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Doctoral thesis

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[1] https://www.nature.com/articles/d41586-018-05925-0

ABBREVIATIONS

√	Root
A	Adjective/adjectivizer
a	Adjective
ADV	Adverb
ANTIC	Anticausative
αP	α Phrase
BM	Norwegian Bokmål
BMO	Norwegian Word Bank, Bokmål
BPS	Bare Phrase Structure
CANS	Corpus of American Norwegian Speech
CardP	Cardinal Phrase
CAUS	Causative
COMP	Comparative
DEF	Definite
DM	Distributed Morphology
DP	Determiner Phrase
FEM	Feminine
FOPC	First Order Projection Condition
FP	Functional Phrase
IA	Item-and-Arrangement
IP	Item-and-Process
IMP	Imperative
INDEF	Indefinite
INF	Infinitive
L	Linking element
LF	Logical form
LINK	Linking element
LOC	Location
MASC	Masculine
N	Noun/nominalizer
n	Noun
NEG	Negation
NEUT	Neutre

NN	Norwegian Nynorsk
NNC	Norwegian Newspaper Corpus
NNO	Norwegian Word Bank, Nynorsk
NoWaC	Norwegian Web as Corpus
NumP	Number Phrase
nP	NP-related Functional Phrase
ON	Old Norse
P	Preposition
PP	Prepositional Phrase
PART	Participial
PAST	Past
PERF	Perfect
PERS	Person
PF	Phonetic form
PL	Plural
PRES	Present
S	Sentence
SG	Singular
SUP	Superlative
STRONG	Strong noun
V	Verb/verbalizer
v	verb
W	Weak adjectival inflection
WEAK	Weak noun
WP	Word-and-Paradigm
Ø	Zero (empty set)

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Chapter 1

INTRODUCTION

Compounding can be thought of as the simple process of combining two or more words or word-like units into one. This is illustrated with Norwegian examples in (1).[2]

(1) a. mjølk-e-flaske
         milk-_{LINK}-bottle
         milk-LINK-bottle
         'milk bottle'

     b. dag-drøyme
         day-dream
         'daydream'

     c. sofa-sitting
         sofa-sitting
         'sitting on a sofa'

     d. [lys-e-blå]-stripete
         light-LINK-blue-striped
         'light blue striped'

     e. [[[[fylke-s-[[trafikk-sikkerhet-s]-utvalg-s]]-sekretariat-s]-leder]-funksjon]
         county-LINK-trafic-LINK-safety-LINK-committee-LINK-secretariat-LINK-leader-function
         'function of the leader for the secretariat in the county's committee for traffic safety'

Two of the motivating questions that guide the present work are i) *what are the basic building blocks of compounds?* and ii) *how are these building blocks combined?*

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[2] There are two written standards of Norwegian, *Bokmål* and *Nynorsk*. I provide examples from both standards, but I will only specify the standard of individual examples when it is relevant to the overall understanding of the system.

Although examples like (1e) may seem quite complex, compounding has been argued to be one of the simplest processes in human language. Jackendoff (2009) proposes that compounds are relics of proto-language, the type of language that existed before we developed grammars with morphology and hierarchical structure. According to this view, compounding is so simple that it is "not a *grammatical* phenomenon" (Jackendoff 2009:113, emphasis in the original).

However, contrary to this view, there is reason to believe that compounding is not actually that simple. Consider first the compounds in (1a) and (1d-e). These compounds contain so-called *linking elements*, which will be glossed throughout the present work as LINK. Linking elements occur between the constituents of some compounds in certain languages, such as Norwegian. If compounds were relics of protolanguage, why would they make use of apparently grammatical formatives like linking elements? Consider furthermore the order of the elements in a compound. Speakers of Norwegian and English alike will agree that *mjølkeflaske* 'milk bottle' is not the same as *flaskemjølk* 'bottle milk'. That means it makes a difference what element we put first and last in a compound. Now, if compounds were relics of proto-language, why would the order of the compound members be so fixed? The fact that compounds have hierarchical structure also becomes clear when we consider the constituent structure of *[kumjølks]-flaske* 'cow's-milk bottle', that is, 'bottle containing cow's milk', compared to *ku-[mjølkeflaske]* 'cow milk-bottle', that is, a 'milk bottle for cows'. Compounds have a hierarchical organization that determines their interpretation.

These types of rules and regularities are exactly what we think of as grammar, and they indicate that compounding is a truly grammatical phenomenon, contrary to Jackendoff's claim. In the course of this dissertation, we will see that while compounds are relatively simple, they display a number of morphosyntactic peculiarities that only a well-articulated grammatical theory can handle. The goal of the current dissertation is to explore and analyze aspects of the grammar of Norwegian compounds, which will help us situate compounds within the larger theory of grammar and of human language.

1.1   Why compounding and why Norwegian?

I have already begun to motivate the topic of the present work, but there are several good reasons for why a study of compounding in Norwegian should be conducted.

Compounding is a widespread phenomenon that is found in most of the world's languages, and in some languages, such as Norwegian and Chinese, it is extremely productive. In addition, as previously mentioned, compounding seems quite simple on a

descriptive level. The relatively basic and fundamental nature of compounding underlines the importance of making sure that compounding is something that a complete theory of human language can account for. Nevertheless, as of today, many aspects of the grammar of compounds remain unaccounted for.

One of the peculiarities of compounds is that they share properties with both word-formation and sentence-formation, or what are traditionally thought of as processes in the lexicon and processes in the syntax, respectively. In this regard, consider the examples in (2).

(2) a. [rett   frå   levra]$_{PP}$ - svar   b. te-drikk-ing   c. beste-mor
        straight from liver.$_{DEF}$ - answer   tea-drink-$_N$ best-mother
        '(an) unvarnished answer'   'tea drinking'   'grandmother'

In (2a) a full phrase *rett frå levra* is used as the left-hand member of the compound. If phrases are created in the syntax whereas words are created in the lexicon, as is traditionally assumed, then (2a) shows that compounding involves both. Next, in (2b), the left-hand member *te* 'tea' is interpreted as the internal argument of the verbal element *drikke* 'drink', headed by the derivational suffix *–ing*. If we think that arguments are introduced in the syntax but derivation happens in the lexicon, then (2b) would indicate that compounding involves both. Finally, consider (2c), which is a non-transparent compound whose meaning cannot be predicted from the meaning of its parts. That is, *bestemor* does not literally mean 'the best mother', but 'grandmother'. This can be compared to (2b), which is a fully transparent compound. Again, if we think that transparent forms are built in the syntax and non-transparent words belong in the lexicon, then these examples would show that compounding involves both.

How can this dual nature of compounds be accounted for? Is it possible to theoretically reconcile the apparent lexical and syntactic properties of compounds? In order to capture such behavior, I will explore an analysis that does not assume a distinction between formations in the lexicon and formations in the syntax. Instead, I take as my starting point the assumption that all structure building takes place in a single component – the syntax – as argued for in the framework of Distributed Morphology (Halle & Marantz 1993, Harley & Noyer 1999, Embick 2015) and related theories such as Borer's (2005a,b, 2013) exoskeletal syntax. This class of approaches is sometimes referred to *syntax-all-the-way-down* or *morphology-as-syntax*.

Harley (2009a) notes in her handbook chapter on compounding in Distributed Morphology that compounds appear to be the perfect case-study for a *syntax-all-the-way-down*-approach, given the types of data that we saw in (2). It is therefore surprising that compounding has not received more attention from such theories. Since Harley's chapter,

we have seen some renewed interest in compounds within syntactic approaches to word-formation. This dissertation ties in with that research and contributes to it by attempting to refine our understanding of the phenomenon and its theoretical implications.

These considerations answer the question *Why compounding?* I propose to study compounding because there are aspects of compounds that we do not yet fully understand, including their dual nature, and it is crucial to understand this piece of the puzzle given our ultimate goal of developing a complete theory of human language.

Another aspect of compounding that remains to be mapped out is the range of variation in compounds within and across languages. Are we, for example, dealing with one phenomenon or multiple phenomena? That leads me to the second question – *Why Norwegian?*

In order to make sure that compounding is something that existing theories of grammar can explain, it is necessary to test our theories against compounds in various languages. For Norwegian, there is a rather rich descriptive literature dealing with compounds. However, much less attention has been paid to their formal, morphosyntactic analysis, with a few notable exceptions, such as Sakshaug (1999) and Johannessen (2001). Thus, for Norwegian there is, in some sense, a large amount of data just 'waiting to be analyzed'. In this dissertation, I collect and systematize existing data and knowledge about Norwegian compounds, I extend the body of knowledge with new observations, and I develop theoretically informed morphosyntactic analyses based on these descriptions.

Developing specific and detailed formal analyses will, at the next stage, allow us to compare the grammar of compounds in Norwegian to that of other languages, including both closely related languages such as Swedish and Dutch, and typologically more different languages such as Spanish and Chinese. It is interesting to note in this connection that although the Scandinavian languages are very similar with respect to compounding as well as most other phenomena, there are also some differences. For example, Norwegian displays more variation in linking elements than Danish and different criteria for the use of linking elements than Swedish.[3] Furthermore, the system of compounding in the Mainland Scandinavian languages is different from that of Icelandic and Faroese, where there is still a developed case system and case markers may be used inside compounds. These types of differences and their implications can only be investigated once we have good descriptions and analyses of compounds in individual languages.

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[3] Swedish always uses an *s*-linker when the left-hand member of a compound is a complex weak nominal (Josefsson 1998). Norwegian never uses an *s*-linker in this context.

Since the majority of the literature on Norwegian compounds is written in Norwegian and therefore has a limited readership, another goal of this work is to make knowledge about Norwegian compounds available to a larger linguistic community.

Moreover, an investigation into the grammar of Norwegian compounds not only provides us with a better understanding of compounding generally, but also contributes to a better and more complete understanding of the grammar of Norwegian specifically. One of the most prolific scholars in compound research, Laurie Bauer, highlighted the need for more research on Scandinavian compounds in his (1978) treatment of compounding in Danish, English and French. Bauer wrote:

> … there is a remarkable poverty of descriptions of compounding in the Scandinavian languages, especially when one considers how important a method of word-formation it is in these languages (…) It is almost as if familiarity has bred, if not contempt, at least disinterest with respect to this part of the grammar. (Bauer 1978:32-33)

Bauer also added that "the area of word-formation in general and compounding in particular is far more fully described in other languages", pointing to work on English, French and German (Bauer 1978:33).

Although much has happened in research on compounds since the time when this was written, it seems clear that there is a need for more work on compounding in Scandinavian in general, and Norwegian in particular. Thus, the aim of the current project is two-fold.

1. to provide a better theoretical understanding of compounding by describing and analyzing compounds in a particular language, i.e., Norwegian, whose system of compounding is less studied than that of many related languages

2. to contribute to the description and analysis of the grammar of Norwegian

Both of these aims, if achieved, will contribute to the larger research project of generative grammar, which is to understand and explain the nature of human language and the human language capacity.

1.2 Theoretical foundation

1.2.1 Generative grammar

This dissertation is placed within the tradition of generative grammar, initiated in the 1950s through the work of Noam Chomsky. Chomsky's approach to language was novel in its emphasis on language as a system in the minds of speakers. This system is fundamentally creative and underlies speakers' ability to constantly form new words and

sentences from a smaller set of primitives and operations. Chomsky compares his view of language to that of traditional and structuralist grammarians in the following passage.

> Although such grammars may contain full and explicit lists of exceptions and irregularities, they provide only examples and hints concerning the regular and productive syntactic processes. (...) The grammar of a particular language, then, is to be supplemented by a universal grammar that accommodates the creative aspect of language use and expresses the deep-seated regularities which, being universal, are omitted from the grammar itself. It is only when supplemented by a universal grammar that the grammar of a language provides a full account of the speaker-hearer's competence. (Chomsky 1965:5-6)

The goal that is formulated here, and that still holds true in modern versions of the framework, is to explain the regular and creative aspects of language by properly characterizing the nuts and bolts of the overall system that produces the observable linguistic output – the human language capacity. The nature of this capacity underlies those properties that all grammars have in common and is also hypothesized to guide the way individual languages are acquired.

The most recent incarnation of Generative Grammar is the Minimalist Program (Chomsky 1995). The Minimalist Program takes as its starting point the knowledge and theorizing that was developed in earlier versions of the theory, and attempts to simplify it by further breaking it down and asking why earlier theories look the way they do. The minimalist approach characterizes a general goal or attitude towards the study of language, and there are several competing theories that all fall within the minimalist program. The current dissertation follows a non-lexicalist, minimalist approach to structure building. I will elaborate on what I take that to mean below.

1.2.2 Lexicalist and non-lexicalist approaches

In current minimalist theorizing, a distinction can be made between lexicalist, endoskeletal approaches on the one hand, and non-lexicalist, exoskeletal approaches on the other. The differences between these approaches pertain to a) the size of syntactic atoms, b) the type of information that these atoms contain, and c) whether there are one or two structure building components of grammar.

Lexicalist approaches to grammar generally assume that there are two components for structure building: the lexicon (i.e. the morphological component) and the syntax. Words, or lexical elements, are formed in the lexicon, where they are equipped with specifications about their grammatical properties, and these lexical elements are the atoms of syntax. When they enter into the syntax from the lexicon, their grammatical specifications are projected as syntactic structure. Since syntactic structure comes from

within the lexical element, the lexicalist approach is also characterized as endoskeletal (Borer 2003). We can illustrate this view with a word like *play*. According to the lexicalist approach, the information that *play* is an intransitive verb with one theta role could be listed in the lexicon as play-V: <u>Theta.</u> Furthermore, the information that *play* is also a noun would entail a separate listing, e.g. play-N. When one of the versions of *play* enters the syntax as a syntactic atom, the grammatical specifications will be projected, thus determining the shape of the larger syntactic context.

Non-lexicalist theories, on the other hand, assume that there is only one component for structure building. Both words and sentences are formed in the syntactic component, which means that words are not the atoms of syntax. Rather, the atoms of syntax are pieces that are smaller than words, and these are combined to form ever larger pieces that finally make up sentences and larger utterances. According to this view, a lexical element like *play* is not a ready-made package of structural information. Rather, the form *play* enters the syntax without any grammatical specifications, such as whether it is a noun or a verb. It can thus be inserted into a nominal context, as in *a play*; a verbal, intransitive context, as in *Mary played*; or even a verbal transitive context, as in *Mary played Anne*. Indeed, an advantage of this approach is that it predicts such flexibility, where the same element can be inserted into a range of different structural contexts. Since grammatical structure and specifications are external to the lexical element itself, non-lexicalist approaches are characterized as exoskeletal (but to varying degrees; see below). Furthermore, since the larger structural context shapes the way lexical elements are interpreted, this view is also called neo-constructionist. It has commonalities with construction grammar, where it is proposed that constructions have meaning (Goldberg 1995, see also Ramchand 2008:11 on this).

In this dissertation, I adopt a non-lexicalist, exoskeletal approach to grammar and I explore how this type of approach can account for the properties of Norwegian compounds. As mentioned earlier, one of the reasons for adopting a non-lexicalist view of grammar is that compounds have properties in common with both words and sentences. This makes compounding difficult to account for within a lexicalist architecture and invites a type of model that does not assume a strict distinction between two different components of structure building. However, both within lexicalist and non-lexicalist approaches we find several theories that differ in the finer details of the architecture they assume, and that place themselves on various stages of the scale between the endoskeletal and exoskeletal view. Here, I adopt the framework of Distributed Morphology (Halle & Marantz 1993, Harley & Noyer 1999, Embick & Noyer 2007, Embick 2015), drawing also

on insights from Borer's (2005a,b,2013) exoskeletal syntax. The details of this theoretical implementation will be presented in Chapter 4.

1.2.3 Theories of word-formation

In the framework of Distributed Morphology, the primitives of grammar are pieces that are smaller than words. This also makes Distributed Morphology a piece-based theory of word-formation, or what Hockett (1954) termed an Item-and-Arrangement (IA) theory.[4]

In IA terms, a form like *baked* can be described as composed of two items, *bake* + PAST. This view can be contrasted with what Hockett called Item-and-Process (IP) theories of word-formation, where, instead, the form *baked* is described as composed of an item and a process. That is, a process of past-tense formation is applied to the item *bake*. Hockett also identified a third type of theory, Word-and-Paradigm (WP), which is the approach found in many classical grammars of languages like Latin, Greek and Sanskrit, where word forms are listed in paradigms.

Hockett's classic classification of morphological theories is still relevant and provides a useful way to approach some of the fundamental conceptual differences between models of word-formation.[5] Notice, however, that the term *word-formation* does not only comprise different models, but can also refer to quite distinct processes. This leads to a question of what a theory of word-formation is really proposing to explain. Below, I outline three different ways of understanding *word-formation* and illustrate how our understanding of the term can influence linguistic analysis. As we will see, the nature of *word-formation* is an issue that has kept turning up in the history of word-formation theory. This dissertation does not solve these issues, but it grapples with them in many of the analyses that are proposed, and in the following, I outline my understanding of them.

A distinction in word-formation studies can be drawn between the study of the creation of new words on the one hand, and the structural analysis of already existing words on the other. While the former is creative and refers to a process in real, historical time, the latter is analytic and static. These two distinct types of word-formation studies have also been referred to as *Wortbildungslehre* vs. *Worttypenlehre* (Funke 1950, cited in Vinje 1973:8), *Wortbildung* vs. *Wortgebildetheit* (Dokulil 1968), *generative* vs. *analytic*

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[4] Distributed Morphology also has some properties of process-based theories of word-formation, specifically in the use of so-called readjustment rules. See discussion in Section 4.5.4.

[5] There are different ways of classifying morphological theories, designed to capture an increasing variety of such theories. See Stump (2001) for a modern and more fine-grained classification.

word-formation (Kastovsky 1982, cited in Kastovsky 2005), and *word-formation* vs. *word-formedness* (Kastovsky 2005).

Word-formation in the creative sense denotes the process that a speaker goes through when forming a new word by applying a *productive rule*. This approach therefore distinguishes sharply between productive and non-productive rules in word-formation, and Hans Marchand argued in his (1960) influential work on English word-formation that only productive word-formation rules should be included in a synchronic grammar (Kastovsky 2005). Other schools, for example much work in American structuralism and theories that have grown out of that tradition, do not distinguish as firmly between productive and non-productive rules, focusing rather on the analysis of existing forms and their properties. In an analytic approach, word-formation rules can also be formulated for processes that are no longer productive. For example, we can state that *warmth* is formed by combining *warm* and *th*, even though *th*-suffixation is non-productive, and speakers of English would not create a noun like *happy-th* to mean *happiness*. Both the IA and IP models of Hockett are analytic approaches to word-formation, and traditionally, Distributed Morphology also follows this view.

In analytic word-formation, unlike creative word-formation, processes should not be understood as happening in real, historical time, as described here by Harris (1944).

> The differences between a base and a base-plus-suffix is described as a result of the process of suffixation. This is a traditional manner of speaking, especially in American Indian grammar. It has, of course, nothing to do with historical change or process through time: it is merely process through the configuration, moving from one to another or larger part of the pattern. (Harris 1944:199, quoted by Hockett 1954)

Thus, these two notions of *word-formation,* the creative and the analytic, correspond to two distinct types of processes.[6]

A challenge with the analytic approach to word-formation is that it risks postulating more knowledge in the grammar of speakers than what they actually have. This is stated clearly by Haugen & Siddiqi, from within the traditionally analytic framework of Distributed Morphology.

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[6] According to Hockett (1954), the implicit 'historical' analogy that is often used in the analysis of existing words in part stems from historical linguistics. He notes that "[r]igorous work with historical linguistics, as everyone knows, preceded almost all rigorous descriptive work; the carry-over of 'process' terminology from historical discussion is natural enough." (Hockett 1954:211). We should add that the synchronic analysis assigned to an existing word usually also reflects its historical formation, which presumably strengthens the implicit historical analogy.

> Indeed, treating all morphologically complex forms as segmentable, a feature of DM called "aggressive decomposition" by Haugen and Siddiqi (2013a), is the metatheoretical problem in the first place: not all forms that are historically complex need to be treated as such in the synchronic grammar of a given language. Indeed, it is cognitively unrealistic to suggest that all unproductive morphology is productively done by the grammar. (Haugen & Siddiqi 2016:354)

Here, Haugen & Siddiqi are actually arguing that DM should move closer to word-formation in the creative sense.[7]

By equipping the grammar with non-productive rules, we risk losing sight of the creative, generative aspect of language. Therefore, in this dissertation, my main concern is with productive rules and the properties of new and established forms that can be analyzed by these productive rules.[8]

There is, however, a third way to understand *word-formation*, which complicates this picture. This third sense is also invoked by Haugen and Siddiqi in the quote above, and refers to word-formation in a performative sense (cf. Chomsky 1965 on competence/performance). Under this interpretation, word-formation can denote the online process of assembling or decomposing the pieces of already existing words during real-time language processing. In fact, much experimental work indicates that the processing of established complex words, including non-transparent words, does involve automatic morphological decomposition at some level of representation (e.g. Taft & Forster 1976, Niswander-Klement & Pollatsek 2006, Fiorentino & Poeppel 2007, Pollatsek et al. 2008, Smolka et al. 2014, Kush et al. 2019).[9] According to this perspective, then, a form like *warmth* could be represented as internally complex in the minds of speakers, even though *th*-suffixation is not synchronically productive.[10]

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[7] Dyvik (1980) also takes issue with the notion of non-productive 'rules' found in analytic approaches to word-formation, especially as proposed by Halle (1977). Dyvik argues that since non-productive rules are generalization over *finite* classes, they do not have the form of predictions or hypotheses, thus depriving the term 'rule' of any explanatory power. Generalizations over non-productive forms are descriptions, not explanations.

[8] The notion of productivity is more complex that what I can discuss here, and also involves, for example, the notion of semi-productivity (see Bauer 2001, ten Hacken 2013).

[9] Pfau (2009) also argues that the organization assumed in Distributed Morphology is well-suited to account for speech-errors.

[10] Note that Chomsky (1965:9) argues that structural analysis should not be confused with language use (i.e. performance), which seems to make his view less compatible with word-formation in the performative sense. However, he also states that the structure should reflect "the knowledge of the language that provides the basis for actual use". Presumably, this could involve both the knowledge of what is productive and not, and the implicit "knowledge" that drives automatic decomposition in

It is clear, then, that adopting one of these distinct perspectives on word-formation – the creative, the analytic and the performative, corresponding to three potentially distinct types of processes – can result in quite different grammars, where the main difference lies in the analysis of forms created by non-productive rules. As stated above, I will focus on word-formation in the creative sense, and on productive word-formation rules. When I extend my perspective beyond that, I make a point of highlighting it (see especially Section 4.6).

1.3 Defining compounds

In order to study the grammar of compounds, it is first necessary to try to identify what constitutes a compound. For this thesis, I adopt Harley's (2009a) definition of a compound as my working definition.

(3)   *Compound definition:* a morphologically complex form identified as word-sized by its syntactic and phonological behavior and which contains two or more Roots.
                                                                    (Harley 2009a:130)

The first part of this definition identifies compounds as word-sized. This serves to distinguish compounds from phrases. Thus, the definition distinguishes the compound in (4a) from the phrase in (4b).

(4)   a. segl-båt   b. segle (ein) båt
           'sailboat'   'sail (a) boat'

The second part of the definition, that a compound contains two or more roots, points to the observation that compounds always contain more than one substantial *lexical* unit. This part of the definition distinguishes the compound in (5a) from other complex words like derivations, which may contain a number of functional elements but only one root, as in (5b).

(5)   a. segl-båt   b. segl-ing
           'sailboat'   'sailing'

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language processing. If so, Chomsky's view would be compatible with most aspects of word-formation in the performative sense as well. See Lewis & Phillips (2015) for discussion of the relationship between grammatical theory and models of language processing.

Naturally, the definition of compounds given in (3) relies on further definitions and assumptions. In the following, I consider some of the problematic issues that this definition runs into.

Harley's definition of compounds is couched within the framework of Distributed Morphology (e.g. Halle & Marantz 1993, Harley & Noyer 1999, Embick & Noyer 2007, Embick 2015). Distributed Morphology standardly recognizes two types of syntactic atoms: Roots (also known as *l-morphemes*) and functional heads (also known as *f-morphemes*). In less theory-internal terms we can cast this as the distinction between lexical and functional material, where lexical material provides the substantive conceptual parts of an expression, and functional elements provide the grammatical information.

A long-standing question in linguistic research concerns exactly where to draw the line between lexical and functional material, and how to treat elements that seem to fall somewhere in between (Corver & van Riemsdijk 2001, Klockmann 2017). An example that serves to illustrate this issue is the Norwegian element *-aktig,* corresponding more or less to English *-like*, in (6).

(6)　blå-aktig
　　　'blue-like', 'blue-ish'

The right-hand member *-aktig* is perceived as more semantically contentful than most functional elements, for example *-ing* in (5). However, *-aktig* is also less contentful than good examples of roots, such as *segl* 'sail' or *båt* 'boat' in (5). Furthermore, *-aktig* only appears in the right-hand position, whereas most roots can appear in both positions. That is, *segl* and *båt* can also switch places, as in *båtsegl* 'boat sail', but this is not possible for elements like *-aktig,* cf. **aktigblå*. The question of whether (6) should be considered a compound or derivation, given our definition, depends on whether *–aktig* is considered a root, that is, a lexical element in our discussion, or a derivational suffix, that is, a functional element. The form *-aktig* seems to fall somewhere in between the two categories.

Even within syntactic decompositional models such as Distributed Morphology and related frameworks, there are different views on the distinction between roots and functional morphemes. Thus, De Belder (2011) and Lowenstamm (2014) develop a view where all derivational affixes are roots. Along a slightly different line, Creemers et al. (2018) argue that "some affixes are roots, others are heads", effectively moving the borderline between roots and functional heads.

The part of the definition in (3) that identifies compounds as word-sized is also problematic inasmuch as it does not specify the syntactic and phonological criteria that make something a word. As I have discussed, according to the lexicalist hypothesis, words

are syntactic atoms, and it would follow from this approach that the internal structure of words cannot be accessed by syntactic operations (see e.g. Di Sciullo & Williams 1987). Syntactic impenetrability could then be used as a syntactic criterion to identify a word. However, as discussed by Bauer (1998), syntactic operations such as coordination and *one*-replacement nevertheless seem able to access the internal structure of forms that are identified as words by other tests. Consider for example (7) from Bauer (1998:75, 77).

(7)   a. We saw a landscape dotted with *wind- and water-mills*
      b. He wanted a riding horse, as neither of the carriage *ones* would suffice

In (7), coordination and *one*-replacement have accessed the internal structure of forms that behave otherwise like compounds. Such examples indicate that the criterion of syntactic impenetrability is not watertight for compounds. Other criteria to identify compounds and other words have also been proposed. However, Lieber & Štekauer (2009) conclude in their thorough review of the various definitions and criteria in the literature that there are still no tests that unambiguously identify something as a compound.

In decompositional non-lexicalist approaches such as Distributed Morphology, the problem of clearly defining a word has been taken to the consequence that the "word" does not have any privileged status in the theory. Instead, various factors come together to give the impression of what is traditionally considered a word, distinguishing, importantly, between phonological and grammatical words.[11] Harley's formulation "identified as word-sized by its syntactic and phonological behavior" points to properties of words without properly including the definition of a word into the definition of a compound.

For the purposes of this dissertation, I consider Harley's (2009a) definition a good enough working definition, although, as I have shown above, certain aspects of this definition are vague or insufficient. As will become clear in this dissertation, there are also different types of compounds and cross-linguistic variation, which further complicates the task of defining a compound once and for all. However, any definition is theory-internal, and a clearer theoretical understanding of what makes something a compound will emerge as the result of a specific analysis.[12]

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[11] See e.g. Dixon and Aikhenvald (2002) and Julien (2002) for reviews of different criteria for words.

[12] In the context of Norwegian, it will appear that what makes a compound seem word-sized has to do with linguistic nature of its components and the claim that they are combined low in the functional structure.

1.4 Research questions

As stated earlier in this introduction and repeated below, the aim of the current project is two-fold. This dissertation seeks

I.   to provide a better theoretical understanding of compounding by describing and analyzing compounds in a particular language, i.e., Norwegian, whose system of compounding is less studied than that of many related languages

II. to contribute to the description and analysis of the grammar of Norwegian

I propose to break down these aims into the following research questions.

Research Questions

1) What are the major descriptive generalizations that capture the properties of Norwegian compounds?

2) What are the basic building blocks of Norwegian compounds and how are these parts of compounds combined?

3) How can we account for the 'dual nature' of compounds, i.e. the observation that compounding seems to share properties with both word-formation and sentence-formation?

In order to answer these research questions, as a first step I collect and synthesize the data and knowledge that we already have about this phenomenon. By offering my own systematization that cuts across previous treatments, and by adding new observations to the existing pool of knowledge, I lay the ground for novel perspectives on the grammar of compounds.

As a second step, I formulate a list of requirements that an adequate analysis of Norwegian compounds must fulfill (Section 4.1.2), based on my treatment of the empirical data and assessment of the success and shortcomings of previous analyses.

As a third step, I develop formal grammatical analyses that are able to predict the behavior of productively formed compounds in Norwegian, and I show how these analyses address the identified desiderata.

The present work is also guided by some general hypotheses. I hypothesize that the basic building blocks and operations observed in compounding fall into the classes of primitives that are known in linguistic theory, such as roots, functional feature bundles, and the operation Merge. Furthermore, I hypothesize that the properties of Norwegian compounds can be captured and explained by a non-lexicalist, syntactic approach to word-formation. Finally, I hypothesize that Norwegian compounds behave in ways that conform

to what we know about compounds in other languages. More detailed and specific hypotheses about the analysis of compounds will be formulated as my discussion unfolds. An example of a more specific hypothesis of this type is that both simple and complex compounds are built by the same process.

I now turn to the methodological considerations of the present work.

1.5   Methodological considerations

The data in this dissertation are collected from the following sources: previous descriptions of compounding in the language, corpora, dictionaries, and every-day linguistic communication (i.e. conversations, media, etc.). In addition, some of the examples I present were constructed by me and affirmed by other native speakers, and some examples were elicited from native speakers of different dialects.

Compounding is an extremely productive word-formation process in Norwegian. It is enough to open a newspaper or overhear a handful of ordinary conversations in order to obtain a large amount of data comprising many different types of compounds. This is an advantage in that it has not been necessary, nor desirable, to conduct large-scale data collection. However, the significant amount of available data also makes it challenging to approach and systematize it, which is one of the reasons why I started my investigation from existing descriptions of Norwegian compounds.

Some caution must be taken when using previous work in this way. For example, many of the previous descriptions build on one another, which can lead to certain patterns being reinforced and given prominence, and other equally important patterns being left out. Moreover, earlier descriptions may vary in their methodology and approach towards the data. To overcome some of these dangers, I have strived to supplement previously described patterns with new examples, rather than reproduce old examples, which increases the validity of the proposed generalizations.

Many of the examples presented in this dissertation were retrieved from corpora. However, I have not used corpora in an exhaustive and systematic way, but, among other purposes, to find further examples of specific patterns and phenomena that I have already observed. A disadvantage of this method is that I am finding what I am looking for, but not what I am not explicitly looking for, which can lead to certain patterns being over-emphasized at the expense of others.

I have also used corpora to test specific hypotheses, for example about whether a given pattern is common or not. However, as we know, corpora do not provide negative evidence, and there can be a number of reasons why a specific type of data does or does

not occur in the corpus. Therefore, in all claims about unacceptability, I have also consulted four or more other native speakers of Norwegian.

In order to obtain a general impression of the types of patterns that exist and the types of hypotheses that can be formed, it is also useful to look at large sets of data (Johannessen 2003). For this purpose, I have frequently consulted the Norwegian Newspaper Corpus' (NNC) list of new words of the day (see below on the NNC), automatically recorded and classified based on the web-edition of Norwegian newspapers. Using this list requires critical judgement to distinguish genuine data from spelling errors etc., but it has been a valuable resource, and provided me with many of the phrasal compounds discussed in Chapters 2 and 4.

Finally, in assessing the validity of previous descriptions and of data retrieved from corpora, and in formulating specific hypotheses about one's native language, there is no way around using introspection. Introspection, understood here as the linguist's use of her own intuitions, has a long tradition in linguistics. It is cost- and time-efficient, but also has some well-known problems: judgements may be colored by knowledge of the hypothesis that is being tested, by personal preferences and by contextual factors. Furthermore, introspection only provides judgements from a single speaker, who has limited access to her grammatical capacity[13] (see Schütze 2016). While it has been shown that data constructed by linguists in this manner are quite reliable (e.g. Sprouse & Almeida 2012), introspection should nevertheless be supplemented with other methods, such as the use of corpora and acceptability judgements from other speakers, and the reader is also encouraged to consult her own intuitions and conduct further studies.

Due to the nature of the current project, I have not conducted any large-scale acceptability judgement studies. Such studies are valuable for testing very specific hypotheses and claims about the acceptability of an expression. However, before we can formulate such hypotheses, it is useful to begin with a more general treatment of the phenomenon, including detailed descriptions and proposals for theoretical analyses. That is especially true for research on compounding, since compounding seems fairly unconstrained, and there is a certain sense that '(almost) anything goes'. The current

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[13] That is, a speaker can judge the acceptability of an expression, but this judgement is influenced by a number of factors, only one of which is the degree of grammatical well-formedness, i.e. whether the expression is derived by the principles of grammar. Therefore, (un)acceptability does not allow us to draw conclusions about (un)grammaticality. (See especially Schütze 2016, and Chomsky 1965 on the related distinction between *competence* and *performance*).

dissertation aims to provide such an initial, general treatment, and the result of this work will allow us to form new hypotheses and detailed questions for future investigations.

The corpora employed in this dissertation are the following:

- *Norwegian Web as Corpus (NoWaC)* v 1.0 is a web-based corpus of over 700 million tokens of Norwegian Bokmål, generated by processing web documents in the .no top-level domain (Guevara 2010). The corpus thus contains both edited and unedited text.

- The *Norwegian Newspaper Corpus (NCC)* is built by harvesting and processing the daily web editions of 24 Norwegian newspapers from different regions of the country, written in Nynorsk or Bokmål. A daily list of neologisms is also collected by comparing new texts with an accumulated list of previously recorded words. The neologisms are classified automatically according to orthographic criteria (Andresen & Hofland 2012).

- *Norsk Ordbank (BMO, NNO)* 'Norwegian Word Bank' for Nynorsk and Bokmål is a database of Norwegian word-forms and their inflection, according to the official norms for written Norwegian. The word bank is used by the electronic versions of the official dictionaries, and is also used for various types of language technology (Kjelsvik 2017). Compounds in the word-bank are tagged manually for the type of linking element that is used and the lexical categories of the left- and right-hand members. This makes it easy to search for specific types of compounds.

- *The Corpus of American Norwegian Speech (CANS)* contains recordings of heritage speakers of Norwegian living in America (Johannessen 2015). These speakers sometimes mix Norwegian and English word-internally. While a treatment of language mixing falls outside the scope of this dissertation, I provide some examples of compound-internal language mixing in Chapter 2 of the dissertation.

The source of specific examples is indicated in the text, where relevant. When no source is indicated, the example is of such a nature that I believe native speakers of Norwegian will judge it as acceptable.

1.6   The structure of the thesis

The thesis is structured as follows.

Chapter 1 has outlined the motivation and aims of the current research project, and has placed it within a specific theoretical context.

Chapter 2 presents a descriptive overview of compounding in Norwegian. This overview builds on existing descriptions of Norwegian compounds, and is extended with my own observations and systematization of the data. A subset of the data presented in Chapter 2 are then analyzed in Chapters 4 and 5. Chapter 2 may also be useful for researchers working in different frameworks.

Chapter 3 provides a review of previous research on compounding in two different areas: compounding in Norwegian on the one hand, and compounding in generative grammar on the other hand. A recurring theme of this chapter is the place of compounding within the architecture of grammar. Special attention is paid to previous research in syntactic approaches to word-formation, and my own analyses in Chapters 4 and 5 build on these in particular.

Chapter 4 develops a formal morphosyntactic analysis of Norwegian primary compounds. I begin by outlining the details of the theoretical framework I am assuming, and identify eight desiderata that any analysis of Norwegian compounds should try to fulfill. The chapter is devoted to answering the first six desiderata.

Chapter 5 proposes an analysis of Norwegian ING-compounds, which include both what are traditionally called synthetic compounds and primary compounds. The chapter also addresses the final two desiderata for an analysis of Norwegian compounds.

Chapter 6 concludes the dissertation by revisiting the aims and research questions outlined in this introduction.

Chapter 2

A DESCRIPTIVE OVERVIEW OF COMPOUNDING IN NORWEGIAN

The Norwegian compound system is a typical Germanic one, where compounding is used extensively to form new words, and items of different types can be combined to form ever longer compounds. Aspects of this system have been described in Norwegian in works such as Aasen (1984), Beito (1970), Vinje (1973), Leira (1992), Faarlund et al. (1997) and Johannessen (2001). Eiesland (2015) and Askedal (2016) provide treatments written in English.[14]

The current chapter provides a descriptive overview of compounding in Norwegian, building on and crucially extending previous descriptions. The data described in this chapter will be the empirical foundation for the analyses to be proposed in Chapters 4 and 5. The current chapter also covers a larger empirical domain than that which will be analyzed in later chapters, and I hope that these descriptions will be useful for future work, and for researchers working in different frameworks.

There are two written standards of Norwegian, *Bokmål* and *Nynorsk*.[15] In addition, there is a wide variety of dialects that can differ quite substantially in their vocabulary and

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[14] An extensive overview of previous work is provided in Chapter 3.

[15] In both written standards, compounds are spelled as one word, e.g., *ananasbiter* 'pineapple pieces'. This distinguishes them from phrases, e.g. *ananas biter* 'pineapple bites(V)'. In some cases, a hyphen can be used, e.g., *e-post* 'e-mail' and *Nord-Europa* 'Northern Europe' (Språkrådet, 2015). When providing examples, I often use a hyphen to indicate morpheme boundaries (i.e., not in line with spelling conventions).

morphosyntax (Jahr 1990). With regard to compounds, most variation between dialects is found in the choice of linking elements. Since I cannot do justice to all the variation within Norwegian here, I start my description from the written standards, but point to dialectal patterns where they can inform and nuance the discussion. I provide examples from both Nynorsk and Bokmål, but I will only specify this for individual examples when it is relevant to our understanding of the system.

In his typology of compounding, Bauer (2009b) finds that there are no clear correlations between types of languages and the types of compounding we find in them. According to Bauer, one reason for the lack of such correlations could be that we lack good descriptions of compounding in individual languages. I hope, here, to contribute to a better understanding of compounding by providing a detailed description of Norwegian compounds guided by the dimensions of variation that Bauer highlights.

I begin in Section 2.1 by presenting a short overview of the different types of compounds found in Norwegian. In doing so, I also introduce some of the basic terminology that is used in research on compounds. I single out the two major compound types, primary compounds and synthetic compounds, as the focus of this dissertation, with emphasis on the former type. The subsequent sections, 2.2 and 2.3, are devoted to describing these two compound types in detail. Section 2.4 summarizes the findings of the chapter by situating Norwegian in a larger cross-linguistic context, drawing on Bauer's (2009) typology of compounding.

2.1   General overview

Compounds can be classified according to their formal and semantic headedness. I will consider each of these notions in turn, before introducing the different types of compounds that we find in Norwegian.

The formal head of a compound is defined as that element which determines the compound's formal properties (Scalise & Fabregas 2010).[16] Consider the compound in (1).

(1)   [hus N.NEUT-flue N.FEM]N.FEM
        'house fly'

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[16] Scalise & Fabregas (2010) propose to distinguish between a categorial head, responsible for the category features of the compound, and a morphological head, responsible for features such as gender and inflectional class. In the following, I conflate the two in the notion of a formal head.

In (1), the formal properties of the compound as a whole are the same as those of the right-hand member. Just like *flue* 'fly', *husflue* 'house fly' is a feminine noun. Thus, *flue* is the formal head of the compound. We can also confirm this by comparing the behavior of the compound as a whole to the behavior of each of its members, as in (2). Notice that the definite article is a suffix in Norwegian.

(2) a. SG. INDEF.   eit._{NEUT} hus   'a house'
         SG. DEF.   hus-et._{NEUT}   'the house'

     b. SG. INDEF.   ei._{FEM} flue   'a fly'
         SG. DEF.   flu-a._{FEM}   'the fly'

     c. SG. INDEF.   *eit._{NEUT} hus-flue
         SG. DEF.   *hus-flu-et._{NEUT}

     d. SG. INDEF.   ei._{FEM} hus-flue   'a house fly'
         SG. DEF.   hus-flu-a._{FEM}   'the house fly'

In (2), we see that *husflue* behaves like its right-hand member *flue*, not like its left-hand member *hus*. We can conclude from this that the compound in (1) is formally right-headed.

The semantic head of a compound is defined as that element which is a hypernym (a less specific type) of the compound as a whole. Or conversely, the compound is a hyponym (a more specific type) of its semantic head (Allen 1978, Bisetto & Scalise 2005). Applied to the compound in (1), *husflue* 'house fly' is a hyponym of *flue* 'fly', so *flue* is the semantic head of the compound *husflue*.

Most compounds in Norwegian are right-headed both formally and semantically, just like *husflue,* but there are also compounds that display different properties. In this section, I use formal and semantic headedness as the guiding principles to classify compounds. The tradition of classifying compounds into different types can be traced to the Sanskrit grammarians, and the Sanskrit terminology is still in use today along with its Latinate translations. Thus, we find labels for compounds such as *dvandva* and *bahuvrihi* alongside *coordinative/copulative* and *possessive*, respectively. However, these classifications are based on a mix of formal and semantic criteria. While my classification is influenced by the Sanskrit classification, and in turn by the Latinate classification and later developments, I strive to keep the semantic and formal aspects of compounds apart. In cases where the two notions of headedness do not coincide, I give formal headedness priority over semantic headedness.

Another much used classification for compounds is that of Bisetto & Scalise (2005), and Scalise & Bisetto (2009), which takes as its starting point the semantic relationship between the left-hand and right-hand members of a compound. At the first level of

classification, Bisetto & Scalise distinguish between subordinate, attributive and coordinative compounds, reflecting the types of relations that we find elsewhere in grammar. According to the authors, a compound like *apron string* is a subordinative compound because it is analyzed as having a complement–head-relation, as in 'string of an apron'. *Snail mail*, on the other hand, is an attributive compound because *snail* specifies a property of *mail,* namely that of being slow. I find this classification problematic for my purposes because of the overwhelming ambiguity in compounds. For example, under the interpretation 'mail that belongs to a snail', *snail mail* would be a subordinative compound. According to the view developed in this thesis, this type of ambiguity is one of the core properties of compounds, in line with Allen's (1978) Variable R (see Chapter 3, Section 3.2.3). The claim here is that the exact relationship between the left-hand and right-hand member of a compound is underspecified and must be determined pragmatically. Therefore, I start my classification from formal rather than semantic criteria, although the two are of course intertwined.

2.1.1 Major compound types in Norwegian

The most important type of compounding in Norwegian is **endocentric compounding**. In endocentric compounds, one of the constituents is identified as the head and the other constituent is a modifier of this head. Some examples of endocentric compounds are provided in (3).

(3) a. [hus$_N$-flue$_N$]$_N$
      house-fly
      'house fly'

    d. [fin$_A$-kjole$_N$]$_N$
       fine-dress
       'gown'

    g. [hurtig$_A$-lese$_V$]$_V$
       speed-read
       'speed read'

    b. [skriv$_V$-e-bok$_N$]$_N$
       write-$_{LINK}$-book
       'notebook'

    e. [raud$_A$-strupe$_N$]$_N$[17]
       red-throat/chest
       'robin'

    h. [blå$_A$-grøn$_A$]$_A$
       blue-green
       'blueish green'

    c. [mjølk$_N$-e-glas$_N$]$_N$
       milk-$_{LINK}$-glass
       'milk glass'

    f. [stå$_V$-pels$_N$]$_N$
       stand-fur
       'goosebumps'

    j. [banan$_N$-gul$_A$]$_A$
       banana-yellow
       'banana yellow'

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[17] *Raudstrupe* 'red throat'='robin' is also a so-called possessive compound because it refers to a part or possession of the referent. Possessive compounds are sometimes considered semantically exocentric rather than endocentric. I discuss this when considering exocentric compounds.

I will also refer to the compounds in (3) as **primary compounds** and consider primary compounds as a subtype of endocentric compounds.[18,19] Norwegian primary endocentric compounds are right-headed both semantically and formally. We have already seen this for (1), repeated here as (3a). Consider also (3b). Semantically, the compound is a hyponym of the right-hand member. A *skrivebok* 'notebook' is a hyponym of *bok* 'book'. Formally, the right-hand member determines the morphological properties of the compound as a whole, including its irregular inflection, as shown in (4)-(5).

(4) a. ei   bok   b. bøk-er
       a.SG.INDEF.FEM book   book-PL.INDEF.FEM
       'a book'   'books'

(5) a. ei   skriv-e-bok   b. skriv-e-bøk-er
       a.SG.INDEF.FEM write-LINK-book   write-LINK-book -PL.INDEF.FEM
       'a notebook'   'notebooks'

In Norwegian, primary compounds often take so-called linking elements, exemplified here in (3b) and (3c).[20] Primary compounding is highly productive, and most of this chapter will be devoted to providing a more detailed description of Norwegian primary compounds.

Another highly productive word-formation process in Norwegian is **synthetic compounding** (Norwegian *samdanning, syntetisk samansetjing,* German *Zusammenbildung*). Synthetic compounds are complex words formed by an interplay of compounding and derivation. (6a) is an argumental synthetic compound, where the left-hand member is interpreted as the internal argument of the right-hand member. (6b) is sometimes called a parasynthetic compound, and typically involves an inalienably possessed noun. [21]

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[18] Although it is not always discussed as such, synthetic compounding can also be considered a subtype of endocentric compounding (see below).

[19] Other terms in the literature that correspond to 'primary compound' are 'root compound' and 'determinative compound'.

[20] The proposed decomposition with linking elements assumes a specific type of analysis, which will be justified in the course of the dissertation.

[21] Notice that synthetic compounds are also endocentric and right-headed, although they are not always discussed as such, which is why I will use the terms 'primary' and 'synthetic' compound to distinguish the compound types in (3) and (6). In Chapters 4 and 5, I argue that primary compounds and synthetic argumental compounds like (6a) are actually created by the same compounding process.

(6) a. kaffi-drikk-ing   b. lang-hår-a
      coffee-drink-$_N$ long-hair-$_A$
      'coffee drinking'   'long haired

Synthetic compounds have received much attention in the Germanic morphological literature.[22] The most debated aspect of such words concerns their constituent structure. Do they have the structure in (7a) or rather the one in (7b)?

(7) a. kaffi [drikk ing]   b. [kaffi drikk] ing
      lang [hår a]   [lang hår] a

In Chapter 5, I propose that synthetic argumental compounds like (6a) have the structure in (7a).

These two most common types of compounds in Norwegian, primary compounds and synthetic compounds, will be described in detail in Sections 2.3 and 2.4 of this chapter, where most attention will be given to the former type. In Chapters 4 and 5, I develop formal analyses of such compounds.

I now turn to some minor compound types in Norwegian, which are more limited in productivity or not productive at all. These compound types will be described briefly here and will not be treated in the remainder of the thesis.

2.1.2 Minor compound types in Norwegian

Exocentric compounds are compounds where the head is said to be external to the compound itself. In Norwegian, like in the other Germanic languages except English, this type of compounding is rare. Descriptive overviews of compounding in Norwegian usually only provide a handful of examples, most of which are listed below (Faarlund et al. 1997:67, Vinje 1973:118).

(8) a. $[kryp_V\text{-}inn_P]_{N.NEUT}$ d. $[far_V\text{-}vel_{ADV}]_{N.NEUT}$
      crawl-in   go-well
      'small shed'   'farewell'

      b. $[sving_V\text{-}om_P]_{N.MASC}$ e. $[grå_A\text{-}bein_{N.NEUT}]_{N.MASC}$
      swing-around   grey-leg
      'dance'   'wolf'

      c. $[forglem_V\text{-}meg_N\text{-}ei_{NEG}]_{N.NEUT}$ f. $[løve_{N.FEM}\text{-}tann_{N.FEM}]_{N.MASC}$
      forget-me-not   lion-tooth
      'forget-me-not'   'dandelion'

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[22] See Wilmanns (1896), Bloomfield (1933), Roeper & Siegel (1978), Botha (1980), Booij (1988), Leser (1990), Sakshaug (1999), Olsen (2017) among many others.

What qualifies the compounds in (8) as formally exocentric is that the category and inflectional properties of the compound as a whole do not stem from one of the compound members. In (8a), the combination of a verb and a particle[23] forms a neuter noun. Thus, whatever makes this compound nominal is said to be external to the compound itself. Arguably, the verbal left-hand members above are in some sense syntactic heads (cf. *å krype inn* 'to crawl in'), but not in the sense that they provide the compounds with their formal properties.

Compounds of the type in (8e) are often called possessive compounds because they refer to a part or possession of the referent. (8e) *gråbein* 'grey leg' is another name for 'wolf'. Possessive compounds can be considered semantically exocentric since the compound is not a hyponym of any of the compound members. A *gråbein* 'wolf' is not a type of *bein* 'leg' nor a type of *grå* 'grey'. However, possessive compounds have convincingly been argued to be ordinary semantically endocentric compounds used figuratively (Booij 2007, Bauer 2008b, 2016 among others). Therefore, I listed the possessive compound *raudstrupe* 'red breast'='robin' as an endocentric compound in (3e). *Raudstrupe* and most other possessive compounds in Norwegian have the formal properties of the right-hand member. For the particular case in (8e), the classification is more complicated because the compound as a whole is a masculine noun, whereas the right-hand member is a neuter noun. Therefore, *gråbein,* unlike *raudstrupe,* is formally exocentric. In the case of *gråbein,* the mismatched morphological properties of the right-hand member and the compound are probably due to lexicalization, and the same would hold for (8f).

While possessive compounds like (3e) *raudstrupe* are very common and easily formed in Norwegian, true exocentric compounds, which are very common in Romance languages (cf. Italian *lavapiatti* 'wash dishes', i.e. 'dishwasher'), are rare and hardly productive in Norwegian. I will not have any more to say about exocentric compounds in this dissertation.

In **coordinative compounds**, there is a relation of coordination between the compound members. Unlike other compounds, coordinative compounds are not necessarily binary structures. They may contain two or more elements on the same hierarchical level, as illustrated in (9).

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[23] I classify particles of the type in (8a-b) as prepositions, following Faarlund et al. 1997, but they can also be considered adverbs.

(9) a. dansk-norsk   språk-historie
         danish-norwegian   language-history
         'Dano-Norwegian language history'

     b. dansk-norsk-svensk   sam-arbeid
         danish-norwegian-swedish   together-work
         'Danish-Norwegian-Swedish collaboration'

The members of a coordinative compound are usually of the same linguistic type, which makes it difficult to identify one of the members as the source of the compound's formal properties, and thus, as its formal head. Semantically, the compound members play equal roles in determining the reference of the compound. Therefore, both formally and semantically, coordinative compounds can be said to have no head, or alternatively, multiple heads, depending on the analysis (Bauer et al. 2013:433, Scalise & Fabregas 2010).

Coordinative compounding is not particularly widespread in Norwegian, but it is nevertheless a productive word-formation process. Norwegian coordinative compounds are most often used as modifiers – either as a complex adjective (10), or as the left-hand member of a larger compound (11). Furthermore, coordinative compounds may also name places, ideologies or directions, as in (12). Complex numerals, as in (13), have also been considered coordinative compounds (Western 1929:46, Faarlund et al. 1997:67).[24,25] Norwegian coordinative compounds do not take linking elements.

(10) Adjectival coordinative compounds
     a. sur-søt   c. blå-gul
         sour-sweet   blue-yellow
         'sweet and sour'   'blue and yellow'

     b. stygg-fin   d. døv-stum
         ugly-pretty   deaf-mute
         'ugly and pretty'   'deaf and mute'

(11) Coordinative compounds as left-hand members
     a. [nomen-nomen]-samansetjing   b. [lese-skrive]-vanskar
         noun-noun-compound   read-write difficulties
         'noun-noun compound'   'reading and writing difficulties'

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[24] To be precise, these authors list numerals as *copulative compounds*. Various labels are found in the literature, including *copulative, coordinative, dvandva* and *co-compound,* sometimes referring to the same construction, sometimes referring to different subtypes of compounds.

[25] Bauer (2008a, in 2017:88-89) does not consider complex numerals coordinative compounds.

c. [hjem-jobb-hjem]-ordning[26]
home-work-home-arrangement
'home-work-home arrangement'

d. [soul-pop-jazz]-håp[27]
soul-pop-jazz-hope
'soul-pop-jazz hope'

(12) Nominal coordinative compounds as place name
a. Austerrike-Ungarn
'Austria-Hungary'

c. Bosnia-Hercegovina
'Bosnia-Herzegovina'

b. marxist-leninist
'Marxist-Leninist'

d. nord-aust
'north-east'

(13) Numerals
a. tjue-åtte
'twenty-eight'

b. seksti-to
six.ten-two
'sixty two'

In some cases, the line between primary endocentric compounds and coordinative compounds is thin, as with the compounds in (10b-c), where both coordinative and modificational relationships between the components are possible. *Styggfin* 'ugly pretty' can be 'ugly and pretty' or an 'ugly type of pretty'. The distinction is even clearer with adjectives of color, which can have either a mixture reading, as in *blågrønn* 'blue green'='turquoise' – an endocentric compound, or a collective reading, as in *blågul*, 'blue yellow'='blue and yellow' – a coordinative compound. The latter sense is often used when talking about Sweden, as in (14).

(14) Torsdagen   ble   i stedet *blå-gul*   med svensk dobbelt-seier[28]
Thursday.DEF became instead blue-yellow   with Swedish double-victory
'The Thursday instead turned out blue-yellow with Swedish first and second places'

Other cases which are difficult to classify are given in (15). Faarlund et al. (1997:67) and Enger & Conzett (2016) classify compounds like the ones in (15) as coordinative (*kopulativ* 'copulative' in their terminology).

(15) a. [klokke$_{\text{N.FEM}}$-radio$_{\text{N.MASC}}$]$_{\text{N.MASC}}$
'clock-radio'

b. [bukse$_{\text{N.FEM}}$-skjørt$_{\text{N.NEUT}}$]$_{\text{N.NEUT}}$
'trouser-skirt'

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[26] *Stavanger Aftenblad,* June 9th, 2018

[27] *Dagsavisen,* August 9th, 2018

[28] *Dagbladet,* August 20th, 2009

Semantically, (15a) denotes an object which is at the same time a *klokke* 'clock' and a *radio* 'radio'.[29] While this makes it possible to classify this compound as semantically coordinative, it is clear that formally, the right-hand member is the head, making this closer to a primary endocentric compound in my classification. However, at this point, terminologies and classifications differ quite considerably, and authors have distinguished between several types of coordinative compounds (Olsen 2003, Bauer 2008a, Scalise & Fabregas 2010, see also footnote 10). We may note in this connection that the *singer-songwriter* type, frequently found in English, is not as common in Norwegian, nor do we find coordinative compounds corresponding to the Vietnamese *bàn ghế* 'table chair'= 'furniture' (Bauer 2017:114).

In some cases, coordinative structures are preferably spelled with a slash "/", as in *lese/skrive-vansker* 'reading/writing difficulties', or with the coordinative head *og* 'and', as in *lese og skrive-vansker* 'reading and writing difficulties', which makes them closer to phrasal structures. Since coordinative compounds and their classification is not the primary focus of this dissertation, I do not go into this in more detail here, but refer the reader to the discussions in Western (1929) on Norwegian and Germanic, and Bauer (2017) and Scalise & Bisetto (2009) on English and more general discussion.

Other compound types that I will only mention briefly here are **neoclassical compounds** and **blends**. Neoclassical compounds are typically composed of forms borrowed from Greek or Latin, as in (16a-d), but can also involve a combination of classical and native elements, as in (16e-f). The status of the components as either affixes or compound-forms is unclear and debated (see Bauer et al. 2013).

(16) a. geo-logi   c. bi-fil   e. pro-russisk
         'geology'   'bisexual'   'pro-Russian'

      b. poly-gami   d. kvasi-filosofi   f. maksi-skjørt
         'polygamy'   quasi-philosophy   'maxi skirt'
                               'philosophism'

Blends (Norwegian *teleskopord* 'telescope words') are words in which phonological segments from different words have been combined into a new word, for example by combining the beginning of one word and the ending of another. Examples of blends that

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[29] Western (1929:48-49) does not classify such compounds as coordinative compounds, but states rather that they are a related type. He discusses examples like *seilerprins* 'sailor prince'='a prince who is also a sailor' and *tyvlytter* 'thief listener'='eavesdropper'.

are used in Norwegian are given in (17), where some are native creations (17b,c) and others are borrowed (17a,d).

(17) a. *motell*   motor   +   hotell
          'motel'   'motor'   'hotel'

      b. *fjellfie*   fjell   +   selfie
          'selfie taken on   'mountain'   'selfie'
          top of a mountain'

      c. *svorsk*   svensk +   norsk
          'mix of Norwegian   'Swedish'   'Norwegian'
          and Swedish'

      d. *Benelux*   Belgia   +   Nederland   + Luxemburg
          'the Benelux Union'   'Belgium'   'the Netherlands'   'Luxemburg'

Blends are interpreted as if they were compounds, e.g., *fjellfie* is interpreted as the endocentric compound *fjell-selfie* 'moutain selfie'. As with other compounds, blends may eventually become lexicalized and get meanings that are independent from the original compound, as in *motell* 'motel'. However, unlike other compounds, blends (and possibly neoclassical compounds as well) are formed by a deliberate, conscious process, sometimes referred to as extra-grammatical derivation (Lieber 1992, Ronneberger-Sibold 2015).

2.1.3 Process and product

Not all words that are classified as compounds based on synchronic criteria result historically from the same process. In addition to what we may call a canonical compounding process, compounds may also be the result of univerbation, that is, the merging of two forms that are frequently adjacent to one another in discourse (Bauer et al. 2013). Many complex subjunctions and adverbials in Norwegian are formed by univerbation, illustrated in (18) (Beito 1970:148-149, Enger & Conzett 2016).

(18) a. fordi   ON 'fyrir því (at)'
          'because'

      b. dersom   ON 'þar sem'
          'if'

      c. altfor   'alt for'
          'much too'

Another process that can create a compound as its result is backformation. Many verbal primary compounds are created via backformation of a synthetic compound, as illustrated in (19) (Faarlund et al. 1997:53).

(19) støv-sug-ing   →   å støv-sug-e
     dust-suck-$_N$ to dust-suck-$_{INF}$
     ʿvacuum cleaning'   'to vacuum clean'

It is possible that compounds that have come about through processes other than canonical compounding are nevertheless represented with similar compound structures in speaker's minds. From a formal perspective, this is difficult to determine. In the next section, I will present words that can be classified as compounds, regardless of the process that first created them. However, in the analysis in Chapter 4, I focus on compounds that are, or at least can be, created productively by a canonical compounding process.

2.2 Norwegian primary compounds

2.2.1 Phonological marking

The phonology of compounds is probably the most reliable criterion to distinguish compounds from phrases in Norwegian. A Norwegian compound is characterized by one tonal accent and two (or more) stresses.

(20) a. Primary stress falls on the left-hand member; secondary stress falls on the right-hand member

   b. The tonal accent of the compound is determined by the tonal accent of the left-hand member

The following section is based primarily on Kristoffersen (1992b, 2000). On tonal accents in Norwegian compounds see also Sakshaug (2000), Lahiri et al. (2005, 2006), Wetterlin & Lahiri (2012), Withgott & Halvorsen (1984, 1988), among others.

2.2.1.1 Stress

Norwegian compounds have primary stress on the left-hand member, exemplified in (21).

(21) a. ˈkvit-vin   b. ˈsommar-natt   c. ˈ[kvit-vin-s]-glas
     white-wine   summer-night   white-wine-$_{LINK}$-glass
     'white wine'   'summer night'   'glass for white wine'

This is the rule for all productively formed compounds, and there are only a handful of lexicalized counterexamples.[30] Apart from these, Norwegian compounds have left-hand stress.

2.2.1.2 Tonal accent

Most Norwegian dialects have contrastive tonal accents, where primary stress is marked tonally in two different ways. The tonal accents, termed accent 1 and accent 2, result in minimal pairs like the ones in (22). Although the spelling may differ, the pronunciation of these words is, for many speakers, only differentiated by their tonal properties.

(22) a. ¹tanken 'the tank'   ²tanken 'the thought'
      b. ¹loven   'the law'   ²låven   'the barn'
      c. ¹rota   'the root'   ²rota   'made a mess'
      d. ¹skapet 'the closet'   ²skape   'create'
      e. ¹jernet 'the iron'   ²gjerne 'gladly'
      f. ¹leken   'the game'   ²leken   'playful'
      g. ¹bønder 'farmers'   ²bønner 'beans'
      h. ¹uttale 'pronounce'   ²uttale 'pronunciation'

Polysyllabic words may have accent 1 or 2. Because the realization of tonal accent 2 requires there to be two syllables, monosyllabic words are always pronounced with accent 1.[31] Whether one of the accents is the default, and if so, which one, is debated in the literature (see e.g. Kristoffersen 1992b, 2000, Lahiri et al. 2005, 2006 and Wetterlin & Lahiri 2012 for different views).

In compounds, the tonal accent of the compound as a whole is determined by the left-hand member (Kristoffersen, 1992b, 2000).[32] As we will see, some left-hand members always induce accent 1 for the compound as a whole, other left-hand members always

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[30] *Sko'maker* 'shoemaker', *lang'fredag* 'long Friday'='Good Friday', *kors'feste* 'cross-fasten'='crucify' and *pepper'mynte* 'peppermint' are pronounced with stress on the right-hand member by some speakers (Kristoffersen 2000:185, Christiansen 1946-48:197). In addition, certain dialects use right-hand stress more systematically, mainly some traditional dialects of Nord-Gudbrandsdalen, Trysil, Nordfjord, Sunnfjord, Sunnmøre, Telemark and Romsdal (Christiansen 1946: 31, 197-206, Skjekkeland 1997:31).

[31] Some dialects have monosyllabic words with accent 2 (circumflex tone) (Kristoffersen, 1992a).

[32] These are the patterns described by Kristoffersen for his Arendal dialect. The same patterns are found in many southern Norwegian dialects. Many northern Norwegian dialects appear, to my ears, to only have accent 2 in compounds, which is also the pattern found in Central Swedish (Wetterlin & Lahiri 2012). However, details of tonal accent in compounds in the various Scandinavian dialects still need to be investigated.

induce accent 2 for the compound as a whole. To see how this works, it is useful to first look at compounds with polysyllabic left-hand members.

2.2.1.2.1 Polysyllabic left-hand members

We saw in (22) that polysyllabic words can have either accent 1 or accent 2. When the left-hand member of the compound is polysyllabic, the compound inherits the tonal accent of the left-hand member. Thus, if the left-hand member has accent 1 when used as an independent word, the compound is pronounced with accent 1. If the left-hand member has accent 2 when used as an independent word, the compound is pronounced with accent 2. This can be seen from the following examples from Kristoffersen (2000:264).

(23) a. ^{1}feber   + ^{1}natt   = ^{1}febernatt   'fever night'
       b. ^{1}feber   + ^{2}anfall = ^{1}feberanfall   'fever attack'
       c. ^{2}sommer + ^{1}natt   = ^{2}sommernatt 'summer night'
       d. ^{2}sommer + ^{2}varme   = ^{2}sommervarme 'summer heat'

As these examples demonstrate, the tonal accent of the right-hand member is irrelevant to the tonal properties of the compound as a whole. The tonal accent of a compound is determined by the left-hand member.

2.2.1.2.2 Monosyllabic left-hand members

The tonal accent of compounds is less straight-forward when the left-hand member is monosyllabic. Recall that monosyllabic free forms are always pronounced with accent 1, because the pronunciation of accent 2 requires more than one syllable. However, when a monosyllabic form is used as the left-hand member of a compound, it may induce either accent 1 or accent 2. Consider (24), also from Kristoffersen (2000:264).

(24) a. ^{1}voks + ^{1}lys   = ^{1}vokslys   'wax candle'
       b. ^{1}voks + ^{2}tavle   = ^{1}vokstavle   'wax tablet'
       c. ^{1}talg   + ^{1}lys   = ^{2}talglys   'tallow candle'
       d. ^{1}talg   + ^{2}kjertel = ^{2}talgkjertel 'sebaceous gland'
       e. ^{1}ball   + ^{1}sal   = ^{1}ballsal   'ballroom'
       f. ^{1}ball   + ^{2}kjole   = ^{1}ballkjole   'ball gown'
       g. ^{1}ball   + ^{1}spill   = ^{2}ballspill   'ball game'
       h. ^{1}ball   + ^{2}trening = ^{2}balltrening 'ball exercise'

The examples above show that compounds with a monosyllabic left-hand member do not simply inherit the tonal accent of the left-hand member when used as an independent word. Rather, some monosyllabic left-hand members always induce accent 1, and some monosyllabic left-hand members always induce accent 2, again irrespective of the tonal

properties of the right-hand member. Notice in particular the two versions of *ball,* 'round object' and 'social dance' in (24e-h). The two versions of *ball* induce different tones in compounding, which shows that they are indeed different words. The patterns that we see in (24) are interpreted as follows: Monosyllabic forms, just like polysyllabic forms, are specified with a tonal accent, either accent 1 or accent 2, and when monosyllabic forms are used as the left-hand member of a compound, they determine the tonal accent of the compound as a whole. However, the distinction between accent 1 and accent 2 does not surface when the monosyllabic form is used as a free form. The distinction only surfaces in compounds, thus accounting for the patterns in (24).

2.2.1.2.3 Additional patterns
The examples considered so far do not involve linking elements. Let us now briefly look at how linking elements influence the tonal accent of a compound. The two most common linking elements in Norwegian are *e* (schwa) and *s*. They are associated with tonal accents in the following way.

(25)   Monosyllabic right-hand members
 • *e*-linkers are associated with accent 2 (26a-b)
 • *s*-linkers are associated with accent 1 (26c-d), except for a few cases with accent 2 (26e)

(26)   a. ¹katt   + ¹mat   = ²katt-e-mat   'cat food'
       b. ¹bøk   + ¹skog   = ²bøk-e-skog   'beech wood'
       c. ¹skog   + ¹troll   = ¹skog-s-troll   'forest troll'
       d. ¹sport + ¹bil   = ¹sport-s-bil   'sports car'
       e. ¹kveld + ¹mat   = ²kveld-s-mat   'evening meal'

When the left-hand member is monosyllabic, the form of the linking element seems to influence the tonal accent of the compound. However, when the left-hand member is polysyllabic, we do not see such an influence, and the tonal accent appears rather to be determined before a linking element is added.

(27)   Polysyllabic left-hand members: linkers do not influence tone

(28)   a. ²glede   + ¹hyl   = ²glede-s-hyl   'scream of joy'
       b. ²bøkeskog + ¹troll   = ²bøkeskog-s-troll 'beech wood troll'

The rule that the tonal accent of a compound is determined by the left-hand member of the compound does not hold when the left-hand member is a particle (preposition or adverb), as in so-called 'particle compounds'. In particle compounds, the compound has accent 1 when the right-hand member is a verb. It also as has accent 1 when the right-hand member is nominalized by the suffix *-ing* or *-else*. However, when the right-

hand member is nominalized by zero-derivation, by a change in the stem, or by the suffixes *-e, -ar/er, -sel,* or *-t,* particle compounds have accent 2.[33] Compare thus the verbal and nominalized forms in (29).

(29) a. ut 'out' + tale 'speak' VERB$_{INF}$ ^{1}ut-tal-e   'pronounce'
                             NOUN ^{2}ut-tal-e   'pronunciation'
                             ELSE$_N$/ING$_N$ ^{1}ut-tal-else   'statement'

     b. inn 'in' + føre 'lead' VERB$_{INF}$ ^{1}inn-før-e   'introduce'
                             NOUN ^{2}inn-før-sel   'introduction'
                             ELSE$_N$/ING$_N$ ^{1}inn-før-ing   'introduction'

     c. av 'off' + bryte 'break' VERB$_{INF}$ ^{1}av-bryt-e   'interrupt, break off'
                             NOUN ^{2}av-brudd   'break, interruption'
                             ELSE$_N$/ING$_N$ ^{1}av-bryt-else   'interruption'
                                                 ^{1}av-bryt-ing   'interrupting, truncation'

     d. ut 'out' + skrive 'write' VERB$_{INF}$ ^{1}ut-skriv-e   'discharge'
                             NOUN ^{2}ut-skrif-t   'printout'
                             ELSE$_N$/ING$_N$ ^{1}ut-skriv-else   'discharge'
                                                 ^{1}ut-skriv-ing   'discharging'

     e. ut 'out' + spele 'play VERB$_{INF}$ ^{1}ut-spel-e   'take place'
                             NOUN ^{2}ut-spel   'initiative'
                             ELSE$_N$/ING$_N$ ^{1}ut-spel-ing   'outplaying'

     f. opp 'up' + samle 'gather' VERB$_{INF}$ ^{1}opp-saml-e   'gather, collect'
                             NOUN ^{2}opp-saml-ar   'collector'
                             ELSE$_N$/ING$_N$ ^{1}opp-saml-ing   'collection, collecting'

Based on these examples, it seems that category information may also be relevant for the realization of tonal accents. In the next section, I turn to categories more generally, and consider what categories we find in Norwegian compounds.

