Human enhancement: Enhancing health or harnessing happiness?

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Abstract:

Human enhancement (HE) is ontologically, epistemologically, and ethically challenging and has stirred a wide range of scholarly and public debates. This article focuses on some conceptual issues with HE that have important ethical implications. In particular it scrutinizes how the concept human enhancement relates to and challenges the concept of health. In order to do so, it addresses three specific questions: Q1.What do conceptions of HE say about health? Q2. Does HE challenge traditional conceptions of health? Q3.Do concepts of health set limits to HE? Addressing Q1 reveals that HE tends to frame and form our conception of health. Thereby it challenges traditional conceptions of health (Q2). Accordingly, health does not provide strong sources for setting limits to HE (Q3). On the contrary HE seems to define and expand the concept of health. Common to the concepts of HE and health is that both depend on vague value concepts, such as happiness, wellbeing, or goodness. There seems to be a tendency in the HE literature to define the goal of human life in terms of what is bigger, stronger, faster, more intelligent, and more resilient. However, this is confusing "goodness" with "more" and quality with quantity. Until HE more appropriately defines happiness, HE will fail to provide a relevant compass for improving the life of human beings. On the contrary, if we let simplified conceptions of "enhancement" come to define goodness or health, we may do more bad than good. Until doing so, we may well learn from Tithonus, listen to Douglas Adams' Wowbagger, and pay attention to Virginia Woolf's Orlando. Enhanced life may not be better. The same goes for health.

Key words: enhancement, health, concept, wellbeing, naturalist, normativist, hybrid

Introduction

Human desire for enhancements can be traced back at least to ancient Greece, where people were given exceptional abilities by the gods. Zeus made the Trojan Tithonus immortal and humans tried to enhance their capabilities, such as in the case of Icarus. Some enhancements came about through food and drink (ambrosia, nectar, Eve's apple); or by specific items, as in Arthurian literature, where the Holy Grail gave eternal youth.

However, the term "human enhancement" is quite new, and is frequently related to recent technological advances, where it has become possible to enhance human abilities beyond what was previously considered to be "normal" or "natural." Human enhancement (HE) has been defined in a number of ways. A frequently referred definition is that HE refers to "any modification aimed at improving individual human performance and brought about by science-based or technology-based interventions in the human body" (Coenen, Schuijff, and Smits 2011)(p. 855).

HE appears ontologically, epistemologically, conceptually, and ethically challenging and has stirred a wide range of scholarly and public debates (Berry 2006, Butcher 2003, Gordijn and ten Have 2014, Lucivero and Vedder 2013, Parens 2005, Bess 2010, Savulescu and Bostrom 2009, Savulescu, ter Meulen, and Kahane 2011, Loi 2013, Powell, Kahane, and Savulescu 2012). While HE obviously is interesting from a wide range of perspectives, this article will focus on the relationship between HE and the concept of *health*. In particular it will scrutinize how the two concepts relate to and challenge each other. In order to do so, I will address the following questions:

1. What do conceptions of HE say about health?
2. Does HE challenge traditional conceptions of health?
3. Do concepts of health set limits to HE?

I will argue that conceptions of HE make health something mouldable (Q1), that HE certainly challenges some, but not all, conceptions of health (Q2), and that concepts of health provide few measures for setting limit to HE. On the contrary, HE expands the conception of health, and thereby the goal of the health care system.

In the following the answers to the questions 1 and 2 will be used to address question 3. Then I will reflect on some of its consequences.

1. What do conceptions of HE say about health?

There may of course be as many conceptions of health following from HE as there are conceptions of HE. Quite surprisingly, few scholars have been preoccupied with HE's relation to health. One important contribution made by Gregor Wolbring reveals how enhancement technologies move conceptions of health from being based on "normative functioning" to "optimum functioning," and how this in consequence is making everyone disabled (Wolbring 2006). According to what he labels "the transhumanist model of health," health is characterized as the "optimum functioning of biological systems and interpreted as the concept of feeling good about one's abilities, functioning and body structure." (Wolbring 2004)

A more elaborate illustration of how HE influences the conception of health can be found in Michael Barilan and Moshe Weintraub's article *The naturalness of the artificial and our concepts of health, disease and medicine*. Let us investigate their argument in some detail as this is one of the few articles explicitly and extensively elaborating on the relationship between HE and health.

