

THE ROOT AND NOTHING BUT THE ROOT: PRIMARY COMPOUNDS IN DUTCH

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Abstract

This article is an addendum to recent contributions on the structure of compounds in root-based frameworks (Borer 2009, Harley 2009). It presents a subtype of Dutch primary compounds of which the non-head is demonstrably a bare root. The non-head of this type of compounding is fully acategorical. It does not contain categorial heads (i.e. little heads) or functional projections. As such, the discussion supports the hypothesis that the most minimal lexical projection is a root (Halle and Marantz 1993, Borer 2005) and that it occupies a syntactic slot in the structure which does not need to be licensed by superstructure in order to be interpretable or realizable (pace Harley 2012, Starke 2009 i.a.). Given that the non-heads of these compounds consist of nothing but bare roots, they are an important testing ground to study the behavior of lexical projections in the absence of functional projections. As a first illustration of this methodological advantage, I present primary compounds which contain more than two roots and I show that they may contain idiomatic clusters which do not correspond to constituents. I argue that word idiomaticity should be distinguished from sentential idiomaticity (Borer 2013, to appear), which depends on constituency.

1. Introduction

A derivation typically consists of functional structure which merged on top of a lexical projection. As a result, lexical projections are rarely attested in the absence of functional projections. For example, the DP in (1) only enables us to observe a lexical head which is embedded under nominal functional structure such as number marking and a determiner. It does not provide us any access to the bare lexical head *straat* ‘street’.

- (1) de straat-en
 the street-PLURAL
 ‘the streets’

In this respect the non-head of a primary compound¹ might be a unique syntactic domain. There is no obvious reason why such a non-head should necessarily project any functional structure. Hypothetically, it is therefore possible that the non-head *straat* ‘street’ in (2) is a bare lexical projection.

- (2) straat-kat
 street-cat
 ‘street cat’

The non-head of the compound in (2) now becomes an important testing ground to determine the theoretical status of a lexical projection. If one proposes that the core of a lexical projection consists of nothing but an acategorical root (Halle and Marantz 1993, Harley and Noyer 1999, Borer 2005), one expects the existence of compounds of which the non-head consists of such a minimal lexical projection. After all, it is the most parsimonious structure imaginable for the non-

¹ Primary compounds are the simplest compounds. They are not synthetic compounds and their left-hand part is not phrasal. They go by the name root compounds as well.

head in contemporary reasoning and there is no *a priori* reason to exclude this possibility. In this article I argue that this prediction is indeed borne out. I will present compounds from Dutch, a language in which a plethora of compounding types can be found (Booij 2001, Don 2009), and I will show there is a subtype of primary compounds in Dutch of which the non-head is indeed a bare root. It will become clear that nothing else is contained in the non-head of this type of compound, not even categorial heads (i.e. little heads) or functional projections.

This article should be understood as an addendum to recent contributions on the structure of compounds in root-based frameworks. Present root-based proposals are succesful in deriving categorial restrictions on the compound's non-head. There are indeed data for which building in categorial restrictions seems to be a main concern. For example, the non-head of English compounds cannot belong to just any category. The possibilities are restricted to the ones given in (3) (Selkirk 1982:14), a restriction which needs to be captured in root-based accounts.

- (3) NN NA PV
 AN AA
 VN PA
 PN

Clearly, one cannot simply postulate that the non-head is an acategorial root in English compounds, as this would result in overgeneration. The non-head root is categorized. Proponents of the root therefore have formulated proposals in this direction. Harley (2009) argues for a categorial head, i.e. a little head such as n° , v° or a° , above the non-head root, Borer (2009, to appear) claims that it moves into the specifier of *some* functional specifier of the extended projection. In both proposals the additional head may serve to categorize the non-head root. However, if we restrict the discussion to compounds of which the non-head is categorized, the domain of compounding does not seem to benefit theoretically from the theory on roots, quite on the contrary. The compound's non-head is still assumed to be a categorized lexical projection. In this article I therefore would like to emphasize on the fact that there exist compounds of which the theoretical status of the non-head directly supports the thesis that the core of a lexical projection consists of nothing but a bare root.