2.2.2 Categories in compounds

Elements of all the major lexical categories can participate in compounding. The possible combinations are illustrated in Table 1.[34]

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[33] Another more marginal suffix is *-en*, as in *^{2}inngripen* 'intervention'.

[34] See Enger & Conzett (2016) for a similar overview comparing modern Norwegian and Old Norse.

Table 1 Combinations of categories in compounds

| | | RIGHT-HAND MEMBER | | | |
		Noun	Adjective	Verb	Preposition
LEFT-HAND MEMBER	Noun	veps-e-stikk wasp-_{LINK}-sting 'wasp sting'	bein-hard bone-hard 'tough'	kross-feste cross-attach 'crucify'	vegg-imellom wall-between 'between walls'
	Adjective	full-måne full-moon 'full moon'	raud-brun red-brown 'reddish brown'	u-farleg-gjere un-dangerous-make 'render harmless'	
	Verb	klatr-e-rose climb-_{LINK}-rose 'climbing rose'	skli-sikker slide-secure 'skid proof'	sitt-e-danse sit-_{LINK}-dance 'dance while sitting'	
	Prep.	med-vind with-wind 'headwind'	over-moden over-ripe 'overripe'	av-folke off-people 'depopulate'	inn-i[35] in-in 'inside'

Although left-hand members are treated here as belonging to specific word-classes, it is not entirely clear that this should be the case in their formal analysis. Since there is usually no inflection in compounds and very little other grammatical context to help us determine their category, it has been suggested that the left-hand member may be an uncategorized root or stem. Acategorial left-hand members in compounds have been proposed by Josefsson (1998) for Swedish, by De Belder (2017) for Dutch, and by Iordăchioaia et al. (2017) for Greek.[36] Thus, according to Josefsson (1998), *bok* 'book' in *bokhylle* 'bookshelf' is interpreted as a noun, not because it is formally categorized as a noun, but because *bok* is typically used as a noun. However, for the purposes of the descriptive overview provided here, it is useful to classify components by their prototypical categories.

In the following, I discuss each of the combinations in the table above, focusing in particular on the resulting compounds' morphosyntactic properties. I also make some general semantic observations. I begin with nominal compounds, that is, compounds headed by nouns, before moving on to adjectival, verbal and prepositional compounds. Finally, additional patterns that do not clearly fall into these categories are discussed.

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[35] The left-hand members of compounds of this type are classified as prepositions by Faarlund et al. (1997), but as locative adverbs by Bakken & Vikør (2011).

[36] Scher & Nobrega (2015) also propose that left-hand members of neoclassical compounds in Brazilian Portuguese are bare roots.

Note that there is much overlap among the properties of the compounds in Table 1. For example, a nominal left-hand member has largely the same properties in NN-compounds and NA-compounds. To avoid repetition, left-hand members are discussed in the most detail the first time they are encountered, which is in the context of nominal compounds.

2.2.2.1 Nominal compounds

The first class of nominal compounding is noun-noun compounding, illustrated in (30).

(30) Noun-noun

a.	sykkel-hjul	f.	liv-s-lyst	k.	Ola-bukse
	bicycle-wheel		life-LINK-desire		Ola-trousers
	'bicycle wheel'		'zest for life'		'jeans'
b.	radio-vert	g.	krig-s-offer	l.	eg-fortellar
	radio-host		war-LINK-victim		I-teller
	'radio host'		'victim of war'		'first person narrator'
c.	vass-flaske	h.	forsk-ing-s-råd	m.	[ord-bok-s]-redaktør[37]
	water-bottle		research-N-LINK-council		word-book-LINK-editor
	'water bottle'		'research council'		'dictionary editor'
d.	jent-e-kor	i.	vekk-else-s-møte	n.	dialekt-[ord-bok]
	girl-LINK-choir		wake-N-LINK-meeting		dialect-word-book
	'girls' choir'		'revival meeting'		'dialect dictionary'
e.	bjørn-e-hi	j.	fot-gjeng-ar-felt	o.	språk-forsk-ing
	bear-LINK-lair		foot-walk-N-area		language-research-N
	'bear's lair'		'pedestrian crossing'		'linguistic research'

NN-compounding is the most common type of compounding in Norwegian (Vinje 1973:117), and the nouns that participate in such compounds come in a variety of types and shapes. In (30a) and (30b), the left-hand member is a simple bare noun. In (30c) the form *vass-* is an allomorph of the free form *vatn* 'water'. In (30d-g), we find simple nominal left-hand members with linking elements, and in (30h-j) we find left-hand members with overt nominalizing suffixes, most of which also require linking elements.

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[37] According to the official dictionaries *Bokmålsordboka* and *Nynorskordboka*, *ordbok* as a left-hand member does not take a linking element. Many speakers, including myself, nevertheless prefer to use a linking element after this left-hand member. See Sections 2.2.3 and 4.4 for extensive discussions of linking elements.

In (30k), the left-hand member is a proper noun[38], and in (30l) it is a pronoun. In (30m) the left-hand member is a nominal compound, and in (30n) the right-hand member is a nominal compound. Finally, in (30o) the right-hand member is a nominalization, which means that (30o) can also be considered a synthetic compound, depending on how the distinction between synthetic compounding and primary compounding is defined (see Section 2.3).

The left-hand member of a primary endocentric compound is usually uninflected. The compound as a whole is inflected by inflecting the right-hand member.[39] This was illustrated in (4)-(5), and is also shown below. As previously mentioned, the singular and plural definite articles are suffixes in Norwegian.

(31)   [dialekt$_{N.MASC}$-[ord$_{N.NEUT}$-bok$_{N.FEM}$]]$_{N.FEM}$ bok $_{N.FEM}$

INDEF. SG.
     ei   dialekt-ord-bok   ei   bok
     a$_{.FEM}$ dialect-word-book   a$_{.FEM}$ book

DEF. SG.
     dialekt-ord-bok-a   bok-a
     dialect-word-book-$_{DEF.SG}$ book-$_{DEF.SG}$

INDEF. PL.
     dialekt-ord-bøk-er   bøk-er
     dialect-word-book-$_{INDEF.PL}$ book-$_{INDEF.PL}$

DEF. PL.
     dialekt-ord-bøk-ene   bøk-ene
     dialect-word-book-$_{DEF.PL}$ book-$_{DEF.PL}$

Semantically, the left-hand member narrows down the reference of the right-hand member. Thus, in (30a), *sykkelhjul* 'bicycle wheel' is a type of *hjul* 'wheel'. However, the exact semantic relationship between the left-hand member and the right-hand member must be determined pragmatically (in line with the Variable R-condition of Allen 1978). In the case of *sykkelhjul,* the most salient interpretation is 'wheel for a bike', but other possible interpretations are 'wheel decorated with little bikes' or 'wheel shaped like a bike', in an imaginary world where wheels are not necessarily round.

In NN-compounds, the semantic relationship between the left-hand member and right-hand member can also be argumental, for example in (30f-g) and (30n). (30g) *krigsoffer* 'war victim' can be rephrased as *offer for krig* 'victim of war'. Compounds with

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[38] A proper noun + linker is found in *Jens-e-mann* 'Jens-$_{LINK}$-man'='nickname for someone called Jens'.
[39] In some older, lexicalized compounds, the inflection of the compound as a whole is not the same as the inflection of the right-hand member, e.g. singular *løve-tann* 'lion tooth'='dandelion', which has the plural form *løve-tann-er,* not *løve-tenn-er.* Cf. singular *tann* 'tooth', plural *tenn-er* 'teeth'.

argumental readings are sometimes called rectional compounds (Enger & Conzett 2016, Kastovsky 2009). Such compounds illustrate that the nature of the semantic relationship depends on the semantics of the elements involved.

The second class of nominal compounding is adjective—noun (AN)-compounding.

(32) Adjective-noun
a. full-måne
full-moon
'full moon'

b. fin-kjole
nice-dress
'gown'

c. blå-papir
blue-paper
'carbon paper'

d. grå-vêr
grey-weather
'grey weather'

e. tom-flaske
empty-bottle
'empty bottle'

f. stor-by
big-city
'metropolis'

g. varm-t-vatn
warm-NEUT-waterNEUT
'hot water'

h. små-pengar
small-money
'coins'

i. små-jente
small-girl
'young girl'

j. lang-bord
long-table
'refectory table'

k. stor-e-bror
big-LINK-brother
'older brother'

l. lille-Per
little.W-Per
'Per Jr.'

m. skumm-a-mjølk
skimm-A-milk
'skimmed milk'

n. heldig-gris
lucky-pig
'lucky dog'

o. forny-bar-mål
renew-able-goal
'goal for renewables'

New AN-compounds are created freely and productively in Norwegian.

As with other compounds, the adjectival left-hand member usually appears in its bare form, without any overt inflection. This distinguishes AN-compounds from AN-phrases, where, in the latter case, the adjective agrees with the noun in number, gender and definiteness.[40] AN-compounds and AN-phrases also differ semantically and in their pronunciation. This is illustrated in (33).

(33) a. Compound: langbord 'refectory table'
INDEF. SG   eit   ²lang-bord
a.INDEF.NEUT long-table.INDEF.NEUT
'a refectory table'

DEF. SG   ²lang-bord-et
long-table-DEF.NEUT
'the refectory table'

---

[40] Most adjectives take the following inflectional endings (the adjective *liten* in (34) is an exception):
Fem: Ø, Masc: Ø, Neut: *-t*, Pl (all genders): *-e*, Weak (i.e. definite): *-e*

b. Phrase: langt bord 'table that is long'

INDEF. SG	eit	¹lang-t	¹bord
	a.INDEF.NEUT	long-INDEF.NEUT	table.INDEF.NEUT

'a long table'

DEF. SG	det	²lang-e	¹bord-et
	the.DEF.NEUT	long-W	table-DEF.NEUT

'the long table'

In the compounds in (33a), inflection is applied to the compound as a whole, whereas in the phrase in (33b) it is applied to each phrasal constituent. Semantically, the compound *langbord* has a specific, lexicalized meaning which refers to a certain type of long table. The phrase *langt bord,* on the other hand, can refer to any long table. Finally, the compound and phrasal structures have different stress patterns and tonal accents.

While the general rule is that left-hand members in AN-compounds are uninflected, an exception to this rule is given in (32g), where the adjectival left-hand member agrees with the right-hand member in gender. A few other examples of this type are *nyttår* 'new year', *godtfolk* 'good people' and *tungtvatn* 'heavy water'. However, this type of agreement is not systematic or productive, so examples of this type might be the result of univerbation (Enger & Conzett 2016:272; see Section 2.1.3).

In (32h-i), the compound-form *små* 'small' is used, which corresponds to the free form *liten* 'small'. Consider the paradigm for *liten* in (34).

(34) *liten* 'small'

SG.MASC	lit-en
SG.FEM	lit-a
SG.NEUT	lit-e
PLURAL	små
WEAK(DEF)	lille
COMPOUND	små

As (34) shows, *små* is used both in plural contexts and as the left-hand member of a compound. If we consider the compound in (32h) *småpengar* 'small money'='coins', the left-hand member could credibly be interpreted as the plural form, seeing as the right-hand member *peng-ar*PL 'money' is inflected for plural. However, in (30i) *småjente* 'small girl' a plural interpretation of the left-hand member *små* is not available. Rather, this example illustrates clearly that *små* is the compound form for *liten,* such that when we want to create a compound with *liten* as the left-hand member, the form *små* must be used (Leira 1992:66). Note further that the inflected form of the adjective is ungrammatical as a left-hand member.

(35) *lit-a-jente
      small-<small>FEM</small>-girl

A different situation is found in (32l) *lille-Per* 'little Per' where the compound's right-hand member is a proper name. In this case, the weak (i.e. definite) form of the adjective is used, the reason being that proper names are definite expressions. Further examples with weakly inflected left-hand members are given below.

(36) a. gaml-e-måt-en   b. yngst-e-gut-en
         old-<small>W</small>-way- <small>DEF.MASC</small>   young.<small>SUP</small>- <small>W</small>-boy-<small>DEF.MASC</small>
         'the old way'   'the youngest boy/son'

The exact status of examples like (32l) and (36) is complicated by the fact that Norwegian has so-called adjective-incorporation, a construction argued to be different from compounds and more similar to AN-phrases. (32l) and (36) are reminiscent of adjective-incorporation structures.[41]

Adjective-incorporations are expressions that look like compounds, but unlike compounds, they are always definite and compositional, which makes them more similar to their phrasal equivalents (Vangsnes 1999, 2003, Julien 2005, Emilsen 2014).[42] Compare the adjective-incorporation in (37a) to the corresponding compound in (37b) and phrasal expression in (37c).

(37) a. adjective-incorporation   ²lang-bord-et
                                     long-table-<small>DEF.NEUT</small>
                                     'the long table'

      b. AN-compound   ²lang-bord-et
                                     long-table-<small>DEF.NEUT</small>
                                     'the refectory table'

      c. AN-phrase   det   ²lang-e ¹bord-et
                                     the.<small>DEF.NEUT</small> long-<small>W</small> table-<small>DEF.NEUT</small>
                                     'the long table'

In adjective-incorporation, the adjective can be interpreted either restrictively or non-restrictively, unlike in AN-compounds, where only non-restrictive readings are

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[41] Adjective-incorporation is most common in the middle and northern dialects of Norwegian, and is not usually discussed for other dialects of Norwegian, where we do however find forms such as (32l) *lille-Per*.

[42] Julien (2005) argues that the expressions analyzed as adjective-incorporations are actually ordinary definite AN-phrases treated as one prosodic word.

available (Vangsnes 2003:54). (32l) and (36) could be cases of adjective-incorporation, if we assume that a limited form of this construction is found in southern dialects as well; alternatively, they could be AN-compounds where the left-hand member carries weak inflection.[43]

Returning now to the AN-compounds in (32), adjectival left-hand members do not usually take linking elements. (32k) can be seen as an exception to this generalization, and some additional examples where the adjectival left-hand member takes *-e* are *først-e-plass* 'first place', *stor-e-søster* 'big sister' and *best-e-venn* 'best friend'. However, an alternative interpretation of indefinite compounds of this type is that they are backformations of definite AN-expressions like those considered in (32l) and (36). The latter interpretation finds some support in a phrase like *ei lille-søster* 'a little sister', where it is clear that the left-hand member of the compound is the weak (definite) form of the adjective (cf. the paradigm in 34).

Not all adjectives form good left-hand members of compounds. In particular, adjectival left-hand members with overt adjectival derivational suffixes are dispreferred, which is illustrated below.[44]

(38) Restrictions on overt adjectival derivational suffixes
   a.   -(e/s)leg[45]   ??barn-sleg-kjole
                        child-$_A$-dress
                        intended: 'childish dress'

---

[43] Notice that a difference between (37a) on the one hand and (37c) and (32l) on the other is that only in the two latter examples do the adjectives clearly carry weak inflection. This is probably because the dialects that have adjective-incorporation often have apocope, where word-final unstressed vowels are dropped. It can nevertheless be assumed that the adjective in adjective-incorporations is based on the weak form of the adjective, rather than the strong form, if we compare the following examples from the Vikna dialect (*lisse* corresponds to *lille* in the written standard) (Linda Emilsen p.c.).

(i) AN-phrases

   a. ei lit-a ku   b. ein lit-en gris   c. et lit-e hus   d. det liss-e huset
      'a small-FEM cow'   'a small-MASC pig'   'a small-NEUT house'   'the small-WEAK house'

(ii) Adjective-incorporation

   a. liss-kua   b. liss-grisen   c. liss-huset
      'the small cow'   'the small pig'   'the small house'

[44] An analysis of this pattern is explored in Section 4.5. See De Belder (2017) on similar restrictions in Dutch.

[45] The suffix *-leg* often occurs with an *e* or *s*, as in *barn-sleg, folk-eleg,* which look similar to linking elements. However, the form found with *–leg* is not always the same as the linking element in compounds, e.g. *fred-s-due* 'peace dove' and *fred-eleg*. Therefore, I consider the forms *-eleg* and *-sleg* as allomorphs of *leg*.

b. -ig ??selv-stend-ig-følelse
self-stand-$_A$-feeling
intended: 'feeling of independence'

c. -ete ??bråk-ete-barn
noise-$_A$-child
intended: 'noisy child'

d. -sk[46] ??skepti-sk-haldning
skeptic-$_A$-attitute
intended: 'attitude of skepticism'

e. -bar ??et-bar-dato
eat-$_A$-date
intended: 'best-before date'

f. -sam ??spar-sam-haldning
save-$_A$-attitude
intended: 'thrifty attitude'

However, (32m-o) are counterexamples to this generalization.

The third class of nominal compounding is verb-noun (VN)-compounding.

(39) Verb-noun

a. skriv-e-pult	d. hopp-e-tau	g. sy-maskin
write-$_{LINK}$-desk	jump-$_{LINK}$-rope	sew-machine
'desk'	'jump rope'	'sewing machine'
b. dans-e-skule	e. jogg-e-sko	h. barber-maskin
dance-$_{LINK}$-school	jog-$_{LINK}$-shoe	shave-machine
'dancing school'	'running shoe'	'razor'
c. tenk-e-tank	f. stå-pels	i. bygg-mester
think-$_{LINK}$-tank	stand-fur	build-master
'think tank'	'goosebumps'	'building contractor'

VN-compounding is very productive in Norwegian. The verbal left-hand member consists of a verbal stem, often followed by a linking element, as in (39a-e).

Verbal left-hand members have been argued to be an innovation in modern Norwegian (Western 1929, Gundersen 1976, Enger & Conzett 2016:279-280). In earlier stages, verbs would have to be nominalized in order to function as left-hand members of compounds.

Verbal left-hand members of the type in (39a-e) are sometimes described as infinitives (Løkke 1855, Vinje 1973, Gundersen 1976, Leira 1994, Endresen et al. 2000), since in the Bokmål written standard, the infinitive is formed by a verbal stem + *e*, which

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[46] Terms for nationalities, such as *tysk* 'German', *engelsk* 'English', *fransk* 'French' are acceptable as left-hand members, e.g. *engelskmann* 'Englishman'.

makes it look identical to the verbal left-hand members in (39a-e). However, an analysis of verbal left-hand members as infinitives is not available for varieties of Norwegian where infinitives take other forms (see also Sandøy 1992, Faarlund et al. 1997, Johannessen 2001, among others).[47] Compare for example the compounds and infinitives in the Nynorsk written standard (40).[48]

(40)	Compound	Infinitive
a.	skriv-e-pult	å skriv-a
	write-LINK-desk	to write-INF
	'desk'	
b.	dans-e-skule	å dans-a
	dance-LINK-school	to dance-INF
	'dancing school'	
c.	tenk-e-tank	å tenk-a
	think-LINK-tank	to think-INF
	'think tank'	

Similar to adjectival left-hand members, verbal left-hand members with overt verbalizing morphology are dispreferred in productive compound formation.

(41) Restrictions on overt verbal derivational suffixes
    a.   -er(e)   ??konstru-er(e)-arbeid
                     construct-v-work
                     intended: 'work that involves constructing'

    b.   -iser(e) ??nominal-iser(e)-prosess
                     nominal-v-process
                     intended: 'process that involves nominalizing'

---

[47] The speakers I have consulted who speak dialects with traces of so-called *jamvekt*-verbs or 'even-stress verbs' do not allow the infinitive of such verbs to be used as left-hand members of compounds: **såvva-put* 'sleep pillow'='pillow', **læssa-bok* 'read book'='textbook', **bærra-vegg* 'carry wall'='supporting wall'. This is another indication that verbal left-hand members are not infinitives. Note that this is not a general ban on *jamvekt*-words as left-hand members. *Jamvekt*-nouns are perfectly fine, as in *hara-meddag* 'hare dinner', *maga-trening* 'stomach exercise'. Note also that the term *jamvekt* is problematic, but is commonly used to describe words that had a light root syllable in Old Norse.

[48] The Nynorsk written standard has three different norms for writing infinitives, reflecting the variation in Norwegian dialects: a-infinitives, e-infinitives and a-/e-infinitives. In the last case, it is lexically specified for each verb which ending (-a/-e) it takes. In (40), I use a-infinitives to illustrate, as they make the point clear.

c.   -n(e)   ??gul-n(e)-grad
                yellow-$_V$-degree
                intended: 'degree of yellowing (e.g. on pine walls)'

However, as is often the case in morphology, there are counterexamples to this generalization. In addition to (39h), we find *studer-kammer* 'study chamber', *spaser-stokk* 'walk stick'='walking stick' and *roter-blad* 'rotate blade'='rotor blade' (Faarlund et al. 1997:75).

Compounded particle verbs are also strongly dispreferred as left-hand members of compounds.

(42)   Particle verb   Compound
  a.   over-leve   *overlev-(e)-innstinkt
        over-live   survive-($_{LINK}$)-instinct
        'survive'   intended: 'instinct to survive'

  b.   av-duke   *avduk-(e)-seremoni
        off-cloth   unveil-($_{LINK}$)-ceremony
        'unveil'   intended: 'ceremony for the unveiling of something'

  c.   bort-føre   *bortfør-(e)-sak
        away-lead   abduct-($_{LINK}$)-case
        'abduct'   intended: 'abduction case'

  d.   opp-leve   *opplev-(e)-tur
        up-live   experience-($_{LINK}$)-trip
        'experience'   intended: 'trip for experiences'

  e.   ut-smykke   *utsmykk-(e)-oppdrag
        out-ornament   decorate-($_{LINK}$)-commission
        'decorate'   intended: 'commission to decorate'

  f.   inn-kalle   *innkall-(e)-frist
        in-call   summon-($_{LINK}$)-deadline
        'summon'   intended: 'deadline for summoning'

  g.   av-slå   *avslå-brev
        off-hit   reject-letter
        'reject'   intended: 'letter of rejection'

Interestingly, the left-hand members in (41) and (42), become fully acceptable when they are nominalized, as shown below.

(43) a. konstruk-sjon-s-arbeid   c. gul-n-ing-s-grad
        construct-$_{N}$-LINK-work   yellow-$_{V}$-$_{N}$-LINK-degree
        'construction work'   'degree of yellowing'

     b. nominal-iser-ing-s-prosess   d. overlev-else-s-instinkt
        nominal-$_{V}$-$_{N}$-LINK-process   survive-$_{N}$-LINK-instinct
        'nominalization process'   'survival instinct'

e. avduk-ing-s-seremoni
    unveil-_N-LINK-ceremony
    'unveiling ceremony'

f. bortfør-ing-s-sak
    abduct-_N-LINK-case
    'abduction case'

g. opplev-else-s-tur
    experience-_N-LINK-trip
    'adventure holiday'

h. utsmykk-ing-s-oppdrag
    decorate-_N-LINK-commission
    'decorating commission'

i. innkall-ing-s-frist
    summon-_N-LINK-deadline
    'deadline for summoning'

j. avslag-s-brev
    rejection-LINK-letter
    'rejection letter'

Semantically, the left-hand member of a VN-compound denotes an event and the right-hand member is interpreted as playing some role in that event. For example, (39d) *hoppetau* 'jump rope' is usually interpreted as 'rope that one jumps over', but it could also be 'rope that jumps' or 'rope that makes someone jump'. It is clear, then, that VN-compounds accommodate the same type of Variable R relation as NN-compounds (Allen 1978), although the particular readings that are available vary as a function of the semantics of the elements involved.

The fourth type of nominal compounding is preposition—noun (PN)-compounding.

(44) Preposition-noun
   a. med-vind
       with-wind
       'headwind'

   b. med-forfattar
       with-author
       'co-author'

   c. bak-side
       back-side
       'backside'

   d. bak-dør
       back-door
       'back-door'

   e. under-tøy
       under-clothing
       'underwear'

   f. under-skrift
       under-write._N
       'signature'

   g. på-funn
       on-find._N
       'idea'

   h. inn-vandr-ar
       in-wander-_N
       'immigrant'

   i. over-varm-e
       above-warm-_N
       'top heat'

PN-compounds are relatively common in Norwegian. When the right-hand member is based on a verb, as in (44f-h), the preposition can be argued to function as a particle. Furthermore, since they involve deverbal nominalizations, (44f-h) can also be considered synthetic compounds (see Section 2.3). PN-compounds usually have the interpretation *N som er P,* 'N which is P'. Thus, (44b) can be paraphrased as *forfattar* ('author') who is *med* ('with'), (44e) as *tøy* ('clothing') that is *under* ('under'), and (44j) as *varme* ('heat') that is *over* ('above').

2.2.2.2 Adjectival compounds

Adjectival compounds are formed with nominal, adjectival, verbal and prepositional left-hand members.

(45) Noun-adjective
    a. bil-sjuk
       car-sick
       'car-sick'

    c. kanon-bra
       canon-good
       'very good'

    b. alvor-s-tung
       gravity-LINK-heavy
       'grave'

    d. mat-glad
       food-glad
       'fond of food'

(46) Adjective-adjective
    a. blå-lilla
       blue-purple
       'blueish purple'

    c. super-hemmelig
       super-secret
       'very secret'

    b. sein-gotisk
       late-Gothic
       'Late-Gothic'

    d. halv-full
       half-full
       'half full'

(47) Verb-adjective
    a. les-e-glad
       read-glad
       'fond of reading'

    c. spring-e-støl
       run-LINK-sore
       'sore from running'

    b. spis-e-klar
       eat-LINK-ready
       'ready to eat'

    d. fly-dyktig
       fly-capable
       'airworthy'

(48) Preposition-adjective
    a. med-skyldig
       with-guilty
       'complicit'

    c. gjennom-våt
       through-wet
       'soaked'

    b. bak-glatt
       back-slippery
       'slippery' (skis)

    d. i-buande
       in-living
       'inherent'

As expected, adjectival compounds behave like their adjectival right-hand members. Norwegian adjectives agree with the noun they modify in number and gender, as well as definiteness in attributive position ('weak adjectival inflection').

(49)

SG. MASC, FEM	bil-sjuk	sjuk
SG. NEUT	bil-sjuk-t	sjuk-t
PL. MASC, FEM, NEUT	bil-sjuk-e	sjuk-e
WEAK	bil-sjuk-e	sjuk-e

In the comparative and superlative, short adjectives are usually inflected by suffixation (comparative: *-are/-ere,* superlative: *-ast/-est*), and longer adjectives use a periphrastic

construction (comparative: *meir/mer,* superlative: *mest*). Due to their length, adjectival compounds usually follow the second pattern.

(50)

POSITIVE	bil-sjuk	sjuk
COMPARATIVE	meir bil-sjuk	sjuk-are
SUPERLATIVE	mest bil-sjuk	sjuk-ast

In adjectival compounds, we often find a type of interpretation where the left-hand member intensifies the interpretation of the right-hand member, as in (45c) and (46c), where the left-hand member can be translated as 'very' (Skommer 1993). A number of common left-hand members have this intensifying function, including *kjempe-hyggelig* 'giant-nice'='very nice'*, knall-bra* 'bang-good'='very good'*, brå-kjekk* 'abrupt-handsome'='very handsome'*, rå-artig* 'raw-funny'='very funny'*, drit-rar* 'shit weird'='very weird'. [49]

Adjectival compounds can also have argumental readings, as in (45d) and (47b,c). (45d) *matglad* corresponds to the analytic structure *glad i mat* 'fond of food', where *mat* can be considered an argument of *glad i*. A non-argumental interpretation is also available where *matglad* refers to a specific type of *glad* 'glad/happy', for example 'happy because of food'.

As mentioned in Section 2.1.2, adjective-adjective compounds can be ambiguous between endocentric and coordinative readings. For example, in addition to the listed modifier reading in (45a), *blålilla* 'blue-purple' can also denote something which is both blue and purple.

Finally, many adjectival compounds are composed with a deverbal or denominal adjectival right-hand member, exemplified here with (48d). Such compounds can be considered synthetic compounds (see Section 2.3).

2.2.2.3 Verbal compounds

Verbal compounds are less common than nominal and adjectival ones, but can be formed with nominal, adjectival, verbal and prepositional left-hand members.

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[49] Some parallel cases that nevertheless look like phrases in terms of their spelling and pronunciation are *stokk dum* 'log dumb'='very dumb', *potte sur* 'pot sour'='grumpy', *trill rund* 'roll round'='round'. The latter two also exist as compounds (see Theil 2016:244-245).

(51) Noun-verb
    a. støv-suge
       dust-suck
       'vacuum clean'

    b. forhånd-s-stemme
       advance-LINK-vote
       'vote in advance'

    c. flis-legge
       tile-lay
       'lay tiles'

    d. hals-hogge
       neck-chop
       'behead'

(52) Adjective-verb
    a. hurtig-lese
       speed-read
       'speed read'

    b. små-springe
       small-run
       'run lightly'

    c. u-farleg-gjere
       un-dangerous-make
       'render harmless'

    d. blank-pusse
       shiny-polish
       'polish (something) until it is shiny'

(53) Verb-verb[50]
    a. tøys-e-krangle
       joke-argue
       'pretend to argue'

    b. bytt-e-låne
       exchange-borrow
       'mutual borrowing'

    c. trøst-e-spise
       comfort-LINK-eat
       'eat for comfort'

    d. skli-takle
       slide-tackle
       'perform a slide tackle'

(54) Preposition-verb
    a. fra-ta (noen) (noe)
       from-take (sb) (smth)
       'take (something) from (somebody)'

    b. over-ta
       over-take
       'take over'

    c. på-stå
       on-stand
       'claim'

    d. opp-dra
       up-drag
       'bring up'

Many attested verbal compounds are backformations of synthetic compounds (cf. Marchand 1969 on English). An example of this is (51a), which was first formed as a synthetic deverbal compound and subsequently reanalyzed as a verbal compound (Faarlund et al. 1997). The process is illustrated below.

(55) Deverbal compound → Verbal compound
    støv-sug-ing → støv-sug-e
    dust-suck-ing   dust-suck-INF
    'vacuum cleaning'   'vacuum clean'

The left-hand member of a synthetic compound is easily interpreted as an internal argument of the deverbal right-hand member. In backformations, on the other hand, left-

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[50] See especially Eiesland (2008) on verb-verb-compounding in Norwegian.

hand members are rather interpreted as modifiers. Thus, in *støvsuge,* arguably *støv* 'dust' is no longer interpreted as the internal argument of *suge* 'suck', as seen from its ability to take a syntactic direct object.

(56) Ola   støv-sug-er   stu-a
      Ola   dust-suck-PRES living room-DEF.SG
      'Ola vacuums the living room'

An argument-like interpretation of the left-hand member seems to be available for (51c). Compare the compound repeated as (57a) to the sentential version in (57b).

(57) a. flis-legg-e bad-et   b. legg-e   flis-er   på bad-et
         tile-lay-INF bath-DEF.SG   lay- INF   tile-INDEF.PL on bath-DEF.SG

Based on the comparison above, *flis* 'tile' in (57) seems like an internal argument of *legge* 'lie'. However, (57a) and (57b) are not perfect equivalents. (57a) entails a sense of completeness where the whole bathroom, or at least the whole bathroom floor, will be covered in tiles, whereas (57b) only conveys that tiles should be put in the bathroom. Therefore, (57a) is perhaps better paraphrased as 'lay the bathroom with tiles' or Norwegian *belegge badet med fliser*. This makes the alternation in (57) similar to the spray/load-alternation (Levin 1993).

Interestingly, when an NV-compound is itself the left-hand member of a larger compound, argument readings are again available. In the following [N$_1$-V]-N$_2$-compounds, N$_1$ is interpreted as an object of V.

(58) a. [energi-spare]-modus   f. [kake-bake]-dag
         energy-save-mode   cake-bake-day
         'energy-saving mode'   'cake-baking day'

      b. [lys-tenne]-sang   g. [jobb-søke]-tips
         candle-light-song   job-search-tip
         'song sung while lighting candles' 'job searching-tip'

      c. [musikk-strømme]-tjeneste   h. [bilde-dele]-tjeneste
         music-stream-service   picture-share-service
         'music-streaming service'   'picture-sharing service'

      d. [pølse-spise]-konkurranse   i. [setnings-lage]-modus
         sausage-eat-contest   senteces-make-mode
         'sausage-eating contest'   'sentence-making mode'

      e. [tre-teikne]-font   j. [øl-drikke]-konkurranse
         tree-draw-font   beer-drink-contest
         'font for syntactic trees'   'beer-drinking contest'

k. [plast-rydde]-prosjekt
plastic-clean-project
'ocean cleanup project'

n. [eksamens-rette]-sukk
exam-grade-sigh
'exam grading sigh'

l. [strand-rydde]-uke
beach-clean-week
'beach-cleaning week'

o. [brød-bake]-maskin
bread-bake-machine
'bread maker'

m. [ball-sprette]-lek
ball-bounce-game
'ball-bouncing game'

To my knowledge, compounds of the type in (58) have not previously been described for Norwegian, but a similar pattern is attested for Dutch (Ackema & Neeleman 2004).[51] The compounds in (58) are possible despite the NV-left-hand members not being acceptable on their own (with the intended interpretation).[52]

(59) a. ??å energi-spare
     to   energy-save
     intended: to save energy

b. ??å setnings-lage
   to   sentence-make
   intended: to make sentences

Compounds of the type in (58) are used alongside nominalized versions, as in (60), which correspond directly to their English translations.

(60) a. [energi-sparings]-modus
     'energy-saving mode'

b. [setnings-lagings]-modus
   'sentence-making mode'

Backformation is likely the source of several of the verbal compounds in (51)-(54), although in order to establish this, it is necessary to investigate the first occurrence of each example. Even though backformation is a common source of verbal compounds, it is fully possible to create new verbal compounds directly without passing through a stage of synthetic compounding. Bäcklund (2007) identifies several NV-compounds that have most likely been created directly, including the ones in (61).

(61) a. mobil-mobbe
     cellphone-bully
     'bully (somebody) by cellphone'

b. promille-ringe
   per thousand-call
   'call (somebody) while drunk'

---

[51] The compounds in (58) were all picked up in natural conversations in 2017-2018.

[52] However, it seems possible to construct examples with internal arguments where there is a part–whole relation between the left-hand member and the argument, e.g. *musikk-strømme opera* 'music stream opera'.

c. rest-e-spise   d. pøls-e-svette
 rest-LINK-eat   sausage-LINK-sweat
 'eat leftovers'   'sweat in the heat from cooking sausages'

NV-compounding is not an innovation, as (51d) is an NV-compound attested in Old Norse. Additional examples of old NV-compounds are *kross-feste* 'cross-fasten'='crucify', *stad-feste* 'place-fasten'='confirm', *tru-love* 'true/faith-promise'='betroth' and *vald-ta* 'violence-take'='rape' (Faarlund et al. 1997:81, Heggstad et al. 2008).[53]

The compound in (52c) illustrates a particularly productive type of verbal compounding where an adjective is combined with the verb *gjere* 'make/do' to give the interpretation 'make something + adjective'. Alongside *ufarleg-gjere* 'make harmless', we find *klar-gjere* 'make ready', *fri-gjere* 'make free', *rein-gjere* 'make clean', *sjukeleg-gjere* 'make (appear) sickly', *vanskeleg-gjere* 'make difficult', and many more.[54]

In (54a) *frata,* the left-hand member is an argument-introducing preposition. Compare thus the compounds and phrasal expressions in (58) and (59).

(58) a. prøver *fra-tar*   elevene   nattesøvnen
   tests   from-take.PRES   the students   the night-sleep
   'tests deprive the students of their sleep'

  b. prøver *tar*   nattesøvnen   *fra*   elevene
   tests   take.PRES   the night-sleep   from   the students
   'tests deprive the students of their sleep'

(59) a. politimannen   på-tvang   rapelskeren   opera[55]
   the police man   on-forced   the rap-lover   opera
   'the police man forced opera upon the rap-lover'

  b. politimannen   tvang   opera   på   rapelskeren
   the police man   forced   opera   on   the rap-lover
   'the police man forced opera upon the rap-lover'

---

[53] From a comparative perspective it is interesting to note that conversion of nominal compounds into verbs is more limited in Norwegian than in English, where such conversion seems unconstrained (Clark & Clark 1979, Borer 2013). Thus, one cannot easily create a verb *å dørmatte* 'to door mat' from *dørmatte* 'door mat', although some conversions of this type are attested, e.g. *å nynorske* 'to Nynorsk', *å saksesparke* 'to scissor kick', *å motorsykle* 'to motorbike'. In comparison, English examples from Clark & Clark (1979) include *to oilcloth, to wallpaper, to licence-plate, to wait-list, to headquarter, to pigeonhole, to housewife* and *to cupboard,* to mention but a few, none of which have good equivalents in Norwegian.

[54] In Section 2.2.2.1 I pointed out that adjectives with over adjectival suffixes are usually dispreffered as left-hand members of compounds. This restriction does not hold when the right-hand members is *gjere*.

[55] Adapted from article on *NRK* February 6th, 2004 (https://www.nrk.no/kultur/domt-til-operalytting-1.860485)

Alternations like these are only found with a small set of verbs (see Faarlund et al. 1997:730).

Particle compounds of the type in (53b-d), repeated in (60), vary in their degree of transparency. Some particle compounds are completely opaque (60b), while others have the same interpretation as their phrasal equivalents (60a) (see Faarlund et al. 1997:81-87 for a detailed overview).

(60) a. over-ta   = ta   over
        over-take   take over
        'take over'   'take over'

     b. på-stå   ≠ stå på
        on-stand   stand on
        'claim'   'keep going'

     c. opp-dra   ≠ dra opp
        up-drag   drag up
        'bring up (a child)'   'pull up, lift (something)'

2.2.2.4 Prepositional compounds

Compounding with a preposition as the right-hand member is limited, but nevertheless occurs.[56]

(61) Noun-preposition
     a. vegg-imellom[57]   b. sør-frå[58]   c. kjempe-på
        wall-between   south-from   giant-on
        'all over the place'   'from the south'   'very excited'

(62) Preposition-preposition
     a. inn-i   c. ned-i
        in-in   down-in
        'inside' (e.g. a box)   'in' (e.g. a purse)

     b. opp-i   d. ut-i
        up-in   out-in
        'in' (e.g. a pot)   'in', 'into' (e.g. a lake)

---

[56] For completeness, I treat prepositional compounds in this section on primary compounding, even though their classification is less clear than that of the compounds we have considered so far.

[57] Example sentence: *bestikket flaug vegg-imellom* 'the cutlery flew between the walls (e.g. in a fight)'. In addition to (61a), we find *husimellom* 'house-between', *gardimellom* 'farm-between', *byimellom* 'town-between', *bygdimellom* 'village-between', *dørimellom* 'door-between', and *landimellom* 'country-between'.

[58] *Sør* 'south' here might be better analyzed as an adverb. We also find *nordfrå* 'north-from', *vestfrå* 'west-from' etc.

e. bort-i away-in 'in touch with'(e.g. a hot plate)	h. inn-til in-to 'against' (e.g. a wall)
f. inn-under in-under 'under' (e.g. a blanket)	i. ovan-frå above-from 'from above'
g. bort-ved away-by 'over by' (e.g. a window)	j . bak-over back-over 'backwards'

Noun-preposition-compounding is limited to cases like the ones in (61). Preposition-preposition-compounding, on the other hand, is quite common in Norwegian and Swedish (Bull 2011). The left-hand member of compounds of the type in (62) can be considered an adverb or a preposition (see footnotes 7 and 21).

According to Bakken & Vikør (2011), new compound prepositions can be formed productively to express more precise relations. To exemplify, *oppi* expresses a path where something is first lifted 'up', before it is placed 'in', and it is therefore used for items with tall sides, e.g. a pot or a bowl. Thus, a recipe can state that the vegetables should be put *oppi* the pot. On the other hand, *nedi* emphasizes that something is both 'down' and 'in'. For example, keys can be placed *nedi* a purse.

Kusmenko (2008) proposes that the high frequency of complex prepositions in Norwegian and Swedish as compared to the other Germanic languages is a result of contact with Sami languages. According to Kusmenko, compound prepositions are also common in other areas that have been in contact with Finno-Ugric languages (northern Russian dialects) and Caucasian and Turkish languages (southern Russian dialects) (Bull 2011:16-19).

2.2.2.5 Additional pattern

In the preceding sections, I have described the types of compounds that result from combining elements of the lexical categories noun, adjective, verb and preposition. In this section, I present compounds formed with other types of elements.

So-called phrasal compounding is relatively common in Norwegian, and involves using a full phrase as the compound's left-hand member.

(63) Phrasal left-hand members[59]

a. CP[60]

det   [[du tror   det ikke før   du   får   se
the   you believe.$_{PRES}$ it $_{NEG}$ before   you   get.$_{PRES}$ see.$_{INF}$

det]$_{CP}$- stor-e]   tre-hus-et
it   big-$_W$ tre-house-$_{DEF.SG}$
'the you-won't-believe-it-until-you-see-it-big treehouse'

b. CP/TP

[dyrk.$_{IMP}$ deg   fresh]$_{CP/TP}$- lektyre
grow   you   fresh -   reading
'grow-yourself-fresh-reading'

c. DP[61]

[nyheter vi har   lyst   til å snakke om   men egentlig ikke har   plass til]$_{DP}$ - quiz
news   we have lust   to $_{INF}$ talk   about but really $_{NEG}$ have place to   - quiz
'news-we-want-to-talk-about-but-don't-really-have-room-for-quiz'

d. NP

[berg   og   dal]$_{NP}$ - bane
mountain and   valley - course
'roller coaster'

e. NP

[ord og   bilde]$_{NP}$ - malerier
word and   picture - paintings
'word-and-picture paintings'

f. PP

[til intet]$_{PP}$ - gjøre
to   nothing - make
'annihilate'

g. PP

[rett   fra   levr-a]$_{PP}$ - bit-en
straight from liver-$_{DEF.SG}$ - part-$_{DEF.SG}$
'the straight-from-the-gut part'

h. AP

[verst mulig]$_{AP}$ - scenario-et
worst possible - scenario-$_{DEF.SG}$
'the worst-possible scenario'

i. AdvP

[hjem på   dør-en]$_{ADVP}$ - selskap-et
home on   door-$_{DEF.SG}$ - company-$_{DEF.SG}$
'the home-to-your-door company'

j. AdvP

[nå   og   da]$_{ADVP}$ - røykere
now   and   then   - smokers
'now-and-then smokers'

k. Num

[fem på halv tre]$_{NUM}$ - presisjon
five   on half three - precision
'14:25-precision'

The examples in (63) were retrieved from the Norwegian Newspaper Corpus, unless otherwise stated. I have also come across a few cases of phrases used as right-hand members of compounds.[62]

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[59] Phrasal compounds are usually spelled with a hyphen between each word in the phrase, or with the phrase in quotation marks.

[60] Children's book title: *Gutta i det du-tror-det-ikke-før-du-får-se-det-store trehuset med 52 etasjer*. Original: *The 52-storey treehouse*

[61] Segment in NRK's TV show *Nytt på Nytt*

[62] The constituent structure in (64), rather than e.g. [haste-gå] på butikken, was indicated by the context and interpretation.

(64) a. haste-[gå   på butikk-en]   b. hurtig-[samle inn   data]
        haste- go   on store-_{DEF.SG}   fast- collect in   data
        'haste-go-to-the-store'   'speed-collect-data'

Compounds can also be created with smaller elements, such as complementizers, interjections, adverbs and numbers, again mainly as left-hand members, exemplified in (65).

(65) a. ikkje-røykar   d. all-song   g. mja-grammatikalitet
        not-smoker   all-song   *mja*-grammaticality
        'non-smoker'   'sing-song'   '?-grammaticality'

     b. nesten-ulykke   e. kvar-dag   h. svisj-lyd
        almost-accident   every-day   swish-sound
        'near miss'   'weekday'   'swish-sound'

     c. at-setning   f. hallo-dame   i. fem-kant
        that-clause   hello-woman   five-edge
        'that-clause'   'female TV announcer'   'pentagon'

Thus, as observed by Aasen ([1864] 1965), the left-hand position of compounds is very free, and can host almost any type of linguistic unit.

While the complex words we have looked at thus far are all clearly compounds, the status of the words in (66) and (67) is less clear. So-called *cran-morphs* are elements that are not used outside of fixed expressions and do not seem to have independent meanings.

(66) a. tytte-bær   c. bom-ull   e. pult-ost
        tytte-berry   *bom*-wool   *pult*-cheese
        'lingonberry'   'cotton'   'sharp cheese of sour
                                                       skimmed milk'

     b. bringe-bær   d. pute-var
        bringe-berry   pillow-*var*
        'raspberry'   'pillowcase'

Faarlund et al. (1997) treat words of the type in (66) as compounds because of their perceived complexity and their resemblance to forms that are more easily classified as compounds, such as *blåbær* 'blueberry'.

The compounds in (67) have in common that their right-hand member has an intermediary status between a lexical element and a suffix. The 'affixoids' or 'semi-suffixes' exemplified in (67a-b) can be used as both bound and free forms, but they have slightly different meanings in each case. For example, *-laus* as a right-hand member means 'without', whereas *laus* as a free form means 'loose'. Related to affixoids are right-hand members of the type in (67c-d), which only exist as bound forms, indicating that they are suffixes, but have richer meanings than those of other suffixes. Furthermore, the complex

words in (67c-d) contain linking elements, and their stress and tonal properties are those of compound words, which potentially puts them closer to compounding than derivation.

(67) a. barn-e-vennleg
          child-LINK-friendly
          'child-friendly'

      b. heim-laus
          home-loose
          'homeless'

      c. forsking-s-messig
          research-LINK-*messig*
          'research-related'

      d. katt-e-aktig
          cat-LINK-*aktig*
          'cat-like'

Forms that have an intermediary status between right-hand members of compounds and suffixes are expected to exist inasmuch as many suffixes are historically developed from compound right-hand members.

Finally, compounds can be created with elements from different languages. Today, it is common to see compounds that combine elements from Norwegian and English, exemplified in (68) (see also Andersen 2012). Notice especially (68f) where an English verbal left-hand member takes a Norwegian linking element, a Norwegian right-hand member, and English plural inflection.

(68) a. metoo-sak
          'me-too case'

      b. [winner-takes-all]-økonomien[63]
          'the [winner-takes-all]-economy'

      c. upskirt-bilder[64]
          'up-skirt photographs'

      d. heim-brew[65]   (westby_WI_06gm)
          'home-brew'

      e. bedroom-glaset   (westby_WI_01gm)
          'the bedroom window'

      f. sleep-e-værelse-s   (chicago_IL_01gk)
          sleep-LINK-room-s
          'bedrooms'

In recent years, there has been an increasing interest in the formal analysis of Norwegian-English word-internal language mixing, and the compounds in (68) would be an interesting testing ground for such theories (see Grimstad 2018, Lohndal et al. 2017, Riksem 2018). However, I will not have more to say about language-mixed compounds in this dissertation.

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[63] *Stavanger Aftenblad,* June 5th, 2018

[64] *Dagsavisen,* September 1st, 2018

[65] Examples (68d-f), with informant codes, were retrieved from the Corpus of American Norwegian Speech, which contains material from Norwegian Heritage speakers in the US (Johannessen 2015).

Having looked at the different types of units that form left-hand and right-hand members of compounds, it is now time to consider another central unit in Norwegian compounds: the linking element.

2.2.3 Linking elements

In the *Oxford Handbook on Compounding*, a linking element is defined as a "meaningless extension that occurs between the first and second elements of compounds" (Lieber & Štekauer 2009:13). Norwegian is one of many languages that employs linking elements in compounds. In Norwegian, linking elements take different forms, some of which are illustrated in (69).

(69) a. katt-e-mat   b. fred-s-pipe   c. ferd-a-folk
        cat-LINK-food   peace-LINK-pipe   journey-LINK-people
        'cat food'   'peace pipe'   'travellers'

It is also common for compounds to appear without a linking element, as in (70).

(70) a. blå-bær   b. sy-maskin   c. dag-bok
        blue-berry   sew-machine   day-book
        'blueberry'   'sewing machine'   'diary'

In Norwegian, we find linking elements after certain verbal and nominal left-hand members. Adjectival left-hand members are usually not followed by linking elements.

2.2.3.1 Historical background

In the diachronic literature on compounding, a distinction is made between proper compounding (*eigentliche, echte Komposita*), and improper compounding (*uneigentliche Komposita, Kasuskomposita*).[66] Proper compounding is the older type, argued to have appeared in early Indo-European. In proper compounding, the left-hand member appears in a bare form (root or stem), without any inflectional material[67] (Kastovsky 2009, Enger & Conzett 2016:273).

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[66]*Proper compounding* is sometimes referred to as *primary compounding* and *improper compounding* is sometimes referred to as *secondary compounding*. However, the primary/secondary opposition has also been used for the distinction between underived compounds and synthetic compounds. To avoid confusion, I do not use the term *secondary compounding* in this dissertation. I use the term *primary compounding* to refer to simple, underived compounds, with or without linking elements, described in Section 2.2.

[67] At certain stages, primary compounding also involved a stem-forming suffix, which could be analyzed as a linking element (Kastovsky 2009; Nübling & Szczepaniak 2013; Enger & Conzett 2016).

Improper compounding is argued to be a more recent development. In improper compounding, the left-hand member carries case (typically genitive) and number marking. Most linking elements in Norwegian are derived from such genitive markers, which in many cases have been phonologically simplified to either -s or -e. [68]

Since Norwegian nouns no longer inflect for case, linking elements cannot be considered genitive markers in the synchronic grammar. The distinct development from case markers can also be seen from the fact that *s*, which as case marker was not used for feminine nouns, is nevertheless found as a linking element with some feminine nouns, as in *mor$_{fem}$-s-mål* 'mother tongue' and *tid$_{fem}$-s-ramme,* 'time frame' (Aasen [1848] 1996:98). Not all linkers are derived from case markers. Linkers following verbal left-hand members seem to be derived from nominalizers, and some linkers following nominal left-members are borrowings, typically from German (see more below) (Iversen 1924, Faarlund et al. 1997).

In modern Norwegian, there do not seem to be two structurally distinct types of compounding, one with linking elements and one without. Rather, in Chapter 4, I maintain that the underlying structure of compounds with and without overt linking elements is the same, and the distinction between proper and improper compounding is rather a question of exponence. [69]

2.2.3.2 *The linking element forms a constituent with the left-hand member*

Linking elements in Modern Norwegian have no clear, independent meaning. As such, they fit well with Lieber & Štekauer's (2009) description of a linking element as a meaningless element that occurs between the two members of a compound. Although it is true that the linking element occurs *between* the two components, several tests indicate that it is tied more closely to the left-hand member than to the right-hand member.

First, the linking element stays with the left-hand member under coordination with ellipsis, as shown in (71).

(71) a. katt-e og hund-e-mat
        cat-LINK and dog-LINK-food
        'cat and dog food'
        (i.e. cat food and dog food)

    b. katt-e-mat og *-e-drikke
        cat-LINK-food and -LINK-drink
        intended: 'cat food and cat drink'

---

[68] This phonological simplification has not been completed across the board, which in part explains why so many different linking elements are in use today. For example, *a*-linkers of the type in (69c) have in most cases been reduced to *e* (schwa), but not after the left-hand member *ferd* 'journey'.

[69] See, however, De Belder (2017) for the opposing view that compounds with and without linking elements in Modern Dutch correspond to two different syntactic structures with different derivations.

Second, the linking element is determined by the left-hand member. For example, *katt* 'cat' as a left-hand member always takes an *e*-linker, and *fred* 'peace' as a left-hand member always takes an *s*-linker, irrespective of the right-hand member of the compound.

(72) a. katt-e-mat   b. katt-e-dag   c. katt-e-drøm
       cat-LINK-food   cat-LINK-day   cat-LINK-dream
       'cat food'   'cat day'   'cat dream'

(73) a. fred-s-mat   b. fred-s-dag   c. fred-s-drøm
       peace-LINK-food   peace-LINK-day   peace-LINK-dream
       'peace food'   'peace day'   'peace dream

A small set of left-hand members appear with more than one linking element (74)-(76).

(74) a. dag-bok   b. dag-s-lys   c. dag-e-lang
       day-book   day-LINK-light   day-LINK-long
       'diary'   'day light'   'lasting for days'

(75) a. mor-kake   b. mor-s-innstinkt
       mother-cake   mother-LINK-instinct
       'placenta'   'mother's instinct'

(76) a. skog-troll   b. skog-s-troll
       forest-troll   forest-LINK-troll
       'forest troll'   'forest troll'

Even though these left-hand members can take more than one linking element, the range of variation is still a specification of the left-hand member, which confirms that linking elements are determined by the left-hand member of the compound.

Third, there is a tendency for left-hand members to take an *s*-linker when they are themselves compounds, which indicates that the linking element is sensitive to the properties of the left-hand member, not the right-hand member.

(77) a. vin-glas   b. [kvit-vin-s]-glas
       wine-glass   white-wine-LINK-glass
       'wine glass'   'white wine glass'

Finally, it was shown in Section 2.3.1 that the left-hand member determines the tonal accent of the compound as a whole, and when a linker is present, that also influences the tonal accent of the compound. This indicates that the linker is part of the left-hand member.

(78) a. ²skog-troll   b. ¹skog-s-troll
       forest-troll   forest-LINK-troll
       'forest troll'   'forest troll'

Taken together, all of the properties highlighted above suggest that compounds have the general structure in (79), where the linking element forms a constituent with the left-hand member of the compound.

(79) [[left-hand member *linker*]   right-hand member]

Having established this, we are now in a position to investigate the distribution of the various linking elements more closely.

2.2.3.3 The choice of linking element

Simple left-hand members occur with a number of different linking elements, including the ones in (80), where *-e* and *-s* are most common.

(80) -a, -ar, -e, -en, -er, -es, -s

I use the term *simple* here to mean 'not compounded'. This will be contrasted later on with *compounded* left-hand members.

With simple left-hand members, there are no definitive rules that allow us to specify which left-hand member occurs with which linker. Rather, in many cases, the choice of linking element is a matter of lexical specification. In (81)-(83), left-hand members are listed with their free form and classified by declension class (strong, weak) and category (noun, verb).[70,] As previously mentioned, adjectival left-hand members usually do not take linking elements in modern Norwegian, except for a few cases that will be discussed at the end of the current subsection.

(81) Strong nominal left-hand member

a.	ferd	ferd-a-folk journey-LINK-people 'travellers'	e.	student	student-er-lue student-LINK-cap 'student cap'
b.	møkk	møkk-a-vær muck-LINK-weather 'horrible weather'	f.	natt	natt-er-gal night-LINK-call 'nightingale'
c.	katt	katt-e-mat cat-LINK-food 'cat food'	g.	arbeid	arbeid-s-ro work-LINK-quite 'peace to work'
d.	mjølk	mjølk-e-glas milk-LINK-glass 'milk glass'	h.	fred	fred-s-pris peace-LINK-prize 'peace prize'

---

[70] In certain dialects, weak nominal left-hand members can also take an a-linker, as in *tim-a-glas* 'hour glass'. Note also that the decomposition of weak nominals is debated, cf. the discussion in this section.

    i. ku   ku-bjelle
                cow-bell
                'cowbell'

    j. ekorn   ekorn-hale
                squirrel-tail
                'squirrel tail

(82) Weak nominal left-hand members

a. stjerne stjern-e-klar
            star- LINK-clear
            'starlit'

e. rose   ros-en-knopp
            rose- LINK-bud
            'rosebud'

b. kake   kak-e-spade
            cake- LINK-spade
            'cake server'

f. glede   gled-es-tåre
            joy- LINK-tear
            'tear of joy'

c. kjole   kjol-e-stoff
            dress- LINK-fabric
            'dress-fabric'

g. jente   jent-unge
            girl-child
            'young girl'

d. øye   øy-en-bryn
            eye- LINK-brow
            'eyebrow'

(83) Verbal left-hand members

a. skriva[71] skriv-e-pult
            write- LINK-desk
            'bureau'

e. sy   sy-maskin
            sew-machine
            'sewing machine'

b. sitta   sitt-e-stilling
            sit- LINK-position
            'sitting posture'

f. barbera barber-maskin
            shave-machine
            'electric razor'

c. gifta   gift-ar-tankar
            marry- LINK-thoughts
            'marriage thoughts'

g. snorka snork-sove
            snore-sleep
            'sleep deeply'

d. vekka   vekk-ar-klokke
            wake- LINK-clock
            'alarm clock'

The distinction between so-called strong and weak nouns is, or has been, relevant for nominal declension classes in Germanic (see Berg, in press, on this distinction in West Nordic). In Modern Norwegian, strong nouns end with a consonant in their free, bare form, and weak nouns end with an unstressed vowel in their free, bare form. In Old Norse, strong and weak nouns had different genitive markers, which in part explains the different tendencies in linker choice illustrated above. In the following, I treat each of the three types of left-hand members and the linkers with which they occur in turn.

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[71] The infinitive is usually the listed form for verbs. Here, I list the Nynorsk a-infinitive, which highlights the difference between infinitives and compound left-hand members.

2.2.3.3.1 Linkers with simple strong left-hand members

Most variation with regard to linking elements is found with simple strong nominal left-hand members.

The *a*-linker in (81a-b) is mainly found in lexicalized compounds, and is rarely used to form new compounds. However, it is productive with the pejorative left-hand member *møkk-a-* (Faarlund et al. 1997).

The *e*-linker in (81c-d) is one of the most common linking elements with simple strong nominal left-hand members, along with the *s*-linker. There is a strong tendency for monosyllabic nouns denoting animals to take an *e*-linker, as in *sau-e-flokk* 'flock of sheep', *hund-e-hus* 'dog house', *bjørn-e-hi* 'bear's lair', *rev-e-hale* 'fox's tail', *mus-e-hol* 'mouse-hole', however not in *mår-familie* 'marten family', 'Mustelidae'. When the right-hand element begins with a vowel, the *e*-linker has sometimes been dropped, as in *katt-unge* 'cat-child', 'kitten' and *jul-aftan* 'Christmas eve' (cf. *jul-e-kveld* 'Christmas eve'). However, this is not systematic, and the productive pattern uses an *e*-linker even in these cases, as in *katt-e-elskar* 'cat lover'. An *e*-linker can also be found after the person-denoting *ing*-suffix, as in *flyktning-e-leir* 'refugee camp' and *viking-e-skip* 'viking ship'[72,73].

The *er*-linker is found in a few older compounds, but is rarely extended to new compounds with the same left-hand member. Thus, we find *berlin-er-bolle* 'Berlin bun'='doughnut', but *berlin-tur* 'Berlin trip'. Most instances of *er*-linkers are borrowed from German. There is also a native *er*-suffix (*ar* in Norwegian Nynorsk), used mainly after verbal left-hand members (see below) (Iversen 1924).

The most common linking element with strong nominal left-hand members is the *s*-linker. It is used with both native and non-native left-hand members, the latter including cases such as *eksamen-s-dag* 'exam day' and *museum-s-bygning* 'museum building'. The *s*-linker is used after most nominalizing suffixes, illustrated in (84), and is also common with other types of morphologically complex strong left-hand elements, illustrated in (85).

(84)

a. forsk-(n)ing-s-råd	b. barn-dom-s-venn	c. øv-else-s-kjøring
research-N-LINK-council	child-N-LINK-friend'	practice-N-LINK-driving
'research council'	'childhood friend'	'driver training'

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[72]This suffix is listed in dictionaries as not taking a linker, but speakers nevertheless use an *e*-linker in some cases (Faarlund et al 1997).

[73] Many instances of *e*-linkers are derived from the genitive plural, which has resulted in a distinction between a plural reading *gud-e-hus* 'gods' house' and a singular reading *gud-s-hus* 'God's house' in modern Norwegian (Iversen 1924:21), but this type of distinction is far from systematic.

d.	sikker-het-s-belte	f.	søk-nad-s-skjema	h.	far-skap-s-test
	secure-N-LINK-belt		search-N-LINK-form		father-N-LINK-test
	'seat belt'		'application form'		'paternity test'

e.	kjær-leik-s-brev	g.	fød-sel-s-dag
	love-N-LINK-letter		birth-N-LINK-day
	'love letter'		'birthday'

(85)

a.	for-hand-s-stemme	b.	bi-stand-s-politikk	c.	an-svar-s-full
	before-hand-LINK-vote		by-stand-LINK-politics		responsibility-LINK-full
	'advance vote'		'international aid policy		'responsible'

Finally, many left-hand members do not take a linking element. With monosyllabic left-hand elements ending with a vowel, as in (81i) above, no linker is the general rule. A linker is nevertheless found in *by-s-barn* 'urban child'. According to Faarlund et al. (1997:68), no linker is actually the most common pattern with simple strong nominal left-hand members. It is probably also the pattern that is extended to new nouns that enter the language, although this claim requires further investigation.

Linkers with simple weak left-hand members
Most simple weak nominal left-hand members take an *e*-linker, as in (82a-c), and some speakers prefer to use an *e*-linker with (82d, e and g) as well. Thus, we can state that the general rule for weak nouns is that they take an *e*-linker in compounds, and other linkers must be listed as exceptions.

The *en*-linker in (82d) is a native linker, whereas the *en*-linker in (82e) is a borrowing from Low German. *En*-linkers are limited to a small number of left-hand members. Note that alongside the Bokmål form *øy-en-bryn* 'eyebrow', we have the Nynorsk form *aug-ne-bryn* 'eyebrow'.[74]

The linker *-es* is also very limited, and in addition to (82f) it is found with *fylkes-* 'county', *minnes-* 'memory', *nattes-* 'night', and a few more cases.

Finally, as with strong nominal left-hand members, the *e*-linker with weak nominal left-hand members has sometimes been dropped before a vowel-initial right-hand member. However, this is not systematic, so we also find *jent-e-ansikt* 'girl's face', which is the productive pattern.

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[74] An *en*-linker is also found in *blikk-en-slager* 'tinsmith', which according to synchronic criteria would be a strong nominal left-hand member, cf. the bare form *blikk*. *Blikkenslager* is a borrowing from Low German.

Before moving on, it is necessary to dwell for a minute on the analysis of *e*-linkers as linking elements in the first place. If we compare the left-hand members in (82a-c) to their bare free forms, it is possible to state that the left-hand member of a compound simply uses this bare form. This is the view of Faarlund et al. (1997), and it works well for written language. However, such an analysis is not available for the dialects where the bare form and the compound left-hand member are different. This is the case in the Hardanger dialect, illustrated below.

(86) Weak feminine noun
    a. ei stjern-a
       'a star'

    b stjern-e-klar
      'star-lit'

(87) Weak masculine noun
    a. ein time
       'an hour'

    b. tim-a-glas
       'hour glass'

In this dialect, it is reasonable to interpret the vowel in compounds as a linking element, on par with the linking element in other compounds.

The pattern in (86) with weak feminine left-hand members is common in many dialects (e.g. Northern dialects). The pattern in (87) is less common, and most dialects use an -*e* in both the bare free form and the compound form (*ein time, timeglas*). However, by extension, I will assume that the -*e* is a linker even in such cases. This analysis has parallels in related languages such as German and Swedish, and it is also warranted historically, as we will see now.

In German, weak nouns usually take an *–(e)n*-linker, illustrated in (88) (Aronoff & Fuhrhop 2002). In Swedish, some weak nouns take *u*- or *o*-linkers, illustrated in (89) (Josefsson 1998).

(88) a. Blume   Blum-en-wiese
               flower-_{LINK}-meadow

    b. Wiese   Wies-en-blume
               meadow-_{LINK}-flower

(89) a. gata   gat-u-korsning
             street-_{LINK}-junction

    b. kvinna kvinn-o-dräkt
             'woman-dress'

The linker used with Norwegian weak nouns has developed from the genitive of weak nouns in Old Norse. Thus, we find the following paradigms in Old Norse (90) and Modern Norwegian (91).

(90) Old Norse

	Feminine	Masculine	Neuter
Nominative	stjarn-a	tím-i	hjart-a
Genitive	stjǫrn-u	tím-a	hjart-a
Dative	stjǫrn-u	tím-a	hjart-a
Accusative	stjǫrn-u	tím-a	hjart-a
	'star'	'time'	'heart'

(91) Modern Norwegian (/dialects)[75]

Bare, free	stjern-e/a	tim-e	hjart-e/a
Compound	stjern-e	tim-e/a	hjart-e/a

Based on the data above, I assume that the final vowel of a weak nominal left-hand member is a linking element. With that in place, we may now move on to linking elements with verbal left-hand members.

2.2.3.3.2 Linkers with verbal left-hand members

As with weak nouns, the most common linking element with verbal left-hand members is the *e*-linker, exemplified in (83a-b). An *e*-linker is the rule with verbal left-hand members that have disyllabic infinitives, which represent most verbs in the language.

The *ar/er*[76]-linker in (83c-d) is less common, and many speakers prefer to use an *e*-linker instead. The *ar/er*-linker is homophonous with the nomina agentis suffix that creates agent nouns from verbs, illustrated in (92).

(92) les-e   → les-ar
      read-INF → read-er

Thus, it may be tempting to analyze all instances of -*ar* in compounds as instances of the *ar*-nominalizer. However, Johannessen (2001) argues against this view, based on examples such as (93a), where an agent reading for the left-hand member is odd. To this, I have added (93b-c), which are also semantically odd if the left-hand member is interpreted as an agent noun.

(93) a. sitt-ar-stol   b. kvel-ar-tak   c. flytt-ar-dag
          sit-*ar*-chair   strangle-*ar*-hold   move-*ar*-day
          'chair for sitting'   'stranglehold'   'moving day'

As can be seen from the translation, *flyttardag* is interpreted as a day for moving, not a day for movers, which indicates that -*ar* here is not an agent suffix, but a linking element.

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[75] Another dialectal pattern is to drop the final vowel entirely. This is especially common in the Trønder dialects.

[76] Nynorsk: *ar,* Bokmål: *er*

It is possible to use agent nouns as left-hand members as well, but these have different interpretations, as in *arbeid-ar-vern* 'worker protection'.

No linker is used with monosyllabic verbs, as in (83e), or with Latinate verbs ending in *-er*, as in (83f) (although recall from Section 2.2.2.1 that such verbs are uncommon as left-hand members of compounds). Finally, no linker is used in older lexicalized compounds such as (83g), although in this case, an *e*-linker is used when forming new compounds with *snorka* as a left-hand member, as in *snorkelyd* 'snoring sound', or *snorkeproblem* 'snoring problem'.

Similar to the *e*-linker with weak nominal left-hand elements, the *e*-linker with verbal left-hand members is not always considered a linking element. Rather, it is analysed as an infinitival ending, which is also realized as *-e* in for example the Bokmål written standard. However, I argued against this analysis in Section 2.2.2.1, based on the fact that the Nynorsk written standard, as well a number of dialects, use different forms for infinitives and left-hand members of compounds. Recall the pattern in (39), repeated as (94) below.[77]

(94) Compound   Infinitive
  a. skriv-e-pult   å skriv-a
     write-LINK-desk   to write-INF
     'desk'

  b. dans-e-skule   å dans-a
     dance-LINK-school   to dance-INF
     'dancing school'

  c. tenk-e-tank   å tenk-a
     think-LINK-tank   to think-INF
     'think tank'

Thus, I follow the view that the *-e* on verbal left-hand members is a linking element (Johannessen 2001; Wetterlin & Lahiri 2012). Verbal left-hand members also take linkers in Faroese (*-i, -u* and *-a*, Thráinsson et al. 2004:207) and Icelandic (*-i* and *-u*, Harðarson 2016:8). The Norwegian *e*-linker on verbal left-hand members has probably developed from an *-i* corresponding to the verbal linker in Faroese and Icelandic (see Enger & Conzett 2016).

The consensus in research on linking elements in Germanic is that their predictability is very limited, so the choice of linker to be used in compounding must be

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[77] The pattern is also confirmed by dialects that do not use a vowel at all in the infinitive, for example the Vesterålen dialct, e.g. *å skriv* 'to write', *skrivepult* 'write desk'= 'desk'.

specified for each lexical element (Iversen 1924; Faarlund et al. 1997; Fuhrhop & Kürschner 2015). As we have seen, this is especially clear with strong nominal left-hand members in Norwegian. Much more systematicity is found with weak nominal left-hand members and verbal left-hand members, which generally take an *e*-linker, although here too there are exceptions. As we will see, however, the unpredictability of linking elements is mainly a property of simple left-hand members. Linking elements with compounded left-hand members are more systematic.

