is more difficult to sing. On the contrary, it is probably easier to speak in a monotonous song-like manner. Many brain-damaged people do this. Yet it is functionally inadequate. Song is a form of jubilation, which is not in tune with the ordinary, problem-solving dynamic of the self. If the relativists were right, it would not matter whether we speak or sing, but it does matter.

14.4.3 The false dichotomy of materialism and spiritualism

When Wilhelm Wundt was talking of 'the concept of actuality', it was a reply to the kind of skepticism often exemplified by Emmanuel Kant's dictum that we cannot know 'the thing in itself'. The problem is concerned with the compliance of experience with laws, causality, and our physical surroundings, which is obviously central to melodic comprehension as it is a precondition for communication and mutual understanding. If our understanding is not *totally* objective, such reasoning sometimes go, it is totally subjective.

Another, more complex issue, which is also contributing to the idea of an inner-outer divide, is the seeming difference between mental phenomena, characterised by consciousness and multi-sensory integration, and physical reality, which is classically imagined as aggregates of massive particles bumping into each other. Like the dogmatic conception of laws, such 'eliminative materialism' has hardly stood the test of time, and the consequences of entertaining it are devastating, as it is relegating all mental and artistic products to an unreal and supernatural sphere, beyond scientific inquiry.

Anyhow, the first of these dichotomies is probably the easiest to disentangle. It is basically a variant of the above discussed relativism, where content is irrationally dissociated from its own constitution. In the one moment it is disregarding a field of content as 'unreal'; in the next moment it is talking about it and taking its categories for granted; which is also Hegel's main critique of Kant; 'he simply put the object under a rubric otherwise ready to hand, instead of deducing its characteristics from its notion'. 'If Reason be mere empty indeterminate thinking', says Hegel, 'it thinks nothing'.⁵⁹ Empirical experience, which is all we have, is differentiated by all kinds of principles and dichotomies. The reality of these dichotomies does not depend on

⁵⁹ Hegel's *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, §48.

being referred to an 'unattainable *beyond*'. The correlation or identity of content with its constitution is logical and obvious in many cases. It is not like arbitrary labels that could be superimposed on foreign phenomena without conflict and contradiction.

Philosophy 'must necessarily be in harmony with actuality and experience' says Hegel, or 'this harmony may be viewed as at least an extrinsic means of testing the truth of a philosophy',⁶⁰ which is all science can do. Hegel does not elaborate much on this here, but it is obvious that if we superimpose the idea of substance into a hole in the ground we would quickly fall into this hole. If we misjudge the spatial properties of a staircase, or confuse it with a flowery meadow, we may easily stumble and break our necks. Our sensory and perceptual apparatus is shaped by an adaptive process, which is not only fine tuned to the interaction with our surroundings, it is *produced* by this interaction.

That is not to say that what we experience is always correct. In hallucinations or paranoia there is obviously a mismatch between experience and surroundings. But these are pathological cases, often with severe consequences. Furthermore, says Hegel: by talking about such defects, sceptics like Kant are contradicting themselves by putting up the kind of objective reference they are themselves denying: 'no one knows, or even feels, that anything is a limit or defect until he is at the same time above and beyond it'.⁶¹

Certainly our sensory apparatuses could be better in many respects, and there are many differences between animals with regard to the precision and strength of different senses. But humans are similar to each other, so with regard to the perception of cultural products, which are making up the major part of our surroundings, the differences are negligible in most cases. So fine tuned is this mutual understanding between humans, that a slight 'sarcastic' tone of voice may destroy our livelihood and chances in a job interview. If musicians were in disagreement about whether they are playing a waltz or a march, or in different tempos and keys, the whole enterprise would be impossible.

Language is very much a proof of such agreement. It would be practically impossible to label and speak about different phenomena without it. Many of the distinctions we are dealing with, like the difference between rock music and country and western music, are both extremely subtle

⁶⁰ Hegel's *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, §6.

⁶¹ Hegel's *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, §60.

and commonplace. The distinction between be-bop and hard-bop not so much; but even the uncertainties are common, and the limits can be pushed, with training and exposure.

What makes musical communication so direct and 'objective', is not only its constitution in a medium which is also outside the body. The logical rationale behind the physical constitution of qualia is much easier to comprehend in music than in many other fields; which is probably why the scientific revolution was very much triggered by musicology. Pythagoras' observations of a correspondence between numerical ratios and the experience of harmony are no less relevant today; and it is confirmed by psychoacoustics and neurodynamics. Not only are the brain waves of different people found to be synchronised during musical interaction and experience;⁶² the correspondence is so strong that one might speculate, like Edward W. Large, that the experience of sound is little but sound itself.⁶³

According to Thomas Heimburg and Andrew D. Jackson at the Niels Bohr institute, the nerve impulses, by which the neurones are communicating with each other and the outside world, are not merely electric and rhythmic by nature, they are also *mechanical* to some extent, constituting so called 'soliton waves', which may play a greater role in neural communication than is generally recognised.⁶⁴ Other researchers, like the Indian Anirban Bandyopadhyay, a senior scientist at the National Institute of Materials Science in Japan, are demonstrating how the large scale neurodynamic frequency bands are connecting with a whole hierarchy of faster frequency bands, stretching down to the interior of cells and the quantum level of reality.⁶⁵ It is an established fact that, at the quantum level, even sound is characterised by phenomena like superposition and wave-particle duality.

Here we are already encroaching on the second problem, which has also been giving rise to scepticism. It is often characterised as the 'harder' problem, as it is concerned with the

⁶² Yingying Hou, Bei Song, Yingying Hu, Yafeng Pan, Yi Hu, 'The averaged inter-brain coherence between the audience and a violinist predicts the popularity of violin performance', *Neuroimage*, Vol. 211, Article 116655 (1 May 2020). <https://doi.org/10.1016/j.neuroimage.2020.116655>.

⁶³ Edward W. Large, 'Chapter 7: Neurodynamics of Music', in *Music Perception*, Springer Handbook of Auditory Research, ed. Mari Riess Jones, Richard R. Fay, and Arthur N. Popper, Vol. 36: 201-231 (New York: Springer, 2010), 225. https://doi.org/10.1007/978-1-4419-6114-3_7.

⁶⁴ Thomas Heimburg and Andrew D. Jackson, 'On soliton propagation in biomembranes and nerves'. *Proceedings of the National Academy Sciences of the United States of America*, Vol. 102, No. 28 (12 July 2005): 9790-9795, <https://doi.org/10.1073/pnas.0503823102>.

⁶⁵ Anirban Bandyopadhyay, *Nanobrain: The Making of an Artificial Brain from a Time Crystal* (Boca Ration: CRC Press, 2020).

integrative binding of experience into conscious percepts and ideas. A good example of such binding is the interpenetration of past and present in melodic experience. Indeed it was the example which the great physicist David Bohm was pointing to when explaining his concept of 'implicate order' in nature. 'The actuality of this whole movement', says Bohm, is not about 'comparing the past with the present'. It is an 'active transformation', 'enfolding into many levels of consciousness'; and his comparison of melodic experience with *electron fields* is already giving a hint about what might be a physical correlate of such enfoldment, even within the brain.

One can thus obtain a direct sense of how a sequence of notes is enfolding into many levels of consciousness, and how at any given moment, the transformations flowing out of many such enfolded notes interpenetrate and intermingle to give rise to an immediate and primary feeling of movement.

This activity in consciousness evidently constitutes a striking parallel to the activity that we have proposed for the implicate order in general. Thus in section 3, we have given a model of an electron in which, at any instant, there is a co-present set of differently transformed ensembles which interpenetrate and intermingle in their various degrees of enfoldment.⁶⁶

The functions of tonal melody: the subdominant and dominant tensions which are implying the repose of the tonic at the same time as they are *challenging* it, are *interpenetrating*. Yet they are not simultaneous or 'immediate'. That would be nothing more than a cluster of dissonant intervals. The interpenetration of melodic functions may be even more paradoxical than Bohm is indicating then, and there is little doubt that it is *actual*.

This 'compounding' capacity of our minds, and the causality of mental processes, which is not mechanistic, but operating on the terms of *ends* and *values*, is not only actual, says Wundt, it is *more actual*, as it is part of the immediate experience of ourselves. This is his 'principle of actuality'. The actuality of physical objects, he says, is 'mediate' and merely 'assumed.' Nevertheless he speaks of a necessary compliance between these fields, and a 'psycho-physical parallelism', which, he says, is less about different substances than about different 'points of view'⁶⁷ - a form of monistic perspectivism. However, by talking about a psycho-physical parallelism here, he is in danger of maintaining the kind of divide that he is doubting: an untraversable gulf between mental phenomena and a purely mechanistic physical sphere.

⁶⁶ David Bohm, *Wholeness and the Implicate Order* [1980] (London and New York: Ark Paperbacks, an imprint of Routledge, 1983), 199.

⁶⁷ Wilhelm Wundt, *Outlines of Psychology*, Part 5, §22.6.

The mind-matter divide is difficult to get rid of, but it might be referred instead to *different stages of integrative complexity*, and to the categories which Bohm is describing as *the implicate and explicate order*, both of which are pertaining to the physical world. If physical reality comprises everything, even the integrative features of mind must be regarded as parts of this reality. Then we are forced to accept that the paradoxical superposition of elements in consciousness is also telling us something about physical reality at the fundamental level, which is not merely mechanical or discrete, but capable of integration. But how is this even possible?

This is precisely where Hegel has provided such a compelling and logical explanation. While it has been a tendency among reductionists to conceive of the building blocks of reality as mechanistic and *finite*, such thinking is logically flawed, says Hegel. The 'finite' might be imagined as something infinitely small and point-like, or something infinitely dense and massive, or something infinitely well-defined. It does not escape infinity at all. And these infinities are not captured in what Hegel describes as 'bad infinities', that is to say: as a mere regress of the finite. The finite and infinite are integrated in a manner that is irreducible and paradoxical.⁶⁸

Even Kant was aware of these paradoxes or 'antinomies', as they are also called, but ascribed them to a deficiency of human consciousness. His conclusion could not be more different from that of Hegel, who is recognising instead the antinomies as *real*; an insight which he develops into what in contemporary lingo might be called a 'theory of everything'. By locating the antinomies to the core of existence, appearing in 'objects of every kind, in all conceptions, notions, and ideas', Hegel is providing a logical explanation both of the integrative coherence and *necessity* of physical reality, as well as the conflict or 'absolute unrest of pure self-movement' that seems to be propelling it forward.⁶⁹

As unfamiliar as this *dialectical monism* is to many scholars, there is nothing new about it. On the contrary, it is a fundamental aspect of traditional Chinese cosmology, reflected in Taoist metaphysics, Confucianism, the *I Ching*, as well as Chinese medicine and martial arts like qigong. It is famously represented by the *yin and yang* symbol, connoting the interpenetration of dark-bright, negative-positive, receptive-active, female-male and so on. It is a dialectic which

⁶⁸ Hegel's *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, § 94 and §95.

⁶⁹ Hegel's *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, §48, and Hegel, *Phenomenology of Spirit*, 100-106.

even Niels Bohr seems to have subscribed to, by putting it into his own coat of arms. Similar insights are made by ancient Greek philosophers like Heraclitus and Zeno.

To a person that is not an expert in physics, the findings of quantum physics, and the manner in which they are described, often appears like a confirmation of these paradoxes. Especially with regard to the speed of light and the so called 'wave-particle duality' of fundamental particles, this interpenetration of finite and infinite seems obvious. The speed of light, while *finite*, is also *infinite* in the sense that it is a *limit* which is unreachable without obliterating time and space altogether. Similarly, when Hegel is talking in his Logic about matter and nothingness as being *identical* if they are derided of the dialectical interpenetration of opposites,⁷⁰ his description is eerily in tune with contemporary physicists talking of infinitely dense objects as 'black holes' and 'singularities'.

Conversely, in *quantum field theory* the fundamental medium of reality is said to be *fields* or properties of the *vacuum*; so even here the priorities of matter and nothingness are curiously turned upside down. There are probably few physicists today that would subscribe to David Bohm's idea that 'what we perceive through the senses as empty space is actually the plenum';⁷¹ but the particles have nevertheless been conceived as *vibrations* in such fields, acquiring duration, mass, and spatial definition by being nested into itself, and a context of other particles and larger objects.⁷²

The concept of 'apperception' in the sense of a contextual self-other specification was first used by Leibniz; and if there is something to the panpsychist conception of reality, even the production of this material dimensionality might be imagined as early stages of an apperception process. Certainly this is part of a larger evolutionary process. Even this evolutionary process, and the idea of a 'big bang' originating in nothingness, is prefigured by Hegel's elaborate description of 'becoming', and it is a description that is stretching from the fundamental dimensions of matter and space to the different stages of human culture and self-reflection. In various discussions of the interpenetration of the One and the Many and the 'being for self in otherness', Hegel even pretends to explain the logical necessity of gravitational attraction and

⁷⁰ Hegel's *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, §87 and §88.

⁷¹ Bohm, *Wholeness and the Implicate Order*, 192.

⁷² See for instance Gregg Jaeger, 'The Elementary Particles of Quantum Fields', *Entropy (Basel)*, Volume 23, Issue 11: 1416 (28 October 2021), <https://doi.org/10.3390/e23111416>.

expulsion;⁷³ which is also reminiscent of some modern theories of gravity focussing on quantum entanglement.⁷⁴

The level of self-consciousness in humans is undoubtedly a product, and a final stage of this apperception and self-other specification. The fundamental particles do not have such a self. This is why Kant was wrong, says Hegel. There is no such thing as the thing 'for itself'. At least, the 'thing' has no self or presence that is comparable to that of a human being. Moreover, by being embodied and composed of such fundamental fields and particles, even human beings are such 'things.' The difference is just that, in humans, the 'thing' is provided with an almost infinitely greater perspective, definition, and conscious presence. So 'there is nothing we can know so easily', says Hegel, as 'the Thing-in-itself'.⁷⁵

Even this orchestration of the self has a physical reality, which large scale features have only recently started to appear in neuroscience. In posterior regions of the brain this orchestration is first of all concerned with the reconstruction of the fundamental dimensionality of spatial and temporal experience. There are special neurones or neuronal clusters that are specialised for each and every dimension and dichotomy, it seems. One after the other, these neurones are nesting single features like directions, vibrations, and basic shapes into the scene. It is a process that is highly reminiscent of Hegel's dialectic. Unlike the logic of mathematics, which is artificially restricted to some abstract 'geometrical' shapes, the brain continues to build content in a manner that comprehends even proprioceptive and social transactions.

The focus of this treatise has first of all been on the highest level product of this process: *the autonomous self*. More specifically it has been important to indicate how the comprehension of the elementary ego-dynamic stream is nested into composite acts, melodies, and higher level gestalts like social emotions and rhetorical figures, which again are nested into dramaturgical functions and higher level ideals. The feat seems to be accomplished by a hierarchy of structures devoted to 'action chunking' and melodic comprehension in the ventrolateral prefrontal cortex, which is also cooperating with the parietal cortex and the rest of the brain to create a sense of bodily presence and immersion of the self in its surroundings.

⁷³ Hegel, *Phenomenology of Spirit*, §136, §288, and *Hegel's Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, §97, §98, and §137.

⁷⁴ Brian Swingle, 'Spacetime from Entanglement', in *Annual Review of Condensed Matter Physics*, Vol. 9:345-358 (March 2018). <https://doi.org/10.1146/annurev-conmatphys-033117-054219>.

⁷⁵ *Hegel's Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, §44 and §164.

In the medial regions of the frontal cortex, the socio-behavioural gestalts and concepts seem to be integrated with features like visceral sensation, mood, drive, and conation, all of which might be seen to come together in the regions around the anterior cingulate cortex and the supplementary motor area. Especially the medial pre-SMA in humans has been connected not only with free will and the last moment vetoing of action tendencies; it is also the place where our favoured melodies and dances seem to be stored.⁷⁶ Vocalisation is triggered by artificial stimulation of this area in humans, and the songs that are activating it are preserved even when most other memory is destroyed, like in Alzheimer patients.⁷⁷

The pre-SMA might be conceived of as an interface between self-consciousness and external action, so it might be a good candidate for what Wundt, in the first volume of his main work, was referring to as an 'Apperzeptionszentrum' in the brain.⁷⁸ The location of melody to this apperception centrum may seem strange to those who wish to degrade music to something unimportant and artificial, but it is not. The self-other interaction, at its highest levels, is social by nature. Our personal voices and our songs and dances are very much constituting the deepest levels of our identities as social beings. The harmonising of these identities and common experiences are essential both to practical, romantic and moral transactions, as well as our sense of communion and wellbeing; so it is not so strange that it is residing in the highest and most integrated regions of the brain.

What is still a mystery, and definitely beyond the scope of this treatise, is what is going on at the micro level of the brain. The characteristic *superposition* of moments and feelings seems to be easiest to accomplish *within* the neurones. As was pointed out by William James and even Aristotle: 'what is united cannot be created by something that is divided.'⁷⁹ And it is a finding of quantum physics, that objects like cells or collections of cells are much too large to be in

⁷⁶ Emily S. Cross, Antonia F. de C. Hamilton, Scott T. Grafton, 'Building a motor simulation de novo: observation of dance by dancers', *Neuroimage*. Vol. 31, Issue 3 (1 July 2006): 1257-1267, <https://doi.org/10.1016/j.neuroimage.2006.01.033>.

Carina Freitas, Enrica Manzato, Alessandra Burini, Margot J. Taylor, Jason P. Lerch, and Evdokia Anagnostou, 'Neural correlates of Familiarity in Music listening: A Systematic Review and a Neuroimaging Meta-Analysis', *Frontiers in Neuroscience*, Vol. 12 (5 October 2018). <https://doi.org/10.3389/fnins.2018.00686>.

⁷⁷ Jörn-Henrik Jacobsen, Johannes Stelzer, Thomas Hans Fritz, Gael Chételat, Renaud La Joie, Robert Turner, 'Why musical memory can be preserved in advanced Alzheimer's disease'. *Brain*, Vol. 138, Issue 8 (August 2015): 2438-2450. <https://doi.org/10.1093/brain/awv135>.

⁷⁸ Wundt, *Grundzüge der Physiologischen Psychologie*, I. Band (Leipzig: Verlag von Wilhelm Engelmann, 1902), Chapter 6, Section 7c, 320-327.

⁷⁹ Aristotle, *De Anima (On the Soul)* [c. 350 BC]. Translated by Hugh Lawson-Tancred (London: Penguin Books, 1986), III.2. See also I.5

'superposition'. This superposition, which is described so well in the above citation of David Bohm, is more likely to occur 'within the monads', so to speak: at the quantum level within a neurone. Certainly, the largest neurones are provided with thousands of inputs through their dendrites and dendritic spines. With the help of the Thalamus, which is serving as a communication central in the middle of the brain, they are continuously updated by input from other brain regions, so it is obvious that some kind of integration is taking place here. The mystery is concerned more with its nature and exact location.

With all we know about the interior of brain cells, there is still no generally recognised candidates for this task. Some researchers, like Stuart Hameroff and Roger Penrose, are pointing to vibrations and entanglement in microtubules. Anirban Bandyopadhyay, who has verified aspects of this theory by measuring such vibrations, has also developed his own model of conscious integration, pointing to a system of 'resonance cavities' in the brain, stretching from neural regions and columns to the interior of neurones. Here the large scale vibrations are connected to the vibration of microtubule bundles and proteins, which are integrated by being nested into magnetic vortices, or so called 'time crystals', at the level of atoms and below. From a musical point of view, it is interesting to notice how Bandyopadhyay, in interviews and writings on these matters, is often describing these things by analogy with flutes, guitar strings, and musical compositions.⁸⁰ Yet there is little agreement up to now, about the accuracy of this research. So contentious are these issues, that it is easy to understand why more conservative researchers are repressing their minds from their brain so to speak.

The wireless electromagnetic communication of today's gadgets, radios, computers, mobile phones, and remote controls, is almost as mysterious as consciousness itself, filling all regions of space around us - even pure vacuum and interplanetary space - with seemingly infinite amounts of information. Similar mechanisms may be at work in our minds; yet we would hardly exist as such without a brain that is orchestrating its content.

⁸⁰ See for instance the introduction to Anirban Bandyopadhyay, *Nanobrain: The Making of an Artificial Brain from a Time Crystal* (Boca Ration: CRC Press, 2020).

Chapter 15

Conclusions and Implications

15.1 The temporal complexity of consciousness

Ego-dynamic processes are not only different from spatial structures and linguistic rules, their principles of organisation are diametrically opposed, and it would be fatal to confuse the one with the other. But how much of reality do these gestalts constitute, and what happens if they disappear? Does life carry on in a mechanistic fashion? Do atoms carry on in a 'frozen' condition. Or does everything vanish?

While quantum field theory tends to boil everything down to vacuum fluctuations, which are dynamic and temporal by nature, some materialists still do not recognise time as a real dimension; and phenomena like 'ego-dynamic gestalts' do not exist even in their wildest fantasy. So let us try to pursue this question a bit. Is dynamic gestalt formation a necessary component of all being, or are there cases where objects or behaviour might be conceived of in a purely spatial or mechanistic manner?

The conclusions and implications that will be detailed in the following paragraphs are wide-ranging. Indeed, they are pointing in the direction of a 'new' and radically expanded model of reality. The hierarchy of ego-dynamic gestalts may be more than a prerequisite for mind and consciousness, it may create the things of which it is conscious, in a manner that is stretching all the way from proto-conscious atoms and molecules to the sphere of social relations and cultures.

If we start by focussing on our sensory faculties, it is fairly obvious that temporal comprehension is a prerequisite for temporal experience. It is not possible to imagine how one could have an idea of movement without something moving. And the movement could not be reduced to an isolated point or a succession of isolated points. It has to incorporate a certain stretch of time, which stages are both distinct and interpenetrating, but never simultaneous. If they are simultaneous they are neither movements nor stages. Furthermore, the idea of someone forming an idea of something, or undergoing an experience, seems to require an active, attentive

subject, with a capability of synthesising its movements into gestalts, and an experience of this life even between its encounters with other things. Even ideas of spatial and atemporal objects depend on being contrasted with, and comprehended by, someone with a temporal existence. The philosopher Henri Bergson calls it 'duration'.

For our duration is not merely one instant replacing another; if it were, there would never be anything but the present - no prolonging of the past into the actual, no evolution, no concrete duration. Duration is the continuous progress of the past which gnaws into the future and which swells as it advances.¹

Bergson might be drawing on Wundt's 'law of the heterogony of ends' here; and even more so in his doctoral thesis *Time and Free Will*. Like Wundt he criticises the tendency to 'project time into space'; and the complexity and unpredictability of mental processing is taken as an indication of free will.² Nevertheless - and as pointed out in an afterword by Hans Kolstad's in the Norwegian translation - Bergson sometimes resorts to spatial thinking, giving several exceptions from this principle, as if temporality was not so important after all.³

A tendency towards such a relapse was present even in the earlier quoted passage by Wundt, speaking of 'time having past' as a row of letters. But Bergson goes even further in this direction. On several occasions he speaks of a 'simultaneous before and after', which is a self-contradiction or paradox at best.⁴ Furthermore his idea of 'duration' seems to be limited here to some special moments of high awareness, whereas past, trivial, routine, or 'not free' activity, could be imagined in a spatial manner. He even believes that language and words involves a spatial 'splitting up' and 'freezing' of reality.⁵ But is this correct? And how is it possible to be conscious at all if ones awareness is limited to an isolated point in time?

From a phenomenological point of view it is difficult to see how it is possible to talk of any kind of behaviour or development without a sense of temporality. We could not possibly grasp the idea of doing or moving if time stood still. And it would not matter whether the concepts

¹ Henri Bergson, *Creative Evolution*, authorised translation by Arthur Mitchell (Mineola, New York: Dover Publications, 1998), 4.

² Henri Bergson, *Tiden og den frie vilje: En undersøkelse av de umiddelbare indre kjensgjerninger*, translated into Norwegian by Hans Kolstad (Oslo: Aschehoug & Co., 1990), 128 and 135.

³ Bergson, *Tiden og den frie vilje*, 261 and 284.

⁴ Bergson, *Tiden og den frie vilje*, 80.

⁵ Bergson, *Tiden og den frie vilje*, 147, 163, and 169-170.

referred to the past or the future. On the contrary, the idea of something *past* is temporal at its core, and implicitly opposed to the present and the future. The idea of something lying to the left or right could not serve even as a symbol of this if the idea of something *having passed*, or moving into the past, was not added to it. There would be nothing there to distinguish it from a static image.

Yet the perception of movement is only the start of temporal comprehension. As earlier argued, the conception of all acts, thoughts, emotions, and investigations, inevitably incorporate behaviour and temporality. Even the perception of spatial objects and scenes is impossible without the movement of the gaze, the frenetic saccades of the eyeballs, the stream of neural impulses, the cerebral comparisons and calculations, and the incremental nesting of perceptual hierarchies in the brain.

It is a problem that these movements, and the temporality of conscious acts, is often taken for granted, or played out so quickly that it is difficult to pinpoint by an introspective glance. It may require some heightened meta-cognitive abilities to grasp them and to imagine a situation where they are absent. The concepts of 'sensory memory' and 'echoic memory' in perception are pretty established, but not more so than they are sometimes confused with working memory.⁶ Yet it is obvious that some kind of temporal 'loops' would have to be engaged in the formation and activation of auditory and temporal percepts, which, in reality, would have to include all percepts with duration. Certainly there are loops and recursiveness already at the quantum level, but in auditory perception we are dealing with higher levels of temporal nesting, like the level of gamma waves, when the pulses are turning into buzz and tone.

It is not wrong, what Bergson indicates, that even spatial imagery is involved in temporal experience and concept formation, if only as an aid or background. The hippocampus, but also associated structures like the entorhinal cortex, the precuneus, the posterior cingulate cortex, and the parietal cortex, are involved both in spatial navigation, episodic memory, and the 'somatic marking' of memories. It is relatively clear that even memories are catalogued according to some kind of spatial maps.⁷ Many times we do this consciously as well. Calendars, schedules, musical

⁶ Michael A. Nees, 'Have We Forgotten Auditory Sensory Memory? Retention Intervals in Studies of Nonverbal Auditory Working Memory', *Frontiers in Psychology*, Vol. 7, Article 1892 (2 December, 2016), <https://doi.org/10.3389/fpsyg.2016.01892>.

⁷ Neil Burgess, Eleanor A. Maguire, John O'Keefe, 'The Human Hippocampus and Spatial and Episodic Memory', *Neuron*, Vol. 35, Issue 4: 625-641 (15 August 2002), [https://doi.org/10.1016/S0896-6273\(02\)00830-9](https://doi.org/10.1016/S0896-6273(02)00830-9).

set-lists, scores, scales, fingering; they are all examples of such mnemonic aids. Attentively or inattentively we are reading symbolic meanings into spatial images: ideas of timelines, or compartments to visit or leave. Yet the visual representations are not temporal in themselves. Temporality is not the dominant feature of paper; nor is it a universal law that the start of a text should be located to the top left corner.

As is demonstrated by Heisenberg's uncertainty principle, by relativity theory, and by Zeno's paradoxes, the dimensions of space and time are interpenetrating, but also ontologically distinct. Specify momentum and time, and the location becomes blurry, or vice versa. Quantum physicists even speak of 'nonlocality': places and stages beyond places and stages, before the dimensions of time and space are even nested into existence. This pre-temporal and pre-spatial transcendence might even be a precondition for the comprehension of past and present, but these are paradoxes or antinomies which have to be recognised as such. They are not resolvable.

The part of the brain where much of this duration and sequential information is added is the *temporal cortex*. It creates aspects of the temporal stream that is a prerequisite for experience; but there is little evidence that it is sufficient for consciousness. Without the attentional focus and the comprehension of actions and interactions, of which the frontal cortex is providing a whole hierarchy of nested levels, the animal might still be unconscious, or in a vegetative state. To put it another way: subjective experience might not be possible without a subject. On the other hand, there is plenty of evidence that sensory regions of the brain may be active without such awareness, like in various experiments suppressing or masking sensory stimuli.⁸

The temporal pole (BA 38) is more complex and multimodal than more posterior parts of the temporal cortex, and it has often been mentioned in connection with concept formation and social experience. According to Kyle Simmons and Alex Martin, it is central to the naming of familiar people and other 'specific' multimodal experiences. But there is little evidence that it is sufficient for more abstract and general concepts.⁹

⁸ See for instance Bruno G. Breitmeyer, 'Psychophysical "blinding" methods reveal a functional hierarchy of unconscious visual processing', *Consciousness and Cognition*, Vol. 35: 234-250 (September 2015).

⁹ W. Kyle Simmons and Alex Martin, 'The anterior temporal lobes and the functional architecture of semantic memory', *Journal of the International Neuropsychological Society*, Vol. 15, Issue 5: 645-649 (September 2009). <https://doi.org/10.1017/S1355617709990348>.

Matthias Michel, who has analysed much of the research literature on conscious experience and the prefrontal cortex, is pointing to the circumstance that conscious perception occurs late, about 300 milliseconds after the stimulus, when the prefrontal cortex has also been engaged; which is indicating that prefrontal activity might be a necessary ingredient of conscious perception. Similar evidence is produced by studies of visual neglect after prefrontal lesions, and unconsciousness after anaesthetics targeting the prefrontal cortex while sparing sensory and subcortical structures.¹⁰ This we will come back to below. Michel also points to research implicating 'fast recurrent processing through the ventrolateral prefrontal cortex as critical to producing behaviourally sufficient object representations in inferior temporal cortex'.¹¹

To further elucidate these matters, both philosophical reflection and more evidence from neuroscience is needed. First of all, one has to distinguish between necessary and sufficient correlates, or to put it another way: between the sensory raw material on the one hand, and on the other hand: the end products of conscious experience, which in the case of behavioural and conceptual comprehension is not limited to simplistic streams of sensory information. It is a perspective that is often missing in reductionist research, like the earlier mentioned music research that is focussing narrowly on the temporal cortex.