In their article Barilan and Weintraub argue that using artefacts to extend health is natural to human beings. In order to make their case, they debunk what they identify to be premises of the existing paradigm of health. In particular, they identify ten presuppositions that "constitute the undercurrent paradigm of contemporary discourse of health disease and medicine." These are shown in the first column in Table 1.(Barilan and Weintraub 2001b)

As most cultures employ a distinction between "nature" and "culture"; "man-made" vs. "nature-made" (Goody 1977)(p. 64), we tend to think of medicine as restoring a state of nature by re-establishing health. Barilan and Weintraub, however, argue that "[d]ividing the world between nature and culture is artificial. This division is a cultural construct by itself" (Barilan and Weintraub 2001b). There is no natural to reach back to in order to establish concepts of health and disease. On the contrary, our nature is to strive for improvements, also with regards to health. With reference to Ayurveda medicine they point to other traditions of striving for "super-health" (Alter 1999, Barilan and Weintraub 2001a).

Barilan and Weingraub argue that health is not “natural” and use, clothing, housing, food, obesity and aging to make their point. Although obesity is associated with various diseases, it may be a sign of health and significantly increasing survival, e.g., given altered living conditions such as famine. Aging is another example illustrating the unsound conception of naturalness in our conceptions of health and disease, according to Barilan and Weintraub. Natural aging makes it unnatural to die, as only persons with reduced health due to various diseases, such as dementia and cancer, are allowed to die a “natural death” of pneumonia, while the otherwise healthy persons will be subject to medical interventions saving their lives.

Likewise, Barilan and Weintraub argue that cultures considered to be “close to nature” have had “the upper hand in sickness, poverty and mortality” and are “not necessarily adapted well, nor are they more disciplined ecologically.”(Barilan and Weintraub 2001b) Excluding or limiting enhancement by referring to “nature” unduly restricts conceptions of health. Barilan and Weintraub ascribe the flawed connection between artificial and bad, between natural and good, to technophobia. They define human nature in terms of flexibility and opportunism. Ecological balance is very different in a nomadic group living in West Sahara than in an urban group in New York, e.g. in terms of menarche and menopause. They contend that “the unlimited versatility of human nature merely appears to defy closure by borders. Biology can shape concepts of health and human nature, but they are of too low standards for modern people.” (Barilan and Weintraub 2001b) Breast enlargement, sex change, and medication make people feel their “true self.” Hence, naturalness has lost its standards for health (and disease), Barilan and Weintraub argue. We must use all available means to shape our health in accordance with what we consider to be good (and not the other way around).

“Standards of normalcy serve as scales of a second order of diagnosis and monitoring, but they do not define states of health and disease. A ‘normal’ red blood cell count does not make a person ‘normal’. It is a normalcy only within the context of specific clinical questions.”(Barilan and Weintraub 2001b), they argue. Here they echo Martin Bunzl who 20 years earlier underscored the difficulty identifying the norms of nature: “For lacking a blue print for the species design, appealing to how the body ought to function, gives an invitation for us to appeal to a standard which we ourselves set independent of facts of the matter.” (Bunzl 1980). Hence, we set the standards of health, not “nature.”

Barilan and Weintraub nicely sum up how nature does not limit our conceptions of health (and disease): “when we give up on the unified, closed and anthropomorphic vision of

‘harmonia mundi’, there is not a basis for regarding nature as benevolent to contemporary people.” (Barilan and Weintraub 2001b).

Accordingly, HE make health something to be creatively manipulated: “If health is not given, it is also not a precious gemstone to be cherished no matter what. Medicine is not an enterprise of natural preservationists. People tend to risk their health in order to realize values and life plans without which they find health is meaningless. Disease and disability are man’s natural lot along with nakedness and ignorance. Health should be weaved and maintained like cloth and home. There is no healthy noble savage.” (Barilan and Weintraub 2001b) Hence, even the norms of biology are governed by human goals as the “[s]anctification of ‘an original lottery’ is merely a myth of return to a pure order of things. ... The search for a species-typical level of conditions is futile unless we first determine the kind of society we wish to create for ourselves.” (Barilan and Weintraub 2001b) Solutions to our social problems, they claim, are not to be found by looking back at nature without human intervention, but by prospective creativity within the limits of what humans can obtain in manipulating the material world.