2.2.3.4 *Compounded left-hand members*
When the left-hand member is itself a compound, the choice of linking element follows a rather regular pattern. Compare the simple and compounded left-hand members below.

(95) Strong nominal left-hand members

	Simple compound	Complex compound
a.	ferd-a-folk journey-LINK-people 'travellers'	[grav-ferd-s]-byrå grave-journey-LINK-bureau 'funeral home'
b.	katt-e-mat cat-LINK-food 'cat food'	[vill-katt]-mat wild-cat-food 'wildcat food'
e.	jul-e-tid Christmas-LINK-time 'Christmas time'	[før-jul-s]-tid before-christmas-LINK-time 'advent'
g.	student-er-lue student-LINK-cap 'student cap'	[fysikk-student]-lue physics-student-cap 'cap of a student of physics'
h.	arbeid-s-avtale work-LINK-agreement 'employment contract'	[sam-arbeid-s]-avtale together-work-LINK-agreement 'agreement about collaboration'
j.	sport-s-veke sport-LINK-week 'sports week'	[ekstrem-sport-(s)]-veke extreme-sport-LINK-week 'week for extreme sports'
l.	bok-klubb book-club 'book club'	[barn-e-bok]-klubb child-LINK-book-club 'children's book club'
n.	vin-flaske wine-bottle 'wine bottle'	[raud-vin-s]-flaske red-wine-LINK-bottle 'bottle of red wine'

(96) Weak nominal left-hand members
Simple compound   Complex compound
a. stjern-e-bil   [pop-stjern-e]-bil
    star-LINK-car   pop-star-LINK-car
    'car painted with stars'   'car of a pop-star'

b. kjol-e-stoff   [sommar-kjol-e]-stoff
    dress-LINK-fabric   summer-dress-LINK-fabric
    'dress fabric'   'fabric for a summer dress'

c. kak-e-spade   [pepper-kak-e]-baking
    cake-LINK-spade   pepper-cake-LINK-baking
    'cake server'   'baking of ginger bread'

d. ros-en-knopp   [klatr-e-ros-e]-knopp
    rose-LINK-bud   climb-LINK-rose-LINK-bud
    'rosebud'   'bud of a climbing rose'

(97) Verbal left-hand members
Simple compound   Complex compound
a. skriv-e-plan   [hurtig-skriv-e]-plan
    write-LINK-plan   fast-write-LINK-plan
    'writing plan'   'speed writing plan'

b. vask-ar-vatn   [vindu-s-vask-e]-vatn[78]
    wash-LINK-water   window-LINK-wash-LINK-water
    'wash water'   'water for washing windows'

c. bak-e-dag   [kak-e-bak-e]-dag
    bake-LINK-day   cake-LINK-bake-LINK-day
    'baking day'   'cake baking day'

d. sy-maskin   [prøv-e-sy]-maskin
    sew-machine   test-LINK-sew-machine
    'sewing machine'   'machine for test-sewing'

When a compounded left-hand member is headed by a strong noun, there is either no linker or an *s*-linker, as in (95). When the compounded left-hand member is headed by a weak noun, the linker is always *-e*, as in (96). When the compounded left-hand member is headed by a verb, there is an *e*-linker with disyllabic verbs, and no linker with monosyllabic verbs.[79] Thus, when the left-hand member of a compound is itself a

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[78] I have not found examples of the form [[X-V]-ar]-X, where the complex left-hand member is interpreted verbally (cf. discussion related to (93)), but I do not rule out that this might be possible for some speakers.

[79] It should be noted that verbal compounds are very limited as left-hand members generally. They appear to be even rarer when the compounded left-hand member is headed by a monosyllabic verb, as in (96d).

compound, linker assignment is rule-based and sensitive to morphological properties like category and declension class.

The only irregular aspect of linker assignment with compounded non-heads is the choice between no linker and an *s*-linker after strong nouns. In fact, no linker and *-s* seem to be in free variation so that speakers may use either one interchangeably, perhaps with individual preferences. I will provide a few examples of this variation.

First, searching the *Norwegian Newspaper Corpus* (Andersen & Hofland 2012) reveals that in productive compound formation, forms with and without a linking element are used interchangeably, even within the same newspaper article. In one article, we find both (98a) and (b). In another article we find both (99a) and (b).

(98) a. [vei-valg-s]-meldingen
      b. [vei-valg]-meldingen
          road-choice(-LINK-)report.DEF.SG
          'the policy choice report'

(99) a. midt-gang-passasjerer   b. midt-gang-s-seter
          midle-gangway-passenger.PL   midle-gangway-seat.PL
          'aisle passengers'   'aisle seats'

When the compounded left-hand member is an established word, a preference for one or the other linking element can develop. Consider in this regard the established compounds in (100). The counts show how many times each compound occurs with/without a linking element in the NOWAC-corpus (Guevara 2010).

(100)   a. barn-e-bok (no linker):   1520
             barn-e-bok + s: 4
             'children's book'

         b. ord-bok + (no linker): 100
             ord-bok + s: 89
             'dictionary'

While *barnebok* preferentially appears without a linking element, *ordbok* very often takes an *s*-linker, even though it is listed without a linking element in official dictionaries. It is not unlikely that the choice between no linker and an *s*-linker with complex strong nominal left-hand members is guided by phonological and rhythmic factors, but further research is needed concerning this point.

The tendency for complex strong nominal left-hand members (and in some languages also weak nominal left-hand members) to take an *s*-linker is found in other Germanic languages as well where linking elements are used (see e.g. Nübling & Szczepaniak 2013 on German, Josefsson 1998 on Swedish, Allan et al. 1995 on Danish,

Thráinsson et al. 2004 on Faroese).[80] I propose an analysis of linking elements in Chapter 4.4.

The distribution of linking elements is summarized below. Here, I encode 'no linker' as Ø, since I will argue in Chapter 4 that an abstract head is present even when the linking element is not realized overtly.

Table 2 Distribution of linking elements in Norwegian

Left-hand members	Simple left-hand member	Compounded left-hand member
Strong noun	a, e, er, s, Ø	s, Ø
Weak noun	e, en, es, Ø, (a)	e
Verb	ar, e, Ø	e, Ø

2.2.3.5 Linking elements with adjectival left-hand members

In modern Norwegian, adjectival left-hand members are generally not followed by a linking element, with the small exception of the adjectival left-hand members discussed in Section 2.2.2.1, repeated here as (101). I speculated that one source for such forms might be backformations of adjective-incorporation structures.

According to Aasen ([1848] 1996:102) an *e*-linker was common with adjectival left-hand members in the Bergen dialect.

An *e*-linker is also found with the left-hand members *lys-* 'light' and *mørk-* 'dark', used especially to create color adjectives, as in (102).[81]

(101) a. stor-e-søster
          big-LINK-sister
          'big sister'

    b. best-e-mor
          best-LINK-mother
          'grandmother'

(102) a. lys-e-blå
          light-LINK-blue
          'light blue'

    b. mørk-e-gul
          dark-LINK-yellow
          'dark yellow'

2.2.4 Internal inflection

The discussion of linking elements leads naturally to the discussion of internal inflection in compounds. Internal inflection in compounds refers to inflection on the non-head of the compound, which is the left-hand member in Norwegian.

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[80] In Icelandic, compounded left-hand members tend to take genitive case marking (Indriðason 2000).

[81] These left-hand members could also be analyzed as the nouns *lys* 'light' and *mørke* 'darkness' rather than adjectives, although they are consistently tagged as adjectives in *Ordbanken*.

Norwegian compounds align well with the cross-linguistic tendency described by Bauer (2009b), where lack of compound-internal inflection is the normal case, but inflection on non-heads nevertheless occurs: the left-hand member in Norwegian usually appears in its bare, uninflected form, or alternatively with a linker, as shown in the previous section. Inflection such as plural-marking is generally disallowed on the left-hand member, even though it could be argued to be semantically appropriate, as exemplified by (103)-(104).

(103) a. bok-hylle   b. *bøk-er-hylle
          book-shelf   book-PL-shelf
          'book shelf'

(104) a. bil-fabrikk   b. *bil-ar-fabrikk
          car-factory   car-PL-factory
          'car factory'

As pointed out by Vinje (1973), seeing as bookshelves usually contain more than one book, we might expect (103b) to be possible. Similarly, car factories produce more than one car. Yet, the general rule is that plural marking and other types of inflection are illicit inside a compound.

Although the general pattern is that compound-internal inflection is not possible, there are a number of apparent counter-examples (see especially Leira 1994).

2.2.4.1 Apparent inflection on left-hand members

Norwegian nouns have gender and inflect for number and definiteness. We find morphology related to both number marking and definiteness marking compound-internally.

Left-hand members sometimes take the form of irregular plurals, exemplified in (105). The free singular and plural forms are listed to the left.

(105)

a.	far; fedre	fedre-kvote father.PL-quota 'father's quota'	c.	bror; brødre	brødre-duell brother.PL-duel 'brothers' duel'
b.	mor; mødre	mødre-omsorg mother.PL-care 'maternity welfare'	d.	barn; born	born-e-born[82] child.PL-LINK-child.PL 'grandchildren'

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[82] Nynorsk. Official dictionaries only list *barneborn,* but *borneborn* is nevertheless in use.

In addition, (106) shows collective nouns that are inherently plural (although *forelder* 'parent' and *søsken* 'sibling' now exist as singular nouns as well) (Faarlund et al. 1997:68).

(106)
a. høns   høns-e-hus
             hen.PL-LINK-house
             'hen house'

b. (forelder);   foreldre-møte
   foreldre   parent.PL –meeting
             'parents' meeting'

c. (søsken);   søsken-flokk
   søsken   sibling.PL-flock
             'many siblings'

The observation that irregular plurals may be used as left-hand members has been made for other Germanic languages as well, including English (e.g. *lice-infested*, Kiparsky 1982).[83]

Although the left-hand members above are homophonous with plural forms, it is not clear that they must be plural in terms of their morphosyntactic features (see discussion in Johannessen 2001).

Another type of plural left-hand member is found in the following cases.

(107) a. [seks-tim-er-s]-dag   b. [to-måned-er-s]-frist
      six-hour-PL-*s*-day   two-month-PL-*s*-time limit
      'six-hour day'   'two-month time limit'

The examples in (107) are so-called 'measure pseudopossessors' (Julien 2005). Julien (2005:242) observes that measure pseudopossessors are only licit as left-hand members when the right-hand member is uncompounded. When the right-hand member is a compound, the left-hand member is realized separately. (108b) also illustrates that the *-s* is not a linking element in these expressions.

(108) a. ??[seks-tim-er-s]-[arbeid-s-dag]   b. [seks-tim-er-s]   [arbeid-s-dag]
      six-hour-PL-*s*-work-LINK-day   six-hour-PL-*s*   work-LINK-day
                                 'six-hour workday'

A definite suffix can appear inside compounds when the left-hand member is a name and the definite suffix is part of the name, illustrated in (109a). In most cases,

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[83] Norwegian has relatively few examples of this type, compared to a language like German. One factor here could be that most irregular plurals in Norwegian have double marking, with both umlaut and a plural suffix. As we have seen, plural suffixes are dispreferred independently.

however, the suffix is dropped even when it is an integrated part of a name, illustrated in (109b-c).

(109) a. [By-ås-en]-kamp
city-hill-DEF.SG-match
'match played by the team *Byåsen*'

b. Lofot-torsk
Lofot-torsk
'cod from Lofoten'

c. *Lofot-en-torsk
Lofot-DEF.SG-cod

     Compound-internal inflection is also found with adjectival left-hand members. As mentioned in Section 2.2.2.2, there are a few cases where an adjectival left-hand member displays gender agreement with a nominal right-hand member.

(110) ny-tt-år
new-SG.NEUT-year. SG.NEUT
'New Year'

Furthermore, we saw that adjectival left-hand members can carry weak (definite) inflection, as in (111).

(111) a. lille-søster
little.W-sister
'little sister'

b. gaml-e-måt-en
old-W-way- DEF.MASC
'the old way'

Adjectival left-hand members can also be inflected for comparative and superlative degree, as in (112).

(112) a. bed-re-vitar
good-COMP-knower
'(a) know-it-all'

b. mind-re-tal
small-COMP-number
'minority'

c. høg-ste-rett
highest- SUP-court
'the Supreme Court'

d. min-ste-pensjonist
small-SUP-pensioner
'receiver of minimum pension'

     When the right-hand member has the form of an adjective/present participle, the left-hand member is often an adjective + *t,* as in (113).[84] Faarlund et al. (1997:391) classify such forms as neuter adjectives, in which case (113) would be examples of compound-internal inflection. However, traditionally, this *-t* is analyzed as deriving adverbs from adjectives, and under that interpretation (113) is just compound-internal derivation.

(113) a. høg-t-flyg-ande
high-*t*-fly-PRES.PART
'high-flying'

b. fin-t-føl-ende
fine-*t*-feel-PRES.PART
'sensitive'

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[84] Such compounds can be considered synthetic compounds (see section 2.3).

Finally, left-hand members may be participles, as in (114), which can be considered examples of either derivation or inflection, depending on analysis.

(114) a. bruk-t-bil
   use-PAST.PART-car
   'used car', 'second-hand car'

        b. lev-ende-født
         liv-PRES.PART-born
         'born alive'

With this, I conclude my description of Norwegian primary compounds. I now turn to the other major compound type in Norwegian: synthetic compounds.

2.3 Norwegian synthetic compounds

In this section, I present Norwegian complex words with the linear structure in (115).

(115) $stem_1$ + $stem_2$ + derivational suffix

This linear structure can be organized hierarchically either as (116a) or (116b).

(116) a. $[stem_1]$ + $[stem_2$ + derivational suffix]
   b. $[stem_1$ + $stem_2]$ + [derivational suffix]

Complex words that fit this description are often referred to as *synthetic compounds*, and some initial examples of such words are given in (117).

(117) a. kyrkj-e-gjeng-ar
    church-LINK-go-N
    'church-goer'

   b. skip-s-bygg-ing
     ship-LINK-build-N
     'shipbuilding', i.e. building of ships

        c. hurtig-veks-ande
         fast-grow-PRES.PART
         'fast-growing'

        d. lang-hår-a
         long-hair-A
         'long-haired'

For some linguists, the term *synthetic compound,* or the Norwegian equivalent *samdanning* (cf. German *zusammenbildung*) 'together-formation', is tied specifically to one or the other of the representations in (116). For example, Leira (1992) defines a *samdanning* as a word that has the structure in (116b), with the additional requirement that the first constituent does not exist as an independent word (e.g. *langhår in (116d)) (see Vinje 1973:70-71, Leira 1992:40-42, Faarlund et al. 1997:60).[85]

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[85] In many cases of synthetic compounding, the intermediary constituent is a non-existent independent word whether we apply analysis (116a) or (116b). Thus, **kyrkjegjenge (/*kyrkjegå)* 'church go' and **gjengar,* but *kyrkjegjengar.*

In this section, I take a rather inclusive view of *synthetic compounding,* starting from the representation in (115), without committing to a structural analysis, and without the 'existing, independent word' requirement, although this holds for many of the compounds that will be considered.[86] The correct constituent structure for the examples in (117) is a much-debated analytical question which deserves careful consideration and cannot be settled in this chapter. However, in Chapter 5 of this dissertation, I propose an analysis for Norwegian deverbal ing-compounds of the type in (117b), and argue that this specific compound type has the representation in (116a).

Notice before moving on that the examples in (117a) and (117b) have a linking element in their left-hand member, which shows that stem-1 of a synthetic compound is the same as in other compounds, described in Section 2.2.

In the following, I describe the various types of synthetic compounds found in Norwegian, and comment on their building blocks and interpretation.

2.3.1 Deverbal synthetic compounds

Deverbal synthetic compounds have a verb stem as their stem-2, and can be headed by either a nominalizing suffix (118), an adjectival/present participle suffix (119), or an adjectival/past participle suffix (120).

(118) Deverbal, nominalized

a. te-drikk-ing
   tea-drink-$_N$
   'tea drinking'

b. histamin-behandl-ing
   histamine-treat-$_N$
   'histamine treatment'

c. sofa-sitt-ing
   sofa-sit-$_N$
   'sitting on sofa'

d. hus-mal-ing
   house-paint-$_N$
   'house painting'

e. hurtig-skriv-ing
   fast-write-$_N$
   'writing fast'

f. ut-flytt-ing
   out-move-$_N$
   'moving out'

g. på-smør-ing
   on-smear-$_N$
   'smearing on'

h. amerika-far-ar
   America-go-$_N$
   'person who travelled to America'

i. boks-opn-ar
   box-opn-$_N$
   'can opener'

j. inn-flytt-ar
   in-move-$_N$
   'somebody who moves in'

---

[86] In English, the term *synthetic compound* is used in various ways in the literature to apply to all or some of the word types in (117), with structure (116a) or (116b) depending on analysis (see Olsen 2017 on the development of the English and German terminology).

k. mat-produk-sjon
food-produc-$_{\text{N}}$
'production of food'

m. skjegg-vek-st
beard-grow-$_{\text{N}}$
'growth of beard'

l. barn-e-fød-sel
child-$_{\text{LINK}}$-birth-$_{\text{N}}$
'childbirth'

n. ut-vek-st
out-grow-$_{\text{N}}$
'outgrowth'

(119) Deverbal and adjectival/present participled

a. kaffe-drikk-ande
coffee-drink-$_{\text{PRES.PART}}$
'coffee drinking'

e. hard-t-arbeid-ande
hard-$_{\text{ADV}}$-work-$_{\text{PRES.PART}}$
'hardworking'

b. blod-drypp-ande
blood-drip-$_{\text{PRES.PART}}$
'blood-curdling'

f. all-vit-ande
all-know-$_{\text{PRES.PART}}$
'omniscient'

c. kjønn-s-diskriminer-ande
gender-$_{\text{LINK}}$-discriminate-$_{\text{PRES.PART}}$
'gender discriminatory'

g. ned-bryt-ande
down-break-$_{\text{PRES.PART}}$
'disruptive'

d. høg-t-flyg-ande
high-fly-$_{\text{PRES.PART}}$
'high-flying'

h. ut-tømm-ande
out-empty-$_{\text{PRES.PART}}$
'exhaustive'

(120) Deverbal, adjectival/past participled

a. passord-beskytt-a
password-protect-$_{\text{A}}$
'password protected'

e. heim-e-strikk-a
home-$_{\text{LOC}}$-knit-$_{\text{A}}$
'home knit', 'home-made'

b. hand-teikn-a
hand-draw-$_{\text{A}}$
'hand drawn'

f. halv-spis-t
half-eat-$_{\text{A}}$
'half-eaten'

c. sjølv-be-dt
self-invite-$_{\text{A}}$
'self-invited'

g. på-ten-t
on-light-$_{\text{A}}$
'lighted', 'set on fire'

d. kort-tenk-t
short-think-$_{\text{A}}$
'short-sighted'

h. gjen-gro-dd
again-grow-$_{\text{A}}$
'overgrown'

Nominal deverbal synthetic compounds of the type in (118) can be formed with various nominalizing suffixes, the most common and productive of which are *–ing* and *–ar*. The *ing*-suffix derives process and result nominals[87], and the *–ar* suffix typically derives agent and instrument nominals.

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[87] Note that these compounds are true nominals, similar to argument structure nominals (e.g. *the selling of the house).* They are not progressives/gerunds of the type found in English (e.g. *He is horsebackriding*) (see Chomsky 1970, among many others).

When the left-hand member of a nominal deverbal synthetic compound is a noun, it can be interpreted as an argument or adjunct/modifier of the verbal stem in the right-hand member. For example, *tedrikking* 'tea drinking' is most easily interpreted as 'drinking of tea', whereas *histaminbehandling* 'histamine treatment' is most easily interpreted as 'treatment by/with histamines' (Lødrup 1989). It is however important to notice that deverbal synthetic compounds are ambiguous, such that the latter compound could also be interpreted as 'treatment of histamines' in the appropriate context. As in other compounds, the relationship between the left-hand and right-hand members of a synthetic compound is open to interpretation. Another type of ambiguity in this type of compounding is found in the interpretation of the right-hand member itself. For example, *maling* in (118d) is ambiguous between a result reading, with the meaning 'paint', and a process reading, which means '(the act of) painting (something)'. This ambiguity in *maling* is carried over to compounds formed with *maling,* as illustrated below.

(121) a. maling   b. husmaling
      1. painting   1. house painting (process of painting a house)
      2. paint   2. house paint (paint used on houses)

Analyses for such compounds and their ambiguity are proposed in Chapter 5 (see also Sakshaug 1999, Andersen 2005a).

The left-hand member of a nominal deverbal synthetic compound can also be an adverb, as in (118e) *hurtigskriving* 'fast writing'. In this case it describes the manner in which the verb *skrive* 'write' is being performed. Finally, the left-hand member can be a particle, as in (118f, g, j, n). In such cases, the interpretation of the compound is related to the corresponding particle verb. Thus, *innflyttar* 'somebody who moves in', 'mover-inner' is related to the particle verb *flytte inn* 'move in'.

To the examples in (118), we may add compounds where the right-hand member is derived by conversion, as in (122).

(122) a. barn-e-pass   b. møbel-salg   c. kles-vask
      child-$_{LINK}$-mind.$_N$ furniture-sell.$_N$ clothes-wash.$_N$
      'child minding'   'selling of furniture'   'laundering'
                             'sale on furniture'   'laundry'

Like the compounds in (118), the compounds in (122) are ambiguous. (122b) can refer to either the selling of furniture (a process reading), or sale on furniture (a so-called result reading).

The deverbal present participle compounds in (119) share many properties with the nominal deverbal compounds in (118). Here, too, the left-hand member is typically a noun,

an adverb or a particle, and is interpreted as an argument, adjunct/modifier, or particle of the verbal stem. Compounds of the type in (119) are used as adjectives, illustrated in (123).

(123)   ein kaffidrikkande/allvitande/nedbrytande person
        'a coffee-drinking/omniscient/disruptive person'

Deverbal past participle compounds of the type in (120) have similar properties. However, in these compounds, the left-hand member cannot be interpreted as an object (unlike 118 and 119). Thus, in (120b) *handteikna* 'hand-drawn', *hand* cannot be interpreted as the object of *teikne* 'draw'. Rather *hand* refers to the manner of the drawing. In comparison, in both *handteikning*$_N$ 'hand-drawing' and *handteiknande*$_A$ 'hand-drawing', *hand* can be interpreted as either the object or manner of *teikne* 'draw'.

2.3.2 Denominal synthetic compounds

(124) Denominal, adjectival/perfect participle-suffix

   a. rød-øyg-d   c. lang-hår-a
      red-eye-$_A$ long-hair-$_A$
      'red-eyed'   'long-haired'

   b. brei-bein-t   d. fir-kant-a
      broad-leg-$_A$ four-edge-$_A$
      'broad-legged'   'quadrangular'

(125) Denominal, adjectival -*ig/-leg*-suffix

   a. mange-sid-ig   c. fem-år-ig   e. to-språk-leg
      many-side-$_A$ five-year-$_A$ two-language-$_A$
      'many-sided'   'five-year long'   'bilingual'

   b. fir-kant-ig   d. alkohol-hold-ig f. tverr-fag-leg
      four-edge-$_A$ alcohol-hold-$_A$ cross-discipline-$_A$
      'quadrangular'   'alcoholic'   'interdisciplinary'

(126) Denominal, nominal -*ing$_2$/-ar*-suffix

   a. ein-kron-ing   c. sam-bygd-ing   e. tre-mast-ar
      one-crown-$_N$ together-town-$_N$ three-mast-$_N$
      'one-krone coin'   'fellow villager'   'three-master'

   b. fire-hjul-ing   d. tre-mast-ing   f. fire-set-ar
      four-wheel-$_N$ three-mast-$_N$ four-seat-$_N$
      'four-wheeler'   'three-master'   'four-seater'

The compounds in (124) are sometimes called *parasynthetic compounds* (Johannessen 2017a,b). In parasynthetic compounds, stem-2 is an inalienable possession

of the noun that the compound describes. For example, a *rødøygd mann* 'red-eyed man' is a man with an inalienably possessed eye (that is, the *eye* is his body part, not just an eye that the he owns). The fact that ordinary possession is not enough to form such compounds can be seen from the following example from Johannessen (2017b).

(127)   *en   rød-vogn-et   jente
          a   red-wagon-ed   girl
          intended: a girl with a red pram

In Norwegian, parasynthetic compounds are formed with the same suffix that derives the past participle of verbs, (cf. 120), and has the same allomorphs. Thus, Norwegian uses the same pattern as English. However, similar compounds can also be derived by the suffix *–ig,* as in (125a-d), although less productively. Interestingly, this is the suffix that generally derives parasynthetic compounds in German and Dutch (hence, German and Dutch *langhaarig* 'longhaired'; cf. (124c)). On Norwegian denominal adjectival compounds see also Landmark (1970).

The compounds in (126) are derived by the suffixes *–ing* and *–ar*. Importantly, this *ing*-suffix is not the same as the deverbal *ing*-suffix in (118). Whereas *–ing₁* in (118) is feminine, *–ing₂* in (126) is masculine. As shown in (126d-e), *–ing₂* and *–ar* are sometimes used interchangeably.

Finally, I will mention that synthetic compounds may be even more complex than the examples I have considered here. In (128), the left-hand member is a complex result, as shown by the comparison with the corresponding verb phrases. In (129), both a direct object and a particle are compounded with a derived verb.

(128) Complex particle compounds, adjective/perfect participal

    a.   hol-på-ti-en   *ta hol på*   'take hole on'='open'
        hole-on-take-_A_
        'opened'

    b.   hol-på-slit-en   *slite hol på*   'tear hole on'='tear up'
        'hole-on-tear-_A_
        'torn'

    c.   i-land-dreg-en   *dra i land*   'pull to shore'
        to-land-pull-_A_
        'pulled ashore'

    d.   i-hop-flett-a   *flette i hop*   'braid/leave together'
        to-heap-braid-_A_
        'interlaced'

(129) Deverbal nominalized and deverbal adjectival/present participle

  a. søppel-ut-tømm-ing   b. (ein) kaffi-opp-drikk-ande (mann)
      trash-out-empty-$_N$ (a) coffee-up-drink-$_A$ (man)
      'emptying out the trash'   '(a man) drinking up his coffee'

2.3.3 Norwegian compounding in a cross-linguistic context

Bauer (2009b) gives an overview of compounding in the world's languages and the dimensions along which they vary. I will conclude this descriptive overview of the Norwegian compound system by situating Norwegian in the larger cross-linguistic context that Bauer sketches.

Compounding is a very common word-formation process in the languages of the world, but it is not a linguistic universal. Languages reported to have no or very limited compounding include Dangaléat, Diola-Fogny, Evenki, Karao and West Greenlandic (Bauer 2009:344 and references there; Štekauer et al. 2012:41, fn.3). Furthermore, languages vary with respect to how productive compounding is. In Chinese, around 80 % of all words are compounds (Ceccagno & Basciano 2009), whereas Turkana only uses compounding to form names (Dimmendaal & Noske 2004).

While such numbers are not available for Norwegian, we have seen throughout this chapter that compounding is an extremely productive word-formation process in the language. New compounds are made instantaneously to cover the naming needs of speakers. The compound system of Norwegian is a typical Germanic one, where the most important compound types are primary compounds (Section 2.2) and synthetic compounds (Section 2.3), both of which are endocentric and right-headed.

Different languages make use of different types and subtypes of compounds. Bauer (2009b) cites sources according to whom the main type of compounding in Chichewa is exocentric (Mchombo 1998), whereas in Warlpiri it is synthetic (Nash 1986), and in Hunzib it is coordinative (van de Berg 2004). Coordinative compounding is most common in Asia, although different subtypes of coordinative compounds are used in different areas (cf. Section 2.1.2). In Norwegian, compounds can be created with elements of all the major lexical categories (Section 2.2.2). In Udihe, there appear to only be verbal and adjectival compounds (Nikolaeva & Tolkskaya 2001).

There is also cross-linguistic variation with respect to the order of the non-head and head in compounds. Right-headed compounding, found in Germanic, is more common than left-headed compounding, found in French and Maori. However, in a sample of 36 languages, Bauer (2001) found that almost half the languages had both right-

headed and left-headed compounds. Languages that make use of both patterns include Vietnamese, Javanese and Breton (Bauer 2009, Štekauer et al. 2012:76).

Another property of Norwegian compounding typical for Germanic languages is the ability to have compounds embedded in larger compounds. In Norwegian, both the left-hand member and the right-hand member may themselves be compounds. Such embedding is very limited in Fongbe and Ngiti, as well as Spanish and Slovak (Bauer 2009 and references there; Štekauer et al. 2012:97). Greek allows what Ralli (2013) calls left-expansion, that is, compounds with the structure [W [X [Y Z]]], but disprefers right-expansion, that is [[[W X] Y] Z] (Ralli 2013:94). Norwegian allows both.

Languages reported to have linking elements in compounds include Danish, Dutch, Faroese, Hausa, Hebrew, Icelandic, Ilocano, Khmer, Kuku, Norwegian, Russian, Serbian-Croatian, Slovak, Swedish, Tibetan, Turkish, Ukranian and Yalanji (Bauer 2009:346, Štekauer et al. 2012:54, 78). However, there is variation with respect to the contexts in which linking elements are used. The Germanic languages typically use linking elements after nominal left-hand members. Linking elements after verbal left-hand elements seem to be more common in Norwegian, Faroese and Icelandic (and arguably Danish) than in the other Germanic languages (see Section 2.2.3). While there are some studies that begin to explore the environments for linking elements in different languages (such as Štekauer et al. 2012), this is an area where further investigation should be made.

Finally, Norwegian aligns well with Bauer's observation that compound-internal inflection, that is, inflection on the non-head of a compound, is rare, but nevertheless occurs (Section 2.2.4).

Based on his typology of compounds in the world's languages, Bauer (2009b) concludes that there are, at present, no clear correlations between the compound system of a language and other linguistic properties of the language (e.g. agglutinative or isolating structure). However, one reason for this might be that we lack sufficient data and descriptions for individual languages. The present chapter has aimed to contribute to our understanding of the compound system in Norwegian, and through that, our understanding of compounding cross-linguistically. Even though Germanic languages are fairly well described, compounding in Norwegian is one of the less described areas, and the endeavor to understand the Norwegian compound system will continue in the next chapters.

Chapter 3

PREVIOUS RESEARCH ON COMPOUNDS

In this chapter, I review previous research on compounds from two different perspectives: studies that focus specifically on Norwegian (Section 3.1), and formal approaches to compounding in human language more broadly – mainly within the tradition of Generative Grammar (Sections 3.2 and 3.3).

Section 3.1 provides an overview of previous research on Norwegian compounds, beginning with the 1848 and 1864 grammars of Ivar Aasen and following through until present day. This overview is intended to be exhaustive and the works are organized thematically.[88] Section 3.2 considers the place of compounds in the grammatical architecture, showing how accounts of compounding have moved between morphology and syntax following various theoretical developments. Section 3.3 takes a more in-depth look at proposals that analyze compounds from a syntactic point of view, in line with the assumptions of the current dissertation. The analyses that I propose in Chapters 4 and 5 build on these accounts. Section 3.4 summarizes the chapter.

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[88] I will not be considering lexicographical work and work related to the development of corpora. See, however, Johannessen & Hauglin (1998), De Smedt (2012) and Kjelsvik (2017) on these perspectives.

3.1 Research on compounding in Norwegian

3.1.1 Early research

A natural place to begin an overview of research on Norwegian compounds is with Ivar Aasen's grammars of Norwegian vernaculars (1848, 1864), the Danish-Norwegian grammar of Knud Knudsen (1856), and the Danish school-grammar of Jakob Løkke (1855) used in Norwegian schools. At the time when these grammars were written, Danish was the written standard used in Norway, following a union of several hundred years that lasted until 1814 (see Haugen 1976, Vikør 1995). The grammars of Aasen, Knudsen and Løkke are thus among the earliest grammars of modern Danish and Norwegian written in Norway, and later descriptions of Norwegian compounds build explicitly upon them.

Aasen set out to create a Norwegian written standard based on Norwegian rural dialects, which differed significantly from spoken and written Danish. Norwegian dialects, more so than Danish, displayed several similarities with Old Norse, which had a high status in this time of romanticism and nationalism. As part of his endeavor to create a Norwegian written standard, Aasen published grammars, dictionaries and poetry. Aasen's written standard later developed into *Norwegian Nynorsk* (Walton 1987). Another important Norwegian linguist and language planner was Knud Knudsen. Unlike Aasen, Knudsen favored a gradual Norwegianization of the Danish language that was already in use, based not on rural dialects, but on the Norwegian spoken by the urban upper middle-class, highly influenced by Danish. Knudsen's written standard later developed into Norwegian *Bokmål* (Haugen 1976). In addition to these early Norwegian grammars, the less known Danish school-grammar written by the Norwegian Jacob Løkke has been influential to researchers working on compounding Norwegian, and is therefore included here (see e.g. Iversen 1924, Vinje 1973, Akø 1989, Johannessen 2001).

The grammars of Aasen, Knudsen, and Løkke all have a chapter on word-formation with a subsection on compounding (Aasen [1848] 1996:97-105, Aasen [1864] 1965:230-240[89], Knudsen 1856:316-340, Løkke 1855:116-141). The most important properties of compounds regarding formal and semantic headedness, as well as the formal properties of left-hand members, are summarized in the following quote from Aasen.

> I et saadant Ord er den sidste Deel at betragte som Hovedordet, hvis Betydning kun bliver nærmere bestemt eller begrænset ved det første Ord. Det sammensatte Ord beholder saaledes det same Kjøns- eller Klasseforhold og faaer den same Bøining som det sidste Ord, naar dette staaer alene. Det første Ord faaer I Almindelighed ikke nogen Bøining,

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[89] Aasen's 1848 grammar is descriptive and more concerned with dialectal variation than the more normative 1864 grammar.

men beholder kun den Form, som det har antaget ved Sammensætningen. Denne Form er tildeels noget forskjellig fra Ordets Nævneform, og kan forsaavidt kaldes *Sammensætningsformen* eller (for at bruge et kortere Navn) *Bindeformen* (Aasen [1848] 1996:97).

In such a word, the latter part is considered the main word, the meaning of which is determined more closely or narrowed down by the first word. The compounded word thus keeps the same gender or declension properties and receives the same inflection as the latter word when this stands alone. The first word usually does not receive any inflection, but merely keeps the form that it took for compounding. This form is at times different from the word's naming form, and can be called *the compound form* or (to use a shorter name) *the binding form.* (My translation)

Knudsen and Løkke give similar descriptions. Compounds that do not fit with this description are also discussed. For example, Knudsen (1856:316) notes that *flaggermus,* 'flutter mouse'='bat' and *hvalfisk* 'whale fish'='whale' are exceptions to the general rule, since a *flaggermus* is not a mouse and *hvalfisk* is not a fish.

All three authors give most attention to the shape of the left-hand members of compounds. They classify compounds by the category of the left-hand member and distinguish between proper/improper compounding (*ekte/uekte, egentlig/uegentlig, løs/fast, ren/blandet,* cf. Section 2.2.3.1), depending on whether the left-hand member is bare or takes a linking element.

Especially in Aasen and Løkke's grammars, particular interest is taken in the nature of linking elements. Løkke (1855) tries to tie the choice of linking element or lack thereof to semantic properties of the compound. For example, he suggests that no linking element is used when the left-hand member denotes a material of which the right-hand member is made (*jern-tråd* 'iron thread', *ull-vante* 'wool mitten', *jord-gulv* 'earth floor'), and he suggests that an *e*-linker is used with left-hand members denoting animals (*hund-e-dage* 'dog days', *gås-e-lever* 'gooseliver', *svin-e-sti* 'pigsty', *ulv-e-jakt* 'wolf hunt'). Aasen makes similar semantic remarks. The validity of semantic criteria in accounting for linking elements was later challenged by Iversen (1924) (see below).

More important is Aasen's investigation of the connection between the choice of linking element and the gender and declension of the left-hand member, comparing Modern Norwegian to Old Norse. Here, Aasen points out that strong feminine nouns in Modern Norwegian can take an *s*-linker, which is not in line with the genitive system in Old Norse where the corresponding feminine nouns would instead take the *ar*-genitive. This shows that linking elements have gone through their own development, independent of the genitive system from which they were derived. Norwegian dialects, especially in Aasen's time, had maintained a wider variety of linking elements, as well as more distinctions in declension classes and gender than Danish. That could explain why this

aspect of compounding is treated more carefully in Aasen's grammars than in the other two. His attention to dialects also leads him to consider a wider range of alternative compound forms, such as *nata-* for the free form *not* 'nut' in *nata-skog* 'nut forest' and *haga-*, without palatalization, for the palatalized free form *hagje* 'garden' in *haga-mur* 'garden wall' (Aasen [1848] 1996:100-101).

One aspect of these early descriptions that is different from my description in Chapter 2 is that they all consider the left-hand member of a compound to be sensitive to properties of the right-hand member. For example, Aasen claims that a linking element on the left-hand member is rare when the right-hand member is an adjective or a verb (Aasen [1864] 1965:238), and Løkke, as noted above, sees the semantic relationship between the two compound members as a determining factor for linking elements. However, the authors do not provide many examples to this effect. Contrary to this view, I claimed in Sections 2.2.3.2 and 2.2.3.3 that the form of the left-hand member, including the choice of linking element, is in principle indifferent to properties of the right-hand member.

Right-hand members of different categories are only investigated systematically by Løkke (1855). The attention to right-hand members allows him to observe many examples of compounds headed by derivational suffixes, such as $stor_A$-$snut_N$-et_A 'big-snout-ed' and $hjerte_N$-$skjær_V$-$ende_A$ 'heart-cut-ing'='heartbreaking'. These were treated as synthetic compounds in Section 2.3.

Other topics that are discussed in these early works include the nature of verbal left-hand members, the presence of some inflection on left-hand members, and the relationship between compounding and derivation. No systematic classification of compounds according to semantic criteria is attempted, along the lines of the Sanskrit classifications, for example, which had begun to become known to western linguists around this time (see Section 3.2.1). It is interesting to note, however, Knudsen's (1856:316) remark that it would be much better to treat compounds on a par with sentences, rather than as words as is traditionally done, seeing as the semantic relationships in compounds are the same as in sentences. Knudsen also argues that idiosyncratic meanings are not particular to compounds, but are also common in phrases (Knudsen 1856:323-325). These are both topics that are relevant in current theoretical discussions.

3.1.2 Modern descriptions

The grammars of Aasen, Knudsen and Løkke have informed later descriptions of the Norwegian compound system. Among the modern grammars of Norwegian, the most

detailed treatments of compounding are found in Beito (1970) and the Norwegian reference grammar (Faarlund et al. 1997), the latter being the most comprehensive overview of compounding in Norwegian to date. Two monographs on word-formation, Vinje (1973) and Leira (1992), give in-depth descriptions and provide many examples of Norwegian compounds. Vinje (1973) is a publication of his lectures on word-formation, and is explicitly informed by traditional grammars in combination with structuralist and transformational grammar. Among treatments in university textbooks, Enger and Kristoffersen's (2000) chapter is particularly informative and provides detailed theoretical discussion. Finally, in a recent book chapter, Theil (2016) discusses the properties that characterize a prototypical Norwegian compound.

Insights and data from the works mentioned here are all represented in Chapter 2 of this dissertation. Therefore, I do not go into individual contributions here, but refer the reader to that chapter.

The works mentioned so far give general descriptions of the Norwegian compound system as a whole. In the next sections, I briefly review research that has considered smaller areas of this system. The works are organized thematically.

3.1.3 Linking elements

Iversen (1924) investigates the great variation in linking elements in Norwegian. Iversen makes explicit reference to the treatment of linking elements in the grammars of Aasen, Løkke and Knudsen, mentioned above, arguing that they are not systematic enough in their treatment. Iversen largely rejects the attempts in previous works to relate the choice of linking elements to semantics. Instead, he argues that a number of different factors have led to the current system of linking elements. Whether or not a compound takes a linking element, and what linking element it takes, is the result of diachronic developments, morphological properties of the left-hand members, dialectal differences and borrowing between dialects and languages. Exceptions to the general patterns are explained by analogy and ease of pronunciation. In the conclusion to his paper, Iversen quotes his contemporary, Danish linguist Otto Jespersen, who writes that "each linguistic phenomenon inevitably presents blurred outlines, perfectly sharp delineations being found rather in our imperfect attempts to interpret nature than in nature itself" (Iversen 1924:26). Iversen concludes that this is also the case with linking elements.

Akø (1989) investigates compounds with *s*-linkers and the factors that seem to influence whether or not an *s*-linker is used. He finds, for example, that an *s*-linker is never used when the left-hand member ends in /s/ or /ʃ/, and it is rare after, *-el, -en, -er, -ft, -kt*

and -*m*. Most of this work is composed of lists of examples and exceptions, with remarks and advice for the standardization and orthography of compounds in dictionaries.[90]

3.1.4 Diachronic perspectives

Western (1929) gives a classification of compound types in Germanic, based on data from Old Norse, Modern Norwegian, Gothic, Old High German and Old English. He classifies compounds according to the Sanskrit typology (*dvandva* 'copulative'*, tatpurusa* 'determinative'*, bahuviri* 'possessive' and subclasses of these), combined with grammatical relations such as *subject, object, temporal, purpose* and *cause*. His examples include both primary compounds and synthetic compounds, in my terminology.

In her doctoral thesis, Bakken (1998a) studies compounds in Old Norse and the extent to which they are spelled as one solid word or with spaces between the components. She finds that there is a correlation between spelling and the degree of transparency, where transparent compounds are more often spelled with spaces than lexicalized compounds. She uses this to argue for a specific type of lexicalization scale for compounds from fully transparent to non-transparent. This analysis is also laid out in Bakken (1995).

Enger & Conzett (2016) trace the historical development of compounding and word-formation, with special emphasis on comparisons between Old Norse and Modern Norwegian. They consider developments in various aspects of compounding, such as word-based vs. stem-based compounding, the development of linking elements, the categories that can be used in compounding, and the possibility of creating argumental compounds, at different stages of the language. The distinction between word-based and stem-based compounding pertains to whether the elements that are combined in a compound can also be used as independent words in an utterance (in which case compounding is word-based), or whether they are smaller than forms used as independent words (in which case compounding is stem-based) (see e.g. Kastovsky 2009 for terminological discussion). According to Enger & Conzett, there has been a development from word-based compounding in early Indo-European to stem-based compounding in Germanic, Proto-Nordic and Old Norse, gradually moving back towards word-based compounding in Modern Norwegian.[91]

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[90] We may also add Bakken's (1990) investigation of old place names in the region of Øvre Telemark, where she finds a wider range of linking elements than in Modern Norwegian.

[91] Two smaller studies are Bakken (1998b) and Fonnum (1928). Bakken (1998b) analyses the increasing tendency for place names with integrated definite suffixes, as in *Drammen*, to keep this suffix when they are used left-hand members of compounds, as in *Drammens-fjorden* 'the Drammen fjord'. Fonnum (1928) investigates cows' names in the area of Ål, which are always compounds. Fonnum

Remarks about historical aspects of compounding can also be found in Beito (1970), mentioned earlier in this chapter.

3.1.5 Formal analyses of primary compounds

Most of the discussion of the structural analysis of compounds takes place in university textbooks on linguistics (see e.g. Kulbrandstad 1993, Nordgård 1998, Enger & Kristoffersen 2000, Bye et al. 2003, Simonsen & Theil 2005, Åfarli & Sakshaug 2006, Abrahamsen & Morland 2012). In addition, the structure of primary compounds is discussed in a few papers that engage in a dialogue with the textbook analyses (Johannessen 2001, Theil 2016).

A recurring topic in the formal analysis of Norwegian compounds is whether they are indeed composed of words or stems. This discussion in the literature is based on the assumption that stems are uninflected forms. Once a stem is inflected, it becomes a word. A word-based view of compounding is proposed by Simonsen & Theil (2005), Leira (1992, 1994)[92] and Theil (2016). This analysis is supported by the existence of compounds in which the left-hand member is inflected, as in *foreldre*PL-*møte* 'parents' meeting' (cf. Section 2.2.4). These authors are also open to analyzing verbal left-hand members as infinitives (cf. Section 2.2.3). On the other hand, a stem-based analysis is advocated by Sandøy (1992), Nordgård (1998), Sakshaug (2000) and Johannessen (2001), among others. A stem-based analysis is supported by the general ban on inflection of left-hand members of Norwegian compounds. Johannessen points out that the apparent presence of inflectional morphology on left-hand members does not necessarily entail that the relevant morphosyntactic features are present. Johannessen's analysis is presented in more detail in Section 3.3.3 of this chapter.

The question of whether compounds are made up of words or stems also concerns the right-hand member of the compound. If the right-hand member is a word, then that

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collects all the cows' names in the area and investigates category combinations, lexicalization and the rationales behind giving a certain name to a certain cow. He finds, for example, that if the cow's owner is called Anne, her cow could be named *Ann-ros*. He also finds a new tendency to use simple rather than compounded cow names in the area. Fonnum disapproves and exclaims 'Vekk med de usammensatte kunavn! 'Gone with the uncompounded cow's names!'

[92] Leira (1992) is a purely descriptive overview. Sandøy (1992) in his review of Leira's book argues against Leira's classification of verbal left-hand members as infinitives. Leira (1994) replies by listing a wide range of examples where left-hand members appear to be inflected, and claims that although it might be necessary to argue against compound-internal inflection from a specific theoretical point of view, it is nevertheless to be preferred from a descriptive point of view.

entails that inflection is added to the right-hand member before it is combined with the left-hand member. If the right-hand member is a stem, then inflection is added to the compound as a whole, after the left-hand and right-hand members have combined. The two analyses are illustrated in (1).[93]

(1)
a.   word-based compounding   b. stem-based compounding
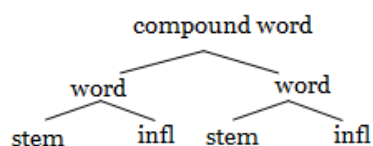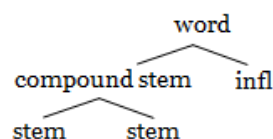
Abrahamsen & Morland (2012) provide a summary of this debate.

Enger (1995) discusses headedness in compounds. He argues against the Right Hand Head Rule of Williams (1981), as well as "word-syntax" more generally, and follows Bauer (1990) in his be-heading of the word. According to this view, morphology is different from syntax in that the former does not have a notion of head. Enger's argumentation is based on compounds that are not inflected in the same way as their right-hand member. For example, whereas *vin* 'wine' is a masculine noun, *brennevin* 'burn-wine'='liquor' is a neuter noun. Enger explains this as the result of lexicalization and semantic drift, and uses this to argue that the *word* is a relevant linguistic unit in morphological theory.

The research considered above treats the general structures and mechanisms that underlie compounding in Norwegian. Other research has dealt with subtypes of compounds and the combination of specific categories in compounds. I give brief summaries of such studies next.

Landmark (1970) applies an immediate constituent (IC) analysis to Norwegian adjectival compounds, drawing on work by American structuralists such as Bloomfield (1933), Hockett (1958) and Wells (1948). Landmark's goal is to demonstrate how the IC-analysis can be applied to word-formation and allow for a more systematic treatment of the material, which includes both primary compounds (*ferie-tom* 'holiday-empty'='empty because of the holidays') and synthetic adjectival compounds (*dansk-språk-et* 'Danish-language-A'='Danish-speaking').[94] See Landmark's study for further discussion.

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[93] Details in the analyses with respect to the definition of *stem* and the placement of linking elements vary between the various proposals (see Abrahamsen & Morland 2012).

[94] Landmark does however point to the problem that an IC-analysis does not always follow the historical word-formation process (see discussion in Chapter 1).

Bakken & Vikør (2011) investigate compound prepositions, such as *opp-under* and *ut-av* (see Section 2.2.2.4). In many dialects, complex prepositions have undergone phonological fusion so that they now constitute a new simple preposition. For example, *ut-av* has become *ta* in some dialects. This has happened in all dialects with the Norwegian preposition *på* 'on', which stems from the Old Norse complex form *upp-á*. The authors find that there is variation with respect to the function of these new prepositions. In some cases, the reduced preposition takes over the whole domain of the original simple preposition, such that *ta* takes over all uses of *av*. In other cases, the two prepositions take on different functions, for example with *ta* taking over the prepositional function and *ta/av* splitting different domains of the adverbial/particle function of the original preposition.

Underived verbal compounds, sometimes viewed as cases of noun incorporation, have been argued only to exist as backformations in English (e.g. *brainwash* from *brainwashing*), or to exist marginally as a productive process (Bauer et al. 2013). A similar situation seems to hold for Norwegian, where many, but not all, verbal compounds are backformations (see Section 2.2.2.3). In his master's thesis, Bäcklund (2007) collects 367 verbal compounds and shows that new ones are being created in Norwegian, although less productively than deverbal compounds. He argues that at least some of these are not backformations, for example *mobil-filme* '(to) cellphone-film'.

Another master's thesis, Eiesland (2008), shows that verb-verb-compounds, such as *prøve-ligge* 'try-lay', e.g. about testing a bed and *sitte-stå* 'sit-stand', are also formed productively in Norwegian. Eiesland collects 266 verb-verb-compounds and assigns them to different constructions, such as a sequence-construction for verbs like *klippe-lime* 'cut-paste'='copy and paste' and a body-construction for verbs like *sitte-danse* 'sit-dance'='seated dancing'.

Bäcklund and Eiesland's studies are important empirical contributions to the research on Norwegian compounds.

I will briefly mention Gundersen's (1976) investigation of verbal and deverbal left-hand members in Norwegian compounds. The option of using a verb as a left-hand member is relatively new to Norwegian, according to Gundersen. This results in many double forms, exemplified below.

(2)
  a. bo-utgift   bolig-utgift
      live-expense   house-expense   'housing expenses'

  b. høre-vern   hør-sel-s-vern
      hear-protection hear-N-LINK-protection 'hearing protection'

c. stråle-dose   strål-ing-s-dose
    radiate-dose   radiate-_{N-LINK}-dose   'radiation dose'

Gundersen also discusses which of the competing forms should be listed in dictionaries.

Finally, the phonology of Norwegian compounds is analyzed in Kristoffersen (1992, 2000), Sakshaug (2000), Lahiri et al. (2005, 2006), Wetterlin & Lahiri (2012) and Withgott & Halvorsen (1984, 1988), Haugen ([1967] 1983), Vanvik (1978) and Christiansen (1946-48), among others. See Section 2.2.1 for further discussion.

3.1.6 Synthetic compounds

As shown in Section 2.4, the term *synthetic compounding* has been used in a variety of ways. Here, I highlight studies that investigate the types of compounds that I categorized as synthetic compounds in Section 2.4. I begin with research on Norwegian deverbal synthetic compounds (cf. Section 2.3.1), and move on to research on Norwegian denominal synthetic compounds (cf. Section 2.3.2).

Lødrup, in a (1989) squib, takes issue with the First Order Projection Condition (FOPC) of Selkirk (1982) (see also Sections 3.3.1 and 5.2.2). The FOPC predicts that in order for an element to be interpreted as an object, it must be the sister of the (nominalized) verb that selects it. In other words, the object must be the element closest to the nominalized verb. This should hold both in deverbal synthetic compounds, as in (3), and in three-word-compounds, as in (4). Thus, according to Selkirk, the FOPC accounts for the unacceptability of (3a) and (4a) in English, while allowing (3b) and (3b).[95]

(3)   (4)
  a. *[tree eating] of pasta   a. *pasta-[tree-eater]
  b. [pasta-eating] in trees   b. tree-pasta-eater

In violation of the predictions of the FOPC, Lødrup finds acceptable examples in Norwegian that correspond to (3a).[96] Two of Lødrup's examples are given in (5).

(5)
  a. [panikk-salg] av biler   b. [lørdag-s-steng-ing]   av butikk-ene
      panic-sell._N   of cars   saturday-_{LINK}-close-_N of shop-_{DEF.PL}
      'panic-selling of cars'   'closing of shops on Saturdays'

---

[95] Examples and judgements in (3a) and (4ab) are from Selkirk (1982:36-37); example (3b) was constructed by me.

[96] See Lieber (2016) on similar counterexamples to the FOPC in English.

Furthermore, some three-word-compounds predicted by the FOPC to be grammatical are actually not, according to Lødrup.[97] All of the compounds in (6) and (7) are judged as unacceptable or strongly dispreferred, even though only (6a) and (7a) are ruled out by the FOPC.

(6)
  a. *bil-[panikk-salg]   b. ??panikk-[bil-salg]
       car-panic-sale   panic-car-sale

(7)
  a. *butikk-lørdag-s-steng-ing   b. ??lørdag-s-butikk-steng-ing
       shop-saturday-$_{LINK}$-close-$_N$ saturday-$_{LINK}$-shop-close-$_N$

Lødrup concludes that the FOPC is not relevant to Norwegian. I discuss these types of data in Chapter 5.

Andersen (2005a)[98] studies aspect and argument structure in deverbal synthetic compounds, as in (8a), and derived nominals, as in (8b). [99]

(8)
  a. tre-fell-ing   b. fell-ing   av trær
       tree-fell-$_N$ fell-$_N$ of tree.$_{PL}$
       'wood felling'   'felling of trees'

He investigates whether thematic role hierarchies like the one proposed by Grimshaw (1990) for English also hold for Norwegian. Grimshaw's thematic role hierarchy can be seen as a later and more developed instantiation of Selkirk's FOPC. Andersen finds that in most cases, Norwegian patterns with the data and predictions of Grimshaw (1990). However, like Lødrup earlier, he also finds some examples that are not predicted by the theory. For example, contrary to Grimshaw's predictions (and, we may add, contrary to Selkirk's predictions), there are cases in Norwegian where the left-hand member is interpreted as a subject (9a) or as an unaccusative object (9b) of the base verb. This is however not systematic, so (9c) is nevertheless ungrammatical.

(9)
  a. russ-e-feiring
      russ-$_{LINK}$-celebrate-$_N$
      'graduate celebration', i.e. 'celebration by graduates'

---

[97] There appears to be interspeaker variation as to the acceptability of (6) and (7), but the native speakers I have consulted generally judge (6a-b) as more acceptable than (7a-b). They judge (5a-b) as fully acceptable.

[98] Available in English as Andersen (2008)

[99] On deverbal nominals, see also Andersen (2005b, 2007)

b. snø-smelt-ing
    snow-melt-$_N$
    'snow melting', i.e. 'snow melts'

c. *løv-fall-ing
    leaf-fall-$_N$
    intended: 'falling of leaves'

Andersen sees argument structure as a property of syntax, and therefore interprets such patterns as evidence for partial interaction between syntax and morphology. I discuss Grimshaw's account of compounds and nominalizations at length in Chapter 5.

One of the most detailed treatments of Norwegian compounds is Sakshaug's (1999) doctoral thesis on synthetic deverbal compounds. I will present her treatment in some more detail due to its empirical and theoretical richness. Sakshaug proposes an autolexical analysis of synthetic deverbal compounds, as in (10).

(10)
a. bær-plukk-er   c. kylling-klekk-eri
    berry-pick-$_N$ chicken-hatch-$_N$
    'berry-picker'   'poultry farm'

b. brøk-rekn-ing   d. ski-hopp
    fraction-calculat-$_N$ ski-jump.$_N$
    'fractional arithmetic'   'ski jump'

In addition, she investigates compounds of the type in (11) that are modified by an adjective, and the type in (12) where the left-hand member involves conjunction.

(11) levende fisk-e-handl-er   (12) dame-   og   herre-fris-ør
     live   fish-$_{LINK}$-deal-$_N$ woman- and man-*fris*-$_N$
     'live fish dealer'   women's and men's hairdresser'

The forms in (11) are ambiguous between a reading where *levende* 'live' modifies *fiskehandler* 'fishdealer' and a reading where *levende* 'live' only modifies *fisk* 'fish', although the latter interpretation is less accessible.

Following theoretical proposals by Sadock (1991), Sakshaug argues that deverbal compounds have independent morphological, syntactic and semantic representations. These modules also have submodules (modulettes), which in turn have independent representations. Thus, for the compound *bærplukker*, Sakshaug gives the following representations in the various modules and modulettes.

(13) Morphological module
  a. Morphological representation

```
                STEM
              ⌒
      STEM        STEM
      bær        ⌒
     'berry'  STEM    DERIV.
             plukk      er
             'pick'    'er'
```
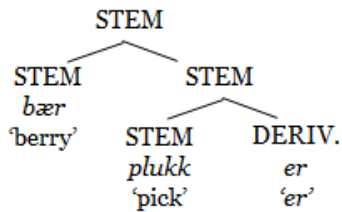
  b. Morpho-phonological representation

```
BASE    BASE      AFF
/¹bær/  /¹plukk/  /er/
/¹bær/      /²plukker/
    /²bærplukker/
```

Recall from Chapter 2.2.1 that a compound's left-hand member, marked in bold above, determines its tonal accent. Sakshaug interprets this as a mismatch between the morphological and morpho-phonological modulettes, such that the morphological representation is right-headed and the morpho-phonological representation is left-headed.

Deverbal compounds are also represented in a semantic module.

(14) Semantic module
  a. Function/argument structure representation

```
              PRED
            ⌒
   ARGUMENT      RELATION
     bær           plukk
    'berry'        'pick'
```
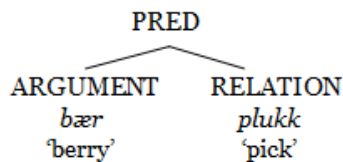
At this level of representation, *bærplukker* has the same structure as the verb phrase *plukke bær* 'pick berry', assuming that linear order is irrelevant (Sakshaug 1999:91).

  b. Participant Role structure representation (ambiguous between i) and ii))
   i) bær   PLUKK   er
      Theme   PRED   Agent

   ii) bær   PLUKK   er
       Theme   PRED   Instrument

A *bærplukker* is ambiguous between an agent-reading 'person who picks berries' and an instrument reading 'instrument used for picking berries'.

c. Predicate type representation (ambiguous)
    i) +Entity, +Activity
    ii) +Entity, +State

Bærplukker is also ambiguous between the readings of 'an entity performing a berry-picking-activity' and 'an entity being in a berry-picking-state'. The former reading, if I understand it correctly, corresponds to both of the readings in (14b). The latter reading denotes somebody who has berrypicking as their occupation (Sakshaug 1999:112).

(15) Syntactic module
      bærplukkar:N0

The syntactic representation simply states that *bærplukkar* is a syntactic atom. Forms like *levende fiskehandler* 'live fish dealer', on the other hand, are structurally ambiguous. Under one reading, they have the syntactic structure [[levende [fiskehandler]]. Under the other reading, they are syntactically atomic, but have the morphological structure [[levende fiske] handler].

The modularity of the autolexical framework thus enables Sakshaug to give independent representation at different levels of analysis, allowing for potential mismatches between levels.

Two recent studies on synthetic compounds are Johannessen's (2017a,b) studies on parasynthetic compounds, such as *rød-øy-d* 'red-eyed', *mange-kant-et* 'many-sided', and *fem-lomm-et* 'five-pocketed' (see Section 2.3.2). Johannessen shows that contrary to previous claims (Melloni & Bisetto 2010), this type of compounding is highly productive and not at all a marginal phenomenon in Norwegian. Parasynthetic compounds in Norwegian always involve inalienable possession, and they systematically take the same suffix as the past participle of verbs. Johannessen (2017a) proposes that the formation of parasynthetic compounds and the formation of past participles both involve a process of detransitivization, thus explaining the common suffix.[100]

3.1.7 The semantics of compounds

In her doctoral thesis, Eiesland (2015) investigates the semantics and productivity of Norwegian noun-noun compounds. The study is based on a collection of 60,000 compounds with elements of eight semantic categories: animals, artefacts, body parts, emotions, foods, persons, plants and substances. Eiesland finds that some semantic types

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[100] See also Grov's (2009) master's thesis on parasynthetic compounds, as well as Landmark (1970) mentioned earlier in this chapter.

of nouns prefer one position over the other. For example, nouns denoting foods (such as *tomat* 'tomato' and *syltetøy* 'jam') are more likely to be used as left-hand members, whereas nouns denoting artefacts (such as *hage* 'garden' and *flaske* 'bottle') are equally likely to be used as left-hand and right-hand members of Norwegian compounds. None of the semantic types that Eiesland investigated were more likely to be used as right-hand members. Eiesland also shows that the left-hand position is more open than the right-hand position, in the sense that more semantic variation is found in the left-hand position than in the right-hand position. Eiesland refers to Maguire et al. (2010), according to whom the opposite holds for English: more semantic variation is found in the right-hand position than in the left-hand position in English. Finally, considering different measures of productivity, Eiesland found that noun-noun compounding is indeed productive in Norwegian, and that the degree of productivity varies for different semantic classes. She interprets her findings within a cognitive framework.

Nesset (2011) treats metaphorical and metonymical compounds used as negative characteristics of people. Examples include *løgn-hals* 'lie-neck'='liar'*, sta-bukk* 'stubborn billy-goat'='stubborn old mule' and *skravle-bøtte* 'chatter bucket'='chatterbox'. Nesset asks how such compounds can be interpreted by language users, and argues that it is done using the mechanisms of metaphor and metonymy, combined with considerations of context, semantic blocking, and similarity to other compounds. Metaphorical interpretations are most relevant when the right-hand member denotes an animal or an artefact, whereas metonymical interpretations are most relevant when the right-hand member denotes a person or body part. In a later paper, Nesset (2016) uses the theory of conceptual integration (Fauconnier & Turner 2002) to explain the interpretation of Norwegian compounds more generally.

Skommer (1993) analyses complex words whose left-hand members function as intensifiers, as in *kanon-full* 'canon drunk'='very drunk', *rå-flott* 'raw great'='very lavish' and *kjempe-bra* 'giant good'='very good'. As can be seen from the translations, all of these left-hand members can be paraphrased as *very*. Skommer identifies different classes of intensifiers depending on the type of paraphrase they have. For example, *pure intensifiers* are paraphrased in one stage, as in *rå-flott* → *veldig flott* 'very lavish', whereas *comparative intensifiers* are paraphrased in two stages, as in *iskald* → *kald som is* 'cold as ice' → *veldig kald* 'very cold'. Skommer uses words like these to argue for the importance of meaning for morphological analysis. An analysis based only on form would not distinguish between the left-hand members in *rå-flott* 'raw great'='very lavish' and *rå-emne* 'raw material'. Yet, these two versions of *raw* are different, since only

the second case uses the meaning of the free form *rå* 'raw'. This type of homophony is common for the intensifiers that Skommer discusses. He connects this to the diachronic development of free forms into bound forms and the discussion of semi-affixes and affixoids in the literature.

Among the research on the semantics of compounds, we may also include Gundersen's (1995) study of folk etymologies. Folk etymologies are found especially in dialects, and Gundersen argues that they are cases of morphological reanalysis. An example is *sjokolade* 'chocolate', which is sometimes replaced by *sukker-lade,* 'sugar-lade'. Another example is the Latinate verb *regjere* 'reign, govern'. The final part of this word is homophonous with the Norwegian verb *gjere* 'to do'. This has led to some speakers inflecting it as *regjere*$_{INF}$ - *regjorde*$_{PAST}$, just like *gjere*$_{INF}$ 'do' - *gjorde*$_{PAST}$ 'did', rather than *regjere*$_{INF}$ 'govern' - *regjerte*$_{PAST}$ 'governed'. Some further examples of folk etymologies from Gundersen (1995) are included below.

(16) Original form   Reanalyzed form
    a. universitet   undervis-itet
       'university'   'teach-*itet*'

    b. filharmonisk   film-harmonisk
       'philharmonic'   'film-harmonic'

    c. skandalde   skam-dale
       'scandal'   'shame-*dale*'

    d. diaré   dia-rauv
       'diarrhea'   '*dia*-ass'

    e. Sanskrit   sand-skrift
       'Sanskrit'   'sand-writing'

    f. Geburtstag (German)   gi-bort-s-dag
       'birthday'   'give-away-$_{LINK}$-day'

    g. telefon   tale-fon
       'telephone'   'speech-*fon*'

It is interesting to note here that that the reanalysis only provides partial compositionality (i.e. only one of the components is a known word), which has nevertheless been preferred to no compositionality.

The semantics of noun-noun compounds also figures in other works mentioned here, most notably in Western (1929) listed under *Diachronic perspectives*.[101]

3.1.8 Brief interim conclusion

In this section, we have seen that there is a substantial body of research on Norwegian compounds. Common to most of this work, however, is that description and listing of examples plays a bigger role than formal analysis and theoretical discussion, with a few notable exceptions.

The research that has been done, including my contribution in Chapter 2, assures that we have a good understanding of the data and generalizations, which is crucial for the formulation of a formal analysis. In Chapters 4 and 5, I build on this foundation, as well as the theoretical insights from previous work on Norwegian compounds highlighted in this section.

In the next section, I review theoretical work on compounds more generally, which will also provide a better understanding of the phenomenon of compounding, but now from a theoretical angle.

3.2 The place of compounds in the architecture of grammar

Compounds have occupied different places within grammar as theories have developed. This section traces important points and trends in the recent history of compound analysis. A recurring theme is the question of whether compounds lie within the domain of syntax or that of a distinct morphology module. I focus on Generative Grammar, but start out by briefly considering the place of compounding and word-formation in earlier work.

3.2.1 Treatments of compounding before 1960

In the Germanic linguistic tradition, word-formation was properly established as a domain in its own right in the course of the 19th century (Kaltz & Leclercq 2015:40). Paul (1897:692) thus considers Jacob Grimm, and in particular his *Deutsche Grammatik* (1826), as initiating scientific word-formation theory. Grimm's work is situated within historical-comparative grammar, where the main interest is to compare different

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[101] See also Eiesland & Lind (2012, 2017) who investigate the range of semantic interpretations in the production and interpretation of nominal compounds in aphasic speakers.

languages at different historical stages in order to establish (genealogical) relationships between them.

The status of word-formation as a separate domain of grammar is clear in the 19th century grammars of Aasen, Knudsen and Løkke, reviewed in Section 3.1. These grammars all contain independent chapters on word-formation[102] with subsections on compounding, separate from the chapters on phonology, inflection and syntax.[103] However, although word-formation and compounding began to play a more prominent role in grammatical descriptions in the 19th and early 20th century, phonology and inflection were generally given prominence (ten Hacken & Thomas 2013:2).

Knowledge of Sanskrit, which was introduced to western linguists in the same period, continues to have a long-lasting impact on compound research. Indian grammarians had developed classifications for Sanskrit that took into consideration both formal and semantic properties of compounds. The Sanskrit classification of compounds was described and given Latinized translations by Franz Bopp (1827:310-332) (Lindner 2015). This classification and the associated terminology were widely adopted in later work on compounding and are still in use today. To take one famous example, the Neogrammarian Hermann Paul (1920) argued for a syntactico-semantic classification of compounds in German based on the Sanskrit typology (cf. also Western 1929 in the previous chapter). Prior to this, descriptions of compounds in Germanic, such as that of Grimm (and Aasen, Løkke and Knudsen), had focused mainly on formal properties of compounds (Kaltz & Leclercq 2015).

Word-formation does not play a prominent role in structuralist linguistics, although developments in structuralist theories became important for later research on word-formation (ten Hacken & Thomas 2013, Motsch 2015). Ferdinand de Saussure, the founder of structuralism, began his career within the neogrammarian tradition. Neogrammarians further formalized the diachronic and comparative study of language that began with earlier historical-comparative grammar. Much of Saussure's view on language was formulated in reaction to this tradition. Saussure argued for a strict separation of *synchrony* and *diachrony* in language. The comparison of different languages at different stages requires a proper understanding of the linguistic system, which makes a *synchronic* perspective the more basic of the two (ten Hacken & Claire 2013, Motsch 2015). Adams (1973:5) sees this strict dichotomy as one of the reasons why

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[102] By *word-formation,* I refer here to compounding and derivation, and do not include inflection.

[103] There is some variation with respect to how many of these chapters are included in the respective grammars.

word-formation, which in its very nature combines the two perspectives, does not play a more important role in structuralist linguistics.

In American structuralism, like European structuralism, the role of word-formation is marginal. Although Bloomfield's (1933) discussion of compounding has been influential, the study of word-formation was restricted by the behaviorist principles of the time. For example, the possibility of referring to *meanings* was strictly limited, as this would require reference to mentalistic, unobservable notions. Motsch (2015) furthermore points out that the reservation towards diachronic perspectives excludes reference to notions such as *affixoid, unproductive rule* or *lexicalized word,* which are all central notions in word-formation studies. In order to describe something as lexicalized or unproductive, it is necessary to invoke an historical context. Finally, *morphemes* and *phonemes* were the basic units of the theory, rather than *words.* American structuralists, studying previously unrecorded American languages, wanted to identify the minimal segments of speech using principles that were equally suitable for known and unknown languages. The written word, separated from other words on paper, was therefore not a primitive (Adams 1973:5, ten Hacken & Thomas 2013:5). All of these factors disfavored the study of word-formation.