Another source of confusion is the semantic ambiguity between 'meaning' in the sense of semantic representation, and 'meaning' in the sense of percepts and ideas. As exemplified by the frequent association of conceptual memory with so called 'semantic memory' and 'semantic dementia', the tendency to confuse these things is common. If the signifier is identified with the signified even before the research has started, and the researchers are not even able to speak about a difference, there is little chance of any advance.

This was not originally the situation. Karl Wernicke, a pioneer in neurolinguistic research in the nineteenth century, was adamant that lesions in certain regions of the left temporal cortex (Brodmann area 22) were only removing the storehouse of word sounds [Wortklänge] or 'sound images' [Klangbilder]. The ideas and the understanding was not destroyed in these patients. He even argued that thinking and speaking are independent processes that might be 'mutually

¹⁰ Matthias Michel, 'Conscious Perception and the Prefrontal Cortex: A Review', *Journal of Consciousness Studies*, Vol. 29 (7-8): 115-157 (2022), 5-6, 11-12, 18, 22. <https://philpapers.org/archive/MICCPA-6.pdf>.

¹¹ Kohitij Kar and James J. DiCarlo, 'Fast Recurrent Processing via Ventrolateral Prefrontal Cortex Is Needed by the Primate Ventral Stream for Robust Core Visual Object Recognition', *Neuron*, Vol. 109, Issue 1: 164-176 (6 January 2021), 164, <https://doi.org/10.1016/j.neuron.2020.09.035>.

constrictive' in some cases.¹² The aphasic patients behaved normally, they just could not comprehend and use words. If the 'sound images' are missing, the link between words and concepts are also missing, argued Wernicke. And even though more automated links may be provided by other parts of the brain, the patient is unable to monitor and inspect the labelling process, that is to say: the very difference between signifier and signified. Indeed, this might be the reason why the patients suffering from Wernicke's aphasia are often unconscious of, and unable to correct, their own gibberish.

The details of how words and concepts are connected are still unclear, but the picture sketched out by Wernicke about 150 years ago is corroborated by contemporary researchers like Evelina Fedorenko and Rosemary Varley, reviewing evidence from fMRI and lesion studies. According to Fedorenko and Varley, there is a set of specialised language regions in the left hemisphere that 'selectively support linguistic processing'. These regions are primarily concerned with linguistic symbolisation, not with thought or conceptualisation per se. Even in cases of global aphasia, where parts of the left temporal cortex and the Broca's area are missing, 'these individuals are nonetheless able to add and subtract, solve logic problems, think about another person's thoughts, appreciate music, and successfully navigate their environments.' Others are not so sure; but according to Fedorenko and Varley, some deviant findings could be explained by 'the close proximity of language regions to domain-general cognitive control regions'.¹³

It seems to be widely recognised by now, that the correlates of concept formation and conceptual memory are not limited to language areas but distributed across the entire brain;¹⁴ possibly, as we will come back to below, with the 'multimodal' and conceptualising integrations, putting things into perspective, being located to the default mode network, of which the prefrontal cortex is the main constituent.¹⁵

¹² Carl Wernicke, *Der Aphasische Symptomencomplex*, (Breslau 1874), 22-23, 33. In Deutsches Textarchiv, https://www.deutschestextarchiv.de/wernicke_symptomencomplex_1874/6.

¹³ Evelina Fedorenko and Rosemary Varley, 'Language and thought are not the same thing: evidence from neuroimaging and neurological patients,' *Annals of the New York Academy of Sciences*, 1369(1) (April 2016): 1 and 6-7, <https://doi.org/10.1111/nyas.13046>.

¹⁴ Jeffrey R. Binder and Rutvik H. Desai, 'The Neurobiology of Semantic Memory', *Trends in Cognitive Sciences*, Vol. 15, Issue 11: 527-536 (November 2011), <https://doi.org/10.1016/j.tics.2011.10.001>.

¹⁵ Jiaqing Tong, Jeffrey R. Binder, Colin Humphries, et al, 'A Distributed Network for Multimodal Experiential Representation of Concepts', *Journal of Neuroscience*, Vol. 42, Issue 37: 7121-7130 (14 September 2022), <https://doi.org/10.1523/JNEUROSCI.1243-21.2022>.

When it comes to areas of the temporal and parietal cortices outside the 'language areas', there is no doubt that they are supplying complex raw material for conscious percepts. Even when Wernicke's main focus was on language, he did recognise that other parts of the temporal cortex provide constituents of actual experience, which might also be destroyed if these areas are damaged; but this, he says, is a damage of 'intelligence', not of language. He might even have considered these correlates to be sufficient for meaning and concept formation to some extent. As for lesions in the prefrontal 'Broca's area', they are mentioned here in connection with what he calls 'images of speech movement' [zerstörung der Sprachbewegungsbilder].¹⁶

At least there are researchers, even today, who think that the temporal or parietal cortices may be more central to consciousness than the prefrontal cortex. These are the 'localists', as Matthias Michel puts it, defending a feedforward conception of perception, or the idea of more local networks, which might be detached from the behavioural and conceptual hierarchies constructed in the prefrontal cortex. At the other end of the spectrum are the 'prefrontalists', who are arguing for the engagement of the prefrontal cortex even in elementary perception. As a matter of fact, the debate between these camps has already been a going for a while.

The most well known alternative to 'localism' is the so called 'global workspace theory of consciousness'. According to Bernard Baars, consciousness is never limited to local regions in the brain, it engages the whole brain as a 'unified oscillatory machine'. The corticothalamic loops are central to this dynamic, as they support a bidirectional binding, ignition, and broadcasting of information. As formulated by George A. Mashour and colleagues, this 'ignition' is associated with recurrent processing, which is 'amplifying and sustaining' certain neural representations, which can be globally accessed by 'local processors' in the cortical layers II, III, and V of large pyramidal neurones.¹⁷

The prefrontal activity is hypothesised by Baars to constitute a third wave or ignition, producing a 'feeling of knowing'; and as an evidence of its involvement, even in visual perception, Baars is pointing to several studies of the frontal eye field, which demonstrates how single units in the frontal eye field are engaged already in relatively early stages of visual

¹⁶ Wernicke, *Der Aphasische Symptomencomplex*, 22, 29.

¹⁷ George A. Mashour, Pieter Roelfsema, Jean-Pierre Changeux, Stanislas Dehaene, 'Conscious Processing and the Global Neuronal Workspace Hypothesis', *Neuron*, Vol. 105, Issue 5: 776-798 (4 March 2020), see Figure 1B, <https://doi.org/10.1016/j.neuron.2020.01.026>.

processing, 50-60 milliseconds post stimulus, while visual consciousness emerges first after 300 milliseconds.¹⁸

The understanding of the components of selfhood that might go into the mentioned 'feeling of knowing' may not be high in mainstream versions of the global workspace theory, although Baars himself is critical of 'overly narrow definitions' of consciousness, ignoring 'feelings of effort, interoceptive emotional feelings, conscious beliefs and ideas, endogenous visual imagery, and inner speech'. This brings him closer to the so called 'higher level' theories of consciousness, which are arguing for a necessary engagement of the self in consciousness.

Proponents of the 'higher level theory of consciousness' are Richard Brown, Hakwan Lau, and Joseph E. LeDoux; and in an article intending to distinguish their theory from the global workspace theory, they claim that 'conscious experiences entail some kind of minimal *inner awareness* of ones ongoing mental functioning'; a 'monitoring' or 'meta-representation by a relevant higher-order representation', or, in LeDoux' version of this theory: a 'multi-state hierarchical model of subjective self-awareness'.¹⁹ This awareness of mental functioning, says Brown and colleagues, is what distinguishes it from the 'global workspace theory', which is merely stressing the engagement of the whole brain in conscious experience, most notably the fronto-parietal and corticothalamic networks.

The 'higher level theory of consciousness' is obviously similar to the hierarchy of ego-dynamic gestalts that has been expounded in this treatise, except that the latter does not require a particularly high or human level of consciousness. It applies to all levels. A certain level only has to be one step higher than the level it is monitoring to advance to a new level of consciousness. While an expansive cortico-parietal-striatal-thalamic network may be essential to the nesting of ego-dynamic gestalts in humans, simpler creatures may have similar networks that are smaller, but still containing the same loops between the components of self-other and feed-forward prediction versus feedback sensation, all of which is going into a transactional and 'autonoetic' model of cognition. According to Colin A. Lee and colleagues, 'all the major circuit modules of action choice, translating that choice into motor commands, and motor pattern-generation found

¹⁸ Bernard J. Baars, Natalie Geld, and Robert Kozma, 'Global Workspace Theory (GWT) and Prefrontal Cortex: Recent Developments', *Frontiers in Psychology*, Vol. 12 (10 November 2021), Figure 1., <https://doi.org/10.3389/fpsyg.2021.749868>.

¹⁹ Richard Brown, Hakwan Lau, Joseph E. LeDoux, 'Understanding the higher-order Approach to Consciousness', *Trends in Cognitive Sciences*, Vol. 23, Issue 9 (30 July 2019): Table 1, <https://doi.org/10.1016/j.tics.2019.06.009>.

in the nervous systems of complex animals are also identifiable in the simple soft-bodied sea slugs'.²⁰

This is not to say that the human cortex does not contain important add-ons to this system. It certainly does. It is a hierarchy, which seems almost infinitely more complex than the 'monitoring of first order states' that Brown and colleagues sometimes speak about. Such a 'first order state' may not exist even in molecules and atoms. And when investigating lesions in this hierarchy it is impossible to start with basic brain structures, as they would collapse the whole building of which it is a foundation. Cutting the neck of a person might prove that consciousness depends on the neck, but it does not explain much about how consciousness works. A similar foundational role is obviously constituted by the thalamus and the reticular formation, but this is not to say that the thalamus is sufficient for everything we associate with consciousness. By proceeding in a top down manner, on the other hand, prefrontal lesions may not remove all aspects of consciousness immediately, but it is possible to demonstrate how layers of conscious understanding are gradually disappearing while approaching a vegetative or minimally conscious condition.

In other words, it may not always be a question of suddenly becoming conscious or unconscious, but different levels of consciousness, which are also instantiating different definitions of what consciousness entails, all of which have to be thoroughly discussed to be of any scientific use. It is first when all attention and volition, that is to say, all 'action-perception cycles' are destroyed that one might speculate whether consciousness is abolished.²¹ Networks with some frontoparietal components may be required to retain at least a minimum of consciousness or responsiveness, but it is unclear which is most essential. According to Athena Demertzi and colleagues, the activation of the so called 'auditory network' might have the greatest capacity to discriminate between 'unresponsive' and minimally conscious states.²² But even this would obviously depend on how consciousness is defined, and what kind of 'responsiveness' is measured in different studies. In any case, it is not the *only* active network.

²⁰ Colin A. Lee, Jeffrey W. Brown and Rhanor Gillette, 'Coordination of Locomotion by Serotonergic Neurons in the Predatory Gastropod *Pleurobranchaea californica*' *Journal of Neuroscience*, Vol. 43, Issue 20: 3647-3657 (17 May 2023), <https://doi.org/10.1523/JNEUROSCI.1386-22.2023>.

²¹ Hans Liljenström, 'Consciousness, decision making, and volition: freedom beyond chance and necessity', *Theory in Biosciences*, Vol. 141: 125-140 (June 2022), <https://doi.org/10.1007/s12064-021-00346-6>.

²² Athena Demertzi, Georgios Antonopoulos, Lizette Heine, Henning U. Voss, et al, 'Intrinsic functional connectivity differentiates minimally conscious from unresponsive patients', *Brain*, Volume 138, Issue 9: 2619-263 (27 June 2015), Abstract and Discussion parts, <https://doi.org/10.1093/brain/awv169>.

If by consciousness one means the post-conventional ability to think independently and systematically - like the Hegelian reduction of dogmatism and nihilism to a false dilemma: a failure to comprehend the pluralistic, changeable, yet categorial character of reality - it was indicated already in Chapter 11 how a removal of the metacognitive faculties located to the rostral and dorsolateral areas of the prefrontal cortex would remove this ability, together with more practical abilities like long range planing, self-reflection, and postponement of immediate satisfaction for the sake of future rewards.²³

If the rostral regions of the inferior frontal gyrus, like pars orbitalis, are damaged, complex narratives containing irony, reversal, and revaluation, might be gone.²⁴ And if with consciousness one means the ability to even experience and adhere to moral values and ideals, like the ones that are associated with Freud's concept of the 'superego', this would very much be lost if the 'somatic marking' of conceptions in the medial and orbitofrontal prefrontal cortex was missing. The sense of shamefulness in shame and the sense of passion in com-passion would hardly be there.

If by consciousness one means the post-compulsive ability to understand people, by monitoring interactions, attitudes, and social relations - enabling cooperation and communication, for the sake of avoiding more direct and violent encounters - a more fundamental level of temporal consciousness is enabled by the pars opercularis and pars triangularis (BA 44 and 45). If the ability to combine into higher level gestalts the action patterns and attitudes of oneself and others is gone, it is not only the ability to understand the social emotions that is gone, the very existence of these emotions and relations is obliterated.²⁵ So are other aspects of behaviour, like the ability to organise melodic phrases, cadences, prosody, linguistic syntax and symbolism, techniques and procedures. The very ability to monitor and plan a line of reasoning is gone, so the subject is not even able to reflect on what it is missing. Most of the prefrontal lesions discussed in chapter 11.4 were unilateral, and one can only

²³ See for instance Sara M. Szczepanski and Robert T. Knight, 'Insights into Human Behavior from Lesions to the Prefrontal Cortex', *Neuron*, Vol. 83, Issue 5: 1002-1018 (3. September 2014). <https://doi.org/10.1016/j.neuron.2014.08.011>.

²⁴ See for instance Andrea Marini, 'Characteristics of Narrative Discourse Processing after Damage to the Right Hemisphere', *Seminars in speech and language*, Vol. 33, Issue 1 (February 2012): 68-78, <https://doi.org/10.1055/s-0031-1301164>.

²⁵ Simone G. Shamay-Tsoory, Judith Aharon-Peretz, Daniella Perry, 'Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions', *Brain*, Vol. 132, Issue 3 (March 2009):617-627, <https://doi.org/10.1093/brain/awn279>.

imagine what would happen if both sides were damaged. It is probably one of the reasons why we have two hemispheres in the first place.

But there are also more elementary levels. If by consciousness one means the post-vegetative ability to monitor simple actions and gain at least a rudimentary sense of agency and interaction, the premotor areas (BA6), and structures like the anterior cingulate cortex and the frontal eye field (BA8) also seem to be needed. There is probably little left of willing, seeing, and looking if even these structures are gone. A study by Cameron P. Casey and colleagues, for instance, is very specific in that it considers the anterior and posterior cingulate cortices to be 'critical' for consciousness.²⁶

And if by conscious existence one means mere wakefulness without any grasp of what is going on, one might speculate whether the organism might still be conscious in some blurry and passive sense, like a plant. The concept of a 'vegetative state' is good, and there is still the possibility that more posterior or subcortical regions may be sufficient for this, even in the absence of a prefrontal cortex. If so, the importance of the prefrontal cortex would be limited to all the 'richer' aspects of consciousness. The mentioned article by Matthias Michel, however, pointing to the disruption of fronto-parietal communication by ketamine or sevoflurane, leaves little hope of such remnants.²⁷ Even what he calls 'thin' properties of experience might be abolished then. One might speculate whether subcortical areas or even single body cells might have a primitive feeling and agency of their own, like a plant or worm. But this might not be part of 'our' consciousness, which has come to depend on the large cortico-striatal-thalamic loops.

If by consciousness one means the ability to perceive at least some simple objects, it is difficult to see that this is possible without at least a remnant of attention and agency in structures like the premotor and the anterior and posterior cingulate cortices. If the behavioural comprehension of hammering is removed from the idea of a hammer, there simply is no hammer; and most of the objects surrounding us have such a function.²⁸ The perception of stones and other impediments in our surroundings would probably lose their meaning if the experience

²⁶ Cameron P. Casey, Sean Tanabe, Sahra Farahbakhsh, Margaret Parker et al., 'EEG signatures differentiate unconsciousness and disconnection during anaesthesia and sleep', *British Journal of Anaesthesia*, Vol. 128, Issue 6: 1006-1018 (June 2022), <https://doi.org/10.1016/j.bja.2022.01.010>.

²⁷ Michel, 'Conscious Perception and the Prefrontal Cortex: A Review', 18-19.

²⁸ Elisa Scerrati, Christina Iani, and Sandro Rbichi, 'Does the Activation of Motor Information Affect Semantic Processing?', In Bechberger, L., K., Kühnberger and. Liu eds. *Concepts in Action. Language, Cognition, and Mind*, vol. 9, 153-166 (Cham: Springer, 2021), https://doi.org/10.1007/978-3-030-69823-2_7.

of tactile texture, resistance, effort, and weight was removed from them. Even primitive sea slugs might have an experience of such things. It is a foundation for the self-other distinction and the motivation to deal with impediments and threats in ones surroundings.

This does not necessarily exclude the existence of sensory primitives, but even these are products of emotionally driven interaction. The characteristic warmth or coolness of colours has already motivational value and valence it seems, which is produced by the transactions between sentient organisms, that is to say: between plants and animals that are drawn to or shunning certain colours. The colours are not merely streaming into our brains from inanimate nature.

While many definitions of consciousness are clarified by subtracting frontal regions, it is difficult to proceed any further in this manner. There are few cases where the whole prefrontal cortex is missing; and as pointed out by Matthias Michell, such lesions might even be lethal. Such patients would hardly be able to participate in any kind of experiment.²⁹ Perhaps lesions to the anterior cingulate cortex and other basic prefrontal structures, with symptoms like 'transient akinetic mutism', might serve as examples, but the functional plasticity of the cortex is considerable, so other methods must also be considered.

A study by Jia-Quing Tong, Jeffrey Binder, and colleagues may not address all these questions, but it highlights the role of the prefrontal cortex in concept formation. By performing a 'representational similarity analysis' of large fMRI datasets, they were able to locate a set of 'multimodal regions' for conceptual processing in the brain. Contrary to common beliefs, it was the whole *default mode network* - including the superior and inferior frontal gyrus, the orbitofrontal cortex, as well as parts of the temporal cortex, the angular gyrus, and the precuneus - which showed up as such regions. According to Tong and colleagues, 'several functional connectivity studies indicate that these areas function as hubs, or convergence zones, for the multimodal integration of sensory-motor information'.³⁰

It is intriguing that *the inferior frontal gyrus*, which has earlier been identified with ego-dynamic gestalt formation, is featuring so prominently in their diagrams. The mentioned posterior regions, and the precuneus in particular, may seem detached from the executive

²⁹ Matthias Michel, 'Conscious Perception and the Prefrontal Cortex: A Review', 22.

³⁰ Jiaqing Tong, Jeffrey R. Binder, Colin Humphries, Stephen Mazurchuk et al., 'A Distributed Network for Multimodal Experiential Representation of Concepts', *Journal of Neuroscience*, Vol. 42, Issue 37: 7121-7130 (14 September 2022), see Figure 6 and Discussion, <https://doi.org/10.1523/JNEUROSCI.1243-21.2022>.

operations of the prefrontal cortex; but the cingulum bundle connects it with the rest of the cingulate gyrus, and it has already been suggested that it might be a correlate of external or bodily attention. A recent study by Dian Lyu and colleagues might be shedding light on this, contrasting the idea of a 'narrative self' in the prefrontal cortex with the idea of a 'bodily self' which they think could be located to the anterior precuneus.³¹

A problem with some of Tong and Binder's studies is the confusion of concepts with words like 'word', 'representation', and 'semantics'. While words are *referring* to concepts, the experimental use of words to localise concepts would also activate the language networks in the left temporoparietal and frontal cortex, parts of which may be more concerned with sound processing and syntax than with concepts per se. Thus it might give a false picture of the neural correlates of concepts. Possibly the picture is different in the right hemisphere, which is less obscured by linguistic processing; and sure enough, their Figure 6 is indicating that in the right hemisphere the inferior frontal gyrus is reigning supreme, with some activity in the parietal angular gyrus.

Also, these diagrams, purporting to highlight the 'multimodal' aspects of conceptual processing, do not distinguish between regions that are merely *multi-sensory* and regions that are dealing with the actual nesting of conceptual hierarchies. However, in the discussion part of their article, they are opening up for such a differentiation by ascribing a control function to the prefrontal cortex. More precisely they propose that 'the information represented in these prefrontal regions reflects their entrainment to experiential representations stored primarily in temporoparietal cortex, providing context-dependent control over their level of activation'.

In a video put on YouTube by the 'Organization for Human Brain Mapping', Jeffrey Binder goes even further in his characterisation of the default mode network. 'In my lab', he says, 'we don't call this network the default mode network, we call it the 'conceptual network'. It is where 'conceptual processing' takes place.³² He also points to the coincidence of this network with capacities for 'planning', 'self-processing', and 'social processing', but he does not go into the reasons for this coincidence, or why they do not consider these other functions to be equally essential. Anyway, the picture given by Tong, Binder, and colleagues seems to support the

³¹ Dian Lyu, James Robert Stieger, Cindy Xin et al., 'Causal evidence for the processing of bodily self in the anterior precuneus', *Neuron* (8 June 2023), <https://doi.org/10.1016/j.neuron.2023.05.013>.

³² Jeffrey Binder, 'OHBM Neurosalience S3E10: Jeff Binder - A neurologist pushing the limits of fMRI', YouTube video by Organization for Human Brain Mapping (2022), 41:00.

transactional and 'autoeotic' model of cognition, where the outer and the self-other dichotomy is constructed by an active and exploratory self.

In an article from 2016, Jeffrey Binder is sketching out a 'componential' analysis of conceptual content that also incorporates some sensorimotor and hierarchical aspects.³³ But, as suggested in this treatise, a more integrative understanding is emerging first by taking into account the action-chunking hierarchy discovered by Etienne Koechlin, and the circumstance that behaviour and thought have also a kinaesthetic or melodic substrate. As previously demonstrated: the hierarchy of behavioural gestalts is also a conceptual hierarchy, which is simultaneously determining the complexity of external transactions and the complexity of personal autonomy. Thinking is allowing for planning and conceptual understanding, but it is also a personal and emotional narrative, which movement has always a melodic or kinaesthetic core.

Another way of investigating the contributions of the prefrontal cortex are studies of anaesthesia. Especially some studies of George A. Mashour, a main proponent of the global workspace theory, are pointing in the direction of a necessary role for the prefrontal cortex. In an article from 2017 he is referring to several studies showing a functional breakdown in frontal-parietal connectivity in anaesthetic-induced unconsciousness. Especially the effect of ketamine is remarkable since it is *only* the cortical connectivity that is suppressed by this anaesthetic. The wake-promoting mechanisms in the thalamus are intact or even enhanced in this case. The anaesthetic effect is described as a 'top-down' degrading or disorganisation of 'the contents of consciousness', which is in contrast to more 'bottom-up' anaesthetic mechanisms, targeting subcortical structures and the level of arousal and wakefulness. The most effective anaesthetics, like propofol, have a dual effect.³⁴

In an article from 2022, Mashour and colleagues go further in this direction, and connects even the level of arousal and wakefulness with prefrontal activity. More precisely, the process of recovery of consciousness after sleep or anaesthesia is thought to be speeded up or even 'choreographed' by the medial prefrontal cortex, which is known to engage in recurrent networks

³³ Jeffrey R. Binder, Lisa L. Conant, Colin J. Humphries, et al, 'Toward a brain-based componential semantic representation', *Cognitive Neuropsychology*, Vol. 33, Nos. 3-4: 130-174 (2016), <http://dx.doi.org/10.1080/02643294.2016.1147426>.

³⁴ George A Mashour and Anthony G. Hudetz, 'Bottom-Up and Top-Down Mechanisms of General Anesthetics Modulate Different Dimensions of consciousness', *Frontiers in Neural Circuits*, Vol. 11, Article 44 (20 June 2017). <https://doi.org/10.3389/fncir.2017.00044>.

with subcortical structures like the serotonergic dorsal raphe, the noradrenergic locus coeruleus, the cholinergic system of the basal forebrain, and the dopaminergic ventral tegmental area.³⁵ They are pointing to studies of cholinergic stimulation of the medial prefrontal cortex in rodents, reversing the state of anaesthesia and promoting wakefulness during seep-wake cycles. A similar effect was not observed after the stimulation of medial-parietal association areas, which, by competing theories, is thought to be more central to consciousness.³⁶ Conversely, the inactivation of the medial prefrontal cortex of rats by tetrodotoxin has been found to delay the recovery of wakefulness, which was not observed after a similar inactivation of parietal areas;³⁷ all of which might indicate that the medial prefrontal cortex is more crucial to these aspects of consciousness.

Mashour and colleagues even indicate a reason for the centrality of the prefrontal cortex. It is of outmost importance to the survival of an animal that it gains rapid control over arousal after sleep. Rapid categorisation of threatening versus non-threatening situations might be required, as well as the activation of behavioural action plans and their execution. Mashour's own experiments on humans are indicating that examples of 'abstract matching', mediated by the dorsolateral prefrontal cortex, were among the first capabilities to recover after anaesthesia.³⁸ The person is understandably groping for control and protection in such cases, and the prefrontal cortex may be central to the integration and 'choreography' both of content and arousal.

An argument often put forward by localist or bottom up theorists, is that in some experiments the prefrontal activity is merely a 'post-perceptual processes', concerned more with the business of 'reporting' than with actual perception. The argument is pertinent, and sometimes valid; but, as pointed out by Matthias Michel, it might also be a pseudo problem, in experiments where both the states of oblivion and the states of awareness are reported. Then, he says, the increase in

³⁵ George A. Mashour, Dinesh Pal, Emery N. Brown, 'Prefrontal cortex as a key node in arousal circuitry', *Trends in Neurosciences*, Vol. 45, Issue 10: 722-732 (October 2022), Figure 1, <https://doi.org/10.1016/j.tins.2022.07.002>.

³⁶ See for instance Dinesh Pal, Jon G. Dean, Tiecheng Liu et al., 'Differential Role of Prefrontal and Parietal Cortices in Controlling Level of Consciousness', *Current Biology*, Vol. 28: 2145-2152 (9 July 2018), <https://doi.org/10.1016/j.cub.2018.05.025>.

³⁷ Emma R. Huels, Trent Groenhout, Christopher W. Fields, Tiecheng Liu, George A. Mashour, Dinesh Pal, 'Inactivation of Prefrontal Cortex Delays Emergence From Sevoflurane Anesthesia', *Frontiers in systems Neuroscience*, Vol. 15 (9 July 2021). <https://doi.org/10.3389/fnsys.2021.690717>.

³⁸ George Mashour, Ben J. A. Palanca, Mathias Basner, Duan Li et al., 'Recovery of consciousness and cognition after general anesthesia in humans', *eLife*, 10:e59525 (May 2021), <https://doi.org/10.7554/eLife.59525>.

prefrontal activity should be found in the unconscious condition too; but it is not.³⁹ To try to circumvent such issues, however, researchers have been seeking to construct so called no-report paradigms, as well as situations where changes in conscious perception are unlikely to be generated by bottom up changes in visual stimulation. So called 'binocular rivalry' might be an example of this. Here conscious perception is vacillating between differently moving images presented to each eye. The stimulus is constant, and it is not clear what happens in the brain when the perception is switching.

Normally such studies require reports from subjects about the perceptual change, but Vishal Kapoor and colleagues claimed to be able to circumvent this by measuring the so called optokinetic nystagmus reflex of the eye, which is known to correlate with the perception of opposing movement. At the same time they were probing, with multi-electrode arrays, the activity in the ventrolateral prefrontal cortex of macaque monkeys.⁴⁰ The ventrolateral prefrontal cortex has earlier been connected with vocalisation, executive functioning, and behavioural comprehension in general; and the circumstance that in this experiment it was activated even during internally generated changes in the perception of visual movement might be seen to confirm the transactional conception of perception that will be further elaborated in the next section of this treatise. The individual is not a passive recipient of impressions from outside. The executive areas of the brain are actively engaged in the conceptualisation and understanding of what is going on.

Similar findings have been presented by Veith Weilhamer and colleagues. TMS induced 'virtual lesions' in the inferior frontal cortex of humans reduced the frequency of changes during bistable perception - switching between left- or rightward rotation - making the researchers conclude that the inferior frontal cortex actively contributes to the resolution of perceptual ambiguities.⁴¹

This evidence, demonstrating prefrontal engagement even at artificially simplified levels of perception, may not be exhaustive; yet it is astonishing, given that the picture of what the

³⁹ Michel, 'Conscious Perception and the Prefrontal Cortex: A Review', 12.

⁴⁰ Vishal Kapoor, Abhilash Dwarakanath, Shervin Safavi, Joachim Werner et al., 'Decoding internally generated transitions of conscious contents in the prefrontal cortex without subjective reports', *Nature Communications*, Vol. 13, Article 11535 (22 March 2022): Figure 1, <https://doi.org/10.1038/s41467-022-28897-2>.