In order to move from the paradigm of health as nature to the paradigm of health as something subject to human enhancement we need to base our thinking on a different set of insights, Barilan and Weintraub suggest. These alternative insights are shown in column 2 in Table 1. Health and human life, they argue, can be shaped by transgressive technologies. “Culture and artificial artifacts are the natural tools of humanity within which people work in order to carve healthy and satisfying life. Innovation and creativity have solved numerous problems encountered by humanity. It is likely that solutions to our ecological and social problems will also be found by technological means. We had better not antagonize technology but harness it appropriately.” (Barilan and Weintraub 2001b)

Table 1 Contrasts between the prevailing (and flawed) paradigm and the appropriate paradigm of nature as normative for our conceptions of health, disease, and medicine according to (Barilan and Weintraub 2001b). Nature1 = the given world without human intervention. Nature2 = the inherent and innate disposition or character of a person. Nature3 = the creative and regulative physical power which is conceived of as operating in the material world and as the immediate cause of all its phenomena.

Nature-as-norm-paradigm	Enhancement paradigm
1. There is an ontological and natural distinction between things and actions that are natural and things and actions that are artificial.	1. Definitions and boundaries do not encompass human nature2.
2. Natural things and actions are good; artificial things and actions are not necessarily good. Rather, they are likely to be bad and are always less valued than natural things and actions when natural substitutes are available.	2. It is within the essence of human nature2 to fashion and to mould its own nature1+2, but humans cannot change the laws of nature3.
3. Nature is set in a perfect order which is sustained by God/Mind or self-supporting laws of cybernetics. The best state of every creature is to abide by its natural place in the Big Ecological Harmony of Nature.	3. The artificial is natural2 to humans, what is natural1 is not necessarily good.
4. The nature of humankind can be delineated, as part of the natural order.	4. Hence technology is no more “good” or “bad” than humanity itself. Evaluation is applied to the specific things humans do or that happen to humans and not the facts that humans exist or have technology.
5. Health is the natural condition of humankind.	5. The natural1+3 condition of humankind is unhealthy. People cannot thrive without prepared food, clothing, shelter and medicine.
6. Disease is a deviance from the natural condition of health.	6. Humans are part of nature1+3 and their nature2 is to act upon nature1 within the limits of nature3. Hence, the concept of “Nature” as a closed cybernetic harmony to which humans must adopt is incorrect.
7. The primary role of medicine is restorative. It aims to correct the abnormal deviance from our healthy nature, which the disease has brought about.	7. Disease is a specific biological process of the human body, but culture and personal preferences determine which specific process is a disease. Whenever we speak of disease we distinguish it from other forms of human events and misfortunes.
8. Nature has healing properties.	8. Medicine is inseparable from human culture and creativity. Even when it acts restoratively, its aim is the restoration of a creative and created life plan and values.
9. The mind has power of control over the body and there is always something that one can do about one’s health.	9. Medicine aims to understand the patient within a wider bio-psycho-social context in order to find the best-localized and specific intervention.
10. Good medicine treats “the whole person” not isolated pathologies. There is an ontological and natural distinction between things and actions that are natural and things and actions that are artificial.	10. Medicine strives to find procedures that have the least possible repercussions in the wider biopsycho-social circles.
	11. Most of the time medicine is effective and satisfying even when it fails to fulfill B9 and B10.

In their analysis and rejection of naturalness as a boundary of health and enhancement, Barilan and Weintraub liberate the concept of health from the yoke of nature and opens it to the creative alterations of HE. HE makes health something mouldable according to other (and more primary) human goals. As such HE may conflict with traditional conceptions of health, especially those referring to "nature." It may of course be argued that health and HE may be independent, but if HE and health are not harnessed by "nature" (in any of the kinds discussed by Barilan and Weintraub), this certainly has implications for our conception of health and for the relationship between HE and health. Let us therefore turn to the second question and investigate how some traditional conceptions of health are challenged by HE.

2. Does HE challenge traditional conceptions of health?

Let me briefly investigate three main types of theories (and definitions) of health, i.e., naturalistic, normativist, and hybrid.