Motsch nevertheless establishes the importance of structuralism for modern research on word-formation in the following quote.

> We thank structuralist approaches for concepts such as *stem morpheme*, *derivational* and *inflectional morpheme, discontinuous morpheme* and *free* and *bound* morpheme. Bloomfield, Harris and Hockett contributed greatly to these results. It would be impossible to imagine modern research in morphology and word-formation without the preliminary work of the structuralists.
> (Motsch 2015:65-66)

Motsch also points out that important work on word-formation was being done at the time by linguists who followed less strict methodological criteria than the structuralists. An example of this is Marchand (1969).

The study of word-formation grew in importance in 19th century historical-comparative grammar. These theories were word-based, and compounding was firmly placed in the chapters on word-formation along with derivation but separate from both inflection and syntax. Word-formation nevertheless had a less prominent role than other aspects of grammar, and this tendency remained in structuralist schools. During the 19th and early 20th century, Germany was the center of development of western linguistic theory. With World War II, European and American structuralism, and later generative

grammar, the attention turned to the English-speaking world (Hovdhaugen et al. 2000:305-306).

3.2.2 Compounds in early generative grammar: Lees (1960)

The first study of compounds in generative grammar was Lees' *The grammar of English nominalizations,* published in 1960, based on his 1959 doctoral dissertation. This was also one of the first works in generative grammar in which the theory was applied to a large set of data, rather than focusing on developing the theory itself (ten Hacken 2009). Lees primarily analyses English data, but he also provides some comparison with German and Turkish (see Lees 1960, Appendix B and C).

In Lees' analysis, compounds are derived from underlying sentences. A compound such as *night owl* can be derived from the sentence *the owl flies at night,* such that the underlying sentence makes explicit the grammatical relationship between the constituents which is only implicit in the compound (Lees [1960]1963:159). This view on the interpretation and formation of compounds means that different interpretations of the same compound are related to different underlying sentences. Lees discusses this in the context of the compound *snake poison,* which could be derived from *the snake gives the poison, the snake has the poison, the poison is for snakes* or some other underlying sentence, depending on the interpretation of the compound in a given context (Lees 1960:122-123).

In Lees' analysis, some transformations are common to many constructions, whereas others are particular to a specific construction. A compound-specific transformation is the NPN-transformation in (17) (ten Hacken 2009).

(17) NPN-Transformation (1963:174-5)
　　　X1 – X2 – X3– X4 – X5 – X6 $\rightarrow$ X1 – X4 – X2 – X6

Let us see how the NPN-transformation generates *night owl*. At the point when the NPN-transformation is applied, the initial sentence *the owl flies at night* has already gone through a number of transformations, and has become *owl flying at night,* which is the input to the NPN-transformation. For this particular compound, the relevant components of the NPN-transformation are X2, X3 and X4. The NPN-transformation deletes X3, and switches the places of X2 and X4.

(18) NPN-Transformation
　　　X2 (owl) – X3(flying at) – X4(night)　　$\rightarrow$　　X4(night) – X2(owl)
　　　owl flying at night　　　　　　　　　　$\rightarrow$　　night owl

Several problems with Lees' account were pointed out following its publication (e.g. Matthews 1961, Schachter 1962, Allen 1978, Bauer 1978, 1983, Scalise 1984. See also Štekauer 2000, ten Hacken 2009 and references therein). The main point of criticism concerns the power of the transformational rules proposed. Lees postulates material in the underlying sentences that cannot independently be shown to have been there. This makes for an unrestricted theory, and later led to Chomsky's (1965) formulation of the principle of recoverability of deletion. This principle states that only certain types of material can be deleted in the course of a transformation, restricting possible transformations and deletions significantly.

Another problem for Lees (1960) is lexicalized and non-transparent compounds such as *shortbread, grapefruit* and *cranberry.* As noted by Bauer (1978:74-75), it is difficult to give paraphrases for such compounds that could serve as their underlying representations. For example, while the paraphrase *the bread is short* is possible, it is not a paraphrase of the compound *shortbread.* For *cranberry,* the problem is even more significant because *cran-* is a bound morph that seems to lack independent meaning (Matthews 1961:207). Thus, as a general criticism of the approach, Bauer states that "there is no *a priori* reason why a compound formed several hundred years ago should be explicable in terms of the same set of rules and the same set of lexical items as explain currently produced compounds" (Bauer 1978:74-75). The treatment of lexicalized compounds became more straightforward in generative approaches as the theory of the lexicon was further developed (Chomsky 1965, 1970).

According to Ten Hacken (2009), Lees' work was received differently in North America and Europe, which he relates to a difference in scientific culture. In North America, Lees' book was generally viewed as a contribution to formal grammatical theory. In Europe, on the other hand, the study of compounds and the extensive application to data was considered to be more important. Thus, the German linguist Hans Marchand's (1969) treatment of English word-formation, which was inspired by Lees, "takes the form of a theoretically informed inventory rather than a theory with examples" (ten Hacken 2009:67). As we saw in Section 3.1, this concern with data rather than theory is predominant in Scandinavian compound research as well.

Lees (1960) was important for later studies of word-formation, and analyses of compounds building on Lees' approach continued to be carried out in transformational grammar and generative semantics, resulting in works such as Lees (1970), Brekle (1970), Kürschner (1974) and Levi (1978) (ten Hacken 2009). An important turn came with Chomsky's "Remarks on Nominalization" (1970) and the introduction of the lexicon as the

locus for word-formation. With this, the focus shifted from the putative transformation of underlying sentences into compounds to the contributions of their individual parts.

3.2.3 Lexicalism and compounds in the 70s

The beginning of lexicalism is often pinpointed to Chomsky's (1970) *Remarks on nominalizations* and Halle's (1973) *Prolegomena to a Theory of Word Formation*, and was properly established with works such as Siegel (1974), Jackendoff (1975) and Aronoff (1976). Whereas in earlier work, aspects of morphology had to be handled by either the transformational component or the phonological component, morphology is now considered as an independent module (Scalise & Guevara 2005). In broad terms, the lexicon went from being a static list of lexical items and idiosyncrasies, as it was construed in structuralist and early transformational theory (the "Bloomfieldian lexicon"), to being a dynamic, computational component where processes could be performed. The lexicon thus became the locus of word-formation.[104]

Two early lexicalist works are especially important for the analysis of compounds: Allen (1978) and Roeper & Siegel (1978).

Allen's (1978) doctoral thesis is the first lexicalist study with an extensive investigation of compounds and the rules that generate them. Allen (1978:91-111) famously formulates the IS A-condition and the Variable R-condition for compounds as constraints in the lexicon. The IS A-condition states that the right-hand member of a compound determines the properties of the compound as a whole, both formally and semantically.

(19)   The IS A-condition (Allen 1978:105)
       In the compound [[....]$_X$ [....]$_Y$]$_Z$
       Z "IS A" Y

Allen illustrates the IS A-condition with the compound *silk-worm*. The IS A-condition correctly captures that a *silk-worm* "IS A" *worm,* and that *silk-worm,* just like *worm,* "IS A" noun.

Allen's Variable R-condition states that the relationship between the components of a compound is not constant but rather variable. Allen contrasts her view with that of

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[104] The term *lexicon* is debated, and some linguists prefer to use it only in the lexicon-as-a-list/Bloomfieldian sense, placing *processes* of word-formation not in the lexicon but in "the morphological component", e.g. Di Sciullo & Williams (1987), William (2007), Ackema & Neeleman (2010). In this chapter, I use "the lexicon" and "the morphology" interchangeably as the locus of word-formation operations.

Lees (1960), who treats the relationship between compound components as a constant expressible by a single verb, e.g *fly* in *night-owl* in the example in (18). Contrary to Lees, Allen argues that the possible meaning relations in a compound are determined by the meaning of the constituent parts.

The IS A-condition, later formulated in various versions of the Right-Hand Head Rule (Williams 1981), and the Variable R-condition are important components in any modern account of compounds.[105]

The same year as Allen completed her dissertation, Roeper & Siegel published their seminal paper on synthetic compounds. Although synthetic compounds had been described and discussed in much previous literature, particularly in German under the name *Zusammenbildungen*[106]*,* Roeper & Siegel's (1978) paper is the first devoted solely to this compound type. Roeper and Siegel propose to derive synthetic compounds by a new type of operation – lexical transformations. This, on the one hand, allows them to derive synthetic compounds in the lexicon, and on the other, captures the sentence-like properties of such compounds by appealing to transformations. The essence of the analysis is that a compound like (20b) is derived from (20a) by affixation followed by movement of the complement.

(20)
   a. make peace
   b. peace-mak-er

Roeper & Siegel's account has been much criticized, including for the use of lexical transformations, for their empirical delimitation to only certain types of synthetic compounds and for how root compounds and synthetic compounds in this approach are

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[105] The empirical observations behind these conditions were of course not new. Formulations similar to the IS A-condition are given in Bloomfield (1933) and Marchand (1969) for English, and at least as early as Aasen (1848, 1864) for Norwegian. The view that the meaning of the compound stems from the meaning of its parts, and that compounds are ambiguous as a result of an underspecified relation between these components, is also found in earlier work, most directly that of Gleitman & Gleitman (1970) and Downing (1977) (ten Hacken 2009).

[106] According to Leser (1990:19), the term *Zusammenbildungen* was most likely coined by Wilmanns (1896). The term *synthetisches Kompositum* was coined by Schröder (1874: 206), according to Lindner (2015:56).

treated completely differently, despite their many similarities (Allen 1978:151ff, Botha 1980: ch.2, Selkirk 1982:43-47, Lieber 1983:283).[107]

Another relevant publication from the same year is Bauer's study on nominal compounding in Danish, English and French, based on his (1975) doctoral thesis. Bauer provides careful consideration of different definitions and criteria for identifying compounds in the three languages, concluding that no definitive definitions can be given. He also proposes a case grammar analysis (Fillmore 1968, Anderson 1971) of nominal compounds. Bauer's (1978) discussion here, as well as subsequent terminological and definitional discussions by the same author (e.g. Bauer 1983, 1990, 1998, 2009, 2016, 2017), have been decisive for our present understanding of the phenomenon.

3.2.4 Strong and weak lexicalism

Throughout the 80s, lexicalist morphology was further developed and refined with important works such as Lapointe (1980), Lieber (1980), Williams (1981), Anderson (1982), Selkirk (1982), Botha (1984), Scalise (1984) and Di Sciullo and Williams (1987). Compounds play a central role in many of these, and synthetic compounds became increasingly important (see also Kageyama 1982, Lieber 1983, Fabb 1984, Höhle 1985, Sproat 1985, Booij 1988, Fanselow 1988, Roeper 1988 and many more). Some analyses of synthetic compounds will be reviewed in more detail in Chapter 5, and I will focus here on the treatment of compounds more generally.

The separation of the morphological and syntactic components of grammar generates discussion about the appropriate type of demarcation between the two. Within the lexicalist framework, two different approaches are recognized, known as strong and weak lexicalism. They differ in the extent to which morphological and syntactic phenomena are allowed to interact. The strong lexicalist hypothesis maintains that morphology and syntax are kept completely apart. According to this view, compounding, derivation and inflection are all handled in the lexicon.

The weak lexicalist hypothesis, on the other hand, allows for more interaction between morphology and syntax. Inflection is typically treated in the syntax, whereas opaque derivations are treated in the lexicon, and compounds are somewhere in between, varying from author to author and even from compound type to compound type.

I first consider what a strong lexicalist analysis of compounding could look like, using Lieber (1980) as a representative of this view. Lieber's (1980) lexicalist morphology

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[107] The latter point is expressed most strongly by Allen (1978). It is not part of Botha's (1980) criticism; Botha himself analyses synthetic compounding in Afrikaans as affixation to deep structures.

takes the IS A-condition of Allen (1978) one step further by formulating specific *feature percolation* mechanisms to ensure this effect. Lieber proposes to generate word-structures in three steps. First, unlabeled syntactic trees are created by a single generic context-free rewrite rule. Next, lexical terminals are inserted into the structures. Finally, formal and semantic features of the lexical terminals percolate upward, thus labelling the trees. This is illustrated in (21) below.

In order to make sure that the morphological trees get the right labels, or put differently, that the head of the structure projects, Lieber proposes four different percolation conventions. The first three account for derivation and inflection, and are hypothesized to be universal. The fourth convention applies to compounds, and is argued to be language-specific since both left-headed and right-headed compounds are claimed to exist in the world's languages.

(21) Feature Percolation Convention IV (Compounds) (Lieber 1980:92-93)
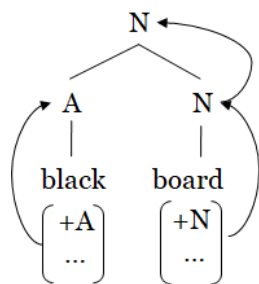
In compound words in English features from the righthand stem are percolated up to the branching node dominating the stems.

The representation in (21) is created by first generating an abstract structure. Next, the terminals *black* and *board* are inserted into the structure, and finally, the features of these terminals, most importantly A and N, percolate up the tree according to Convention IV above.

The language-specific nature of the fourth percolation convention makes Lieber's theory different from Williams' Right Hand Head Rule (RHHR) (1981), according to which words are right-headed universally. Williams' RHHR was later modified by Selkirk (1982) and Di Sciullo and Williams (1987) to allow for more variation. Selkirk (1982) formulates an account of compounds similar to that of Lieber (1980), which will be reviewed in more detail in section 3.3.1.

Proponents of the strong lexicalist hypothesis all subscribe to some version of the *lexical integrity hypothesis*, a constraint that is formulated in different ways in the literature. Thus, Lapointe (1980:8) proposes that "[n]o syntactic rule can refer to elements of morphological structure". Similarly, Di Sciullo & Williams' (1987) *Atomicity Thesis*

states that "[w]ords are 'atomic' at the level of phrasal syntax and phrasal semantics". In the same vein, Botha (1981:18) formulates and then rejects what he calls the *No Phrase Constraint*, which states that "[m]orphologically complex words cannot be formed (by W[ord] F[ormation] R[ules]) on the basis of syntactic phrases".

Botha (1981) rejects the *No Phrase Constraint* based on the existence of phrasal compounds in Afrikaans. He provides many examples of compounds with phrasal left-hand members of various types, some of which are given below. Importantly, new phrasal compounds are created freely, according to Botha, and the phrasal left-hand member does not have to be a lexicalized idiom.

(22) Botha (1981:73-76)
   a. [spek en eiers]$_{NP}$-ontbyt
      bacon and eggs breakfast

   b. [oor die heining]$_{PP}$-stories
      over the fence-stories

   c. [vies vir die wêreld]$_{AdvP}$-uitdrukking
      mad at the world expression

   d. [maklik om te maak]$_{VP}$-poeding
      easy to make pudding

   e. [wie is baas]$_S$[108]-gryns
      who is boss-sneer

The examples in (22) show that the *No Phrase Constraint* is at least violated by Afrikaans. Hoeksema ([1984] 2014:21) points out that it is also violated by its own name.[109] Phrasal compounds, along with other phenomena where syntax and morphology interact in unexpected ways, seriously challenge the strong lexicalist hypothesis and thus support a weaker version of lexicalism.[110]

Weak lexicalism allows for some interaction between syntax and morphology, or phrase-formation and word-formation, and is thus better equipped to deal with phrasal compounds. For proponents of weak lexicalism, however, the challenge is to determine what types of interaction are allowed and what is the appropriate division of labor between

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[108] S = Sentence = CP

[109] On phrasal compounds, see especially Lieber (1988, 1992), as well Trips & Kornfilt (2017) and the papers therein.

[110] But see Wiese (1996), who argues that phrasal compounds do not constitute evidence against the strong lexicalist hypothesis.

components. To see how these questions have been handled, I briefly consider two approaches.

Fabb (1984) develops a theory where inflection as well as certain types of derivation and compounding belong to the syntax. More specifically, and in line with much other work, productive and semantically transparent forms are created in the syntax, whereas unproductive, non-transparent forms are created in the lexicon. Fabb's main concern is with syntactic word-formation, and he argues that English synthetic compounds belong in this category. He also argues that English AN-compounds such as *green-card* "might … plausibly be constructed in the syntax", without however discussing such cases further (Fabb 1984:180-181). English NN-compounds, on the other hand, must be created in the lexicon, he argues, because there are restrictions on the semantic relationship between the left-hand and right-hand members of NN-compounds. This claim is the opposite of the approach in much later work, largely building on Allen's (1978) Variable R, which holds that the semantic relationship between the left-hand and right-hand member of a compound is underspecified and determined pragmatically.[111] As pointed out by Lieber (2015:104), Fabb's theory faces a similar problem with respect to affixation, since he would have to postulate both syntactic and lexical versions of most suffixes (Lieber 2015:104).

A different version of lexicalism is put forth by Anderson (1992). Anderson formulates a lexicalist theory that does not make use of morphemes, but regards the word as the central building block. Anderson's a-morphous morphology, thus, does not assign internal structure to words, with the important exception of compounds and a few other forms. Compounding, unlike derivation and inflection, involves the combination of two independently existing words, and, according to Anderson (1992:292) "seems to involve a genuinely syntactic combination of lexical elements below the level of the word". For noun-noun compounds, Anderson assigns the phrase structure rule N $\rightarrow$ N$\underline{N}$, which applies in syntax; the underlining marks the head of the compound. Anderson nevertheless argues that compounds with idiosyncratic properties, such as *cranberry*, reside in the lexicon.

Thus, both Fabb and Anderson argue that some compounds are formed in the syntax, whereas other compounds are formed in the lexicon. However, the way they

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[111] One explanation could be that what Fabb has in mind is the class of established NN-compounds, not productively formed NN-compounds. However, if we accept that NN-compounding is productive, and if we follow Fabb's logic, then the result would be that some NN-compounds are generated in the syntax and other NN-compounds are generated in the lexicon, which poses the challenge of finding good criteria to determine what goes where.

distribute compounds between the two components is different, which only serves to illustrate how difficult it is to manage the distinction between word-formation in the syntax and word-formation in the lexicon, once some interaction is allowed. We will continue to see examples of this in the next section. In recent years, many linguists have abandoned the idea of two places for word-formation altogether, instead following a non-lexicalist approach (Maranz 1997). The current dissertation explores such a view, as will be seen in Chapters 4 and 5. I turn to some recent developments in theories of compounding and word-formation next.

3.2.5 Compounds since the 90s

The last couple of decades have seen many developments in the study of word-formation. Weak lexicalist analyses of compounding continue to be developed and are still prominent (e.g. Rappaport-Hovav & Levin 1992, Ackema 1999, Ackema & Neeleman 2004, Di Sciullo 2005b, 2009, Giegerisch 2015, Olsen 2017). A common feature of these models is that they allow for partial, but not complete, overlap between word-building and phrase-building. Thus, structure-building is still organized in modules.

However, a significant development in this period is the increased attention paid to a completely reductionist position where both word-formation and phrase-formation are handled in a single component with a single set of principles. This position is often referred to as 'syntax-all-the-way-down' and has by some been described as a return to the position of American structuralists and early generative grammar (Spencer 2005:76, Scalise & Guevara 2005). Early syntactic approaches to word-formation were formulated by Toman (1983), Sproat (1985), Walinska de Hackbeil (1986) and Lieber (1992) (see also Baker 1988). This view has since been developed in the frameworks of Distributed Morphology (Halle & Marantz 1993, Harley & Noyer 1999), Julien (2002), exoskeletal syntax (Borer 2005 a, b, 2013) and nanosyntax (Caha 2009, Baunaz et al. 2018), and has become increasingly popular throughout the 90s and beyond.

These recent syntactic approaches to word-formation are also referred to as *neo-constructionist* because they assume that all or most grammatical properties of lexical elements are defined syntactically. The property of being a noun or a verb, for example, is in this view not inherent to *fish*. Rather, it is a syntactically determined property assigned to *fish* in the context of nominal or verbal structure, as in *a fish* and *to fish*, respectively. This view can be contrasted with the lexicalist view of Lieber (1980), reviewed in Section 3.2.4, where category information is inherent to the lexical element and percolates up the tree when the elements are inserted into syntactic structures. The neo-constructionist approach, though it is generative, thus draws on the insight from construction grammar

that many formal and semantic properties of linguistic expressions stem from structural templates (Goldberg 1995, and see Ramchand 2008 for discussion).

In this dissertation I employ a syntactic, neo-constructionist approach to word-formation, and I therefore review previous syntactic analyses of compounding in more detail in Section 3.3. Before turning to those, however, it is informative to consider examples of how compounds have been analyzed in a recent lexicalist approach, represented here by Ackema & Neeleman (2004), and in Booij's (2009) construction morphology, a branch of construction grammar.

Ackema & Neeleman (2004) develop a model of grammar where what they term word-syntax (i.e. morphology) and phrase-syntax are submodules of a larger syntactic module. Both submodules can combine lexical elements. They are thus in competition, and, in non-polysynthetic languages, when all else is equal, syntax wins. This entails that elements are only combined in morphology when no syntactic competitor exists.

Ackema & Neeleman use their model of competition to explain the general ban on NV-compounds where N is an object of V in Germanic languages. That is, (23a) is blocked by (23b).

(23)   a. *truck$_N$-drive$_V$ b. drive trucks

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           V                              VP
          / \                            /  \
         N   V                          V    NP
       truck drive                    drive trucks
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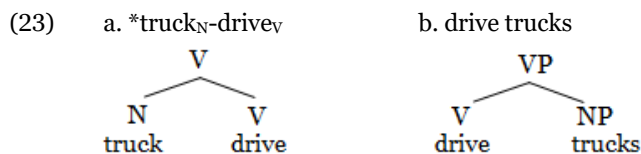
(23b) wins over (23a) because when all else is equal, syntax wins, and else is equal when the semantic relationship between the components is the same, they are combined in the same order and the categories combined are the same. However, the synthetic compound *truck driver* in (24a) is not blocked by *driver of trucks* in (24b), because even though the semantic relationship is the same, the order of combination and thus the categories combined are not the same.

(24)   a. [truck driv]er   b. driver of trucks

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            N                                  NP
           / \                                /  \
          V   N                              N    FP
         / \  er                            / \   / \
        N   V                              V   N F   NP
      truck drive                        drive er of trucks
```
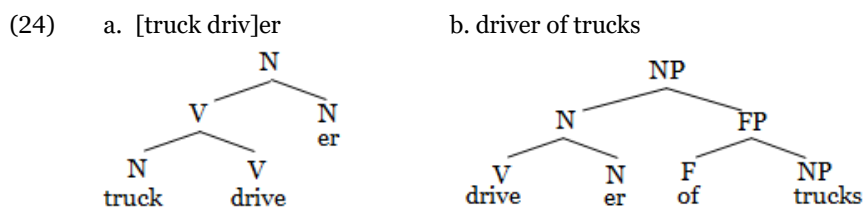
In this system, Ackema & Neeleman must assume that in (24a) *truck* and *drive* are merged before adding the suffix, whereas in (25b), *drive* is merged with the suffix before the

merging of the argument. Note however that the constituent structure of both of these constructions is much debated in the literature (cf. Section 2.3).

As for primary compounds, or in their terminology root compounds, Ackema & Neeleman argue that these are also built in the morphology rather than in the syntax. The question is why that should be the case if syntax always wins. The answer they propose is that root compounds are listed as morphological, and they are listed because they are non-compositional.

Different types of evidence are put forth to justify the claim that the semantics of root compounds is non-compositional. First, they point to Dutch compounds like *zwartboek* 'black book', which does not have the same meaning as the syntactic phrase *een zwart boek* 'a black book'. The lexicalized meaning of the compound is 'book of complaints and accusations' (Ackema & Neeleman 2004:82).

Another type of evidence is that newly formed root compounds have underdetermined meanings (i.e. the Variable R relation). For example, a newly formed compound like *cup-scarf* (my example) can mean many different things, and must be interpreted in context.

A third type of evidence for the listed nature of root compounds comes from Swedish particle verbs. Ackema & Neeleman refer to Holmes & Hinchcliffe (1994:84), who show that verb-particle combinations in Swedish often have compositional readings in their phrasal variant but figurative meanings in their compounded variant. This forces the compounded variant to be listed.

(25) a. jag   bryt-er   av   kvist-en
          I   break-PRES   off   branch-DEF.SG
          'I break off the branch'

      b. jag   av-bryt-er   samtal-et
          I   off-break-PRES conversation-DEF.SG
          'I interrupt the conversation'

In some cases, particle-verb combinations have the same meanings in both their syntactic and compounded variants, but in such cases, the compounded version is usually more formal. Ackema and Neeleman argue that belonging to a different register is an idiosyncratic property, which again requires listing. Listing allows expressions to be realized morphologically rather than syntactically, despite the more general principle that syntax always wins. In their words, "[i]f something needs to be listed anyway because of some unpredictable property, it can be listed with the additional idiosyncratic information that it is a morphological complex, thereby suspending competition" (Ackema &

Neeleman 2010:30). I will now point out some problems with this approach to compounding.

Ackema & Neeleman's discussion of root compounds suffers from the mixing of different notions of compositionality and listedness to the extent that their claims become empty and difficult to evaluate (see also Spencer 2011:502, fn.21 for a similar criticism).

First, although the compounds *zwartboek* and *cup-scarf* both have unpredictable meanings, they are of course unpredictable in very different ways and for very different reasons. The former is unpredictable because it is an old, lexicalized compound whose meaning was established a long time ago. The latter is unpredictable because it is new and must be interpreted in context. It is not clear why these two types of unpredictability should require the same treatment, namely listing. In fact, if root compounds are morphological because they are listed, and they are listed because they have unpredictable meanings, then it is not clear how new root compounds, which are necessarily unlisted, can be formed in the first place.[112]

As for particle verbs, especially from the perspective of Norwegian, it is important to note that that there are particle-verb combinations where the syntactic and compounded versions have the same meaning and where the compounded version is not restricted to formal settings. Thus, in (26)-(29), the compound and verb phrase can be used interchangeably (see also Faarlund et al 1997:83-87 for discussion).

(26)
  a. fram-kalle   gode minn-er
     forth-call   good memory-PL
     'evoke good memories'

  b. kalle fram gode minn-er
     call   forth good memory-PL
     'evoke good memories'

(27)
  a. bort-forklare et mot-eksempel
     away-explain   a counter-example
     'explain away a counter-example'

  b. forklare bort et mot-eksempel
     explain away a counter-example
     'explain away a counter-example'

(28)
  a. ut-viske   forskjell-er
     out-erase difference-PL
     'erase differences'

  b. viske ut   forskjell-er
     erase out   difference-PL
     'erase differences'

(29)
  a. inn-kalle   til presse-konferanse
     in-call   to press-conference
     'call a press conference'

  b. kalle inn til   presse-konferanse
     call in to   press-conference
     'call a press conference'

---

[112] The authors state in footnotes that it can be done, but they do not show how (Ackema & Neeleman 2004:80-81, fn. 9 and 10).

Granted, although the expressions can be used interchangeably in the contexts above, they can have marginally different connotations, and that is perhaps enough to warrant listing. There are also contexts where only one or the other version can be used, which also warrant listing. However, that holds for both the syntactic and compounded versions. This can be exemplified with a particle verb like *slå av/avslå*.

(30) slå av

   a. slå   av   radio-en
        hit   off   radio-DEF.SG
        'turn off the radio'

   b. slå   av   en prat
        hit   off   a talk
        'have a chat'

   c. slå   av   på pris-en
        hit   off   on price-DEF.SG
        'give a discount'

(31) avslå

   a. av-slå   et tilbud
        off-hit   a offer
        'turn down an offer'

As (30) and (31) show, the phrasal and compounded versions of *slå av/avslå* have different interpretations. Importantly, it is necessary to list what the combination of *slå* and *av* means in both cases. The meaning of *slå+av* in (30a-c) is just as unpredictable as the meaning of *av+slå* in (31). That the interpretations in (31) are unpredictable can also be seen from the English translations, since English happens to use other verb-particle combinations to convey same meanings (*turn off, turn down,* cf. also *hit it off*). Now, if both (30) and (31) must be listed, and the reason the examples in (30) are realized in syntax but (31) is realized in morphology is that (31) is listed as morphological, then there is little reason to invoke competition in the first place. All that is needed is listing. This makes for a highly circular type of argumentation where morphological structures are morphological because they are listed as morphological, and syntactic structures are syntactic because they are listed not as morphological.

The idea that there is some general division of labor between higher and lower structural domains that yields blocking effects can still be correct, and it probably is. I would argue, however, that the authors do not offer a coherent proposal of how this might work.[113] As with the theories of Fabb and Anderson, then, one of the major problems is how predictable and unpredictable meanings can be paired with the distinction between syntax and morphology, once a connection is postulated.

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[113] See also De Belder and van Koppen (2016), who also point to problems with the notion of listedness in Ackema & Neeleman's analysis of AN-compounds in Dutch.

A rather different approach to these questions is proposed in Booij's (2009) analysis of compounds in construction morphology. Booij argues that compounds are morphological templates that are created as abstractions over existing compounds. These templates serve to specify the productive compounding rules. The following abstract template is proposed for Dutch endocentric compounds.[114]

(32)

$$
\begin{array}{c}
Y \text{———} [\alpha F] \\
\diagup \quad \diagdown \\
X \qquad Y_i \text{———} [\alpha F] \\
a \qquad b \qquad \text{'}Y_i \text{ with relation R to X'}
\end{array}
$$
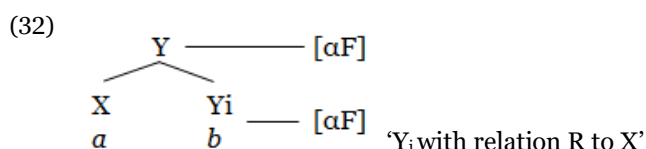
In (32), *a* and *b* are phonological variables, X and Y are abstract category labels, and αF refers to gender and declensions class features. The fact that the structure is endocentric is a stipulation on the template.

Templates like this are listed in a hierarchically organized lexicon, where the structure in (32) is the most general, highly abstract rule for Dutch endocentric compounds. It is connected to more specified templates, further down in the hierarchy, such as $[XN]_N$, $[XA]_A$, $[XV]_V$, and at the subsequent level $[NN]_N$, $[AN]_N$ and so on. At an even more specified level we find for example $[[hoofd]_N [b]_N]_N$ for the *hoofd-X* 'main-X' construction, and finally a fully specified compound $[[hoofd]_N [ingang]_N]_N$ 'main entrance' as a listed instantiation of this construction.

Thus, an abstract compound template coexists with more specific compound templates and fully specified compounds in the lexicon. The advantage of this organization is that it lists all the established compounds of a language and connects them to the compound rule by which they were created. The hierarchical lexicon also makes it possible to state that certain subclasses of templates are more restricted, without losing sight of higher-level commonalities.

The templates in the lexicon can also have what Booij terms 'embedded productivity'. This is what Booij proposes for Dutch synthetic compounds. According to Booij, NV-compounding in Dutch is only productive when embedded, so we find (33a) and (33b) but not (33c).

(33)
    a. $[brand_N$-$blus]_V$-$installatie_N$ 'fire extinguish installation'='fire extinguisher'
    b. $[brand_N$-$blus]_V$-er_N 'fire extinguisher'
    c. *$brand_N$-$blus_V$ 'to fire-extinguish'

---

[114] Booij uses bracketing notation, but I use a tree structure representation in (32) to facilitate comparison with the other analyses in this chapter.

The pattern in (33) can be accounted for by formulating complex templates such as $[[NV]_V \ N]_N$ and $[[NV]_V \ er]_N$ that are productive, despite the [NV]-template not being productive.[115]

Booij also considers some cases of Romance compounding. In languages like Italian and Spanish, compounding is generally left-headed. However, right-headed formations occur, as in Spanish *auto-escuela* 'car-school'='driving school'. Since right-headed compounding is restricted to *auto*-compounds and a few other classes, a general template like (32) would over-generate for these languages. *Auto*-compounds are nevertheless productive, and Booij therefore proposes that they are formed on the template in (34), which can be considered a constructional idiom.

(34) $[auto \ [x]_N]_N$ '$[x]_N$ with relation R to car'

Finally, for Romance exocentric VN-compounds such as *parte-lettere* 'carry letters'= 'post man', Booij proposes the template in (35).

(35) $[[a]_V \ [b]_{Nx}]_{Ny}$ 'entity that performs action V on N_x'

As already mentioned, so-called neo-constructionist theories combine the perspective of generative grammar with certain ideas from construction grammar, exemplified here with Booij's construction morphology. Specifically, both approaches assume abstract syntactic structures that are independent of the lexical elements with which they are paired. Furthermore, both frameworks assume that the abstract syntactic structures determine certain aspects of semantic interpretation. However, there are also important differences between the approaches. According to Borer (2005:14-15), neo-constructionist approaches generally do not assume language-specific constructions. Furthermore, they reject that the core of linguistic knowledge resides in a lexicon of learned constructions, and assume rather that our linguistic capacity is computational at its core. This computational and rule-governed behavior underlies the assembly of all linguistic structures, and as such, restricts the shape that an abstract structure might possibly take. In a sense then, generative approaches focus on structures at an even higher level of abstraction, which can be reduced to the operations of merge and move and a set of primitives.

Ackema & Neeleman (2004) and Booij (2009) are good examples of the types of compound analyses that we have seen in the last few decades. In recent years we have also

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[115] Booij derives complex templates by a procedure of template conflation (Booij 2009:213-214).

seen several special issues and anthologies on compounding. The *Italian Journal of Linguistics* has published a special issue titled *The morphology of compounding,* with descriptions of compounds in a range of European languages (Scalise 1992). Seventeen years later the same journal published another special issue titled *Compounds between syntax and the lexicon* (Gaeta & Grossmann 2009). The difference between the two titles can be taken to reflect the general development of compound research during this time. A special issue on linking elements has also been published (in *Morphology,* Szczepaniak & Kürschner 2013), as has a collection of papers on phrasal compounding (Trips & Kornfilt 2017).

Furthermore, we have seen the publication of *The Oxford Handbook of Compounding* (Lieber & Štekauer 2009), *Cross-disciplinary Issues in Compounding* (Scalise & Voegel 2010) and *The Semantics of Compounding* (ten Hacken 2016), all collecting chapters by different authors on a wide range of topics, approaches and languages.

One trend that stands out in recent research on compounds is the way linguists increasingly try to derive the properties of compounds from general properties of structure building (see e.g. Nóbrega & Miyagawa 2015). As a specific example, linking elements and the headedness of compounds have both been analyzed as a consequence of the general need for asymmetry in syntax (e.g. Josefsson 1998, Roeper et al. 2002, Di Sciullo 2005b, Mukai 2006, Delfitto et al. 2011). This is very much in line with the goals of the minimalist program, which are to minimize and streamline theoretical assumptions and constructs as much as possible (Chomsky 1995).

As research on compounding becomes more specialized, studies also draw attention to finer details in the structure of compounds, such as whether non-heads are categorized as belonging to a word-class (Holmberg 1992, Josefsson 1998, De Belder 2017), what determines the (im)possibility of recursion in compounds in different languages (Roeper & Snyder 2005, Mukai 2013), and the properties of proper names in compounds (Bobaljik 2003, Koptjevskaja-Tamm 2009).

Finally, an important development in recent research on compounds is the extensive use of corpora, for example to test specific claims that have been made about possible and impossible compounds. This has revealed that many of the hard restrictions on compounds proposed in the 70s and 80s, concerning synthetic compounds for example, are rather tendencies. I return to this issue in Chapter 5. Lieber (2016) and Bauer et al. (2013) are among the important contributions on this point.

3.2.6 Interim conclusion

In the overview in Section 3.2, many theories and approaches to compounding, both within and outside the generative framework, have not been mentioned. We have nevertheless seen enough to make some general observations about the place of compounding in grammatical architectures. Word-formation in general, and compounding in particular, was treated as separate from syntax in the 19th century Germanic grammars and in historical-comparative grammar. In structuralist schools, the role of word-formation and the distinction between word-formation and phrase-formation was weakened, and in early transformational grammar, as exemplified by Lees (1960), compounds were treated in the transformational component and directly related to sentences. With the introduction of the generative lexicon, and what Giegerich (2009) describes as "the reinstatement of the word", compounding again became a part of a specific word-formation component, although to different degrees by different authors. As it has gradually become clear that word-formation and phrase-formation must nevertheless be allowed to interact, the formulations of the once-strong lexicalist hypothesis have been weakened. Today, the most reductivist minds argue for a fully syntactic, non-lexicalist approach to word-formation. I turn to such analyses next.

3.3 Syntactic analyses of compounds

In this section, I review proposals that analyze compounds by use of syntactic principles. Not all of the analyses that I reviewed here are what Spencer (2005) classifies as 'radically syntactic', however.

In addition to the distinctions between strong and weak lexicalism, and between lexicalist and non-lexicalist approaches, another relevant distinction is that of word-syntax versus radical word-syntax. Spencer (2005) uses the term *word-syntax* to describe approaches that assume similar principles in both syntax and morphology, without however claiming that syntax and morphology must be one and the same thing. Many of the lexicalist approaches mentioned in the previous section are word-syntax approaches, among them Lieber (1980), Fabb (1984), Di Sciullo & William (1987) and Ackema & Neeleman (2004). Spencer uses the term *radically syntactic* to describe approaches according to which words and phrases are built in the same way because syntax and morphology are reduced to a single component with a single set of principles.

In the current section, I review groups of radically syntactic analyses of compounding, including Lieber (1992), Josefsson (1998), Harley (2009a) and Delfitto et al. (2011). In

addition, I review some lexicalist word-syntax accounts that formulate specific hypotheses about the internal structure of compounds, and as such, constitute relevant hypotheses for my analysis of compounding in Norwegian. These analyses have in common that they can be carried over to a radically syntactic approach, and include Selkirk (1982), Johannessen (2001) and Di Sciullo (2005b, 2009).

Taken together, the analyses reviewed in this section cover most of the options that are logically available for the internal structure of compounds, given a syntactic approach to word-formation. They all consider compounding in a Germanic language, and my own analysis in Chapter 4 will build on insights from these studies. In this section, I will focus in particular on the following aspects of the analyses.

(36)
    a. The configuration in which the elements of compounds are combined
    b. The analysis of headedness in compounds
    c. The analysis of linking elements in compounds

My main concern in this section is with primary compounds, and proposals about the structure of synthetic compounds are only considered when relevant for the general structure of compounds (on synthetic compounds see Chapter 5). For each analysis that I review, I discuss how it would fare faced with Norwegian data, thus determining whether it is a possible candidate for my analysis in Chapter 4.

3.3.1 Combining heads: Selkirk (1982)

In her (1982) *The Syntax of Words,* Selkirk proposes a lexicalist analysis of English compounds. Even though this is not a radically syntactic approach to word-formation, the title alone indicates that it is worth some further consideration.

Selkirk (1982) argues that the grammar of English compounds is composed of context-free rewrite rules. The rewrite rules combine two syntactic heads, which in Selkirk's framework are words, and she proposes that the following rewrite rules can generate all and only the possible English compounds.

(37)

$$N \rightarrow \begin{Bmatrix} N \\ A \\ V \\ P \end{Bmatrix} N \qquad A \rightarrow \begin{Bmatrix} N \\ A \\ P \end{Bmatrix} A \qquad V \rightarrow P \quad V$$

Since the rules in (37) are recursive, they can also generate more complex compounds, such as *bathroom towel rack designer* (Selkrik 1982:15). In syntactic tree representations, the rules generate structures like the following.

(38)

```
        N [+ plur]                        V [+ past]
       /        \                        /        \
      N        N [+ plur]               P        V [+ past]
      |          |                      |          |
    apron      strings                 out       lived
```
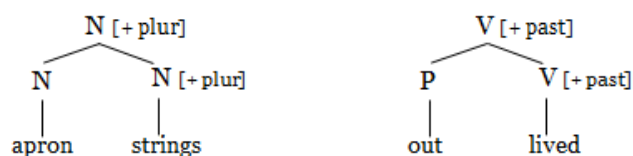
Selkirk briefly considers a more general rule for compounding of the form X → Y X, but rejects it. It is necessary to encode the possible category combinations as part of the rule, she argues, because there are systematic gaps in the categories that can make up a compound. The more general rule X → Y X would wrongly generate compounds with the structures NV and AV. Although such compounds do occur in English, as in *to window-shop* and *to whitewash,* Selkirk follows Marchand (1969) in the claim that these are backformations, and therefore outside the scope of her theory.

In order to account for headedness in compounds, Selkirk formulates a modified Right-hand Head Rule (Williams 1981).

(39) *Williams' Right-hand Head Rule:* In morphology we define the head of a morphologically complex word to be the right-hand member of that word

(40) *Selkirk's Right-hand Head Rule (revised):* In a word-internal configuration,

```
        X^n
       /|\
      / ↑ \
     P  X^m  Q
```
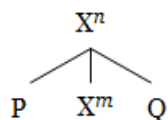
Where X stands for a syntactic feature complex and where Q contains no category with the feature complex X, X^m is the head of X^n.

In other words, the grammar of compounds identifies as the head "the rightmost category with the same feature complex as the parent". This allows Selkirk to have a common rule for right-headed compounds like *apron string* and verb-particle sequences like *grow up,* which Selkirk considers to be left-headed compounds.

The Right-hand Head Rule is specific to morphology. Selkirk points to two reasons why the ordinary syntactic definition of heads cannot be extended to compounds. First, the head of a phrase has the same category as the parent node, and second, the head has one bar-level less than the parent node (Selkirk 1982:19). However, in compounds, the two members are of

the same level as the parent node. That is, a compound is a word composed of two words. Furthermore, the two members of a compound may be of the same category as the parent node, as in [towel_N rack_N]_N, which means that both members would be equally qualified as the head.

Assessment of Selkirk (1982)

In Selkirk's approach to compounds, compounding simply involves taking two words and combining them into one, followed by the application of a general rule that identifies one of the words as the head. Based on the description of Norwegian compounds in Chapter 2, it seems, however, that compounds are not that simple. Thus, if we were to apply this analysis to Norwegian, certain modifications would have to be made, in addition to translating the analysis into current syntactic theory.

First, left-hand members of compounds in Norwegian often take linking elements. That means that they are not words, but something else.

Second, left-hand members in both Norwegian and English can be full phrases. In order to capture this, we would have to add left-hand members such as CP and DP to the rewrite rules. While it would be tempting to generalize the category of the left-hand member to XP, a third issue is that overt adjectival and verbal suffixes are strongly dispreferred in both languages. Thus, just like English dislikes *a nominal-ize_V-process*, Norwegian dislikes the corresponding *ein nominalis-ere_V-prosess,* and both languages must instead nominalize the left-hand member to create *a nominalization process*. In other words, the rewrite rules in (37) are both too strict and too general.[116]

3.3.2 A general X-bar approach: Lieber (1992)

Lieber (1992) argues that it is possible to combine the modules of morphology and syntax into a single module with a completely uniform set of principles. She motivates such a

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[116] We may also note that the same challenges apply to two recent, radically syntactic analyses by Borer (2013) and De Belder (2017). Like Selkirk, they argue that primary compounding involves the direct combination of two heads, in these analyses, two roots. De Belder derives root-root compounds in Dutch by a post-syntactic fission procedure. Borer derives root-root compounds in English by merging the two roots directly, before incorporating one root into the other (see De Belder 2017 for an exposition of both proposals). In Norwegian, only a small subset of compounds could credibly be analyzed as root-root compounds. Thus, without going into the details of these analyses, the problem I foresee is that we would have to postulate radically different compound processes in order to generate otherwise similar compounds.

theory by considering phenomena that are problematic for a strong lexicalist hypothesis, including the ones in (41) and (42).

(41)   Phrasal compounds (Lieber 1992:11-12)
    a. [Charles en Di] sindroom   *Afrikaans*
        'Charles and Di syndrome'

    b. [lach of ik schiet] humor   *Dutch*
        'laugh or I shoot humor'

    c. a [slept all day] look   *English*

    d. die [Rund-um-die-Uhr]-Rennen   *German*
        'the round the clock racing'

(42) English possessive -s (Lieber 1992:14)
    a. [a friend of mine]'s book
    b. [a man I know]'s hat

The examples above allow syntactic phrases as the input to morphological processes, which indicates a larger degree of interaction between the two components than previously assumed. Lieber makes the argument that the simplest type of theory that can account for this is one that does not distinguish between a morphological and syntactic component at all.

Lieber then develops a theory where exactly the same X-bar principles apply to all levels of structure building, both above and below the word-level. First, she argues that each language has to set three different parameters for X-bar templates. The parameters are set only once for each language and apply at all levels of analysis.

(43) Licensing Conditions (Lieber 1992:35)
    a. Heads are initial/final with respect to complements and adjuncts
      i. Theta-roles are assigned to the left/right
      ii. Case is assigned to the left/right
    b. Heads are initial/final with respect to specifiers
    c. Heads are initial/final with respect to modifiers

Thus, the ordering of *head, complement, specifier* and *modifier* is the same within words and outside of words in a given language. For English, the following conditions are specified.

(44)
    a. Heads are initial with respect to complements
    b. Heads are final with respect to specifiers
    c. Heads are final with respect to modifiers

Furthermore, Lieber proposes some crucial changes to the X-bar template in order to accommodate both word-building and phrase-building. Most importantly, she proposes a modified notion of *head* where the head of a structure does not have to be one bar level less than the category that dominates it. Rather, the head can be of the same level as the phrase. Recall that the issue of bar-levels was also why Selkirk (1982) proposed different definitions of heads for morphology and syntax. Lieber instead proposes to change the X-bar template from (45a) to (b), making the head recursive.

(45)
    a. $X^n \rightarrow \ldots X^{\{n-1, n\}} \ldots$
    b. $X^n \rightarrow \ldots X^{\{n-1\}} \ldots$, where recursion is allowed for n = 0

Lieber also modifies the claim by Stowell (1981) and Baker (1988), among others, that elements that are not heads must be maximal projections. Instead, she follows Emonds (1985) and Baltin (1989) in stating that non-heads can be non-maximal.

With these modifications in place, Lieber can now generate the following structures for a language with the parameter settings of English (Lieber 1992:54-61).

(46)
    a. *head + comp* b. *head + comp*[117] c. *spec/mod + head* d. *spec/mod + head*
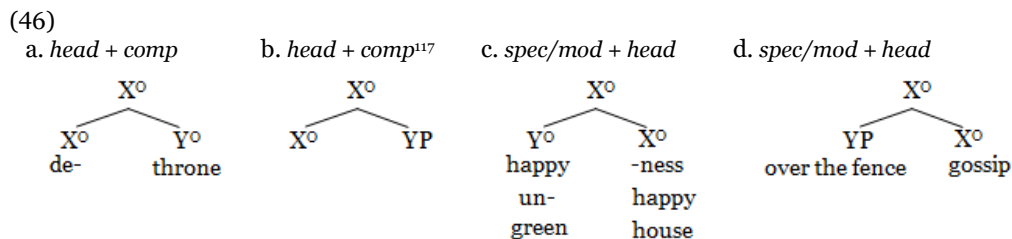
Heads can be affixes or roots/stems. Complements are internal arguments. Modifiers are elements that restrict the reference of the head, typically left-hand members of compounds. Specifiers can be prefixes or some roots/stems (as well as quantifiers and subjects). Thus, for the study of compounds, the relevant structures are (46c) and (d). The former is the structure of root compounds (or primary compounds in my terminology); the latter is the structure of phrasal compounds.

Synthetic compounds do not immediately fit into the structures in (46), according to Lieber. A synthetic compound such as *thirst-quencher* appears to have its internal argument, in other words its complement, to the left, not to the right as predicted by (44).

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[117] As far as I can tell, Lieber does not give examples of this structure in English.

Lieber therefore derives synthetic compounds by head-moving the complement to the left, as illustrated in (47).[118]

(47)
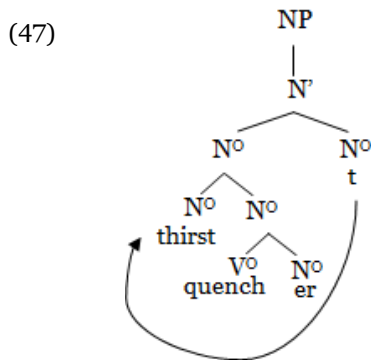
Assessment of Lieber (1992)

Lieber does not consider languages with linking elements in her analyses of compounds. However, such compounds could probably be accommodated by (46c) in her theory, given the recursive nature of heads and assuming for example that linking elements are affixes. Therefore, problems with Lieber's proposal would not concern Norwegian specifically, but rather revolve around theory-internal issues.

The most problematic aspect of Lieber's theory, pointed out also by Lieber (2015:106), is the challenge of classifying word-internal elements as *specifiers, complements* or *modifiers*. For example, while admitting that this is difficult to determine, Lieber (1992) proposes that *happy* in *happiness* is probably a specifier, not a modifier, since *happy* cannot be said to modify *–ness*. However, such differences do not fall out from the structural configuration itself. Furthermore, as Stump (1993) points out in his review of Lieber's book, the classification of *happy* as a specifier entails that a suffix such as *–ness* is subcategorized for its specifier, a property not otherwise known in syntax. This undermines the project of formulating a common component for syntax and morphology in the first place.

Lieber's enterprise of developing a single component for word-building and phrase-building continues in current decompositional frameworks such as Distributed Morphology and Exoskeletal Syntax. In these theories, X-bar templates have been replaced by Bare Phrase Structure. Furthermore, issues of linearization and the order of heads and complements are treated as secondary, but are often resolved by head-

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[118] Before movement, the complement is not inside the word. Movement is necessary so as not to violate the Visibility Condition (Lieber 1992:60).

movement. In these theories, *happy* would typically be considered a complement, or perhaps an adjunct, of *–ness* (cf. discussion by Alexiadou & Lohndal 2017b).

However, as we will see shortly in Sections 3.3.4 and 3.3.5, the issues of defining heads and labels are still debated. According to one common view, it is not possible to merge two heads, as in (46c), as that would create a symmetrical structure where both constituents could potentially determine the label of the parent node. Before turning to such issues, I will consider two other proposals that assume templates of specifiers and complements inside words.

3.3.3 Linker Phrase: Johannessen (2001), Di Sciullo (2005b, 2009)

Johannessen (2001) and Di Sciullo (2005b, 2009) make similar proposals concerning the structure of compounds. In both proposals, the head of the compound is the linking element, which takes the two members of the compound as its specifier and complement. However, the structures they propose are mirror images of one other.

(48) a. Johannessen (2001)   b. Di Sciullo (2005b, 2009)
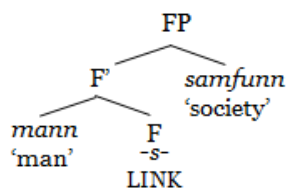
Norwegian: *mann-s-samfunn* 'man's society'   Greek: *pag-o-vuno* 'iceberg'
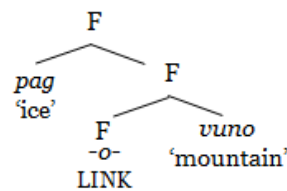
In Johannessen's structure, the left-hand member is the complement and the right-hand member is the specifier. In Di Sciullo's structure, the left-hand member is the specifier and the right-hand member is the complement. I present each proposal in turn, beginning with the latter.

Di Scuillo (2005b, 2009)

Di Sciullo's analysis of compounds is couched in her asymmetry theory (Di Sciullo 2005a, cf. also Kayne 1994, Moro 2000). It is a lexicalist theory in that she views syntax and morphology as separate, autonomous domains. It is a word-syntax approach in that many of the same principles are nevertheless at play in both domains.

For Di Sciullo, the most important difference between syntax and morphology is that morphology is strictly asymmetrical. Morphemes cannot be concatenated directly as this would result in symmetric structures. Instead, they are combined in minimal trees

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composed of a head, a specifier and a complement. Minimal trees embed minimal trees, thus creating what Di Sciullo calls M-shells, and she proposes that the compound *blackboard* has the M-shell structure in (49a). (49b) is a simplified version of the same structure.

(49) a.   b.

```
        F                                    F
      /   \                                /   \
  black    \                           black    \
          /  \                                 /   \
         F    Root                            F    board
             /   \
           Root
           board
```
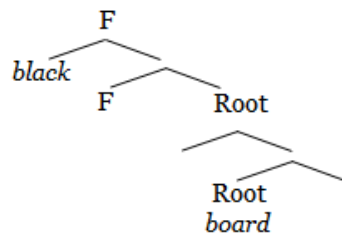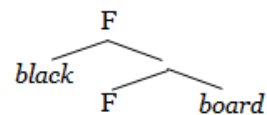
Di Sciullo (2005b:4-5, 2009:152-153) takes the existence of linking elements (50) and conjunctions in certain coordinative compounds (51) as evidence for a functional head in compounds.

(50) Linking elements
   a. pag-o-vuno   *Greek*   b. vin-o-delie   *Russian*
      ice-LINK-mountain   wine-LINK-making
      'ice-berg'   'wine producing'

(51) Conjunction in coordinative compounds
   a. bed-and-breakfast
   b. hit-and-run
   c. truth-or-dare

She also considers linking elements in Germanic languages as evidence for a functional head in compounds (Di Sciullo 2009:153). The functional head comes in different flavors. In coordinative compounds, it is AND or OR. In a primary compound like (50a), the head has the flavor SORT (Di Sciullo 2005b:4). Other heads are WITH, as in *vodka soda*, TO as in Montreal-Boston train, and IN, as in Tucson Arizona (Di Sciullo 2009b:152).

Left-hand members of root compounds are modifiers semantically, and are therefore assumed to be specifiers, as in (49) above. Left-hand members of synthetic compounds, on the other hand, are arguments, and are therefore assumed to be complements. Roots and suffixes are typically heads. Compare thus the primary compound in (49) above to the synthetic compound *chess player* in (52a).

(52)

a. F

-er V

V N
play

N
chess

M-Flip
→

b. F

V -er

N V
play

N
chess
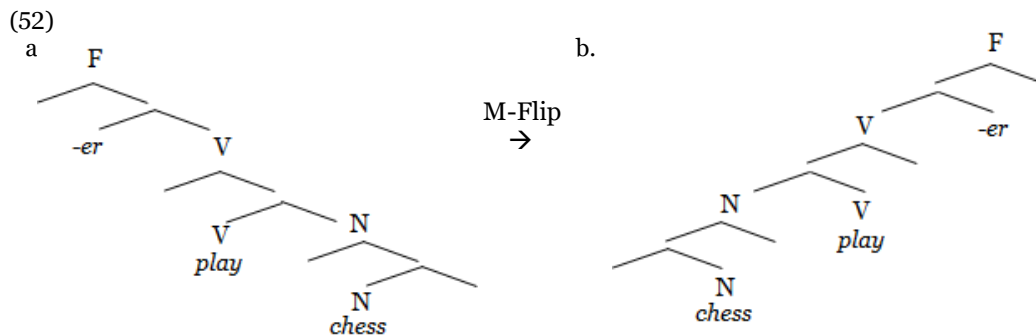
In order to obtain the correct linearization, Di Sciullo has an operation called M-Flip. M-Flip creates a mirror image of the minimal trees it applies to. In synthetic compounds, it applies to the whole structure, turning (52a) into (52b). In primary compounds, on the other hand, it applies only to the lower part of the tree, as in (53). The reason for this is that M-Flip does not apply when the specifier of a minimal tree is filled with PF-features.

(53)

a. F

black F

F Root

Root
board

M-Flip
→

b. F

black F

F Root

Root
board
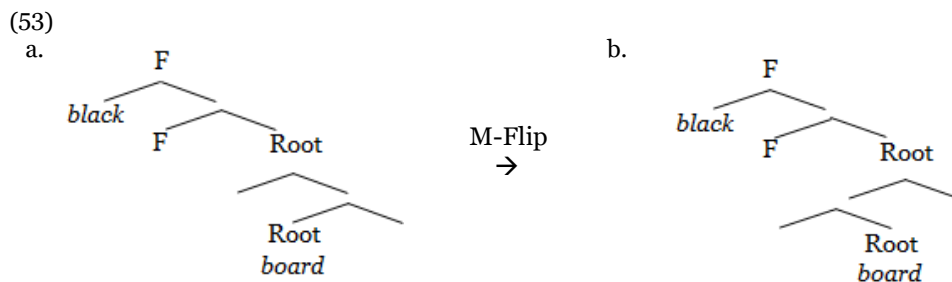
Assessment of Di Sciullo (2005b, 2009)

From the perspective of Norwegian, the main problem with Di Sciullo's account of compounds is the analysis of linking elements. In primary compounds, Di Sciullo analyses the linker as forming a constituent with the right-hand member. However, in Norwegian and the other Germanic languages, which she explicitly refers to, it is clear that linking elements form a constituent with the left-hand member. Recall the pattern in (54) where the linking element stays with the left-hand member in coordination, as well as the other arguments presented in Chapter 2.

(54) a. katt-e   og   hund-e-mat
         cat-LINK   and dog-LINK-food
         'cat and dog food' (i.e. cat food and dog food)

      b. katt-e   og   hund-e-trening
         cat-LINK   and dog-LINK-training
         'cat and dog training' (i.e. training of cats and training of dogs)

Furthermore, it is not clear where Di Sciullo would fit the linker in synthetic compounds. As shown in (54), the behavior of linking elements is exactly the same in primary compounds and synthetic compounds. However, the structure of the synthetic compound in (52) has no F-head that could accommodate linking elements. Based on these observations, it is not possible to adopt Di Sciullo's analysis for compounds in Norwegian.

A more general problem with Di Sciullo's analysis concerns the semantic flavor of the functional heads in compounds. Once we begin to list possible semantic relations in primary compounds, we are forced to make a decision about exactly how many different relations can exist. The problem with this approach is that the number of possible interpretations appears to be infinite and determined by context and world-knowledge. This has led many linguists to give up the enterprise of listing possible relations in compounds and rather assume a pragmatically determined Variable R (see Spencer 2011).

Scher & Nóbrega (2015) adopt Di Sciullo's structure for the analysis of neoclassical compounds, such as *neur-o-psic-ó-logo* 'neuropsychologist', in Brazilian Portuguese. Unlike Di Sciullo, however, they argue that the linking element is not a realization of the F-head. The F-head has a semantic contribution, but no phonological exponent. The reason for this is that the linking element in neoclassical compounds is always the same, whereas the semantic flavors in such compounds can be different. If the linking element were an exponent of F, we would expect different phonological exponents for different F-heads, they argue. Therefore, they propose that the various F-heads are always realized as Ø in neoclassical compounds, and linking elements are purely phonological. Note however, that if the F-head is never overtly realized, this further weakens Di Sciullo's proposal.

Johannessen (2001)

The topic of Johannessen's paper is the morphological size of compound components. Johannessen asks whether compounds in Norwegian are composed of words or stems, and argues for the latter option. I reviewed some of this discussion in Section 3.1.5 of this chapter. Here, I concentrate on the structural analysis that Johannessen sketches for Norwegian compounds. Johannessen proposes that the left-hand member of a compound is a complement and the right-hand member is a specifier, as illustrated in (48a), repeated as (55). The compound's formal head is the linking element.

(55)

```
                    FP
              ┌─────────┐
             F'        samfunn
          ┌──────┐     'society'
        mann     F
        'man'   -s-
               LINK
```
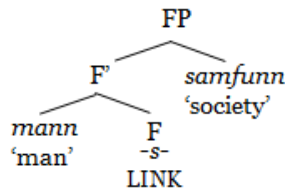
If compounds are composed of stems, that is, uninflected forms, then it follows that the compound is inflected by adding inflection to the compound as a whole (and not just to the right-hand member, as proposed by e.g. Theil 2016).

(56)

```
                        word
              ┌──────────────────┐
       compound stem            infl
          LINK
        ┌──────┐
      LINK     stem ─┐ Spec-head
    ┌──────┐         │ agreement
  stem    LINK ◄─────┘
```
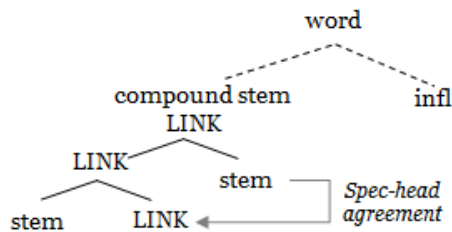
Therefore, before inflection is added the whole compound is a stem. Linking elements are argued to serve the function of creating compound stems, and in doing so give rise to the formal property that percolates up the tree and justifies treating the linking element as the head of the structure.

As we have seen, however, compounds in Norwegian are generally thought to be right-headed in the sense that the right-hand member determines the formal and semantic properties of the compound. Johannessen proposes that this is so because features of the right-hand member are transferred to the formal head, i.e. the linking element, via specifier-head agreement, thus accounting for the general descriptive right-headedness of Norwegian compounds. In compounds where that is not the case, however, typically in lexicalized compounds such as [*brenn-e-vin*N.MASC]N.FEM 'burn wine'='liquor', this fails to apply because the features of the specifier are more vulnerable to lexicalization than those of the formal head, which simply signals compound-hood.

Johannessen does not discuss her analysis with respect to the distinction between lexicalist and non-lexicalist approaches to word-formation.

Assessment of Johannessen 2001

Johannessen, unlike Di Sciullo, correctly predicts that the linking element forms a constituent with the left-hand member. However, Johannessen does not elaborate on the

fact that specifiers are now to the right, unlike in phrase-building in Norwegian where specifiers are to the left. Nor does she provide independent criteria to determine whether a word-internal element is a complement or a specifier. Given Johannessen's structure, the left-hand member of a compound, which typically acts as a modifier, is now a complement. Semantically, this is somewhat unexpected. Thus, if we were to adopt Johannessen's analysis for Norwegian, these are all notions that would have to be further developed, and as we saw from Lieber's (1992) analysis, that may turn out to be difficult.

Thus, while Johannessen's analysis is interesting and captures many of the relevant facts, it is not the analysis I will opt for in my proposal for the structure of Norwegian compounds. Rather, I argue for what I consider a simpler analysis, namely that compounding is adjunction. I turn to some previous analyses of compounding as adjunction in the next section.

3.3.4 Linker-induced asymmetry: Delfitto et al. (2011), Josefsson (1998)

Delfitto et al. (2011) and Josefsson (1998) both begin by considering a simple compound structure where the syntax combines the left-hand and right-hand members directly into a symmetrical structure. However, they reject such an analysis because of a general requirement for asymmetry in syntax (Kayne 1994, Moro 2000). As a solution, they propose that linking elements introduce the necessary asymmetry. I present and comment on each of these analyses in turn.

Delfitto et al. (2011)

Delfitto et al. propose that compounds start out as symmetrical structures. Two elements of the same morphological size, in their discussion two nPs, are combined by parallel merge. This creates a point of symmetry, marked by the question mark in the structure below.

(57)
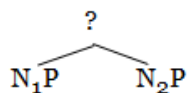
A symmetrical structure like this faces a labeling problem since neither constituent can determine the label of the structure. That is, it is not clear from the configuration in (57) which of the two compound members is the formal head that projects its label to the whole constituent. The authors follow the view that projection is only possible when a syntactic head (a simple object, a terminal node) combines with a non-head (a complex

object, not a terminal node) (Kayne 1994). In the structure in (57), however, both components are equally complex, which means that the structure is symmetrical, and a label cannot be determined.

The symmetrical structure in (57) needs to be rescued somehow, so that a label can be given and the structure can become interpretable at the interfaces. The authors propose, following and modifying Moro (2000), that the structure is rescued by moving one of the nPs out of the constituent. The element that triggers this movement is a functional head added on top of the symmetrical structure, as in (58).

(58)

```
         FP
        /  \
       F    PoS
            /  \
          N₁P   N₂P
```
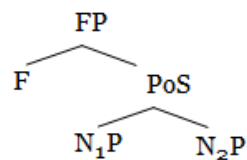
For Germanic languages, the authors argue that the relevant feature on the F-head,which causes one of the nPs to move is an uninterpretable but valued gender feature (Pesetsky & Torrego 2007). It attracts the nP with the corresponding interpretable but unvalued gender feature, and causes that nP to move and adjoin to FP. They exemplify this with the German compound *Hund-e-futter* 'dog food', in (59).

(59)

```
            FP
           /  \
         N₁P   FP
              /  \
             F    PoS
            -e-   /  \
      [u Gender]N₁P  N₂P
            Hund    Futter
          [i Gender]
```
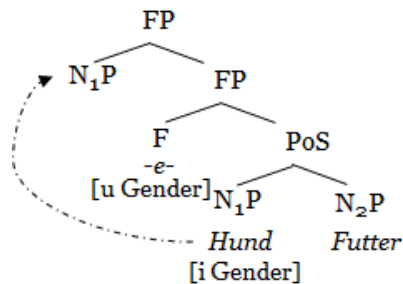
In this example, the nPs *Hund* and *Futter* are merged and a Point of Symmetry (PoS) is created. In order to rescue the structure, an F-head is merged on top of the PoS. The F-head, which is realized by the linking element *e,* has an unvalued gender feature, causing the nP *Hund* to move and adjoin to FP. *Hund-e* thus becomes the left-hand member of the compound, and the remaining nP becomes the right-hand member of the compound, interpreted as the semantic head (i.e. that element which is a hypernym of the compound as a whole, cf. Chapter 2.1). In other words, the formal head of a

compound in Germanic is the linking element. The semantic head of the compound is the right-hand member, identified purely on the basis of the structural configuration. The result is a well-formed asymmetrical compound structure.

A crucial step for this analysis is the hypothesized connection between declension, linkers and gender. This argument has three important components. First, the authors claim that linking elements are really markers of declension. The F-head is a declension-head. They refer to work on German showing that left-hand elements of different declensions take different linking elements, such that the choice of linking element is determined by the declension of the left-hand member (Montgomery 2001).

Second, they connect declension to gender. Declension is not an active feature in syntax, which is why, for example, it does not participate in agreement. Yet, as we have seen, the F-head does play an active role in syntax. The authors solve this by pointing to the observation that in Germanic, there is some overlap between declension and gender, and unlike declension, gender *is* an active feature in syntax. Therefore, they claim, it is possible that the feature on the F-head which makes one of the elements of the compound move is a gender feature.

The third component of the argument concerns the exponent of F. Although F is a declension-head (with a gender feature), declension does not have its own morphological exponent according to Delfitto et al. Therefore, a random exponent for the F-head is chosen by searching the morphological paradigm of the left-hand member and picking a phonological sequence that occurs some other place in the paradigm of that element. For example, a common linking element in German is –*en,* which is homophonous with the plural ending –*en.* This exponent does not have any plural semantics when used as a linking element. Rather, this exponent happened to be picked out from the paradigm of the left-hand member because F does not have its own exponent.

These three steps explain what the F-head is (a declension head), what causes one of the elements to move (a gender feature on the F-head), and how the exponent of F is chosen (a random exponent from the inflectional paradigm of the left-hand member).

Delfitto et al. go on to compare compounding in Germanic, where the semantic relationship between left-hand and right-hand members is very free, to compounding in Romance, where this semantic relationship is much more constrained. The authors propose that this is due to differences in the properties of the F-head, related also to the independence of declension class and gender in Romance.

Assessment of Delfitto et al. (2011)

The connection between linkers, declension and gender is a crucial component of Delfitto et al.'s analysis. If we are to adopt their analysis for Norwegian, this connection must hold in Norwegian as well. I argue that it does not.

First, in order for the derivation to be successful, the choice of linking element must be predictable from the declension of the non-head. The linking element is a realization of F, which is argued to be a declension head.

In Norwegian, linking elements are only partly predictable from declension. This was shown in Section 2.2.3 of the previous chapter (see also Aasen 1864 and Iversen 1924). To see this, consider the forms *gard* 'farm' and *hund* 'dog', which have exactly the same declension properties in Norwegian and are only distinguished by the choice of linking element.

(60) a.

gard 'farm'	
INDEF.SG	*ein gard*
DEF.SG	*gard-en*
INDEF. PL	*gard-ar*
DEF. PL	*gard-ane*
COMPOUND	*gard-s*

b.

hund 'dog'	
INDEF.SG	*ein hund*
DEF.SG	*hund-en*
INDEF. PL	*hund-ar*
DEF. PL	*hund-ane*
COMPOUND	*hund-e*

In this case, the only way to state that the linking element is predictable from the declension class is to formulate new declension classes based only on the choice of linking element. That would be a highly circular and stipulative move.[119]

Another problem with adopting Delfitto et al.'s analysis for Norwegian is the claim that the linking element is picked randomly from the inflectional paradigm of the left-hand member. In Norwegian, the linking element is not always found in the paradigm of the left-hand member. Consider for example the noun *mus* 'mouse' in the Kristiansand dialect.

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[119] In this regard, the challenge of adopting Delfitto et al.'s account of German for Norwegian (although they claim explicitly that it can be done) is that most dialects of Norwegian no longer have case-marking, except on some pronouns. Therefore, the paradigms of Norwegian nouns are smaller than those of German nouns, so there is less data on which basis we can postulate different declension classes. In other words, German has more declension classes than Norwegian, which makes it possible to formulate more generalizations from declension classes to linker realizations.

(61)

mus 'mouse'	
INDEF.SG	*ei mus*
DEF.SG	*mus-a*
INDEF. PL	*mus*
DEF. PL	*mus-an*
POSSESSIVE	*mus-a-s*
COMPOUND	*mus-e*

(61) shows that the linking element *–e-* is nowhere to be found in the inflectional paradigm of *mus*. Therefore, the linking element cannot be a randomly selected inflectional exponent.[120]

Delfitto et al. also face the same problem as Di Sciullo (2005b, 2009) concerning the constituency of the linking element. Although they postulate a tight connection between the linking element and the left-hand member of a compound, the linker still forms a constituent with the right-hand member. This at least requires further justification. Furthermore, Delfitto et al. do not make proposals for compounds with verbal or adjectival left-hand members. In such cases, a gender feature on the F-head would not cause the non-heads to move, so we would need to find some other relevant feature to derive the asymmetric structure.

Josefsson (1998)

Josefsson proposes that compounds in Swedish are adjunction structures in which the left-hand member is adjoined to the right-hand member, more specifically to the category-node of the right-hand member, as in (62a).

---

[120] As noted in Chapter 2, linking elements are historically derived from inflectional markers, which explains why there is some overlap. In fact, it would be very surprising if the historical connection were not partially reflected in present day exponents (in both Norwegian and German). However, that does not mean that there is a synchronic connection between linking elements and exponents of inflection, which is what Delfitto et al. propose.

(62)

a.　　　　　　　　　　　　　　　　　　b.
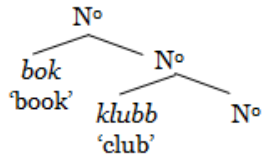
```
        N°                                    ?
       /  \                                  /  \
   bok    N°                             bok     klubb
  'book' /  \                           'book'   'club'
     klubb   N°
     'club'
```
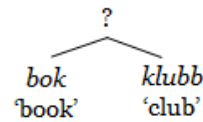
Josefsson briefly considers a symmetrical structure like (62b) but ultimately rejects it. Following Kayne (1994), she assumes that all structures must be asymmetrical in order to determine which of the elements is the head.

An important assumption in Josefsson's analysis is that lexical elements do not have a category inherently. Rather, they are categorized by inflectional elements, here represented by N, which contain features for number and definiteness. In the compound in (62a), the right-hand member *klubb* 'club' is turned into a noun by the inflectional properties of N, but the left-hand member *bok* 'book' remains an uncategorized stem.

One of the arguments for treating left-hand members of compounds as uncategorized is that it is often difficult to determine the category of a left-hand member. As we saw in Chapter 2, left-hand members of compounds are generally not inflected. Thus, in a Swedish compound like *res-väska* 'trip/travel bag', the left-hand member could equally well be the noun *resa* 'trip' or the verb *resa* 'travel' (Josefsson 1998:25).[121]

The assumption that left-hand members are uncategorized is important for the analysis of compounds with complex left-hand members. If left-hand members are bare stems without any inflection or category, how do we introduce the necessary asymmetry in compounds of the type [XX]X? Consider the preliminary structure for [*barn bok-s*] *klubb*] 'children's book club'='club for children's books' in (63).

(63)