The theoretical consequences of this article reach further than evidence in favor of the root hypothesis. Crucially, it is not only argued that the most minimal lexical projection can be a root, but also that this root can be bare. Consequently, a root can occupy a position which does not depend on categorial or functional heads to be interpretable or to be realized. This conclusion is problematic for the view which is held in Distributed Morphology according to which roots depend on a categorial head in order to be interpretable (see Harley 2012 for discussion). The root in the non-head of a Dutch root primary compound does not merge with a categorial head, yet it is interpretable.² It is equally problematic for frameworks which claim that roots depend on functional superstructure in order to be realized. Such a view is defended by proponents of Nanosyntax (Starke 2009, Ramchand 2008). They argue that vocabulary items of lexical categories do not spell out a root position. They rather realize a set of functional heads. The occurrence of bare roots devoid of functional structure in the non-head, i.e. a left branch, of Dutch root primary compounds is an empirical problem for such a theoretical view.

Finally, it will become clear that we may profit from having access to a syntactic domain which contains nothing but lexical projections. It enables us to study their behavior in more detail. As a first illustration of this advantage, I will present primary compounds which contain more than two roots and I will show that they may contain idiomatic clusters which do not correspond to constituents. I argue that word idiomaticity should be distinguished from sentential idiomaticity (Borer 2013, to appear), which depends on constituency.

I will proceed as follows. In the next section I first present two types of primary compounds in Dutch. I will distinguish between a first type which invariably selects a nominal as its non-head and a second type of which the non-head is category-independent. This second type is the empirical basis of this article. In section 3 I argue against intervening functional head, in section 4

² It still holds that roots need to be embedded in a syntactic structure in order to be interpretable: the structure determines the meaning of the root at Encyclopedia.

I present counter-evidence against intervening categorial heads. Section 5 provides evidence in favor of a root status of the non-head. In section 6 I present a syntactic structure for the compounds under discussion. In section 7 I discuss compounds which consist of more than two roots and I point out that these data lead to new insights on idiomaticity. Section 8 sums up and concludes.

2. Two types of primary compounding in Dutch

In this section I argue that there are two different types of primary compounds in Dutch³. They can be distinguished empirically and historically. It will become clear that a first type invariably contains a nominalized root as its non-head. The second type, on the other hand, can contain a non-head of any category⁴. This type will be analyzed in detail in the present article. I will demonstrate that its non-head is invariably a root.

The non-head of the first type is invariably nominal and it is followed by what is called a linking phoneme in descriptive work on Dutch morphology (e.g. Haeseryn et al. 1997, de Haas & Trommelen 1993), as is shown in (4).

- (4)
- a. varken-s-hok
pig-LP⁵-pen
'pig's pen'
 - b. bakker-s-winkel
baker-LP-store
'bakery'
 - c. kat-en-luik
cat-LP-panel
'cat door'
 - d. peer-en-boom
pear-LP-tree
'pear tree'

The linking phoneme is selected by the specific root in the left-hand part and it is consistent in the sense that it can be predicted for newly formed compounds within a given dialect. This type of compounding has been attested in Dutch since the sixteenth century and it only became attested frequently since the twentieth century (Tiel, Rem and Neijt 2011:132). It has been studied extensively. As its non-head is invariably nominal, it stands to reason that the linking phoneme⁶ instantiates a piece of nominal inflection, such as (a remnant of) case ending (Booij 2001), plural marking (Neijt and Schreuder 2009) or noun class marking (De Belder 2013). As such, the non-head of this type of compounding might be a good candidate to exemplify a root which has merged with *some* functional projection (Borer 2009, to appear and see section 1), such as class or number. In the remainder of this article I will mainly ignore this type of compounding. When I do refer to these compounds I will call them nominal primary compounds, as they are primary compounds with a nominal non-head.