Normativistic conceptions of health

Normativistic conceptions define health in terms of norms and values of the prevailing society or culture (King 1954, Kingma 2007, Fedoryka 1997, Bircher 2005, Caplan, McCartney, and Sisti 2004, Dogra, Li, and Ertubey 2015, Engelhardt and Wildes 1995, Ereshefsky 2009, Fulford 1993, Kovács 1998, Napier et al. 2014, Nordenfelt 1986, 2005, Pörn 1993, Von Engelhardt 1995, Whitbeck 1981) and are thus hardly challenged by conceptions of HE. As revealed in the analysis of Berilan and Weintraub's theory of HE, the concept of health is construed by human (moral) norms, i.e., it is a normative conception of health. Desirable enhanced human performances come to define health. Berilan and Weintraub do not ignore biological norms, but they subordinate them to human (moral) norms that define health.

The same goes for other normative conceptions of health, e.g., theories that define health as the ability to adapt to social, physical, and emotional challenges (Huber et al. 2011, Huber et al. 2016). These may easily be attuned to various conceptions of HE. So may theories that view health as a balance (homeostasis) or as a reduced sense of coherence (Antonovsky 1985). However, this may require an extension of such theories, as some such theories explicitly or implicitly see nature as something normatively good. Moreover, welfare-based theories of health are not challenged by HE either (Savulescu, Sandberg, and Kahane 2001, Giubilini and Sanyal 2016, Savulescu and Bostrom 2009), as any enhancement of welfare is seen as an enhancement of health.

HE does not necessarily challenge health conceived of as a *surplus* or a *margin* either, e.g., as expressed by George Canguilhem: "Health is a margin of tolerance for the inconstancies of the environment" (Canguilhem 1989)(p.197). HE does not challenge health when defined in terms of the ability to set new norms in response to challenges of the situation, e.g., when increasing human margins to specific diseases through immunization. Accordingly, a wide range of HEs could be directed at increasing the margin of tolerance, and thus, fall under such conceptions of health. The same goes for *resilience*.

Hence, HE does not tend to challenge normativistic conceptions of health. There are, however, some premises for this. For example, it presupposes that the inconstancies of the environment are constant or controllable. If human-made enhancements aggravate environmental inconsistencies, health may be reduced. It also presupposes that the norm-generating feature of the human being stays constant. Rapidly advancing technological developments coupled with altered living conditions place new, or at last increased, physical, cognitive, emotional, as well as social demands on people. No doubt, providing humans with various forms of enhancement can be a way to meet such demands (Fröding and Juth 2015). But it is unclear whether HE will satisfy such demands without creating new needs or whether it will increase or reduce the inconsistencies of the environment. In short, it is not clear whether HE will support or undermine "the norms and values of the prevailing society or culture."

This is not the place to enter the debate about the outcome of HE technologies. The point here is that normativistic theories acknowledge the crucial role of human norms and values in shaping the concept of health either it is conceived of as a margin, a tolerance, harmony, or as welfare in general. Accordingly, normativistic conceptions of health are not challenged by HE. On the contrary, one could argue that HE shapes and expands the concept of health in terms of norms and values of what human being should pursue (Barilan and Weintraub 2001a). As increased demands augment our needs, "normal simply is not good enough anymore." (Fröding and Juth 2015). HE may of course change the norms and values that make up our conceptions of health. As long as these norms and values are not self-undermining, this may not be a problem.

Naturalistic conceptions of health

Naturalistic theories define health in terms of biological phenomena and standards, e.g., in terms of species-typical normal functioning (Boorse 1977). Normal functioning is given by

statistically typical contributions to survival and reproduction for a specific group, called the reference class, which is typically characterized by age and sex (Boorse 2014).

When human interventions and enhancements alter normal functioning of a species or change the reference class (Boorse 2014), it also alters health. Accordingly it can be argued that HE challenges naturalistic conceptions of health. Moreover, it can be argued that what is normal (species-typical) may not contribute to survival and reproduction, for example in abrupt environmental changes. As argued by John Harris, when a reduced protection of ozone makes white people vulnerable to radiation and skin cancer "whites might have disabilities relative to blacks even though their functioning was quite species typical or normal." (Harris 2001) Hence, when the environment changes, the statistically normal functioning may not be good enough for sustaining survival and reproduction. What is normal is different from what is desirable (and non-disabled).