```
             N°
            /  \
           /    N°
          /    /  \
         /    /    \
      /  \  klubb   N°
   barn  bok 'club'
  'child' 'book'
```
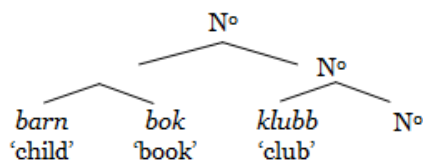
The question here is how to introduce asymmetry in the constituent *barnbok* when left-hand members cannot be inflected. Josefsson proposes that this is where the linking

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[121] I discuss arguments like these and the nature and size of left-hand members in Section 4.5.

element comes in. The purpose of the linking element is to create the necessary asymmetry in complex compounds, as in (64).

(64)
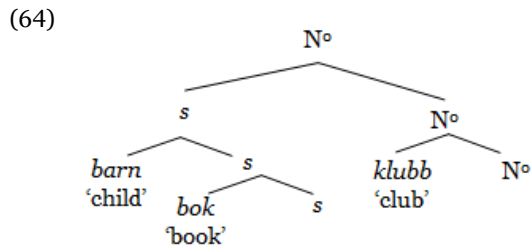
The need for asymmetry explains why linking elements in Swedish are obligatory (with the exception of certain phonetic environments) when the left-hand member of a compound is itself a compound (Josefsson 1998:186). The linking element is what Josefsson refers to as a dummy inflectional element, without any semantic content or grammatical features in need of checking. It is only required for asymmetry.

When the left-hand member is morphologically simple, a linking element is not strictly required since the structure is already asymmetrical (cf. 62a). Thus, Josefsson argues for a systematic distinction between linking elements in simple compounds and linking elements in complex compounds, where only the linker in complex compounds is 'syntactically visible' (Josefsson 1998:64). She motivates this distinction by pointing to several differences between the two types of linking elements.

The first difference between the linker in simple and complex compounds is that the one in simple compounds is more 'lexical-like' in that it may be associated with a specialized meaning. An example of this is *moder* 'mother', which can take either the form in (64) or (65) in simple compounds.

(64)
a. moder-fartyg
   mother-vessel
   'mother ship'

b. moder-nod
   mother-node
   'mother node'

(65)
a. moder-s-mjölk
   mother-LINK-milk
   'mother's milk'

b. moder-s-lycka
   mother-LINK-happiness
   'joy of motherhood'

According to Josefsson, the form *moder-* without a linker in (64) is used in a metaphorical, non-human sense. The form *moders-* with an s-linker is used to denote human motherhood. Josefsson argues that although the linker does not itself have semantic content, the combination of a stem and a linker may become associated with a

special meaning. This type of semantic alternation is not found with complex left-hand members, where the presence or absence of a linking element does not correlate with special meanings. Josefsson therefore concludes that the linkers in simple and complex compounds are grammatically different (Josefsson 1998:64).

The second difference between the simple and complex linkers is their influence on the phonology of the left-hand member. When an *s*-linker is added to a simple left-hand member with a long vowel, this vowel is shortened. This is shown in (66a). When an *s*-linker is added to a complex non-head, on the other hand, it has no effect on the vowel length. This is shown in (66b), with examples from Swedish.

(66) Free form: *skog* /sku:g/ 'forest'
   a. Simple left-hand member: /skuks/   e.g. *skog-s-troll*
                                             'forest troll'

   b. Complex compound: /sku:ks/   e.g. *[bok-skog-s]-plantering*
                                             'beech forest troll'

Since the addition of an *s*-linker has different effects on simple and complex left-hand members, Josefsson argues that there are really two different *s*-linkers.

The third difference between the linking elements in simple and complex compounds is the linker's sensitivity to the declension class of the left-hand member. According to Josefsson, there is some sensitivity to declension class in simple compounds. For example, in Swedish, only strong nouns take an *s*-linker in simple compounds, exemplified in (67), with examples from Josefsson. In complex compounds, on the other hand, both weak and strong nouns take an *s*-linker, as in (68).

(67) a. flick-bok   *weak*, cf. *flick-s-bok   (68) a. [snö-skat-s]-bo   *weak*
        girl-book   snow-magpie-LINK-nest
        'book for girls'   'fieldfare nest'

      b. stol-s-rygg *strong*   b. [barn-bok-s]-klubb   *strong*
        chair-LINK-back   child-book-LINK-club
        'back of a chair'   'club for children's books'

A final difference between simple and complex compounds is that a greater number of realizations is available in simple compounds. For example, *o-* and −*u*-linkers only

appear in simple compounds.[122] This, again, is taken to show that the simple and complex linking elements are different.

Based on these patterns, Josefsson concludes that the linking elements in simple and complex compounds are different grammatical creatures. The linking element in complex compounds is required in order to create asymmetry and it is syntactically visible. The linking element in simple compounds is not required for asymmetry, so "no grammatical principle requires its presence" (Josefsson 1998:62), and it is not visible to syntax. Josefsson refers to it as obsolete. She does not illustrate the analysis of linkers in simple compounds.

Assessment of Josefsson (1998)

In the analysis of Norwegian compounds that I present in the next chapter, I adopt Josefsson's analysis of compounding as adjunction. However, our analyses differ in the treatment of linking elements. Therefore, I take issue here with the analysis of linking elements: first, the claim that there are two grammatically distinct linking elements, and second, the claim that linkers introduce asymmetry. In the discussion, I point to some differences between Norwegian and Swedish.[123]

Josefsson argues that linking elements in simple and complex compounds are grammatically different. As we recall, one argument for this distinction was that only linking elements in simple compounds are sensitive to declension. This description does not fit for Norwegian compounds, as the linking element in Norwegian is sensitive to the weak/strong distinction in both simple and complex compounding. Recall the distribution for linking elements in Norwegian summarized below.

Table 2   Distribution of linking elements in Norwegian

Left-hand members	Simple left-hand member	Compounded left-hand member
Strong noun	a, e, er, s, Ø	s, Ø
Weak noun	e, en, es, Ø, (a)	e
Verb	ar, e, Ø	e, Ø

---

[122] A counter-example to this generalization is [*fri-kyrk-o*]-*pastor* 'Free Church reverend' (Teleman p.c. to Josefsson (1998:66)).

[123] Norwegian and Swedish are mutually intelligible languages with a high amount of shared vocabulary and morphosyntax (Vikør 1995).

In fact, in Norwegian, unlike Swedish, the sensitivity to declension class is strongest in complex compounds. Thus, the argument that only linkers in simple compounds are sensitive to declension classes does not hold for Norwegian.

There are also examples from Swedish where there would appear to be declension sensitivity in complex compounds. The following examples are from Josefsson (1998:66).

(69)
   a. kvinn-o-händer
      woman-LINK-hands
      'hands of a woman'

   b. [bond-kvinn-e]-händer
      farmer-woman-LINK-hands
      'hands of a female farmer'

(70)
   a. sag-o-bok
      story-LINK-book
      'story book'

   b. [troll-sag-e]-bok
      troll-story-LINK-book
      'book of stories about trolls'

The *e*-linker in these compounds does not occur with complex strong nominal non-heads, only with certain weak nominal non-heads. Such examples weaken the claim that only simple linkers are sensitive to declension classes in Swedish, and thus, the overall claim that there are two grammatically distinct linking elements.

Josefsson also argues that there are phonological arguments for two grammatically distinct linking elements. Specifically, she argues that only the linker in simple compounds can shorten a long vowel in the left-hand member of a compound. The problem with this observation is that it is neither systematic nor specific to compounds. According to Torp & Falk (1898:52-53), vowel shortening as a historical process has happened in many words in front of a consonant cluster, typically as the result of suffixation in derivation, inflection and compounding alike. Vowel shortening is especially common when an −*s* is suffixed to a word ending in *d* or *g*, and sometimes *v* or *p/b*. However, it is not a systematic process, at least from a synchronic perspective. Some Norwegian examples with and without vowel-shortening are given below.[124]

(71) Shortened vowel in compounds
     tid-s-klemme 'time squeeze'
     skog-s-maur 'wood ant'
     bruk-s-rett 'right of use'
     skip-s-vrak 'shipwreck'
     liv-s-tid 'lifetime'

     fred-s-due 'peace dove'
     lag-s-møte 'group meeting'
     smak-s-sak 'matter of taste'
     dåp-s-kjole 'baptismal dress'
     vev-s-prøve 'tissue sample'

Long vowel in compounds

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[124] The complex left-hand member in [*sam-liv-s*]-*brudd* 'relationship break up' can also be pronounced with a shortened *i,* which indicates that vowel shortening is not strictly related to the complexity of the left-hand member.

Josefsson only provides two examples of vowel-shortening in Swedish, which does not allow us to conclude anything about the systematicity of the phenomenon in Swedish.

In addition to the lack of a systematic and productive rule for vowel shortening, simple and complex compounds differ considerably in the phonological properties of the left-hand member. This makes it difficult to prove that vowel-shortening is indeed the consequence of two grammatically distinct *s*-linkers, rather than a consequence of diachrony paired with other phonological differences between simple and complex left-hand members. Therefore, I do not see vowel-shortening as a sufficiently strong argument to postulate two grammatically distinct *s*-linkers.

Josefsson also claims that there is a semantic difference where only the simple linker can be associated with specific semantic readings. However, if linkers are indeed obligatory with complex left-hand members, and the vast majority of complex left-hand members in Swedish take an *s*-linker, then there is no occasion for such distinctions to develop between complex left-hand members with and without linkers. Thus, it is hard to construct an argument from semantics.

All of these considerations weaken the claim that there are two grammatically distinct *s*-linkers, at least in Norwegian.[125] The lack of such a distinction in turn also weakens the claim that the role of the complex linker, and the complex linker only, is to introduce asymmetry. I turn to this part of the proposal now.

According to Josefsson, a linking element is obligatory in Swedish with complex left-hand members, with the exception of some well-defined phonological environments (Josefsson 1998:186). The tendency for an *s*-linker to occur in complex compounds is found to various degrees in all the Germanic languages except English (see section 2.2.3.4 and references there). However, in Norwegian, this requirement is weaker than in Swedish, such that in many cases a linker can, but need not occur after a complex left-hand member. Thus, in Norwegian, we find both [*barn-e-bok*]-*klubb* 'club for children's books' without a linker (cf. the Swedish example in 68b) and [*ord-bok-s*]-*redaktør* 'word-book-editor'='dictionary editor' with a linker.[126] If linking elements are not obligatory in

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[125] In Section 4.4.3, I argue that there is variation with respect to the productivity of the various *exponents* of linking element, and that this is partly related to the distinction between simple and complex compounding. However, that does not entail that there is a difference in the abstract grammatical *function* of linking elements.

[126] In Swedish we also find examples of complex compounds without linking elements, such as [*mobil-telefon*]-*laddare* 'cellphone charger' and [*energi-spar*]-*modus* 'energy-save-mode'='energy saving mode' (Marit Julien p.c.). Notice that the latter example is an [NV]N-compound, and that the absence

complex compounds then that weakens the proposal that they are required in complex compounds to introduce asymmetry. In order to maintain Josefsson's analysis for Norwegian, we would have to postulate Ø-linkers in complex compounds. That is not in and of itself a problem, but it is a worry as long as Josefsson's argumentation is built precisely on the obligatoriness of a linking element in such compounds.

Finally, I will point out a challenge with adopting Josefsson's analysis that relates only to a difference between frameworks. In current mainstream Distributed Morphology, derivational suffixes are analyzed as categorizers. Thus, a word like Norwegian *mal**ing***/Swedish *mål**ning*** 'paint' would have a structure like (72a). In Josefsson's theory, on the other hand, which we can consider an earlier version of Distributed Morphology, derivational suffixes are treated like roots/stems, as in (72b). [127]

(72) a.

```
        n
       / \
     mal   n
          ing
```

b.

```
        N°
       / \
     mal   N°
          / \
        ing  N°
```

In the Germanic languages that employ linking elements, there is a strong tendency to use an *s*-linker when the left-hand member of a compound is a nominalization. Consider thus the representations in (73) for the compound *mal-ing-s-flekk* 'paint stain', building on (72).

(73)   a. DM-analysis

```
              s
            /   \
           n     flekk
          / \
         n   s
       mal  n
            ing
```

b. Analysis in Josefsson's system

```
             s
           /   \
          s     flekk
        /   \
      mal    s
            / \
          ing  s
```
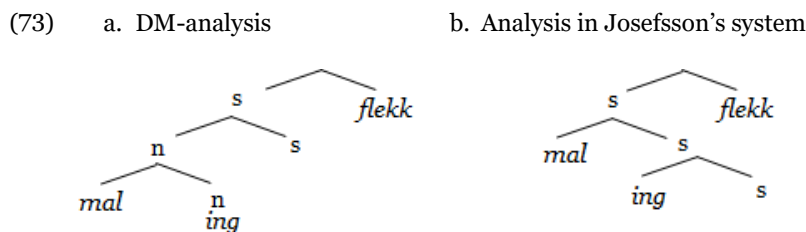
Now, if derivational suffixes are categorizers, as I will assume, then asymmetry is already taken care of by the suffix, as in (73a), so the role of the linking element cannot be

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of a linking element in such cases could indicate sensitivity to the category of the complex left-hand member, which would indicate that left-hand members are indeed categorized (see also Section 4.5.2).
[127] Derivational suffixes are also analyzed as roots by De Belder (2011) and Lowenstamm (2014). See also Creemers et al. (2018) on the claim that some derivational suffixes are roots in French and Dutch, respectively.

to introduce asymmetry. However, in Josefsson's framework, the fact that derivational suffixes take linkers is expected for exactly the same reason that complex left-hand members take linkers, although Josefsson does not discuss examples like (73b).

This can be seen as an advantage of Josefsson's framework. However, since I will not change the assumption that derivational suffixes are categorizers, the asymmetry story of Josefsson cannot be adopted for my analysis of Norwegian compounds. To summarize, then, I adopt from Josefsson the idea that compounding is adjunction, but I propose a different role for linking elements.[128]

3.3.5 Root Phrase: Harley (2009a)

Compounding has not received much attention in Distributed Morphology. As pointed out by Harley (2009a), this is somewhat surprising since compounding would be good case for 'morphology as syntax'. Compounds have properties in common with both sentences and words, and should thus be ideal for theories that argue for shared structure building mechanisms for both. However, within Distributed Morphology, similar compound structures have been proposed by Harley (2009a) and Siddiqi (2009).[129] Here, I present Harley's (2009a) version of the analysis.

In the analysis of compounds proposed by Harley (2009a), compounds are root phrases (RootP or √P). A compound is formed by first building the left-hand member, and subsequently building the right-hand member on top of this.

First, the root of the left-hand member is combined with a categorizer, usually a nominalizer, to form an nP. Next, this nP is merged with the root of the right-hand-member, which projects and creates a RootP. Finally, the resulting RootP is categorized to give the compound as a whole its category. This is shown in (74).

(74)

```
        nP
     ／      ＼
    n        √P
          ／      ＼
      √shoe       nP
                ／    ＼
               n     √nurse
```

---
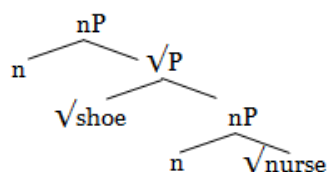
[128] An analysis of compounding as adjunction is also proposed by Hardarson (2017) for compounds with case-marked left-hand members in Icelandic.

[129] This is also the analysis in Siddiqi's (2006) dissertation. Siddiqi (2006, 2009) proposes an analysis for irregular plurals as compound left-hand members in English, as in *lice-infested*. I discuss such data in Section 4.5.3.

In between each of the steps sketched above, the heads are incorporated via head-to-head movement. This results in a structure like (75).[130]

(75)

nP
 n   √P
  √shoe   n √shoe   nP
   n   √shoe   n √nurse
 √nurse n
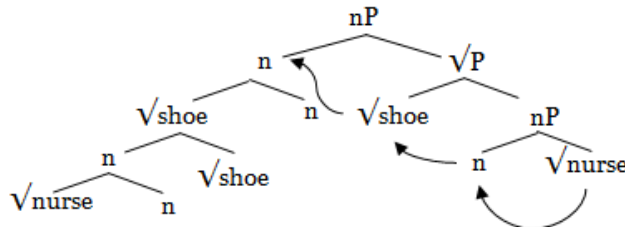
Notice that in the structure in (75) there is not only incorporation into functional heads, as is standardly assumed, but also into roots.

Harley (2009a) applies the basic analysis in (75) to the four different compound types listed in (76) below. The structure for (76a) was given in (75), and the structures for (77b-c) are given in (77).

(76)
    a. Primary compound: *nurse shoe*
    b. Synthetic compound: *truck driver*
    c. Synthetic modificational compound: *quick-acting*
    d. Phrasal compound: bikini-girls-in-trouble genre

(77)
    a. truck driver
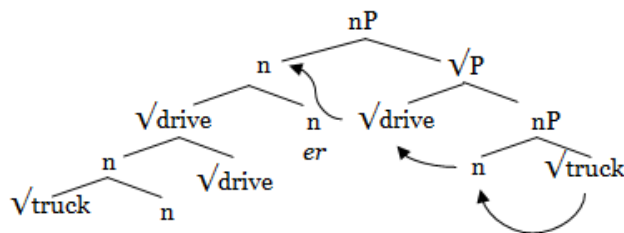
nP
 n   √P
  √drive   n √drive   nP
   n   √drive   er   n √truck
 √truck n

---

b.   quick acting (baking powder)

aP
a √P
√act a √act aP
a ing a √quick
√quick a

c.   bikini-girls-in-trouble genre

nP
n √P
√genre n √genre nP
n √genre n √bikini-girls-in-trouble
√bikini-girls-in-trouble n
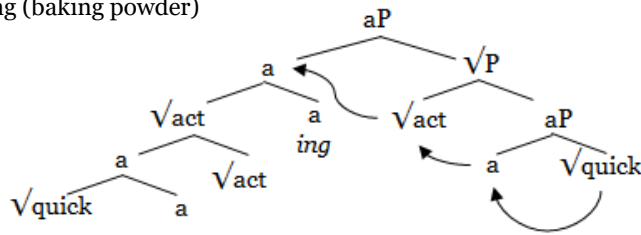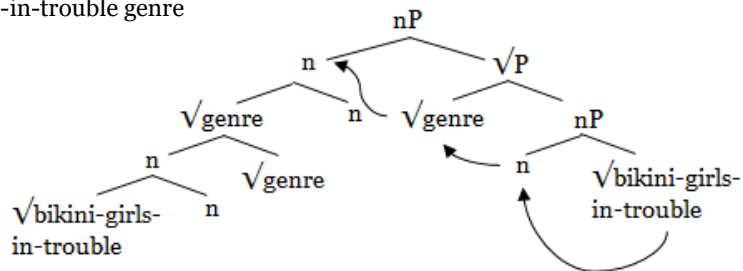
Notice also that there is no verbal head in either (77a) or (b), even though these compounds seem closely related to the verb phrases *drive truck* and *act quickly*. The reason verbal heads are avoided in these structures is to rule out the possibility of verbal compounds such as **to truck-drive* and **to quick-act*. Instead, Harley argues that the verb-like properties of the compounds in (77a) and (b) stem from the roots √*drive* and √*act*. These roots have argument structure and event structure, such that in (77a) the root √*drive* selects the nP *truck* as its internal argument, and in (77b) the aP *quick* is a modifier of the event properties of the root √*act*. In (75) and (77c), on the other hand, the roots √*shoe* and √*genre* have no argument structure or event structure, so in these cases, a pragmatically determined interpretation is established between the left-hand and right-hand members of the compounds.

Thus, the only reason why (75) is considered a primary compound and (77a) and (77b) are considered synthetic compounds is that the roots of the right-hand members have different syntacticosemantic properties. In addition, the top-most categorizers (*–er, –ing*) are realized phonologically in synthetic compounds, but have a Ø-realization in primary compounds. I return to the analysis in (77a) with respect to synthetic compounds in Norwegian in Chapter 5.

Harley speculates that phrasal compounds have a structure along the lines of (77c). Specifically, she proposes that the phrasal left-hand member *bikini-girls-in-trouble* is first built like an ordinary phrase in its own workspace. Next, it is reentered into the

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numeration of a second workspace, behaving this time as if it were a root. The little n-head on top of the phrase serves to reify the phrase and turn it into a simple Saussurean sign (see also Ackema & Neeleman 2004 and Sato 2008 for related approaches to phrasal compounds).

Harley's analysis of compounds as RootPs is also adopted by Nevins & Myler (2014) for English parasynthetic compounds like *brown-eyed*.

Assessment of Harley (2009a)

Harley proposes that compounds are derived by a series of head-incorporations. This approach works well for simple compounds. However, as we have seen in this dissertation, compounds can also be more complex in the sense that both constituents can themselves be compounds. It is not clear how an incorporation analysis can derive structures with compounded right-hand members, i.e. examples of the type [X[Y Z]], as in *leather nurse shoe*, or [W X][Y Z], as in *cushion heel nurse shoe*. The problem is that in these cases, the topmost constituent (the right-hand member) is not a head, but a complex object. To see why this is a problem, consider the structure below, where the two constituents *cushion heel* and *nurse shoe* have been built independently. There is no principled way in which these two constituents can be combined and √[*cushion heel*] can be incorporated into √[*nurse shoe*] to obtain the correct constituent structure.

(78)
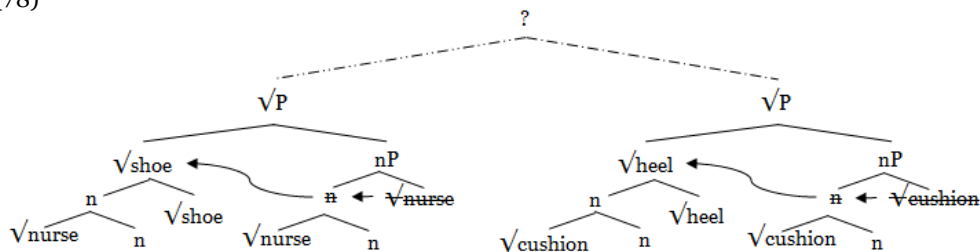
An incorporation analysis can only derive complex compounds of the type [X Y] Z]...]...] where new heads are added repeatedly to the right, in which case the compound has the same structure as a complex derivational structure like [*predict*]able]*ity*.

A possible solution would be to treat compounded compound constituents along the lines that Harley proposes for phrasal compounds, where complex constituents are reentered into the numeration as roots. However, as Harley herself describes this solution as speculative, an analysis where complex compounding is actually expected to exist would be preferable. Notice that if we treat compounding as adjunction, as I propose in Chapter

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4, we can easily combine the complex constituents *cushion heel* and *nurse shoe* into one complex compound.

Before moving on to my analysis, I will briefly mention three other challenges with adopting Harley's analysis for Norwegian compounds. First, in her analysis of synthetic compounds, Harley argues that there is no v-head. However, as pointed out by Borer (2013:585), there are synthetic compounds with overt verbalizing morphology, as in *rule general-**iz**-ing* and its Norwegian counterpart *regel-general-iser-ing,* which in this framework require the presence of a v-head. I return to this issue in Section 5.2.

Second, Harley's assumption that roots can project and take arguments is much debated in the literature. The opposing view, that roots do not project or take arguments, is argued by Alexiadou (2014), Borer (2005b) and Lohndal (2014), among others. I will not go into the details of this debate here, but simply state that I follow the latter type of approach, the details of which will be laid out in Section 4.1.1.

Third, since Harley discusses compounding in English, she of course does not have an account for linking elements. Thus, this aspect of the theory would have to be changed to accommodate compounding in Norwegian.

3.3.6 Conclusion

In Section 3.3, I have presented some previous analyses of compounds that assume the same or similar structure building principles above and below the word-level. The analyses were selected because they cover a large hypothesis space for the structure of compounds in Germanic languages. In the course of the section, I have pointed out various problems with these analyses, some theoretical and some that arise specifically in the context of Norwegian compounds. I have also identified structural proposals that I will adopt for my analysis of Norwegian compounds in the next chapter. Most importantly, I follow Josefsson (1998) in the analysis of compounding as adjunction to a category-defining head. I also follow Johannessen (2001) and Josefsson (1998) in their analyses of linking elements as forming a constituent with the left-hand member of the compound. I assume with Josefsson (1998) and Harley (2009a) (as well as Delfitto et al. 2011 although this was not discussed) that compound constituents can be decomposed into roots and categorizers. Finally, I follow Selkirk (1982), Lieber (1992), Josefsson (1998) and Harley (2009a) in the view that the formal and semantic head of a compound is the right-hand member, not an abstract or overt element in the middle of the compound.

The goal of the present chapter was to trace the history of compound research in Norway on the one hand, and in formal, especially generative, grammar on the other hand. Through this discussion, we have seen that compounding was established as its own object

of study within the chapters on word-formation in the 19th century Germanic grammars. The first generative study on compounding was Lees (1960), who treated compounds as transformationally related to underlying sentences. Since then, the status of compounds as morphology or syntax has been debated, with the latter approach becoming increasingly influential in recent years. The last section of the chapter has shown that a syntactic analysis of compounds is indeed possible, although there are details that remain to be worked out. In the next chapter, I present my proposition for a syntactic analysis of Norwegian compound words.

Chapter 4

COMPOUND STRUCTURE

In this chapter, I develop a formal analysis of Norwegian compounds. The foundation for this analysis was laid in the previous chapters. Chapter 2 provided a description of the Norwegian compound system, presenting data and important patterns that an analysis of Norwegian compounds must account for. Chapter 3 provided an overview of previous accounts of compounding in frameworks and languages related to those of the current dissertation. In that chapter, I also pointed to specific theoretical challenges with which a formal analysis is faced. Based on these considerations, I summarize the most important desiderata for an analysis of compounding in Norwegian in Section 4.1.2.

A major theme of the present chapter is the linguistic nature of left-hand members of compounds. I ask in what way left-hand members are added to right-hand members, how we can account for the classes of possible and impossible left-hand members, and how we can formalize the realization of linking elements as being dependent on the left-hand member.

Another theme that runs through both the present chapter and the next chapter is the underspecified semantic relationship between the left-hand and right-hand members of compounds, formalized as Allen's (1978) Variable R. I argue that the Variable R applies to both primary compounds (Chapter 4) and synthetic compounds (Chapter 5), and I argue that the linking element plays a crucial role in establishing this underspecified relation.

Formulating a specific analysis of compound formation will allow us to see Norwegian compounds as part of a larger system. This will also allow us to further develop,

and question, our present understanding of the phenomenon and facilitate the comparison of Norwegian to other languages. In the analyses I propose in this chapter, I strive to strike a good balance between capturing important generalizations about the system and taking into account the variation and fuzziness in the data, keeping in mind that a theory that is as complex as the data it describes is not a theory but merely a restatement of the facts.

I assume a syntactic approach to word-formation, as argued for in Chapter 1. In particular, I take the view of Distributed Morphology, drawing also on Borer's (2005a, 2005b, 2013) exoskeletal syntax and related approaches. The assumption that syntax exists both below and above the word-level makes available specific hypotheses about the structure of compounds. In Section 4.1, I lay out my theoretical assumptions in more detail, thus narrowing down the hypothesis space for the structure of Norwegian compounds. In Section 4.2, I present the general compound structure that I take to be present in all core cases of Norwegian compounding, and I give a sample derivation. Sections 4.3-4.5 are devoted to motivating and justifying each step of this analysis, and at the same time exploring finer details within the structure. In Section 4.6, I discuss lexicalized compounds as idioms. Section 4.7 summaries the chapter and identifies some open questions and areas for future research.

4.1   Carving out a hypothesis space

4.1.1   Theoretical framework

In the framework of Distributed Morphology (DM), words are built in the syntax. The leaves of syntactic trees are abstract morphemes manipulated according to the general principles of minimalist syntax (Chomsky 1995). Since words are created by combining distinct pieces into hierarchical structures, DM qualifies as a piece-based, item-and-arrangement theory, as opposed to a process-based or item-and-process theory, as developed by Anderson (1992) among others (Harley & Noyer, 1999, Hockett, 1954) (see discussion in Chapter 1).

The pieces that are combined into words, and eventually into sentences, come in two types: roots and functional morphemes. To illustrate, a form such as *dogs* will have the structure in (1), where the acategorial root √dog is combined with a nominalizer *n,* which makes this a noun, and a number morpheme specified for PLURAL, which makes this a plural noun.

(1)

```
            Num
        ┌────────┴────┐
      Num            n
      [pl]        ┌──┴────┐
                 n      √DOG
```
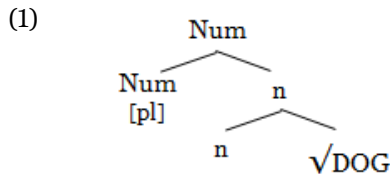
I will provide more details about structures like (1) in a moment. First, however, I will introduce another important assumption in DM: there is no single module that fulfills all the roles of the lexicon in lexicalist theories. Traditionally, the lexicon is considered to be responsible for listing sound-meaning pairs, irregularities, and performing word-building processes. Instead, in DM, these attributes are distributed across separate lists— hence the name *distributed* morphology. A short description of the content of each list is given below, and will be further elaborated upon in the rest of this section.

List 1: *Syntactic atoms*
The first list contains the atomic building blocks manipulated by the syntax – the terminal nodes of syntactic trees. As mentioned above, two types of syntactic atoms are recognized: (i) roots, such as √dog, √eat, and √red; and (ii) functional morphemes, made up of abstract syntacticosemantic feature bundles, which provide grammatical properties such as PLURAL or PAST. Importantly, functional morphemes are completely abstract and do not have any phonological content in List 1. The phonological content of morphemes is provided by the second list.[131]

List 2: *The Vocabulary*
The second list contains phonological exponents, known as *vocabulary items*. Vocabulary items are phonological realizations of the abstract syntactic terminals, and are paired with syntactic terminals post-syntactically (see Figure 1 below). Each vocabulary item consists of a phonological representation and a feature specification that indicates which syntactic terminals it can realize. For example, the vocabulary item /-z/ in *dogs* can have the specification [pl] ⇔ /-z/.

List 3: *The Encyclopedia*
The third list contains idiosyncratic semantic information about vocabulary items. According to DM, any string without fully predictable semantics is an idiom (Marantz

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[131] The exact content and nature of roots in List 1 is debated in the framework, and will be elaborated upon below.

1995, 1997, Harley & Noyer 1999). Thus, single words such as *dog,* complex words such as *grapefruit,* and complex expressions such as *kick the bucket* are all considered idioms in the theory. They must all have their interpretation listed in the encyclopedia, so the encyclopedia is in effect a list of idioms.

According to DM, then, there is a single computational component responsible for the generation of both words and phrases – the syntax. In addition, the three separate lists introduced above perform the listing-properties associated with the lexicon in lexicalist theories. The first list contains abstract syntactic building blocks, the second list contains phonological exponents, and the third list contains semantic information. Distributing this information over separate lists in this way makes it possible to account for cases where there are not one-to-one mappings between function, form and meaning.

A syntactic derivation is assumed to proceed as in Figure 1 (adapted from Embick & Noyer 2007), where the lists are accessed at different points in the derivation.

Figure 1   Stages of the derivation
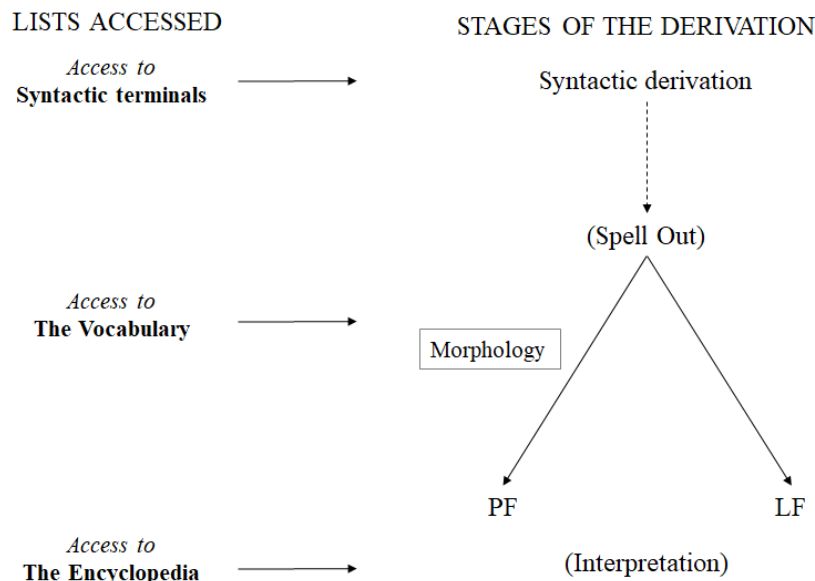
In what follows, I walk through the steps of Figure 1, and along the way, I specify my positions on issues where there are several opposing views among researchers who adopt this type of decompositional model.

4.1.1.1   The syntactic derivation

In the computational component, which I refer to as the syntax[132], atomic building blocks from List 1 are combined by internal and external merge. The result is an abstract hierarchical structure of the type illustrated in (1), with roots and syntacticosemantic functional feature bundles as the terminal nodes.

The functional feature bundles provide the derivation with grammatical information, such as PLURAL, DEFINITE, or PRESENT. Functional heads also provide roots with categories, such as NOUN, VERB or ADJECTIVE. Roots, which are assumed to be acategorial, are categorized by combination with a categorizing head, illustrated in (2) below.

(2)   a. (a) fish   b. (to) fish   c. fishy
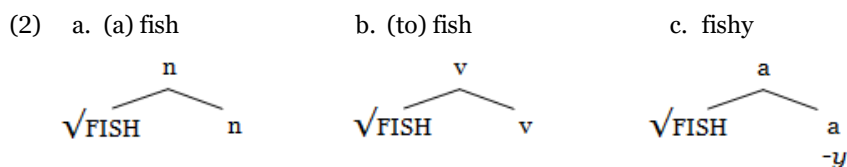
The categorizing head can have a zero-realization, as in (2a-b), or it can be realized by a derivational affix, as in (2c). However, this distinction lies at the level of phonological realization (List 2). At the level of syntax, the forms in (2) are all equally complex.

There are different proposals for the exact manner in which roots and categorizers combine in the syntax. Roots have been argued to be merged as modifiers/adjuncts of the categorizer (Embick 2004, Alexiadou & Lohndal 2017b), as complements of the categorizer (Embick 2004, Harley 2009a,b, 2014), or inserted in the context of the categorizer post-syntactically (De Belder & van Craenenbroeck 2015). In this dissertation, I adopt the view that roots are adjoined to their categorizer, as it allows for the most streamlined analysis of compounds (see Section 4.3.1).

I will briefly mention here models that assume a slightly different type of categorization. Borer (2005 a, b, 2013, 2014) argues against the use of zero-categorizers, as in (2a-b). According to Borer, when no derivational suffix is present, the root is rather categorized by higher functional material, for example the determiner *a* and the infinitive

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[132] The term *syntax* can be misleading, since as Williams (2007:8) notes in his defense of lexicalism, "[b]oth words and phrases have syntax – that is, they have parts, and there are rules and principles for putting the parts together". Thus, proponents of the lexicalist hypothesis can still have a notion *word-syntax* (Ackema and Neeleman 2004, Spencer 2005). Here, I use *syntax* in a stronger sense to denote the single computational component that uses a single set of principles for all structure building, whether above or below the word-level.

marker *to* in (2a-b). Another view, argued by De Belder (2011) and Lowenstamm (2014), is that derivational suffixes, as in (2c), are actually roots and must also be categorized by functional material. For the purposes of this dissertation, I simply adopt what we can call the mainstream DM view, illustrated in (2).

While there is some debate about how roots are categorized, there is much more debate about the nature of roots before categorization. Roots constitute a core component of many decompositional, constructionist frameworks. Most researchers in such frameworks assume that roots are the acategorial, atomic units that remain when all grammatical material is abstracted away. Roots thus form the substantive, "lexical" contribution of an expression. Beyond that, however, there is little agreement about the exact nature of roots.

One point of contention is the extent to which roots have grammatical properties, such as the ability to project and take arguments, or specifications about gender or declension class. Is it, for example, specified on the root in Norwegian that *hund* 'dog' is masculine, whereas *tann* 'tooth' is feminine? An argument against equipping roots with diacritics to indicate their gender or declension class is that this information is tied to specific lexical categories in such a way that encoding them on the root is equivalent to encoding the category on the root as well (Acqaviva 2009). This is problematic inasmuch as most researchers agree that roots are not encoded with lexical categories, as shown in (2). Since I accept the basic premise that roots are acategorial, I also follow the view that they do not have information about gender or declension class. Rather, this type of information is encoded on the categorizers n, v and a. Roots are completely agrammatical creatures which do not project grammatical structure and cannot take arguments. This view is advocated most strongly in Borer's (2005a,b 2013) exo-skeletal framework, as well as by Åfarli (2007), Acquaviva (2009), De Belder & van Craenenbroeck (2011), Lohndal (2014), Alexiadou (2014), Alexiadou & Lohndal (2017b), Riksem (2018) and Grimstad (2018).

Another point of contention is whether roots have phonological and/or semantic content in List 1. Researchers who argue that roots have phonological content agree that such content must be underspecified (Arad 2003, Borer 2005 a, b, 2013, 2014 and De Belder 2014). Phonological underspecification seems necessary if one and the same root underlies for example *buy/bought* or *sing/sang/sung/song*. Thus, Borer argues that roots have just enough phonology to accommodate phonologically related forms like these. However, phonological underspecification is not enough if we also take the same root to underlie suppletive forms like *am/is/are* or *go/went*. Based on such data, other

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researchers hold that roots have no phonology at all at the point when they enter the syntactic derivation (Pfau 2009, Acquaviva 2009, Harley 2014). Rather, the claim that a common underlying root is present in *go/went* can be stated semantically or with indices on abstract forms. For my purposes, the question of whether roots have phonology is not directly relevant, except in Section 4.5.4, where I discuss some cases of allomorphy in compounds. The data presented there cannot be used to determine between approaches, but different implementations are discussed. For expository purposes, I will represent roots orthographically in my structural representation, as in (2).

For the analysis of compounds, the question of whether roots have semantic content is a more pressing matter. Again, we can distinguish between proposals according to which the semantics of roots is abstract and underspecified (Arad 2003), and proposals according to which roots have no semantic content at all in List 1 (Acquaviva 2009, Harley 2014). Arad (2003) argues that roots have some semantic content. This content must be highly underspecified since the same root √*qlt* contributes its semantics to all of the Hebrew words in (3).

(3)   √qlt 'absorption, taking in' (Arad 2003:744)
  a.   *qalat*$_V$ 'absorb, receive'
  b.   *hiqlit*$_V$ 'record'
  c.   *miqlat*$_N$ 'a shelter
  d.   *taqlit*$_N$ 'a record'
  e.   *qaletet*$_N$ 'a cassette'

The words in (3) have very different meanings, but it is nevertheless possible to find a common semantic core that has to do with 'absorbing' or 'taking in'. However, it is not always possible or, I would claim, desirable to assign semantics to roots. Consider for example the English cases in (4).[133]

(4)
a.	re √**ceive**	e. √**cran** -√berry	i. √grape-√fruit	m. $_N$ √**hand**
b.	per √**ceive**	f. √**rasp**-√berry	j. √dead-√line	n. $_A$ √**hand**-some
c.	con √**ceive**	g. √**bil**-√berry	k. √horse-√radish	o. $_N$ √**hand**-le
d.	de √**ceive**	h. √**straw**-√berry	l. √butter-√fly	p. $_V$ √**hand**-le

Is there a common semantic contribution of √*ceive* in (4a-d)? What are the semantics of the roots in (4e-h)? Would it for example be correct to state that the meaning of √*cran* is that meaning of *cranberry* that is not covered by √*berry*, and how could we even evaluate this claim? The matter is perhaps even more complicated in a case such as *grapefruit*. How do we determine which part of the meaning of *grapefruit* is covered by √*grape* and

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[133] Parallel examples are found in Norwegian. I use English here for expository purposes.

which part is covered by √*fruit*? And finally, how do we determine whether we have the same root √*hand* in (4m-p)?

Even though it is possible for linguists to find a common denominator for some sets of words that they claim have the same root, and state this is the contribution of the root, it is not clear that this is a theoretically relevant exercise. This intuition is captured in the following quote from Aronoff (1976:14).

> A priori, any word can be split in two and each part given a meaning. I can divide apple into *a* and *pl*, and give each of them part of the meaning of the whole word. However, we prefer to reject this solution, for by allowing such an analysis we would reduce the predictive power of a theory to zero ... It is unfalsifiable.

It is simply not clear what we gain from assigning an underspecified semantics to, for example, the root √*hand* that accommodates all of (4m-p). A more specific meaning has to be listed for the whole form into which the root is embedded anyway. The reason underspecified content can, to some extent, be assigned to roots, of course has to do with the words' diachronic profiles, since presumably their meanings were transparent at the moment when they were first formed, but may have subsequently taken on idiosyncratic meanings.

Alexiadou & Lohndal (2017a) propose that there might be cross-linguistic differences in the meaning of roots, such that roots in a language like Hebrew generally have less semantic content than roots in a language like English, despite the examples in (4), which are rather exceptional.[134] Yet, in this dissertation, I follow Acquaviva (2009), Harley (2014) and Borer (2014), among others according to whom roots do not have semantic content when they enter the syntactic derivation.[135]

To summarize, I remain agnostic about the extent to which roots have independent phonology, but I assume that they do not have independent semantic content in List 1. The position that roots have neither phonology nor semantics is argued by Pfau (2009), Acqvaviva (2009) and Harley (2014), among others. Note that there is an obvious problem with this position, which is that both language learners and linguists need at least one constant, either the phonology or the semantics, in order to identify a root in the first

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[134] Based on what is said above, we can predict that the more derivational morphology a language has, the more abstract the meaning that can be assigned to roots will generally be. The reason is that there will be more words that share a common root, which means that the meaning of a root will have to be smeared thinner.

[135] It has also been proposed that roots can be classified into different types, for example 'event', 'thing' and 'state' (Harley 2005). I will not discuss this here as it is not directly relevant for this dissertation.

place. Without semantics, there is little to tell us that *go* and *went* contain the same root, and without phonology, there is little to tell us that *qalat* and *taqlit* contain the same root. How, then, can we identify a root and state that two expressions contain the same one?[136] I see this as problematic, and it is a potential problem for the position I adopt in this dissertation. However, it is related to the question taken up in Chapter 1 concerning what a morphological theory attempts to explain and how we chose to decompose unproductive forms. The issue of the nature of roots cannot be resolved without taking a specific stance on that larger question.

At this point, one might ask why roots are assumed to be useful entities in the first place, if their role is so diminished. One compelling argument is made by Borer (2014), who points to the nonce forms in Lewis Caroll's *Jabberwocky*. The first stanza is given in (5)

(5)   `Twas **brillig**, and the **slith**y **tove**s / Did **gyre** and **gimble** in the **wabe**

The roots bolded in (5) are nonsensical and do not contribute any meaning to the sentence. Nevertheless, their presence is obligatory. A word cannot be expressed without some basic material to fill the innermost slots of the grammatical structure. Functional formatives, such as inflectional heads or complementizers, can often have a zero-realization, but not so the innermost elements around which the functional structure is built. The innermost slots, the meat of the grammatical skeleton, must be filled. That is the role of roots.

Beyond what is said here, I will not be able to go further into the various debates concerning roots, but I refer the reader to substantial volumes devoted to such issues in recent years (Krifka 2014, Alexiadou et al. 2014). For this dissertation, roots are adopted as part of the standard repertoire of the framework I employ, with the additional specifications made above.

Thus, feature bundles and roots are the atomic building blocks of syntax. The former make up the grammatical skeleton, and the latter provide the meat around which the grammatical skeleton is built.

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[136] Harley (2014), following Aronoff (2011), proposes that speakers can identify forms like *go/went* as suppletive if the forms show covariation in contextually determined interpretations. That is, in an idiom like *go/went for it*, both forms get the same contextually determined meaning, which indicates that they realize the same root.

4.1.1.2   Vocabulary insertion

After syntax, the abstract syntactic structure is interpreted phonologically and semantically. The process whereby abstract syntactic terminals (abstract morphemes) are paired with phonological exponents is known as *vocabulary insertion,* and the process whereby phonological exponents are inserted after syntax is known as *late insertion.*

Vocabulary items (phonological exponents) are morphologically underspecified compared to the abstract syntactic terminals they realize. Specifically, in order to realize an abstract syntactic terminal, a vocabulary item must contain a subset of the features of that syntactic terminal. Furthermore, when there is more than one vocabulary item that can realize a syntactic terminal, the most specified vocabulary item wins, in line with the Subset Principle (Kiparsky 1973, Halle 1997). Halle (1997:428) states this in the following way.

> The phonological exponent of a Vocabulary item is inserted into a morpheme in the terminal string if the item matches all or a subset of the grammatical features specified in the terminal morpheme. Insertion does not take place if the Vocabulary item contains features not present in the morpheme. Where several Vocabulary items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

Consider now verbal agreement in English (example from Riksem 2018). The vocabulary items that realize present tense can be listed as in (6).

(6)   Vocabulary items for English present tense
      [PRES, 3PERS, SG] ⇔ /-z/
      [PRES]   ⇔ -Ø

For the sentence *John eat*-PRES.3PERS.SG *cake,* the vocabulary item that matches the largest subset of the feature specifications of the verb is /-z/. Therefore /-z/ is inserted. For sentences that do not have a 3ʳᵈ person subject, -Ø would be inserted.

Notice that this type of organization makes it possible for a single phonological exponent to realize more than one syntactic feature bundle. In this case −Ø would realize both 1PERS and 2PERS, thus accounting for syncretism and minimizing the number of vocabulary items in List 2.

A vocabulary item can also be specified with contextual conditions. Consider again the plural form *dogs,* as well as the irregular plural *oxen* (Embick 2015).

(7)   Vocabulary items for English plural
      [PL] ⇔ -en/{√ox…}
      [PL] ⇔ -Ø/ {√fish, √sheep…}
      [PL] ⇔ /-z/

Irregular inflection must be specified for the specific roots with which it occurs. We see here that the context in which –*en* is used is more specific than the context in which /-z/ is used. Again, the most specific form wins, and we get *oxen* rather than *oxes.[137]

4.1.1.3 *Interpretation*

The abstract syntactic structure is interpreted semantically at LF, which is the locus of structural, compositional semantics. Idiosyncratic semantic information and information related to world-knowledge, on the other hand, is hypothesized to be accessed in the encyclopedia – DM's third list (Harley 2012). As mentioned earlier, the encyclopedia is conceptualized as a list of idioms, where any string without fully predictable semantics is considered an idiom. Thus, *dog, grapefruit* and *kick the bucket* are all idioms. They are all unpredictable sound-meaning pairs.

The way this is implemented by Harley (2014), among others, the encyclopedia contains statements about the interpretation of roots in context. We might for example find the information that the root √*kick* is interpreted as 'die' in the context of *the bucket*, and that the root √*fish* is interpreted as a specific type of water creature in the context of nominal syntactic structure, as in (2a). Furthermore, Harley (2014) proposes that √*ceive* is interpreted as 'think' in the context of *con-* and as 'fake' in the context of *de-* (i.e. 'conceive' and 'deceive').

Notice that such statements about the semantics of roots in context are different from the issue discussed earlier, namely whether roots have semantic content independently of their structural context. However, one of the issues pointed out in that discussion is also relevant here. For a compound such as *honeymoon*, should we state that √*moon* means 'holiday spent together by a newly married couple' in the context of √*honey*? Or should we state rather that this is meaning of √*honey* in the context of √*moon*? How would we go about determining that, and is the answer to this question theoretically interesting?

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[137] In Figure 1, there is also a stage labelled 'Morphology'. This is a hypothesized stage in the derivation where the output of syntax can be altered to accommodate mismatches between vocabulary items and syntactic terminal nodes. In cases where there is a mismatch, operations such as fission, fusion and morphological merger can apply between syntax and vocabulary insertion to alter the output from syntax. Unlike lexicalist theories, where morphology happens before syntax, morphology in DM, then, happens after syntax. Researchers within DM differ as to the roles they assign to the morphological component and exactly where and how different operations should take place. The morphological component will not play a prominent role in this dissertation.

The encyclopedia is especially important for the analysis of compounds, which vary a lot in their interpretation from fully transparent to non-transparent. However, the theories of the organization of the encyclopedia and various aspects of interpretation are less developed than other parts of DM. In Section 4.6, I discuss at length the role of the encyclopedia in the interpretation of compounds, and I explore some alternative approaches to the assignment of idiosyncratic content to complex structures. There, I end up favoring an approach that is more in line with Kelly (2013) and Borer (2013, 2014). Specifically, instead of stating meanings in terms of roots in context, I opt for stating meanings on complex forms. Thus, the interpretation of *honeymoon* would be stated for the whole form, rather than the individual parts.

4.1.1.4   Phrase structure and notation

I assume a minimalist view of structure building, where syntactic structures are built by external and internal merge, and bar-levels are determined relationally, in line with the assumptions of Bare Phrase Structure (BPS) (Chomsky 1995). Compared to the earlier X'-notation, BPS does not require bar-levels to be specified, and since structure is built by merging two elements, there is no unary branching, only binary branching. This is illustrated in (8)-(9). (The introduction and internal structure of arguments are simplified here.)

(8)   X'-schema
   a.
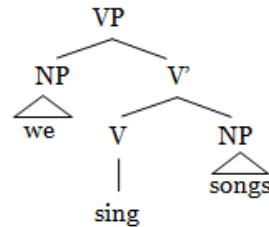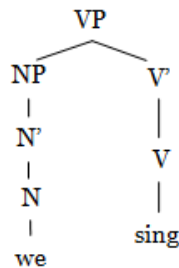
(9)   Bare phrase structure
   a.
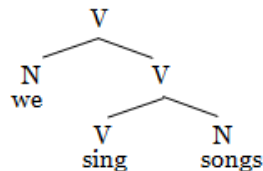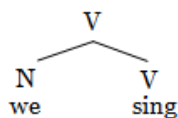
In all of these structures, the topmost V(P) is a maximal projection. However, in BPS, unlike X'-structure, the notions of minimal and maximal projections are not intrinsic properties of the syntactic nodes, but are rather derived from the structural configurations

(Muysken 1982). Hornstein et al. (2005:197) describe the different conceptions in the following quote.

> Abstractly speaking, one can conceptualize the difference between X, X', and XP in two rather different ways. First, they may differ roughly in the way that a verb differs from a noun, that is, they have different intrinsic features. Alternatively, they can differ in the way that a subject differs from an object, namely, they differ in virtue of their relations with elements in their local environment, rather than inherently. On the first interpretation [i.e. X'-theory] bar-levels are categorial features, on the second [i.e. BPS] relational properties.

According to BPS, then, *N-we* in (9) is both minimal and maximal, since N neither projects to a higher node, nor dominates any lower nodes.

Taken to its logical conclusion, BPS would also imply the following type of representation.

(10)
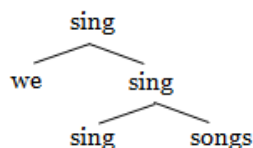
However, since I take categorial nodes to be primitives of the theory, and I follow the view that roots are not able to project, I will not use the notation in (10). Rather, I use category labels as in (8)-(9). Furthermore, I will specify bar-levels (that is, XP, X' and X) where relevant, even though I take these to be determined relationally, since it will make the representations easier to read. That is especially true when we take adjunction into account.

I also assume a distinction between ordinary structure building, as in the structures above, and adjunction. Traditionally, adjunction is an operation that keeps the bar-level information of the target node intact, as illustrated in X'-terms below, where the PP *on Mondays* is right-adjoined to VP.

(11)
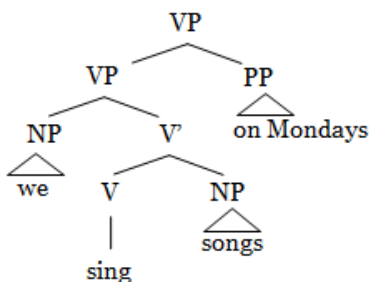
In modern syntactic theory, however, the exact nature of adjunction (as well as the mechanism that labels adjunction structures, a matter I will not go into here) is less clear (see e.g. Hornstein & Nunes 2008 for a proposal).

Here, I will follow the view developed by Chomsky (2004), where adjunction is understood as Pair-Merge, as opposed to Set-Merge. While Set-Merge ("normal merge") creates unordered sets, Pair-Merge creates ordered sets.

(12) Set-Merge: {α, β}
      Pair-Merge: <α, β>

In the tree structure representation, I will represent adjunction as a doubling of the target node, as in (11). In the next sections, I argue that compounding is adjunction.

4.1.2 What should the analysis account for?

Before I present my proposal for the internal structure of Norwegian compound words, it is useful to recapitulate what such an analysis should capture. In (13), I list the desiderata for a morphosyntactic analysis of Norwegian compounds, and refer to the section of the dissertation where each property was first described and discussed.

(13) Desiderata for an analysis of Norwegian compounds

An analysis of Norwegian compounds should…

A. identify the structural configuration in which the components of a compound are combined (cf. Section 3.3)

B. identify one of the compound members as the head and the other as the non-head (cf. Section 2.1)

C. identify the nature and role of linking elements (cf. Section 2.2.3)

D. account for possible and impossible left-hand members, including phrasal left-hand members (cf. Section 2.2.2)

E. address the (im)possibility of compound-internal inflection (cf. Section 2.2.4)

F. account for the assignment of semantic content to transparent and non-transparent compounds (cf. Section 4.1.1.3)

G. inform us about the relationship between primary compounding and synthetic compounding (cf. Sections 2.3 and 2.4)

H. make explicit the role of argumental and non-argumental constituents in compounds, as in *pasta eting* 'pasta eating' and *restaurant eting* 'restaurant eating' (cf. Section 2.3)

A property elaborated on in Chapter 2 that I will not address in my analysis is the phonology of compounds, including stress and tonal accent.

In this chapter and the next, I aim to provide answers to all of the requirements in (13). The current chapter addresses requirements A-F, and the next chapter will address requirements G-H. This will lead to a firmly grounded analysis of the phenomenon couched within a larger theory of grammar.

4.2   How to build a compound: a sketch of a derivation

I begin this analysis of Norwegian compounds with a sketch of the main features of my proposal. The remainder of the chapter will be devoted to motivating and exploring the details of the proposal.

I propose the following structure as the basic structure for all productively formed Norwegian endocentric compounds.

(14)
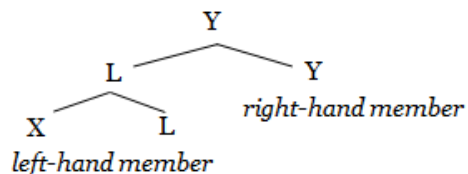
X and L make up the compound's left-hand member – the non-head. L is a functional head realized by a linking element. Y is the compound's right-hand member – the head. The left-hand member is adjoined to the right-hand member.[138]

Let us consider how such a derivation precedes with the compound *barndomsvenn* 'childhood friend'.

(15)   barn-dom-s-venn
   child-NOM-LINK-friend
       'childhood friend'

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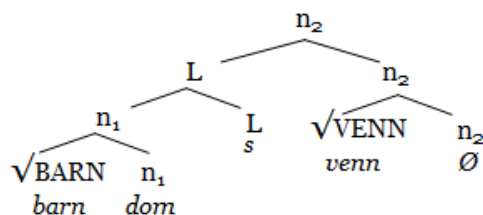
[138] Throughout the dissertation, the term 'left-hand member' sometimes refers only to X and other times refers to X+L. The intended interpretation will be clear from the context.

1. The derivation begins by combining terminals, that is, roots and functional heads, from List 1 into abstract syntactic structures.

2. The two members of the compound are built separately before they are combined by adjunction, where I take adjunction to be Pair Merge, as opposed to Set Merge, following Chomsky (2004), although the tree structure potentially conflates this distinction.

3. In one workspace, the right-hand member of the compound is built by adjoining the root √*venn* to a nominal categorizer.

4. In a different workspace, the left-hand member is built by combining the root √*barn* with an abstract nominal categorizer. A functional head – the linking element – is merged on top of the nominalizer.

5. The finished left-hand and right-hand members are combined by adjunction, more specifically by adjoining the left-hand member to the categorizer of the right-hand member.

6. The right-hand member is now the head of the compound both formally and semantically.

7. After syntax, phonological exponents from List 2 are inserted into the abstract morphological heads: n_1 is realized as *dom,* L is realized as *s,* and n_2 is realized as Ø. The roots take the forms *barn* and *venn*.[139]

8. Finally, the structure is interpreted semantically, or, in the case of established, conventionalized compounds, paired with a semantic interpretation from List 3.

As shown in Chapter 2 as well as Sections 4.4 and 4.5, the internal structure of left-hand members varies a great deal. One of the questions that I will address in the course of this chapter is whether left-hand members are categorized when, unlike in the derivation above, there is no overt categorizing suffix present. Is *barn* 'child' formally categorized as a noun in (16)? In other words, should (16) be represented as (17a) or (17b)?

(16) barn-e-song
      child-LINK-song
      'children's song'

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[139] As discussed in 4.1.1.1, the question of whether roots have phonological content as early as List 1 is debated.

(17) a.

b.
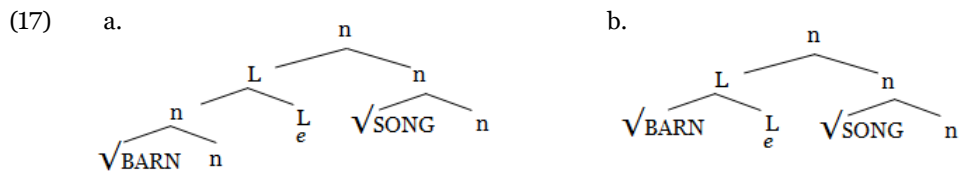
Until I investigate this in more detail in Sections 4.4 and 4.5, I will provide simplified representations for the internal structure of left-hand members, as in (18).

(18)
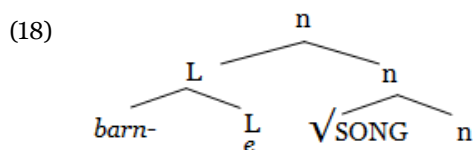
The basic steps sketched here are common to all productively formed endocentric compounds in Norwegian, including deverbal synthetic compounds, which I treat in Chapter 5.[140] In the next sections, I motivate and explore each component of this analysis, extending it to various subtypes of compounds. In that process, I show how the analysis meets the requirements for Norwegian compounds summarized in Section 4.1.2.

4.3 Compounding as adjunction

A central question for the derivation of compounds is exactly how the left- and right-hand members combine. In Chapter 3, we saw that different options have been explored, including merging left-hand members as specifiers, complements and adjuncts.

This question is tied to both Requirements A and B in 4.1.2. Requirement A states that an analysis of Norwegian compounds must identify the appropriate structural configuration in which members of compounds combine. Requirement B states that an analysis of Norwegian compounds should identify one of the compound members as the head, and the other compound member as the non-head. If we understand these notions as structurally defined, then Requirement B is related to Requirement A.

I argue here that the best analysis is one according to which compounding is adjunction, following the proposals of Josefsson (1998) for Swedish and Harðarson (2017)

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[140] In this chapter, I am primarily concerned with productive compound formation and transparent compounds. While there must be some kind of rule or procedure that creates new compounds, it is less clear that a structural analysis should be assigned to lexicalized compounds, as discussed in Chapter 1. Lexicalized compounds are mainly considered in Section 4.6.
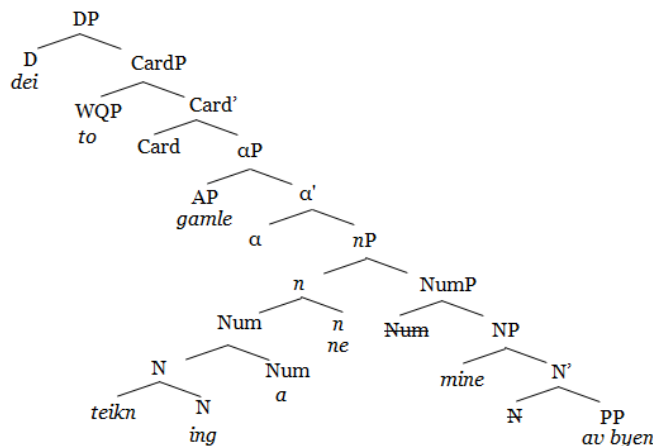
for Icelandic, as well as Aronoff (1994:16). The left-hand member of the compound is adjoined to the right-hand member of the compound.

An adjunction analysis captures many central properties of Norwegian compounds, including the question of headedness. I elaborate on this in section 4.3.2. Before turning to the advantages of an adjunction analysis, however, I will investigate the question of where in the structure of the right-hand member the left-hand member should be adjoined.

4.3.1 Where to adjoin

Adjunction can target different nodes. This raises the question of which nodes in the structure of the compound's right-hand member the left-hand member can be adjoined to.[141] This question can be made clearer by considering Julien's (2005) structure for full Norwegian DPs.

(19) dei to gaml-e teikning-a-ne mine av by-en
  DEF.PL two old-w drawing-PL-DEF my.PL of city-DEF.M.SG
  'my two old drawings of the town'