The second type of compounding has been given less attention, but it will be the empirical core of the present article. Its non-head may be associated with just any category, including nouns, verbs, adjectives, prepositions, cardinals, interjections, conjunctions and adverbs. The

³ This observation goes back to a short note in Bilderdijk 1826:207 who observed that the nominal non-head of Dutch compounds may come in two varieties, viz. with or without a linking phoneme. We will see that the present claim is more general as it includes non-nominal non-heads as well.

⁴ Most approaches to Dutch morphology sort compounds according to the category of the non-head (see, for example, de Haas and Trommelen 1993 and Don 2009).

⁵ LP = linking phoneme

⁶ The term *linking phoneme* is thus a misnomer.

non-head is directly adjacent to the head, without any intervening material. This is illustrated below.

- (5)
- a. klee-kast
cloth-closet
'wardrobe'
 - b. slaap-pil
sleep-pill
'sleeping pill'
 - c. snel-trein
fast-train
'high-speed train'
 - d. achter-deur
back-door
'backdoor'
 - e. drie-luik
three-panel
'triptych'
 - f. ja-woord
yes-word
'marriage vows'
 - g. of-poort
or-gate
'or-gate'
 - h. niet-verjaardag
not-birthday
'unbirthday'

Most often, the head will be nominal as in the examples above, but this is not a requirement, see (6).

- (6)
- a. Zij **zweef-vlieg**-t
she hover-fly-INFL
'She glides.'
 - b. een **kakel-bont**-e trui
a cackle-colorful-INFL sweater
'a gaudy sweater'
 - c. een **hoog-zwanger**-e collega
a high-pregnant-INFL colleague
'a late pregnant colleague'

This type of compounding is attested in the oldest Dutch text which are available to us. This means that it is at least as old as the ninth century (Tiel, Rem and Neijt 2011, Ruissen 2011:55). Old Dutch examples of such compounds are given in (7) (Ruissen 2011:55 and *Oudnederlands woordenboek*).

- (7) a. kuo-smero
cow-smear
'butter'
- b. frīt-hof
enclose-garden
'atrium'
- c. hēt-muodi
hot-mood
'anger'
- d. ēn-gimi
one-winter
'an animal of one year old'

Even though this type of compounding is very old, it does not differ from other compounds in Dutch in being fully productive. The examples in (8) are only added recently to Dutch vocabulary.

- (8) a. koop-moeder⁷
buy-mother
'woman who receives a child from a surrogate mother'
- b. mee-moeder
with-mother
'co-mother, i.e. lesbian partner of a biological mother'

On a par with other types of Dutch compounding, the examples may be transparent meaningwise, as in (9)a, or they may be fully idiomatic, as in (9)b.

- (9) a. lees-moeder
read-mother
'mother who is a volunteer reading helper'
- b. baar-moeder
give.birth⁸-mother
'womb'

As the non-head is adjacent to the head on the surface, there is no direct evidence to postulate an intervening head. In fact, below I will present evidence against such a head and I will conclude the non-head is a bare root.⁹ I will therefore refer to this type of primary compounds as root primary compounds.

To be entirely clear, the claim in this article is not that all primary compounds in Dutch have a bare root as their non-head. I adopt the view that nominal primary compounds do contain structure which restricts them to nominality. The claim is rather that there is a subtype of primary compounds in Dutch, which I have called root primary compounds, for which a bare root analysis is the only one which is compatible with the data and which as such supports the hypothesis that the most minimal element in the lexical projection is an acategorical root.

⁷ This example was added to *Van Dale* dictionary in 2009.

⁸ It is not entirely clear whether *baar* should be glossed as *give birth*, which is its contemporary meaning, or as *bear*, to which it goes back etymologically.

⁹ Such an analysis has been pursued for root compounds with an adjectival non-head by De Belder and Van Koppen (2012).