Hence, it may be argued that HE challenges naturalistic conceptions of health. However, as acknowledged by Boorse and others, the functions of a species ("species design") is not given for all time, but is open for evolutionary developments (Boorse 1977, Schramme 2013). The crucial question then becomes whether human-made evolutionary developments can be included in the species design or not. As will be argued below, this presupposes that we can differentiate "good evolution" from "bad evolution." Accordingly, a naturalistic conception of health may dismiss the relevance of HE on health on basis that it is unclear whether HE will improve the overall species design.

Moreover, naturalistic conceptions tend explicitly or implicitly to define health in terms of absence of disease (Boorse 1977, 2014, Daniels 2008, Sandel 2004). Eliminating (and avoiding) disease could (indirectly) be conceived of as enhancing health. Treating colorectal cancer or removing polyps that can evolve into colorectal cancer pre-empts disease, and thereby increases (the extension of) health (in terms of non-disease). However, it can be argued that no increase in functioning, ability, or well-being in a healthy individual, can count as health-enhancing (Tengland 2015), as it does not pre-empt disease. Any enhancement of a normal trait or ability is therefore to "reach beyond health" (Sandel 2004)(p.72).

There are of course other naturalistic conceptions of health (and disease) that may be less challenged by HE (Neander 1991, Schramme 2013, Lindstrøm 2012). Nonetheless, it is unclear whether HE challenges naturalistic conceptions of health. Whether it does depends

very much on the naturalistic conception of health. What then about hybrid conceptions of health?

Hybrid conceptions of health

Hybrid conceptions of health define health both in terms of naturalistic elements, such as biological dysfunction, and in terms of normative aspects, such as wellbeing, quality of life, or vital goals (Schermer 2013). Theories of health, relating health to wellbeing, e.g., in terms of abilities (Nordenfelt 2005) or capabilities (Venkatapuram 2013), grant the possibility of enhancing health in healthy individuals, not only in unhealthy ones, as wellbeing, can be enhanced beyond the absence of disease. Even more it can be argued that there is an obligation from health care and society "to enhance and support people's health" (Tengland 2015), as health is not only "a fundamental human right," but as "the attainment of the highest possible level of health is a most important world-wide social goal" (World Health Organization 1978). Therefore, HE hardly challenges hybrid conceptions of health.

There are many hybrid conceptions of health, and it is beyond the scope of this article to investigate them all. Allow me to limit this analysis to one example that explicitly has investigated the relationship between HE and the concept of health, i.e., Per-Anders Tengland's article *Does Amphetamine Enhance Your Health? On the Distinction between Health and "Health-like" Enhancements* (Tengland 2015). Tengland's assessment illustrates a general point which appears relevant for other hybrid conceptions of health as well. By analyzing an ability-based conception of health Tengland comes to the preliminary conclusion that HE enhances health: "we have to accept that all those kinds of aids and substances that are integrated into, or absorbed by, our bodies, including titanium implants, medicines, and other drugs, should count as health enhancing, as long as they increase either our basic abilities and/or our internally caused (i.e., health-related) well-being."

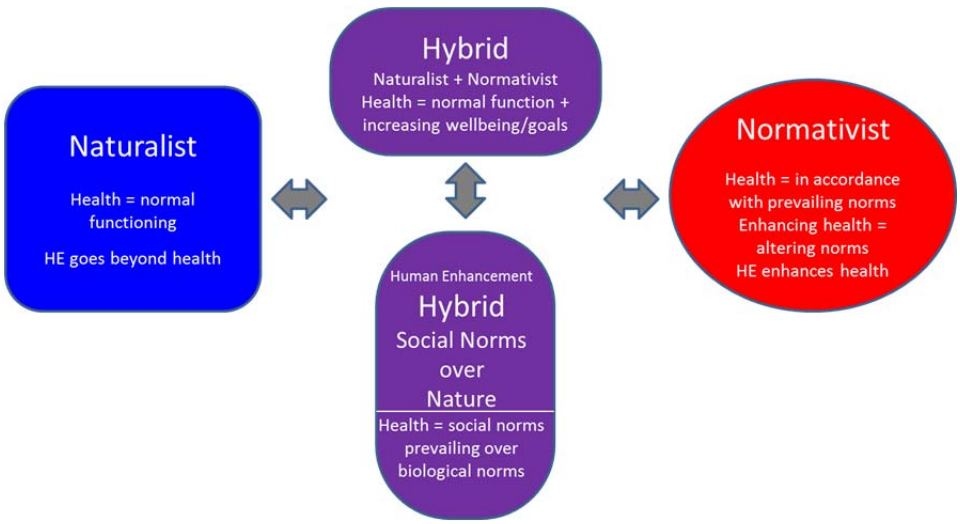
However, Tengland is uncomfortable with this conclusion as he finds that it has counterintuitive implications. Amphetamine does enhance people's ability and/or wellbeing, but is still not considered to be an enhancement of health. To overcome this problem Tengland points to the distinction between health and "health-like" enhancements, and between "fundamental health" and "manifest health" and this leads him to argue that "every substance that increases basic ability and/or well-being is an enhancement of manifest health, but also to conclude that some of these substances at the same time damage fundamental health." (Tengland 2015). It is not enough that an enhancement simply increases ability, but it