```
              DP
             /  \
            D    CardP
           dei   /  \
             WQP    Card'
              to   /   \
                 Card   αP
                       /  \
                     AP    α'
                    gamle / \
                        α    nP
                            /  \
                           n    NumP
                          / \   /  \
                       Num  n  Num  NP
                       / \  ne      / \
                      N  Num      mine N'
                    teikn  a          / \
                       N              N   PP
                      ing                av byen
```

Julien (2005:11) proposes the structure in (19) for the most elaborated DPs in Norwegian. From the perspective of compounding, we may ask where a left-hand member such as *barn-e-* 'child-LINK-' should be adjoined if the sentence in (19) were altered to (19').

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[141] Hardarson (2017, 2018) proposes that some cross-linguistic variation in compounding may be due to differences in available adjunction sites.

(19') dei   to   gaml-e   barn-e-teikning-a-ne   mine   av by-en
DEF.PL   two   old-W   child-L-drawing-PL-DEF   my.PL   of city-DEF.M.SG
'my two old child-drawings of the town'

The option that immediately stands out is adjunction of *barne-* to Julien's N (corresponding to n in my structures). Adjunction to the categorizer N captures the fact that higher inflectional elements, here Num and *n*, take scope over the whole compound. This is illustrated in (20).

(20)
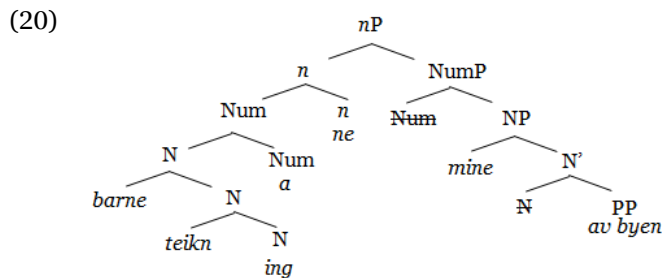
According to this view, inflecting a compound means inflecting the compound as a whole and not just its right-hand member, as has sometimes been proposed for Norwegian compounds (Theil 2016). Thus, adjunction to the categorizer of the right-hand member keeps compounding within the lower functional domain, capturing the intuition in lexicalist and non-lexicalist theories alike that compounds are more lexical in nature, without however deriving them in a different component of grammar.

Another reason for assuming that left-hand members are adjoined low is that when a compound undergoes further derivation, functional projections related to number or definiteness are excluded below the category-changing projection, as shown in (21).[142]

(21)
a. [kyrkj-e-musik]-alsk   [krykje-musikk-*en]-alsk
    church-LINK-music-A   church-music-DEF.M.SG-A
    'that has to do with church music'

b. [atom-fysik]-ar   [atom-fysikk-*en]-ar
    atom-physics-N   atom-physics- DEF.M.SG-N
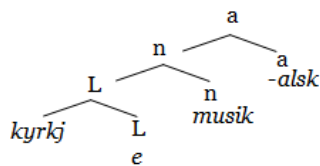   'nuclear phycisist'

---

[142] Words of the type in (21) are sometimes considered bracketing paradoxes because the semantic structure indicated in (21) is not compatible with morphological rules of level ordering, which would predict the structure *[kyrkje][musikalsk]*. Since there are no such restrictions in the framework I assume, I take the semantic structure to be the correct one.

c. [små-borger]-lig   [små-borger-*e]-lig
    small-citizen- A   small-citizen-PL-A
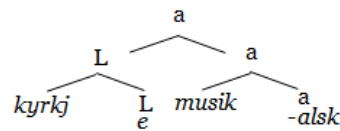   'petit bourgeois'

Examples like these indicate that left-hand members of nominal compounds are adjoined lower than Julien's Num and *n*.

Consider also the observation that the compounds in (21) have an alternative constituent structure, reflecting an alternative semantic interpretation, indicated in (22).[143]

(22) a. [kyrkje-musik]-alsk   b. [kyrkje]-[musik-alsk]

(22a) corresponds to an interpretation of 'something having to do with church music', whereas (22b) corresponds to 'musicality having to do with church'. These differences can be implemented straightforwardly if compounding targets categorizers. Adjunction to different categorizers results in different interpretations.

Finally, adjunction at the level of the categorizer enables us to give completely parallel treatments to compounds of all categories. Whether the categorizer is nominal, adjectival or verbal, adjunction happens before any inflectional material is introduced. Structures with right-hand members of different categories are provided in (23).
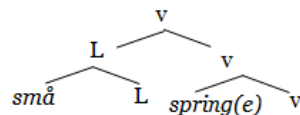
(23)
  a. mjølk-e-glas
     milk-LINK-glass
     'milk glas'
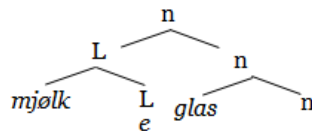
  b. himmel-blå
     sky-blue
     'sky blue'
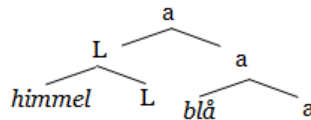
  c. små-springe
     small-run
     'scurry','jog'

---

[143] To simplify the representations, I am not specifying the internal structure of *musik-*.

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I assume that a linking element is present in all three structures, even though it is not always overtly realized (cf. 23b,c). I discuss this in section 4.4.

There are also two more technical arguments for assuming adjunction at the level of the categorizer, which relate to the compatibility of the proposed analysis with other aspects of structure building.

First, structures of the type in (23) and earlier are compatible with head-to-head movement of the compound up to higher functional heads (provided that the root is also adjoined to the categorizer, as discussed in Section 4.1.1.1). Given the structures above, compounds are actually complex heads, not xPs, which means that they behave as heads and can undergo head-movement. So far, I have not indicated head-movement of compounds, but I see it as an advantage that the analysis is compatible with this mechanism (see e.g. Julien 2005, Harley 2009a for head-movement approaches to word-formation).

Second, adjunction at the level of the categorizer ensures that compounding does not interfere with the ability of verbal compounds to take internal arguments. As an example, (23c) can take an internal argument as in (24).

(24) små-spring-e   halv-maraton
      small-run-$_{INF}$ half-marathon
      '(to) jog a half-marathon'

Given the representation in (23c), the internal argument can still be introduced as either the specifier or complement of v (or by a higher projection), and is thus compatible with different types of analyses for internal arguments. Thus, the compound analysis that I propose here is in accordance with other mechanisms of structure building.

4.3.1.1   Adjunction to heads

A note is due here on word-internal adjunction. Adjunction is most commonly used either to merge phrasal modifiers to maximal projections, as in (25), or as the result of head movement, as in (26).
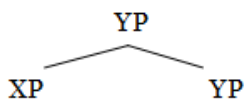
(25)   (26)
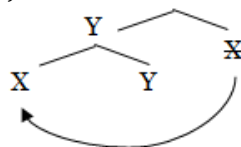
In other words, adjunction to heads is usually the result of internal merge. It is less common to assume adjunction to heads by external merge, which is what I propose for the

analysis of Norwegian compounds. Head adjunction analyses have also been proposed by Piggott & Travis (2013) for Ojibwe complex verbs, by Tomioka (2006) for Japanese resultative verbal compounds, by Josefsson (1998) for Swedish compounds and by Harðarson (2017) for Icelandic compounds (see also Kayne 1994 on left-adjunction to heads).

Piggott & Travis (2013) argue on conceptual grounds that external merge to heads should be possible. The simplest assumption for a grammar is that the same structure building mechanisms are available at all levels, that is, both the head level and the phrasal level. Seeing as both internal and external merge, and both Set Merge and Pair Merge (adjunction), are possible at the phrasal level, we should expect the same to hold for heads. Thus, the simplest assumption is that external pair merge to heads is possible (but see Mathieu et al. 2017 for an opposing view). [144,145]

4.3.2 Arguments for compounding as adjunction

Having argued that compounding targets categorizers, I will now present arguments for why compounding is best analyzed as adjunction.

Given the assumption that words are assembled in the syntax, our hypothesis space is narrowed down to the options of analyzing left-hand members of compounds as specifiers, complements or adjuncts (or heads, which for obvious reasons is not considered). One way to argue in favor of left-hand members as adjuncts, then, is to show that they are not specifiers or complements. I considered previous analyses along those lines in Chapter 3, and pointed to challenges with both alternatives. I this section, I argue for an adjunction analysis by elaborating on the properties of compounds that fall into place once such an analysis is assumed.

First, an adjunction analysis of compounding unambiguously identifies one of the members as the head of the compound, and the other member as the non-head. Assuming that left-hand members are adjoined to right-hand members in Norwegian, the right-hand member is the head of the compound both structurally and descriptively. This distinguishes the current proposal from some of the proposals reviewed in Chapter 3,

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[144] Piggott & Travis speculate that head adjunction might be restricted to modifiers. It is interesting, then, that left-hand members of compounds are also modifiers semantically.

[145] Mathieu et al. (2017) argue against head-adjunction because of the difficulty of distinguishing between simple and complex structures, given Bare Phrase Structure. At this point, we must simply note that the connection between Bare Phrase Structure, adjunction and labeling is a more general problem for the larger theory, and requires more attention in future research (see Hornstein & Nunes 2008, among others, for a proposal).

according to which the right-hand member behaves as the head, but the linking element is the true, syntactic head (cf. Johannessen 2001, Di Sciullo 2005b, 2009, Delfitto et al. 2011).

Recall from Chapter 2 that in descriptive terms, the formal head of an endocentric compound is understood as that element which determines the formal properties of the compound, including its morphological and syntactic properties. The semantic head of an endocentric compound is defined as that element whose denotation is a hyponym of the denotation of the compound as a whole. The right-headedness of Norwegian compounds is illustrated below, where (27) shows that the morphological features of the compound are those of the right-hand member, (28) shows that the compound is inflected the same way as the right-hand member, and (29) shows the compound shares the syntactic distribution of the right-hand member.[146]

(27) a. [mjølk $_{\text{N.FEM}}$-e-glas $_{\text{N.NEUT}}$] $_{\text{N.NEUT}}$
          milk-$_{\text{LINK}}$-glas s
          'milk glas'

      b. [små $_{\text{A}}$-springe $_{\text{V}}$] $_{\text{V}}$
          small-run
          'scurry', 'jog'

      c. [himmel $_{\text{N.MASC}}$-blå $_{\text{A}}$] $_{\text{A}}$
          sky-blue
          'sky-blue'

(28) a. mjølk-e-glas-et   glas-et
          milk-$_{\text{LINK}}$-glas-$_{\text{DEF.NEUT}}$ glas-$_{\text{DEF.NEUT}}$

      b. små-sprang   sprang
          small-run.$_{\text{PAST}}$ run.$_{\text{PAST}}$

      c. himmel-blå-tt   blå-tt
          sky-blue-$_{\text{NEUT}}$ blue-$_{\text{NEUT}}$

(29) a. Ola samlar på sjeldne mjølk-e-glas   Ola samlar på sjeldne glas
          'Ola collects rare milk-glasses'   'Ola collects rare glasses'

      b. Ola små-spring til bussen   Ola spring til bussen
          'Ola jogs to the buss'   'Ola runs to the bus'

      c. Ola ønsker seg eit himmel-blå-tt glas Ola ønsker seg eit blå-tt glas
          Ola wants a sky-blue glass'   'Ola wants a blue glass'

---

[146] As shown in Section 2.1, a handful of compounds do not fit with this description, e.g. *løvetann* 'dandelion', which does not behave grammatically like its right-hand member *tann*. Such cases will be discussed at the end of the current section.

All of the patterns in (27)-(29) are expected if compounding is adjunction of a left-hand member to a right-hand member.

According to the adjunction analysis, then, a compound behaves like its right-hand member because it *is*, in the relevant sense, the right-hand member. This can be understood as a direct theoretical implementation of Allen's (1978) IS A condition (see Section 3.2.3). Adjunction allows us to identify the head of a compound without additional mechanisms such as specifier-head-agreement between the linker and the head (Johannessen 2001, cf. 3.3.3) or the stipulation of the Right-hand-head-Rule (Williams 1981, Selkirk 1982, cf. 3.3.1). We do, however, have to postulate that compounding in Norwegian is left-adjunction. This type of information concerning the linearization of adjuncts must be postulated anyway, given cross-linguistic variation, along with the information that in Norwegian, high adverbials (sentential adverbials) are left-adjoined and low adverbials are right-adjoined (Åfarli & Eide 2003).

Adjunction of left-hand members to right-hand members thus meets Requirement B in Section 4.1.2, which states that an analysis of Norwegian compounds should 'identify one of the compound members as the head and the other as the non-head'.

The examples in (28)-(29) above also illustrate another property of compounding and adjunction: left-hand members of compounds are not obligatory for grammatical well-formedness. Adjuncts are generally optional, as shown with the adverbials in (30), and so are left-hand members of compounds.

(30) Ola   et (kanskje)   kake (kvar dag) (etter jobb)
      Ola   eats (perhaps)   cake (every day) (after work)

The observation that both left-hand members of compounds and elements typically analyzed as adjuncts are optional is the second argument for analyzing compounding as adjunction.

The third argument for analyzing compounding as adjunction is that as far as the grammar is concerned, there is no upper bound to the number of adjuncts that can be added to a structure. In a parallel manner, there is no upper bound to the number of left-hand members that can be added to a compound, although very long compounds may be difficult to interpret.

(31) a. anitkk-[plast-[barn-e-[mjølk-e-glas]
         antique-platic-child-LINK-milk-LINK-glas
   e.g. antique glass made of plastic used by children to drink milk

b. sakte-[monster-[hopp-e-[små-springe]
   slow-monster-jump-LINK-small-run
   e.g. slow easy running in a jumpy manner as done by a monster

c. gamal-[lys-e-[kommun-e-[himmel-blå]
   old-light-LINK-municipality-LINK-sky-blue
   e.g. blue like the sky, but light, greyish (=*kommune*) and old

Finally, an adjunction analysis can derive complex compounds in exactly the same way as simple compounds, by repeating the same operation. This is shown in (32).

(32) a. [[barn-e]-bok]-klubb   b. barn-e-[bok-klubb]
       child-LINK-book-club   child-LINK-book-club
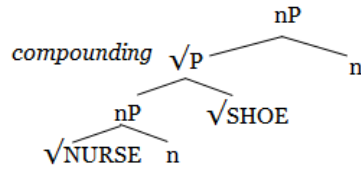   'club for children's books'   'book club for children'
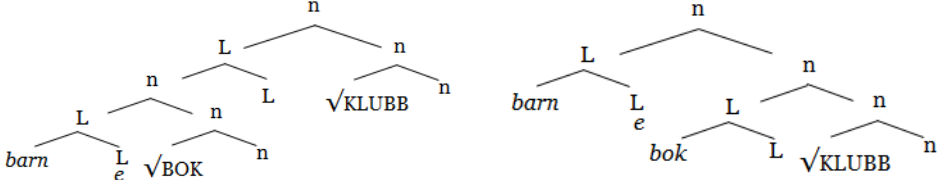
c. [[grå-vêr]-s]-[[barn-e]-bok]]
   grey-weather-LINK-child-LINK-book
   e.g. 'children's book for days with bad weather'
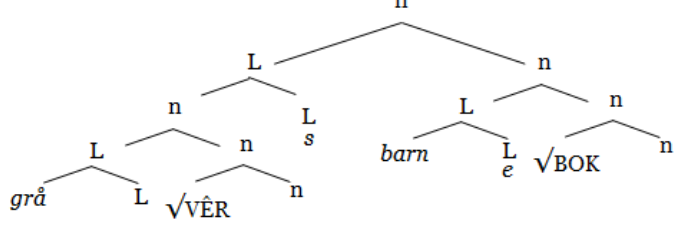
Recall from Section 3.3.5 that the generation of complex compounds is problematic in an analysis such as that of Harley (2009a), which derives compounds via head-movement. This can also be framed as a labeling problem. Assuming the view on labeling developed by Chomsky (2008), Set-Merge does not allow the combination of two objects of the same linguistic size, because it becomes impossible to identify one of the constituents as the head of the structure. Consider the compound structure below, where a version of the analyses by Siddiqi (2009) and Harley (2009a) is provided in (33), and an attempt at extending this to more complex compounds is provided in (34).

(33)

compounding √P ── nP ── n
             nP √SHOE
        √NURSE n

(34)

compounding √P ── nP ── n ⋯ ? ⋯ nP
             nP √HEEL   *nurse shoe*
        √CUSHION n
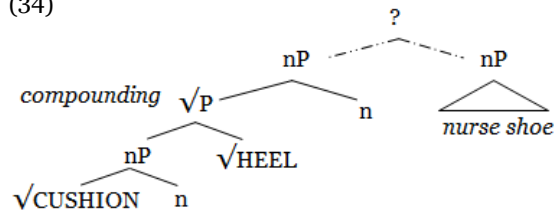
The labeling mechanism associated with Set-Merge only allows us to combine a simple object (a head) and a complex object (a phrase). It does not allow the combination of two objects of the same size (e.g. two phrases, as in (34)), because that would make it impossible to determine the label of the resulting structure.[147]

Under the reasonable assumption that simple and complex compounds are generated by the same structure building mechanism, the observation above provides indirect support for a compound structure derived by Pair-Merge/adjunction. Indeed, the structure in (34) looks like a typical case of adjunction.

In this section, I have pointed to many properties of Norwegian compounds that are predicted if the left-hand and right-hand members of a compound are combined via adjunction. One of the important advantages of the current proposal is that it identifies the right-hand member of a Norwegian endocentric compound as the head both descriptively and syntactically, thus accounting for both Requirements A and B in Section 4.1.2.

4.3.2.1 Compounds that are not predicted by the analysis

A handful of compounds do not behave as predicted by the analysis proposed here. First, there are some compounds whose grammatical properties do not match those of the right-hand member, as shown in (35). In (35a) the right-hand member is feminine and the compound as a whole is masculine. In (35b), the simple verb and the compounded verb have different argument structure properties – only the compound can take *badet* 'the bathroom' as an internal argument.

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[147] Despite this ban on symmetrical structures, the building of symmetrical structures has been argued to happen, and when it does, there are proposals for how such situations can be solved (see Moro 2000, Lohndal 2014, Adger 2013, Narita 2014). An analysis of compounds along these lines is proposed by Delfitto et al. (2011). However, as discussed in Section 3.3.4, there are a number of difficulties in making this proposal work. An alternative, then, is that compounds are not derived by Set-Merge at all, but rather by Pair-Merge.

(35) a. [løve~N.FEM~-tann~N.FEM~]~N.MASC~
         lion-tooth
         'dandelion'

     b. [flis-legge] bad-et   *legge   bad-et
         tile-lay   bath-~DEF. SG~   laybath-~DEF. SG~
         'lay tiles in the bathroom'   'lay   the bathroom'

Furthermore, there are compound-like words whose left-hand member appears to be
obligatory.

(36) a. klokke-makar   b. blå-aktig   c. barn-e-vennlig
         watch-maker   blue-*aktig*   child-~LINK~-friendly
         'watchmaker'   'blue-like', 'blueish' 'child friendly'

The right-hand member *makar* in (36a) does not occur as a free form in Norwegian, nor
is there an independent verb *å make* 'to make'. The bound right-hand member -*makar*
can nevertheless be used to form new words denoting somebody who creates something.
Similarly, the right-hand member in (36b) only occurs as a bound form. And finally, the
right-hand member in (36c) exists both as a free form and a bound form, but with
slightly different interpretations in each case. The reading of *vennlig* as 'appropriate for'
only appears when *vennlig* is a bound form. The forms in (36) are all pronounced with
compound intonation (cf. Section 2.2.1).

    The examples in (35) and (36) are problematic for an analysis of compounding as
adjunction, which predicts (a) that the grammatical properties of the compound should
be the same as those of the right-hand member and (b) that the left-hand member should
not be obligatory.

    My main goal is to account for productive compound formation. However, (35a) is
an old, lexicalized form borrowed into Norwegian via Low German. Compounds with such
properties are not formed productively, so I do not consider them within the scope of my
analysis. (35b) is potentially more challenging since this type of compound formation is
productive. However, an explanation is available in the exoskeletal framework (Borer
2005b). According to this view, argument structure is not a property of roots, but is rather
imposed by functional structure higher than the locus of compounding. According to this
view it is not unexpected that simple and compounded verbs sometimes occur in different
structural environments, since their semantics can be compatible with different sentence
structures.

    As for the forms in (36), I propose that these are actually suffixes. Historically,
many suffixes are derived from right-hand members of compounds. As noted by Kastovsky
(2009), since this is a gradual development, it is expected that some forms will display a

type of intermediary status between compound form and suffix (sometimes referred to as affixoid). If the forms in (36) are suffixes, they too fall outside the scope of this dissertation, but must be addressed in future work.

4.4 A functional head in compounds

One of the basic questions concerning the structure of compounds is whether the two stems combine directly, as in (37a), or whether there is something mediating between them, as in (37b).

(37) a.

```
      /\
     a    b
```

b.

```
     /  ┊  \
    a    x    b
```

In Chapter 3, we saw that both positions have been taken. In Section 4.2, I sketched an analysis in line with (37b), and I will argue for that view here. Specifically, I propose that left-hand members of compounds are headed by a functional projection, realized by what we know as the linking element. Although not all compounds have overt linking elements, I propose that the functional head is always present. This makes the proposed functional head similar to others such as C or Num, which can also be present in the syntax even when they are not realized phonologically.

The current section, then, addresses Requirement C in Section 4.1.2, which states that an analysis of Norwegian compounds must identify the nature and role of linking elements.

Assuming binary branching (Kayne 1984), the proposed functional head must form a constituent either with the left-hand member or the right-hand member of the compound. In Chapter 2, I presented several types of data indicating that linking elements in Norwegian form a constituent with the left-hand member. Consider again the examples below.

(38)
  a. katt-e   og   hund-e-mat
     cat-LINK   and   dog-LINK-food
     'cat and dog food' (i.e. cat food and dog food)

  b. katt-e-mat   og   *-e-drikke
     cat-LINK-food and   -LINK-drink
     intended: 'cat food and cat drink'

(39) a. katt-e-mat   b. katt-e-dag   c. katt-e-drøm
         cat-LINK-food   cat-LINK-day   cat-LINK-dream
         'cat food'   'cat day'   'cat dream'

(40) a. fred-s-mat   b. fred-s-dag   c. fred-s-drøm
         peace-LINK-food   peace-LINK-day   peace-LINK-dream
         'peace food'   'peace day'   'peace dream'

These examples show that the linking element stays with the left-hand member under coordination with ellipsis, and that the form of the linking element is determined by the left-hand member. I conclude from this that if there is a functional head in compounds, and the functional head is realized by linking elements, then such a functional head forms a constituent with the left-hand member. Thus, Norwegian compounds have the structure in (41), where I label the functional head L.[148]

(41)
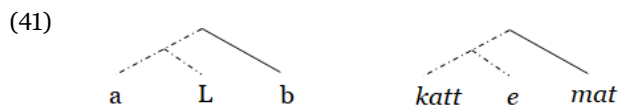
In the next subsection, 4.4.1, I present further arguments for assuming a functional head in compounds, and in 4.4.2. I develop a view on the exact role of this functional head. Finally, in 4.4.3, I investigate the insertion of phonological exponents to realize the L-head.

4.4.1 Arguments for an L-head

There are four different arguments that I will pursue in favor of positing a functional head in compounds, that is, for the structure in (37b), rather that (37a). Here I outline them briefly before returning to each in more depth.

The first argument for (37b) comes from the observation that linking elements show up between the components of compounds in a range of languages. This simple observation indicates that there is something there. The second argument for (37b) comes from the productivity of linking elements, which, as I will show, is difficult to capture in approaches that assume (37a). I develop the first two arguments in the current section.

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[148] Elements classified as "linkers" also occur elsewhere in grammar (Rubin 2003, den Dikken & Singhapreecha 2004, den Dikken 2006, Philip 2012 among others). Future work should address the extent to which these notions of "linker" belong to the same phenomenon.

In Section 4.4.2, I formulate a specific view of the role that the functional head plays in semantic composition. This, then, becomes the third argument for the existence of a functional head in compounds.

Finally, the fourth type of argument I will pursue relates to the usefulness of a functional head in allowing us to account for other properties of compounds, such as allomorphy in left-hand members of compounds. This argument is developed in Section 4.5.

4.4.1.1   Linking elements show up in compounds cross-linguistically

Linking elements occur in compounds in a number of languages. For example, in Greek, compounds take an *o*-linker (Ralli 2009:458).

(42) a. aɣri-o-ɣata
          wild-LINK-cat
          'wild cat'

      b. nixt-o-puli
          night-LINK-bird
          'night bird'

In Polish, a linking element, usually *-o-*, is found with adjectival and nominal left-hand members (Szymanek 2009:466-67).

(43) a. gwiazd-o-zbiór
          star-LINK-collection
          'constellation'

      b. żyw-o-płot
          live-LINK-fence
          'hedge'

German is known for its intricate system of linking elements, similar to that of Norwegian (Nübling & Szczepaniak 2013).

(44) a. Abfahrt-s-zeit
          departure-LINK-time
          'departure time'

      e. Schwein-e-braten
          pig-LINK-roast
          'roast pork'

      b. Blume-n-stängel
          flower-LINK-stem
          'flower stem'

      f. Kind-er-wagen
          child-LINK-wagon
          'perambulator'

      c. Schrift-en-verzeichnis
          writing-LINK-register
          'publication list'

      g. Schmerz-ens-geld
          pain-LINK-money
          'compensation for pain'

      d. Kind-es-wohl
          child-LINK-well-being
          'child's welfare'

      h. Name-ns-schild
          name-LINK-sign
          'name tag'

English has been analyzed as having remnants of linking elements in cases like (45) (Marchand 1969:27, Bauer et al. 2013:624).

(45) a. sport-s-man   b. spoke-s-man

Other languages reported to have linking elements include Danish, Dutch, Faroese, Hausa, Hebrew, Icelandic, Ilocano, Khmer, Kuku, Norwegian, Russian, Serbo-Croatian, Slovak, Swedish, Tibetan, Turkish, Ukranian and Yalanji (Bauer 2009, Štekauer et al. 2012). These languages vary with respect to how common linking elements are and in which compounds they are used. For example, in Norwegian, linking elements are rarely used with adjectival left-hand members, but in Polish, adjectival left-hand members can take *o*-linkers, as shown in (43). Linking elements are found with verbal left-hand members in Norwegian, Icelandic and Faroese, but not in Swedish. The way I interpret this, languages vary with respect to what vocabulary items (phonological exponents) they have available to realize the L-head, as well as the specific conditions for their insertion. I explore these conditions for Norwegian in Section 4.4.2.[149]

The vocabulary items (linking elements) that realize the L-head are usually derived from other grammatical markers. In Germanic, most linking elements are reanalysed case-markers and stem-forming suffixes (Nübling & Szczepaniak 2013). In West Frisian, diminutive markers are also used as linking elements (Hoekstra 1998:40-41, cited in Fuhrhop & Kürschner 2015), and in Norwegian, some nominalizers seem to be used as linking elements (see 2.2.3). The linking element in Greek is historically derived from a theme vowel (Ralli 2009). If compounds have the structure in (37b), then the reason why reanalyzed phonological material keeps showing up between the components of compounds could very well be that there is an underlying functional head in the structure that drives this reanalysis.

In conclusion, I take the observation that linking elements appear in compounds in many languages as an indication that there is a functional head in compounds. This functional head can be phonologically overt or covert.[150]

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[149] This view can be contrasted with that of De Belder (2017) for Dutch. De Belder argues that there are two types of compounds in Dutch: noun-link-X compounds like kat_N-en_L-*luik* 'cat panel'='cat door' and root-X compounds like *slaap-pil* 'sleep pill'='sleeping pill', where only the former takes linking elements. This classification is not possible in Norwegian, since in Norwegian, unlike Dutch, verbal left-hand members also take linking elements (e.g. sov_V-e_L-*pille* 'sleep pill'='sleeping pill'), and thus would not fit into either category. Rather, I propose that there is a common compound structure where the phonological realization of the L-head is dependent on the properties of the left-hand member.

[150] Alternatively, linking elements could be analyzed as 'dissociated morphemes' (Embick 1997). Unlike other morphemes in the theory, dissociated morphemes are hypothesized to be purely morphological

4.4.1.2 Accounting for linkers without FP: Neef (2015)

Analyses of compounds that do not assume a mediating functional head, that is, analyses that assume (37a), must provide an alternative account for linking elements. Here, I consider one such approach and point out that it cannot easily account for the productivity of linking elements. On the analysis in (37b), on the other hand, the existence of productive linking elements is expected. This is an argument for the structure with an L-head.

A common analysis of linking elements is that they do not play any functional role, but rather form inherent parts of left-hand member allomorphs. Such an analysis is proposed by Neef (2015), and is compatible with the structure in (37a).[151] (See also Aronoff & Fuhrhop 2002, Booij 2005 among others.) Neef takes a particularly strong position stating that "linking elements do not have the status of linguistic units on any level of the language system" (Neef 2015:30).

The analysis Neef proposes is based on stem-form paradigms. He argues that the linker is an integrated part of a compound stem, a bound stem-allomorph specific to compounds. For the German lexeme LIEBE, for example, he proposes that there is a slot in the paradigm specific to compounds, which specifies its compound stem as Liebes-.

(46)

Default stem	*LIEBE*	*Liebe*	'love'
Derivational stem	*LIEB*	*lieb-lich*	'lovely'
Compound stem	*LIEBES*	*Liebes-brief*	'love letter'

Neef finds support for the compound stem analysis in the observation that German also has compound left-hand members that involve alternations other than adding a linking element to the left-hand lexeme, as shown in (47).

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elements that do not realize any syntactic node. They are only present to fulfill the morphological well-formedness requirements of a language.

[151] Neef (2015) does not use tree structure representations, but the analysis is compatible with (37a).

(47)	a. Mutter	Mütter-heim	'mother's shelter'
	b. Sprache	Sprach-insel	'linguistic enclave'
	c. Firma	Firm-en-führung	'chief executive'
	d. Mythos	Myth-en-bildung	'creation of myths'

A theory that postulates specific compound forms can account for linking elements and the examples in (47) in a single system. Thus, according to Neef, linkers are simply inherent parts of bound stem-allomorphs licensed by compound structure.

Although this analysis covers much of the data, it is unclear how it can accommodate the observation that linkers are in some cases productive, in the sense that they extend to new left-hand members, both in German and Norwegian (Kürschner 2010, Nübling & Szczepaniak 2013). The productivity of linkers in Norwegian is illustrated by (48). It is not likely that all speakers have an already existing stem-allomorph in their paradigm for left-hand members like these, since they are all recent formations. The compound in (a) is constructed by me, (b) is from a 2017-newspaper article, and (c) is formed with a recent borrowing from English. Yet, although these formations are new, speakers know that a linker should be used.

(48)   a. [[mår-mjølk]-s]-kake
           marten-milk-LINK-cake
           e.g. 'cake made from the milk of a marten'

       b. [[[syv-fjell]-s]-vett]-regel[152]
           seven-mountain-LINK-wits-rule
           'common sense rule for a hike of seven mountains'

       c. [chill-e]-dag[153]
           chill-LINK-day
           'relaxing day'

If there is no listed allomorph for the left-hand members in (48), how do speakers determine that there should be a linker and what form it should have? It is not clear how the stem-allomorph account can deal with *productive* allomorph-formation, especially without granting the linking element the status of a "linguistic unit on any level of the language system", as Neef puts it.[154]

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[152] *Aftenposten* May 27th 2017

[153] Recall from Chapter 2 that this -*e* should not be analyzed as an infinitive, since there are dialects that have different forms in infinitives and compounds (e.g. inf. *chill-a* in the Hardanger dialect).

[154] Neef also denies that linkers could have any phonological or prosodic role. Thus, there is no reason, in his account, for why new stem allomorphs should be created productively. Furthermore, to my

As an alternative, I propose the schematic structure in (24b) for compounds. I do however follow Neef in analysing some alternative left-hand members as cases of stem-allomorphy. Importantly, such allomorphs are licensed not by the compound structure as such, as proposed by Neef, but by the functional head. This is laid out in Section 4.5.4.

4.4.2 The role of the L-head

Endocentric compounds have in common that there is a relation of modification between the two members. The left-hand member modifies and restricts the reference of the right-hand member. Since this aspect of the interpretation of compounds is common to all regularly formed compounds in Norwegian, I take it to be imposed by the syntactic structure of compounds. Other than that, the exact modificational relationship between the two compound members is underspecified and must be determined pragmatically, in line with the Variable R approach to compounds. Consider for example the compound *gullskei* 'gold spoon', which can have at least the interpretations listed in (49).

(49) gull-skei 'gold spoon'
    a. spoon made of gold
    b. spoon used to eat gold (e.g. soup)
    c. spoon with a gold color
    d. spoon that is as valuable as gold
    e. the spoon that won you the first place in the egg-and-spoon-race

What all of these readings have in common is that *gull* 'gold' somehow restricts the reference of *skei* 'spoon' to a specific type of *skei*. Furthermore, the range of possible interpretations is tied to the meaning of the parts, but which of the interpretations in (49a-e) is the appropriate one must be determined in context. The question that arises is how exactly this structural semantics is imposed.

Since we know already that vocabulary items (i.e. linking elements) frequently appear between the two members of a compound, and we know that something must be said about the semantic composition of compounds, I propose to pair these two observations: The L-head provides a procedural semantics, an instruction that specifies how elements should compose. Specifically, it establishes an underspecified relationship between the compound members.

We can also consider this in formal semantic terms. Arguably, the modificational relationship between the two compound members does not immediately arise upon combining the members directly in a sisterhood relation. If that were the case, under

knowledge, allomorphy in these languages otherwise comes about through gradual diachronic processes, such that "productive allomorph formation" is not really an established theoretical concept.

standard assumptions, they would compose via Predicate Modification (Heim & Kratzer 1998, Kelly 2013:32, fn 8). For a compound like *tekopp* 'tea cup'*,* the resulting semantic representation would be 'something which is tea and something which is a cup', which clearly is not the correct interpretation for 'teacup'. Therefore, something more is necessary in order to account for the semantics of compounds.[155]

What I propose is that the functional head in compounds drives their semantic composition by establishing an underspecified relationship between the property denoted by the left-hand member and an entity in the extension of the right-hand member. This is represented in (50), where R is a free variable over relations between individuals and properties, whose value in any given utterance is provided pragmatically.

(50)   L = $\lambda P.\lambda Q.[\lambda x.Q(x) \ \& \ R(x)(P)]$

Let us see how this works with the compound *barndomsvenn* 'childhood friend'.

(51)
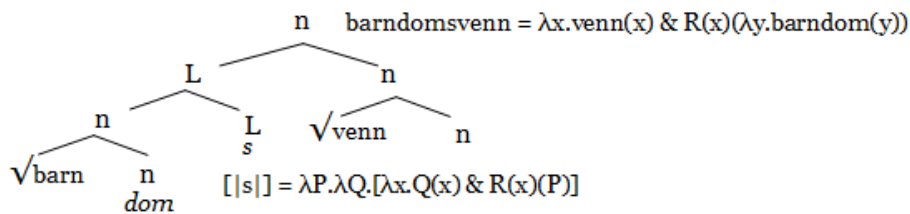
In a compound, L takes the left-hand member and the right-hand member as its arguments. It combines first with the left-hand member and then with the right-hand member. In this particular example, L, realized as *s*, takes *barndom* 'childhood' and *venn* 'friend' as its arguments.

The denotation of L can be stated as that function which takes a property P, a property Q and an entity x and returns true if x is a Q and x stands in some relation to P. The result is a representation for *barndomsvenn* which now can be stated as that function which takes an argument x and returns true if x is a *venn* and x stands in some

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[155] For certain compounds, such as *klokkeradio* 'clock radio', the statement 'something which is a *klokke* 'clock' and something which is a *radio* 'radio' may be appropriate. However, that is not the only possible interpretation of *klokkeradio,* another interpretation being 'radio that looks like a clock'. This indicates that the meaning of *klokkeradio* is really more abstract. Consider also *blåbær* 'blueberry' and *kvitvin* 'white wine', which can denote things that are blue and white, but also things that are green and yellow.

pragmatically determined relationship to the function that takes an argument y and returns true if y is *barndom*, i.e. to the property *barndom* 'childhood'.

This is the desired result. A *barndomsvenn* 'childhood friend' is a *venn* 'friend' that stands in some underspecified relation to *barndom* 'childhood'. The exact nature of the relation is determined pragmatically (or, in the case of conventionalized compounds, encoded in the encyclopedia, cf. Section 4.6). For *barndomsvenn* the most accessible interpretation is the one in (52a), but (52b-d) are also possible interpretations given very specific contexts.

(52)   a. a friend from one's childhood
        b. somebody who likes (i.e. is a friend of) childhood
        c. a friend who reminds you of your childhood
        d. a friend who is an expert on childhood

This illustrates how the semantic interpretation of a compound is both underdetermined and conceptually constrained by the semantics of the components.

Here, I have provided a preliminary sketch of how this can be implemented for a case of NN-compounding. However, it is important to acknowledge the challenge posed by the fact that compounds can be formed with predicates of many different types. Compounds are formed with elements from all lexical categories. For example, both constituents can be verbs, which in many theories would require different treatments from those described in the previous examples for nouns. Furthermore, left-hand members can be of almost any size, from full phrases to elements potentially as small as roots. (See Sections 4.4.3 and 4.5 for discussion. See also Marantz 2007 and Harley 2014 for some discussion of the semantic composition of roots compared to categorized elements.) Thus, several details remain to be worked out before we have a complete proposal concerning the semantic composition of compounds, and those must be addressed in future research. However, the above illustrates the gist of the analysis.

The semantics proposed for the linking element here is similar to that of certain possessives (Partee 1983/1996 cited in Partee 2006).[156] This is a welcome result inasmuch as there are several similarities between compounds and possessives. Possessive constructions and compounds are both highly underspecified and can be used to express many different relations. Furthermore, one language will often use a possessive construction or possessive-like construction to express what another language expresses with a compound. Consider for example French *lampe de poche* 'lamp of

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[156] The linker is probably most similar to the *s*-genitive in English: *The finger of Mary* can't be 'the finger that points at Mary', but *the Mary-finger* can and so can *Mary's finger*.

pocket'='flashlight' corresponding to the Norwegian compound *lommelykt* 'pocket lamp'='flashlight'. In some languages, left-hand members of compounds can have genitive case marking (e.g. Icelandic, see Harðarson 2017), and most linking elements in Germanic are historically derived from such genitive markers. Finally, English has a number of expressions that are difficult to classify as either compounds or possessives, such as 'children's book'. All of these factors indicate that we do indeed want similar semantic representations for compounds and possessives.

### 4.4.3 Accounting for the choice of linking element

In this chapter, I have argued for a compound structure where the left-hand member is adjoined to the right-hand member. The left-hand member is headed by a functional projection, L, which can be realized by a linking element. This results in the following coarse representations for simple (53a) and complex compounds (53b,c) with different constituent structures.

(53)
a. [mjølk-e]-flaske
    e.g. 'bottle for milk'

b. ku [[mjølk-e]-flaske]
    e.g. 'milk bottle with a picture of a cow'
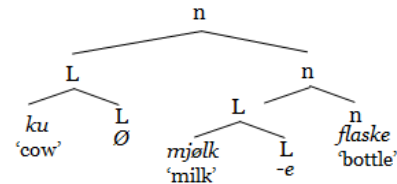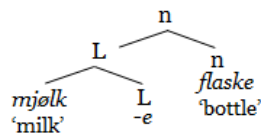
c. [[ku-mjølk]-s]-flaske
    e.g. 'bottle for cow's milk'
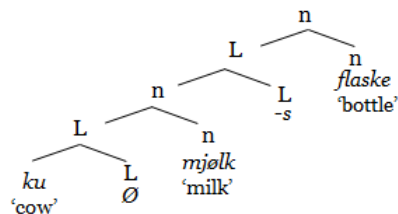
The goal of the present section is to investigate the conditions that determine the insertion of linking elements into structures like those in (53). In particular, there is a question of how to implement the difference in linker choice between simple and complex left-hand members. In (53a) and (b), the linker immediately following *mjølk* is *e,* whereas in (53c), the linker immediately following *mjølk* is *s*. Based on such examples, it seems that the linking element is sensitive to the complexity of the left-hand member. Thus, in

the current section, I also take up the question raised in Section 4.2 about the internal structure of left-hand members.

I begin by recapitulating the main patterns for the distribution of linking elements in Norwegian, laid out in more detail in Chapter 2, before addressing what these patterns tell us about the structures above and the vocabulary insertion of linking elements.

4.4.3.1 *Predictable and unpredictable linking elements*

A distinction can be made between linking elements that are predictable from the morphological properties of the left-hand member, specifically their category and declension class, and linking elements that are not predictable in this way and must be specified for the individual left-hand members with which they occur. Research on linking elements in Norwegian has focused on the latter type, which I describe first.

Linking elements in Norwegian, and in Germanic more generally, are known to be unruly and unpredictable. Bauer (2009a:406) concludes that compounds in Danish "indicate that no absolute generalizations about the form of the link (if any) exist as long as we seek generalizations over the established lexicon", and he cites similar conclusions for other Germanic languages. Similarly, as shown in Chapter 3, Aasen (1848, 1864), Iversen (1924) and Faarlund et al. (1997) all conclude that the synchronic distribution of linking elements in Norwegian is largely unpredictable, although tendencies exist, and they must be explained with reference to various historical factors. Thus, there is no way to predict in the synchronic grammar that among the so-called strong[157] nominal left-hand members in (54), (54a) takes an *s*-linker, (54b) takes an *e*-linker, and (54c) takes no linker.

(54) a. land-s-lag   b. and-e-dam   c. sand-Ø-korn
       land-LINK-team   duck-LINK-pond   sand-LINK-grain
       'national team'   'duck pond'   'grain of sand'

Rather, a left-hand member selects a particular linking element and uses this in all productive compound formation.[158] These linkers must be listed on an item-by-item basis. They are lexicalized and idiosyncratic to the extent that *explaining* their exact distribution falls outside the scope of a synchronic morphological theory (Fuhrhop & Kürshcner 2015).

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[157] In Modern Norwegian, weak nouns end with an unstressed vowel in their free form, and strong nouns end with a consonant in their free form (see Section 2.2.3.3).

[158] The left-hand member *land-* 'land, country' also occurs with *e* and *Ø*. Again, whether a left-hand member takes one or more linking elements is a specification of the particular left-hand member and cannot be predicted. When more than one linker is used, the linkers can be associated with different semantic interpretations of the left-hand member, or one of the linkers can be the productive one.

However, as we saw in Chapter 2, there are also linking elements that have more rule-governed behavior. When the left-hand member of a compound is a weak noun, the linker can always be realized as *e*. Thus, in this case, we can state that the choice of linking element is conditioned by the category and declension class of the left-hand member, cf. (55).[159]

(55) a. kak-e-boks   b. stjern-e-klar   c. oks-e-hale
         cake-LINK-box   star-LINK-clear   ox-LINK-tail
         'cake tin'   'starry'   'oxtail'

We see the same type of predictable behavior with respect to left-hand members and the choice of linking element with verbal left-hand members. With a few exceptions, which must be listed for specific left-hand members just as with the strong nouns in (54), simple weak nominal left-hand members and verbal left-hand members take predictable rule-governed linking elements.

The patterns of linking elements in Norwegian are summarized in the table below, with left-hand members classified by category and declension class, as well as complexity. I list less common linking elements in parentheses. When more than one linking element is available for a given class, the choice between these linking elements cannot be conditioned by morphological factors alone. Rather, one or more of the linking elements must be conditioned by specific left-hand members that fall into this class, as with the examples in (54).

Table 3 Distribution of linking elements, all non-heads

Left-hand members	Left-hand member is simple	Left-hand member is a compound
Strong noun	e, s, Ø (a, er)	s, Ø *free variation?*
Weak noun	e (en, es, Ø)	e
Verb	e (ar, Ø)	e
Short verb	Ø	(Ø) *short verbs rare in this position*

Thus, linking elements with simple strong nominal left-hand members are unpredictable. It is not possible to predict based on the morphological properties of such left-hand members which of the linking elements in this cell should be used. This was exemplified in (54). Similarly, in some cases when the left-hand member is a weak noun

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[159] See Section 2.2.3.3 as well as footnote 31 for arguments that this -*e* is a linker and not an inherent part of the stem.

or a disyllabic verb, the linking element is unpredictable (this will be illustrated below). Put differently, these linking elements are conditioned by idiosyncratic properties of a specific left-hand member. In most cases, however, weak nominal left-hand members and verbal left-hand members take a regular, rule-based linker, exemplified in (55). That is, they are conditioned by morphological properties of the left-hand member. This is also true when the left-hand member is itself a compound. The exception to the latter generalization is the choice between s/Ø, which appear to be used almost interchangeably, and might be goverened by phonological and prosodic factors (see discussion in Section 2.2.3).

The table also indicates that the situation described in the introduction of this section, where the same form appears with different linking elements in simple and complex compounding, occurs when the linking element in the simple case is of the unpredictable type. That leads to the pattern in (53) with the strong noun *mjølk*, where *mjølk* as a simple left-hand member takes the unpredictable linker *e,* but *(ku)mjølk* as a complex left-hand member takes the predictable linker *s*.[160]

The various patterns are illustrated in (56)-(58). The examples show compounds with simple and complex left-hand members of different types.

(56) Strong nominal left-hand members

	Free form	Simple compound	Complex compound
a.	katt 'cat'	[katt-e]-mat cat-LINK-food 'cat food'	[vill-katt]-mat wild-cat-food 'wild cat-food'
b.	mjølk 'mjølk'	[mjølk-e]-flaske 'milk' milk-LINK-bottle 'milk bottle'	[[ku-mjølk]-s]-flaske cow-milk-LINK-bottle 'bottle for cow's milk'
c.	sport 'sport'	[sport-s]-veke sport-LINK-week 'sports week'	[[ekstrem-sport]-(s)]-veke extreme-sport-LINK-week 'week for extreme sports'

---

[160] Linking elements are sometimes argued to play a functional role in distinguishing complex compounds with the structure N [N N] from those with the structure [N N] N (Iversen 1924). This could explain the different linking elements in *[ku-mjølk]-s-flaske* and *ku-[mjølk-e-flaske],* and is proposed to help the processing of complex words (Kürschner & Szczepaniak 2013). However, while the linking element can be said to have this effect, it seems clear that this is not its *raison d'etre*. As the examples in (56)-(58) show, there are a number of compounds where the linking element does not help in this way (see also Bauer 2009a, who reaches the same conclusion for Danish). Rather, the cases where the linking element distinguishes between constituent analyses must be considered the convenient consequence of other properties of compounds.

d.	fred	[fred-s]-tid	[[jul-e-fred]-s]-tid
	'peace'	peace-LINK-time	Christmas-LINK-peace-LINK-time
		'peace time'	'period of Christmas peace'
e.	bok	[bok]-klubb	[barn-e-bok]-klubb
	'book'	book-club	child-LINK-book-club
		'book club'	'children's book club'
f.	vin	[vin]-flaske	[[raud-vin]-s]-flaske
	'wine'	wine-bottle	red-wine-LINK-bottle
		'wine bottle'	'bottle of red wine'
g.	ferd	[ferd-a]-folk	[[grav-ferd]-s]-byrå
	'journey'	journey-LINK-people	grave-journey-LINK-bureau
		'travellers'	'funeral home'
h.	student	[student-er]-hus	[fysikk-student]-avis
	'student'	student-LINK-house	physics-student-newspaper
		'student building'	'paper for students of physics'

(57) Weak nominal left-hand members

	Free form	Simple compound	Complex compound
a.	stjerna/e[161]	[stjern-e]-bil	[[pop-stjern]-e]-bil
	'star'	star-LINK-car	pop-star-LINK-car
		'car painted with stars'	'car of a pop-star'
b.	kjole	[kjol-e]-stoff	[[sommer-kjol]-e]-stoff
	'dress'	dress-LINK-fabric	summer-dress-LINK-fabric
		'dress fabric'	'fabric for a summer dress'
c.	kaka/e	[kak-e]-spade	[[pepper-kak]-e]-baking
	'cake'	cake-LINK-spade	pepper-cake-LINK-baking
		'cake server'	'baking of gingerbread'
d.	rosa/e	[ros-en]-knopp	[[klatr-e-ros]-e]-knopp
	'rose'	rose-LINK-bud	climb-LINK-rose-LINK-bud
		'rosebud'	'bud of a climbing rose'

(58) Verbal left-hand members

	Free form	Simple compound	Complex compound
a.	skriva/e[162]	skriv-e-plan	[[hurtig-skriv]-e]-plan
	'write'	write-LINK-plan	fast-write-LINK-plan
		'writing plan'	'speed-writing plan'

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[161] There is dialectal variation with respect to the final vowel of the free form. This is included because it shows that the left-hand member is not identical to the free form (cf. Section 2.2.3).

[162] The free form that is given here is the infinitive. There is variation both between dialects and between the two written standards. Again this shows that verbal left-hand members are not infinitives (cf. Section 2.2.3).

b.	vaska/e	vask-ar-vatn	[[vindu-s-vask]-e]-vatn[163]
	'wash'	wash-_{LINK}-water	window-_{LINK}-wash-_{LINK}-water
		'wash water'	'water for washing windows'
c.	baka/e	bak-e-dag	[[kak-e-bak]-e]-dag
	'bake'	bake-_{LINK}-day	cake-_{LINK}-bake-_{LINK}-day
		'baking day'	'cake-baking day'
d.	sy	sy-maskin	[[prøv-e-sy]-maskin
	'sew'	sew-machine	try-_{LINK}-sew-machine
		'sewing machine'	'machine for trial-sewing'

The examples above illustrate that predictable linkers are the same in both simple and complex compounds, but unpredictable linkers need not be. The important insight here and in previous research on linking elements in Germanic (Nübeling & Szczepaniak 2013, Fuhrhop & Kürschner 2015), is that some linking elements are assigned productively by rule, based on the category and declension class of the left-hand member. Other linking elements are unproductive and unpredictable, and must be listed for individual left-hand members. Thus, one of the tasks when specifying the vocabulary insertion of linking elements is to design a system that allows for both idiosyncracy and systematicity in principled ways.

4.4.3.2 *Preliminary rules and challenges*
Linking elements are vocabulary items that compete for insertion into the L-head of a compound structure. Some linking elements are conditioned by idiosyncratic properties of the left-hand member and others are conditioned by morphological properties of the left-hand member.

In Section 4.1, I gave an example of how irregular, unpredictable morphology, such as irregular plural forms in English, is represented in List 2 (the Vocabulary). Specifically, we must state that a specific abstract morpheme or feature bundle is realized by a specific vocabulary item, in the context of a specific root, as exemplified below.

(59) Vocabulary items for English plural
[PL] ⇔ -en/{√ox...}
[PL] ⇔ -Ø/ {√fish, √sheep...}
[PL] ⇔ /-z/

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[163] As mentioned in Section 2.2.3, I have not found examples of the form [[X-V]-ar]-X where the complex left-hand member is interpreted verbally, but I do not rule out that this might be possible for some speakers.

Since it is well established by now that in compounding certain linking elements are licenced by particular left-hand members, we can assume a similar type of formulation for these unpredictable linking elements. Thus, I propose (60).

(60) L ⇔ -e/ {√mjølk, √katt, √jul, √and...}_
      L ⇔ -s/ {√fred, √sport, √arbeid, √land...}_
      L ⇔ -a/ {√ferd, √møkk...}_
      L ⇔ -en/{√ros...}_
   L ⇔ Ø/ {√vin, √bok, √hus, √sand...}_

These rules can be read as "L is realized by *-e* in the context of √*mjølk*", and "L is realized by Ø in the context of √*vin*".

However, given formulations such as those in (60), it is perhaps surprising that the same linking element does not automatically extend to complex left-hand members, as shown again in (61) below.

(61) a. [mjølk-e]-flaske   b. [[ku-mjølk]-s]-flaske
         e.g. 'bottle for milk'   e.g. 'bottle for cow's milk'

Given (60), what prevents an *e*-linker from being used after *mjølk* in (61b)? An explanation could be that the licensing conditions of linking elements are also somehow sensitive to complexity. If so, this leads to the question of how, or whether, the linker's apparent sensitivity to the complexity of the left-hand member is implemented structurally.

One challenge for such an approach is the common assumption in Distributed Morphology that apparently simple elements are always composed of at least a root and a categorizer. If we assume such structures for compounds, then both simple and compounded left-hand members are in some sense complex. This is illustrated with the structures in (62).

(62) a.   b.
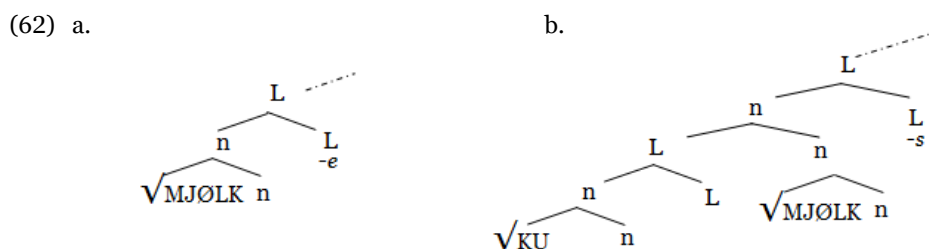
Furthermore, if compounding is indeed adjunction, as I have proposed, then arguably *mjølk* in (62a) and (b) are strictly identical, grammatically speaking. Adjunction

only repeats the information of the head and should not affect the status of *mjølk*. It is therefore not clear how the L-head would be able to see that (62b) is more complex than (62a) or differs from (62a) in any other relevant way.

Another type of explanation for the the distinct linker choices with simple and compounded forms could be available from productivity. The linking elements with simple strong nominal left-hand members, such as the *e*-linker that attaches to *mjølk,* are not predictable and do not seem to be assigned productively to new forms.[164] Therefore, the reason why *mjølk* and *kumjølk* receive different linkers could be that −*e* no longer has the ability to be assigned to new forms, and instead, the productive linking element -*s* must be used (see Nübeling & Szczepaniak 2013 and Fuhrhop & Kürschner 2015 for ideas along these lines).

A problem with this type of explanation is pinning down exactly what we mean by productivity. Irregular inflection is unproductive, in the sense that it does not extend to new words that enter the language. Nevertheless, it extends from simple forms to compounds. Consider the regular inflection in (63a) and the irregular inflection in (63b, c) with simple forms and compounds.

(63)

	Singular		Plural	
a.	kopp	te-kopp	kopp-ar	te-kopp-ar
	'cup'	tea-cup	cup-PL	tea-cup- PL
		'tea-cup'	'cups'	'cups'
b.	feil	trykk-feil	feil	trykk-feil
	'error'	print-error	error.PL	print-error.PL
		'printing error'	'errors'	'printing errors'
c.	bok	barn-e-bok	bøk-er	barn-e-bøk-er
	'book'	child-LINK-book	book-PL	child-LINK-book-PL
		'children's book'	'books'	'children's books'

These examples show that inflection is the same regardless of complexity. This is expected under the adjunction analysis. However, the linking elements appear to be different, since irregular linkers do not automatically extend to complex forms. Compare thus the plural inflection and linking elements in (64). Unlike the vocabulary items for inflection, the

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[164] It is difficult to establish whether the linking elements with simple strong nominal left-hand members (-*e, -s*) are really unproductive. Most newly formed simple strong nominal left-hand members, such as borrowings or new coinages, seem to take an Ø-linker, but it is not entirely clear that this is the only productive form. Further investigation into this would be valuable for future research.

vocabulary items for linking elements are somehow sensitive to complexity and not just to the right-edge of the form they attach to.

(64)

Plural inflection		Linking element	
vin-ar	[raud-vin]-ar	vin-Ø-glas	[raud-vin]-s-glas
wine-PL	red-wine-PL	wine-LINK-glass	red-wine-LINK-glass
'wine glass'	'red wines'	'wine glass'	'glasses for red wine'

This weakens an explanation based on productivity, or at least requires further elaboration.

The question, then, is how the linking element "knows" the difference between the two types of structures. How does it "know" that in *mjølk-e-flaske* 'milk bottle' a listed, lexicalized, idiosyncratic linking element should be used, whereas in *ku-mjølk-s-flaske* 'bottle for cow's milk' a rule-based, predictable, productive linking element should be used?

Before moving on to answer this question, it is interesting to note that the pattern whereby simple and complex compounds can take different linking elements is not particular to Norwegian, but is also found in other Germanic languages. Consider thus the examples from Faeroese and Swedish in (65)-(66) (Josefsson 1998, Thráinsson 2004).

(65) Faeroese
Simple compound   Complex compound

a. [brugv-ar]-endi   a. [[træ-brugv]-s]-á
    bridge-LINK[165]-end   wood-bridge-LINK-river
    'bridge end'   'wood-bridge river'

b. [rót-ar]-ávöxtur   d. [[gul-a-rót]-s]-pakki
    root-LINK-fruit   yellow-LINK-root-LINK-pack
    'root vegetable'   'pack of carrots'

c. vín-glas   c. [[reyð-vín]-s]-glas
    wine-glass   red-wine-LINK-glass
    'wine glass'   'glass for red wine'

d. borð-pláta   d. [[skriv-i-borð]-s]-arbeiði
    table-board   write-LINK-table-LINK-work
    'table top'   'desk-work'

---

[165] Some linking elements in Faroese can also be analyzed as genitive inflection (see discussion in Thráinsson 2004:204-208).

(66) Swedish
     Simple compound   Complex compound

a.   [kvinn-o]-händer   a.   [[bond-kvinn]-e]-händer
     woman-LINK-hands   peasant-woman-LINK-hands
     'woman's hands'   'hands of a peasant woman'

b.   [gat-u]-korsning   b.   [[stor-gat]-s]-korsningen
     strees-LINK-crossing   big-street-LINK-crossing
     'street junction'   'main street junction'

c.   [sag-o]-bok   c.   [[troll-sag]-e]-bok
     story-LINK-book   troll-story-LINK-book
     'story book'   'book with stories of trolls'

d.   flick-bok   d.   [[skol-flick]-s]-bok
     girl-book   school-girl-LINK-book
     'book for girls'   'book for school girls'

4.4.3.3 Inner and outer morphology

The distinction between productive, regular, systematic and transparent forms on the one hand and unproductive, irregular, idiosyncratic and opaque forms on the other hand is well known in morphology. Arad (2003) points out that this 'double nature' of word-formation has been used to argue for different types of architectures, including two different places for word-formation (the lexicon and the syntax), different ordering of word-formation processes (level 1 and level 2) and distinct treatments of derivation and inflection. What these approaches have in common is that they distinguish between "lower" or "inner" morphology, which is closer to the root and typically displays more idiosyncrasies, and "higher" or "outer" morphology, which is typically regular.

From the perspective of Distributed Morphology, Marantz (2001) proposes that this distinction should be recast as a distinction between word-formation from roots and word-formation from categorized elements.

(67)

194
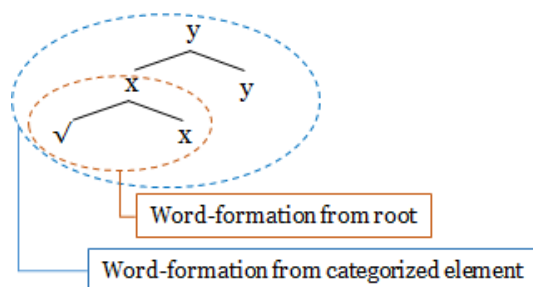
Root-attaching morphology
"When a head attaches to a root, its selectional requirements must be satisfied by the idiosyncratic properties of the root." (Marantz 2001: 7)

Category-attaching morphology:
"Structurally, when a head attaches outside of little x, it sees the features of x locally, not the features, properties, or identity of the root merged with x." (Marantz 2001:7)

According to this idea, morphological elements that attach directly to roots interact with the root in ways that morphological elements attaching further out cannot, and that accounts for the observed distinction between inner and outer morphology. This is a widely adopted idea in Distributed Morphology (e.g. Arad 2003, Embick 2015, among others), and it makes the right predictions for compounds and linking elements, as I will show now.

It follows from the compound structure I have proposed that left-hand members that are themselves compounds are always categorized. This is because compounds are created by adjoining a left-hand member to the categorizer of the right-hand member. That is, the innermost left-hand member, headed by L1 in the abstract structure below, must be adjoined to the categorizer B in (68).
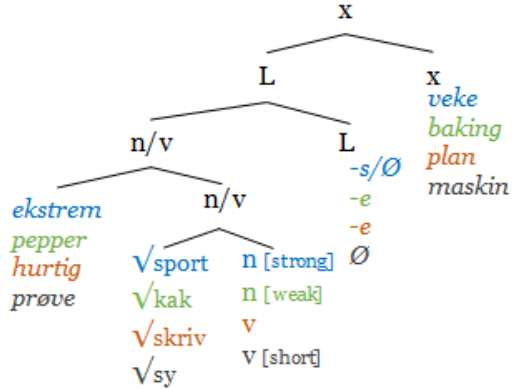
(68)
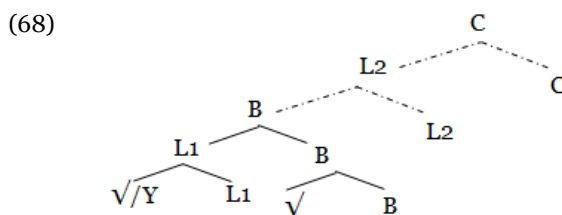
Therefore, a compound always has a category, so when the left-hand member of a compound is a compound, this left-hand member has a category.

Now, if we follow the assumptions of Marantz (2001), a linking element that attaches to a compound (L2 above) is predicted to be regular because it attaches to an already categorized form. This prediction is borne out. Linking elements that attach to complex left-hand members are regular and predictable from the morphological properties of the left-hand member, specifically their category and declension class, as shown in Section 4.4.3.1. Thus, I propose the following Vocabulary Items for category-attaching linking elements. [166]

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[166] Here, I am exploring a structural explanation for the difference between linkers with simple and complex left-hand members. Alternatively, we could explore an analysis where the linker sees the

(69) Vocabulary items for category-attaching L

L ⇔ -s/N[strong] _
L ⇔ Ø/N[strong]_
L ⇔ -e/N[weak] _
L ⇔ -e/V _
L ⇔ Ø/V[short] _

```
                                          x
                                      ┌───────┴────────┐
                                      L                x
                                ┌─────┴──────┐          veke
                              n/v            L          baking
                          ┌────┴───┐        -s/Ø        plan
                       ekstrem    n/v       -e          maskin
                       pepper   ┌──┴───┐    -e
                       hurtig  √sport  n [strong]  Ø
                       prøve   √kak    n [weak]
                               √skriv  v
                               √sy     V [short]
```

a.   ekstrem-sport-(s)-veke
     extreme-sport-LINK-week
     'week for extreme sports'

b.   pepper-kak-e-baking
     pepper-cake-LINK-baking
     'baking of gingerbread'

c.   hurtig-skriv-e-plan
     fast-write-LINK-plan
     'speed-writing plan'

d.   prøve-sy-Ø-maskin
     try-sew-LINK-machine
     'machine for trial sewing'

A few remarks must be made about the representations above. First, as discussed briefly in Section 4.1.1, I assume that declension class is a feature of category nodes (rather than of roots, as proposed by e.g. Embick 2015). Furthermore, I will simply assume the declension class labels above, without further discussion of the nature and number of declension classes in the morphology of Norwegian. My goal here is to sketch the general architecture of the system that can capture the appropriate generalizations for linking elements. For this reason, I will also not discuss whether for example L ⇔ -e/N[weak] and L ⇔ e/V could be reduced to a single rule, although I suspect that the answer could depend on the specific dialect under investigatation.

Finally and importantly, notice that the conditions for the insertion of −s and Ø in (69) are actually identical. The reason is that in many cases, although not all, these two linkers can be used interchangeably, as I discussed in Section 2.2.3.4. I leave it to future work to determine a more precise formulation of this distinction.

The abstract compound structure, depicted in (68), makes different predictions for simple left-hand members. Specifically, there is no demand in the structural representation of compounds that simple left-hand members be categorized. Let us assume, then, that the set of left-hand members that take unpredictable linking elements

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semantics of the left-hand member and knows from that whether it is simple or complex, or an analysis where the number of syllables plays a role (in addition to category and declension class).

is actually that of bare roots, shown below. The vocabulary items from (60) are repeated here as (70).

(70)

L ⇔ -e/ {√mjølk, √katt, √jul, √and...}_
L ⇔ -s/ {√fred, √sport, √arbeid, √land...}_
L ⇔ -a/ {√ferd, √møkk...}_
L ⇔ -en/ {√ros...}_
L ⇔ Ø/ {√vin, √bok, √hus, √sand...}_
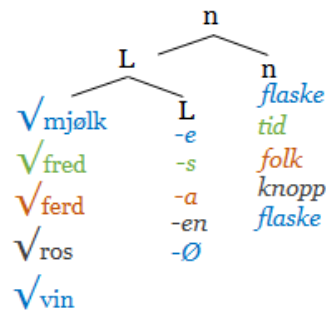
a. mjølk-e-flaske
   milk-LINK-bottle
   'milk bottle'

b. fred-s-tid
   peace-LINK-time
   'peace time'

c. ferd-a-folk
   journey-LINK-people
   'travellers'

d. ros-en-knopp
   rose-LINK-bud
   'rosebud'

e. vin-Ø-flaske
   wine-LINK-bottle
   'wine bottle'

```
                    n
           L              n
  √mjølk       L        flaske
  √fred       -e         tid
  √ferd       -s        folk
  √ros        -a        knopp
  √vin       -en        flaske
             -Ø
```

Following Marantz' assumptions about word-formation from roots, the root of the left-hand member and the L-head are now in a local configuration that allows for selection.

Importantly, although these left-hand members were classified according to their category and declension class in Table 3, there is no sense in which these elements actually have such morphological labels in the structural representation in (70). A possible concern with the proposal in (70), then, could be that by eliminating such labels we are missing generalizations about left-hand members and linkers. Based on Table 3, we can for example state that no verb-roots take an *s*-linker. While the loss of generalizations is a reasonable concern, what the analysis in (70) suggests is that we could in principle have a verbal left-hand member with an *s*-linker, and as far as the synchronic grammar is concerned, it is a coincidence that we do not find such forms. The explanation for the lack of verbs with *s*-linkers lies in the diachronic development of linking elements, not in the synchronic grammar (see e.g. Haugen 2016 for discussion of synchronic and diachronic explanations in morphology).

Left-hand members of compounds have also been analyzed as uncategorized roots in Dutch (De Belder 2017), Swedish (Josefsson 1998), Brazilian Portuguese (Scher & Nóbrega 2015) and Greek (Iordăchioaia et al. 2017). The idea that roots can appear without categorizers is not uncontroversial, however, since it is standardly assumed that roots must be categorized in order to undergo further structure building. In the context of

compounding, this move can nevertheless be motivated since left-hand members do not need to be inflected or interact with the larger structural context. They must only fullfil the requirements of the compound structure.

If the class of left-hand members that take idiosyncratic linkers are actually roots, the distinct linker choices with simple and complex left-hand members follow from the structural representations.

(71) a. mjølk-e-flaske
milk-LINK-bottle
'milk bottle'

ros-en-knopp
rose-LINK-bud
'rosebud'
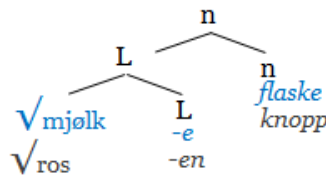
b. ku-mjølk-s-flaske
cow-milk-LINK-bottle
'bottle for cow's milk'

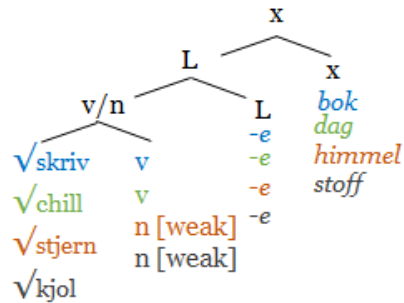klatre-ros-e-knopp
climb-rose-LINK-bud
'bud of a climbing rose'
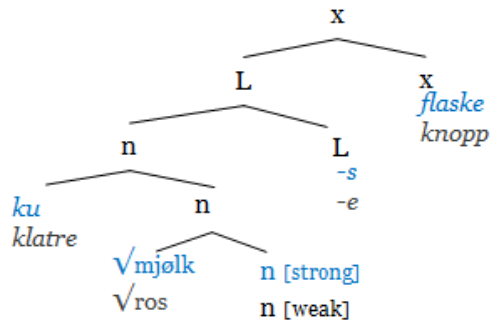
Only in (71a) can the linking element see the properties of the root. In (71b), it just sees the categorizer. [167] For that reason, different vocabulary items are inserted into the L-nodes of the two structures.

A remaining issue is the internal structure of simple left-hand members that take predictable linking elements, notably verbal and weak feminine left-hand members. Following the logic proposed here, such left-hand members are categorized, and have the structure in (72).[168]

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[167] Embick (2015) maintains a distinction between *cyclic* and *non-cyclic* morphemes, where the latter type is actually able to see the root across the intervening node. Since the L-head is not able to do this, it must be a cyclic morpheme.
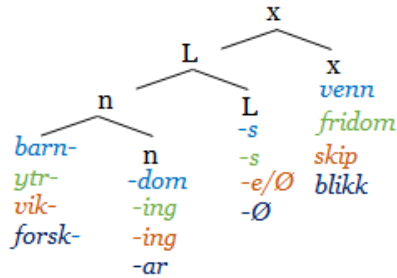
[168] Admittedly, there is a circular aspect to the analysis in (72). These left-hand members are analyzed as categorized because they take predictable linkers, and they are argued to take predictable linkers because they are categorized. Since the pattern in (72) is the productive pattern, we can hypothesize

(72)

```
                              x
                          ╱       ╲
                      L             x
                   ╱    ╲          bok
               v/n       L         dag
              ╱   ╲      -e        himmel
          √skriv  v     -e         stoff
          √chill  v     -e
          √stjern n [weak] -e
          √kjol   n [weak]
```

Finally, I showed in Section 2.2.3.3 that left-hand members with overt nominalizers can have individual specifications for their choice of linking element. In particular, there are two different *ing*-suffixes in Norwegian: one is feminine and takes an *s*-linker, and the other is masculine and takes an *e*-linker or no linker, varying between speakers.

(73) a. child-NOM-LINK-friend
         'childhood friend'

     b. utter-NOM-LINK-freedom
         'freedom of speech'

     c. vik-NOM-LINK-ship
         'viking ship'

     d. research-NOM-LINK-look
         'expert eye'

```
                          x
                      ╱       ╲
                  L             x
               ╱    ╲          venn
              n       L        fridom
           ╱   ╲     -s        skip
        barn-   n    -s        blikk
        ytr-   -dom  -e/Ø
        vik-   -ing  -Ø
        forsk- -ing
               -ar
```

According to the structure in (73), the nominalizer and L-head are now in the appropriate structural relationship for the linking element to see the nominalizing suffix and its requirements.

To summarize, then, the structure of compounds predicts that both roots and categorized elements can occur as simple left-hand members. According to the analysis developed here, both types of structures exist, and they have different consequences for the choice of linking elements. The discussion above has emphasized the fact that the

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that compounding with bare roots is not generally productive and only occurs in some older cases where the connection between the left-hand member and the linking element was established hundreds of years ago. The left-hand members in (72) happen to be formed by the productive pattern rather than the unproductive pattern.

realization of linking elements must mainly be accounted for by listing. However, I have attempted to reduce some of this listing by allowing generalization over categories and declension classes where possible. This is a first attempt at modelling the famously messy area of linking elements in Germanic within an explicit framework like Distributed Morphology. Thus, I have provided an answer to Requirement C in Section 4.1.2, which states that an analysis of compounding in Norwegian should identify the nature and role of linking elements. In the next section, I turn to the nature of left-hand members of compounds more generally.

4.5 The nature of left-hand members

The left-hand position of Norwegian compounds can host a range of different elements of different categories and complexity. Some of this variation is illustrated in (75)-(80).

(75) Simple left-hand members

  a. mja-grammatikalitet
      m...yes-grammaticality
      'somewhat grammatical'

  b. uæææ-rop
      uæææ-scream
      '/wæ:/-scream'

  c. [raise shoulders]$_{Nonverbal}$-haldning
      '[raise shoulders]-attitude'

  d. hallo-dame
      hello-woman
      'female TV announcer'

  e. nei-rørsle
      'no-movement'

  f. at-setning
      'that-clause'

(76) Simple verbal, adjectival or nominal forms, with/without overt linkers

  a. blå-farge
      blue-color
      'blue'

  b. sy-maskin
      sew-machine
      'sewing machine'

  c. te-kopp
      tea-cup
      'tea cup'

  d. sport-s-bil
      sport-$_{LINK}$-car
      'sports car'

  e. katt-e-mat
      cat-$_{LINK}$-food
      'cat food'

(77) Left-hand members with bound stem allomorphs

a. billed-bok   free form 'bilde'
picture-book
'picture book'

b. vass-flaske *free form 'vatn'*
water-bottle
'water bottle'

(78) Compounds as left-hand members

a. [[energi-spar]_V-e]-modus[169]
energy-save-LINK-mode
'energy saving mode'

c. [skriv-e-bok]_N-(s)-salg
write-LINK-book-(LINK)-sale
'sale on notebooks'

b. [fot-sid]_A-kjole
foot-long-dress
'long dress'

(79) Nominalized left-hand members

a. forsk-ning-s-prosjekt
research-NOM-LINK-project
'research project'

b. skjønn-het-s-ideal
beauty-NOM-LINK-ideal
'beauty ideal'

(80) Phrasal left-hand members

a. DP[170]
[[nyheter   vi   har   lyst til å   snakke   om   men
news   we   have lust to _INF_ talk._INF_ about   but

egentlig   ikke har   plass til]_DP - quiz]_N
really   NEG   have place to   - quiz
'news-we-would-like-to-talk-about-but-do-not-really-have-room-for quiz'

b. CP[171]
det   [[du tror   det ikke før   du   får   se
the   you believe._PRES_ it   NEG   before you   get._PRES_ see._INF_

det]_CP - stor-e]   tre-huset
it   - big-_W_   tree-house._DEF_
'the you-won't-believe-it-until-you-see-it big treehouse'

---

[169] Some speakers prefer to nominalize NV-N-compounds as well, e.g. [*energi-spar-ing*._N_-*s*._LINK_]-*modus*
'energy saving mode', but examples without nominalization are nevertheless common.

[170] Segment in the TV-program *Nytt på Nytt*

[171] Part of the children's book title *Gutta i det du-tror-det-ikke-før-du-får-se-det-store trehuset med 52 etasjer,* by Andy Griffiths. Original title: *The 52-storey treehouse*

c. PP

    [rett   fra   levr-a]$_{PP}$ - bit-en
    straight from   liver-$_{DEF.SG}$ - part-$_{DEF.SG}$
    'the straight-from-the-gut part'

The range of possible left-hand members suggests that this position is grammatically very free. There are, however, also some restrictions on the types of elements that can be used as left-hand members. Left-hand members are clearly dispreferred with overt verbal and adjectival suffixes, shown in (81)-(82). Such examples were also discussed in Section 2.2.2.1, where I pointed to some counterexamples to the generalizations but also established that the tendencies are nevertheless very strong.

(81)   Restrictions with overt adjectival suffixes[172]

    a. -ig   ??[selv-stend-ig]-følelse
                self-stand-$_A$-feeling
                Intended: 'feeling of independence'

    b. -(e/s)lig[173] ??[barn-slig]-kjole
                child-$_{ADJ}$-dress
                Intended: 'childish dress'

    c. -som   ??[spar-som]-holdning
                save-$_A$-attitude
                Intended: 'thrifty attitude'

(82)   Restrictions with overt verbal suffixes

    a. -er   ??[konstru-er-(e)]-arbeid
                construct-$_V$-($_{LINK}$)-work
                Intended: 'construction work'

    b. -iser   ??[nominal-iser-(e)]-prosess
                nominal-$_V$-($_{LINK}$)-process
                Intended: 'nominalization process'

    c. -n   ??[gul-n-(e)]-grad
                yellow-$_V$-($_{LINK}$)-degree
                Intended: 'degree of yellowing'

---

[172] Left-hand members with overt adjectival suffixes are perfectly acceptable when the left-hand member is *gjere/gjøre* 'do',´make', as in *selvstendig-gjøre* 'independent-make'= 'make independent'. I treat this as a different type of construction, the analysis of which must be addressed in future research.

[173] As shown in Section 2.2.2.1, fn. 31, I consider *-eleg* and *-sleg* as allomorphs of *-leg*.

Furthermore, particle verbs are strongly dispreferred as left-hand members of compounds.

(83) Restrictions with compounded particle verbs

  a. ??[av-duk-(e)]-fest
      off-cloth.$_V$-($_{LINK}$)-party
      Intended: 'unveiling party'

  b. ??[gjen-ta]-tegn
      again-take.$_V$-sign
      Intended: 'repeat sign'

  c. ??[bort-før-(e)]-sak
      away-lead-($_{LINK}$)-case
      Intended: 'abduction case'

The left-hand members in (81)-(83) can be made fully acceptable by nominalizing them, as shown in (84).

(84) a. selvstend-ig-het-s-følelse
          self-stand-$_{A-N-LINK}$-feeling
          'feeling of independence'

      b. konstruk-sjon-s-arbeid
          construct-$_{N-LINK}$-work
          'construction work'

      c. av-duk-ing-s-fest
          off-cloth-$_{N-LINK}$-party
          'unveiling party'

The examples above indicate that, on the one hand, the left-hand position of compounds is very free and must be open enough to accommodate for example phrasal left-hand members, but at the same time, it must be appropriately constrained to account for the observed restrictions.

In this section, I investigate the grammatical nature of left-hand members of compounds. Thus, I address Requirement D in Section 4.1.2, which states that an analysis of Norwegian compounds should account for possible and impossible left-hand members, including phrasal left-hand members. I will propose that the L-head in compounds imposes certain restrictions on the types of elements it can attach to, and I show that these restrictions are similar to the restrictions on conversion, suggesting that the two types of patterns belong to the same phenomenon. However, I do not have a final answer to Requirement D, which is to say that my main contribution here lies in the exploration of

these issues, specifically in narrowing down the hypothesis space by rejecting certain existing hypotheses.

Embedded in Requirement D is also Requirement E, which addresses the (im)possibility of compound-internal inflection. I discuss this as well as compound allomorphs at the end of the section.

I begin in Section 4.5.1 by proposing an analysis of phrasal left-hand members. Next, in Section 4.5.2, I investigate the nature of the restrictions that rule out certain elements in the left-hand position. In Section 4.5.3, I discuss the possibility of inflection on left-hand members, and in Section 4.5.4, I analyze allomorphy in left-hand members of compounds. In the course of this chapter, I point to some interesting puzzles for future research.

4.5.1 Phrasal left-hand members

The existence of phrasal left-hand members has been taken as strong evidence against a lexicalist approach to word-formation and as support for a syntactic approach (Lieber 1992). The lexicalist hypothesis states that phrasal constituents cannot be the input to word-formation processes because the lexicon is strictly ordered prior to syntax. Morphology can be the input to syntax, but not the other way around. Thus, phrasal compounds pose a serious problem to a lexicalist architecture.

In a syntactic approach to word-formation, on the other hand, there is in principle nothing in the grammatical architecture that prevents phrasal constituents from forming the input to word-formation processes. In the theory explored in this dissertation, where compounding is adjunction of a left-hand member to a right-hand member, there is no *a priori* reason to assume that phrasal left-hand members should be excluded from compounding. The null hypothesis is that all types of phrases can be adjoined as left-hand members, and this prediction seems to be borne out, as was shown in (80). Further examples are given in (85) below.[174]

(85)
  a. CP
      [kven   er   du?]$_{CP}$ - blikk
      who   are   you   - look
      'who-are-you look'

---

[174] (85a) was picked up in conversation and (85e) is from Enger & Kristoffersen (2000:126). The remaining examples were retrieved from the Norwegian Newspaper Corpus.

b. CP/TP
   [dyrk   deg   fresh]_CP/TP - lektyre
   grow._IMP you   fresh   - reading
   'grow-yourself-fresh reading'

c. Small Clause
   [penger   rett   i   dass]_SC - fellen
   money._PL   straight in toilet   - trap._DEF.SG
   'the money-straight-into-the-toilet trap'

d. NP
   [berg   og   dal]_NP - bane
   mountain and valley   - course
   'rollercoaster'

e. NP
   [sint   ung   mann]_NP - syndrom
   angry   young   man   - syndrome
   'angry-young-man syndrome'

f. PP
   [til intet]_PP - gjøre
   to nothing - make
   'annihilate'

g. AP
   [verst mulig]_AP - scenario-et
   worst possible - scenario-_DEF.SG
   'the worst-possible scenario'

h. AdvP
   [hjem på   døren]_ADVP - selskapet
   home on   door._DEF.SG - company._DEF.SG
   'the home-to-your-door company'

i. Num
   [fem på halv tre]_NUM - presisjon
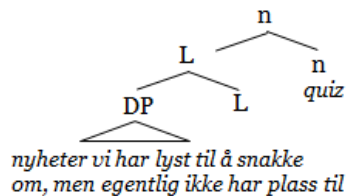   five on half three   - precision
   '14:25-precision'

It has been proposed that only lexicalized phrases can be used as left-hand members of compounds (Bresnan and Mchombo 1995). This is not correct for Norwegian, where compounds with novel phrasal left-hand members are created freely. Furthermore, while some phrasal left-hand members appear to be quotes, and could as such be argued to be exceptional, not all left-hand members are. Compare (86a) and (86b), adapted from Pafel (2017) for German, where only the former is a direct quotation, as evidenced by the pronoun in the phrasal left-hand member.

(86) a. ho   svara   på   [er-du-lykkeleg?]- spørsmålet
        she   answered   on   are-you-happy- question._DEF.SG
        'she answered the question *are you happy?*'

     b. ho   svara   på   om-ho-er-lykkeleg-spørsmålet
        she   answered   on   whether-she-is-happy-question._DEF.SG
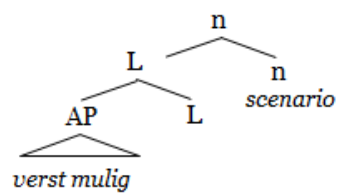   'she answered the question of whether she is happy'

Based on these data, I conclude that the left-hand position of compounds can accommodate elements larger than what we would identify as morphological formations. The simplest possible analysis of phrasal compounds which is also in line with the general compound structure proposed in this dissertation is one in which left-hand members of

various types and sizes can be inserted directly below the L-head. This is shown in (87) for the compounds in (80a) and (85g).

(87) a.