⁴¹ Veith Weilhamer, Merve Fritsch et al, 'An active role of inferior frontal cortex in conscious experience', *Current Biology*, Vol. 31: 2868-2880 (12 July 2021): 2868, <https://doi.org/10.1016/j.cub.2021.04.043>.

prefrontal cortex is doing is still underdeveloped. Even some higher level theorists are talking mostly about 'monitoring' and 're-representation', as if the self and the social world, with all the objects and gadgets that are already loaded with personal, social, and instrumental meanings, played only an insignificant or illusory role in our perceptual reality.

It is precisely this content that is expounded in this treatise, as a hierarchy of temporal and ego-dynamic gestalts; and there is much to show that it plays a much more central role than is hitherto believed. The self, as integrated in the prefrontal cortex, is not reducible to the 'control', 'monitoring', or 're-representation' of primordial 'first order' matters streaming into the brain. Such 'first order' matters might not even exist. Something and its other is always created by a transaction, generating both the protagonist and its antagonist. And in the life of a protagonist, even the simplest of impediments, like stone or water, are connected with sensorimotor and holistic properties.

Even at fundamental levels of existence this might be the case. The fundamental particles are not merely monitoring each other; their magnetic and vibrational transactions are constituting subordinate functions of a new and larger gestalt: the integrated whole of an atom. The atoms are not merely monitoring each other; they are enacting the different spatial and vibratory functions of molecules. The molecules are not merely registering each other; they are enacting different functions in the factory of a cell. The cells are not merely monitoring other cells; they are cooperating to constitute the body parts and movements of multi-cellular organisms. The monitoring of other organisms is not a mere monitoring; it opens up for behavioural attitudes, social emotions, and roles. Similarly, the monitoring of roles and emotions opens up for social institutions, dramas, and histories. The monitoring of histories is not a mere registering of sequences of events; it opens up for reflections, religions, philosophies, techniques, strategies, and scientific theories; all of which are real, although they are often wrong.

The amount of cooperation, integration, and energy that is required for something to exist and reach a higher level of consciousness is not explained by reductionism. The idea of tiny balls bumping into each other may be compelling, but it has no generative potential, and it is characterised by the same regress, repression, and reference to mystical 'laws' as are more religious world views. More dynamic and integrative models are sketched out by thinkers like Hegel and Schopenhauer. They are talking about a fundamentally restless reality, where the path to harmony is also fraught with crises and conflicts. We already know that the heavy elements

going into organisms require supernovas to be fused together, and the lightning theory of organic reactions is still defended by some. Other researchers talk about a Darwinian principle in cosmos: a development towards more complex and possibly more stable structures. What is often neglected is the interpenetration of opposites that is required to integrate the phenomena and urge the process in the direction of conflict reduction. It seems like the finite and the infinite can never exist in pure form, thus reality might be logically deemed to an uneasy, often violent, progression in either or both directions. It is ultimately a conscious and melodic process, and the following section may give some indications of how it is evolving.

15.2. Dynamic transactions: a characteristic of all existence

Endel Tulving, who coined the concept of 'episodic memory', was talking of the necessity of an 'auto-noetic' perspective.⁴² The memories are not like video clips; they are construed from the perspective of an active self, and a sphere of meaning where emotional interaction and valuation is central and open to reinterpretation each time a memory is recalled. Yet the implications of Tulving's ideas are probably much wider. It is not only episodic memory that is construed from the perspective of the self, but the whole field of experience, also at the level of sensations and concepts. The concept of a 'home' has little meaning if our lives and a certain cosiness is subtracted from the picture. If you cannot sleep and relax there, it is no longer a home; it is a workplace or a torture chamber.

It is the active and emotionally driven transactions of an organism with its surroundings and its fellow beings that are gradually carving out a sensory and conceptual apparatus; a circumstance that is already indicated by the above mentioned studies of the engagement of the prefrontal cortex, and the inferior frontal gyrus in particular, in perception and conceptualisation. The role of this 'auto-noetic', 'apperceptive', and 'con-scious' engagement in evolution has recently been described in monumental works like Iain McGilchrist's *The Matter With Things*,⁴³ and in several related works, some of which are also endorsed by McGilchrist, like Kriti

⁴² Endel Tulving, 'Episodic memory and auto-noesis: Uniquely human?', in H. S. Terrace and J. Metcalfe eds., *The Missing Link in Cognition*, 4-56 (New York, NY: Oxford University Press, 2005)

⁴³ Iain McGilchrist, *The Matter with Things: Our Brains, Our Delusions, and the Unmaking of the World* (London: Perspectiva Press, 2021).

Sharma's *Interdependence: Biology and Beyond*,⁴⁴ Jude Currivan's *The Cosmic Hologram: Information at the Center of Creation*,⁴⁵ and Nicholas Humphrey's *Sentience: The Invention of Consciousness*.⁴⁶

While Humphrey may not address the problems of conscious integration beyond a mechanistic level, it is McGilchrist's mission to resolve these issues by pointing to the 'concordia oppositorum' of contrasting phenomena, which is particularly evident in the field quantum physics. Indeed, McGilchrist is sketching out a metaphysic where the chasm between the physical and psychical is replaced already at the fundamental level, by a continuum of expanding conscious gestalts. 'I see matter as a special case, or 'phase', says McGilchrist, 'of consciousness, which is the primal 'stuff' out of which the universe is made'.⁴⁷

Already at the level of atoms we are dealing with vibrations and dynamic transactions, which might even be *proto-affective* in a musical and melodic sense. Certainly, if this *panpsychist* conception of reality is correct, the melodic structure of mind, which is the subject matter of this treatise, might have a precursor at more fundamental levels of existence: a 'proto-melody' and a 'proto-self'. The below paragraphs are sketching out how this process might start and evolve into higher levels of integration.

1 Inanimate existence, like that of fundamental particles and forces, is already containing a tremendous amount of movement, energy in the form of vibration, as well as harmonious integer relationships; all of which are musical characteristics. This movement is nested into 'itself', as recursive waves and loops, but also relating to something 'other', like in wave-particle duality, complementary polarities, charges, and antiparticles. To the extent that such quantum phenomena are 'non-local', 'entangled', or 'super-positioned' in a paradoxical manner, they may already contain the elements of interpenetration and integrative transcendence which are characteristic 'building blocks' not only of temporal perception, but of consciousness and existence in general. Already at this level we can observe how the fundamental parameters are

⁴⁴ Kriti Sharma, *Interdependence: Biology and Beyond (Meaning Systems)* (New York: Fordham University Press, 2015)

⁴⁵ Jude Currivan, *The Cosmic Hologram: Information at the Center of Creation* (Rochester, Vermont: Inner Traditions, 2017).

⁴⁶ Nicholas Humphrey, *Sentience: The Invention of Consciousness* (Cambridge, Massachusetts and London: The MIT Press, 2023)

⁴⁷ McGilchrist, *The Matter with Things*, 1026-1027 and 1104.

not independently existing, but shining forth only in the perspective of their own negations and the larger contexts into which they are nested.⁴⁸ In the Appendix of David Bohm's influential textbook on *The Special Theory of Relativity* he is talking of cosmos as fundamentally 'relational', very much like a baby, whose cognitive repertoire is expanding as a product of its emotionally driven explorations of its surroundings.⁴⁹

Partly due to the Heisenberg uncertainty principle, even molecules vibrate. The bonds between the constitutive atoms are constantly stretching, bending, rocking, wagging, and twisting in complex patterns, which do not only determine the affinity of molecules with other molecules, but also their ability to interact with and generate electromagnetic waves.⁵⁰ Far from being dead and immovable, like the diagrams in a textbook, the molecules are more like complex bundles of vibration or self-propagating music, which engages a spatial structure, but is also interactive in a proto-behavioural manner. Indeed, there are new fields of study devoted to the 'sonification' and conversion of molecular vibrations into audible music.⁵¹

Even human level consciousness may be based on such vibrations; and the media in which they are taking place might not be restricted to axonal firing. Dimitris A. Pinotsis and colleagues also speak about 'ephaptic coupling', electrodiffusion and mechanotransduction, which is enabled by the proximity of cell membranes. These vibrations are 'forming neural ensembles at the macro scale level', they say, which information propagates down to the neuronal and molecular levels and 'tunes the cytoskeleton to process information more efficiently'.⁵² Other theorists are talking of the resonant 'eigenmodes' of brain geometry as correlates of

⁴⁸ A speculative conception of this dance is Anirban Bandyopadhyay's theory of 'time crystals' in nature and the brain; nesting into being, in a vibrational and quasi-fractal manner, the properties of time, space, and consciousness. Anirban Bandyopadhyay, *Nanobrain: The Making of an Artificial Brain from a Time Crystal* (Boca Ration: CRC Press, 2020).

⁴⁹ David Bohm, *The special Theory of Relativity* [1965] (London and New York: Routledge Classics, 2006), Appendix: Physics and Perception.

⁵⁰ Werner Jaross, 'The Possible Role of Molecular Vibration in Intracellular Signalling', *Journal of Cellular Signalling*, Vol. 1, Issue 4; 180-186 (2020), <https://doi.org/10.33696/Signaling.1.027>.

⁵¹ See for instance Babak Mahjour, Jordan Bench, Rui Zhang, Jared Frazier, and Tim Cernak, 'Molecular sonification for molecule to music information transfer', *Digital Discovery*, Issue 2: 520-530 (14 Mars 2023), <https://doi.org/10.1039/D3DD00008G>.

⁵² Dimitris A. Pinotsis, Gene Fridman, Earl K. Miller, 'Cytoelectric Coupling: Electric fields sculpt neural activity and "tune" the brain's infrastructure', *Progress in Neurobiology*, Vol. 226 (July 2023), <https://doi.org/10.1016/j.pneurobio.2023.102465>.

consciousness.⁵³ If it is true, it is a very concrete manifestation of the mind-body duality which might exist already at the fundamental levels.

At least these are some hypotheses that might serve to illustrate the so called 'panpsychist' conception of existence, as well as the wave-particle 'complementarity' which may be stretching all the way from electrons to the architecture of the human brain. The ordinary meaning of concepts like 'consciousness', 'feeling', and 'music' may be far too complex to associate with isolated particles and molecules; and the mentioned attempts at 'sonification' and conversion of molecular vibrations into music are often smuggling in scales and progressions which in reality belong to a much higher, human and rhetorical level of comprehension. However, concepts like *proto-consciousness*, *proto-feeling*, and *proto-self-other-interactions* might still be relevant. Certainly our own consciousness is made up by the same fundamental perturbations and complexes, but it is almost infinitely larger in terms of content and integrated wholes.

2. Sensation, of the kind that might be going on in a whole cell or a plant, is requiring much more in terms of behavioural autonomy. There is no point in sensing much if you cannot respond, for instance by *retracting* from or *approaching* the nurturing light and water. And to be able to engage with the incoming sensations in a controllable manner, even the *response* might have to be 'sensed', structured, and monitored as such. That is to say: the ego-dynamic repertoire, which is constituting the 'auto-noetic', 'auto-nomous', and 'con-scious' perspective of the organism, is already starting to develop, as a sensorimotor dealing with and discovering of the external impediments and sources of pleasure and pain. It may not always be *auditory* in the sense of resounding in air at frequencies that the human ear can perceive, but it is undoubtedly dynamic, vibrational, and rhythmical.

It is somewhat under-communicated in this treatise how a cell or organism depends on a large range of rhythms in the timing of metabolic pulsation or its daily and seasonal cycles or growth. Moreover, there is a whole field of research devoted to 'plant bioacoustics', indicating that plants are really charting their environment by means of sound emissions, if not exclusively so. The plants may also be *responding* to sounds, like in the case of so called 'buzz pollination'. Researchers at the university of Tel Aviv have revealed that tomato and tobacco plants make

⁵³ James C. Pang, Kevin M. Aquino, Marianne Oldenhinkel, Peter A. Robinson et al., 'Geometric constraints on human brain function', *Nature*, Vol. 618: 566-574 (2023), <https://doi.org/10.1038/s41586-023-06098-1>.

ultrasonic 'shrieks' when their stems are cut, and when stressed and deprived of water. These sounds may be perceived and responded to by insects. Such emissions, including chemical and other modes of signalling, are also enabling a certain *cooperation* between plants.⁵⁴

Some of this vibrational 'betweenness' in plants and primitive organisms is described by the biologist Nina Kraus in her *Of Sound Mind* - yet another work that is endorsed by Iain McGilchrist. Kraus is pointing for instance to sea creatures that interact with their surroundings through sound alone.⁵⁵ Her notion of 'efferent-afferent' processes are reflecting in a unique way the 'autonoetic' construction of reality that is ensuing from the transactions between an agent and its surroundings; a process that is started already at the basic levels of existence.

It is apparently the increasing *independence* from its surroundings that makes us refer to an organism as 'living'. It has the capacity of procreation, but also a way of *dealing* with and reacting to its environment, both within and outside the cells. It is not clear whether anything is really *felt* or consciously grasped by a cell or plant. But if something is felt, there is already an early form of simulation of the world going on here: a primitive mapping of the other from the perspective of an autonomous and dynamic self. It is a well known fact that for instance the colour of plants have evolved only in interaction with insects and other animals, and that the whole ecosystem, including the soil and atmosphere of the earth, is a product of interacting organisms. Yet the *autonomy of the protagonist*, the system of 'ego-dynamic' functions and *gestalts*, is often neglected or taken for granted.

3. Perception takes the ego-dynamic autonomy to an entirely different level. It is probably first when the organism starts to organise its own existence by a *repertoire of composite actions* that it is able to move around in a complex manner. There is already a certain amount of agency and freedom here, which is not reducible to the reductionist conception of 'stimulus and response'. To the extent that there is agency and will in primitive organisms, this agency might be widening now into larger ego-dynamic *gestalts*: the experience of *inspecting, charting, turning, shaking, lifting* etc.; or even auditory *gestalts* like *cracking, knocking, scraping, or gasping*; and it is the element of behavioural *freedom* that enables the organism to explore and simulate whole objects

⁵⁴ Itzhak Khait, O. Lewin-Epstein, R. Sharon, K. Saban et al., 'Sounds emitted by plants under stress are airborne and informative', *Cell*, Vol 186, Issue 7: 1328-1336 (30 Mars 2023), <https://doi.org/10.1016/j.cell.2023.03.009>.

⁵⁵ Nina Kraus, *Of Sound Mind: How Our Brain Constructs a Meaningful Sonic World*, (Cambridge, Massachusetts, London, England: The MIT Press, 2021).

and scenes, gathering estimates of how heavy things feel, how much friction or pain they cause, how much time and movement is involved in creeping around them or above them, and so on.

The importance of the executive brain regions and a fronto-parietal circuit to the contextual apperception of such content has already been mentioned in connection with discussions of the behavioural aspects of emotion and concept formation. It is a circumstance that seems to be confirmed by research on anaesthetics, which is sometimes targeting these regions.⁵⁶ If the self and its perspective on reality is removed, it is doubtful whether the individual may be transcending a vegetative state.

It is no wonder that it takes a large community of neurones to orchestrate the content going into such consciousness. And the communication between these neurones is engaging frequency bands that are stretching from the vibrations of atoms, proteins, and dendritic spines, to the synchronisation of cortical regions. Whether researchers like Anirban Bandyopadhyay are correct that music, in the sense of rhythm and vibration, has a constitutional role in the creation of all percepts and even all material entities is still unclear; but all these phenomena are undoubtedly arising from dynamic interactions between a 'monad' and its surroundings, which take billions of years to accomplish. It is creating all the perceptual faculties as it goes along, including a sensorimotor and memorial hierarchy, a complex motivational apparatus to steer and drive its actions, and a material architecture through which the vibrations and movements are sustained.

Why is not everything 'automatic' and 'unconscious'? Perhaps because the spatiotemporal *integrations* that constitute the existence of atoms and molecules, in like manner with the spatiotemporal integrations that constitute living organisms, are conscious and sentient per definition. They are just different stages of 'integration', 'transcendence', and self-reflected 'presence'. Certainly many parts of our brains seem to operate without *our* consciousness; but this does not preclude that the cells and even the atoms have a certain sentience of their own. Machines and automatons are human made tools and toys. There is no integrative coherence or perception here, neither of their own behaviour nor their Umwelt. Apart from the materials by which they are made, these mechanisms have no independent status or integrity as natural

⁵⁶ The research of George A. Mashour and colleagues was discussed in the previous section. See also Stuart Hameroff, 'The "conscious pilot" - dendritic synchrony moves through the brain to mediate consciousness', *Journal of Biological Physics*, Vol. 36, Issue 1: 71-93 (January 2010), <https://doi.org/10.1007/s10867-009-9148-x>.

objects. There are no natural necessities, needs, or processes leading to the creation of a machine other than the whims and prescriptions of human beings.

4. Social cognition might be ego-dynamic altogether, as its objects are other selves; and it depends to a large extent on the nonverbal and auditory manifestation of feelings and attitudes. Whether or not it adds to the temporal complexity of the processes, social cognition is obviously an important factor in the development of a self, and later: a cultural sphere, which is almost entirely dealing with its own narratives and self-productions. Sound and melody, in the sense of changing vibrations, might already play an important role in the communication between cells and plants, but it is first with the communication between different *animals* that the field of *social emotion* is starting to evolve. There is no sensory medium that is richer, more controllable, and more explicit than sound; and the social emotions are obviously *coproduced* in such interaction.

Certainly one is losing a bit of one's autonomy when interacting with others, but this interaction is also very stimulating. The advantages of comprehending other creature's attitudes and vocalisations, and adjusting one's own attitudes accordingly, may propel the evolution of new ego-dynamic gestalts several steps up the hierarchy of complexity, producing a whole range of new functions, like the ones that are expressed by the familiar vocalisations of *begging*, *threatening*, *calling*, *seducing*, *screaming*, *warning*, *signalling dominance* or *submission*, *laughing*, *crying*, and so on. This is also when *character* and *personality* becomes important, like when a dog is classifying people and other dogs according to categories of *dangerous*, *fun*, *generous*, or according to power hierarchies of relative dominance, weakness, and submission.

The realisation that it might benefit oneself to mould one's own character according to the perspective of other's views, to fool or make an impression on them, or to help them - exchanging information, services, viewpoints etc - obviously requires even more of self-consciousness and temporal comprehension. It is first from such a perspective that the individual gets a conscious *identity*. Such awareness is also crucial to the development of shared knowledge and science. Not all humans have these insights and cooperative abilities in equal amounts. It might also depend on the historical and metacognitive abilities listed below; but it is definitively building on the social emotions.

4. Thinking, in the sense of extensive lines of reasoning, is obviously even more complex in terms of ego-dynamic autonomy. It is first with *thinking* that the individual radically detaches its actions from the sequences of stimulus and response, to gain a *mental life* that is autonomous even at the long range level. By mentally simulating different scenarios, it is possible to comprehend and compare whole chains of causal relations, and prepare for future opportunities and dangers which otherwise would be detrimental. At the same time we are monitoring and planning our personal strategies: the question whether we should be careful, take a chance, change our minds, rest, try harder, or simply give up.

Even the *activity* of thinking has to be felt and administered. It is a personal struggle, which is not reducible to the things we are thinking about. To carry it out, one must introduce a mental tension or 'question' which is not leading to immediate results, but going into the effort of simulating future scenarios, which results may be judged and compared according to their relative value. It is a process that may be repeated several times, while the person is undergoing a whole range of doubts, hesitations, frustrations, attempts at reorientation, intensification and relaxation, before a sense of *resolution*, *answering*, and a premonition of *satisfaction* might potentially be acted upon. As pointed out by James and Wundt, the tensions, resolutions, hopes and regrets that are going into thinking, must necessarily be felt and realised in some sensory media. The tonal tensions and resolutions are particularly suited for this as they are under voluntary control, abstracted from external matters, and directly experienced both by the individual and its listeners.

The potentially very loud, precise, and resounding character of tones, and the circumstance that our voices are detached, both from physical objects and the need for looking at each other, are all possible explanations of Helen Barbas' notion that we 'use auditory signals as internal representations for organised thought sequences'.⁵⁷ A source of confusion is the circumstance that sound is a medium both for words and emotional intonation. Yet the ego-dynamic process does not rely on words. A rule based manipulation of symbols, which is very much the essence of syntax, is far beyond the grasp even of animals that can grasp some simple words, so the dominance of sound in similar brain structures of animals is pointing rather to the centrality of conation and emotional vocalisation.

⁵⁷ Barbas, 'Prefrontal pathways that control attention', 38 and 32.

6. Historical awareness, as far as it is focussing on our collective development, is also social and emotional in the sense that it is only in individual human brains that the functions of long range processes could be integrated. Certainly animals may have memories of remote events too, but there is nothing ontologically new here as long as the idea of *development* and the products of interchanging periods of time are not grasped: conceptual compounds like *revolution*, *evolution*, *setback*, *decline*; and in the life of humanlike beings: functions like *regret*, *nostalgia*, and *hope*.

Like the attitudinal, rhetorical and other emotional gestalts, these 'dramaturgical' functions do not exist in inanimate nature. Yet they are requisites even in natural science. Solving a scientific problem is obviously a long range mental endeavour, involving *hypotheses*, *strategies*, *planning*, *learning*, *discussion*, *revision*, *critiquing*, as well as *hope*, *curiosity*, *collaboration*, *competition*, and *patience*. In fact, our modern society and its institutions are founded almost entirely on this level of ego-dynamic gestalt formation. Parliaments and councils are *discussing* and *deciding*. Governments and administrations are *planning*. The military is *preparing* for war. The press is *narrating*, of course. The schools are *teaching*; and it is a process that takes many years to complete, involving *pedagogical methods* and even *study techniques* in some cases.

Our *leisure* time, and the very concept of 'work', as contrasted with *fun*, *recreation*, *partying*, *entertainment*, *celebration* and *festivities*, are fundamental examples of such long range narrative functions; and they are all musical and melodic in the sense that they are usually entailing the alternation between modes of speech-melody, song-melody, rhythmical irregularity, regularity, and *dance*. Technology and money may seem like the most important things in the whole world to an hardheaded businessman; but this money and technology is seldom concerned with his primary needs. On the contrary, it is often subserving the 'melodramatic emotions': the dramatic excitement and suspense of soap operas, TV entertainment in general, musical tunes, concerts, gaming, sports and other kinds of competition, the building of careers and social status, controversies in social media, political controversies in the press, novels, cartoons, all kinds of design and architecture, as well as all the finer arts.

Even some scientific activity, like astronomy and cosmology, seems to have little practical value beyond the pleasure of satisfying our curiosity and longing for the unknown, easiest

conceived as something 'very far away'. What is often escaping people is that this pleasurable wondering, and the abyss of physical complexity, is located rather within themselves.

7. Philosophical awareness is where the self is really coming to itself as a conscious being; forming now a set of ideals and an understanding of reality which is not merely occasional and programmed, but a product of personal experience and systematic reflection. This is also where the limits of human consciousness are starting to be felt. It is a sad fact that some reductionists and dogmatists, even within the humanities, see little need for reflecting on prevalent theories. According to Thomas Kuhn, there is a fundamental conflict in academia between the pressure to adhere to 'normal' dogma and the demands of scientific development. Many good proposals might have been rejected because they have been perceived as unfamiliar, subversive, or unnecessarily *systematic* from a specialist point of view, taking the prevalent 'paradigm' for granted. To a great extent, says Kuhn, challenging theories have been 'rejected as metaphysical, as the concern of another discipline, or sometimes as just too problematic to be worth the time.'⁵⁸

Nonetheless, it is the essence of the category of consciousness we are discussing now, to be preoccupied with some of these wide perspectives: questions of a priori logical necessities and limitations, overarching values and ideals, and the meaning and purpose of life. The higher level emotional entities that come out of this are ideals like *goodness, justice, fairness, optimism, faith, truthfulness, equality, and democracy*; the latter of which have already been implemented in some societies, if not in all domains. Such engagement is also what brings art and music to a higher level than crude entertainment.

Given the right behavioural context, the feeling of harmony is often serving as a dynamic correlate of such emotions; an incarnation both of social unity, peace, religious resolve, and order. It might well have started out as mere self-stimulation, but then it would also be instilling a trance-like calm and unity in the tribe, which might have been a catalyst for religious worship, wondering, and prescientific seeking. It is well known fact that the modern scientific tradition, from Pythagoras and onwards, was to a large extent inspired by harmony and harmonic ratios in music. Yet this harmony, the search for harmony, and the feeling of harmonious resolve, would not have been there if it was not felt as such. There is a reason why Albert Einstein, when

⁵⁸ Thomas Kuhn, *The Structure of Scientific Revolutions* [1962](Chicago and London: University of Chicago Press, 1970), 5, 24, 37.

developing his theories, was constantly alternating between his piano and his desk. In a conversation with the great pioneer in music education, Shinichi Suzuki, Einstein had told him that 'the theory of relativity occurred to me by intuition, and music is the driving force behind this intuition.'⁵⁹

The same might well be true for the antidotes of harmony: loud and discordant phenomena like *explosion*, *cacophony*, *paradox* and *infinity*. They might require the ability to *feel* it, which would necessarily entail a certain *anxiety*, since the problems of destruction and infinity also apply to our selves. If one cannot hear and grasp this abyss and unresolvable conflict as an existential *scream*,⁶⁰ it is probably easier to be satisfied with reductionism and finitude. Yet the idea of something 'finite' is just the flip side of the problem. From a logical point of view, the idea of something infinitely compressed and 'simple', without any extension, duration, or interpenetration of opposites, might well be self-annihilating. In fact, it is not even empirically correct. As pointed out by many physicists, they constantly have to manipulate or 're-normalise' their equations to 'remove the infinities'. So the limitations within this field are not necessarily empirical.

It should be sufficiently exemplified now, how the dynamic structure of the self is also a prerequisite for general consciousness at different levels. The growth of the self and the understanding of its surroundings are parallel processes, grounded in sensorimotor experience and integration. According to research by Pengmin Qin and colleagues, comparing different types of sleep and unconsciousness, it is especially the regions forming 'a higher-order sensorimotor integration circuit' that are involved in supporting consciousness within the brain's global functional network (comprising the supragenual anterior cingulate cortex and the supplementary motor area, but also the middle temporal gyrus and the left supramarginal gyrus).⁶¹ The content of this attentional and behavioural realm, especially when it gets more complex than the kind of resting state consciousness which was investigated in this study, is

⁵⁹ Shinichi Suzuki, *Nurtured by Love: A New Approach to Education*, trans. Waltrud Suzuki (New York: Exposition Press, 1969), 90.

⁶⁰ Like in Edvard Munch's paintings, drawings, and lithographic renderings of this motif.

⁶¹ Pengmin Qin, Xuehai Wu, Changwei Wu, Hang Wu et al., 'Higher-order sensorimotor circuit of the brain's global network supports human consciousness', *Neuroimage*, vol 231 (1 May 2021), <https://doi.org/10.1016/j.neuroimage.2021.117850>

familiar and well known; so well known that it is usually taken for granted; but its content has to be produced; and its presence has to be felt through every step on the road.

Yet such content is not restricted to behaviour as such. Even human made objects are drawn into a behavioural and cultural perspective by the apperception of their function and design. Even when we are merely thinking or talking about a tool - like mentioning the word 'knife' - we also activate those parts of our brain which organise the movements involved in using it: the idea of taking it, lifting it, and *stabbing* a dangerous intruder; or the idea of *cutting* a piece of food to make it easier to eat. Especially some left premotor and parietal regions have been found to be central to our conception of tools and other manipulable man-made objects.⁶²

At other levels of behavioural complexity, the idea of an *entrance*, an *exit*, or a *portal*, is incorporating the notion of *arriving*, *leaving*, or *passing through*; perhaps with a certain *grandeur*, or in a modus of *flight* or nervous exposure to a *security cheque*. A chair or a recliner is a device in which we *eat*, *write*, *rest*, or *recline* in different positions and postures, which is already part of a certain narrative or daily life. Ideas of homes and residences are even more complex as they imply the notion of a *private life* or a *family life*, with certain qualities and activities, like *entertaining* on the porch, or *observing* and *enjoying* the surroundings through a window. Similarly, factories and offices are places where things are *produced* and people perform different types of *work*. Even cars and roads are more than chunks of metal and asphalt. Our concepts of these objects are implying the consciousness that they are *doing* things, and *leading* to certain places, according to certain *rules*, and at certain *speeds*.

But this is not all. All these things also have a *design*. That is to say: an aesthetic quality, which may be expressive both of personality and status, but also give associations to the time periods they are designed. In addition to its functional value, a car may be *stylish*, *ugly*, *brand new*, *modern*, or even *futuristic*; or it may be slightly *used* and *out of fashion*, *veteran*, or *pre-historic* in some cases. In other words, there is even a historical or long-range dramaturgical aspect that is incorporated into our concepts of these objects, as well as a style, which may be

⁶² S. T. Grafton, L. Fadiga, M. A. Arbib, G. Rizzolatti, 'Premotor cortex activation during observation and naming of familiar tools', *Neuroimage*, Vol. 6, Issue 4: 231-236 (November 1997), <https://doi.org/10.1006/nimg.1997.0293>.

See also Philippe A. Choinard and Melvyn Goodale, 'Category-specific neural processing for naming pictures of animals and naming pictures of tools: An ALE meta-analysis', *Neuropsychologia*, Vol. 48, Issue 2: 409-418 (January 2010), <https://doi.org/10.1016/j.neuropsychologia.2009.09.032>.