3. Evidence against intervening functional heads

3.1 Introduction

In this section I argue that the non-head of a root primary compound never merges with a functional head before it merges with the compound's head. In other words, root primary compounds do not contain intervening functional heads. Given that root primary compounds stand in competition with nominal primary compounds (see section 2), the argumentation will differ for non-nominal and nominal functional heads. For non-nominal heads it suffices to show that they should be obligatorily absent to conclude that the head of the primary compound is a non-head. For nominal heads, however, we predict that they may be present. However, if they are present we are mistakenly studying nominal primary compounds. Yet, it can be shown that some non-heads which could be taken to be nouns are structurally smaller than actual nouns. I will conclude they are roots. Due to this methodological bifurcation I discuss non-nominal and nominal functional heads separately below.

3.2 Non-nominal functional projections

Given that there are only two types of primary compounds in Dutch, i.e. nominal primary compounds and root primary compounds, we expect that non-heads which cannot be analyzed as nouns are invariably roots. We predict that all non-nominal functional material is excluded from the non-head in a primary compound. An exhaustive discussion of all imaginable functional projections would lead us too far. In this section I therefore restrict the discussion to some examples from the verbal domain. It will become clear that the non-head of root primary compounds does not tolerate functional projections of any kind.

In descriptive literature on Dutch morphology scholars are well aware of the fact that when a primary compound contains a non-head which could be considered to be verbal, it is invariably the *stem* of the verb which is attested (de Haas and Trommelen 1993, Haeseryn et al. 1997, Don 2009). Indeed, adding verbal inflection to the non-head of a primary compound results in such a high degree of ungrammaticality it even seems absurd to consider the possibility. It is, for example, highly ungrammatical for a root primary compound to contain markers of verbal agreement. This is illustrated in the *b*-examples below. Without verbal agreement, the examples are fully acceptable, as shown in the *a*-examples.

- (10) a. *speur-hond*
 track-dog
 ‘tracking dog’
- (11) a. * *speur-t-hond*
 track-3.SG-dog
- (12) a. *zwem-vogel*
 swim-bird
 ‘swimming bird’
- b. * *zwem-t-vogel*
 swim-3.SG-bird

Interpretable functional heads, such as past tense, cannot be contained within the root primary compound either. Consider the *b*-examples below. Again, these compounds are fully grammatical without the past tense marker, as can be concluded from the *a*-examples.

- (13) a. *speur-hond*
 track-dog
 ‘tracking dog’

- b. * *speur-de-hond*
track-PAST-dog
Intended: ‘retired tracking dog’
- (14) a. *baar-moeder*
give.birth-mother
‘womb’
 - b. * *baar-de-moeder*
give.birth-PAST-mother
Intended: ‘womb which carried a foetus’
- (15) a. *drijf-hout*
drift-wood
‘driftwood’
 - b. * *dreef-hout*
drift.PAST-wood
Intended: ‘stranded driftwood’

Given that roots which may be considered to be adjectives are allowed as the non-head of a root primary compound (see (5)c),¹⁰ it is not too far-fetched to expect that past participles¹¹ are allowed as the root primary compound’s non-head as well. However, such formations are again strongly ungrammatical, as can be seen in (16).

- (16) a. * *gesneuveld-bericht*
fallen.in.battle-message
Intended: ‘message that someone has fallen in battle’
 - b. * *gestoord-ziek*
disturbed-sick
Intended: ‘sick because of mental issues’
 - c. * *uitgenodigd-cadeau*
invited-present
Intended: ‘present offered to someone because s/he invited you’

There is no *a priori* reason why the examples in (16) should be excluded. Compounding is fully productive in Dutch. I conclude their ungrammaticality is due to a structural flaw. The non-head of a root primary compound cannot contain functional material.¹²

3.3 Nominal functional projections

A primary compound which contains a non-head which seems nominal may either be a root primary compound or a nominal primary compound. We know independently that nominal primary compounds may contain some low functional projections. In this section I will therefore not argue that nominal functional projections are necessarily absent in a primary compound as this is clearly false for nominal primary compounds. However, I will show that even the lowest,

¹⁰ Nominal compounds which contain adjectives or roots which could be taken for adjectives as their non-head are particularly complex due to the fact that one has to distinguish between true compounds and lexicalized AN phrases (Don 2009:375), a question which would take us too far afield. I refer the reader to De Belder & van Koppen (2012) in which this project is undertaken in detail. I would like to point out, though, that the results of their research support the present discussion. They show that root compounds with a non-head which could be taken as an adjective fail to show adjectival inflection. They show that all apparent counterexamples are in fact phrases.