also has to contribute to the ability in the long run in order to enhance health. So as to exclude amphetamine and other types of enhancement from health, he argues that "an enhancement is health related when the substance, or aid, increases ability or well-being, is integrated into the body, and does not harm the individual's fundamental health." (Tengland 2015).

Whether Tengland's qualification is sound or not is open for discussion. The point here is that ability-based theories of health as well as other wellbeing- or capability-based theories of health are not challenged by HE. Many HEs "increases ability or well-being" and "is integrated into the body." Accordingly, HE does not necessarily challenge hybrid conceptions of health.

However, it is important to notice that many hybrid theories of health are not especially developed to address HE. In fact Tengland explicitly argues that his theory does not take account of the contemporary enhancement debate, as he is not focusing on changes in the upper part of the "health dimension," in following Lennart Nordenfelt's use of the term "enhancement" (Nordenfelt 1998, 2001). Tengland has himself dealt with issues of increasing health in healthy people in terms of "health promotion" as distinct from treatment and "disease prevention" elsewhere (Tengland 2010a, b). Nonetheless, the discussion illustrates that HE may endorse more than challenge hybrid conceptions of health. Figure 1 tries to illustrate the relationship between HE and traditional conceptions of health.

Figure 1 Overview of traditional conceptions of health, including a HE-inspired conception of health.



3. Do concepts of health set limits to HE?

The investigation of how the concept of health relates to HE (Q1), and specifically whether HE challenges traditional concepts of health (Q2), has prepared us to address whether the concept of health provides recources for setting limits to HE or to direct HE (Q3). The question of limit setting appears relevant as the cost-effectiveness of HE is still quite uncertain while the needs for resources for reducing human suffering are great on a global scale and alternative cost-effective means for addressing these needs are available. The question is whether the concept of health can do the trick.

There seem to be many references to health when arguing for barring HE. Health has been seen as the reference standard for medicine defined as "a restorative practice aimed at the return to health" (Pellegrino and Thomasma 1981)(p. 62). Correspondingly, Erik Parens uses the concept of "a state of health" as a benchmark for discussing human enhancement (Parens 1998). Others also argue that seeking a condition "better than well" is wrong (President's Council on Bioethics and Kass 2003). Accordingly, to go beyond healing and restoring health is wrong (Benditt 2007) and the concept of health appears to be a reasonable candidate for setting limits to HE.

However, as seen in section 2, normativistic conceptions of health are highly compatible or even endorse HE. Such conceptions of health vary from one definition to another and shifts from culture to culture and epoch to epoch (Macklin 1999). Therefore they cannot be used to bar HE (Bess 2010). They provide little guidance to set limits to HE. Normativistic conceptions of health may of course direct HE, but as the norms and conceptions of health themselves may be influenced by HE, this will be a dynamic and interactive process. In particular, transhumanist conceptions of health as "optimum functioning of biological systems" where persons are "feeling good about one's abilities, functioning and body structure." (Wolbring 2004) obviously provide no limits, but promote HE through a dynamic and limitless but also vague concept of health, which may be difficult to operationalize.

On the other hand, some naturalistic conceptions may provide measures to reflect on and set limits to HE. Anything that strives for abilities beyond statistically normal functioning for human beings goes beyond health (descriptively). Whether or not this warrants barring HE is a normative question (Schramme 2013). On the naturalistic account the question of whether a process is valued is irrelevant to establishing whether it is a function or health (Schramme

2013). However, there is an extensive debate on whether naturalistic conceptions of health are purely descriptive (Guerrero 2010, Loi 2009, Kingma 2014, Rogers and Walker 2017).