Linda L. Chao and A. Martin, 'Representation of manipulable man-made objects in the dorsal stream', *Neuroimage*, Vol. 12, Issue 4: 478-484 (October 2000), <https://doi.org/10.1006/nimg.2000.0635>.

conservative, sporty, macho, eco friendly, luxurious, family oriented and so on. Some hard-nosed people might think that they are not interested in aesthetics and design, or that it is possible to avoid it. But if given the option of going to work in a baroque or rococo gown they would probably resist it. Even a red jumpsuit, which is both practical, very simple, and safe in the traffic, would not necessarily go home among such people.

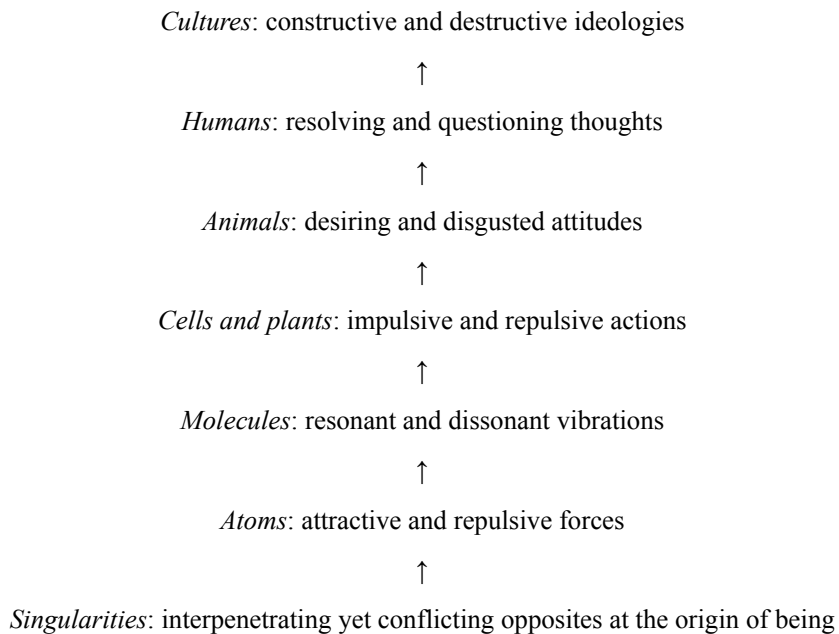
It may seem like a radical claim, but it follows from the above reflections that the portion of reality implicating the self and the process of 'ego-dynamic gestalt formation' is extremely large. For what is left if all the above content is subtracted from experience? Inanimate natural objects like stones, gasses, and planets, are certainly very fundamental, but they are not a big part of our conscious existence. Their independent existence might even be doubted. The shape, weight, duration, or position of a stone or a grain of sand is not conscious to this grain or stone. These objects are mere agglomerations of elementary particles like atoms and molecules, which constituent quantum dynamics is even more flimsy and 'undetermined'. What gives it form, smell, colour and hardness, is fully realised first when coming together in our minds, after a whole hierarchy of motor and mental transactions: lifting, viewing, poking, smelling, listening, contemplating, conceptualising, measuring, and classifying.

Certainly the atomic or molecular level may mean the whole world to a geology and astronomy nerd, but not everybody are granted an academic position, and even these people would have to face the complexities of reality in their daily lives. It might not be correct to go to the opposite extreme, like in *solipsism*, which is also entertained by some cosmologists: the idea of the human mind creating all of reality by causing the collapse of the quantum wave function. Yet there is little doubt that many cosmological or metaphysical models would have to be expanded and remodelled, with much more importance given to the dynamic and integrative structure of the self.

Instead of considering oneself a hole, or a couple of holes - into which the natural matters are streaming, so to speak - it should be possible to take another step towards self-awareness now, and realise that the self has also a dynamic substrate, and a structure of its own: a hierarchy of dynamic gestalts which is very different from spatial gestalts, but not a bit less complex and real. In its purest and most autonomous form, which is also very concrete and explicit, this hierarchy of ego-dynamic gestalts is observable in melodies and musical phrase structure. But it is not limited to the celebration of harmony. It is characteristic of all prosody and behaviour. And if the

above reflections are correct, it is also a necessary ingredient of consciousness and existence in general, paralleling every evolutionary step from atoms to human beings.

The manner in which the action-hierarchy is described below is sketchy, with little pretension to precision, but in so far as it is real, it is a necessary complement to the previous taxonomies in this treatise. By expanding the diagrammatic representation downwards, it might indicate how the hierarchy of ego-dynamic gestalts might incorporate even the so called 'inanimate' level.



In other words: it might not be correct to speak of a mind-matter schism. The mind is already at the inside of the matter and vice versa. It is a body, but also a life. According to contemporary idealists like Donald Hoffman reality is all about 'conscious agents',⁶³ which may be true; but rather than relinquishing the material one might be better off by talking, like Hegel, of a pluralism of dimensions and dichotomies at different levels of complexity. Which came first of these dimensions is a moot question. Some would say that everything is dynamic and musical at bottom; yet this dynamic is probably always entailing its own negation: an ether or 'massive vacuum' perhaps, and at higher levels: a body or anatomical structure in which the forces and

⁶³ Donald D. Hoffman, 'The Origin of Time In Conscious Agents', *Cosmology*, Vol. 18: 494-520 (2014)

vibrations are manifested and orchestrated. Even Anirban Bandyopadhyay is talking of *material* structures: cytoskeletal 'instruments', or large scale geometries of the brain, through which the 'music' of consciousness is nested in a hierarchical manner.⁶⁴

One might argue that cosmos is immaterial and static in the sense of being constituted by so called 'mathematical' necessities and regularities; yet it is difficult to see how matter and force, not to speak of any higher level entities, could develop from what is basically a one-dimensional and quantitative logic. Rather than embracing this reductionist logic, the idea of a 'mathematical' world, and even a mathematical field of study, might have to be relinquished and incorporated into a richer and much more integrative understanding of reality. It is a reality which is consisting both of singularities and vacuum, but never without paradox and mutual interpenetration. On the contrary: it is probably this transcendence and interpenetration of opposites that is the logical basis of reality. What Hegel called 'true infinity' is not a mere regress of the finite, but transgressing it in a paradoxical manner.

According to thinkers like Hegel and Bohm, vacuum and plenum, the infinitely massive and the infinitely empty, are the same: progressions toward something unambiguous and finite which may never reach their end points, but, precisely because of these unsolvable paradoxes, are deemed to eternal alternation and interpenetration. What is infinitely massive is totally undifferentiated and therefore non-existent, like a hole; and if nothingness has no independent existence, it is self-obliterating and massive, like an infinitely tiny point that is filling the whole universe. Apparently, the truth lies somewhere in between, and rather than speaking of beginnings and endings, we might better return to the ancient idea of eternal cycles and the complementarities of Yin and Yang. It is a mode of thinking that is not unique to Taoism or eastern traditions; on the contrary, it is very much at the foundation of western thought, in the philosophies of Anaximander and Heraclitus 500 years before Christ. Similar ideas, incorporating even the centrality of personal growth, were living a shadow existence in Christian gnosticism before blossoming into German idealism and the realisations that are emerging now, as a product of quantum physics and modern cosmology. To try to capture this understanding in a single concept, the concept of 'dialectical panpsychism' might be suitable.

⁶⁴ See for instance Anirban Bandyopadhyay - Does Consciousness Defeat Materialism?, YouTube video by 'Closer to Truth', 2020.

The monads or egos never exist in isolation. The existence and autonomy of a monad is increasing in proportion to its ability to protect itself, harvest energy, predict what is going to happen, and cooperate with other beings. It is a 'transactional' or 'interactive' theory of evolution, which is also shared by thinkers like Hoffman and McGilchrist. The transactions are not only competitive, they are also co-operative to a large extent; and since sound is both the richest and the most explicit medium for emotional cooperation, it is easy to understand how it has acquired such an important role in the prefrontal cortex and the lives of human beings. Especially at the later and social stages of animal existence it has brought a tremendous amount of new content and harmony into existence, and it gives hope for the future that it is increasingly centred around communion and peace of mind.

References

- Abrams, Daniel A., Srikanth Ryali, Tianwen Chen, Parag chordia, Amirah Khouzam, Daniel J. Levitin, and Vinod Menon. 'Inter-subject synchronization of brain responses during natural music listening'. *European Journal of Neuroscience*. Volume 37, Issue 9 (11 April 2013): 1458-1469. <https://doi.org/10.1111/ejn.12173>.
- Agawu, Kofi. 'The Challenge of Semiotics'. In *Rethinking Music*. Edited by Nicholas Cook and Mark Everist (Oxford, New York: Oxford University Press, 1999).
- Alexander, Michael P. 'Impairments of procedures for implementing complex language are due to disruption of frontal attention processes'. *Journal of the International Neuropsychological Society*. Volume 12, Issue 2: 236-247 (22 Mars 2006). <https://doi.org/10.1017/S1355617706060309>.
- Allport, Floyd Henry. *Social Psychology as a Science of Individual Behavior and Consciousness*. Boston: Houghton Mifflin Company, 1924.
- Alluri, Vinoo, Petri Toiviainen, Liro P Jääskeläinen, Enrico Glerean, Mikko Sams, and Elvira Brattico. 'Large-scale brain networks emerge from dynamic processing of musical timbre, key and rhythm.' *Neuroimage*. Volume 59, No 4: 3677-3689 (15 February 2012). <https://doi.org/10.1016/j.neuroimage.2011.11.019>.
- Alluri, Vinoo, Petri Toiviainen, Torben E. Lund, Mikkel Wallentin, Peter Vuust, et al. 'From Vivaldi to Beatles and back: predicting lateralized brain responses to music.' *Neuroimage*, Volume 83 (2013): 627-636. <https://doi.org/10.1016/j.neuroimage.2013.06.064>.
- Anderson, P. W. 'More is different'. *Science*, Vol. 177, no. 4047 (4 August 1972): 293-316, <https://doi.org/10.1126/science.177.4047.393>
- Ansani, Alessandro, Marco Marini, Francesca D'Errico, and Isabella Poggi. 'How Soundtracks Shape What We See: Analyzing the Influence of Music on Visual Scenes Trough Self-Assessment, Eye Tracking, and Pupillometry', *Frontiers of Psychology* (7 October 2020), <https://doi.org/10.3389/fpsyg.2020.02242>.
- Appali, Revathi, Ursula van Rienen, Thomas Heimburg. 'A Comparison of the Hodgkin-Huxley Model and the Soliton theory for the Action Potential in Nerves'. Chapter Nine in *Advances in Planar Lipid Bilayers and Liposomes*. Volume 16 (2012): 275-299. <https://doi.org/10.1016/B978-0-12-396534-9.00009-X>.
- Arbib, Michael A. and Mihail Bota. 'Neural homologies and the grounding of neurolinguistics'. In *From Action to Language via the Mirror Neuron System*. Edited by Michael A. Arbib. New York: Cambridge University Press, 2006.
- Aristotle. *De Anima (On the Soul)* [c. 350 BC]. Translated by Hugh Lawson-Tancred. London: Penguin Books, 1986.
- Aristotle. *Politics* [350 BC]. Translated by Benjamin Jowett. The Internet Classics Archive. <http://classics.mit.edu/Aristotle/politics.8.eight.html>.

- Aristotle. *Poetics* [c. 335 BC] Translated by Malcolm Heath. London: Penguin Books, 1996.
- Aristotle. *The Art of Rhetoric* [c. 367-322 BC]. Translated by Hugh Lawson-Tancred. London: Penguin books, 2004.
- Argyle, Michael, *Bodily Communication* [1975]. London and New York: Routledge, 1988.
- Arnheim, Rudolf. *Visual Thinking*. Berkeley, Los Angeles, London: University of California Press, 1969.
- Aso, Yoshinori, Andrea Herb, Maite Ogueta Gierrez, Igor Siwanowicz et al. 'Three Dopamine Pathways Induce Aversive Odor Memories with Different Stability'. *PLoS Genetics*, Volume 8, Issue 7 (12 July 2012): <https://doi.org/10.1371/journal.pgen.1002768>.
- Asp, Erik, Kenneth Manzel, Bryan Koestner, Natalie L. Denburg, Daniel Tranel. 'Benefit of the doubt: a new view of the role of the prefrontal cortex in executive functioning and decision making'. *Frontiers in Neuroscience*, Volume 7, Article 86 (24 May 2013). <https://doi.org/10.3389/fnins.2013.00086>.
- Averill, James R. 'A constructivist view of emotion'. Chapter 12 in *Emotion: Theory, Research and Experience*. Edited by R. Plutchik and H. Dellerman. 305-339. New York: Academic Press, 1980. <https://doi.org/10.1016/B978-0-12-558701-3.50018-1>.
- Aziz-Sadeh, Lisa, Tong Sheng, and Anahita Gheyntanchi. 'Common Premotor Regions for the Perception and Production of Prosody and Correlations with Empathy and Prosodic Ability'. *PLoS ONE*, 5(1) (20 January 2010): <https://doi.org/10.1371/journal.pone.0008759>.
- Azuar, Carole, P. Reyes, A. Slachevsky, E. Volle, S. Kinkinghunn, F. Kouneiher, E. Bravo, B. Dubois, E. Koehlin, R. Levy. 'Testing the model of caudo-rostral organization of cognitive control in the human with frontal lesions'. *Neuroimage*. Volume 84 (1 January 2014):1053-1060. <https://doi.org/10.1016/j.neuroimage.2013.09.031>.
- Baars, Bernard J., Natalie Geld, and Robert Kozma. 'Global Workspace Theory (GWT) and Prefrontal Cortex: Recent Developments', *Frontiers in Psychology*, Volume 12 (10 November 2021). <https://doi.org/10.3389/fpsyg.2021.749868>.
- Bach, Carl Philipp Emanuel. Versuch über die wahre Art das Clavier zu spielen. Berlin: Selbstverlag, 1759.
- Badre, David, Bradley B. Doll, Nicole M. Long, and Michael J. Frank. 'Rostrolateral Prefrontal Cortex and Individual Differences in Uncertainty-Driven Exploration.' *Neuron*, Volume 73, Issue 3 (9 February 2012): 595-607. <https://doi.org/10.1016/j.neuron.2011.12.025>.
- Badre, David, and Derek Evan Nee. 'Frontal Cortex and the Hierarchical Control of Behavior'. *Trends in Cognitive Sciences*. Volume 22, Issue 2 (February 2018): 170-188. <https://doi.org/10.1016/j.tics.2017.11.005>.
- Bandyopadhyay, Anirban. *Nanobrain: The Making of an Artificial Brain from a Time Crystal*. Boca Ration: CRC Press, 2020.
- Bandyopadhyay, Anirban. *Anirban Bandyopadhyay - Does Consciousness Defeat Materialism?* YouTube video by 'Closer to Truth' (2020).
- Bang, Steinar. 'Psychologizing Music: a Psychodynamic Explication of Beethoven's Op. 54'. Cand. Philol. thesis in musicology, University of Oslo, 2004.

- Barbas, Helen. 'Flow of information for emotions through temporal and orbitofrontal pathways.' *Journal of Anatomy*. Volume 211, No. 2 (September 2007): 237-239. <https://doi.org/10.1111/j.1469-7580.2007.00777.x>.
- Barbas, Helen, Jamie G. Bunce, and Maria Medalla. 'Prefrontal pathways that control attention'. Chapter 3. in *Principles of Frontal Lobe Function*, second edition, edited by. Donald T. Stuss and Robert T Knight. 31-48. New York: Oxford University Press, 2013.
- Barbey, Aron K., Michael Koenigs, and Jordan Grafman. 'Dorsolateral prefrontal contributions to human working memory'. *Cortex*. Volume 49, Issue 5 (May 2013): 1195-1205. <https://doi.org/10.1016/j.cortex.1012.05.022>.
- Bartel, Dietrich. *Musica Poetica: Musical-Rhetorical Figures in German Baroque Music*. Lincoln and London: University of Nebraska Press, 1997.
- Bartels, Andreas, Semir Zeki. 'The neural correlates of maternal and romantic love'. *Neuroimage*, Volume, 21, Issue 3 (March 2004): 1155-1166. <https://doi.org/10.1016/j.neuroimage.2003.11.003>.
- Bartlett, Frederic. C. *Remembering: A study in experimental and social psychology*. Cambridge, UK: Cambridge University Press, 1932.
- Baruchi, Itay, Vernon L. Towle, Eshel Ben-Jacob. 'Functional holography of complex networks activity - From cultures to the human brain'. *Complexity*, Volume. 10, Issue 3 (9 February 2005): 38-51. <https://doi.org/10.1002/cplx.20065>.
- Beck, Aaron T., A. John Rush, Brian F. Shaw, and Gary Emery. *Cognitive therapy of Depression*. New York: Guilford Press, 1979.
- Beck, Aaron T. and Emily A. P. Haigh. 'Advances in cognitive theory and therapy: the generic cognitive model.' *Annual Review of Clinical Psychology*, Volume 10 (2 January 2014): 1-24. <https://doi.org/10.1146/annurev-clinpsy-032813-153734>.
- Bechara, Antoine, Hanna Damasio, Antonio Damasio. 'Emotion, Decision Making and the Orbitofrontal Cortex'. *Cerebral Cortex*. Volume 10, Issue 3 (1 March 2000): 295-307. <https://doi.org/10.1093/cercor/10.3.295>.
- Beckett, Samuel, Robert Hughes, Jane Livingstone et. al: *Arikha*. Paris and New York: Thames and Hudson, 1978.
- Beethoven, Ludwig van. *Dreizehn unbekannte Briefe an Josephine Gräfin Deym geb. von Brunsvik*. Edited by Joseph Schmidt-Görg. Bonn: Beethoven-Haus, 1957.
- Beethoven. *Symphony No. 5 in C minor: An Authoritative Score; The Sketches, Historical Background, Analysis, Views and comments*. Edited by Elliot Forbes. New York, London: W. W. Norton & Company, 1971.
- Beghin, Tom, and Sander M. Goldberg ed. *Haydn and the Performance of Rhetoric*. Chicago and London: The University of Chicago Press, 2007.
- Benade, Arthur H. *Fundamentals of Musical Acoustics*. New York: Dover Publications, Inc. 1990. Originally published by Oxford University Press, 1976.

- Bengtsson, Sara L., Mihály Csikszentmihályi, and Fredrik Ullén. 'Cortical Regions Involved in the Generation of Musical Structures during Improvisation in Pianists.' *Journal of Cognitive Neuroscience*. Volume 19, No. 5 (May 2007): 830-842. <https://doi.org/10.1162/jocn.2007.19.5.830>.
- Belin Pascal, Robert Zatorre, Philippe Lafaille, Pierre Ahad et al. 'Voice-selective areas in human auditory cortex.' *Nature*, Volume 403, No. 6767 (20 January 2000): 309–312. <https://doi.org/10.1038/35002078>.
- Belyk, Michel and Steven Brown. 'Perception of affective and linguistic prosody: an ALE meta-analysis of neuroimaging studies'. *Social Cognitive and Affective Neuroscience*. Volume 9, Issue 9 (September 2014): 1395-1403. <https://doi.org/10.1093/scan/nst124>.
- Belyk, Michel and Steven Brown. 'Pitch underlies activation of the vocal system during affective vocalization'. *Social Cognitive and Affective Neuroscience*, 11(7) (July 2016): 1078-1080. <https://doi.org/10.1093/scan/nsv074>.
- Bergson, Henri: *Tiden og den frie vilje: En undersøkelse av de umiddelbare indre kjensgjerninger*. Translated into Norwegian by Hans Kolstad. Oslo: Aschehoug & Co., 1990.
- Bergson, Henri. *Creative Evolution*. Translated by Arthur Mitchell. New York: Henry Holt, 1911.
- Bergson, Henri, *Creative Evolution* [1911]. Authorised translation by Arthur Mitchell. Mineola, New York: Dover Publications, 1998.
- Berlioz, Louis-Hector. 'On Imitation in Music', In *Berlioz's "Fantastic Symphony"*. Edited by Edward Cone. New York: Northon Critical Scores, 1971.
- Berns, Gregory S., Samuel M. McClure, Giuseppe Pagnoni, and P. Read Montague. 'Predictability Modulates Human Brain Response to Reward.' *The Journal of Neuroscience*, Volume 21, Issue 8 (15 April 2001): 2793-2798. <https://doi.org/10.1523/JNEUROSCI.21-08-02793.2001>.
- Berridge, Kent C. 'The debate over dopamine's role in reward: the case for incentive salience', *Psychopharmacology*, 191 (2007):391-431. <https://doi.org/10.1007/s00213-006-0578-x>.
- Bhattacharya, Joydeep, Hellmuth Petsche, Ernesto Pereda. 'Interdependencies in the spontaneous EEG while listening to music'. *International Journal of Psychophysiology*, Volume 42 (December 2001): 287-301. [https://doi.org/10.1016/S0167-8760\(01\)00153-2](https://doi.org/10.1016/S0167-8760(01)00153-2).
- Bills, Arthur G. & James C. Stauffacher. 'The Influence of Voluntarily Induced Tension on Problem Solving'. *The Journal of Psychology*, Vol. 4, Issue 2 (1937): 261. <https://doi.org/10.1080/00223980.1937.9917536>.
- Binder, Jeffrey R., C. F. Westbury, K. A. McKiernan, E. T. Possing, D. A. Medler. 'Distinct brain systems for processing concrete and abstract concepts'. *Journal of Cognitive Neuroscience*. Volume 17, Issue 6 (June 2005): 905-917. <https://doi.org/10.1162/0898929054021102>.
- Binder, Jeffrey R. and Rutvik H. Desai. 'The Neurobiology of Semantic Memory'. *Trends in Cognitive Sciences*, Volume 15, Issue 11: 527-536 (November 2011). <https://doi.org/10.1016/j.tics.2011.10.001>.
- Binder, Jeffrey R., Lisa L. Conant, Colin J. Humphries, et al. 'Toward a brain-based componential semantic representation'. *Cognitive Neuropsychology*. Volume 33, Nos. 3-4: 130-174 (2016), <http://dx.doi.org/10.1080/02643294.2016.1147426>.

- Binder, Jeffrey R. 'OHBM Neurosalience S3E10: Jeff Binder - A neurologist pushing the limits of fMRI'. YouTube video by Organization for Human Brain Mapping (4 August 2022) 41:00.
- Bleuler, Eugen. 'Vortrag über Ambivalenz'. *Zentralblatt für Psychoanalyse*. Volume 1 (1911): 266-268.
- Blood, Anne J., and Robert J. Zatorre. 'Intensely pleasurable responses to music correlate with activity in brain regions implicated in reward and emotion'. *Proceedings of the National Academy of Sciences USA*, Volume 98, Issue 20 (25 September 2001): 11818-23. <https://doi.org/10.1073/pnas.191355898>.
- Bohm, David. *The special Theory of Relativity* [1965]. London and New York: Routledge Classics, 2006.
- Bohm, David. *Wholeness and the Implicate Order* [1980]. London and New York: Ark Paperbacks, an imprint of Routledge, 1983.
- Boltzmann; Melanie, Simone B. Schmidt, christoph Gutenbrunner, Joachim K. Krauss et al. 'Auditory Stimulation Modulates Resting-State Functional Connectivity in Unresponsive Wakefulness Syndrome Patients.' *Frontiers in Neuroscience* (16 February 2021) <https://doi.org/10.3389/fnins.2021.554194>.
- Bookheimer, Susan Y. 'Functional MRI OF LANGUAGE: New approaches to understanding the cortical organization of semantic processing.' *Annual Review of Neuroscience*, 25(1) (February 2002): 151-188. <https://doi.org/10.1146/annurev.neuro.25.112701.142946>.
- Boso, Mariana, Enzo Emanuele, Vera Minazzi, Marta Abbamonte, and Pierluigi Politi. 'Effect of Long-Term Interactive Music Therapy on Behavior Profile and Musical Skills in Young Adults with Severe Autism'. *The journal of alternative and complementary medicine*, Vol. 13, No. 7 (2007): 709-712. <https://doi.org/10.1089/acm.2006.6334>.
- Boulez, Pierre. 'Putting the Phantoms to Flight' [1964], in *Orientalisms*, ed. Jean-Jacques Nattiez, translated by Martin Cooper. London and Boston: faber and faber, 1986.
- Boulez, Pierre. *Conversations with Celestin Deliege*. Paris: Ernst Eulenburg Ltd, 1975.
- Bousfield Paul. *Pleasure and Pain: A theory of the energetic Foundation of Feeling*. New York: Routledge, 1926.
- Bower, Calvin Martin. *Boethius' The Principles of Music: An Introduction, Translation and Commentary* Ph.D. dissertation, George Peabody College for Teachers, 1967.
- Brass, Marcel, and Patrick Haggard. 'The What, When, Whether Model of Intentional Action'. *The Neuroscientist*, Volume 14, Issue 4 (August 2008): 319-325. <https://doi.org/10.1177/1073858408317417>.
- Brass, Marcel, Margaret T. Lynn, Jelle Demanet, Davide Rigoni. 'Imaging volition: What the brain can tell us about the will'. *Experimental Brain Research*, Volume 229, Issue 3 (September 2013): 301-312. <https://doi.org/10.1007/s00221-013-3472-x>.
- Brass, Marcel, Ariel Furstenberg & Alfred R. Mele. 'Why neuroscience does not disprove of free will'. *Neuroscience & Biobehavioral Reviews*, Volume 102 (May 2019): 251-263. <https://doi.org/10.1016/j.neubiorev.2019.04.024>.

- Braun, Allen, T. J. Balkin, N. J. Wesenten, R. E. Carson, M. Varga et al. 'Regional blood flow throughout the sleep-wake cycle. An H2(15)O PET study.' *Brain*. Volume 120, Part 7 (August 1997): 1173-97. <https://doi.org/10.1093/brain/120.7.1173>.
- Breitmeyer, Bruno G. 'Psychophysical "blinding" methods reveal a functional hierarchy of unconscious visual processing'. *Consciousness and Cognition*, Volume 35: 234-250 (September 2015).
- Brendel, Alfred. *Musical Thoughts and Afterthoughts* [1976]. London: Robson Books, 1982.
- Brendel, Alfred. *Music Sounded Out: Essays, Lectures, Interviews, Afterthoughts*. London: Robson Books, 1990.
- Brentano, Franz. *Psychology from an Empirical Standpoint* [1874]. London and New York: Routledge.1995.
- Brewer, Judson A., Kathleen A. Garrison, Susan Whitfield-Gabriel. 'What about the "self" is processed in the posterior cingulate cortex?'. *Frontiers in Human Neuroscience*, Volume 7, Article 647 (2 October 2013). <https://doi.org/10.3389/fnhum.2013.00647>.
- Brindle, Reginald Smith. *Serial Composition* [1966]. London, Oxford, New York: Oxford University Press, 1982.
- Bromis, Konstantinos, Maria Calem. Antje A. T. S. Reinders, Steven C. R. Williams, Matthew J. Kempton. 'Meta-Analysis of 89 Structural MRI studies in Posttraumatic Stress Disorder and Comparison With Major Depressive Disorder.' *The American Journal of Psychiatry*. Volume 175, Issue 10 (1 October 2018): 989-998. <https://doi.org/10.1176/appi.ajp.2018.17111199>.
- Brown, Richard, Hakwan Lau, Joseph E. LeDoux. 'Understanding the higher-order Approach to Consciousness'. *Trends in Cognitive Sciences*, Volume 23, Issue 9: 754-768 (30 July 2019). <https://doi.org/10.1016/j.tics.2019.06.009>.
- Brown, Steven, Michael J. Martinez, and Lawrence M. Parsons. 'Music and language side by side in the brain: a PET study of the generation of melodies and sentences'. *European Journal of Neuroscience*. Volume 2, No. 10 (May 2006): 2791-2803. <https://doi.org/10.1111/j.1460-9568.2006.04785.x>.
- Brunsvik, Therese. 'Diary, 4. February 1846'. In Goldschmidt, Harry. *Um die Unsterbliche Geliebte. Ein Beethoven-buch*, p. 296. Munich: Rogner & Bernhard, 1980.
- Buddhala, Chandana. susan K. Loftin, Brandon M. Kuley, Nigel J. Cairns et al. 'Dopaminergic, serotonergic, and noradrenergic deficits in Parkinson disease'. *Annals of Clinical and Translational Neurology*, 2(10) (September 2015):949-59. <https://doi.org/10.1002/acn3.246>.
- Buelow, George J. 'Rhetoric and music', in the first edition of *The New Grove Dictionary of Music and Musicians*. Volume 15, 793-803.
- Burgess, Neil, Eleanor A. Maguire, John O'Keefe. 'The Human Hippocampus and Spatial and Episodic Memory'. *Neuron*, Volume 35, Issue 4: 625-641 (15 August 2002). [https://doi.org/10.1016/S0896-6273\(02\)00830-9](https://doi.org/10.1016/S0896-6273(02)00830-9).
- Burunat, Iballa, *Dynamics of brain activity underlying working memory for music in a naturalistic condition*. Master thesis. University of Jyväskylä, November 2012.