```
            n
          /   \
        L       n
      /   \     quiz
    DP      L
   /____\
 nyheter vi har lyst til å snakke
 om, men egentlig ikke har plass til
```

b.

```
            n
          /   \
        L       n
      /   \     scenario
    AP      L
   /____\
 verst mulig
```

Many analyses of phrasal compounds propose that phrasal left-hand members are turned into simple signs, typically nouns, through renumeration, zero-deriviation or conversion, prior to compounding (e.g. Ackema & Neeleman 2004, Sato 2008, Harley 2009a, Pafel 2017). I would like to propose that such an intermediary step is not necessary. Rather, the compound structure can be conceptualized as a syntactic frame where, in principle, anything can be embedded under L, and the structural context shapes the semantic and grammatical nature of what is inserted. Thus, using an item as a compound left-hand member is what makes it seem like a simple sign, not an additional operation prior to compounding. This approach is exoskeletal or constructionist in spirit in the sense that linguistic elements are shaped by their structural environment.

Before moving on, note that the possibility of taking a phrase as an input to word-formation is not limited to compounding, but also occurs with suffixes, exemplified in (88) for Norwegian and English.

(88) a. stille-før-stormen-sk
quiet-before-storm.DEF.SG-ADJ
'quiet-before-the-storm-y'

b. av-og-på-ing
on-and-off-ing
'turning on and off'

c. She [I'm from New York]TP -ed her way into the men's room
(Carnie 2000, in Sato 2008)

d. Lieber-and-Scalise-ish
(Lieber & Scalise 2006)

A similar claim can be made here, namely that suffixation shapes how we interpret the input phrase, and the intermediary step of turning the phrase into a specific type is not necessary. I take the examples in this section to support the non-lexicalist claim made here that phrases and words are not derived in separate components of grammar.

4.5.2 Restrictions on left-hand members

For a syntactic approach to word-formation, the question is not why phrasal left-hand members should be allowed, but rather why certain smaller left-hand members seem not to not be. Adjectival and verbal category-changing suffixes are clearly dispreferred as left-hand members of compounds, and the same holds for particle verbs. I showed this in (81)-(83), and additional examples are given in (89)-(91).

(89)   Restrictions with overt adjectival suffixes

    a. -lig   ??[lykke-lig]-pille
                  happyness-$_A$-pill
                  intended: pill for feeling happy

    b. -ete   ??[bråk-ete]-barn
                  noise-$_A$-child
                  intended: noisy child

    c. -sk   ??[skepti-sk]-holdning
                  sketptic-$_A$-attitute
                  intended: attitude of skepticism

    d. -bar   ??[et-bar]-dato
                  eat-$_A$-date
                  intended: best-before date

    f. -som   ??[glem-som]-plager
                  forget-$_A$-affliction
                  intended: problems with forgetfulness

(90)   Restrictions with overt verbal suffixes

    a. -er(e)   ??møbl-er-(e)-klar
                  furniture-$_V$-$_{(LINK)}$-ready
                  intended: ready to furnish

    b. -iser(e) ??urban-iser-(e)-prosess
                  uraban-$_V$-$_{(LINK)}$-process
                  intended: process of urbanization

    c. -n(e)   ??smal-n-(e)-plan
                  narrow-$_V$-$_{(LINK)}$-plan
                  intended: plan to narrow something, e.g. a road

(91)   Restrictions with compound particle verbs

    a. ??[1]om-tal-(e)-eksemplar
       about-talk.$_V$-$_{(LINK)}$-copy = review.$_V$-$_{(LINK)}$-copy
       intended: copy (e.g. of a book) to be reviewed

b. ??inn-kall(e)-frist
in-call.$_{V\text{-}(LINK)}$-deadline = summon.$_{V\text{-}(LINK)}$-deadline
intended: deadline for summoning someone

c. ??av-slå-strategi
off-hit.$_V$-strategy = reject.$_V$-strategy
intended: strategy for rejecting something

d. ??gjen-gi-norm
again-give.$_V$-norm = reproduce.$_V$-norm
intended: norm for reproducing material

As mentioned previously, these left-hand members become acceptable if they are nominalized. For a case like (91a), nominalization simply involves changing the tonal accent of the left-hand member, which is enough to make it fully acceptable. Compare thus (91a) to (92).

(92) ^{2}om-tal-e-eksemplar
about-talk.$_{N\text{-}LINK}$-copy = review.$_{N\text{-}LINK}$-copy
'copy (e.g. of a book) to be reviewed'

The observation that certain adjectival and verbal forms are dispreferred as the head of a left-hand member is not particular to Norwegian. Similar observations have been made for other Germanic languages as well. Ten Hacken (1994) notes that verb-stems that cannot also be used as nouns, such as *happen* and *occupy,* do not form good left-hand members in English. Similarly, Borer (2013) proposes that left-hand members of English compounds are always turned into nouns or what she terms +N-equivalent. For Swedish, Lundquist (2009) makes the same observations as in (90a, b), namely that verbal suffixes are excluded. The issue is investigated most thoroughly by De Belder (2017) for Dutch. De Belder notes that overt adjectival and verbal categorizing affixes (both prefixes and suffixes) are strongly dispreferred as left-hand members of compounds, paralleling the examples in (90)-(91). Consider the Dutch examples in (93)-(94) (judgements from De Belder 2017:144, 146).

(93) a. *spaar-zaam-attitude
save-$_A$-attitude

b. *eet-baar-datum
eat-$_A$-date

c. *vet-ig-dieet
fat-$_A$-diet

(94) a. *?be-plant-seizoen
$_V$-plant-season

b. *?menstru-eer-pijn
menstru-$_V$-pain

c. *?ver-suiker-honing
$_V$-sugar-honey

Unlike (93)-(94), morphologically simple verb-like and adjective-like forms are fully acceptable (*eet, vet*). Furthermore, there are a handful of apparent counterexamples to the patterns in (93) and (94) where overt verbal and adjectival affixes do seem to be possible, shown in (95).

(95) a. vertaal-bureau   b. parkeer-garage
          translate-agency   park-garage
          'translation agency'   'parking garage'

However, De Belder argues that in cases like these, the complexity of the left-hand member is only apparent. The verbal prefix *ver-* and suffix *–eer* are acceptable as left-hand members only in non-productive use. Based on this and other considerations, De Belder concludes that the acceptable left-hand members in (95) are actually monomorphemic, unlike the left-hand members in (93).

From the perspective of Norwegian, it is interesting that according to De Belder, particle verbs are acceptable as left-hand members in Dutch compounds such as [*weg-geef*]-*prijs* 'away-give-price'='a very low price'. This distinguishes Dutch from Norwegian. In the literature, two different proposals suited to account for the restrictions on left-hand members have been proposed. One line of analysis argues that left-hand members of compounds are actually acategorial roots (Josefsson 1998). This would explain why certain overtly complex forms are dispreferred as left-hand members.[175] The other line of analysis argues that left-hand members in Germanic compounds are best analyzed as nouns (ten Hacken 1994).

Some authors have argued for a hybrid solution between these two views. Borer (2013:254, fn. 9) proposes that the compound structure in English can take left-hand members that are either roots or nouns, but not other categories. The compound structure makes its left-hand member +N-equivalent, which means that when a root is inserted into the left-hand position, it becomes (equivalent to) a noun. When a noun is inserted into the left-hand position, it already fills the requirements of the compound structure and remains a noun. De Belder (2017) argues that there are actually two compound structures in Dutch, one in which the left-hand member is a root, and another one in which the left-hand member is a noun. According to De Belder, (93)-(94) are ruled out because the left-hand members are neither roots nor nouns.

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[175] Josefsson does not herself pursue this question, but her analysis does suggest an answer.

From the perspective of Norwegian, then, the questions I am asking are why left-hand members like the ones in (89)-(91) are unacceptable, and whether any of the explanations that have been proposed for other languages can be extended to Norwegian. As previewed in the introduction to Section 4.5, I will not provide definitive answers to these questions. However, I hope I will highlight their significance and make some progress towards understanding them.

In the next section, I begin by considering the hypothesis that simple left-hand members are roots. According to this view, the reason why simple verbal and adjectival left-hand members are acceptable (cf. (76)) whereas derived verbal and adjectival left-hand members are not (cf. (89)-(91)) is that simple verbal and adjectival left-hand members are roots without a category. Thus, I revisit the question already addressed in Section 4.4.3 about the size of left-hand members, but from a different perspective. In the subsequent section, I consider the hypothesis that left-hand members of compounds are actually nouns.

4.5.2.1 *Are Norwegian left-hand members roots?*
The lexical category of a linguistic element can usually be determined by the element's distribution and paradigmatic behavior. Left-hand members of compounds are interesting because they have very little context of this type to help us determine their category. A theoretical possibility which then emerges is that left-hand members of compounds have no category. Instead, they can be bare roots.

From the perspective of Norwegian, it seems clear that at least some left-hand members are not roots but rather nouns, seeing as they take overt nominalizing suffixes. This was shown in (79), repeated here as (96).

(96) Nominalized left-hand members
   a. forsk-ning-s-prosjekt
       research-NOM-LINK-project
       'research project'
   b. skjønn-het-s-ideal
       beauty-NOM-LINK-ideal
       'beauty ideal'
   c. far-skap-s-test
       father-NOM-LINK-test
       'paternity test'

I maintain that the left-hand members in (96) are morphologically categorized as nouns. It is however possible that left-hand members that do not have overt categorizing morphology are roots, and that is the hypothesis I will investigate here. Examples of such left-hand members are given in (97).

(97) a. sykkel-hjul
          bicycle-wheel
          'bicycle wheel'
      b. stor-by
          big-city
          'metropolis'
      c. stå-pels
          stand-fur
          'goosebumps'

An analysis whereby simple left-hand members are roots would be in line with De Belder's (2017) proposal for Dutch that there are two distinct compound types, root-compounds and noun-compounds. However, I will now point to some arguments for why that is not the correct analysis for Norwegian.

Simple left-hand members can be covertly complex
Recall that a key idea behind the root-hypothesis in decompositional frameworks is that one and the same root may be present in words of different categories. For example, the noun *dream* and the verb *dream* both contain the same root √*dream* with nominalizing and verbalizing structures, respectively.

An argument against analyzing apparently simple left-hand members as roots is that there are cases where the verbal and nominal versions of a root have slightly different phonological realizations. This is the case with the Norwegian Nynorsk *draum/drøym* 'dream'. Both the nominal version *draum* and the verbal version *drøym* can be used as the left-hand member of a compound, as shown in (98). Further examples of such alternations are provided in (99)-(101).

(98) a. draum-e-hus
          dream.N-LINK-house
          'dream house' (e.g. a house
          made of dreams)

      b. drøym-e-hus
          dream.V-LINK-house
          'dream house' (e.g. a house
          where you dream)

(99) a. song-stund
          song-time
          'sing-song'

      b. syngj-e-stund
          sing-LINK-time
          'time for singing'

(100) a. tank-e-tank
          thought-LINK-tank
          'tank filled with thoughts'

      b. tenk-e-tank
          think-LINK-tank
          'a tank for thinking'

(101) a. dåp-s-gåve
          baptism-LINK-gift
          'gift for baptism'

      b. døyp-e-font
          baptize-LINK-font
          'baptismal font'

If we follow the assumption that both the nominal and verbal forms contain the same underspecified root with additional categorizing structure, then the examples above indicate that at least one of the forms is morphologically complex, which means that they are not roots.

A similar type of alternation is found with Norwegian verbs that have a causative and an anti-causative variant. Both variants can participate in compounding and they contribute different semantics to the compound, as demonstrated in (102)-(104).

(102) a. sett-e-potet   b. sitt-e-streik
           set.CAUS-LINK-potato   sit.ANTIC-LINK-strike
           'seed potato'   'sit in'

(103) a. legg-e-tid   b. ligg-e-stol
           lay.CAUS-LINK-time   lie.ANTIC-LINK-chair
           'bedtime'   'reclining chair'

(104) a. senk-e-kjøl   b. synk-e-ferdig
           sink.CAUS-LINK-keel   sink.ANTIC-LINK-finished
           'drop keel'   'ready to sink' (about a boat in bad shape)

These types of verbs have been analyzed as stem alternations of a common root where the amount of functional material in the structure determines which phonological realization is used (see e.g. Alexiadou, Gehrke and Schäfer 2014). Assuming such an analysis, the left-hand members in (102)-(104) are morphologically complex and contain at least a little v-head, and perhaps more.

Thus, the alternations considered here indicate that apparently simple verbal left-hand members are really categorized as verbs. If that is correct, then the explanation for the strong dispreference for overt verbalizing suffixes (and by extension, overt adjectival suffixes) in (89)-(90) is not that all left-hand members must be roots.[176] De Belder's analysis of Dutch cannot be extended to parallel data in Norwegian, so we must look for an alternative explanation.[177]

So far, I have only considered whether simple left-hand members could be analyzed as acategorial roots. However, if we take into consideration the whole range of left-hand members, these also point to the same conclusion. First, we saw in Section 4.5.1 that phrases can be used as left-hand members. Unless we assume an analysis where phrases are renumerated as roots, along the lines of Sato (2008), such left-hand members are not roots. Note also that if we were to assume a renumeration analysis of phrasal left-hand

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[176] Note, however, that it will be very difficult to finally disprove a root analysis of verb-like left-hand members as long as we lack clear criteria for identifying roots.

[177] De Belder's two compound structures are *root-X* and *N-link-X*. Since Norwegian verbal left-hand members take linking elements, unlike Dutch verb/root left-hand members, we could not adopt this proposal directly, but would have to modify or supplement it with e.g. *root-link-X*.

members, we would still have to come up with an explanation for why the left-hand members in (89)-(91) cannot be renumerated as roots.

Furthermore, recall from Section 4.4.3 that left-hand members that are themselves compounds often take linking elements, and that these linking elements are sensitive to the category and declension class of the left-hand member. Consider in this regard (105)-(106).

(105) a. [[grav-stell]-e]-dag
      grave-care.$_\text{V}$-$_\text{LINK}$-day
      'day for maintenance of a grave'

     b. [[grav-stell]-(s)]-dag
      grave-care.$_\text{N}$-$_\text{LINK}$-day
      'day for maintenance of a grave'

(106) a. [[øl-drikk]-e]-konkurranse
      beer-drink.$_\text{V}$ -$_\text{LINK}$-competition
      'beer drinking competition'

     b. [[tryll-e]-drikk]-brygging
      conjure-$_\text{LINK}$-drink.$_\text{N}$-brewing
      'magic potion brewing'

The compounds in (105) and (106) take different linking elements depending on the category of the left-hand member. That indicates that these complex left-hand members are categorized. Semantically, (105a) and (b) are very similar, but speakers agree that (105a) is more verbal, and this is reflected in the choice of linking element. In (106), the verbal and nominal versions of *drikk* are easy to disentangle.[178]

To conclude, various types of data presented in this section indicate that left-hand members in Norwegian do not have to be bare, uncategorized roots. They can also be categorized as verbs (and although I have not discussed it explicitly, presumably also as adjectives, cf. (78b) and (85g)). Therefore, we need an alternative explanation for the observation that forms headed by overt adjectival and verbal suffixes are not used as left-hand members of compounds.

4.5.2.2 *Are Norwegian left-hand members nouns?*

It has also been proposed that left-hand members of compounds are best analyzed as nouns (ten Hacken 1994). That could explain why forms headed by adjectival and verbal suffixes are excluded from the left-hand position.

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[178] A similar argument for categorization can be made from simple left-hand members whose linking elements are sensitive to their category and declension class. However, as shown in Section 4.4.3, the data with simple left-hand members is more open to alternative interpretations, and since the argument from linking elements with complex left-hand members is sufficient for the point I am making, I only focus on that argument here.

I showed earlier in this section that the unacceptable left-hand members all become acceptable when they are nominalized. This is significant in that it strongly indicates that there is a preference for nominal forms as left-hand members. It is also noteworthy that previous analyses of phrasal left-hand members have typically proposed that the left-hand member is turned into a noun before compounding.

Thus, on the one hand, the previous sections show that left-hand members do not have to be nouns; they can for example be verbs, APs or PPs. On the other hand, there seems to be a clear preference for nouns when the left-hand member is morphologically complex. How can this be? In particular, how can the left-hand members in (107) be acceptable, when those in (108) are not?

(107)
  a. [pek-e]-finger
      point.$_{\text{V-LINK}}$-finger
      'index finger'

  b. [polar-iser-ing-s]-tendens
      polar-$_{\text{V-N-LINK}}$-tendency
      'tendency of polarization'

  c. [snø-smelt-e]-flom[179]
      snow-melt.$_{\text{V-LINK}}$-flood
      'flood cause by melting snow'

  d. [være-eller-ikke-være]$_{\text{VP}}$-holdning
      '(to)-be-or-not- (to)-be attitude'

(108)
  a. ??[på-pek-e]-finger
      on-point.$_{\text{V-LINK}}$-finger
      intended: finger that points something out

  b. ??[polar-iser-e]-tendens
      polar-$_{\text{V-LINK}}$-tendency
      intended: tendency to polarize

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[179] As noted earlier, some speakers prefer to nominalize NV-N compounds as well, as in *snø-smelt-ing-s-flom,* but examples without nominalization are easily found in natural speech and on the web.

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The data in (107) and (108) indicate that the restrictions on left-hand members have more to do with purely morphological or morphophonological constraints than with categories or complexity as such. That is, the left-hand members in (108) are not simply ruled out because they are verbal or because they are complex, as is clear from the comparison with (107). However, a generalization that can be stated based on these data is the following: left-hand members of compounds, that is, elements below L, cannot contain overt morphological cues to the effect that they are *not* nouns.

Adjectival and verbal suffixes are overt morphological cues of this type so this restriction would rule out such forms, including (108b) above. What about particle verbs, as in (108a)? The restriction on particle verbs as left-hand members becomes more puzzling when we consider the observation that particle verbs are acceptable as left-hand members in Dutch. Recall from Chapter 2, however, that particle verbs in Norwegian are pronounced with a particular tonal accent, where the verbal version of a particle verb is always pronounced with tonal accent 1, and the nominalized version is pronounced with tonal accent 2, except with the overt nominalizing suffixes *-ing* and *-else*. This results in pairs like (91a) and (92), which are only distinguished by their tonal accent. To my knowledge, this type of pattern is not found outside the mainland Scandinavian languages, so it is possible that with particle verbs, the tonal accent also functions as an overt cue of the category of the left-hand member. In other words, the claim is that overt cues of a non-nominal category, that is, categorizing suffixes and the tonal accent of particle verbs, are blocked from the left-hand position. Forms that are free of such cues, that is, simple verbal left-hand members, including simple verbal stem-allomorphs as in *drøymehus* 'dream$_V$-house' and complex left-hand members without overt suffixes to signal their non-nominal category, are allowed. This is a curious type of constraint that does not easily align with abstract morphological analysis, but it seems to be the generalization that best captures the data.

One way to implement the restriction on left-hand members is to simply state it as selectional property of L, or the suffixes (linking elements) that realize L. Since we know already that suffixes are picky about the types of elements that can go before and after them, this might not be an unattractive solution. It is in essence similar to the patterns captured by level ordering or Aronoff & Fuhrhop's (2002) notion of opening and closing suffixes.

Alternatively, and more interestingly, we could try to propose that the L-head requires its complement to be nominal and turns it into a noun if something other than a

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noun is inserted, which then amounts to a process of conversion. This is similar to Borer's (2013) analysis of English compounds, outlined earlier, where she proposes that the compound frame makes the left-hand member +N-equivalent.[180] Under this line of analysis, it is interesting to note that the observed restrictions on left-hand members of compounds are very similar to restrictions on conversion.

It has been observed that conversion is restricted by overt suffixes (Marchand 1969, Bauer 1992, Borer 2013). This is exemplified for English in (109)-(110) and for Norwegian in (111)-(112), where we see that bare forms are easily used as both nouns and verbs, whereas forms with overt suffixes are not easily converted. Note that the final -e in the Norwegian verbal forms is the infinitival marker, not a verbal derivational suffix.

(109) a government	*to government	(110) an ornament	to ornament
a formation	*to formation	a form	to form
to instantiate	*an instantiate	a chair	to chair
to acidify	*an acidify	a floor	to floor

(111) en byg-ning	??å bygning-e	(112) en buss	å buss-e
'a building'	'to building'	'a bus'	'to travel by bus'
en lær-er	??å lær-er-e	et søk	å søk-e
'a teacher'	'to teatcher'	'a search'	'to search'
en depre-sjon	??å depre-sjon-e	en velt	å velt-e
'a depression'	'to depression'	'a fall'	'to fall'
å klar-n-e	??et klar-n	et telt	å telt-e
'to clear up'	'a clear'	'a tent'	'to tent'
å sosial-iser-e	*et sosial-isere	sukker	å sukr-e
'to socialize'	'a socialize'	'sugar'	'to sugar'

As with left-hand members of compounds, the restrictions on conversion are strong tendencies, but they are not absolute, so we also find forms like *adventure, bandage, champion, commission,* and *disadvantage* that can be used as both verbs and nouns (Bauer et al. 2013:504). Another parallel is that full phrases can participate both in compounding and in conversion, as shown below ((88c) is repeated as (113a)).

(113) a. She [I'm from New York]$_{TP}$ -ed her way into the men's room'

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[180] However, unlike in Borer's (2013) proposal, there is not a requirement that left-hand members that are not nominal must be roots.

b. et [være   eller ikke være]   for   norsk   jordbruk
   a be   or   not be   for   Norwegian agriculture'
   'a matter of life and death for Norwegian agriculture'

c. et [før nobelprisen]   og   et   [etter nobelprisen]
   a before the Nobel Prize   and   an   after the Nobel Prize

These parallels between left-hand members of compounds and conversion indicate that they may be part of the same phenomenon. This points out a possible direction for future investigations, which may allow us to provide a full answer to Requirement D in Section 4.1.2. However, the most important conclusion from this section is an empirical one, namely that overt morphological cues play a role in restrictions on word-formation, and the relevant generalizations cannot be formulated over abstract structures alone. Furthermore, restrictions like these are soft constraints, rather than hard grammatical facts.

In the next section, I turn to another case where the restrictions on left-hand members are tendentious.

4.5.3 The ban on internal inflection

It is often stated that inflectional material is banned from the non-head of a compound. (see e.g. Sandøy 1992 on Norwegian). This restriction rules out forms like (114a) and its Norwegian counterpart (115a) in favor of (114b) and (115b).

(114) a. books-shelf   (115) a. bøker-hylle
      b. book-shelf   b. bok-hylle

However, the claim that internal inflection is banned from compounds is usually followed by list of exceptions, including the phrasal left-hand members that were considered earlier in this section. Some further examples of Norwegian internal inflection are provided in (116) (see also Section 2.2.4).

(116) a. fedre-permisjon   c. mind-re-tal
         father.PL-leave   small-COMP-number
         'paternity leave'   'minority'

      b. [By-ås-en]-kamp   d. kaffe-bønn-er-beholder[181]
         city-hill-DEF.SG-match   coffee-bean-PL-container
         'match played by the team *Byåsen*'   'container for coffee beans'

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[181] This example was used in a conversation about the department coffee machine.

Bauer in his (2009b) overview of compounds in a range of different languages also concludes that no internal inflection is the common case in compounds, but some internal inflection nevertheless occurs. Thus, the appropriate question is *why is compound-internal inflection generally dispreferred, and why does it nevertheless occur?*

The inherent conflict in this question suggests that it might not have clear categorical answers, but I will offer some considerations that I believe are important. I hypothesize that the lack of inflection inside compounds is not a hard-wired grammatical constraint, but a tendency that has its roots in economy and a general division of labor between higher and lower syntactic domains.

In the framework that I am exploring, where both phrases and words are built in the syntax, it is in principle surprising that there should exist a ban on compound-internal inflection. This is different from lexicalist theories that distinguish firmly between the building of words and the building of sentences. From the perspective of weak lexicalism, one can argue that inflectional heads are absent from left-hand members of compounds because compounding happens in the lexicon and inflection happens in the syntax. However, as already noted, such theories run into problems with phrasal left-hand members in compounds, as well as case-marking on left-hand members of compounds (e.g. in Icelandic and Finnish) and other phenomena where different levels seem to mix. The fact that such data exist, and indeed seem to be relatively common, suggests that the exception of compound-internal inflection is not a strictly architectural constraint. Thus, I would argue it is not the result of two distinct structure building components, the lexicon and the syntax.

The most discussed type of compound-internal inflection is number marking on left-hand members. It has long been observed that some irregular plurals can be used as left-hand members in compounds in Germanic languages, as in English *teeth-marks, lice-infested* and Danish *børne-billet* 'child.PL-LINK-ticket' 'children's fare', and the Norwegian form in (116a). Various explanations have been proposed to account for the acceptability of irregular forms and the exclusion of regular forms (e.g. Kiparsky 1982, Siddiqi 2009, Kilbourne et al. 2016). However, what such treatments seem to underplay is a) that not all irregular plural forms are equally good as left-hand members (*??men catcher*), and b) that regular plural marking is rather frequent and apparently productive, at least in a language like English, as in *jobs listing, neurosciences department* and *sweets shop* (see Bauer 2017

for extensive discussion of the English data).[182] Thus, the claim that irregular plurals are licit and regular plurals are not is wrong.

One relevant observation here is that compounds are in principle underspecified for number, such that plural marking is never strictly necessary. Consider (116a) *fedrepermisjon* 'father.PL-leave'='paternity leave'. This compound coexists with *far-s-permisjon* 'father.SG-LINK-leave'='paternity leave', and there is no clear difference in interpretation between the two. Both can apply to one father or multiple fathers. Consider also (115). *Bokhylle* 'bookshelf', with a bare left-hand member, can refer to a shelf containing one book, many books or indeed no books. This underspecified nature of left-hand members means that plural marking is redundant. The lack of plural marking does not entail a singular interpretation. This, then, is an economy argument against general number marking on the left-hand member of compounds.

Nevertheless, it seems possible to exploit the possibility of plural inflection for disambiguation in limited ways. In English, there is, for example, a small semantic distinction between a *Neuroscience department* and a *Neurosciences department*. In Norwegian, internal plural marking is less common than in English, but internal definiteness marking is sometimes used with place names, as in (117).

(117) a. Øy-a-festival-en
island-DEF.SG.FEM-festival-DEF.SG.MASC
'the music festival at Øya in Oslo'

b. øy-festival-en
island-festival-DEF.SG.MASC
'the festival taking place on an island'

Furthermore, in a context where someone is organizing books into piles, we can get the following forms.

(118)
a. les!-bunke
read.IMP-pile

b. les-er-bunke
read-PRES-pile

c. las-bunke
read.PAST-pile

d. lest-bunke
read.PERF-pile

e. skal lese-bunke
shall read-pile
'will-read pile'

As long as phrasal left-hand members exist, there is little reason to assume that the forms in (117) and (118) should not. It is sometimes claimed that phrasal and inflected left-hand members are becoming increasingly common in modern Norwegian (Gundersen

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[182] Haskell et al. (2003) also conducted several studies on plurals in English which indicated that even though plural forms are sometimes acceptable as left-hand members, for example pluralia tantum nouns and irregular plurals, the bare singular forms were always rated higher.

1971 cited in Enger & Conzett 2016, Uri 2004). I have not investigated this, but we may be witnessing a change in the language. Importantly, internal inflection is never required by the larger *structural* context. The grammatical properties of the sentence into which a compound is embedded only influences the inflection of the compound as a whole, not its constituent parts.

The inherently underspecified, non-referential nature of left-hand members also means that other constructions are much better suited to express nuances and tie the content of the left-hand member to the larger discourse. In that sense, there is a general division of labor between the lower and higher domains of the syntactic structure concerning their optimal use. Thus, I am proposing that compound internal inflection is not banned by the architectural design of the structure-building component, which explains why it sometimes occurs. However, it is often redundant, and left-hand members of compounds are less compatible with the purposes of inflection, which leads to a general dispreference for these types of elements. This provides the first part of the to answer Requirement E of Section 4.1.2, according to which an analysis of Norwegian compounds should address the (im)possibility of compound-internal inflection. However, the inconsistent nature of this and other phenomena in left-hand members of compounds is puzzling, and future work will hopefully provide more complete answers.

For irregular plural forms like *fedrepermisjon* 'paternal leave' an alternative analysis is also available. Left-hand members of compounds sometimes use a bound stem, in a type of compound-licensed allomorphy. I turn to that next.

4.5.4 Left-hand member allomorphy

Left-hand members of compounds are sometimes realized by compound-specific forms. Consider the examples in (119).

(119)   *Free form*
    a. billed-bok   'bilde'
       picture-book
       'picture book'

    b.   vass-damp   'vatn'
       water-vapor'
       'water vapor'

    c.   små-jente   sg. 'lita', pl. 'små'
       small-girl
       'young girl'

d. mødre-heim   sg. 'mor', pl. 'mødre' (Bm), 'mødrer' (Nn)
    mother-home
    'maternal home'

e. fedre-permisjon   sg. 'far', pl.'fedre' (Bm), 'fedrar' (Nn)
    father.PL-leave
    'paternity leave'

f. høns-e-hus   sg. – , pl. 'høns'
    hen-LINK-house
    'hen house'

I propose to interpret the patterns in (119) as root/stem-allomorphy licensed by compound structure, specifically by the L-head (but cf. the discussion of plural forms in the previous section).

In some cases, for some speakers, both the compound form and the free form can be used. Thus, for 'picture book' we find both *billedbok* and *bildebok*. In other cases, the compound form is obligatory. Thus, for many speakers, *små-* is always the compound form for *liten$_{MASC}$/lita$_{FEM}$/ lite$_{NEUT}$* 'small'.[183]

There are two competing ways of dealing with allomorphy in lexical material in Distribued Morphology: readjustment rules and listed root/stem-forms (suppletion). Both options are much discussed in the literature and have been implemented in different ways by different authors (see e.g. Halle & Marantz 1993, Harley & Tubino Blanco 2013, and Embick 2015 for approaches using readjustment rules, and Haugen 2016 for a recent approach assuming root/stem-listing). Stem-listing was also proposed by Neef (2015), reviewed in Section 4.4.1.2, in a different type of framework.

Readjustment rules alter the phonological form of an item, for example from *sing* to *sang* by replacing *i* with *a* (/æ/). Readjustment is typically assumed to apply after vocabulary insertion but prior to regular phonological processes, and the application of the rule is triggered by adjacency to a particular element, in the case of *sing → sang* by T[+past] (Embick 2015:203). In compounds, readjustment rules could derive a compound form, e.g. *vass-* 'water' from the corresponding free form *vatn* 'water' by changing *-tn* to /s/. The L-head would be the head that triggers readjustment.

Readjustment rules are conceptually problematic because the types of phonological alternations they can perform are unconstrained, and they introduce a process-based procedure in an otherwise item-based morphological theory. For these and other reasons,

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[183] In some cases, the weak (definite) form *lille* can also be used, cf. discussion in Section 2.2.2.1.

their use is much criticized (see Haugen 2016 for a review), and here I will rather opt for a root/stem-listing approach.

An analysis in line with root/stem-listing simply states that all allomorphs are listed and one or the other form is inserted based on the structural environment, typically an adjacent head. In the case of *sing/sang,* then, the presence of T[+past] licenses the insertion of *sang* rather than *sing* or *song,* or to use an example from Norwegian, the plural suffix *-er* licenses the insertion of *bøk-* 'book' rather than *bok* 'book'. For compounds, I assume that the L-head licenses the insertion of a compound form when several allomorphs are available, as illustrated below.

(120)

√vatn 'water' ⇔ *vass* /_ L
                  vatn Elsewhere
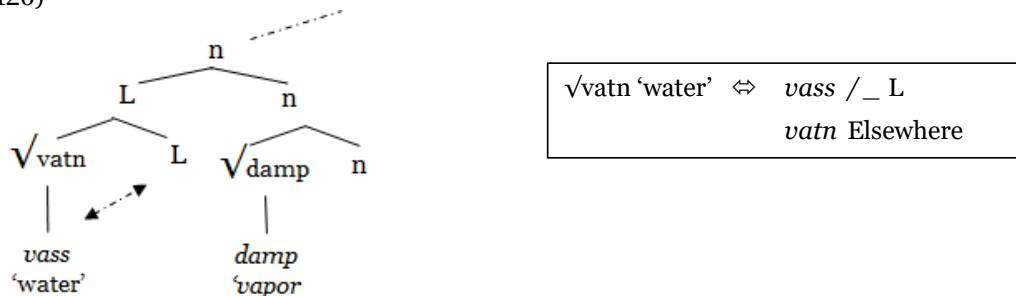
The insertion rules state that the form *vass* should be inserted in the context of L, whereas the form *vatn* should be inserted in all other contexts.

In principle, a compound-form analysis can also be assumed for left-hand members that appear to take the form of irregular plurals. The left-hand member *fedre-* 'father(PL)' in *fedrepermisjon* 'paternity leave' need not be a true plural, but could be an allomorph that happens to appear both in the context of L and PL. Some support for this analysis is found in the observation that *fedre* is used as a left-hand member both in Norwegian Nynorsk and Norwegian Bokmål, despite the plural form being *fedrar* in Norwegian Nynorsk, as indicated in (119e).

An issue that faces both a root/stem-listing analysis and a readjustment analysis is that the rule for vocabulary insertion of left-hand members appears not to be deterministic, since it is often the case that more than one stem can appear in the same environment. A similar type of behavior was noted for linking elements in Section 4.4.3.

The fact that two forms can be used interchangeably indicates that this must be regulated by speaker choice.[184]

I will now consider some implications of this type of analysis. First, an advantage of the current proposal is that the conditions for insertion are very specific. The condition is "when embedded under L, use X form". If there were no functional head in compounds, the licensing conditions would be much weaker. The L-head thus allows us to formulate specific contexts for the insertion of compound allomorphs, and we are able to account for allomorphy in compounding, derivation and inflection in parallel ways. Importantly, the existence of such a head is justified independently.

Second, in Section 4.1.1, I discussed whether roots have phonological content in the list of syntactic atoms – List 1. The suppletion approach I am proposing here entails that they do not, or more specifically, the vocabulary item that ends up realizing the root is phonologically independent of the listing of the root in List 1. Proponents of this type of approach have argued that roots are individuated by indices in the list of syntactic atoms (Harley 2014). According to this view, the roots in (120) can for example be listed as $\sqrt{234}$ and $\sqrt{14}$, and are given a phonological realization (*vass, damp*) only at the level of vocabulary insertion. As far as I can tell, this approach also allows us to list them as $\sqrt{vatn}$ and $\sqrt{damp}$, as indicated in (120), or as $\sqrt{@}$ and $\sqrt{\%}$, for that matter. The point is just that whatever representation they have in List 1 is completely replaced, rather than altered, at vocabulary insertion.

Third, an advantage of the root/stem-listing analysis, as opposed to a readjustment analysis, is that we only require one mechanism to account for compound forms like *billed-* or *vass-,* which are phonologically similar to their free forms, and a left-hand member like *små-,* which is radically different from the related forms with *lit-*. In both cases, we assume distinct allomorphs competing for insertion. A readjustment analysis could handle the phonologically similar variants, but not the phonologically unrelated variants. A readjustment rule that changes *lit-* to *små-,* or the other way around, would be too powerful even for readjusters, so a root/stem-listing analysis could have to be invoked

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[184] It is often the case that one form is more productive than the other. For example, in the case of *bilde/billed* 'picture', *bilde-* appears to be the preferred form in productive compound formation. However, both forms are possible. This also indicates that an analysis whereby the form of the left-hand member is licensed by the form of the right-hand member is not correct, although we could get that impression by considering only established compounds and not productive compound formation.

in any case. By applying the same analysis for both phenomena, we are reducing the inventory of necessary operations.

4.6 Compounds in the Encyclopaedia

The meaning of the words in (121) can to varying extents be predicted from the meaning of their parts.

(121) a. jord-bær
      earth-berry
      'strawberry'

    b. sommar-fugl
       summer-bird
       'butterfly'

    c. blå-bær
       blue-berry
       'blueberry'

    d. grøn-sak
       green-thing
       'vegetable'

    e. sølv-tre
       silver-tree
       'silver tree'

    f. hurtig-lese
       fast-read
       'speed read'

A core property of compounds is their many-faceted semantic profiles. On the one hand, the relationship between the two members of a productively formed compound is underspecified and allows a single compound to have a range of different denotations. This aspect of compounds was treated in Section 4.4. On the other hand, compounds tend to develop semi-transparent and non-transparent meanings through convention. Conventionalized meanings must be listed, and in this section I will show how this property of compounds provides us with a window into the component of the encyclopedia. The goal of this section is to explore how the structure of compounds can be paired with interpretations in the Encyclopaedia that vary in their degree of transparency. In so doing, I address Requirement F in Section 4.1.2, which states that an analysis of compounding in Norwegian must account for the assignment of semantic content to transparent and non-transparent compounds. On a more general level, then, this section addresses the complicated relationship between form and meaning in linguistic expressions.

4.6.1 The semantic lifespan of a compound

It is well established by now that compounds can have a range of possible interpretations, captured by the Variable R condition (Allen 1978, cf. 3.2.3). Thus, the compound *sølvskei* 'silver spoon' can have at least the following interpretations.

(122) sølv-skei
       silver-spoon
       'silver spoon'

   a. spoon made of silver
   b. spoon used to eat silver (e.g. soup)
   c. spoon with a silver color
   d. spoon that is as valuable as silver
   e. the spoon that won you the second place in the egg-and-spoon race

With language use, one interpretation tends to become fixed for a given compound. In the case of *sølvskei* 'silver spoon', this is the meaning in (122a). Alternative interpretations nevertheless remain available, if an appropriate context is given.

In most cases, the interpretation that becomes fixed for a compound is one of the interpretations that was made available when the compound was formed, as with *sølvskei*. In other cases, and over time, the fixed interpretation can be removed from those that are immediately available in the synchronic grammar. Compare in this regard *sølvskei* to the compound *sommarfugl* 'summer bird'='butterfly'. For *sommarfugl* the interpretation given to the compound as a whole is not available from the combination of *sommar* and *fugl*. At least in my own vocabulary, there is no context where *fugl* can refer to a butterfly, nor do I interpret *sommarfugl* as a metaphorical bird in any clear sense. I interpret it as referring to a simple concept BUTTERFLY.[185]

As with *sølvskei,* a compositional interpretation is nevertheless available if *sommarfugl* is used in a context that requires reinterpretation. Thus, in the appropriate context, *sommarfugl* could for example refer to a bird that you only see in summer, e.g. a migratory bird.

Semantically removed compounds sometimes develop grammatical properties that differ from those of their right-hand member. This is illustrated with the established compounds in (123) (examples from Johannessen 2001).[186]

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[185] There may very well be individual differences in speakers' represenatations of such meanings, and others might perceive them as more transparent and metaphorical than I do. It is easy to find anecdotal evidence for such individual differences.

[186] In terms of the formal analysis of such words, they can have a normal compound structure with different values on the categorizer of the left-hand member, since I assume that gender and declension class features are encoded on the categorizer.

(123)

	Singular	Plural	Expected plural based on right-hand member
a.	løv-e-tann	løv-e-tann-er	*løv-e-tenn-er
	lion-_{LINK}-tooth	lion-_{LINK}-tooth-_{PL}	lion-_{LINK}-tooth-_{PL}
	'dandelion'	'dandelions'	
b.	over-vær-e	over-vær-er	*over-er
	over-be-_{INF}	over-be-_{PRES}	over-be-_{PRES}
	'witness'	'witness(es)'	

When the inflection of the compound is different from that of its right-hand member, assigning a compositional interpretation also requires reinterpretation of the grammatical properties. That is, if we try to interpret *løvetann* compositionally as 'lion's tooth', the plural changes to *løvetenner*.

A final stage in the life of a compound involves its undergoing phonological changes, which can mask the original constituents to the extent that they are no longer recognizable. In the compound in (124), this has happened partially. The left-hand member *jord-* is by many speakers pronounced /jur:/ with a short vowel, whereas a fully compositional reading would require *jord* 'earth' to be pronounced with a long vowel, /ju:r/. For the words in (125) and (126), the phonological masking is complete. Many words that are today perceived as simplex were once compounds.

(124) a. jord-bær   (from *jord* 'earth' + *bær* 'berry') /ˈjur:ˌbæ:r/
        earth-berry
        'strawberry'

    b. vindu   (from *vind* 'wind'+ *auge* 'eye')   /ˈvin:ˌdy:/
        'window'

    c. fjøs   (from *fe* 'livestock + *hus* 'house)   /ˈfjø:s/
        'barn'

Words from *sølvskei* 'silver spoon' to *fjøs* 'barn' can thus be placed on a scale from transparent to non-transparent, as in (125). To the very left (most transparent), I add the freshly created compound *sølvtre* 'silver tree', for which there is no conventionalized meaning (in my vocabulary). (See e.g. Bakken 1998a for the formulation of a specific lexicalization scale).

(125)

Transparent ⟶ Non-transparent

sølv-tre	sølv-skei	jord-bær	sommar-fugl	løve-tann	vindu	fjøs
'silver tree'	'silver spoon'	'strawberry'	'butterfly'	'dandelion'	'window'	'barn'

Two questions that have received some attention in the literature are *a) what exactly happens to the representation of a compound when it becomes non-transparent*, and *b) at what point is a compound no longer a compound*? In particular, there is a question concerning whether a word such as *sommarfugl* has internal structure.

Different answers can be given depending on what we take to be the relevant linguistic building blocks, since the nature of the building blocks necessarily determines how we assign constituent structure.

In a theory where morphosyntactic complexity goes hand in hand with semantic complexity, that is, where morphosyntactic and semantic constituency map one-to-one, *sommarfugl* 'butterfly' does not have internal structure. *Sommarfugl* is semantically simple, in the sense that it is not semantically composed of *sommar* and *fugl,* and it would follow that it is also morphosyntactially simple. *Sommarfugl* is therefore monomorphemic.[187] From this perspective, what happens when a compound becomes non-transparent is that the internal structure disappears. If, on the other hand, there does not have to be a direct mapping between morphosyntactic complexity and semantic complexity, then *sommarfugl* can be argued to have internal structure. *Sommarfugl* can be morphosyntactically complex but semantically simple. While this may seem counterintuitive, this is the view I will explore in the next sections.[188]

It is worth pointing out here that the notion of *listedness* arguably does not make a difference to the question of internal structure. One line of reasoning could claim that things that are listed do not need to have internal structure, so because the meaning of *sommarfugl* is listed, it has no internal structure (cf. the discussion of Fabb 1984 in Chapter 3). However, to this I would object that even a compound like *sølvskei* 'silver spoon' with the interpretation 'spoon made of silver' must be listed in the sense that speakers know that this is the conventionalized interpretation for *sølvskei,* rather than the other interpretations that are available. Simply recognizing that a word-form has been

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[187] Bakken (1998a) formulates a specific view of the lexicalization of compounds which is in line with this view. She argues that when the meaning of a compound is no longer traceable from the meaning of its parts, such that the morphological structure no longer has a semantic correlate, the structure does not have any psychological relevance for the speakers. At this stage, the word is no longer a compound. Bakken lists *jordmor* 'earth mother'='midwife' and *snippkjole* 'collar dress'= 'evening suit' as examples of words that have reached this stage. According to Bakken, these words act as prototypical Saussurean signs and must be considered simplexes.

[188] Note that these questions are related to a question addressed in Chapter 1 concerning what exactly a morphological theory is proposing to explain.

heard before entails listing. This knowledge is listed somewhere, and I take that somewhere to be the Encyclopedia. Unless we want to say that all compounds that have a conventionalized interpretation are morphologically simple - a view that is logically possible, but not widely held – then listedness is not a relevant factor.[189]

In the next section, I point to arguments for the view that semantic and morphosyntactic structure do not need to go hand in hand, and by extension, that formally complex words, such as *sommarfugl* 'butterfly', can have simple meanings.

4.6.2 Dissociating semantic and morphosyntactic structures

There are certain phenomena that speak to the view that semantic compositionality is not a requirement for structural complexity. Such phenomena seem to require a theory where interpretation and morphosyntactic structure can be dissociated within well-defined domains.[190]

Idioms are classic examples of complex structures with unpredictable meanings. Some much-cited examples from English are given in (126), along with two Norwegian examples in (127).

(126) a. kick the bucket (127) a. tvinne tommeltottar
     b. spill the beans   'twiddle one's thumbs'
     c. break the ice

                                b. svelge kamelar
                                  swallow camels
                                  'put up with/accept something'

Although the full meaning of these expressions is not predictable from the meanings of their parts, there is good reason to think that they have internal structure. They can for example occur with different types of inflection and be manipulated according to general syntactic principles.

(128) Dette   er de   største **kamelene**   partiene   har   måttet **svelge**[191]
      This   is the   biggest camels   the parties have must   swallow
      'These are the biggest camels the political parties have had to swallow'

The mismatch between structure and interpretation makes idioms similar to non-transparent and semi-transparent compounds. In both cases, it appears that simple or

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[189] So let us not commit the rule-list-fallacy (so termed by Langacker 1987)

[190] In other words, they speak against the traditional view of 'morphemes' as "the smallest individually meaningful element in the utterances of a languages" (Hockett 1958:123).

[191] *Aftenposten,* December 4th, 2016

idiosyncratic semantic content can be paired with a complex form, e.g. 'die' for the idiom 'kick the bucket'. Furthermore, in both compounds and idioms, a compositional interpretation is available alongside the idiosyncratic interpretation, if an appropriate context is provided.

The elements that Harley (2014) terms "caboodle-roots", shown in (129), illustrate a similar point.

(129) a. kit and **caboodle**   'everything'
      b. run the **gamut**   'includes a whole range'
      c. by **dint** of   'by means of'
      d. in **cahoot**s   'conspiring'
      e. **vim** and vigor   'vitality'
      f. high **jink**s   'mischief'
      g. **kith** and kin   'friends and relations'

The idioms in (129) contain elements that do not have a clear meaning outside of these contexts. For example, the meaning of *caboodle* is not clear enough to be used productively to build new compositional expressions. Speakers of English nevertheless know the interpretation of the idiom *kit and caboodle,* as well as the other idioms in (129), without knowing the meaning-contribution played by each part. It follows from this that having a semantic contribution is not the defining criterion for constituency.

Consider finally the nonce forms in Lewis Carroll's Jabberwocky.

(130)   'Twas brillig, and the slithy toves
             Did gyre and gimble in the wabe:
         All mimsy were the borogoves,
             And the mome raths outgrabe.

The words *slithy*, *mimsy* and *outgrabe* are preceived morphologically complex. Yet, as Borer (2014) points out, these forms cannot be considered compositional for the simple reason that we do not know the individual semantic contribution of *slith, mims* and *grabe*. Lack of semantic contribution does not, however, prevent us from assigning internal structure to such words. In Borer's words, content matching for morphologically complex structures is optional.

Thus, we have seen that simple interpretations can be paired with complex structures, as with idioms. Moreover, we have seen that linguistic building blocks do not need to be semantically contentful at all in order for them to participate in complex expressions with internal constituents.

Taken together, these phenomena indicate that being semantically compositional is not strictly required for structural complexity. Semantics is not a reliable indicator of

internal structure. This does not change the fact that systematic blocks of form-meaning pairs are what allows us to build larger compositional expressions. However, the presence of such building blocks is not a necessary condition for assigning internal structure to linguistic expressions.

Applied to compounds, this means that words like *sommarfugl, cranberry* and *sølvskei* with conventionalized interpretations can all be structurally complex.

The view that there does not have to be a direct mapping of constituency at different levels is not new, and has long been assumed in variants of generative grammar. Marantz (2007:1) summarizes this aspect of the theory in the following quote.

> On perhaps the most stringent view of compositionality (exemplified, e.g., by Montague Grammar), each syntactic operation would have a corresponding interpretation, making the result of every "merge" of items into a phase, in the sense of a domain for phonological and semantic processing. In contrast, Chomsky's Minimalist Program instantiates a basic principle of standard generative grammar – interpretation waits a bit within a syntactic derivation, allowing for small apparent mismatches between syntactic hierarchical structures on the one hand and the constituents of phonological and semantic interpretation on the other. Syntax within a cyclic domain proceeds without interpretation at each generative step, but the merger of a phase head triggers the semantic interpretation and phonological spell-out of a chunk of syntactic structure.

Note also that in a theory like Distributed Morphology, where both words and phrases are built in the same component, it is not surprising that they share this property of allowing both compositional and non-compositional meanings.[192] I will now consider how the mapping between structure and idiosyncratic meaning should be modelled.

4.6.3 Mapping structure and meaning

The pairing of complex structures with unpredictable meanings has been modelled in different ways. The solution I will opt for is closest to that of Borer (2013, 2014), Kelly (2013) and Nediger (2017), and parts from some standard assumptions in Distributed Morphology. My views here, also discussed briefly in Section 4.1, build especially on Aronoff's (1976) discussion of cran-morphs.

Distributed Morphology typically deals with idiosyncratic interpretations in terms of roots. Roots are semantically underspecified, and can only be interpreted in context. The interpretation of a root in a specific context is listed in the encyclopedia. For example,

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[192] A question that has received more attention in recent years is how the domains of idiosyncratic content are structurally defined, that is, how the mapping between form and meaning is constrained (see e.g. Arad 2003, Marantz 2013, Borer 2013, 2014, Harley 2014). Compounds do not seem to provide clear support for one or the other side of this debate.

Arad (2003) states that √*hammer* is interpreted as a type of instrument in the context of nominal syntactic structure and as an activity performed in a certain manner in the context of verbal structure. Similarly, Harley (2014) states that √*ceive* is interpreted as 'think' in the context of *con-* and as 'fake' in the context of *de-* (i.e. 'conceive' and 'deceive'). Along the same lines, *kick* is interpreted as 'die' in the context of *the bucket* (Harley & Noyer 1999:4), and *cahoot* is interpreted as 'conspiracy' in the structural context of *in* (Harley 2014:244). This is also referred to as contextual allosemy (e.g. Wood & Marantz 2017).

Thus, from the classic DM perspective, all unpreditcable meaning is actually placed on roots. The verb *deceive* does not mean 'fake'. Rather, the root √*ceive* means 'fake' in the context of *de-*. This way of modelling the mapping between structure and meaning is conceptually very different from stating that meaning is assigned to the entire consituent *deceive,* although the result is in many respects the same. In the former case, the semantic content is placed at the root. In the latter case, the semantic content is mapped onto the entire form. The latter view, whereby idiosyncratic meanings can be paired with entire structures, is taken by Borer (2013, 2014) for complex words, and by Kelly (2013) and Nediger (2017) for non-decomposable idioms such as *kick the bucket*. This is also the view I will argue for.

It is in principle difficult to distinguish between the allosemy approach of DM and what we can call a full dissociation approach of the type proposed by Borer (2013, 2014), Nediger (2017) and Kelly (2013), where simple meanings can be associated with entire structures. In most respects, these two approaches can be seen as representational variants. However, facets of this distinction are discussed in detail by Aronoff (1976), who argues explicitly against what he calls allo-meanings, corresponding to what has recently been called allosemy. The problem pointed out by Aronoff is that it is difficult to go about the allo-meaning approach in a principled manner. Let us consider the cran-morph of *cranberry* from an allo-meaning-perspective. Should we state that *cran-* refers to whatever semantic part of *cranberry* is not covered by *berry*? Or should we perhaps state that *cran* is semantically empty and *berry* means 'cranberry' in the context of *cran*? It is useful to repeat Aronoff's point quoted in Section 4.1.

> A priori, any word can be split in two and each part given a meaning. I can divide apple into a and pl, and give each of them part of the meaning of the whole word. However, we prefer to reject this solution, for by allowing such an analysis we would reduce the predictive power of a theory to zero … It is unfalsifiable. (Aronoff 1976:14)

Thus, Aronoff argues that morphemes are not individuated semantically and concludes that "what is essential about a morpheme: not that it mean, but rather merely that we be able to recognize it" (Aronoff 1976:15, and see Harley 2014 for similar discussion).

In fact the problem for allosemy approaches is even clearer with compounds than with other complex words. As mentioned above, it is crucial in DM that the root is the carrier of meaning. The fact that for Harley, meaning is placed on the root √*ceive*, and not for example on the prefixes *de-/con-*, simply falls out from core assumptions in the theory, namely that idiosyncratic, "lexical" meaning is located on roots, whereas grammatical meaning is located on grammatical formatives like prefixes and suffixes. This is different with compounds, which contain two or more roots, and which therefore force us to make a decision about which of the roots is the carrier of meaning. Applied to *sommarfugl* 'butterfly' or an English example like *honeymoon,* the allosemy approach forces us to make an impossible decision about where in *sommarfugl* or *honeymoon* the various aspects of the meaning are located.

At least for compounds, I assume that meaning is assigned to the entire structures, rather than positing contextually determined allo-meanings. Note that this does not mean that meanings are not also determined contextually. Consider for example the examples from Marantz (1984) and Harley (2014).

(131)
   a.   kill a bug   "cause the bug to croak"
   b.   kill a conversation   "cause the conversation to end"
   c.   kill an evening/day/hour   "while away the time span of the evening
   d.   kill a bottle/beer/wine/soda   "empty the bottle"
   e.   kill an audience   "entertain the audience to an extreme degree"

(132)
   a.   pass judgement   "evaluate"
   b.   pass thirty   "get older than thirty"
   c.   pass a law   "enact legislation"
   d.   pass a test   "meet a standard of evaluation"
   e.   pass a kidney stone   "excrete a kidney stone"
   f.   pass the hat   "solicit contributions"

It seems clear that the nature of a direct object influences the way we interpret the verb it composes with. I am not arguing against that. Rather, the claim is that this is not what is going on with established, semi-transparent and non-transparent compounds like *sommarfugl* 'butterfly'. Whereas V-DO meanings are negotiated productively, semantically non-transparent compound meanings come about through years of language use. There is no productive linguistic process that renders the meaning of *sommarfugl*

from the combination of *sommar* and *fugl*.[193] Thus, I adopt the model where simple meanings can be paired with complex structures (but cf. some critical discussion shortly).

Let us briefly consider how this can work with different types of compounds.

- Newly formed compounds, such as *sølvtre* 'silver tree', are composed and interpreted according to the procedure that was sketched in Section 4.4.2. Thus, the compound structure dictates that the non-head *sølv* 'silver' stands in some relation to the head *tre* 'tree', and the specific nature of the relation is determined by the context, as specified by the L-head.
- Established compounds, such as *sølvskei* 'silver spoon' and *sommarfugl* 'butterfly', have their interpretations listed in the Encyclopedia. In order to account for the distinction between e.g. *sølv-[te-skei]* 'silver teaspoon'= e.g. 'tea spoon made of silver' and *[sølv-te]-skei* 'silver-tea spoon'= e.g. 'spoon for silver tea', interpretations must be mapped cyclically, and not just paired with phonological strings. Recall also that even transparent readings like that of *sølvskei* must be listed in order to account for the knowledge that this is the conventionalized reading, not the other possible readings.
- The intuition that a compound like *sølvskei* is nevertheless transparent and that *blåbær* 'blueberry' is partly transparent (not fully transparent, since blueberries can be green) is due to the fact that we can apply both processes and compare their results. Both productive composition and pairing with listed content can be applied to a single expression, and the degree of transparency is reflected by the degree of overlap in the two semantic representations.

The approach to semi-transparent and non-transparent meanings sketched here is radically different from an allosemy approach, where individual parts are assigned meaning in the context of one another. This addresses Requirement F in Section 4.1.2, according to which an analysis of Norwegian compounds should account for the assignment of semantic content to transparent and non-transparent compounds.

I will end this chapter with some final remarks about the decomposition of morphologically complex forms that tie in with my discussion in the introduction to this

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[193] That is not to say that is not possible to find associations to summers and birds in *sommarfugl* 'butterfly', but that would mainly be a retrospective exercise that works when you already know the meaning of the compound.

dissertation. I have argued here that compounds with both conventionalized and unpredictable meanings can be structurally complex, and for a compound like *sølvskei* 'silver spoon' the advantage seems clear. We want to say that *sølvskei* is structurally complex, even though its interpretation is conventionalized, which entails listing. Similarly, we perceive *tyttebær* 'lingon berry' as structurally complex, even though we do not know the meaning of *tytte*. However, while we want some decomposition of non-transparent forms, it is also clear that at some point the decomposition must stop, at least if we are concerned with 'what speakers know' rather than historical reconstruction. A clear example where all would agree that the synchronic grammar does not decompose is *fjøs* 'barn', which is historically derived from *fe-hus* (livestock-house). Another case would, presumably, be English *husband,* which in Norwegian is partially transparent as *husbond* 'house dweller/farmer', but in English is not. So at what point does the decomposition stop?

Haugen & Siddiqi (2013, 2016) argue from within the DM framework against linguists' tendency for "aggressive decomposition". Specifically, they propose that many cases of borrowed Latinate morphology should not be treated as internally complex in the synchronic grammar of English, even though morphologists are able to provide a decompositional analysis. In their words, "not all forms that are historically complex need to be treated as such in the synchronic grammar of a given language. Indeed, it is cognitively unrealistic to suggest that all unproductive morphology is productively done by the grammar" (Haugen & Siddiqi 2016:354). As I discussed in Chapter 1, these issues are closely related to the question of what a theory of morphology should try to explain. This is clearly an important question that we should continue to try to answer.

4.7 Conclusion and open questions

In this chapter, I have developed a formal analysis for the basic structure that underlies all Norwegian primary compounds. I have applied this analysis to different subtypes of compounds, thus developing the finer details of the morphosyntactic representation.

This chapter has also identified specific questions for future research, and I will briefly outline some of those questions here.

One question concerns the nature of adjunction. I have proposed that compounds are formed by adjunction, and according to some accounts, adjuncts are spelled out independently (Uriagereka 1999, Chomsky 2004, etc). To what extent does this hold for left-hand members of compounds? There appears to be very little interaction between the

two compound members, which indicates independent spell-out, but more research is needed to establish this.

Another question pertains to the semantic composition of compounds. I have outlined how compounds may compose semantically. However, we do not yet have a theory that accounts for the full range of compound types and their interpretation, and this is an important question for future reseach.

Turning to linking elements, a remaining question that stands out is exactly how we should model cases where several realizations are licit, but there seems to be a preference for one linker over the others.

Finally, I have identified the restrictions on left-hand members of compounds as one of the bigger puzzles in the grammar of Norwegian compounds. These constraints have not been discussed previously, and I hope that future work will be able to provide us with interesting answers.

In the introduction to this chapter, I outlined eight requirements for an analysis of Norwegian compounds. So far, I have explored and answered Requirements A-F, and in the next chapter I addresses the remaining two, G-H.

Chapter 5

SYNTHETIC ING-COMPOUNDS

Synthetic compounding is a much-studied phenomenon of Germanic morpho-syntax. As discussed in Chapter 2, the term broadly defined can refer to a range of complex words created by a combination of compounding and derivation. In this chapter, I analyze one type of word-formation that displays this combination: Norwegian ING-compounds.

Norwegian ING-compounds are multi-way ambiguous. Consider the compound in (1), which can have at least the interpretations paraphrased in (1a-h). While the readings in (1a-d) refer to an item that results from a drawing process, the readings in (1e-h) refer to the process of drawing itself.[194]

(1)   hand-teikn-ing
       hand-draw-$_N$
       'hand drawing'

   a.   a drawing drawn by hand
   b.   a drawing of a hand
   c.   a drawing on a hand
   d.   a drawing made while thinking about a hand[195]

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[194] Norwegian does not have an ING-progressive of the type found in English. The interpretation I am referring to in (1e-h) corresponds to English synthetic compounds like *truck driving* and is similar to argument structure nominals like *the destruction of the city* (e.g. Chomsky 1970).

[195] For the interpretation in (1d) (and similarly for 1h), one could imagine the following scenario. Mary spends all her time thinking about hands and feet. She also likes to draw, and when she draws, she thinks about either hands or feet. Knowing this, her friend John points to one of her recent drawings

e. the act of drawing by hand
f. the act of drawing a hand
g. the act of drawing on a hand
h. the act of drawing while thinking about a hand

The leading question of the current chapter is whether there are distinct structural representations underlying the readings of (1) and other ING-compounds, and if so, how many.

I will argue that the ambiguity of ING-compounds has two structural correlates. First, there is structural ambiguity in the right-hand member, whose internal structure can be either that of a result nominal or that of a process nominal, building on the analysis proposed by Grimshaw (1990). This is illustrated with simplified representations in (2). I will motivate and specify the internal structure of the respective right-hand members later in the chapter.

(2) a.   b.
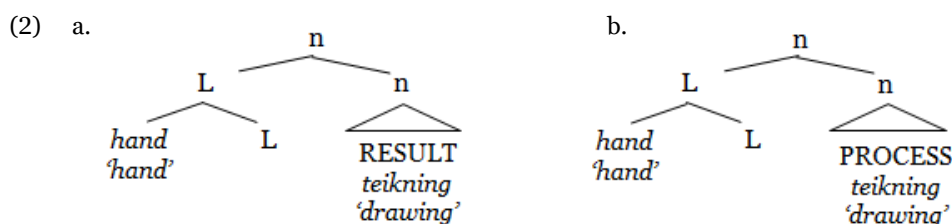
Second, because ING-compounds are compounds and share the basic structure of other compounds as developed in Chapter 4, there is a Variable R relation between the left-hand member and the right-hand member. When the right-hand member denotes a result, the left-hand member is interpreted as somehow related to this result, but the exact nature of the relationship must be determined pragmatically. Similarly, when the right-hand member denotes a process, the left-hand member is interpreted as related to this process, typically as an argument or adjunct/adverbial of the underlying verb, but the exact nature of the relationship must be determined pragmatically. Thus, the structure in (2a), headed by a result nominal, is responsible for the readings in (1a-d), whereas the structure in (2b), headed by a process nominal, is responsible for the readings in (1e-h). In other words, there are precisely two syntactic structures underlying the various interpretations of *handteikning* 'hand drawing' and other ING-compounds.

This view on the structure of ING-compounds entails a specific view on the distinction between primary and synthetic compounding. Specifically, it will emerge that

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and asks: 'Is this a hand drawing or a foot drawing?', i.e. 'Were you thinking about a hand or a foot while you made this?'

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(2a) corresponds to what is otherwise called a primary compound, while (2b) corresponds to what is otherwise called a synthetic or argumental compound. Moreover, this analysis entails a specific view on the role of argument structure in compounds. Thus, the current chapter addresses Requirement G in 4.1.2, which states that an analysis of Norwegian compounds must inform us about the relationship between primary compounding and synthetic compounding, and Requirement H, which states that an analysis of Norwegian compounds must make explicit the role of argumental and non-argumental constituents in compounds.

The analyses I propose for Norwegian ING-compounds build on Grimshaw (1990) for English, and are also similar to Allen's (1978) analysis, but differ in important ways from the analyses proposed in recent years by Harley (2009a), Borer (2013) and Alexiadou (2017).

The chapter is divided into two main parts. The first part, Section 5.1, treats systematic ambiguity in derived nominals and shows how this ambiguity extends to compounds created with such nominals. I begin by presenting Grimshaw's (1990) treatment of ambiguous nominals and compounds, before I go on to show that the Norwegian data pattern as predicted by Grimshaw's proposal. Based on these patterns, I propose structural analyses of Norwegian ING-compounds in Section 5.1.3. I end the first part of the chapter by showing the implications of this analysis for the distinction between primary and synthetic compounding.

The second part of the chapter, Section 5.2, discusses what ING-compounds can tell us about compound-internal argument structure. Based on data from Norwegian, I will show that both lexicalist and neo-constructionist analyses of argument structure tend to formulate analyses that are too strict and limiting to accommodate the observed patterns of argument interpretation.

I conclude the chapter with some final remarks and some issues for future work in Section 5.3.

5.1 Systematic ambiguity in derived nominals

5.1.1 Grimshaw (1990)

In her (1990) seminal work, Grimshaw investigates English nominalizations, such as *examination, assignment* and *shooting,* and as part of this investigation, she considers the role of nominalizations in compounding.

Grimshaw points out that there is a systematic ambiguity in nominals. There is a well-defined class of nominals that take arguments, and there is a well-defined class of nominals that do not take arguments. Specifically, she shows that a nominal's ability to take arguments correlates with a number of grammatical properties, summarized in (3) (modified from Alexiadou 2017).

(3)   Non-argument-taking   Argument-taking

Referential nominals		*Process/AS-nominals*
Result nominals	Simple event nominals	Complex event nominals
1. no event reading	1. event reading	1. event reading
2. no internal argument	2. no internal argument	2. internal argument
3. no agent modifiers	3. no agent modifiers	3. agent modifiers
4. no *by*-phrases	4. no *by*-phrases	4. *by*-phrases
5. no aspectual modifiers	5. no aspectual modifiers	5. aspectual modifiers
6. *frequent* + plural N	6. *frequent* + plural N	6. *frequent* + singular N
7. no article restriction	7. no article restriction	7. only definite article
8. no implicit argument control	8. no implicit argument control	8. allows implicit argument control

Grimshaw's claim is that only nominals that denote complex events have argument structure, and such nominals can be identified by the properties listed above. Examples of each type of nominal, taken from Grimshaw, are given in (4)-(6).

(4)   a. The **expression** on her face   *Result nominals*
      b. The **assignments** were long

(5)   The **exam/trip/race** took a long time   *Simple event nominals*

(6)   a. The **expression** of her feelings   *Complex event nominals*
      b. The **assignment** of the problem by a teacher
      c. The **shooting** of rabbits is illegal

Result nominals (R-nominals) like (4) do not refer to events, they do not take internal arguments, and they do not take agent-oriented modifiers like *intentional*. Nor do they take subjects in *by*-phrases or aspectual modifiers such as *in/for two hours*. They only allow modification by *frequent* and *constant* when they are pluralized, and they occur with both definite and indefinite articles. Finally, result nominalizations do not allow implicit argument control, e.g. with *in order to*. This is illustrated in (7) (my examples).

(7)   a. The (*frequent) (*intentional) **assignment** (*in/for two hours) was long
      b. *An **expression** on her face (*by Mary) (*in order to convince...)

The same behavior is found with Simple event nominals (SE-nominals), and the only property that distinguishes R-nominals from SE-nominals is that the latter type in some sense refers to events (property 1 in (3)). That is, *exam, trip* and *race* all refer to events, but in a different way than complex event nominals, which we will see. Thus, SE-nominals behave grammatically as R-nominals, as illustrated in (8).

(8) *a frequent and intentional *exam* of the papers in two hours by the instructor in order to teach the students...

Complex event nominals (CE-nominals) display the opposite behavior with respect to the diagnostics in (3). They take internal arguments, they take modifiers like *intentional,* which modify the agent of the event, they express subjects in *by*-phrases (and as possessors), and they allow aspectual modifiers like *in/for two hours* to modify the event. Furthermore, they allow modification by *frequent* when they are singular, they allow definite determiners but not indefinite determiners, and they allow implicit argument control, as demonstrated below.

(9) the (/*a/*two) frequent and intentional expression of her feelings by Mary in two hours in order to explain...

We should note here that the tests in (3) are not watertight[196], but they do a good job at bringing out two distinct types of interpretations. Thus, the important insight is that there is a systematic ambiguity in nominalizations. *Expression* and a range of other deverbal nominals are ambiguous between an interpretation that denotes a result, as in (4a), and an interpretation that denotes a process, or complex event, as in (6a), and each interpretation correlates with different grammatical properties, identified in (3).

Grimshaw goes on to argue that the distinction between R-nominals and CE-nominals is also relevant in compounding. Specifically, a synthetic compound (i.e. verbal or argumental compound) is what we get when the right-hand member of the compound is a CE-nominal. Grimshaw illustrates this with the examples in (15), originally from Roeper and Siegel (1978).

(10) a. John likes clam baking
     b. John likes clam bakings
        (Grimshaw 1990:70)

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[196] It has for example been noted that CE-nominals derived from telic predicates can take indefinite articles (by Mourelatos 1978 among others, cited by Borer 2005b), as in *There was a capsizing of the boat by Mary* (from Borer 2005b:78).

In (10a), *baking* is a CE-nominal, so *clam baking* is a synthetic compound. Therefore, *clam* can be interpreted as the internal argument of *bake*. CE-nominals are not compatible with plural morphology (as by property 6 in (3) above), so (10b) cannot be a synthetic compound, and therefore *clam* is not interpreted as an argument in (10b).

We see here that Grimshaw (1990) distinguishes between three classes of nominals: Result nominals, Simple event nominals and Complex event nominals. Later work, following Borer (2003), typically considers Result nominals and Simple Event nominals as one type, *R(eferential)-nominals*, because of the similarities noted above, and refers to Complex Event nominals as *AS-nominals*. In addition, this class is also referred to as *process-nominals*. This terminology is indicated in (3). I will continue to use the terms R(esult/referential)-nominal, SE-nominal and CE-nominal/process-nominal.

In the next section, I show that the same type of systematic ambiguity described for English above is also found in Norwegian nominalizations. Norwegian ING-nominals fall into two classes: R-nominals and CE/process-nominals, and I will propose that these nominalizations correspond to two distinct structural representations, following much research in the last few decades (see Alexiadou's 2010a,b review).

In the subsequent section, I show that when these nominalizations are compounded, they behave exactly as predicted by Grimshaw: Exactly those ING-nominals that are ambiguous between an R-reading and a CE-reading create compounds that are ambiguous between primary and synthetic readings.

5.1.2 Systematic ambiguity in Norwegian ING-nominals

Nominalizations and synthetic compounds in Norwegian are in most respects similar to the corresponding structures in English (see especially Vinje 1973b, Alhaug 1973, Andersen 2005a, b, 2007, Sakshaug 1999, and Faarlund et al. 1997). However, one difference between the languages is that Norwegian has a larger group of ambiguous ING-nominals.[197] Consider thus the ING-nominals in (11), where the ambiguity is also clear from the English translations. Applying Grimshaw's diagnostics reveals that this ambiguity is systematic and the interpretation of the nominals falls neatly into two groups: R-nominals and CE-nominals. In (11), I use *ei* 'a', 'one' to bring out R-interpretations (cf.

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[197] Another difference is that Norwegian avoids *by*-phrases in nominalizations. The Norwegian preposition corresponding to *by* (used e.g. in passives) is *av*. However, this is also the preposition that introduces the internal argument in nominalizations, which could explain why agents are not introduced by *av* in nominalizations. Instead, agents can be realized as possessors, as in *gartnerens hyppige samling av planter* 'the gardener's frequent collecting of plants'.

property 7 in (3)), and *hyppig* 'frequent' + singular to bring out CE-interpretations (cf. property 6 in (3)).

(11)   Ambiguous ING-nominals

	R-nominal	CE-nominal
a.	ei teikning	hyppig teikning av hender
	a drawing	frequent drawing of hands
b.	ei skildring	hyppig skildring av naturen
	a description	frequent description of the nature
c.	ei løysing (på eit problem)	hyppig løysing av problem
	a solution (to a problem)	frequent solving of problems
d.	ei melding (om fravær)	hyppig melding av fravær
	a message (about absence)	frequent reporting of absences
e.	ei kopling	hyppig kopling av varmekablar
	a connection	frequent connecting of heating-cables
f.	ei ordning (for farleg avfall)	hyppig ordning av arkiver
	an arrangement (for hazardous waste)	frequent organizing of archives
g.	ei samling	hyppig samling av plantar
	a collection	frequent collecting of plants
h.	ei nominalisering	hyppig nominalisering av verb
	a nominalization	frequent nominalizing of verbs
i.	ei endring	hyppig endring av adresse
	a change	frequent changing of address
j.	ei investering	hyppig investering av pengar
	an investment	frequent investment of money
k.	ei takling	hyppig takling av spelarar
	a tackle	frequent tackling of players
l.	ei gruppering	hyppig gruppering av tall
	a group/fraction	frequent grouping of numbers
m.	(%ei) maling	hyppig maling av veggen
	(%a) paint	frequent painting of the wall

The last example, (11m), has a mass interpretation in its R-reading and is therefore not easily quantized. However, the interpretation allows us to classify *maling* in the first column as an R-nominal, which is made clear by the English translation and the fact that the relevant R-reading becomes unavailable under modification by *hyppig* 'frequent'.

Such examples are interesting as they show that the process/result-distinction is not just a mass/count distinction (cf. Harley 2009b).[198],[199]

These two classes of nominalizations have been argued to have distinct structural representations (Alexiadou 2001, Borer 2005b, among many others).[200] For simple R-nominals in Norwegian, I adopt the following structure, which corresponds to the structure of other simple referential nominals such as *dog* or *dream* (see chapter 4).

(12)

$$\begin{array}{c} n \\ \diagup \diagdown \\ \sqrt{\text{teikn}} \quad n \\ \hspace{2.2em} ing \end{array}$$
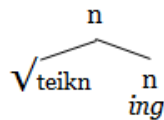
There is one issue with this analysis of R-nominals. Some R-nominals contain overt verbalizing morphology. An example from Norwegian is (11h) *nominal-iser.$_V$-ing,* and the same is found in English *nominal-iz.$_V$-ation.* In the framework of Distributed Morphology it is argued that every overt morpheme must realize a terminal node. Thus, the presence of *-iser-* and *-iz-* indicate the presence of a little v-head inside these nominals.[201] This is problematic inasmuch the v-head has also been argued to introduce event-readings (Embick 2004, Harley 2012), which we have seen are absent from R-nominals.

This issue has been noted in much recent research, and some different proposals have been made. One possibility is that the eventive semantics of the v-head in R-nominals is somehow suppressed by the larger structure (Harley 2009b, Moulton 2013). Another option is that the v-head realized by verbal morphology is not responsible for event-readings, and the event-readings of process-nominals are introduced by other properties

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[198] The examples in (11) demonstrate that Norwegian ING-nominals have much in common with English (A)TION-nominals.

[199] Alongside the ING-suffix, there is also a NING-suffix. The NING-suffix is most often found with R-nominals, which can result in a distinction between R-nominals with NING and CE-nominals with ING, as in *ein bygning* 'a building'*, hyppig bygging av kontor* 'frequent building of offices', *ei flygning* 'a flight', *hyppig flyging av helikopter* 'frequent flying of helicopters'.

[200] Note that Grimshaw (1990) does not assume a structural explanation for the distinction between the two types of nominals, but proposes rather a difference in their event representations. See Alexiadou & Grimshaw's (2008) comparison of the two types of models.

[201] In addition *–al* indicates the presence of a little a-head, which is omitted here only for simplification.
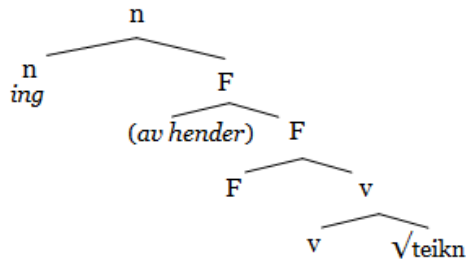
of their structure (Borer 2005b, Fabregas 2012, Anagsnostopoulou & Samioti 2014).[202] Here, I follow the latter approach, and I assume that certain derived R-nominals, such a *nominalisering* 'nominalization', have a structure like the one in (13), where the v-head does not provide a process/event-reading.

(13)
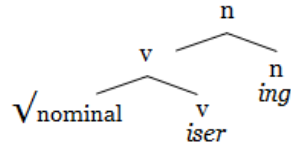
For CE/process-nominals, I adopt the structure in (14) from Fabregas (2012), adapted from Borer (2005b). This structure contains an aspectual head, labelled F, which contributes eventive readings and can introduce internal arguments. This projection always selects a verb phrase, thus capturing the observations that CE/process-nominals are formed with verbs.

(14)   a. hyppig teikning av hender   b. (hyppig) nominalisering av verb
          '(frequent) drawing of hands'   '(frequent) nominalizing of verbs'
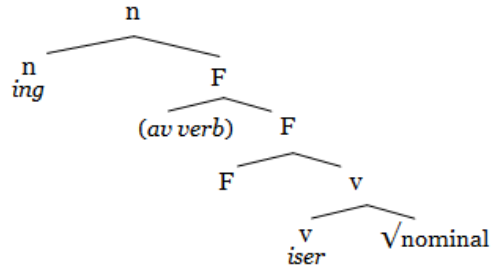
The exact number and nature of projections in process nominals is the topic of a considerable amount of research and theoretical debate. We also observe some cross-linguistic differences in deverbal nominalizations and differences in the grammatical behavior of a nominalization depending on the type of verb that is used (Lundquist 2008, as well as Alexiadou's 2010a,b review). Setting these issues aside, the important point from my perspective, and from the perspective of a larger theory of compounding, is that the

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[202] A third option is that the creation of R-nominals involves semantic and morphological simplification, such that we actually have a new root √nominaliser- (cf. the discussion in Section 4.6 of the mapping between semantics and morphology).

distinction between different types of nominalizations is carried over to compounds.[203] I show this next.

5.1.3   Systematic ambiguity in Norwegian ING-compounds

We know that most words can participate in compounding. We also know that compounds are ambiguous, and that the range of possible interpretations depends on the semantics of the components. We can thus make the following predictions.

(15)
      I. Both result-nominals and process-nominals can be compounded
    II. Both result-nominals and process-nominals will create compounds where there is an underspecified relation (Variable R) between the left-hand member and the right-hand member.

Applied to the nominalization *teikning* 'drawing' in (11a), it is expected that the result reading of *drawing* can be a right-hand member, and that the left-hand member will be interpreted as somehow related to this result. Similarly, it is expected that *drawing* with a process reading can be a right-hand member and that the left-hand member will be interpreted as somehow related to this process, e.g. as an argument or an adjunct/adverbial.

      Creating compounds with the ambiguous nominals in (11) confirms these predictions. I show examples of compounds made with a subset of the nominalizations and list some of the possible interpretation below. Parallel compounds can be created with all of the nominals in (11). The example *handteikning* 'hand drawing' in (1) is repeated as (16).

(16)
  a. ei hand-teikning   Possible interpretations
        a hand drawing   'a drawing drawn by hand'
                                           'a drawing of a hand'
                                         'a drawing on a hand'
                                       'a drawing made while thinking about a hand'

---

[203] Given the view on the pairing of semantic interpretations with complex structures laid out in 4.6, one might ask if the two interpretations of nominalizations like *drawing* could just be cases of semantic ambiguity, where a single structure is paired with two distinct meanings. That could turn out to be correct, and would be in line with what Harley (2009a, b) proposes for both simple nominalizations and compounds. However, that would require an alternative explanation for the systematicity in the observed ambiguity. For the purposes of this chapter, the exact internal structure of nominalizations is less important than the insight that the ambiguity in nominalizations also leads to ambiguity in compounds created with these nominalizations.
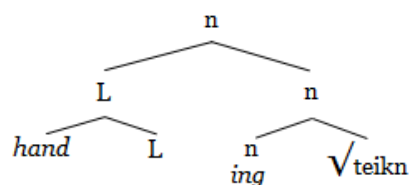
b.	hyppig hand-teikning frequent hand-drawing	Possible interpretations 'frequent drawing by hand' 'frequent drawing of hands' 'frequent drawing on hands' 'frequent drawing while thinking about hands'

(17)

a.	ei manus-skildring a manuscript-description	Possible interpretations 'a description in a manuscript' 'a description of a manuscript' 'a description on a piece of paper that was misplaced in a manuscript'
b.	hyppig manus-skildring frequent manuscript-describing	Possible interpretations 'frequent describing in a manuscript' 'frequent describing of a manuscript' 'frequent describing using a pattern set in a manuscript'

(18)

a.	hus-maling house-paint	Possible interpretations 'paint to use on the outside of houses' 'paint removed from a house' 'paint produced in a house'
b.	hyppig hus-maling frequent house-painting	Possible interpretations 'frequent painting of houses' 'frequent painting done while in a house' 'frequent painting using a toy house as a brush'

(19)

a.	ei bokstav-rekning a letter-bill/invoice	Possible interpretations 'an invoice with alphabetic letters' 'an invoice from buying alphabetic letters, e.g. for decoration' 'an invoice written on a piece of paper shaped like an alphabetic letter'
b.	hyppig bokstav-rekning 'frequent letter-calculating'	Possible interpretations 'frequent calculating with letter, i.e. algebra' 'frequent calculating using prose instead of numbers'

The examples in (16)-(19) demonstrate that ING-compounds are multiway ambiguous. On the one hand, they are ambiguous between result-interpretations (the a-examples) and process interpretations (the b-examples). On the other hand, they are ambiguous with respect to the semantic relationship between the left-hand member and the right-hand member. In both result compounds and process compounds several types of relationships can be established between the compound members, although some interpretations are clearly more accessible than others.

Based on the compound structure proposed in Chapter 4, and the structures for nominalizations proposed in 5.3.1, we are now in a position to assign syntactic structures to Norwegian ING-compounds.
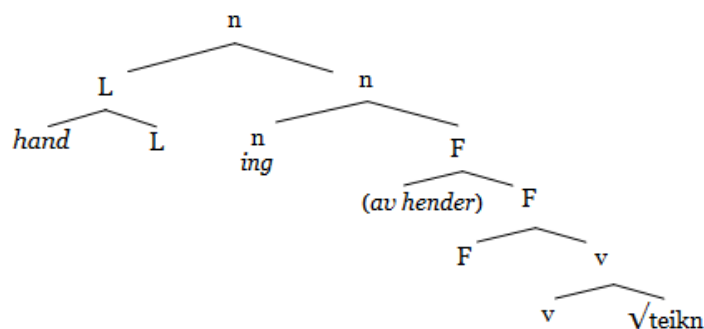
When a result nominal is compounded, we get a result compound. Result compounds then have the structure in (20), with the left-hand member adjoined to the categorizer of the right-hand member, just like in other compounds, and the L-head establishes the Variable R relation.

(20) Result compound