On the other hand, few hybrid conceptions of health provide measures to bar HE. One reason for this is that they have been devised to address challenges in the low (ability) spectrum of health while HE is preoccupied with the high end. However, various types of modifications, such as Tengland's distinction between manifest and fundamental health, may provide assets for reflecting on the limits to HE. This would need some extensions and qualifications, which are beyond the scope of this study.

Thus, while some conceptions of health, such as specific interpretations of naturalistic conceptions of health, may set limits to HE, most concepts of health do not provide such resources.

4. Enhancing health or harnessing happiness?

So far the analysis shows that conceptions of HE make health something mouldable (Q1), that HE certainly challenges some, but not all, conceptions of health (Q2), and that traditional concepts of health only have limited resources for setting limit to HE (Q3). Moreover, this study has revealed that HE alters and expands the concept of health. Human enhancement, e.g., through emerging and disruptive technologies, gives new norms for healthcare practices as well as for conceptions of health. As pungently pointed out by William Stempsey: "Technologies may aim at the prevention and treatment of disease, but they also bring about modifications of what we consider normal for the human being … the evolution of medicine into techno-medicine is bringing about a corresponding evolution in the very conception of health. … The technology we use in medical practice will actively shape how we see health. Technology is not simply a means to the goal of health, but rather a practice that necessarily shapes the reality that reveals health and sickness."(Stempsey 2006)

Accordingly, it could be argued that HE explicates the concept of health and provides new goals for health care. Health is given in terms of optimum functioning and to be healthy is to be as strong, intelligent, and moral as possible. Health care should therefore strive to enhance human capabilities. Hence, it can be argued that HE does not only expand on health, as clearly seen in the first part of this article, but that it also defines or frames the concept of health as a leading goal for health care. HE provides an ambitious and dynamic but clear conception of what has been called a vague and enigmatic concept, health (Gadamer 1996).

However, there are three main challenges with this. First, it implies reasoning from “is” to “ought,” and second, the argument harbours an “if-and-then” fallacy. Third (and related to the first), there appears to be a normative difficulty in defining what is enhanced.

Regarding the first fallacy, there seems to be a tendency amongst the proponents of HE to reason from quantity (*is*) to quality (*ought*), as more is frequently associated with better (Bess 2010). More strength and endurance, more intelligence, and longer lives are considered to be better. Quantity adds value. However, there appears to be little evidence that this is the case.

In addition there is a strong cognitive association between health as “morally good” (and disease as “sinful”)(Lakoff and Johnson 1999)(pp. 208–209). Health provides a moral imperative and goal for health care. Accordingly, enhancement is double good, i.e., in providing more of certain qualities, and in particular in providing health. Even more, every attempt to hamper enhancement is morally wrong. If you think that human improvement is the ultimate goal (good)(Harris 2001, Harris 2016), and that any restriction of good is bad, then it logically follows that restricting human improvements is bad.

Secondly, it is argued that HE-promoting arguments lean heavily on a speculative fallacy (Nordmann 2007). They move from the statement that HE *can* improve X to the statement that HE *will* improve X, where X is any characteristics you can imagine (Hofmann 2018 Online). This involves a transition from a merely claimed possible future to issues that undoubtedly will arise. However, it is often far from clear that HE will improve X, be it longevity or intelligence. As pointed out by Nordmann, many arguments promoting or opposing HE “foreshorten the conditional” in what has been called an “if-and-then-fallacy” (Nordmann 2007) They move (e.g.) from the (legitimate) conditional “if HE can expand human health (conceived of by all as something good), then we would face the question of whether withholding HE would be immoral” to the conditional “if you question whether HE can expand human health, then you are immoral.” The problem with this is of course that it is unclear whether the antecedent is true (i.e., whether HE expands human health conceived of as something good).

The third fallacy is related to the difficulty in defining the goodness to be enhanced (Hofmann 2017). In particular, it is quite unclear what the “optimum” is in HE. Relating it to the individual does not tend to do the trick. Accordingly, instead of clarifying health, HE and health face the same challenges in specifying its goals (values). While HE tries to evade the

issue of defining goodness by claiming that “more is better” or by lofty speculation, theoreticians of health strive with specifying what “wellbeing,” “vital goals,” or “happiness” is. Goodness, wellbeing, and happiness are concepts difficult to grasp, and definitions of HE or health based on these concepts tend to be vague.