- Cabral, Joana, Francisca F. Fernandes, and Noam Shemesh. 'Intrinsic macroscale oscillatory modes driving long range functional connectivity in female rat brains detected by ultrafast fMRI. . *Nature Communications*. Volume 14, Article 375 (6 February 2023). <https://doi.org/10.1038/s41467-023-36025-x>.
- Cameron, C. Daryl, Justin Reber, Victoria L. Spring, and Daniel Tranel. 'Damage to ventromedial prefrontal cortex is associated with impairments in both spontaneous and deliberative moral judgements.' *Neuropsychologia*. Volume 111 (Mars 2018): 261-268. <https://doi.org/10.1016/j.neuropsychologia.2018.01.038>.
- Cardinal, Rudolf N., John A. Parkinson, Jeremy Hall, Barry J. Everitt, 'Emotion and motivation: the role of the amygdala, ventral striatum, and prefrontal cortex.' *Neuroscience and Biobehavioral Reviews*, 26 (2002): 321-352.
- Carlhart-Harris, Robin L., Helen S. Mayberg, Andrea L. Malizia and David Nutt. 'Mourning and melancholia revisited: correspondences between principles of Freudian metapsychology and empirical findings in neuropsychiatry.' *Annals of General Psychiatry*. Volume 7, Article 9 (24 July 2008): <https://doi.org/10.1186/1744-859X-7-9>.
- Carmichael, S. Thomas and J. L. Price. 'Connectional networks within the orbital and medial prefrontal cortex of macaque monkeys.' *Journal of Comparative Neurology*, Volume 371, Issue 2 (22 July 1996): 179-207. [https://doi.org/10.1002/\(SICI\)1096-9861\(19960722\)371:2<179::AID-CNE1>3.0.CO;2-%23](https://doi.org/10.1002/(SICI)1096-9861(19960722)371:2<179::AID-CNE1>3.0.CO;2-%23).
- Cartmill, Erica A. and Richard W. Byrne. 'Semantics of primate gestures: intentional meanings of orangutan gestures.' *Animal Cognition*, Vol. 13, No. 6 (19 June 2010): 793-804. <https://doi.org/10.1007/s10071-010-0328-7>.
- Casey, Cameron P., Sean Tanabe, Sahra Farahbakhsh, Margaret Parker et al.. 'EEG signatures differentiate unconsciousness and disconnection during anaesthesia and sleep'. *British Journal of Anaesthesia*. Volume 128, Issue 6: 1006-1018 (June 2022). <https://doi.org/10.1016/j.bja.2022.01.010>.
- Caspers, Svenja, Stefan Heim, Marc Guy Lucas, Egon Stephan et al. 'Moral Concepts Set Decision Strategies to Abstract Values'. *PLoS ONE*, 6(4): e18451 (April 2011): <https://doi.org/10.1371/journal.pone.0018451>.
- Chanda, Mona Lisa and Daniel J. Levitin. 'The neurochemistry of music'. *Trends in Cognitive Sciences*, Vol. 17, No. 4 (April 2013): 188-189. <https://doi.org/10.1016/j.tics.2013.02.007>.
- Chao, Linda L. and Alex Martin. 'Representation of manipulable man-made objects in the dorsal stream'. *Neuroimage*. Volume 12, Issue 4: 478-484 (October 2000). <https://doi.org/10.1006/nimg.2000.0635>.
- Chapin, Heather, Kelly Jantzen, J.A. Scott Kelso, Fred Steinberg, Edward Large. 'Dynamic Emotional and Neural Responses to Music Depend on Performance Expression and Listener Experience.' *PLoS ONE*. Volume 5, Number 12 (16 December 2010): e13812. <https://doi.org/10.1371/journal.pone.0013812>.

- Cheng, Qiuping, Xue Wen, Guozhen Ye, Yanchi Liu, Yiong Kong, Lei Mo. 'Neural underpinnings of morality judgment and moral aesthetic judgment', *Scientific Reports*, Volume 11, Article 18232 (14 September 2021): <https://doi.org/10.1038/s41598-021-97782-7>.
- Choinard, Philippe A., and Melvyn Goodale. 'Category-specific neural processing for naming pictures of animals and naming pictures of tools: An ALE meta-analysis'. *Neuropsychologia*. Volume 48, Issue 2: 409-418 (January 2010). <https://doi.org/10.1016/j.neuropsychologia.2009.09.032>.
- Chow, Ivan, and Steven Brown. 'A Musical Approach to Speech Melody.' *Frontiers in Psychology* (05 March 2018), <https://doi.org/10.3389/fpsyg.2018.00247>.
- Chrisoff, Kalina, Justin M. Ream, Leo P. T. Geddes, John D. E. Gabrieli. 'Evaluating Self-Generated Information: Anterior Prefrontal Contributions to Human Cognition.' *Behavioral Neuroscience*, Volume 117, Number 6 (December 2003): 1161-1168. <https://doi.org/10.1037/0735-7044.117.6.1161>.
- Christoff, Kalina, Diego Cosmelli, Dorothée Lebrand, and Evan Thompson. 'Specifying the Self for Cognitive Neuroscience'. *Trends in Cognitive Sciences*, Volume 15, Issue 3 (March 2011): 104-112. <https://doi.org/10.1016/j.tics.2011.01.001>.
- Ciaramelli, Elisa, Michela Muccioli, Elisabetta Làdavas, Giuseppe di Pellegrino, 'Selective deficit in personal moral judgment following damage to ventromedial prefrontal cortex', *Social Cognitive and Affective Neuroscience*, Volume 2, Issue 2 (June 2007): 84-92. <https://doi.org/10.1093/scan/nsm001>.
- Clayton, Nicola S., Joanna M. Dally, and Nathan J. Emery. 'Social cognition by food-caching corvids. The western scrub-jay as a natural psychologist.' *Philosophical Transactions of the Royal Society B*. Volume 362, No. 1480 (29 April 2007): 507-522, <https://doi.org/10.1098/rstb.2006.1992>.
- Cohen, Elliot D. 'Freud's Brain: Neuroscience suggests that the brain has "id", "ego", and "superego" substrates.' in *Psychology Today* (18 Mars 2020): <https://www.psychologytoday.com/us/blog/what-would-aristotle-do/202003/freuds-brain>.
- Cole, Jonathan and Ian Waterman. With a foreword by Oliver Sacks. *Pride and a Daily Marathon*. Cambridge, MA: MIT Press, 1995.
- Colombetti, Giovanna and Evan Thompson. 'Enacting emotional interpretations with feeling.' Commentary on Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modeling.' *Behavioral and Brain Sciences*, Volume 28, Issue 2 (April 2005): 200. <https://doi.org/10.1017/S0140525X0542004X>.
- Cook, Peter F. Ashley Prichard, Mark Spivak, Regory S. Berns. 'Awake canine fMRI predicts dogs' preference for praise vs food.' *Social Cognitive and Affective Neuroscience*, Volume 11, Issue 12 (December 2016): 1853-1862. <https://doi.org/10.1093/scan/nsw102>.
- Cooke, Deryck: *The Language of Music* [1959]. Oxford: Oxford University Press 1989.
- Cooper, Martin. *Beethoven: The Last Decade 1817-1827*. London: Oxford University Press, 1970.
- Coudé, Gino, Pier Francesco Ferrari, Francesca Rodà, Monica Maranesi, Eleonora Borelli, Vania Veroni, Fabio Monti, Stefano Rozzi, Leonardo Fogassi. 'Neurons Controlling Voluntary Vocalization in the Macaque Ventral Premotor Cortex'. *Plos One*. Volume 6, Issue 11 (2 November 2011): e26822. <https://doi.org/10.1371/journal.pone.0026822>.

- Craig, A. D. 'Forebrain emotional asymmetry: a neuroanatomical basis?'. *Trends in Cognitive Sciences*. Volume 9, Issue 12 (December 2005): 566-571. <https://doi.org/10.1016/j.tics.2005.10.005>.
- Crocker, Richard L. 'Melisma'. In the first edition of *The New Grove Dictionary of Music and Musicians*, [1980]. Edited by Stanley Sadie. London, Macmillan Publishers Limited, 1998. Volume 12, 105-106.
- Crockford, Catherine, Roman M. Wittig, Roger Mundry, Klaus Zuberbühler. 'Wild Chimpanzees Inform Ignorant Group Members of Danger,' *Current Biology*. Volume 22, Issue 2 (24 January 2012): 142-146,. <https://doi.org/10.1016/j.cub.2011.11.053>.
- Crone, Eveline A., Carter Wendelken, Linda van Leijenhorst, Ryan D. Honomichi, Kalina Christoff, Silvia A. Bunge. 'Neurocognitive Development of Relational Reasoning,' *Developmental Science*, Volume 12, Number1 (January 2009): 55-66. <https://doi.org/10.1111/j.1467-7687.2008.00743.x>.
- Cross, Emily S., Antonia F. de C. Hamilton, Scott T. Grafton. 'Building a motor simulation de novo: observation of dance by dancers'. *Neuroimage*. Volume 31, Issue 3 (1 July 2006): 1257-1267. <https://doi.org/10.1016/j.neuroimage.2006.01.033>.
- Csikszentmihályi, Mihály. *Creativity: Flow and the Psychology of Discovery and Invention*. New York: Harper Perennial, 1996.
- Currivan, Jude. *The Cosmic Hologram: In-formation at the Center of Creation*. Rochester, Vermont: Inner Traditions, 2017.
- Dahlhaus, Carl. *Die Musiktheorie im 18. und 19. Jahrhundert, Zweiter Teil: Deutschland*. Darmstadt: Wissenschaftlich Buchgesellschaft, 1989.
- Damasio, Antonio, *Descartes' Error: Emotion, Reason and the Human Brain* [1994]. New York: Vintage Books, 2006.
- Damasio, Antonio. *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*. San Diego: A Harvest book, Harcourt, inc., 1999.
- Damasio, Antonio, *Looking for Spinoza: Joy, Sorrow and the Feeling Brain*. London: Vintage, 2004.
- Damasio, Antonio. *Self Comes to Mind: Constructing the Conscious Brain*. New York: Pantheon Books, 2010.
- Damasio, Antonio, Hanna Damasio, and Daniel Tranel. 'Persistence of Feelings and Sentience after Bilateral Damage of the Insula'. *Cerebral Cortex*, Volume 23, Issue 4 (1 April 2013): 833-846. <https://doi.org/10.1093/cercor/bhs077>.
- Davies, Martin, Max Coltheart, Robyn Langdon, Nora Breen. 'Monothematic Delusions: Towards a Two-Factor Account'. *Philosophy, Psychiatry, and Psychology*, Volume 8, Number 2/3 (June/September 2001): 133-158. <https://doi.org/10.1353/ppp.2001.0007>.
- Demertzi, Athena, Georgios Antonopoulos, Lizette Heine, Henning U. Voss et al. 'Intrinsic functional connectivity differentiates minimally conscious from unresponsive patients'. *Brain*, Volume 138, Issue 9 (September 2015): 2619-2631, <https://doi.org/10.1093/brain/awv169>.
- Dennett, Daniel. *Content and Consciousness*. New York: Routledge & Kegan Paul, 1969.
- Derrida, Jacques. *Writing and Difference* [1967]. Translated by. Alan Bass. Chicago: The University of Chicago Press, 1978.

- Desmurget, Michel and Angela Sirigu, 'A parietal-premotor network for movement intention and motor awareness'. *Trends in Cognitive Sciences*, Vol. 13, No 10 (2009): 411-419. <https://doi.org/10.1016/j.tics.2009.08.001>.
- Dick, Antony Steven, and Willis F. Overton. 'Executive Function: Description and Explanation.' Chapter 1 in Bryan Sokol, Ulrich Müller, Jeremy Carpendale, Arlene Young, and Grace Larocci eds. *Self and social Regulation: social interaction and the development of social understanding and executive functions*. New York: Oxford University Press, 2010.
- Dick, Anthony Steven, Dea Garic, Paulo Graziano, Pascale Tremblay. 'The frontal aslant tract (FAT) and its role in speech, language and executive function'. *Cortex*, Volume 111 (February 2019): 148-163. [10.1016/j.cortex.2018.10.015](https://doi.org/10.1016/j.cortex.2018.10.015).
- Dippel, Gabriel, Christian Beste. 'A causal role for the right inferior frontal cortex in implementing strategies for multi-component behaviour'. *Nature Communications*, Volume 6, No 6587 (8 April 2015). <https://doi.org/10.1038/ncomms7587>.
- Donald, Merlin. *Origins of the Modern Mind*. Cambridge: Harvard University Press, 1991.
- Donnay, Gabriel F., Summer K. Rankin, Monica Lopez-Gonzalez, Patpong Jiradejvong, Charles J. Limb. 'Neural Substrates of Interactive Musical Improvisation: An fMRI Study of 'Trading fours' in Jazz'. *PLoS ONE*. Volume 9, Issue 2 (19 February 2014): e88665. <https://doi.org/10.1371/journal.pone.0088665>.
- Doolittle, Emily L., Bruno Gingras, Dominik M. Endres, and W. Tecumseh Fitch. 'Overtone-based pitch selection in hermit thrush song: Unexpected convergence with scale construction in human music,' *PNAS*, Volume. 111, No. 46 (3. November 2014): 16616-16621. <https://doi.org/10.1073/pnas.1406023111>.
- Doya, Kenji, 'Complementary roles of basal ganglia and cerebellum in learning and motor control'. *Current Opinion in Neurobiology*, 10(6) (December 2000): 732-739. [https://doi.org/10.1016/S0959-4388\(00\)00153-7](https://doi.org/10.1016/S0959-4388(00)00153-7).
- Dresler, Martin, Renate Wehrle, Vicor I. Spoormaker, et al. 'Neural Correlates of Dream Lucidity Obtained from Contrasting Lucid versus Non-Lucid REM Sleep: A Combined EEG/fMRI Case Study.' *Sleep*, Vol. 35, No. 7 (1 July 2012): 1017-1020. <https://doi.org/10.5665/sleep.1974>.
- Dunning, Albert. 'Musica Reservata', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 12, 825-827.
- Ekman, Paul. 'An argument for basic emotions.' *Cognition and Emotion*, Volume 6, Issue 3-4 (1992), <https://doi.org/10.1080/02699939208411068>.
- Elliott, Rebecca, Raymond J. Dolan, and Chris D. Frith. 'Dissociable Functions in the Medial and Lateral Orbitofrontal Cortex: Evidence form human Neuroimaging Studies'. *Cerebral Cortex*. Volume 10, Issue 3 (1 March 2000): 308-317. <https://doi.org/10.1093/cercor/10.3.308>.
- Ellis, Hadyn D., Andrew W. Young, Angela H. Quayle, Karel. W. de Pauw. 'Reduced autonomic responses to faces in Capgras delusion'. *Proceedings of the Royal Society of London. Series B:*

- Biological Sciences*, Volume 264, No. 1384 (22 July 1997): 1085-1092. <https://doi.org/10.1098/rspb.1997.0150>.
- Ellis, Havelock. *The Dance of Life*. New York: Modern Library, 1923.
- Ellis, John M. *Against Deconstruction*. Princeton, New Jersey: Princeton University Press, 1989.
- Euston, David R., Aaron J. Gruber, and Bruce L. McNaughton. 'The Role of Medial Prefrontal Cortex in Memory and Decision Making.' *Neuron*, Volume 76, Issue 6 (20 December 2012): 1057-1070. <https://doi.org/10.1016/j.neuron.2012.12.002>.
- Fadiga, Luciano, Laila Craighero, Alessandro D'Ausilio. 'Broca's Area in Language, Action, and Music'. *Annals of the New York Academy of Sciences*. Volume 1169, Issue 1 (24 July 2009): 448-458. <https://doi.org/10.1111/j.1749-6632.2009.04582.x>.
- Falk, Dean, Frederick E. Lepore, and Andrianne Noe. 'The cerebral cortex of Albert Einstein: a description and preliminary analysis of unpublished photographs'. *Brain*, Vol. 136, Issue 4 (April 2013): 1304-1327, <https://doi.org/10.1093/brain/aws295>.
- Fallows, David. 'Ars nova'. In The Second Edition of *The new Grove Dictionary of Music and Musicians*, ed. Stanly Sadie and John Tyrell. London: Macmillan, 2001.
- Fannin, Henry A., W. F. Braud. 'Preference for Consonant over Dissonant Tones in the Albino Rat.' *Perceptual and Motor Skills*, 32 (1) (1 February 1971): 191-193. <https://doi.org/10.2466/pms.1971.32.1.191>.
- Fedorenko, Evelina, and Rosemary Varley. 'Language and thought are not the same thing: evidence from neuroimaging and neurological patients.' *Annals of the New York Academy of Sciences*, 1369(1): 1-22 (April 2016). <https://doi.org/10.1111/nyas.13046>.
- Fiebach, Christian J. and Ricarda I. Schubotz. 'Dynamic anticipatory processing of hierarchical sequential events: a common role for Broca's area and ventral premotor cortex across domains?.' *Cortex* 42 (4) (May 2006): 499-502. [https://doi.org/10.1016/s0010-9452\(08\)70386-1](https://doi.org/10.1016/s0010-9452(08)70386-1).
- Forde Thompson, William, Manuela M. Marin, and Lauren Stewart. 'Reduced sensitivity to emotional prosody in congenital amusia rekindles the musical protolanguage hypothesis'. *PNAS*. Volume 109, No. 46 (29 October, 2012): 19027-19032. <https://doi.org/10.1073/pnas.1210344109>.
- Forkel, Johann Nikolaus. *Allgemeine Geschichte der Music*. Leipzig: Schwickert, 1788-1801.
- Fox, Kieran C. R., Savannah Nijeboer, Elizaveta Solomonova, G. William Domhoff, and Kalina Christoff. 'Dreaming as mind wandering: evidence from functional neuroimaging and first-person content reports'. *Frontiers in Human Neuroscience*. Volume 7, No. 412 (30 July 2013). <https://doi.org/10.3389/fnhum.2013.00412>.
- Freeman, Walter J. 'Emotion is from preparatory brain chaos; irrational action is from premature closure.' Commentary to Marc D. Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modeling.' *Behavioral and brain sciences*, Volume 28, Issue 2 (12 August 2005): 204-205, <https://doi.org/10.1017/S0140525X05330044>.
- Freitas, Carina, Enrica Manzato, Alessandra Burini, Margot J. Taylor, Jason P. Lerch, and Evdokia Anagnostou. 'Neural correlates of Familiarity in Music listening: A Systematic Review and a

- Neuroimaging Meta-Analysis'. *Frontiers in Neuroscience*, Volume 12 (5 October 2018). <https://doi.org/10.3389/fnins.2018.00686>.
- Freud, Sigmund: *On Metapsychology: The Theory of Psychoanalysis*. The Penguin Freud Library, Volume 11. Edited by Angela Richards. Translated under the general editorship of James Strachey. London, Penguin Books, 1984.
- Freud, Sigmund. *The Standard Edition of the Complete Psychological Works of Sigmund Freud*. Volume 12 (1911-1913): The Case of Schreiber, Papers on Technique and Other works. Translated by James Strachey in collaboration with Anna Freud. London: Vintage books, 2001.
- Fried, Itzhak, Amiram Katz, Gregory McCarthy, Kimberlee J. Sass, Peter Williamson, Susan S. Spencer, and Dennis D. Spencer. 'Functional organization of human supplementary motor cortex studied by electrical stimulation'. *The Journal of Neuroscience*, Volume 11 No. 11 (November 1991): 3656-3666. <https://doi.org/10.1523/JNEUROSCI.11-11-03656.1991>.
- Frijda, Nico H. *The Laws of Emotion* (Mahwah New Jersey: Laurence Erlbaum Associates, 2007)
- Freitas, Carina, Enrica Manzato, Alessandra Burini, Margot J. Teylor, Jason P. Lerch, Evdokia Anagnostou. 'Neural Correlates of Familiarity in Music Listening: A Systematic Review and a Neuroimaging Meta-Analysis'. *Frontiers in Neuroscience*, Volume 12 (5 October 2018). <https://doi.org/10.3389/fnins.2018.00686>.
- Fuchs, Perry N., Yuan Bo Peng, Jessica A. Boyette-Davis, and Megan L. Uhelski. 'The anterior cingulate cortex and pain processing'. *Frontiers in Integrative Neuroscience* 8: 35 (5 May 2014); 8:35. <https://doi.org/10.3389/fnint.2014.00035>.
- Fujioka, Takako, Laurel J. Trainor, Edward W. Large, Bernhard Ross. 'Internalized Timing of Isochronous Sounds Is Represented in Neuromagnetic Beta Oscillations.' *Journal of Neuroscience*. Volume 32, No. 5 (1 February 2012): 1791-1802. <https://doi.org/10.1523/JNEUROSCI.4107-11.2012>.
- Fujisawa, Takashi, and Norman D. Cook. 'The perception of harmonic triads: An fMRI study.' *Brain Imaging and Behavior*. Vol. 5, Issue 2 (February 2011): <https://doi.org/10.1007/s11682-011-9116-5>.
- Gallagher, S., 'Neurophilosophy and neurophenomenology'. In *Phenomenology*, edited by L. Embree and T. Nenon. Volume 5., 293-316. Bucharest: Zeta Press, 2005.
- Gangrade, Abhishek. 'The Effect of Music on the Production of Neurotransmitters, Hormones, Cytokines, and Peptides: A Review', *Music and Medicine*, Volume 4, Article 1 (January 2012): 40-43, <https://doi.org/10.1177/1943862111415117>.
- Gao, Junling, Han Kin Leung, Bonnie Wai Yan Wu, Stavros Skouras, Hin Hung Sik. 'The neurophysiological correlates of religious chanting'. *Scientific Reports*, Volume 9, Article 4262 (12 Mars 2019). <https://doi.org/10.1038/s41598-019-40200-w>.
- Gao, Junling, Stavros Skouras, Hang Kin Leung, Bonnie Wal Yan Wu, Huljun Wu, Chunqi Chang, and Hin Hung Sik. 'Repetitive Religious Chanting Invokes Positive Emotional Schema to Counterbalance Fear: A Multi-Modal Functional and Structural MRI Study'. *Frontiers in Behavioral Neuroscience*, Volume 14 (24 November 2020). <https://doi.org/10.3389/fnbeh.2020.548856>.

- Gibbs, Raymond W. Jr. *Embodiment and Cognitive Science*. New York: Cambridge University Press, 2006.
- Gilbert, Sam J., Stephanie Spengler, Jon S. Simons, J. Douglas Steele et al. 'Functional Specialization within Rostral Prefrontal Cortex (Area 10): A Meta-analysis'. *Journal of Cognitive Neuroscience*. Volume 18, No. 6 (July 2006): 932-948. <https://doi.org/10.1162/jocn.2006.18.6.932>.
- Gillespie, A. 'The social basis of self-reflection.' In *The Cambridge handbook of socio-cultural psychology*. Edited by Jaan Valsiner and Rosa Alberto (Cambridge: Cambridge University Press, 2007): 678-691. <http://eprints.lse.ac.uk/id/eprint/38683>.
- Giorgi, Amedeo P. 'Phenomenological Psychology', in *Rethinking Psychology*. Edited by Jonathan A. Smith, Rom Harré, and Luk Van Langenhove. London: Sage Publications, 1995.
- Glenberg, Arthur M., Alex Cherry Wilkinson, and William Epstein. 'The illusion of knowing: Failure in the self-assessment of comprehension'. *Memory and Cognition*, Volume 10, Article 6 (1982): 597-602.
- Gogtay, Nitin, Jay N. Giedd, Leslie Lusk, Kiralee M. Hayashi et al. 'Dynamic mapping of human cortical development during childhood through early adulthood.' *Proceedings of the National Academy of Sciences of the United States of America*, Volume 101, No. 21 (25 May 2004): 8174-8179. <https://doi.org/10.1073/pnas.0402680101>.
- Goldberg, Elkhonon. *The Executive Brain, Frontal lobes and the Civilized Mind* (Oxford University Press, 2001)
- Gomes, Gilberto. 'Volition and the Readiness Potential'. *Journal of Consciousness Studies*, Vol. 6, No. 8-9 (1999): 59-76, <https://philarchive.org/archive/GOMVATv1>.
- Gómez-Robles, Aida, William D. Hopkins, and Chet C. Sherwood. 'Increased morphological asymmetry, evolvability and plasticity in human brain evolution.' *Proceedings of the Royal Society, B: Biological Sciences*, Volume 280, No. 1761 (24 April 2013). <https://doi.org/10.1098/rspb.2013.0575>.
- Grafton, Scott T., L. Fadiga, M. A. Arbib, G. Rizzolatti. 'Premotor cortex activation during observation and naming of familiar tools'. *Neuroimage*. Volume 6, Issue 4: 231-236 (November 1997). <https://doi.org/10.1006/nimg.1997.0293>.
- Grahn, Jessica A., and James B. Rowe. 'Finding and Feeling the Musical Beat: Striatal Dissociations between Detection and Prediction of Regularity'. *Cerebral Cortex*. Volume 23, Issue 4 (April 2013): 913-921. <https://doi.org/10.1093/cercor/bhs083>.
- Graybiel, Ann M. 'The Basal Ganglia and Chunking of Action Repertoires.' *Neurobiology of Learning and Memory*, Volume 70, Issues 1-2 (July 1998): 119-136. <https://doi.org/10.1006/nlme.1998.3843>.
- Gu, Xiaosi, Patrick R. Hof, Karl J. Friston, and Jin Fan, 'Anterior Insular Cortex and Emotional Awareness', *The Journal of comparative neurology* 521 (2013): 3371-3388.
- Gurney, Edmund. 'What is an emotion?'. In *Mind, A quarterly review of psychology and philosophy*. Edited by George Croom Robertson, Volume 9. London: Williams and Norgate, 1884.
- Haggard, Patrick. 'Human volition: towards a neuroscience of will', in *Nature reviews, Neuroscience*, vol. 9, Macmillan Publishers Limited (December 2008): 934-946.

- Hagoort, Peter. 'On Broca, brain, and binding: a new framework.' *TRENDS in Cognitive Sciences*. Volume 9, No. 9 (September 2005): <https://doi.org/doi:10.1016/j.tics.2005.07.004>.
- Hagura, Nobuhiro, Harry Barber, and Patrick Haggard. 'Food vibrations: Asian spice sets lips trembling'. *Proceedings of the Royal Society of Biological Sciences*. Volume 280, No. 1770 (7 November 2013). <https://doi.org/10.1098/rspb.2013.1680>.
- Hahn, Songsuk Susan. *Contradiction in Motion: Hegel's Organic Concept of Life and Value*. New York: Cornell University Press, 2007.
- Hameroff, Stuart. 'The "conscious pilot" - dendritic synchrony moves through the brain to mediate consciousness.' *Journal of Biological Physics*, Volume 36, Issue 1: 71-93 (January 2010). <https://doi.org/10.1007/s10867-009-9148-x>.
- Hameroff, Stuart R., and Roger Penrose. 'Consciousness in the Universe, an Updated Review of the "Orch Or" Theory', in *Biophysics of Consciousness: A foundational Approach*, edited by R. R. Plznanski, J. A. Tuszynski and T. E. Reinberg, 517-599. Singapore: World Scientific, 2016.
- Hanslick, Eduard: *Vom Musikalisch-Schönen* [1854]. Leipzig: Breitkopf & Härtel, 1910.
- Hareli, Shlomo and Brian Parkinson. 'What's social about social emotions'. *Journal for the Theory of Social Behaviour*, Volume 38, Issue 2 (8 May 2008): 131-156. <https://doi.org/10.1111/j.1468-5914.2008.00363.x>.
- Harris, Sam, Jonas T. Kaplan, Ashley Curiel, Susan Y. Bookheimer, Marco Lacoboni, Mark S. Cohen. 'The Neural Correlates of Religious and Nonreligious Belief'. *Plos One*, Volume 5, No. 1 (1 October 2009). <https://doi.org/10.1371/journal.pone.0007272>.
- Harts, Mickey, and Frederic Lieberman. *Planet Drum and Drumming at the Edge of magic*. San Francisco: Harper Collins, 1991.
- Hartshorne, Charles. *The Philosophy and Psychology of Sensation*. Eugene, Oregon: University of Chicago Press, 1934.
- Hattory, Yuko, and Masaki Tomonaga. 'Rhythmic swaying induced by sound in chimpanzees (*Pan troglodytes*)'. *The Proceedings of the National Academy of Sciences*, Volume 117, Issue 2 (23 December 2019):936-942. <https://doi.org/10.1073/pnas.1910318116>.
- Hebb, Donald Olding 'Drives and the C.N.S. (Conceptual Nervous System)'. *The Psychological Review*, Vol. 62, No. 4 (July 1955): 243-254.
- Hegel, G W. F. *Phenomenology of Spirit* [1807]. Translated by A. V. Miller. Oxford: Oxford University Press, 1977.
- Hegel, G. W. F. *Aesthetics: Lectures on Fine Art* [1820s]. Volume 2. Translated by T. M. Knox. Oxford, New York: Oxford University Press, 1998.
- Hegel, G. W. F. *Hegel's Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences* [1830]. Translated by William Wallace. Oxford: Clarendon Press, 1975.
- Hegel, G. W. F. 'Die Philosophie des Geistes'. Volume 3 of *Enzyklopädie der philosophischen Wissenschaften im Grundrisse* [1830]. Frankfurt am Main: Suhrkamp Taschenbuch Wissenschaft, 1986.