```
                    n
           _____/ _____
          L                   n
       __/ \__             __/ \__
    hand      L         n       √teikn
                        ing
```

When a process nominal is used as the right-hand member of a compound, a process compound results, as shown in (21). Again, the left-hand member is adjoined to the topmost categorizer of the right-hand member, and there is a semantically underspecified relationship between the two members, established by the L-head, which entails that the exact nature of the relationship between the two members of the compound is ultimately determined pragmatically. Recall that such compounds display the same behavior as ordinary primary compounds with respect to linking elements (cf. Chapter 2.3).

(21) Process-compound

```
                    n
          _____/ _____
         L                      n
      __/ \__               ___/ \___
   hand      L           n           F
                         ing      __/ \__
                              (av hender)  F
                                        __/ \__
                                       F        v
                                              _/ \_
                                             v    √teikn
```

The view that emerges here is that left-hand members that are interpreted as internal arguments are not introduced as arguments structurally. The argumental

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interpretation is just one of several interpretations made available for the left-hand member in a process compound.[204, 205]

A consequence of this analysis is that when the left-hand member of a process compound is interpreted as an adverbial/adjunct, the compound can take the internal argument in an *av* 'of'-phrase. Thus, we get expressions like (21) *hyppig hand-teikning av hender* 'frequent hand-drawing of hands', i.e. 'frequent drawing of hands by hand'. This flexibility with respect to the argumental properties of process compounds is further demonstrated below, and I will continue to discuss such examples in the second part of the chapter.

(22) a. båt-kryssing av Mjøsa
        'boat-crossing of the Mjøsa lake'

      b. Mjøs-kryssing i båt
        'Mjøs-crossing in (a) boat'

(23) a. hyppig sokke-strikking om kvelden
        'frequent sock-knitting at night'

      b. hyppig kvelds-strikking av sokkar
        fequent evening-knitting of socks'

To summarize so far, there are two types of ING-nominals in Norwegian, result nominals and process nominals. Both types of nominals can be used as right-hand members of compounds, which produces two types of ING-compounds, result compounds and process compounds. In both compound types, there can be an underspecified relationship between the left-hand member and the right-hand member. Thus, the ambiguity of ING-compounds like *hand-teikning* 'hand drawing' is explained by i) the structural distinction in the right-hand member, and ii) the Variable R relation between the right-hand member and the left-hand member.

Following Grimshaw (1990), result compounds and process compounds correspond to what is otherwise referred to as primary compounds and synthetic or argumental compounds. I will end this first part of the chapter by comparing this view to other views on the primary-synthetic distinction (cf. Section 2.3).

---

[204] This conclusion is different from that of Grimshaw (1990), who does not define arguments in terms of syntactic positions, but purely in terms of their semantic interpretation.

[205] See also Bobaljik (2003) on the claim that left-hand members interpreted as external arguments are not true external arguments.

5.1.4 The primary-synthetic distinction

In the literature on compounds, rather different views have been proposed on the relationship between primary ('root', 'determinative') compounds and synthetic ('verbal', 'argumental') compounds. This distinction is both a question of terminology and of analysis.[206]

Roeper & Siegel (1978) make a distinction between *root compounds* and *verbal compounds*. In their classification, verbal compounds are those that have a verbal base in their right-hand member and are nominalized by the suffixes *-ed, -ing,* and *-er.*

(24) Verbal compounds: expert-tested, oven-cleaner, checker-playing
(25) Root compounds: bedbug, green house

According to Roeper & Siegel's analysis, verbal compounds and root compounds are derived by very different routes. As was shown in Section 3.2.3 as well, verbal compounds are created via a lexical transformation that derives a verbal compound like (26b) from (26a) by suffixation followed by a movement operation. Root compounds are argued to be radically different, although no analysis is proposed.

(26)
  a.   make peace
  b.   peace-mak-er

Contrary to Roeper & Siegel, Allen (1978) argues that what she calls *primary compounds* and *verbal-nexus compounds* or *synthetic compounds* share a common compound structure. She includes in the class of synthetic compounds all those that have a nominalized verb as their right-hand member, including the ones in (27) (Allen 1978:157).

(27) food-spoilage, grain-storage, mail delivery, wedding announcement, farm production, vowel pronunciation, heart-failure, dealer maintenance, snow-removal, stickleback courtship, population growth, building collapse

Selkirk (1982) distinguishes between *verbal compounds* and *non-verbal compounds*, where verbal compounds are only those compounds whose left-hand member is interpreted as an internal argument of the base verb in the right-hand member.

---

[206] See Olsen 2015 on the development of the term 'synthetic compound' and the German equivalent *zusammenbildung* (cf. Norwegian *samdanning*). See also my discussion of the terminology in Chapter 2, Section 2.3.

According to this view, (28a) is a verbal compound, whereas (28b) is a non-verbal compound on a par with e.g. *tree snake* in (28c) (Selkirk 1982:28ff).

(28)
   a.   tree eating 'eating of trees'   verbal compound
   b.   tree eating 'eating in trees'   non-verbal compound
   c.   tree snake   non-verbal compound

In Selkirk's analysis, the same compound structure underlies both verbal and non-verbal compounds. The only distinction between (28a) and (28b) is that 'eat' assigns a theta role to 'tree' in (28a). Theta roles are assigned optionally in word structure, which explains that it can go unassigned in (28b).

Lieber (2016) classifies as synthetic compounds those compounds where the left-hand member is interpreted as subject, object or prepositional object and where the deverbal right-hand member is headed by one of the nominalizing suffixes *-ing, -ation,-ment, -al, -ure. –er,* or *–ee*. Thus, *truck driving, city employee, rent collection* and *road closure* are all examples of synthetic compounds, according to Lieber.

Finally, many authors implicitly confine their discussion of synthetic compounds to compounds where the left-hand member is interpreted as an internal argument, not including compounds with adjunct/adverbial left-hand members into their analysis. Alexiadou and Iordăchioaia (2015) consider *teacher recommendation* a primary compound when *teacher* is not interpreted as the internal argument of *recommend,* and they consider *dog training* a synthetic compound when *dog* is interpreted as the internal argument of *train*. They do not discuss compounds like *pan frying (of potatoes) or Sunday training (of dogs)*.

A crucial step in the developent a structural analysis of a phenomenon involves determining which parts of the data pattern together such that they are explainable by the same structure, and which parts result from a grammatically distinct pattern. I have argued here that the grammatically relevant distinction for ING-compounds is that between result readings and process readings. Compounds in which the left-hand member is interpreted as an adjunct/adverbial pattern with compounds in which the left-hand member is interpreted as an argument, and the structural analysis of process compounds should be able to explain both types of interpretations. The availability of adverbial/adjunct readings in process compounds is further demonstrated below.

(29) a. *Direct object*　　　　　hyppig pasta-spising
　　　　　　　　　　　　　　frequent pasta-eating

　　b. *Prep. object*　　　　　hyppig sofa-sitting
　　　　　　　　　　　　　　frequent sofa-sitting

　　c. *Adverbial*_{MANNER}　　　hyppig hurtig-spising (av pasta)
　　　　　　　　　　　　　　frequent fast-eating (of pasta)

　　d. *Adverbial*_{DEGREE}　　　hyppig stor-spising (av pasta)
　　　　　　　　　　　　　　frequent big-eating (of pasta), i.e.
　　　　　　　　　　　　　　'frequent eating of pasta in large quantities'

　　e. *Adverbial*_{LOCATION}　　hyppig restaurant-spising (av pasta)
　　　　　　　　　　　　　　frequent restaurant-eating (of pasta)

　　f. *Adverbial*_{INSTRUMENT}　?hyppig skei-spising (av pasta)
　　　　　　　　　　　　　　frequent spoon eating (av pasta)

　　g. *Adverbial*_{TEMPORAL}　　hyppig kvelds-spising (av pasta)
　　　　　　　　　　　　　　frequent evening-eating (of pasta)

This classification is different from for example Selkirk's classification, according to which compounds with adjunct/adverbial interpretations are primary compounds.

Thus, the analysis I have proposed here for ING-compounds addresses Requirement G in 4.1.2 according to which an analysis of Norwegian compounds must inform us about the distinction between primary and synthetic compounding. The answer is that primary compounds and synthetic ING-compounds both share the same basic compound structure, and the differences between them only pertain to the internal structure of the right-hand member. As was shown in Chapter 2, the entire class of compounds classified as synthetic compounds is much larger than the compounds I have discussed here, and also includes cases like *blue-eyed* and *four wheeler*. There is little reason to assume that all compounds within this larger class have the same structure. However, I have argued that the subclass of synthetic ING-compounds (classified as *Deverbal Synthetic Compounds* in Chapter 2) are ordinary compounds headed by process nominalizations.

The analysis developed here does not only account for the properties of ING-compounds, but also entails a specific view on compound-internal argument structure. The nature of Norwegian ING-compounds suggests that the interpretation of arguments is freer and less structured that what has traditionally been claimed. In the second part of the chapter, I discuss different views on argument structure in words, and show how the Norwegian data challenge previous analyses, and strengthen the proposal developed here.

5.2 Argument structure in ING-compounds

5.2.1 Lexicalist and constructionist approaches

The participants in an event are understood as arguments. These participants play different parts in the event – they have different (thematic) roles. For example, in all of the structures in (30), *book* plays the role as that which is being read – the internal argument of *read*.

(30) *Sentence:* John reads a book
Nominalization: the reading of the book
Compound: book reading

Here, *book* occurs in three different configurations with respect to the verb *read*. Therefore, an important question is how to assure that *book* receives the same type of interpretation in all three configurations.

This question is answered differently in different models of grammar. In research on argument structure, a basic distinction can be drawn between lexicalist and (neo-) constructionist approaches (Ramchand 2008). A common assumption in lexicalist theories is that a verb is listed in the lexicon with its thematic roles (Chomsky 1981). The thematic roles encode information about the participants of an event and the roles they play. In such theories, the thematic roles are often listed in a hierarchical way, and some type of linking principle accounts for where in the syntactic structure the different thematic roles are assigned (e.g. Larsson 1988, Grimshaw 1990).

Argument structure listing and theta-roles enable us state the commonalities in interpretation between different types of structures, like those in (30). In a lexicalist theory, the information that *read* is a transitive verb (e.g. READ$_V$: Agent, Patient), paired with linking principles that assign thematic roles to specific positions, thus enables us to capture the aspects of interpretation that are common to the sentence, nominalization and compound in (30).

Recent work within neo-constructionist approaches to syntax argue against the need for theta-roles as listed in the lexicon and projected in syntax. Instead, proponents of this view argue that arguments are introduced in syntax by distinct functional projections. For example, in DM and related theories, it is typically assumed that external arguments are introduced by a Voice head and that benefactives are introduced by an Applicative head (e.g. Pylkkänen 2002, Harley 2013). Internal arguments have been argued to be introduced as complements of roots (e.g. Marantz 1997, Alexiadou 2001), by

an event structure complex (Borer 2005a,b, 2013), as a specifier of the verbal categorizer (e.g. Alexiadou 2017) or by a distinct functional head (Lohndal 2012).

The common idea in all of these proposals is that functional structure guides the interpretation of arguments. We may see this as a continuation of Baker's UTAH, where each theta role is associated with a designated structural position. From a constructionist viewpoint, then, one can argue that if a theta-role is always projected to a specific position in syntax, there is no need to code this information twice, both in terms of a thematic hierarchy and in terms of syntactic positions.

Both the lexicalist and constructionist views entail that argumental interpretations are highly structured, whether through argument hierarchies and linking principles or through the layering of argument-introducing functional projections. However, as I will now show, the Norwegian data presented in the previous section seem to suggest that argumental interpretations in compounds are actually freer and less structured. I begin by showing how this challenges lexicalist theories like those of Selkirk (1982) and Grimshaw (1990), before I turn to the constructionist approaches of Alexiadou (2017), Harley (2009a) and Borer (2013) for English. While my analysis of Norwegian proposed in the previous sections is in essence constructionist, we will see that it differs in important ways from these previous analyses.

5.2.2 The FOPC and structured argument structure

Lexicalist accounts of argumental interpretations in compounds are proposed by Selkirk (1982) and Grimshaw (1990) (among many others). Selkirk's (1982) First Order Projection Condition (FOPC) and its relatives (the First Sister Principle of Roeper & Siegel's 1978 and the Argument Linking Principle of Lieber 1983) were designed to account for restrictions like the following, where a compound like (31a) is unacceptable, despite (31b) being fine.

(31)   a. *[tree eating] of pasta
       b. the [eating of pasta] in trees

Selkirk proposes to explain such patterns by appealing to the argument structure of the derived nominal and the way arguments are satisfied within syntactic representations, stated as the FOPC.

(32)   FOPC: All non-SUBJ arguments of a lexical category X_i must be satisfied within the first order projection of X_i

According to the FOPC, the reason why (31a) is not well-formed is that the theme *pasta* is not within the First Order Projection of (i.e. is not a sister of) *eating*. This way, Selkirk

relates the interpretation of arguments in sentences to the corresponding interpretations in compounds.

Similar data was later used by Grimshaw (1990) to argue for a hierarchically structured argument structure, with the following relative ranking of theta-roles.

(33)   agent [experiencer [goal/source/location [theme]]]

In Grimshaw's theory, the innermost theta-role must be assigned first, starting with the left-hand member of the compound. Applied to (31a), then, this example would be ruled out because the locational role of *tree* would have to be assigned before the theme role of *pasta,* contrary to what the hierarchy states. Thus, under Grimshaw's account, a left-hand member can only be interpreted as a location when no theme is present.

Some version of the thematic hierarchy in (33) is generally accepted for the realization of arguments in sentences, but the Norwegian data presented in (21)-(23) and in (29) indicate that it is not correct for compounds. This problem is also noted by Lødrup (1989) who points to the following acceptable examples in Norwegian, which are parallel to the English examples in (28).

(34) a. fluor-behandl-ing   av tenn-ene
         fluoride-treat-N   of tooth-DEF.PL
         'treatment of (the) teeth with fluoride'

      b. panikk-salg   av biler
          panic-sell.N   of cars
         'panic-selling of cars'

      c. lørdag-s-steng-ing   av butikk-ene
          saturday-LINK-close-N   of shop-DEF.PL
         'closing of shops on Saturdays'

Lieber (2016) also provides similar counter-examples from English. Lødrup proposes that the compounds above are able to take arguments in *av* 'of'-phrases because the corresponding simple nominals *behandling, salg* and *stenging* are able to do so, and compounds have the properties of their right-hand member. This is also the essence of my analysis proposed in 5.1.

Thus, the data presented here suggest that the linking theories of Grimshaw (1990) and Selkirk (1982) are too strict to account for the interpretation of Norwegian compounds. I will now turn to recent constructionist analyses of the structure of synthetic compounds, where we will see that the same data are problematic, although for different reasons.

5.2.3 Constructionist proposals

As mentioned earlier, constructionist approaches to argument structure argue that arguments are introduced in specific functional projections. A difference between lexicalist and constructionist approaches, then, is that according to the constructionist position, argumental interpretations are defined by structures rather than paired with them (although this varies between constructionist approaches, as we will see below). However, the task is still to account for the commonalities in interpretation between different constructions, as in (30), repeated as (35).

(35) *Sentence:* John reads a book
Nominalization: the reading of the book
Compound: book reading

Constructionist theories have come a long way in accounting for the interpretation of arguments in sentence structure and nominalizations. The question is whether the same type of analysis can and should be extended to compounds as well. I argue that it should not. Below, I review three different takes on this question from a constructionist perspective, proposed by Alexiadou (2017), Harley (2009a) and Borer (2013), and compare them to my account in Section 5.1.

5.2.3.1 Alexiadou's proposal

Alexiadou's work presents one explicit proposal for the treatment of arguments across constructions. In Alexiadou's theory, the same functional projections and syntactic positions are responsible for argument interpretation in all constellations. In sentences, nominalizations and compounds alike, the presence of an external argument implies the presence of a Voice-head to introduce this argument. Elements interpreted as internal arguments are introduced in the specifier of v. Furthermore, eventive properties (e.g. the ability to be modified by *frequent*) stem from the presence of the v-head and aspectual properties (e.g. the ability to take modifiers such as *for two hours*) stem from the presence of an Asp-head. This way, the properties of an expression are introduced by layering functional projections.
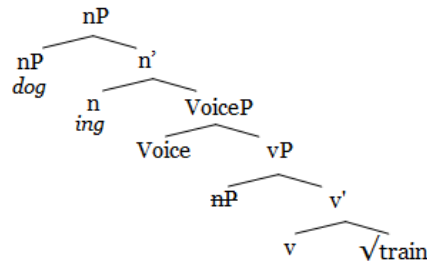
Alexiadou gives the following representations for complex event nominals and synthetic compounds.[207]

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[207] In her paper, Alexiadou is sometimes inconsistent with the notation of bar-levels (e.g. v'). For the representations in (36) and (37), I represent bar-levels consistently.

(36) Nominalization: The training of the dog by John for 2 hours

```
                DP
           ┌────┴────┐
           D         nP
          the    ┌────┴────┐
                 n        AspP
                ing    ┌────┴────┐
                       PP       Asp'
                     for 2h  ┌────┴────┐
                            Asp      VoiceP
                                  ┌────┴────┐
                                  PP      Voice'
                                by John ┌────┴────┐
                                       Voice     vP
                                           ┌──────┴────┐
                                           DP          v'
                                        the dog     ┌───┴───┐
                                                    v     √train
```
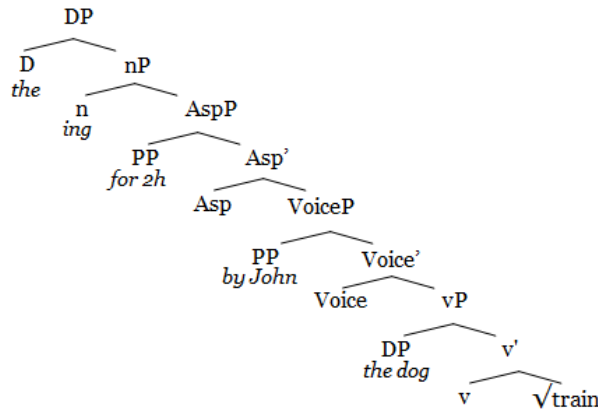
(37) Synthetic compound: dog training

```
              nP
          ┌────┴────┐
          nP        n'
         dog     ┌───┴────┐
                 n       VoiceP
                ing   ┌────┴────┐
                     Voice     vP
                          ┌─────┴───┐
                          n̶P̶        v'
                              ┌─────┴────┐
                              v       √train
```

Importantly, the internal argument 'dog' is introduced in a parallel manner in both structures, thus accounting for the commonalities in interpretation between the two. The fact that 'dog' ends up in different places in compounds and nominalizations is accounted for by a movement operation, where in the synthetic compound, 'dog' moves from spec, vP to spec, nP in order to be case licensed.

Although Alexiadou does not discuss this, a consequence of her analysis is that adjunct/adverbial-readings and argument-readings of left-hand members must be derived by distinct syntactic structures. Furthermore, under this analysis, synthetic compounds must be very different from other compounds, which would result in a number of different structures for descriptively similar words. For the analysis of Norwegian ING-compounds, I argue for a simpler view, where synthetic ING-compounds are just ordinary compounds, and the left-hand member is free to be interpreted either as an argument or as an adjunct/adverbial. This explains the observed commonalities between them, such as the use of linking elements, which would be surprising under Alexiadou's account.
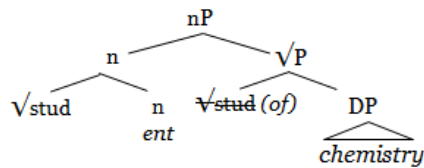
5.2.3.2 Harley's proposal

Harley (2009a) proposes a similarly consistent approach to arguments. According to Harley's analysis, internal arguments are always complements of the root. She proposes the following analyses of sentence structure (38), nominalizations (39) and synthetic compounds (40). Below, I use Harley's examples, which is why different lexical elements are used, but these can in principle be changed to create fully parallel examples.
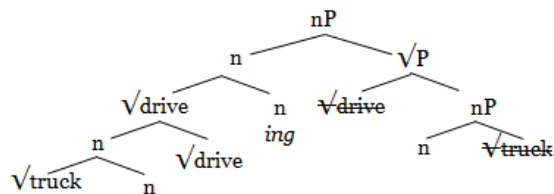
(38) Sentence: study chemistry

```
              v'
         /         \
        v            √P
     /     \       /    \
   √stud   v   √stud    DP
           y           chemistry
```
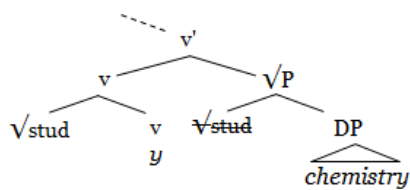
(39) Nominalization: student of chemistry

```
              nP
         /         \
        n            √P
     /     \       /    \
   √stud    n   √stud (of)   DP
           ent             chemistry
```

(40) Synthetic compound: truck driving

```
                    nP
              /           \
             n              √P
          /     \        /      \
       √drive    n    √drive     nP
      /    \    ing          /      \
     n    √drive            n      √truck
   /   \
√truck  n
```

In all three cases, the element interpreted as the internal argument is introduced as a complement of the root. In (38) and (39), *√stud* selects the DP complement *chemistry*. In (40), *√drive*, selects the nP complement *truck*.

In Harley's analysis, unlike Alexiadou's analysis, there is no verbalizing element in synthetic compounds like 'truck driving'. At no stage in the derivation does this compound contain verbal structure. This is proposed to account for the impossibility of the verb **to truck drive*. However, this move is problematic for the analysis of parallel synthetic compounds like *rule general-iz-ing* where there is in fact an overt verbalizing morpheme, which in Harley's framework necessarily entails the presence of a verbalizing v-head, as

discussed in 5.1.2 and pointed out by Borer (2013) as well (cf. also Harley 2009b on nominalization with *-iz-*).

Another important aspect of Harley's analysis is that a primary compound like *nurse shoe* has exactly the same syntactic structure as the synthetic compound *truck driving*.

(41) Primary compound: nurse shoe

```
                        nP
              n ——————————— √P
        √shoe      n   √shoe        nP
      n      √shoe            n    √nurse
 √nurse   n
```
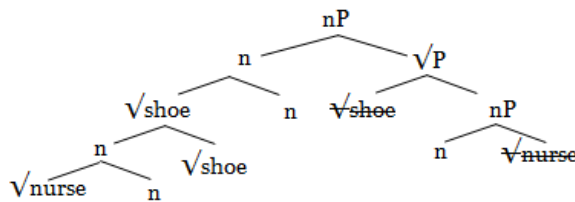
Compound left-hand members that are not interpreted as arguments are merged in exactly the same way as left-hand members that are interpreted as arguments: as complements of the root in the right-hand member. For Harley, then, the only difference between primary compounds and synthetic compounds concerns the properties of the root. Some roots, like √*drive*, have argument structure, while others, like √*shoe*, are purely nominal. In this respect, Harley's analysis is closer to traditional lexicalist analyses in that interpretation is not so much determined by structure as by inherent properties of lexical material.

This aspect of Harley's analysis entails that there can be no structural distinction between the process reading and the result reading of a compound like *handteikning* 'hand drawing', explored in (1) and (16). All differences between these expressions must reside in the root, which must be ambiguous between a process interpretation and a result interpretation. In addition to causing massive ambiguity in roots without structural contexts to disambiguate them, the observed systematicity of this ambiguity also becomes rather coincidental.[208]

A more significant problem with Harley's proposal is that there is no way to derive a Norwegian compound like *kvelds-strikking av sokkar* 'evening knitting of socks', or other cases where the compound itself takes an *av* 'of'-argument, shown in (22), (29), and (34). The problem is that under Harley's analysis both *kvelds-* 'evening' and *av sokkar* 'of socks' would have to be introduced in the same position, as the complement of the root.

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[208] In Section 3.3.5, I also pointed out some problems with the general compound structure proposed by Harley (2009a).

Thus, Harley's theory struggles with the same data as Selkirk (1982) and Grimshaw (1990). In comparison, such data is predicted to be possible given the analysis of Norwegian process compounds in 5.3.2.

5.2.3.3 Borer's proposal

Borer's (2013) approach to synthetic compounds is different in that Borer does not consider left-hand members of synthetic compounds as real arguments. In the three configurations in (30), repeated as (42), *book* is a real argument in the sentence and the nominalization, but not in the compound.

(42)   *Sentence:* John reads a book
         Nominalization: the reading of the book
         Compound: book reading

Rather, in compounds, the argument-like interpretation of *book* is an implicature (Borer 2013:598). This is in line with my proposal presented in 5.3.2, but as we will see, the reasoning and final structures are different, and I will show that when applied to Norwegian data, certain properties of synthetic compounds only follow from my proposal.

Borer's reasoning goes as follows. In the exoskeletal system developed by Borer, internal arguments "emerge in the context of fully projected event structure" (Borer 2013:582). It follows that in order for there to be a real internal argument in synthetic compounds there must be event structure. However, Borer, referring also to van Hout and Roeper (1998), points out that synthetic compounds do not display all the characteristics of event structure. This is seen by comparing a synthetic compound like (43) to a CE-nominal like (44), where only the last type allows by-phrases, aspectual modifiers and implicit argument control (cf. Grimshaw's diagnostics in (3)).

(43)   the door breaking (*by Mary) (*in two minutes)
       (*in order to retrieve her locked-up dog)

(44)   the breaking of the door (by Mary) (in two minutes)
   (in order to retrieve her locked-up dog)

In Borer's system, event structure is projected in syntax. Complex event nominals (and sentences) contain event layers, shown in (45) using Borer's example, and the internal argument is introduced inside the event complex, the circled constituent. Given the lack of event properties in synthetic compounds, event layers must be absent from such structures, which means that there is nothing to introduce the internal argument. Compare in this regard the CE-nominal in (45) to the R-nominal in (46). Thus, *door* is not

an internal argument of *break* in the compound (43), and *book* is not an internal argument of *read* in the compound in (42).

(45) CE-nominal: the *transformation* of the sentence
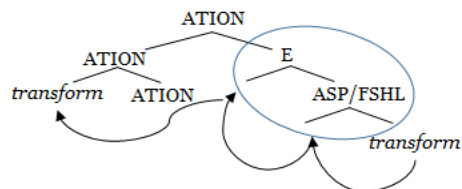
(46) R-nominal: two linguistic *transformations*
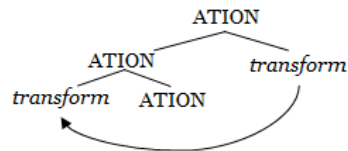
Borer's alternative for synthetic compounds is that they are composed with what she calls R-ING nominals, a type of *simple event nominal* (Borer 2013:616-617). R-ING do not take arguments, illustrated in (47).

(47) "Women are reared not to feel competent or gratified by *the questing, the competing, the outbidding* that collecting…demands" (S. Sontag, *Volcano Lover,* p. 138, quoted by Borer 2013:160)

According to Borer, R-ING nominals have the structure of R-nominals, as in (46). Thus, the structure of *truck driving* is as in (48), where the left-hand member can be interpreted as an internal argument or as an adjunct/adverbial (cf. Borer 2013:620ff).[209]

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[209] Borer assumes a different constituent structure than what I proposed in 5.3.2. I discuss the constituent structure of synthetic compounds briefly 5.3.

(48)
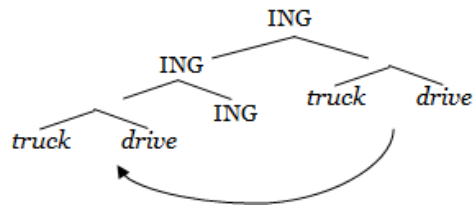
Borer proposes that the process-like interpretation of R-ING nominals stems not from the presence of a syntactic event layer, but from the ING-suffix itself. Thus, according to Borer, synthetic compounds are not created with CE/process nominals, and they do not take arguments.

Notice now, that if we try to extend this analysis to Norwegian, it has some puzzling consequences. First, *løysing* 'solving' in (49a) would have the same representation as *løysing* 'solution' in (49b), which would be very different from *løysing* 'solving' in (46c), despite (49a) and (49c) patterning together semantically and grammatically.[210]

(49) a. den hyppig-e   oppgåve-*løys-ing-a*
         the frequent-w   assignment-solv-N-DEF.SG.FEM
         'the frequent assignment solving', i.e. the frequent solving of assignment

       b. *(den hyppig-e) *løys-ing*-a   på oppgåv-ene
          the frequent-w   solv-N-DEF.SG.FM   on assignment-DEF.PL.FEM
          '(the frequent) solution to the problem'

       c. den hyppig-e   *løys-ing*-a   av oppgåv-ene
          the frequent-wsolv-N-DEF.SG.FM   of assignment-DEF.PL.FEM
          'the frequent solving of assignments'

Contrary to this view, I claimed that the right-hand member of a Norwegian synthetic compound is really a full process-nominal, which entails that the internal structure of *løysing* is the same in (49a) and (49c), but not in (49b).

Furthermore, as with most of the other proposal considered here, the structure in (48) is not compatible with the observation that Norwegian process compounds can in fact take internal arguments in *av* 'of'-phrases, which strongly indicates that these compounds contain true CE/process nominals. Such compounds can display the full range of event

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[210] A similarly strange pattern appears for English with nominals like *building,* which, according to Borer's proposal, would be classified as an R-nominal in both 'This is an old *office building*' and 'The government subsidized *office building* as a way to encourage development' but as a CE-nominal in 'The *building* of the offices took five years'

properties, including aspectual modifiers and implicit argument control (cf. the tests in (3)).

(50) a. Innbyggernes hand-tømming av Mjøsa på en dag for å tilrettelegge kryssing til den andre sida imponerte journalisten

'The inhabitants' hand-emptying of the Mjøsa lake in one day in order to accommodate crossing to the other side impressed the journalist'

b. Innbyggernes Mjøs-tømming på en dag for å tilrettelegge kryssing til den andre sida imponerte journalisten

'The inhabitants' *Mjøs*-emptying in one day in order to accommodate crossing to the other side impressed the journalist'

(51) a. Båt-kryssing av Mjøsa på 10 minutt for å rekke bussen på den andre sida
'Boat-crossing of Mjøsa in 10 minutes in order to catch the bus on the other side'

b. Mjøs-kryssing i båt på 10 minutt for å rekke bussen på den andre sida
'Mjøs-crossing in (a) boat in 10 minutes in order to catch the bus on the other side'

(52) a. Studentens hurtig-redigering av kapittelet i/på to dagar for å kunne sende det til rettleiaren så fort som mogleg

'The student's speed editing of the chapter for/in two days in order to be able to send it to the supervisor as quickly as possible'

b. Studentens kapittel-redigering i/på to dagar for å kunne sende det til rettleiaren så fort som mogleg

'The student's chapter editing for/in two days in order to be able to send it to the supervisor as quickly as possible'

(53) a. Bestemors konstante/hyppige sokke-strikking for å halde hendene i gang er til glede for alle barneborna

'Grandma's constant/frequent sock-knitting in order to keep the (/her) hands moving is a source of joy for her grandchildren'

b. Maskin-strikking av sokkar på ti minutt
'Machine knitting of socks in ten minutes'

As expected, modification by *på ein time* 'in one hour', which is associated with a telic interpretation, is not possible when the left-hand member is interpreted as an adjunct/adverbial and no internal argument is introduced by *av* (unless an argument is implicit), since in such cases, there is nothing to 'measure out the event' in the sense of Tenny (1987). This is shown in (54a). However, modification by *i ein time* 'for one hour', which is associated with an atelic interpretation, is possible, as shown in (54b).

(54) a. *Hurtig-strikk-ing   på   ti   minutt
        speed-knit-$_N$ on   ten   minutes
        'Speed knitting in ten minutes'

    b. Hurtig-strikk-ing   i   ti   minutt
       speed-knit-$_N$ in   ten   minutes
       'Speed-knitting for ten minutes

In certain cases when the left-hand member of a synthetic compound is construed as an internal argument, a telic interpretation may also be less available than in the corresponding analytic nominalizations, which is parallel to what Borer (2013) observed for the English examples in (43) and (44). In Norwegian, (55) is not clearly unacceptable, but worse than (56).[211]

(55) ?sokk-e-strikk-ing-a   på ein dag
     sock-$_{LINK}$-knit-$_{N-DEF.SG}$ on one day
     'the sock-knitting in one day'

(56) strikk-ing-a   av sokk-en   på ein dag
     knit-$_{N-DEF.SG}$ of sock-$_{DEF.SG}$ on one day
     'the knitting of the sock in one day'

Again, this is not entirely surprising, as (55) and (56) are not minimal pairs, and the same holds for Borer's examples in (43) and (44). That is, they are not just different because the former is a compound and the latter is an analytic construction, but they are also different because the element interpreted as the internal argument has different grammatical properties in the two cases. Whereas *sokken* 'the sock' is definite and referential, *sokk-e* 'sock-' is closer to a mass interpretation and is not referential. [212]

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[211] For certain predicates, a resultative particle must be incorporated to create telic readings, as in *bok-**ut**-lesing på ein time,* 'book-**out**-reading in one hour'='finishing a book in one hour' and cf. *??bok-lesing på ein time* 'book-reading in one hour'. A particle is also used in the corresponding sentences, as in *ho las ut boka på ein time* 'she read out the book in one hour'='she finished the book in one hour'.

[212] It is not clear to me whether the observed properties constitute genuine differences in the structure of synthetic compounds in Norwegian and English or whether this is a also question of the types of predicates that are used. In a footnote, Borer notes examples from English that display the full range of event-properties (due to Andrew McIntyre p.c. to Borer 2013:580 fn.3):

i.   frequent share dumping by institutional investors in order to case a price collapse

ii. frequent tree planting by residents in order to block out the noise

These examples indicate that English synthetic compounds are not R-nominals, at least according to Borer's definition: "Valid, infallible tests for AS-nominals [i.e. CE-nominals], in turn, are provided by a purpose clause, controlled by an overt or covert argument, as well as by aspectual modification, such as in two hours or for two hours." (Borer 2013:57-58, fn. 9).

All of the considerations that have been discussed in this section suggest that the analysis of Norwegian presented in 5.1.3 is on the right track. This analysis predicts that the left-hand member of a process compound is free to be construed either as an adjunct/adverbial or as an internal argument. In both cases, the left-hand member is adjoined as a modifier. Furthermore, it predicts that process compounds behave like process nominals with respect to Grimshaw's diagnostics, except for the properties that are sensitive to the grammatical nature of the internal argument (e.g. modification by *in one hour*). I repeat the structure of Norwegian process compounds below with different lexical elements.

(57)
   a. mjøs-kryss-ing (i båt)(på 10 min)(for å rekke bussen på andre sida)
       'Mjøsa crossing (in (a) boat) (in 10 minutes) (in order to catch the bus on the other side)'

   b. båt-kryss-ing (av Mjøsa)(på 10 min)(for å rekke bussen på andre sida)
       'boat crossing (of Mjøsa) (in 10 minutes) (in order to catch the bus on the other side)'

   c. søndags-kryssing (av Mjøa)(i båt))(på 10 min)(for å rekke bussen på andre sida)
       'Sunday crossing (of Mjøsa)(in (a) boat) (in 10 minutes) (in order to catch the bus on the other side)'
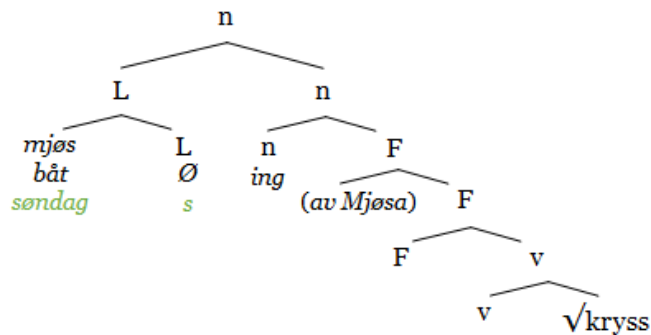
This analysis also suggests that arguments are not obligatory with process-nominals, contrary to Grimshaw's (1990) claim. That is, in terms of their syntactic structure, both *hyppig handteikning* 'frequent hand drawing' and *hyppig teikning* 'frequent drawing' are based on an intransitive process-nominal, which behaves just like its transitive counter-part, except that the internal argument is left out.[213]

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[213]Grimshaw does not consider nominalizations of intransitive verbs or transitive nominalizations occurring without an object, except for the remark that "obligatory must mean the same for nouns as for verbs: capable in principle of being obligatory but perhaps subject to lexical variation" (Grimshaw

This analysis also implies a weakened version of the constructionist view of argument structure as fully determined by the syntactic structure. Rather, it relies on what we may consider the semantic-conceptual properties of the verbal base. A verbal structure, in my analysis the sequence √-v-F, holds the semantic potential to accommodate argumental readings, and left-hand members of compounds may access this potential. Further indications that this view on argumental interpretations in compounds is correct is provided by examples such as *krigs-offer* 'war victim'='victim of war'*, mat-glad* 'food glad'='fond of foot' and *klubb-medlem* 'club member'. These compounds all have what may be considered argumental construals, but there is nothing in their morphological makeup to suggest that they are anything more than ordinary compounds. Thus, the current chapter has addressed Requirement H in 4.1.2 according to which an analysis of compounds in Norwegian must make explicit the role of argumental and non-argumental constituents in compounds.

5.3 Conclusion

In early analyses of the semantics of compounds (Lees 1960), all types of compounds were hypothesized to be derived from sentence structures, and in later work, attempts were made to list all of the possible relationships that can exist between a left-hand member and a right-hand member, for example by the use of prepositions (Levi 1978). However, it has become increasingly clear that this is an impossible endeavor, as the list of possible relationship would be endless. Thus, for primary compounds, it seems clear, and is generally agreed, that the structural representation must be underspecified, in line with Allen's (1978) Variable R. The number of possible interpretations is infinite and it would not be feasible nor desirable to postulate different source structures for each interpretation. In research on synthetic compounds, on the other hand, there is still an ongoing tradition of relating synthetic compounds to sentence structure, such that different relationships correspond to different structures (e.g. Ackema & Neeleman 2014). I have argued here that a simpler analysis can be obtained by analyzing such compounds

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1990:49). Intransitive nominalizations are discussed by Moulton (2013) as *derived simple event nominals,* and by Borer (2013), who, as we saw, calls them R-ING nominals, a subtype of simple event nominals. While labelling such nominals as simple events seems appropriate, it is worth emphasizing that they do not pattern with the SE-nominals identified by Grimshaw. Rather, applying Grimshaw's tests would place them somewhere between SE-nominals and CE-nominals.

as ordinary compounds with a Variable R relation between the left-hand and right-hand member (see also Allen 1978, Bauer 2017:81, Olsen 2017).

There are many interesting issues in the literature on synthetic compounds that I have not been able to address here. The most debated of these concerns the appropriate constituent structure of synthetic compounds, that is, whether a form like *truck driving* is structured as [[truck drive]ing] or [truck [driving]]. While a number of different arguments have been presented for each view (see e.g. McIntyre 2009 and Olsen 2017), none seem conclusive. I have proposed the second structure, and I challenge proponents of the opposite view to explain why certain nominals, specifically process nominals, should be banned from compounding, seeing as they are independently predicted to be allowed, based on our general theory and knowledge of compounds.

Chapter 6

CONCLUSION

This dissertation has investigated the grammar of Norwegian compounds with the following aims in mind:

    I.   to provide a better theoretical understanding of compounding by describing and analyzing compounds in a particular language, i.e., Norwegian, whose system of compounding is less studied than that of many related languages

    II.   to contribute to the description and analysis of the grammar of Norwegian

In order to reach these aims, I formulated three overarching Research Questions in the introduction to the dissertation.

Research Questions

(1)   What are the major descriptive generalizations that capture the properties of Norwegian compounds?

(2)   What are the basic building blocks of Norwegian compounds and how are these parts of compounds combined?

(3)   How can we account for the 'dual nature' of compounding, i.e. the observation that compounding seems to share properties with both word-formation and sentence-formation?

In addition to these three questions, I also formulated a list of requirements that a morphosyntactic analysis of Norwegian compounds should meet, repeated in (4).

(4) A morpho-syntactic analysis of Norwegian compounds should
  A. identify the structural configuration in which the components of a compound are combined
  B. identify one of the compound members as the head and the other as the non- head
  C. identify the nature and role of linking elements
  D. account for possible and impossible left-hand members, including phrasal left-hand members
  E. address the (im)possibility of compound-internal inflection
  F. account for the assignment of semantic content to transparent and non-transparent compounds
  G. inform us about the relationship between primary compounding and synthetic compounding
  H. make explicit the role of argumental and non-argumental constituents in compounds, as in pasta eting 'pasta eating' and restaurant eting 'restaurant eating'

This dissertation has provided initial, and in some cases elaborate, answers to all of these requirements, and I think these requirements should continue to serve as criteria for future work on Norwegian compounds.

I now consider the answers that this dissertation offers to each of the three Research Questions, before I turn to some general concluding remarks.

RQ1: What are the major descriptive generalizations that capture the properties of Norwegian compounds?

The task of identifying descriptive generalizations for a grammar is cumulative and can be considered complete when all of the observed behavior is accounted for. Since this is an enormous task, and since working on a subset of the problem is nevertheless productive, this dissertation has not aimed at an exhaustive account of the Norwegian compound system. Rather, it focuses on what I consider the major descriptive generalizations, without, however, shying away from offering finer and more detailed generalizations when appropriate.

Most of the descriptive groundwork was laid in Chapter 2, where I identified the different types of compounds that are found in Norwegian and singled out the two most productive types as the focus of the dissertation: primary compounds and synthetic compounds. By describing, systematizing, and later analyzing such compounds, I was able

to both corroborate known generalizations proposed in previous work and, importantly, offer novel generalizations. While space does not allow all generalizations to be repeated, I will nevertheless mention a few. Among the known generalizations that were corroborated are the observations that Norwegian primary and synthetic compounds are formally and semantically right-headed, that both compounds types may contain an overt linking element, and that compounds can be created with elements of most syntactic categories and sizes, although most variation is found in the left-hand member of a compound. Among the novel contributions were the identification of a heretofore undescribed type of NV-N-compound in Norwegian, exemplified by *strand$_N$-rydde$_V$-uke$_N$,* 'beach-cleaning week', the classification of the sub-types of synthetic compounds that exist in Norwegian, and the insight that a distinction must be made between linking elements licensed by idiosyncratic properties of the left-hand member and linking elements licensed by the category and declension class of the left-hand member. Novel generalizations for Norwegian compounds also emerged in the context of the analyses developed in Chapter 4 and 5, including the puzzling generalization that there is a strong dis-preference for non-nominal suffixes in compounds.

One of the important findings of this dissertation is that many of the observed restrictions in the grammar of compounds are soft restrictions rather than hard and absolute restrictions. This conforms with the behavior of morphology more generally, and it is an interesting question exactly how such soft restrictions should be modeled.

RQ2: What are the basic building blocks of Norwegian compounds and how are these parts of compounds combined?
I have proposed that Norwegian primary compounds and synthetic ING-compounds have the general structure in (5).
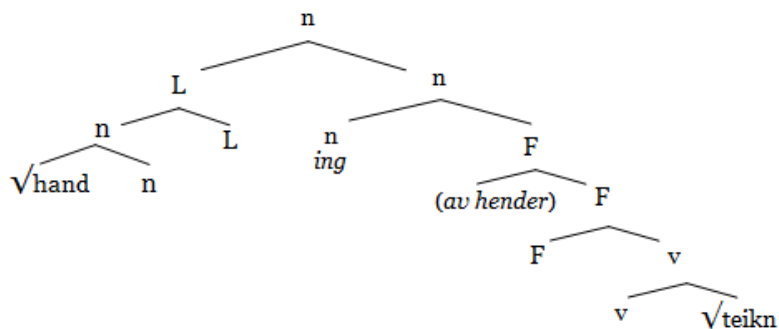
(5)
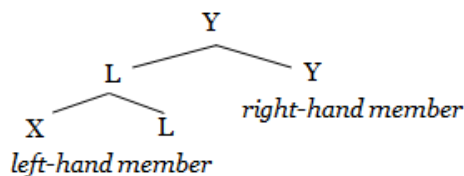
Left- and right-hand members can be of variable size, and are composed of roots and functional heads, which are realized by phonological exponents post-syntactically.

Many properties of Norwegian compounds are predicted if compounding is analyzed as adjunction of the left-constituent to the right-constituent, including their formal and semantic right-headedness. Thus, I proposed the following structures for primary compounds and synthetic ING-compounds, where the only distinction between the two types of compounds lies in the internal structure of the right-hand member.

(6)   Primary compound

```
                    n
           L ───────────── n
      n ──────── L      √venn ── n
  √barn ── n     s       venn
          dom
```
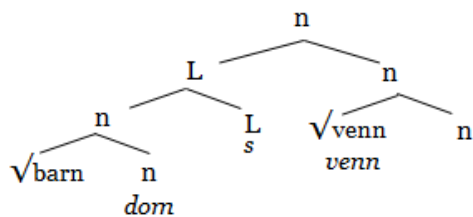
(7)   Synthetic ING-compound (Process compound)

```
                      n
          L ───────────────────── n
      n ────── L         n ─────────────── F
  √hand ── n            ing      (av hender) ── F
                                          F ──────── v
                                                 v ── √teikn
```

Both the compounds in (6) and (7) are created by the same basic operation of compounding, the main features of which are as follows. The left-hand member and right-hand member of a compound are built independently before they are combined by adjoining the left-hand member to the categorizer of the right-hand member. The L-head, which is realized by what is commonly known as linking elements, specifies the way in which the two members should compose semantically, establishing a semantically underspecified relationship between the two members which must ultimately be determined pragmatically. This basic analysis was extended to further subtypes of compounds.

RQ 3: How can we account for the 'dual nature' of compounding, i.e. the observation that compounding seems to share properties with both word-formation and sentence-formation?

Throughout this dissertation, I have observed that compounding shares properties with both word-formation and sentence-formation. In order to account for this mixed nature of compounding, I adopted a non-lexicalist framework where no strict distinction is assumed between these types of formations. By developing theoretically informed analyses of various properties of compounds, including the possibility of using full phrases as left-hand members, the presence of arguments and argument structure compound-internally, and the varying degree of semantic transparency observed in compounds, we have seen that the 'dual nature' of compounding can be successfully derived within a non-lexicalist framework. The story is not yet complete, however, and several aspects of the grammar of Norwegian compounds are still not accounted for. In this regard, I would like to single out, in particular, Requirements D, F and G in (4), as especially significant areas for future research.

By addressing the Research Questions in (1-3) and the desiderata for an analysis of Norwegian compounds in (4), this dissertation contributes to a better theoretical understanding of compounding, through the description and analysis of compounds in a particular language, whose system of compounding is less studied than that of many related languages. Furthermore, it contributes to the description and analysis of the grammar of Norwegian. At a more general level, this dissertation addresses the bigger issue of the morphology-syntax-semantics interface, where I have identified important questions and venues for improving our understanding of this larger area.

In my introductory chapter, I discussed the claim that compounding does not belong to grammar proper. The analyses and discussion that I have provided clearly demonstrate that such a claim is wrong, and that compounds display properties that can only be captured by a grammatically sophisticated theory.

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