The problem of defining goodness or betterment may be the reason why the concept of health is not suitable for reflecting on setting limits to HE and why it is as difficult to grasp *what it is* that is enhanced with HE as it is to grasp the *wellbeing* in health (Gadamer 1993). Hence, HE and health face with the same normative challenges.

This is not the place to enter the details of the vast and vivid debate on HE. The point here is that health and HE share some basic normative concepts, such as goodness, wellbeing, or happiness. However, it is unclear what goodness is (inherent) in health and in HE (Hauskeller 2014). The common reference to goodness may render both concepts vague. Hence, until we have harnessed happiness, HE and health may be lofty (and dynamically reciprocal) concepts.

The problem with vagueness of health concepts are not new. Some of the challenges discussed were already outlined in Nietzsche’s reflection on health in The Gay Science: “There is no health as such, and all attempts to define everything in that way have been miserable failures. Even the determination of what health means for your body depends on your goal, your horizon, your energies, your drives, your errors, and above all on the ideals and phantasms of your soul. Thus there are innumerable healths of the body; and … the more we put aside the dogma of ‘the equality of men‘, the more must the concept of a normal health, along with a normal diet and the normal course of an illness be abandoned by our physicians. … in one person’s case this health could, of course, look like the opposite of health in another person.“ (Nietzsche 1974)(book III, section 120) See also (Podolsky and Tauber 1999, Boyd 2000).

It is worth noting that the value of the analysis above depends on philosophical context. For example, the is-ought-fallacy may not be relevant for a utilitarian, where more quantities of happiness is a moral goal. Nonetheless, defining and measuring happiness in altering conceptions of health and HE may be challenging. Correspondingly, the issues discussed above may have different takes in various philosophical perspectives. The point here has not been to give a total overview of this, but only to point to some challenges that can be relevant to a fair range of perspectives.

Moreover, health and HE may be seen completely independent of each other, e.g., where HE has implications for what is considered to be health.[1] I accept this perspective, but hope to have shown that health and HE are interdependent, especially as emerging and disruptive technologies come to shape HE and frame health.

Conclusion

Human enhancement is conceptually and ethically challenging as it concerns the goal of health care. In this article I have investigated the relationship between HE and the concept of health, and in particular, how HE challenges (various traditional) concepts of health. HE tends to frame, form, and widen our concepts of health. Accordingly, the concept of health provides little resources to set limits to human enhancement.

On the contrary, HE tends to influence, define, or frame the concept of health. However, this does not make the concept of health less elusive, as HE is based on a vague conception of goodness or betterment provides a dynamic concept of health. I have identified three main challenges with this. First, there tends to be a reasoning from "is" to "ought," from "quantity to quality," and second, pro-HE arguments tend to harbour an "if-and-then" fallacy, and third, there appears to be a normative difficulty in defining what is enhanced, i.e., what makes something better.

Accordingly, the concept of enhancement is weak with regards to defining what is to be enhanced, i.e., to address the question "what is goodness?". As such health and enhancement are closely related concepts, as both hinge on vague value concepts. While the concept of health does not offer resources to reflect on the limits of HE, HE does not provide measures to understand the values in health.

No doubt, our aspirations with respect to health and HE are grand. Nonetheless, a closer look at these concepts and their interrelationship directs us back to the basic values in these normative concepts. The *goodness* inherent in concepts of HE and health tend to go beyond "more intelligence" and "longer lives," and insights in this basic goodness may not be found in enhancement technologies alone. Tithonus obtained eternal life, but found this meaningless as he nevertheless aged. Bowerick Wowbagger in Douglas Adams' Hitchhiker's Guide to the Galaxy lives eternal, but got a miserable life, as immortality makes his life meaningless and boring. Virginia Woolf's Orlando, lives for 400 years, but struggles. It is far from obvious that

[1] I owe this argument to one of the reviewers.

these reflections result from prejudice or "status quo bias," (Bostrom and Ord 2006, Caviola et al. 2014, Kahane and Savulescu 2015). They may reflect basic human insights. Unless we define goodness or happiness, health and HE are poor compasses for improving the life of humans. On the contrary, if we let simplified conceptions of "enhancement" come to define goodness or health, we may do more bad than good.

Declaration

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