- Hegel, G. W. F. *Philosophy of Mind: Part Three of the Encyclopaedia of the Philosophical sciences*, Translated by William Wallace. Oxford: Clarendon Press, 1971.
- Hegel, G. W. F. *Elements of the Philosophy of Right*. Translated by H. B. Nisbet. Edited by Allen W. Wood. Cambridge: Cambridge University Press, 1991.
- Heilman, K.M, Watson, R.T, and Bowers, D. Affective disorders associated with hemispheric disease. In *Neuropsychology of Human Emotion*, edited by K.M. Heilman and P. Satz. New York: Guilford Press, 1983.
- Heimburg, Thomas and Andrew D. Jackson. 'On soliton propagation in biomembranes and nerves'. *Proceedings of the National Academy Sciences of the United States of America*. Volume 102, No. 28 (12 July 2005): 9790-9795, <https://doi.org/10.1073/pnas.0503823102>.
- Heinzelmann, Nora, Susanna C. Weber, Philippe N. Tobler. 'Aesthetics and morality judgments share cortical neuroarchitecture.' *Cortex*, Volume 129 (August 2020): 484-495. <https://doi.org/10.1016/j.cortex.2020.04.018>.
- Helmholtz, Hermann. *On the Sensations of Tone: as a Physiological Basis for the Theory of Music* [1863]. Translated by Alexander J. Ellis. New York: Dover Publications Inc., 1954.
- Herder, Johann Gottfried. *Kalligone*. Leipzig: Johann Friedrich Hartknoch, 1800.
- Herrmann, Christoph. S., Angela D. Riederici, Ulrich Oertel, Burkhard Maess, Anja Hahne, Kai Alter. 'The brain generates its own sentence melody: A Gestalt phenomenon in speech perception'. *Brain and Language*, Volume 85, Issue 3 (June 2003): 396-401. [https://doi.org/10.1016/s0093-934x\(03\)00054-3](https://doi.org/10.1016/s0093-934x(03)00054-3).
- Higuchi, Satomi, Thierry Chaminade, Hiroshi Imamizu, and Mitsuo Kawato. 'Shared neural correlates for language and tool use in Broca's area.' *NeuroReport*, 20 (2009): 1376-1381. <https://doi.org/10.1097/WNR.0b013e3283315570>.
- Hillman, James. *Emotion: A Comprehensive Phenomenology of Theories and their Meanings for Therapy* [1960]. Evanston, Illinois: Northwestern University Press, 1992.
- Hoehn, Ross D, David E. Nichols, Hartmut Neven, and Sabre Kals. 'Status of the Vibrational Theory of Olfaction'. *Frontiers in Physics* (19 March 2018). <https://doi.org/10.3389/fphy.2018.00025>.
- Hoffman, Donald D. 'The Origin of Time In Conscious Agents', *Cosmology*, Vol. 18: 494-520 (2014).
- Hoffmann, Ernst Theodor Amadeus. *E.T.A. Hoffmanns Musikalische Schriften*. Edited by Edgar Istel. Stuttgart: Greiner & Pfeiffer, 1907.
- Hoffstaedter, Felix, Christian Grefkes, Karl Zilles, Simon B. Eickhoff. 'The "What" and "When" of Self-initiated Movements', *Cerebral Cortex*. Volume 23, Issue 3 (Mars 2013): 520-530. <https://doi.org/10.1093/cercor/bhr391>.
- Hooker, Christine I. and Robert T. Knight. 'The role of lateral orbitofrontal cortex in the inhibitory control of emotion.' Chapter 12 in David Zald and Scott Rauch, eds. *The Orbitofrontal Cortex*. Oxford University Press, 2006. 307-324.

- Hornak, J, J. Bramham, E. T. Rolls, R. G. Morris, J. O'Doherty, P. R. Bullock, C. E. Polkey. 'Changes in emotion after circumscribed surgical lesions of the orbitofrontal and cingulate cortices'. *Brain*, Volume 126, Issue 7 (1 July 2003): 1691-1712. <https://doi.org/10.1093/brain/awg168>.
- Hou, Yingying, Bei Song, Yingying Hu, Yafeng Pan, Yi Hu. 'The averaged inter-brain coherence between the audience and a violinist predicts the popularity of violin performance'. *Neuroimage*, Volume 211, Article 116655 (1 May 2020). <https://doi.org/10.1016/j.neuroimage.2020.116655>.
- Huels, Emma R., Trent Groenhout, Christopher W. Fields, Tiecheng Liu, George A. Mashour, Dinesh Pal. 'Inactivation of Prefrontal Cortex Delays Emergence From Sevoflurane Anesthesia'. *Frontiers in systems Neuroscience*. Volume 15 (9 July 2021). <https://doi.org/10.3389/fnsys.2021.690717>.
- Humphrey, Nicholas. *Sentience: The Invention of Consciousness*. Cambridge, Massachusetts and London: The MIT Press, 2023.
- Husserl, Edmund. *Logische Untersuchungen*. Halle: Niemeyer, 1901.
- Husserl, Edmund. *Logical Investigations*. Volume 1. Translated by J. N. Findlay. London: Routledge and Kegan Paul, 1970.
- Husserl, Edmund. *Cartesian Meditations: An Introduction to Phenomenology* [1931]. Translated by Dorion Cairns. Dordrecht: Kluwer Academic Publishers, 1991.
- Hyde, Krista L., Isabelle Peretz, Robert Zatorre. 'Evidence for the role of the right auditory cortex in fine pitch resolution'. *Neuropsychologia*, Volume 46, Issue 2 (2008): 632-639. <https://doi.org/10.1016/j.neuropsychologia.2007.09.004>.
- Hyde, Krista L., Robert Zatorre, and Isabelle Peretz. 'Functional MRI Evidence of an Abnormal Neural Network for Pitch Processing in Congenital Amusia'. *Cerebral Cortex*, Volume 21, Issue 2 (February 2011): 292-299. <https://doi.org/10.1093/cercor/bhq094>.
- Ishizu, Tomohiro, and Semir Zeki. 'Toward A Brain-Based Theory of Beauty'. *PLoS ONE*, Volume 6, No. 7 (6 July 2011), <https://doi.org/10.1371/journal.pone.0021852>.
- Jackson, Leonard: *The Poverty of Structuralism: Literature and Structuralist Theory*. London and New York: Longman, 1991.
- Jacobs, Bob, Matthew Schall, Melissa Prather, Elisa Kapler et al. 'Regional Dendritic and Spine Variation in Human Cerebral Cortex: a Quantitative Golgi Study.' *Cerebral Cortex*. Volume 11, Issue 6 (1 June 2001): 558-571. <https://doi.org/10.1093/cercor/11.6.558>.
- Jacobsen, Jörn-Henrik, Johannes Stelzer, Thomas Hans Fritz, Gael Chételat, Renaud La Joie, Robert Turner. 'Why musical memory can be preserved in advanced Alzheimer's disease'. *Brain*. Volume 138, Issue 8 (August 2015): 2438-2450. <https://doi.org/10.1093/brain/awv135>.
- Jacobson, Theodore A., and Renaud Parentani, 'An Echo of Black Holes'. *Scientific American*. Volume 293, No 6 (December 2005): 68-75. <https://doi.org/10.1038/scientificamerican0407-12sp>.
- Jaeger, Gregg. 'The Elementary Particles of Quantum Fields'. *Entropy (Basel)*, Volume 23, Issue 11: 1416 (28 October 2021). <https://doi.org/10.3390/e23111416>.

- James, William. 'What is an Emotion'. In *Mind: a quarterly review of psychology and philosophy*. Volume 9. Edited by George Croom Robertson (1 April 1884): 188-205. <https://www.jstor.org/stable/2246769>.
- James, William. *The Principles of Psychology*. London: Macmillan, 1891.
- James, William. *A pluralistic Universe* [1909]. Edited and introduced by H. G. Callaway. Newcastle upon Tyne: Cambridge Scholars Publishing, 2008.
- James, William, *Writings 1902-1910: The Varieties of Religious Experience, Pragmatism, A Pluralistic Universe, The Meaning of Truth, Some Problems of Philosophy, Essays*. New York: The Library of America, 1987.
- Jamjoom, A. A. B., P. Gallo, J. Kandasamy, J. Phillips, D. Sokol. (2017) Autobiographical memory loss following a right prefrontal lobe tumour resection: a case report and review of the literature. *Child's Nervous System*, Volume 33, Issue 7 (21 Mars 2017): 1221-1223. <https://doi.org/10.1007/s00381-017-3380-7>.
- Janata, Petr, Jeffrey L. Birk John Van Horn, Marc Leman et al. 'The Cortical Topography of Tonal Structures Underlying Western Music.' *Science*. Volume 298, No. 5601 (13 December 2002): 2167-2170. <https://doi.org/10.1126/science.1076262>.
- Janata, Petr. 'The Neural Architecture of Music Evoked Autobiographical Memories. *Cerebral Cortex*. Volume 19, Issue 11 (November 2009): 2579-2594. <https://doi.org/10.1093/cercor/bhp008>.
- Janata, Petr. 'Music and the self'. Chapter 8 in R. Haas and V. Brandes eds., *Music that works* (Vienna: Springer, 2009). https://doi.org/10.1007/978-3-211-75121-3_8.
- Jarcho, Johanna M., Elliot T. Berkman, and Matthew D. Lieberman. 'The neural basis of rationalization: cognitive dissonance reduction during decision-making.' *Social Cognitive and Affective Neuroscience*, Volume 6, Issue 4 (September 2011): 460-467. <https://doi.org/10.1093/scan/nsq054>.
- Jaross, Werner. 'The Possible Role of Molecular Vibration in Intracellular Signalling', *Journal of Cellular Signalling*. Volume 1, Issue 4; 180-186 (2020). <https://doi.org/10.33696/Signaling.1.027>.
- Jayasooriya, S. D., Bhesh Bhandari, Peter Torley and Bruce Robert D'Arcy. 'Effect of High Power Ultrasound Waves on Properties of Meat: A Review'. *International Journal of Food Properties*, Volume 7, Issue 2 (December 2004): 301-319. <https://doi.org/10.1081/JFP-120030039>.
- Johnsen, Erica, Daniel Tranel, Susan Lutgendorf, and Ralph Adolphs. 'A neuroanatomical Dissociation for Emotion Induced by Music'. *International Journal of Psychophysiology* 72(1) (April 2009): 24-33. <https://doi.org/10.1016/j.ijpsycho.2008.03.011>.
- Johnsrude, Ingrid S., and Olaf Hauk, chapter 14, 'Neuroimaging', in Nick Braisby and Angus Gellatly, ed. *Cognitive Psychology*, Second edition. Oxford: Oxford university Press, 2012.
- Jordania, Joseph. *Who Asked the First Question: The Origins of Human Choral Singing, Intelligence, Language and Speech*. Tbilisi: Logos, 2006.
- Joseph, Rhawn. *Neuropsychiatry, Neuropsychology, Clinical Neuroscience*, 3rd edition. New York: Academic Press, 2000.

- Jubault, Thomas, Chrystele Ody, and Etienne Koechlin. 'Serial Organization of Human Behavior in the Inferior Parietal Cortex.' *The Journal of Neuroscience*, 27(41) (10 October 2007): 11028-11036. <https://doi.org/10.1523/JNEUROSCI.1986-07.2007>.
- Jungblut, Monika, Walter Huber, Monika Pustleniak, Ralph Schnitker. 'The impact of rhythm complexity on brain activation during simple singing: an event-related fMRI study.' *Restorative Neurology and Neuroscience*. Volume 30, Issue 1 (2012):39-53. <https://doi.org/10.3233/RNN-2011-0619>.
- Jürgens, Uwe. 'Neural pathways underlying vocal control.' *Neuroscience & Biobehavioral Reviews*. Volume 26, Issue 2 (March 2002): 235-258. [https://doi.org/10.1016/S0149-7634\(01\)00068-9](https://doi.org/10.1016/S0149-7634(01)00068-9).
- Khait, Itzhak, O. Lewin-Epstein, R. Sharon, K. Saban et al. 'Sounds emitted by plants under stress are airborne and informative'. *Cell*, Volume 186, Issue 7: 1328-1336 (30 Mars 2023). <https://doi.org/10.1016/j.cell.2023.03.009>.
- Kapoor, Vishal, Abhilash Dwarakanath, Shervin Safavi, Joachim Werner et al. 'Decoding internally generated transitions of conscious contents in the prefrontal cortex without subjective reports'. *Nature Communications*. Volume 13, Article 11535 (22 March 2022). <https://doi.org/10.1038/s41467-022-28897-2>.
- Kar, Kohitij and James J. DiCarlo. 'Fast Recurrent Processing via Ventrolateral Prefrontal Cortex Is Needed by the Primate Ventral Stream for Robust Core Visual Object Recognition'. *Neuron*, Volume 109, Issue 1: 164-176 (6 January 2021). <https://doi.org/10.1016/j.neuron.2020.09.035>.
- Katayama, Kaoru, Nobuyoshi Takahashi, Kazue Ogawara, Takamichi Hattori. 'Pure Topographical Disorientation Due to Right Posterior Cingulate Lesion'. *Cortex*, Volume 35, Issue 2 (1999):279-282. [https://doi.org/10.1016/S0010-9452\(08\)70801-3](https://doi.org/10.1016/S0010-9452(08)70801-3).
- Keeler, Jason R., Edward A. Roth, Brittany L. Neuser, John M. Spitsbergen, Daniel J. M. Waters, and John-Mary Vianney. 'The neurochemistry and social flow of singing: bonding and oxytocin.' *Frontiers in Human Neuroscience*. Volume 9, Article 518 (23 September 2015), <https://doi.org/10.3389/fnhum.2015.00518>.
- Keenan, Julian P., and Gorman, Jamie. 'Reply to commentary on "The causal role of the right hemisphere in self-awareness: it is the brain that is selective"'. *Cortex*, 43 (2007): 1074-1082.
- Kemp, D. T. 'Stimulated acoustic emissions from within the human auditory system'. *The Journal of the Acoustical Society of America*. Volume 64, Issue 5 (1 January 1978): 1386. <https://doi.org/10.1121/1.382104>.
- Kennerley, Steve W., K. Sakai, M. F. S. Rushworth. 'Organization of action sequences and the role of the pre-SMA'. *Journal of Neurophysiology*, Volume 91, Issue 2 (February 2004):978-993. <https://doi.org/10.1152/jn.00651.2003>.
- Kerskens, Christian Matthias and David López Pérez. 'Experimental indications of non-classical brain functions'. *Journal of Physics Communications*. Volume 6, Number 10 (7 October 2022): <https://doi.org/10.1088/2399-6528/ac94be>.
- Kinderman, William. *Beethoven's Diabelli Variations*, Oxford: Clarendon Press, 1987.

- Klempe, Hroar. *Fra opplysning til eksperiment: Om psykologiens oppkomst fra Wolff til Wundt*. Bergen: Fagbokforlaget, 2008.
- Koechlin, Etienne, Gregory Corrado, Pietro Pietrini, and Jordan Grafman. 'Dissociating the role of the medial and lateral anterior prefrontal cortex in human planning'. *Proceedings of the National Academy of Sciences of the United States of America*. Volume 97, No 13 (13 June 2000): 7651-7656. <https://doi.org/10.1073/pnas.130177397>.
- Koechlin, Etienne, Thomas Jubault. 'Broca's Area and the Hierarchical Organization of Human Behavior'. *Neuron*. 50(6) (15 June 2006): 936-974. <https://doi.org/10.1016/j.neuron.2006.05.017>.
- Koechlin, Etienne. 'Frontal Pole function: what is specifically human.' *Trends in Cognitive Sciences*. Volume 15, no. 6, (June 2011) <https://doi.org/10.1016/j.tics.2011.04.005>.
- Koelsch, Stefan. 'Toward a neural basis of music perception - a review and updated model.' *Frontiers of Psychology*. Volume 2 (9 June 2011): <https://doi.org/10.3389/fpsyg.2011.00110>.
- Koffka, Kurth. *Principles of Gestalt Psychology*. London: Routledge and Keagan Paul ltd, 1935.
- Kohlberg, Lawrence. 'The Claim to Moral Adequacy of a Highest Stage of Moral Judgment.' *The Journal of Philosophy*. Volume 70, No. 18 (25 October 1973): 630-646. <https://doi.org/10.2307/2025030>.
- Kohlberg, Lawrence, Clark Power. 'Moral Development, Religious Thinking, and the Question of a Seventh Stage'. In Lawrence Kohlberg (ed.). *Essays of Moral Development Vol 1: The Philosophy of Moral Development*. San Francisco, CA: Harper & Row, 1981.
- Köhler, Wolfgang. *The Mentality of Apes* [1925]. Translated by Ella Winter. New York: Liveright, 1976.
- Köhler, Wolfgang. *Gestalt Psychology: An Introduction to New Concepts in Modern Psychology* [1947] New York: Liveright, 1992.
- Kohut, Heinz and Ernest S. Wolf, 'The disorders of the self and their treatment: An outline.' *International Journal of Psycho-Analysis*. Volume 59 (1978).
- Kohut, Heinz. 'Observations on the Psychological Functions of Music.' Chapter 2 in *Psychoanalytic Explorations in Music*. Edited by Stuart Feder, Richard L. Karmel, and George H. Pollock. Madison, Connecticut: International Universities Press, 1990.
- Koubeissi, Mohamad Z, Fabrice Bartolomei, Abdelrahman Beltagy, Fabienne Picard. 'Electrical stimulation of a small brain area reversibly disrupts consciousness'. *Epilepsy & Behavior*, 37C (August 2014):32-35. <https://doi.org/>.
- Kouneihier, Frédérique, Sylvain Charron, Etienne Koechlin. 'Motivation and cognitive control in the human prefrontal cortex.' *Nature Neuroscience*, Volume 12, Number 7 (July 2009), <https://doi.org/10.1038/nn.2321>.
- Kowalchuk, Mary. Helena Palmieri, Elena Conte, Pascal Wallisch. 'Narcissism through the lens of performative self-elevation', *Personality and Individual Differences*, Volume 177 (July 2021), <https://doi.org/10.1016/j.paid.2021.110780>.
- Kraus, Nina. *Of Sound Mind: How Our Brain Constructs a Meaningful Sonic World*. Cambridge, Massachusetts, London, England: The MIT Press, 2021.

- Kregor, Jonathan. *Cambridge Introductions to Music: Programme Music*. Cambridge: Cambridge University Press 2015.
- Kringelbach, Morten L and Edmund T. Rolls. 'The functional neuroanatomy of the human orbitofrontal cortex: evidence from neuroimaging and neuropsychology.' *Progress in Neurobiology*. Volume 72 (2004): 341-372, <https://doi.org/doi:10.1016/j.pneurobio.2004.03.006>.
- Kuhn, Thomas. *The Structure of Scientific Revolutions* [1962]. Chicago and London: University of Chicago Press, 1970.
- Kühn, Simone, Marcel Brass, and Patrick Haggard. 'Feeling in control: Neural correlates of experience of agency'. *Cortex*, Volume 49, Issue 7 (July-August 2013): 1935-1942. <https://doi.org/10.1016/j.cortex.2012.09.002>.
- Kurniawan, Irma Triasih, Marc Guitart: Masip, and Ray J. Dolan. 'Dopamine and effort-based decision making'. *Frontiers in Neuroscience* (21 June 2011). <https://doi.org/10.3389/fnins.2011.00081>.
- Kretzschmar, Hermann. 'Anregungen zur Förderung musikalischer Hermeneutik' [1902], in *Gesammelte Aufsätze über Musik*. Band II. Leipzig: Breitkopf & Härtel, 1911.
- Lachmann, Frank M. 'Richard Wagner: Grandiosity, Entitlement, and its Metastases', *Psychoanalytic Inquiry*. Volume 34, Issue 5 (2014): 498-512, <https://doi.org/10.1080/07351690.2013.846028>.
- Lakoff, George and Mark Johnson, *Philosophy in the flesh: The Embodied Mind and its Challenge to Western Thought*. New York: Basic Books, 1999.
- Landis-Shack, Nora, Adrienne J. Heinz, Marcel O. Bonn-Miller. 'Music Therapy for Posttraumatic Stress in Adults: A theoretical Review.' *Psychomusicology: Music, Mind, and Brain*. Volume 27(4) (2017): 334-342. <https://doi.org/10.1037/pmu0000192>.
- Langer, Susanne K. *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite, and Art* [1942]. Cambridge, Massachusetts: Harvard University Press, 1979.
- Langer, Susanne K. *Feeling and Form: a Theory of Art*. New York: Charles Scribner's Sons, 1953.
- Large, Edward W. 'Chapter 7: Neurodynamics of Music', in *Music Perception*, Springer Handbook of Auditory Research. Edited by Mari Riess Jones, Richard R. Fay, and Arthur N. Popper, Volume 36: 201-231. New York: Springer, 2010. https://doi.org/10.1007/978-1-4419-6114-3_7.
- Large, Edward W. 'Musical Tonality, Neural Resonance and Hebbian Learning.' In C. Agon, E. Amior, M. Andreatta, G. Assayag, J. Bresson, J. Manderau Eds. *Mathematics and Computation in Music* (Berlin: Springer, 2011): 115-125.
- Large, Edward W., Ji Chul Kim, Nicole Kristine Flaig, Jamshed J. Bharucha, Carol Lynne Krumhansl. 'A Neurodynamic Account of Musical Tonality'. *Music Perception*, Volume. 33, Issue 3, 319-331 (1 February 2016). <https://doi.org/10.1525/mp.2016.33.3.319>.
- Lauritzen, Martin, Claus Mathiesen, Katharina Schaefer, Kirsten J. Thomsen. 'Neuronal inhibition and excitation, and the dichotomic control of brain hemodynamic and oxygen responses.' *NeuroImage*. Volume 62, Issue 2 (August 2012): 1040-1050. <https://doi.org/10.1016/j.neuroimage.2012.01.040>.

- Leaver, Amber M., Jennifer Van Lare, Brandon Zielinski, Andrea R. Halpern, Josef P. Rauschecker. 'Brain Activation during Anticipation of Sound Sequences.' *The Journal of Neuroscience*. Volume 29, No. 8 (25 February 2009): 2477-2485. <https://doi.org/10.1523/JNEUROSCI.4921-08.2009>.
- LeDoux, Joseph. *The Emotional Brain: The Mysterious Underpinnings of Emotional Life*. New York: Simon and Schuster, 1996.
- LeDoux, Joseph. *Synaptic Self: How Our Brains Become Who We Are*. London: Penguin Books, 2003.
- LeDoux, Joseph. 'Rethinking the Emotional Brain.' *Neuron*, Vol. 73, Issue 4 (23 February 2012): 653-676. <https://doi.org/10.1016/j.neuron.2012.02.004>.
- Lee, Colin A., Jeffrey W. Brown and Rhanor Gillette. 'Coordination of Locomotion by Serotonergic Neurons in the Predatory Gastropod *Pleurobranchaea californica*'. *Journal of Neuroscience*, Volume 43, Issue 20: 3647-3657 (17 May 2023). <https://doi.org/10.1523/JNEUROSCI.1386-22.2023>.
- Leggieri, Melissa, Michael H. Thaut, Luis Fornazzari, Tom A. Schweizer, Joseph Barfett, David G. Munoz, and Corinne E. Fischer. 'Music Intervention Approaches for Alzheimer's Disease: A Review of the literature'. *Frontiers in Neuroscience*. Volume 13, Issue 132 (12 March 2019), <https://doi.org/10.3389/fnins.2019.00132>.
- Lepage, Martin, Omar Ghaffar, Lars Nyberg, Endel Tulving. 'Prefrontal cortex and episodic memory retrieval mode'. *Proceedings of the National Academy of Sciences*, Volume 97, No. 1 (4 January 2000):506-511. <https://doi.org/10.1073/pnas.97.1.506>.
- Levesque, Johanne, Fanny Eugène, yves Joannette, Vincent Paquette et al. 'Neural circuitry underlying voluntary suppression of sadness'. *Biological Psychiatry*. Volume 53, Issue 6 (15 March 2003):502-510. [https://doi.org/10.1016/S0006-3223\(02\)01817-6](https://doi.org/10.1016/S0006-3223(02)01817-6).
- Levitin, Daniel J. and Vinod Menon. 'Musical structure is processed in "language" areas of the brain: a possible role for Brodmann Area 47 in temporal coherence.' *Neuroimage*. Volume 20, Issue 4 (December 2003): 2142-2152. <https://doi.org/10.1016/j.neuroimage.2003.08.016>.
- Lewis, Marc D. 'Bridging emotion theory and neurobiology through dynamic systems modeling'. *Behavioral and Brain Sciences*, Volume 28, Issue 2, 169-194, discussion 194-245 (April 2005): <https://doi.org/10.1017/S0140525X0542004X>.
- Lewis, Michael B., Sarah Sherwood, Hamdy Moselhy, Haydn D. Ellis. 'Autonomic responses to familiar faces without autonomic responses to familiar voices: Evidence for voice-specific Capgras delusion'. *Cognitive Neuropsychiatry*, Volume 6, Issue 3 (2001): 217-228. <https://doi.org/10.1080/13546800143000041>.
- Li, Wei, Lei Ma, Guang Yang, and Wenbiao Gan. 'REM sleep selectively prunes and maintains new synapses in development and learning.' *Nature Neuroscience*. Volume 20, Issue 3 (March 2017): 427-437. <https://doi.org/10.1038/nn.4479>.
- Libet, Benjamin, Curtis A. Gleason, Elwood W. Wright. 'Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential): the unconscious initiation of a freely voluntary act', in *Brain* 106 (Pt 3) (October 1983): 623-642. <https://doi.org/10.1093/brain/106.3.623>.

- Libet, Benjamin. 'Unconscious cerebral initiative and the role of conscious will in voluntary action'. *Behavioral and Brain Sciences*, 8, (1985): 529-566.
- Liljenström, Hans. 'Consciousness, decision making, and volition: freedom beyond chance and necessity'. *Theory in Biosciences*, Vol. 141: 125-140 (June 2022). <https://doi.org/10.1007/s12064-021-00346-6>.
- Lima, César F., Saloni Krishnan, and Sophie K. Scott. 'Roles of Supplementary Motor Areas in Auditory Processing and Auditory Imagery'. *Trends in Neurosciences*, Volume 39, Issue 8 (August 2016): 527-542. <https://doi.org/10.1016/j.tins.2016.06.003>.
- Limb, Charles J. and Allan R. Braun. 'Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation'. *PLoS One*, Volume 3, Issue 2 (27 February 2008), <https://doi.org/10.1371/journal.pone.0001679>.
- Linden, David E. J., Katy Thornton, Carissa N. Kuswanto, Stephen J. Johnston, Vincent van de Ven, Michael C. Jackson. 'The brain's voices: comparing nonclinical auditory hallucinations and imagery'. *Cerebral Cortex*. Volume 21, Issue 2 (February 2011): 330–337.
- Llinás, Rodolfo. *I of the Vortex: From Neurons to Self*. Cambridge: MIT Press, 2001.
- Locke, John, *An Essay Concerning Human Understanding* [1689]. Edited by Roger Woolhouse. London: Penguin Books, 2004.
- Lockwood, Lewis. *Beethoven: The Music and the Life*. New York and London: Norton, 2003.
- Loftus, Elizabeth F. and Jacqueline E. Pickrell. 'The Formation of False Memories.' *Psychiatric Annals*. Volume 25, Article 12 (December 1995): 720-725.
- Logothetis, Nikos K. 'What we can do and what we cannot do with fMRI.' *Nature*. Volume 453 (12 June 2008): 869-878. <https://doi.org/10.1038/nature06976>.
- Longman dictionary of the English Language*. Essex: Merriam-Webster Inc., 1984.
- Loui, Psyche, Sean Patterson, Matthew E. Sacks, Yvonne Leung, Tima Zeng, and Emily Przsinda. 'White Matter Correlates of Musical Anhedonia: Implications for Evolution of Music'. *Frontiers in Psychology* (25 September 2017): <https://doi.org/10.3389/fpsyg.2017.01664>.
- Lyshak-Stelzer, Francie, Pamela Singer, St. John Patricia, Claude M. Chemtob. 'Art Therapy for Adolescents with Posttraumatic Stress Disorder Symptoms: A Pilot Study.' *Art Therapy: Journal of the American Art Therapy Association*. Volume 24, Issue 4: Art Therapy with Trauma (2007): 163-169. <https://doi.org/10.1080/07421656.2007.10129474>.
- Lyu, Dian, James Robert Stieger, Cindy Xin et al. 'Causal evidence for the processing of bodily self in the anterior precuneus'. *Neuron* (8 June 2023). <https://doi.org/10.1016/j.neuron.2023.05.013>.
- Lyyra, Pessi. 'Review of José Luis Bermúdez: *Thinking Without Words*'. In *PSYCHE*, Vol. 11, Issue 2 (March 2005).
- Mackevicius, Emily L., Matthew D. Best, Hannes P. Saal, and Sliman J. Bensmaia. 'Millisecond Precision Spike Timing Shapes Tactile Perception'. *Journal of Neuroscience*, Volume 32, Issue 44 (31 October 2012): 15309-15317. <https://doi.org/10.1523/JNEUROSCI.2161-12.2012>.

- Maddock, Richard J., A. S. Garrett, M. H. Buonocore. 'Remembering Familiar People: The Posterior Cingulate Cortex and Autobiographical memory retrieval'. *Neuroscience* Volume 104, Issue 3 (14 June 2001): 667-676. [https://doi.org/10.1016/s0306-4522\(01\)00108-7](https://doi.org/10.1016/s0306-4522(01)00108-7).
- Maegaard, Jan. *Præludiv til musik af Arnold Schönberg*. Copenhagen: Wilhelm Hansen, 1976.
- Maess, Burkhard, Stefan Koelsch, Thomas C Gunter, and Angela D. Friederici. 'Musical syntax is processed in Broca's area: An MEG study.' *Nature neuroscience*. Volume 4, no. 5 (May 2001):540-545. <https://doi.org/10.1038/87502>.
- Mahjour, Babak, Jordan Bench, Rui Zhang, Jared Frazier, and Tim Cernak. 'Molecular sonification for molecule to music information transfer'. *Digital Discovery*. Issue 2: 520-530 (14 Mars 2023). <https://doi.org/10.1039/D3DD00008G>.
- Marchesi, Mathilde. *Marchesi and Music: Passages from the life of a Famous Singing-Teacher* [1897]. Cambridge: Cambridge University Press, 2013.
- Marchette, Steven A., Lindsay K. Vass, Jack Ryan, and Russel A. Epstein. 'Anchoring the neural compass: coding of local spatial reference frames in human medial parietal lobe.' *Nature Neuroscience*. Volume 17 (5 October 2014): 1598-1606. <https://doi.org/10.1038/nn.3834>.
- Mariën, Peter, Stefanie Keulen, Jo Verhoeven. 'Neurological aspects of foreign accent syndrome in stroke patients'. *Journal of Communication Disorders*. Volume 77 (December 2018):94-113. <https://doi.org/10.1016/j.jcomdis.2018.12.002>.
- Marini, Andrea, 'Characteristics of Narrative Discourse Processing after Damage to the Right Hemisphere'. *Seminars in speech and language*. Volume 33, Issue 1 (February 2012): 68-78. <https://doi.org/10.1055/s-0031-1301164>.
- Martin, John Levi. 'The birth of the true, the good, and the beautiful: toward an investigation of the structures of social thought.' *Current Perspectives in Social Theory*, Volume 35 (2017): 3-56. <https://doi.org/10.1108/S0278-120420160000035001>.
- Martínez-Molina, Noelia, Ernest Mas-Herrero, Antoni Rodríguez-Fornells, Robert J. Zatorre, and Josep Marco-Pallarés. 'Neural correlates of specific musical anhedonia'. *Proceedings of the National Academy of Sciences of the United States of America*. Volume 113, No. 46 (31 October 2016): E7337-E7345. <https://doi.org/10.1073/pnas.1611211113>.
- Mashal, Nira, M. Faust, T. Hendler, M. Jung-Beeman. 'An fMRI investigation of the neural correlates underlying the processing of novel metaphoric expressions'. *Brain and Language*. Volume 100, Issue 2 (February 2007):115-126. <https://doi.org/10.1016/j.bandl.2005.10.005>.
- Mashour, George A. and Anthony G. Hudetz. 'Bottom-Up and Top-Down Mechanisms of General Anesthetics Modulate Different Dimensions of consciousness'. *Frontiers in Neural Circuits*, Volume 11, Article 44 (20 June 2017). <https://doi.org/10.3389/fncir.2017.00044>.
- Mashour, George A., Pieter Roelfsema, Jean-Pierre Changeux, Stanislas Dehaene. 'Conscious Processing and the Global Neuronal Workspace Hypothesis'. *Neuron*, Volume 105, Issue 5: 776-798 (4 March 2020). <https://doi.org/10.1016/j.neuron.2020.01.026>.

- Mashour, George A., Ben J. A. Palanca, Mathias Basner, Duan Li et al., 'Recovery of consciousness and cognition after general anesthesia in humans'. *eLife*, 10:e59525 (May 2021). <https://doi.org/10.7554/eLife.59525>.
- Mashour, George A., Dinesh Pal, Emery N. Brown. 'Prefrontal cortex as a key node in arousal circuitry'. *Trends in Neurosciences*. Volume 45, Issue 10: 722-732 (October 2022). <https://doi.org/10.1016/j.tins.2022.07.002>.
- Maslow, Abraham. *Motivation and personality* [1954] New York: Harper & Row Publishers Inc., 1970.
- Maslow, Abraham H. *The farther reaches of human nature* [1971]. New York, Penguin Books, 1976.
- Matsui, Tomoko, Tagiru Nakamura, Akira Utsumi, Akihiro T. Sasaki et al. 'The role of prosody and context in sarcasm comprehension: Behavioral and fMRI evidence.' *Neuropsychologia*. Volume 87 (1 July 2016): 74-84, <https://doi.org/10.1016/j.neuropsychologia.2016.04.031>.
- Mattheson, Johann. *Der Volkommene Capellmeister: Das ist Gründliche Anzeige aller derjenigen Sachen, die einer wissen, können, und vollkommenen inne haben muss, der einer Capelle mit Ehren und Nutzen vorstehen will*. Hamburg: Herold, 1739.
- Mattheson, Johann. *Der Volkommene Capellmeister* [1739]. Documenta Musicologica Faksimile - Nachdruck, herausgegeben von Margarete Reimann. Kassel und Basel: Bärenreiter-Verlag, 1969.
- Mattheson Johann. *Der Volkommene Capellmeister: A revised translation with critical commentary* by Ernest C. Harris. Ann Arbor, Mch.: UMI Research Press, 1981.
- Mazzini, Francesco, Simon W. Townsend, Zsófia Virányi, Friederike Range. 'Wolf Howling Is Mediated by Relationship Quality Rather than Underlying Emotional Stress'. *Current Biology*. Volume 23, Issue 17 (9 September 2013): 1677-1680. <https://doi.org/10.1016/j.cub.2013.06.066>.
- McGettigan, Carolyn, E. Walsh, R. Jessop, Z. K. Agnew, D. A. Sauter, J. E. Warren, S. K. Scott. 'Individual differences in laughter perception reveal roles for mentalizing and sensorimotor systems in the evaluation of emotional authenticity'. *Cerebral Cortex*, Volume 25, Issue 1 (January 2015): 246-oi.org/10.1093/cercor/bht227.
- McGilchrist, Iain. *The Matter with Things: Our Brains, Our Delusions, and the Unmaking of the World* (London: Perspectiva Press, 2021).
- Medalla, Maria, and Helen Barbas. 'Specialized prefrontal "auditory fields": organization of primate prefrontal-temporal pathways'. *Frontiers in Neuroscience*. Volume 8, No. 77 (16 April 2014): <https://doi.org/10.3389/fnins.2014.00077>.
- Mehr, Samuel A., Manvir Singh, Hunter York, Like Glowacki, Max M. Krasnow. 'Form and Function in Human Song'. *Current Biology*, Volume 28, Issue 3 (5 February 2018): 356-368. <https://doi.org/10.1016/j.cub.2017.12.042>.
- McFadden, Johnjoe (2002). 'The Conscious Electromagnetic Information (Cemi) Field theory: The Hard Problem Made Easy'. *Journal of Consciousness Studies*. Volume 9, Issue 8 (2002): 45-60, https://www.johnjoemcfadden.co.uk/wp-content/uploads/2014/10/mcfadden_JCS2002b.pdf.
- Merleau-Ponty, M. *Phenomenology of Perception* [1945]. Translation by Colin Smith. London: Routledge, 1992.

- Meyer, Leonard B. *Emotion and Meaning in Music*. Chicago and London: The University of Chicago Press, 1956.
- Michel, Matthias. 'Conscious Perception and the Prefrontal Cortex: A Review'. *Journal of Consciousness Studies*, Volume 29 (7-8): 115-157 (2022). <https://philpapers.org/archive/MICCPA-6.pdf>.
- Milanlioglu, Aysel, Mehmet Nuri Aydin, Alper Gökgül, Mehmet Hamamci, Mehmet, Atilla Erkuzu, and Temel Tombul. 'Ischemic Bilateral Opercular syndrome'. *Case Reports in Medicine*. Article ID 513572 (18 February 2013). <https://doi.org/10.1155/2013/513572>.
- Miller, Adam M. P., Lindsey C. Vedder, L. Mataathew Law, David M. Smith. 'Cues, context, and long-term memory: the role of the retrosplenial cortex in spatial cognition'. *Frontiers in Human Neuroscience*, Volume 8, No. 586 (5 August 2014). <https://doi.org/10.3389/fnhum.2014.00586>.
- Mitchell, Jennifer M, Michael Bogenschutz, Alia Lilienstein, Charlotte Harrison et al. 'MDNA-assisted therapy for severe PTSD: a randomized, double blind, placebo-controlled phase 3 study.' *Nature Medicine*. Volume 27 (June 2021): 1025-1033. <https://doi.org/10.1038/s41591-021-01336-3>.
- Mitchell, Rachel, Tim J. Crow. 'Right hemisphere language functions and schizophrenia: the forgotten hemisphere?'. *Brain*. Volume 128, Issue 5 (May 2005): 963-978. <https://doi.org/10.1093/brain/awh466>.
- Mitchell, Stephen A. and Margaret J. Black, *Freud and Beyond: A History of Modern Psychoanalytic Thought*. New York: Basic Books, 2016.
- Mithen, Stephen. *The singing Neanderthals: The Origin of Music, Language, Mind and Body*. London: Phoenix, 2006.
- Moll, Jorge, Paul J. Eslinger, Ricardo de Oliveira-Souza. 'Frontopolar and anterior temporal cortex activation in a moral judgment task: Preliminary functional MRI results in normal subjects'. *Arquivos de Neuro-Psiquiatria*. Volume 59, Issue 3-B (September 2001): 657-664. <https://doi.org/10.1590/s0004-282x2001000500001>.
- Mori, N. 'Styles of remembering and types of experience: An experimental investigation of reconstructive memory.' *Integrative Psychological and Behavioral Science*, Vol. 42, Issue 3 (September 2008): 291-314. <https://doi.org/10.1007/s11229-008-9100-0>
- essay of Antonio Damasio's *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*'. *PSYCHE*, 6 (10) (October 2000). <http://psyche.cs.monash.edu.au/v6/psyche-6-10-mosca.html>.
- Muggenthaler, Elizabeth von, 'The felid purr: A healing mechanism?'. *The Journal of the Acoustical Society of America*, Volume 110, Issue 5 (November 2001): <https://doi.org/10.1121/1.4777098>.
- Mulert, Christoph, Gregor Leicht, Oliver Pogarell, Roland Mergl et al. 'Auditory cortex and anterior cingulate cortex sources of the early evoked gamma-band response: relationship to task difficulty and mental effort.' *Neuropsychologia*. Volume 45, No 10 (11 June 2007):2294-306. <https://doi.org/10.1016/j.neuropsychologia.2007.02.020>.
- Nachev, Parashkev, Henrietta Wydell, Kevin O'Neill, Masud Husain, and Christopher Kennard. 'The role of the pre-supplementary motor area in the control of action'. *Neuroimage*, Volume 36, Supplement 2 (1 January 2007): T155-T163. <https://doi.org/10.1016/j.neuroimage.2007.03.034>.

- Nachev, Parashkev, Christopher Kennard, and Masud Husain. 'Functional role of the supplementary and pre-supplementary motor areas'. *Nature Reviews Neuroscience*, Volume 9 (October 2008): 856-869. <https://doi.org/10.1038/nrn2478>.
- Nagy, Attila, Gabriella Eördegh, Zsuzsanna Paróczy, Zita Márkus, György Benedek. 'Multisensory integration in the basal ganglia'. *European Journal of Neuroscience*. Volume 24, Issue 3 (14 August 2006): 917-924. <https://doi.org/10.1111/j.1460-9568.2006.04942.x>.
- Nees, Michael A. 'Have We Forgotten Auditory Sensory Memory? Retention Intervals in Studies of Nonverbal Auditory Working Memory'. *Frontiers in Psychology*, Volume 7, Article 1892 (2 December 2016). <https://doi.org/10.3389/fpsyg.2016.01892>.
- Neubert, Franz-Xaver, Rogier B. Mars, Adam G. Thomas, Jerome Sallet, and Matthew F. S. Rushworth. 'Comparison of Human Ventral Frontal Cortex Areas for Cognitive Control and Language with Areas in Monkey Frontal Cortex.' *Neuron*, Volume 81, Issue 3 (February 2014): 700-713. <https://doi.org/10.1016/j.neuron.2013.11.012>.
- Neubert, Franz-Xaver, Rogier B. Mars, Jérôme Sallet, and Matthew F. S. Rushworth. 'Connectivity reveals relationship of brain areas for reward-guided learning and decision making in human and monkey frontal cortex.' *Proceedings of the National Academy of Sciences*, Volume 112, Issue 20 (6 May 2015): E2695-E2704. <https://doi.org/10.1073/pnas.1410767112>.
- Newman, Sharlene D., Patricia A. Carpenter, Sashank Varma, Marcel Just. 'Frontal and parietal participation in problem solving in the Tower of London: fMRI and computational modeling of planning and high-level perception.' *Neuropsychologia*. Volume 41, No. 12 (February 2003): 1668-1682. [https://doi.org/10.1016/S0028-3932\(03\)00091-5](https://doi.org/10.1016/S0028-3932(03)00091-5).
- Newmann, William S.. *The Sonata in the Classic Era: The Second Volume of a History of the Sonata Ideas*. Second edition. New York: W. W. Norton & Company, 1972.
- Newmann, William S. 'Sonata'. In the first edition of *The New Grove Dictionary of Music and Musicians*. Volume 17, 479-496.
- Norman-Haignere, Sam, Nancy G. Kanwisher, and Josh H. McDermott. 'Distinct Cortical Pathways for Music and Speech Revealed by Hypothesis-Free Voxel Decomposition'. *Neuron*, Volume 88, Issue 6 (16 December 2015): 1281-1296. <https://doi.org/10.1016/j.neuron.2015.11.035>.
- Northway, Mary L. 'The influence of age and social group on children's remembering'. *British Journal of Psychology. General Section*. Volume 27, Issue 1 (1 July 1936): 11-29. <https://doi.org/10.1111/j.2044-8295.1936.tb00813.x>.
- Obert, Alexandre, Fabien Gierski, Arnaud Calmus, Aurélie Flucher, Christophe Portefaix, Laurentt Pierot, Arthur Kaladjian, and Stéphanie Caillies. 'Neural Correlates of Contrast and Humor: Processing Common Features of Verbal Irony'. *PLoS One*, Volume 11 (16 November 2016) <https://doi.org/10.1371/journal.pone.0166704>.
- Ono, Kentaro, Akinori Nakamura, Kenji Yoshiyama, Takeshi Kinkori, Masahiko Bundo, Takashi Kato, Kengo Ito. 'The effect of musical experience on hemispheric lateralization in musical feature

- processing'. *Neuroscience Letters*. Volume 496, Issue 2 (1 June 2011): 141-145. <https://doi.org/10.1016/j.neulet.2011.04.002>.
- Ortony, Andrew, and Terence J. Turner. 'What's basic about basic emotions?', *Psychological Review*, Volume 97, Issue 3 (August 1990): 315-331, <https://doi.org/10.1037/0033-295X.97.3.315>.
- Ostlund, Sean B., Neil E. Winterbauer, Bernard W. Balleine. 'Evidence of action sequence chunking in goal-directed instrumental conditioning and its dependence on the dorsomedial prefrontal cortex.' *Journal of Neuroscience*. Volume 29(25) (24 June 2009): 8280-8287. <https://doi.org/10.1523/JNEUROSCI.1176-09.2009>.
- Paddison, Max. 'Stravinsky as devil: Adorno's three critiques.' Chapter 10 of *The Cambridge Companion to Stravinsky*. Edited by Jonathan Cross. Cambridge: Cambridge University Press, 2003.
- Pal, Dinesh, Jon G. Dean, Tiecheng Liu et al. 'Differential Role of Prefrontal and Parietal Cortices in Controlling Level of Consciousness'. *Current Biology*. Volume 28: 2145-2152 (9 July 2018). <https://doi.org/10.1016/j.cub.2018.05.025>.
- Pang, James C., Kevin M. Aquino, Marianne Oldenhinkel, Peter A. Robinson et al. 'Geometric constraints on human brain function'. *Nature*. Volume 618: 566-574 (2023). <https://doi.org/10.1038/s41586-023-06098-1>.
- Parrish, Carl, and John F. Ohl. *Masterpieces of Music before 1750: An Anthology of Musical Examples from Gregorian Chant to J. S. Bach* [1952]. London and Boston: Faber and Faber, 1980.
- Pascual-Leone, Juan. 'Not a bridge but an organismic (general and causal) neuropsychology should make a difference in emotion theory'. Commentary on Lewis, 'Bridging emotion theory and neurobiology through dynamic systems modeling.' *Behavioral and Brain Sciences*, Volume 28, Issue 2, 213-214 (April 2005): <https://doi.org/10.1017/S0140525X0542004X>.
- Passingham, Richard E. and Steven P. Wise, 'The neurobiology of the prefrontal cortex; Anatomy, Evolution, and the Origin of Insight'. Oxford: Oxford University Press, 2012.
- Patel, Aniruddh D, Jessica M. Foxton, and Timothy.D Griffiths. 'Musically tone-deaf individuals have difficulty discriminating intonation contours extracted from speech'. *Brain and Cognition*, Vol 59, Issue 3 (December 2005): 310-313. <https://doi.org/10.1016/j.bandc.2004.10.003>.
- Patel, Aniruddh. 'Musical rhythm, linguistic rhythm, and human evolution'. *Music Perception: An Interdisciplinary Journal*, Vol. 24, No. 1 (September 2006): 99-104. <https://doi.org/10.1525/mp.2006.24.1.99>.
- Patel, Aniruddh, and John Iversen. 'A non-human animal can drum a steady beat on a musical instrument', in *Proceedings of the 9th International Conference on Music Perception and Cognition*. Edited by M. Baroni, A. R. Addressi, R. Caterina, and M. Costa (Bologna 2006).
- Patel, Aniruddh. *Music, Language, and the Brain*. New York: Oxford University Press, 2008.
- Patel, Aniruddh D., John R. Iversen, Micah R. Gregman, Irena Schulz, Charles Schulz. 'Investigating the human-specificity of synchronization to music'. In M. Adachi et al. (Eds.). *Proceedings of the 10th International Conference on Music Perception and Cognition* (Adeleide: Causal Productions, 2008)

- Pears, Andrew, John A. Parkinson, Lucy Hopewell, Barry J. Everitt, Angela C. Roberts. 'Lesions of the orbitofrontal but not the medial prefrontal cortex disrupt conditioned reinforcement in primates'. *The Journal of Neuroscience: the official journal of the Society for Neuroscience*, 23(35) (3 December 2003): 11189-111201. <https://doi.org/10.1523/JNEUROSCI.23-35-11189.2003>.
- Pearson, John M., Sarah R. Heilbronner, David L Barack, Benjamin Y. Hayden, Michael L. Platt. 'Posterior Cingulate Cortex: Adapting Behavior to a Changing World'. *Trends in Cognitive Science*, Volume 15, No 4 (April 2011). <https://doi.org/10.1016/j.tics.2011.02.002>.
- Penrose, Roger, *Shadows of the Mind: A Search for the Missing Science of Consciousness* [1994]. London: Vintage, 2005.
- Pepperberg, Irene M. *The Alex studies: Cognitive and Communicative Abilities of Grey Parrots*. Cambridge, Mass., Harvard University Press paperback edition, 2002.
- Pereira Barbosa de Aquino, Marcela, Juan Verdejo-Román, Miguel Pérez-García, Purificación Pérez-García. 'Different role of the supplementary motor area and the insula between musicians and non-musicians in a controlled musical creativity task'. *Scientific Reports*, Volume 9, Article 13006 (September 2019). <https://doi.org/10.1038/s41598-019-49405-5>.
- Peretz, Isabelle, Régine Kolinsky, Mark Tramo, Raymonde Labreque, Claude Hublet, Guy Demeurisse, and Sylvie Belleville. 'Functional dissociations following bilateral lesions of auditory cortex'. *Brain*. Volume 117, Part 6 (December 1994):1283-1301. <https://doi.org/10.1093/brain/117.6.1283>.
- Peretz, Isabelle, and Lise Gagnon. 'Dissociation between recognition and emotional judgement for melodies'. *Neurocase*, Volume 5, Issue 1 (1999): 21-30. <https://doi.org/10.1080/13554799908404061>.
- Peretz, Isabelle., J. Ayotte, R. Zatorre, J. Mehler, P. Ahad, V. Penhune, and B. Jutras. 'Congenital Amusia: A Disorder of Fine-Grained Pitch Discrimination'. *Neuron*, Volume 33, Issue 2 (17 January 2002): 185-91. [https://doi.org/10.1016/S0896-6273\(01\)00580-3](https://doi.org/10.1016/S0896-6273(01)00580-3).
- Peretz, Isabelle. 'Brain Specialization for Music: New Evidence from Congenital Amusia', in *The Cognitive Neuroscience of Music*, edited by I. Peretz and R. Zatorre (2003): <https://doi.org/10.1093/acprof:oso/9780198525202.003.0013>.
- Peretz, Isabelle, 'Music, Language and Modularity framed in Action', *Psychologica Belgica*, 49-2&3 (2009): 157-175. <https://doi.org/10.5334/pb-49-2-3-157>.
- Petrides, Michael. 'Lateral prefrontal cortex: architectonic and functional organization.' *Philosophical Transactions of the Royal Society of Biological Sciences*. Vol. 360, No. 1456 (29 April 2005): 781-795. <https://doi.org/10.1098/rstb.2005.1631>.
- Petrides, Michael, and Deepak N. Pandya. 'Efferent Association Pathways from the Rostral Prefrontal Cortex in the Macaque Monkey' *The Journal of Neuroscience*. Volume 27, No. 43 (24 October 2007): 11573-11586. <https://doi.org/10.1523/JNEUROSCI.2419-07.2007>.
- Phillippi, Carissa L., Justin S. Feinstein, Sahib S. Khalsa, Antonio Damasio, Daniel Tranel, Gregory Landini, Kenneth Williford, David Rudrauf. 'Preserved Self-Awareness following Extensive Bilateral Brain Damage to the Insula, Anterior cingulate, and Medial Prefrontal Cortices', *Plos One* 7(8): e38413 (22 August 2012). <https://doi.org/10.1371/journal.pone.0038413>.

- Piaget, Jean. *The Language and Thought of the Child* [1926]. London and New York: Routledge Classics, 2002.
- Piantoni, Giovanni, Bing Leung P. Cheung, Barry D. Van Veen, Nico Romeijn et al. 'Disrupted directed connectivity along the cingulate cortex determines vigilance after sleep deprivation'. *Neuroimage*. Volume 79 (October 2013): 213-222. <https://doi.org/10.1016/j.neuroimage.2013.04.103>.
- Pinotis, Dimitris A., Gene Fridman, Earl K. Miller. 'Cytoelectric Coupling: Electric fields sculpt neural activity and "tune" the brain's infrastructure'. *Progress in Neurobiology*. Volume 226 (July 2023). <https://doi.org/10.1016/j.pneurobio.2023.102465>.
- Plomp, Reinier. *Aspects of Tone Sensation: A Psychophysical Study*. London, New York, San Francisco: Academic Press, 1976.
- Popescu, Mihai, Asuka Otsuka, and Andreas A. Ioannides. 'Dynamics of brain activity in motor and frontal cortical areas during music listening: a magnetoencephalographic study'. *Neuroimage*. Volume 21, Issue 4 (April 2004): 1622-1638. <https://doi.org/10.1016/j.neuroimage.2003.11.002>.
- Powers, Harold S. 'Mode', in the first edition of *The New Grove Dictionary of Music and Musicians*, Vol. 12, 376-450.
- Preston, Alison R. and Howard Eichenbaum. 'Interplay of hippocampus and prefrontal cortex in memory', *Current biology*, Vol. 23, Issue 17 (9 September 2013): R764-R773. <https://doi.org/10.1016/j.cub.2013.05.041>.
- Prinz, Jesse. *Gut reactions: A Perceptual Theory of Emotion*. New York: Oxford University Press, 2004.
- Prinz, Jesse. 'Which Emotions Are Basic?'. In *Emotion, Evolution, and Rationality*. Edited by Dylan Evans and Pierre Cruse. New York: Oxford University Press, 2004.
- Proske, Uwe, and Simon C. Gandevia. 'The kinaesthetic senses.' *The Journal of Physiology*, Volume 587, Issue 17 (27 August 2009): 4139-4146. <https://doi.org/10.1113/jphysiol.2009.175372>.
- Qin, Pengmin, Xuehai Wu, Changwei Wu, Hang Wu, Jun Zhang et al. 'Higher-order sensorimotor circuit of the brain's global network supports human consciousness'. *NeuroImage*. Volume 231, No. 117850 (1 May 2021): <https://doi.org/10.1016/j.neuroimage.2021.117850>.
- Raffman, Diana. *Language, Music and Mind* (Cambridge, MA: The MIT Press, 1993) <https://doi.org/10.1017/S0022226700016868>.
- Rameau, Jean-Philippe. *Treatise on Harmony* [1722]. Translated by Philip Gossett. New York,: Dover Publications, Inc., 1971.
- Ramezani, Amir, G. Andrew Valasquez, Sulaimon Rasuli and Laura R Knowles. 'Neuroanatomical and Neurocognitive Functions of the Structure of the Mind: Clinical and Teaching Implications. *Current Opinions in Neurological Science*. Volume 2, Issue 6 (26 September 2018): 567-584. <https://scientiaricerca.com/srcons/pdf/SRCONS-02-00079.pdf>.
- Redondo, Roger L., Joshua Kim, Autumn L. Arons, Steve, Ramirez, Su Liu, and Susumu Tonegawa. 'Bidirectional switch of the valence associated with a hippocampal contextual memory engram'. *Nature*, Volume 513, Article 7518 (18 September 2014): 426-430. <https://doi.org/10.1038/nature13725>.

- Reig, Ramon, and Gilad Silberberg. 'Multisensory Integration in the Mouse Striatum'. *Neuron*. Volume 83, No 5 (3 September 2014): 1200-1212. <http://dx.doi.org/10.1016/j.neuron.2014.07.033>.
- Révész, Geza. *Introduction to The Psychology of Music* [1946]. Translated from German by G.I. C. De Courcy. Norman, Oklahoma: University of Oklahoma Press, 1954.
- Rilling, James K. 'Human and NonHuman Primate Brains: Are They Allometrically Scaled Versions of the Same Design?' *Evolutionary Anthropology*, Volume 15, Issue 2 (20 April 2006): 65-77. <https://doi.org/10.1002/evan.20095>.
- Rizzolatti, G, L. Fadiga, L. Fogassi, V. Gallese. 'Resonance behaviors and mirror neurons.' *Archives Italiennes de Biologie*. Volume 137(2-3) (May 1999): 85-100.
- Roberts, Anna Ilona, Sarah-Jane Vick, Sam G. B. Roberts, Hannah M. Buchanan-Smith. 'A structure-based repertoire of manual gestures in wild chimpanzees: Statistical analyses of a graded communication system.' *Evolution and Human Behavior*, Vol. 33, No. 5 (September 2012): 578-589. <https://doi.org/doi:10.1016/j.evolhumanbehav.2012.05.006>.
- Rolls, Edmund T. *The Orbitofrontal Cortex*. New York: Oxford University Press, 2019.
- Rolls, Edmund T., Wei Cheng, Jianfeng Feng. 'The orbitofrontal cortex: reward, emotion and depression, *Brain Communications*. Volume 2, Issue 2 (November 2020): <https://doi.org/10.1093/braincomms/fcaa196>.
- Rolls, Edmund T., 'The mechanisms for pattern completion and pattern separation in the hippocampus'. *Frontiers in Systems Neuroscience*, Volume 7 (30 October 2013). <https://doi.org/10.3389/fnsys.2013.00074>.
- Romanski, Lizabeth M. 'Representation and Integration of Auditory and Visual Stimuli in the Primate Ventral lateral Prefrontal Cortex'. *Cerebral Cortex*, Volume 17, Suppl. 1 (1 September 2007): i61-i69. <https://doi.org/10.1093/cercor/bhm099>.
- Rosen, Charles. *The Classical Style: Haydn, Mozart, Beethoven*. New York and London: Norton, 1972.
- Ross, Elliott D., Marilee Monnot. 'Neurology of affective prosody and its functional-anatomic organization in right hemisphere'. *Brain and Language*. Volume 104, No 1 (January 2008): 51-74. <https://doi.org/10.1016/j.bandl.2007.04.007>.
- Rothenberg, David. *Why Birds Sing: A Journey Into the Mystery of Bird Song*. New York: Basic Books, 2005.
- Rothenberg, David. *Survival of the Beautiful: Art, Science, and Evolution*. London: Bloomsbury, 2013.
- Rouget, Gilbert. *Music and Trance*. Chicago: University of Chicago Press, 1985.
- Sack, Alexander T., and Teresa Schuhmann. 'Hemispheric differences within the fronto-parietal network dynamics underlying spatial imagery.' *Frontiers in Psychology*. Volume 3, Article 214 (28 June 2012): <https://doi.org/10.3389/fpsyg.2012.00214>.
- Sachs, Curt. *Real-Lexicon der Musikinstrumente* [1913] (New York: Dover Publications, 1964).
- Sacks, Curt. *The Wellsprings of Music*. Edited by Jaap Kunst. New York, Da Capo Press paperback edition, 1962.
- Sacks, Oliver, *The Man Who Mistook his Wife for a Hat*. London: Picador, 1986.

- Sacks, Oliver, *Musophilia: Tales of Music and the Brain*. London: Picador, 2007.
- Sadaghiani, Sepideh, Guido Hesselmann, Andreas Kleinschmidt. 'Distributed and antagonistic contributions of ongoing activity fluctuations to auditory stimulus detection.' *Journal of Neuroscience*. Volume 29, No 42 (21 October 2009): 13410-13417. <https://doi.org/10.1523/JNEUROSCI.2592-09.2009>.
- Salgado-Pineda, Pilar, Anne Caclin, Illyana Baeza, Carme Junqué, Miguel Bernardo, O. Blin, P. Fonlupt. 'Schizophrenia and frontal cortex: Where does it fail?.' *Schizophrenia Research*, Vol. 91, Issues 1-3 (March 2007): 73-81, <https://doi.org/10.1016/j.schres.2006.12.028>.
- Salimpoor, Valorie N., Mitchel Benovoy, Kevin Larcher, Alain Dagher, Robert J. Zatorre. 'Anatomically distinct dopamine release during anticipation and experience of peak emotion to music'. *Nature Neuroscience*, Volume 14, Number 2 (February 2011): <https://doi.org/doi:10.1038/nn.2726>.
- Samuel. 'Book 1 of Samuel.' In *Old Testament* (about 550 BC).
- Särkämö, Teppo, Mari Tervaniemi, Seppo Soynila, Teina Autti, Heli M. Silvennoinen, Matti Laine, Marja Hietanen, Elina Pihko. 'Auditory and cognitive deficits associated with acquired amusia after stroke: a magnetoencephalography and neuropsychological follow-up study'. *Plos One*. Volume 5, No 12 (2 December 2010). <https://doi.org/10.1371/journal.pone.0015157>.
- Saussure, Ferdinand: *Course in General Linguistics* [1916]. Translated and annotated by Roy Harris. London: Duckworth, 1995.
- Scerrati, Elisa, Christina Iani, and Sandro Rbichi. 'Does the Activation of Motor Information Affect Semantic Processing?'. In Bechberger, L, K., Kühnberger and Liu eds. *Concepts in Action. Language, Cognition, and Mind*. Volume 9: 153-166 (Cham: Springer, 2021). https://doi.org/10.1007/978-3-030-69823-2_7.
- Schachter, Stanley & Jerome Singer. 'Cognitive, Social, and Physiological Determinants of Emotional State'. *Psychological Review*, 69, 5 (1 September 1962): 379–399. <https://doi.org/10.1037/h0046234>.
- Schenker, Heinrich. *Free Composition (Der Freie Satz): Volume III of New Musical Theories and Fantasies*. Translated and edited by Ernst Oster. New York: Longman, Inc., 1979.
- Scherer, Klaus R. 'Which Emotions Can be Induced by Music? What Are the Underlying Mechanisms? And How Can We Measure Them?'. *Journal of New Music Research*, Volume. 33, Issue 3 (2004): 239-251, <https://doi.org/10.1080/0929821042000317822>.
- Schlegel, Friedrich. *Philosophical Fragments* [1798]. Translated by Peter Firchow. Foreword by Rodolphe Gaascheé. Minneapolis and London: University of Minnesota Press, 1991.
- Schleim, Stephan, and Jonathan P. Roiser. 'fMRI in Transition: The Challenges Facing Real-World Applications'. *Frontiers in Human Neuroscience* (23 December 2009). <https://doi.org/10.3389/neuro.09.063.2009>.
- Schmitz, Taylor, Tisha N. Kawahara-Baccus, Sterling C. Johnson. 'Metacognitive evaluation, self-relevance, and the right prefrontal cortex'. *Neuroimage*. Volume 22, No. 2 (June 2004): 941-947. <https://doi.org/10.1016/j.neuroimage.2004.02.018>.

- Schneider, Marius. *Geschichte der Mehrstimmigkeit: Historische und Phänomenologische Studien*. Tutzing: Hans Schneider, 1969.
- Schoenberg, Arnold. *Theory of Harmony* [1911]. Translated by Roy E. Carter. London: Faber & Faber, 1978.
- Schoenberg, Arnold. *Style and Idea: Selected Writings of Arnold Schoenberg*. Edited and translated by Dika Newlin. New York: Philosophical Library, 1950.
- Schoenberg, Arnold. *Style and Idea, Selected Writings of Arnold Schoenberg*. Translated by Leo Black. Edited by Leonard Stein. London: Faber & Faber, 1975.
- Schoenberg, Arnold. *Verklärte Nacht and Pierrot Lunaire* (New York: Dover Publications, 1994)
- Schopenhauer, Arthur. *Die Welt als Wille und Vorstellung* [1819] Erster Teilband. Züricher Ausgabe. Zürich: Diogenes Verlag, 1977.
- Schridde, Ulrich, Manjula Khubchandani, Joshua E. Motelow, Basavaraju G. Sanganahalli, Fahmeed Hyder, Hal Blumenfeld. 'Negative BOLD with Large Increases in Neuronal Activity.' *Cerebral Cortex*. Volume 18, No. 8 (August 2008):1814-1827. <https://doi.org/10.1093/cercor/bhm208>.
- Schubotz, Richarda I. 'Prediction of external events with our motor system: towards a new framework'. *Trends in Cognitive Sciences*, vol.11, no. 5 (May 2007): 211-218. <https://doi.org/10.1016/j.tics.2007.02.006>.
- Schulz, GERALYN M., M. VARGA, K. JEFFIRES, C. L. LUDLOW, A. R. BRAUN. 'Functional neuroanatomy of human vocalization: An H215O PET study'. *Cerebral Cortex*, Volume 15, Issue 12 (March 2005): 1835-47. <https://doi.org/10.1093/cercor/bhi061>.
- Schultz, Jon-Håkon and Lars Weisæth. 'The power of shamanic rituals in dealing with traumatic stress symptoms: cleansing rituals for former child soldiers in Northern Uganda.' *Mental Health, Religion & Culture*. Volume 18, Issue 10 (2015): 822-837. <https://doi.org/10.1080/13674676.2015.1094780>.
- Scruton, Roger. 'Programme music'. In the first edition of *The New Grove Dictionary of Music and Musicians*. Volume 15, 283-287.
- Scully, Iona D., Lucy E. Napper, and Almut Hupbach. 'Does Reactivation trigger episodic memory change? A meta-analysis.' *Neurobiology of Learning and Memory*. Volume 142 (PtA) (1 July 2017): 99-107, <https://doi.org/10.1016/j.nlm.2016.12.012>.
- Seghezzi, Silvia, Eleonora Zirone, Eraldo Paulesu, Laura Zapparoli. 'The Brain in (willed) Action: A Meta-Analytical Comparison of Imaging Studies on Motor Intentionality and Sense of Agency'. *Frontiers in Psychology*, Volume 10, No 804 (12 April 2019). <https://doi.org/10.3389/fpsyg.2019.00804>.
- Selezneva, Elena, Susann Deike, Stanislava Knyazeva, Henning Scheich, André Brechmann, and Michael Brosch. 'Rhythm sensitivity in macaque monkeys'. *Frontiers in Systems Neuroscience* (6 September 2013): <https://doi.org/10.3389/fnsys.2013.00049>.
- Shamay-Tsoory, Simone G., R. Tomer, B. D. Berger, D. Goldsher, J. Aharon-Peretz. 'Impaired "affective theory of mind" is associated with right ventromedial prefrontal damage'. *Cognitive and Behavioral*

- Neurology*, Volume 18, No. 1 (Mars 2005): 55-67. <https://doi.org/10.1097/01.wnn.0000152228.90129.99>.
- Shamay-Tsoory, Simone G., R. Tomer, and J. Aharon-Peretz. 'The Neuroanatomical Basis of Understanding Sarcasm and Its Relationship to Social Cognition'. *Neuropsychology*. Volume 19, No. 3 (May 2005): 288—300. <https://doi.org/10.1037/0894-4105.19.3.288>.
- Shamay-Tsoory, Simone G., Judith Aharon-Peretz, Daniella Perry. 'Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions'. *Brain*, Volume 132, Issue 3 (March 2009): 617-27, <https://doi.org/10.1093/brain/awn279>.
- Shammi, P. and D. T. Stuss, 'Humour appreciation: a role of the right frontal lobe.' *Brain*, Volume 122, Issue 4 (April 1999): 657-666. <https://doi.org/10.1093/brain/122.4.657>.
- Shany, Ofir, Neomi Singer, Benjamin Paul Gold, Nori Jacoby, Ricardo Tarrasch, Talma Hendler, Roni Granot. 'Surprise-related activation in the nucleus accumbens interacts with music-induced pleasantness'. *Social Cognitive and Affective Neuroscience*, Volume 14, Issue 4 (4 April 2019): 459-470. <https://doi.org/10.1093/scan/nsz019>.
- Sharma, Kriti. *Interdependence: Biology and Beyond (Meaning Systems)*. New York: Fordham University Press, 2015.
- Shein Idelson, Mark, Eshel Ben-Jacob, and Yael Hanein. 'Innate Synchronous Oscillations in Freely-Organized small Neuronal Circuits', *PLoS ONE*, 5(12) (28 December 2010): <https://doi.org/10.1371/journal.pone.0014443>.
- Sheldon, Signy. Can Fenerci and Lauri Gurguryan. 'A Neurocognitive Perspective on the Forms and Functions of Autobiographical Memory Retrieval'. *Frontier in Systems Neuroscience*, Volume 13 (29 January 2019). <https://doi.org/10.3389/fnsys.2019.00004>.
- Shima, Keisetsu, Masaki Isoda, Hajime Mushiake, and Jun Tanji. 'Categorization of behavioral sequences in the prefrontal cortex.' *Nature*. Volume 445(7125) (February 2007): 315-318. <https://doi.org/10.1038/nature05470>.
- Shrivastava, Shamit, and Matthias F. Schneider. 'Evidence for two-dimensional solitary sound waves in a lipid controlled interface and its implications for biological signalling.' *Journal of the Royal Society Interface*. Volume 11, No. 97 (6. August 2014). <https://doi.org/10.1098/rsif.2014.0098>.
- Sihvonen, Aleks J., Teppo Särkämö, Antonio Rodríguez-Fornells, Pblo Ripollés, Thomas F. Münte, Seppo Soinila. 'Neural architectures of music - Insights from acquired amusia'. *Neuroscience & Biobehavioral Reviews*, Volume 107 (December 2019): 104-114. <https://doi.org/10.1016/j.neubiorev.2019.08.023>.
- Simmons, Kyle W. and Alex Martin. 'The anterior temporal lobes and the functional architecture of semantic memory'. *Journal of the International Neuropsychological Society*, Volume 15, Issue 5: 645-649 (September 2009) <https://doi.org/10.1017/S1355617709990348>.

- Siniscalchi, Marcello, Angelo Quaranta, Lesley J. Rogers. 'Hemispheric Specialization in Dogs for Processing Different Acoustic Stimuli'. *PLoS ONE*. Volume 3, Issue 10 (9 October 2008): e3349. <https://doi.org/10.1371/journal.pone.0003349>.
- Skille, Olav, Tony Wigram and Lyn Weekes, Vibroacoustic Therapy: 'The Therapeutic Effect of Low Frequency Sound on Specific Physical Disorders and Disabilities'. *British Journal of Music Therapy*, Volume 3, Issue 2 (1 December 1989): <https://doi.org/10.1177/135945758900300202>.
- Smythies, John, Lawrence Edelstein, and Vilayanur Ramachandran, 'Hypotheses relating to the function of the claustrum', *Frontiers in Integrative Neuroscience*, 6: 53 (2 August 2012), <https://doi.org/10.3389/fnint.2012.00053>.
- Soder, Aidan, with a preface by Walter B. Bailey. *Sprechstimme in Arnold Schoenberg's Pierrot Lunaire: a Study of Vocal Performance Practice*. Lampeter: The Edwin Mellen Press, 2008.
- Solomon, Maynard. *Late Beethoven: Music, Thought, Imagination*. Berkeley: University of California Press, 2003.
- Solomon, Maynard. *Beethoven* [1977]. New York: Schirmer Trade Books, 2001.
- Sousa, Ronald de. 'Epistemic Feelings'. *Mind and Matter*, Vol. 7 (2) (January 2009): 139-161.
- Sowman, Paul F., Stephen Crain, Elisabeth Harrison, Blake W. Johnson. 'Reduced activation of left orbitofrontal cortex precedes blocked vocalization: a magnetoencephalographic study.' *Journal of Fluency Disorders*. Volume 37, Issue 4 (December 2012):359-65. <http://dx.doi.org/10.1016/j.jfludis.2012.05.001>.
- Sridharan, Devarajan, Daniel J. Levitin, Chris H. Chafe, Jonathan Berger, and Vinod Menon. 'Neural Dynamics of Event Segmentation in Music: Converging Evidence for Dissociable Ventral and Dorsal Networks.' *Neuron*. Volume 55, Issue 3 (2 August 2007): 521-532. <https://doi.org/10.1016/j.neuron.2007.07.003>.
- St. George, Marie, M. Kutas, A. Martinez, M. I. Sereno. 'Semantic Integration in reading: engagement of the right hemisphere during discourse processing.' *Brain*. Volume 122, Issue 7 (1 July 1999): 1317-1325. <https://doi.org/10.1093/brain/122.7.1317>.
- Stanley, Glenn. 'Beethoven at work: musical activist and thinker', Chapter 2 in *The Cambridge Companion to Beethoven*. Edited by Glenn Stanley. Cambridge: Cambridge University Press, 2000.
- Steele, Joshua. *An Essay Towards Establishing the Melody and Measure of Speech, to Be Expressed and Perpetuated by Peculiar Symbols*. London: J. Almon, in Piccadilly, 1775.
- Stevens, John. 'Medieval drama.' In the first edition of *The New Grove Dictionary of Music and Musicians*, [1980]. Edited by Stanley Sadie. London, Macmillan Publishers Limited, 1998 Vol. 12, 21-58.
- Stevens, John. *Words and Music in the Middle Ages: Song, Narrative, Dance and Drama, 1050-1350*. Cambridge University Press, 1986.
- Stravinsky, Igor. *An Autobiography* [1935]. New York: The Norton Library, 1962.
- Stumpf, Carl. *Tonpsychologie*. Leipzig: S. Hirzel, 1883.

- Suga, Motomu, Hidenori Yamasue, Osamu Abe, Syudo Yamasaki, et al., 'Reduced gray matter volume of Brodman's Area 45 is associated with severe psychotic symptoms in patients with Schizophrenia', *European Archives of Psychiatry and Clinical Neuroscience*, 260 (September 2010): 465-473, <https://doi.org/10.1007/s00406-009-0094-1>.
- Sukale, M. *Comparative Studies in Phenomenology*. The Hague: Martinus Nijhoff, 1976.
- Suzuki, Shinichi. *Nurtured by Love: A New Approach to Education*. Translated by. Waltrud Suzuki. New York: Exposition Press, 1969.
- Swingle, Brian. 'Spacetime from Entanglement', in *Annual Review of Condensed Matter Physics*, Volume 9:345-358 (March 2018). <https://doi.org/10.1146/annurev-conmatphys-033117-054219>.
- Szczepanski, Sara M., Robert T. Knight. 'Insights into Human Behavior from Lesions to the Prefrontal Cortex'. *Neuron*. Volume 83, Issue 5 (3. September 2014): 1002-1018. <https://doi.org/10.1016/j.neuron.2014.08.011>.
- Tagliatalata, Jared P., Jamie L. Russell, Jennifer A. Schaeffer, William D. Hopkins. 'Communicative Signaling Activates 'Broca's' Homolog in Chimpanzees.' *Current Biology*, Volume 18, Issue 5 (March 2008): 343-348. <https://doi.org/10.1016/j.cub.2008.01.049>.
- Tellenbach, Marie-Elizabeth. *Beethoven and His "Immortal Beloved" Josephine Brunsvik: Her Fate and the influence on Beethoven's Oeuvre*. Translated by John E. Klapproth. North Charleston: CreateSpace, 2014.
- Ten Cate, Carel, and Kazuo Okanoya. 'Revisiting the syntactic abilities of nonhuman animals: Natural vocalizations and artificial grammar learning.' *Philosophical Transactions of The Royal Society of Biological Sciences*. Volume 367(1598) (11 June 2012): 1984-1994. <https://doi.org/10.1098/rstb.2012.0055>.
- Terashima, Hiroki, and Haruo Hosoya. 'Sparse codes of harmonic sound and their interaction explain harmony-related response of auditory cortex'. *BMC Neuroscience*, Volume 11, Issue 1:019 (July 2010): <https://doi.org/10.1186/1471-2202-11-S1-O19>.
- Terhardt, Ernst. 'The Concept of Musical Consonance: A Link Between Music and Psychoacoustics'. *Music Perception*. Volume 1, No. 3 (Spring 1984): 276-295. <https://doi.org/10.2307/40285261>.
- The New Grove Dictionary of Music and Musicians* [1980]. First Edition. Edited by Stanley Sadie. London, Macmillan Publishers Limited, 1998.
- The new Grove Dictionary of Music and Musicians*. Second Edition. Edited by Stanley Sadie and John Tyrell. London: Macmillan, 2001.
- Tierney, Adam, Fred Dick, Diana Deutsch. 'Speech versus Song: Multiple Pitch-Sensitive Areas Revealed by a Naturally Occurring Musical Illusion'. *Cerebral Cortex*. Volume 23, Issue 2 (February 2012): 249-254. <https://doi.org/10.1093/cercor/bhs003>.
- Tomlinson, Gary. 'The Web of Culture: A Context for Musicology'. In *19th-Century Music*, Volume 7, No. 3, Essays for Joseph Kerman (3 April 1984): 350-362. <https://doi.org/10.2307/746387>.
- Tong, Jiaqing, Jeffrey R. Binder, Colin Humphries, Stephen Mazurchuk, Lisa L. Conant, and Leonardo Bernardino. 'A Distributed Network for Multimodal Experiential Representation of Concepts'.

- Journal of Neuroscience*, Volume 42, Issue 37: 7121-7130 (14 September 2022). <https://doi.org/10.1523/JNEUROSCI.1243-21.2022>.
- Tononi, Giulio and Christof Koch. 'Consciousness: here, there and everywhere?' *Philosophical transactions of the Royal Society B*. Volume 370, Issue 1668 (19 May 2015), <https://doi.org/10.1098/rstb.2014.0167>.
- Treitler, Leo. 'The Historiography of Music: Issues of Past and Present'. In *Rethinking Music*. Edited by Nicholas Cook and Mark Everist. 356-377. Oxford, New York: Oxford University Press, 1999.
- Tsakiris Manos, Matthew R. Longo, Patrick Haggard. 'Having a body versus moving your body: Neural signatures of agency and body-ownership.' *Neuropsychologia*, Volume 48, No. 9 (July 2010): 2740-2749. <https://doi.org/10.1016/j.neuropsychologia.2010.05.021>.
- Tulving, Endel. 'Episodic Memory: From Mind to Brain'. *Annual Review of Psychology*, Volume 53 (February 2002):1-25. <https://doi.org/10.1146/annurev.psych.53.100901.135114>.
- Tulving, Endel. 'Episodic memory and autoevidence: Uniquely human?', in H. S. Terrace and J. Metcalfe eds., *The Missing Link in Cognition*, 4-56. New York, NY: Oxford University Press, 2005.
- Turken, And U., Nina F. Dronkers. 'The Neural Architecture of the Language Comprehension Network: Converging Evidence from Lesion and Connectivity Analyses'. *Frontiers in Systems Neuroscience*. Volume 5, No 1 (10 February 2011). <https://doi.org/10.3389/fnsys.2011.00001>.
- Ullal-Gupta, Sageeta, Christina M. Vanden Bosch der Nederlanden, Parker Tichko, Amir Lahav, and Erin E. Hannon. 'Linking prenatal experience to the emerging musical mind.' *Frontiers in Systems Neuroscience*. Volume 7, Article 48 (3 September 2013). <https://doi.org/10.3389/fnsys.2013.00048>.
- Vallortigara, Giorgio, Lesley J. Rogers. 'Survival with an asymmetrical brain: Advantages and disadvantages of cerebral lateralization.' *Behavioral and Brain Sciences*, 28(4) (September 2005): 575-589, <https://doi.org/10.1017/S0140525X05000105>.
- Vanneste, Sven, and Dirk De Ridder. 'Brain Areas Controlling Heart Rate Variability in Tinnitus-Related Distress.' *PLoS One*. Volume 8, No 3 (22 Mars 2013): e59728. <https://doi.org/10.1371/journal.pone.0059728>.
- Vartanian, Oshin, Peter Kwantes, David R. Mandel, Fethi Bouak, Ann Nakashima, Ingrid Smith, and Quan Lam. 'Right inferior frontal gyrus activation as a neural marker of successful lying'. *Frontiers in Human Neuroscience*. Volume 7, No. 616 (3 October 2013): <https://doi.org/10.3389/fnhum.2013.00616>.
- Vatle, Haakon. 'Sjømannssangar og Segelskute-historikk', Master thesis. University of South-Eastern Norway. 2005.
- Vuust, Peter, Mikkel Wallentin, Kim Mouridsen, Leif Østergaard, Andreas Roepstorff. 'Tapping polyrhythms in music activates language areas.' *Neuroscience Letters*. Volume 494 (2011): 211-216. <https://doi.org/10.1016/j.neulet.2011.03.015>.
- Wackenroder, Wilhelm Hainrich. *Die Wunder der Tonkunst. Das eigentümliche innere Wesen der Tonkunst und die Seelenlehre der heutigen Instrumentalmusic*. Offenbach am Main: W. Gerstung, 1926.

- Wagner, Dylan D., William M. Kelley, James V. Haxby, and Todd F. Heatherton. 'The Dorsal Medial Prefrontal Cortex Responds Preferentially to Social Interactions during Natural Viewing', *The Journal of Neuroscience*, Volume 36, No. 26 (29 June 2016): 6917-6925. <https://doi.org/10.1523/JNEUROSCI.4220-15.2016>.
- Wagoner, Brady. 'Bartlett's concept of schema in reconstruction'. *Theory & Psychology*. Vol. 23, Issue 5 (October 2013), 553-575. <https://doi.org/10.1177/09593543500166>.
- Wandschneider, Dieter. *Raum, Zeit, Relativität. Grundbestimmungen der Physik in der Perspektive der Hegelschen Naturphilosophie*. Frankfurt Am Main: Vittorio Klostermann, 1982.
- Wandschneider, Dieter. 'The Problem of Mass in Hegel'. In *Hegel and Newtonianism*. 249-265. Edited by M. J. Petry. Dordrecht: Kluwer Academic Publishers, 1993.
- Wang, Fei, Kaiping Peng, Yang Bai, Rul Li, Ying Zhu, Pei Sun, Hua Guo, Chun Yuan, Pia Rotshtein and Jie Sui. 'The Dorsal Anterior cingulate Cortex Modulates Dialectical Self-Thinking'. *Frontiers in Psychology*. Volume 7, No 152 (11 February 2016): <https://doi.org/10.3389/fpsyg.2016.00152>.
- Waytz, Adam, Jamil Zaki, and Jason P. Mitchell. 'Response of Dorsomedial Prefrontal Cortex Predicts Altruistic Behavior.' *Journal of Neuroscience*, Volume 32, Issue 22 (30 May 2012): 7646-7650. <https://doi.org/10.1523/JNEUROSCI.6193-11.2012>.
- Weilnhammer, Veith, Merve Fritsch, Meera Chikermane, Anna-Lena Eckert et al. 'An active role of inferior frontal cortex in conscious experience'. *Current Biology*. Volume 31: 2868-2880 (12 July 2021). <https://doi.org/10.1016/j.cub.2021.04.043>.
- Wenner, Adrian, 'Sound Communication in Honey Bees', *Scientific American*, 210 (April 1964): 116-124.
- Wernicke, Carl. *Der Aphasische Symptomencomplex*, (Breslau 1874.), 22-23, 33. In Deutsches Textarchiv, https://www.deutschestextarchiv.de/wernicke_symptomencomplex_1874/6.
- Williams, Carol. '3. Johannes de Grocheo's *De Musica* as a Guidebook for Thirteenth-Century Parisian Musical Practice'. In *Aesthetics and Experience in Music Performance*. Edited by Elizabeth Mackinlay, Denis Collins and Samantha Owens. Newcastle: Cambridge Scholars Press 2005.
- Wong, Patrick C. M., Lawrence M. Parsons, Michael Martinez, Randy L. Diehl. 'The role of insular cortex in pitch pattern perception: the effect of linguistic contexts.' *Journal of Neuroscience*, Volume 24, Issue 41 (13 October 2004): 9153-9160. <https://doi.org/10.1523/JNEUROSCI.2225-04.2004>.
- Wood, Jaqueline N., Stephen G. Romero, Kristine M. Knutson, Jordan Grafman. 'Representation of attitudinal knowledge: role of prefrontal cortex, amygdala and parahippocampal gyrus'. *Neuropsychologia*. Volume 43, Issue 2 (2005): 249-259. <https://doi.org/10.1016/j.neuropsychologia.2004.11.011>.
- Wright, Anthony A., Jacquelyne Rivera, Stewart H. Julse, Melissa R. Shyan-Norwalt. Julie J. Neiworth. 'Music perception and Octave Generalization in Rhesus Monkeys.' *Journal of Experimental Psychology General*, Vol 129, No. 3 (October 2000):291-307. <https://doi.org/10.1037/0096-3445.129.3.291>.
- Wundt, Wilhelm: *Ethics: An Investigation of the Facts and Laws of the Moral Life*, Vol. II: Ethical Systems. Translated by Margaret Floy Washburn. New York: Macmillan Co., 1897.

- Wundt, Wilhelm. *Grundriss der Psychologie*. Zweite Auflage. Leipzig: Verlag von Wilhelm Engelmann, 1897.
- Wundt, Wilhelm. *Outlines of Psychology* [1897]. Translated by C.H. Judd. Bristol: Thoemmes press, 1999.
- Wundt, Wilhelm. *Grundzüge der Physiologischen Psychologie, Erster Band*. Leipzig: Verlag von Wilhelm Engelmann, 1902.
- Wundt, Wilhelm. *Grundzüge der Physiologischen Psychologie*. Sechste, umgearbeitete Auflage. Band 3. Leipzig: Verlag von Wilhelm Engelmann, 1911.
- Wundt, Wilhelm. *Völkerpsychologie: Eine Untersuchung der Entwicklungsgesetze Sprache, Mythos und Sitte*. Dritter Band: Die Kunst. Dritte, neubearbeitete Auflage. Leipzig: Alfred Kröner Verlag, 1919.
- Wundt, Wilhelm. *Erlebtes und Erkanntes*. Stuttgart: Kröner 1920.
- Yuvaraj, Rajamanickam, Murugappan Murugappan, Mohamed Ibrahim Norlinah, Kenneth Sundaraj, Mohamad Khairiyah. 'Review of Emotion Recognition in Stroke Patients.' *Dementia and Geriatric Cognitive Disorders*. Volume 36, No 3-4 (July 2013): 179-196. <https://doi.org/10.1159/000353440>.
- Zaldivar, Daniel, Alexander Rauch, Kevin Whittingstall, Nikos K. Logothetis, Jozién Goense. 'Dopamine-Induced Dissociation of BOLD and Neural Activity in Macaque Visual Cortex.' *Current Biology*. Volume 24, Issue 23 (1 December 2014): 2804-2811. <https://doi.org/10.1016/j.cub.2014.10.006>.
- Zalla, Tiziana, Michael Phipps, and Jordan Grafman. 'Story processing in patients with damage to the prefrontal cortex.' *Cortex*. Volume 38, Issue. 2 (April 2002): 215-231. [https://doi.org/10.1016/s0010-9452\(08\)70651-8](https://doi.org/10.1016/s0010-9452(08)70651-8).
- Zatorre, Robert J., Andrea R. Halpern, Marc Bouffard. 'Mental Reversal of Imagined Melodies: A Role for the Posterior Parietal Cortex'. *Journal of Cognitive Neuroscience*, Volume 22, Issue 4, 775-789 (May 2009). <https://doi.org/10.1162/jocn.2009.21239>.
- Zatorre, Robert J., and Jackson Tl Gandour. 'Neural specializations for speech and pitch: moving beyond the dichotomies.' In *The perception of Speech: From Sound to Meaning*. Edited by Brian Moore, Lorraine Tyler, and William Marslen-Wilson. New York: Oxford University Press, 2009.
- Zatorre, Robert J., Shari R. Baum. 'Musical Melody and Speech Intonation: Singing a Different Tune'. *PLoS Biology*, Volume 10, No. 7 (31 July 2012). <https://doi.org/10.1371/journal.pbio.1001372>.
- Zentner, Marcel, Didier Grandjean, Klaus cherer. 'Emotions Evoked by the sound of Music: Characerization, Classification, and Measurement'. *Emotion*, Volume 8, Number 4 (September 2008): 494-521. <https://doi.org/10.1037/1528-3542.8.4.494>.
- Zhao, Hongyi, Dandan Li, Xiuzhen Li et al. 'Relationship between Dreaming and Memory Reconsolidation.' *Brain Science Advances*. Volume: 4, Issue 2 (2 April 2019): 118-130. <https://doi.org/10.26599/BSA.2018.9050005>.
- Zhu, Jing and Paul Thagard. 'Emotion and action'. *Philosophical Psychology*, vol.15, no. 1 (2002): <https://doi.org/10.1080/09515080120109397>.

Zikopoulos, Basilis, Xuefeng Liu, Justin Tepe, Iris Trutzer, Yohan J. John, and Elen Barbas. 'Opposite development of short- and long-range anterior cingulate pathways in autism'. *Acta Neuopathologica*, Vol. 136, No. 5 (6 September 2018): 759-778, <https://doi.org/10.1007/s00401-018-1904-1>.

Zuckermandl, Victor. *Sound and Symbol: Music and the External World*. Translated by Willard R. Trask. New York: Princeton University Press, 1956.