¹¹ See Giorgi and Pianesi (1997) on the functional role of participial inflection in the verbal domain.

¹² Note that it follows that Dutch does not have VN compounds; it only has root primary compounds and nominal primary compounds.

most expected nominal projections *may* be absent. I will conclude that next to nominal primary compounds there are root primary compounds of which the non-head may be taken for a noun pre-theoretically, although it is in fact a bare root structurally.

More specifically, I discuss two instances of inflection, viz. gender marking and number marking on pluralia tantum. For both of them it has been argued that they are very low in the nominal structure. In fact, it has been claimed they can even be identified as the nominal categorial head, i.e. n^0 , which attaches directly to the root (see Lowenstamm 2007 for gender as n^0 , see Acquaviva 2008 for plural marking on pluralia tantum as n^0).

I will first discuss gender marking. In Standard Dutch the gender of a noun can only be read off from agreement in the DP (see Schoorlemmer 2009). In contrast, West-Flemish dialects have overt gender marking on the noun. Dialects which belong to this group have overt gender marking on feminine nouns by means of a schwa ending (Haegeman 2000). This is illustrated in (17)¹³. (17)d shows that this gender marking is obligatory in a DP.¹⁴

- (17) a. e vrouw-e
a woman-F
'a woman'
- b. e stroat-e
a street-F
'a street'
- c. e school-e
a school-F
'a school'
- d. * e vrouw
a woman

In root primary compounds this gender marking is absent, as shown in (18).¹⁵

- (18) a. vrouw-mens
woman-human
'woman (pejorative)'
- b. stroat-kat-e
street-cat-F
'street cat'
- c. school-gebouw
school-building
'school building'

The non-head of these compounds does not contain gender marking. We have seen above that it is an obligatory ending on a feminine noun in West-Flemish. I conclude that the compound's non-head in (18) is smaller than the noun. It is a bare root.

Secondly, let us take a look at pluralia tantum. Some examples are given below.

- (19) a. hersen-en
brain-PL
'brains'

¹³ All West-Flemish examples in this article are from Blankenberge Dutch. I would like to thank Katlijn Van Audenaerde and Monica Roose for data and judgments.

¹⁴ Masculine and neuter nouns lack this ending, e.g. *vent* 'man' (masculine) and *kind* 'child' (neuter).

¹⁵ Nominal primary compounds retain gender inflection (see De Belder 2013). For example, the feminine noun *sirope* 'syrup' keeps its ending in *sirpeflasche* 'syrup bottle'.

- b. mazel-en
spot-PL
'measles'
- c. pok-en
pock-PL
'smallpox'
- d. klee-en
cloth¹⁶-PL
'clothes'

Number marking on pluralia tantum is obligatorily present on the noun and lexically selected by the root. Yet, interestingly, the plural markers are absent in root primary compounds.

- (20)
- a. hersen-helft
brain-half
'cerebral hemisphere'
 - b. mazel-hout
measle-wood
'maser wood'¹⁷
 - c. pok-gezicht
pock-face
'pock face'
 - d. klee-kast
cloth-closet
'wardrobe'

What is contained in the non-head of these compounds is again smaller than the noun itself. I conclude it is a bare root.

If 'nouns' lacking gender marking and pluralia tantum lacking number marking are both roots structurally, one predicts that it should be possible to coordinate them as they are of the same category (Chomsky 1959). This prediction is borne out. The feminine noun in (21) lacks gender marking in a primary compound in West-Flemish, as in (22).

- (21)
- e nek-e
 - a neck-f
 - 'a neck'
- (22)
- nek-klachtn
 - neck-complaints
 - 'pain at the neck'

We expect it is possible to coordinate the root *nek* 'neck' with the root *hersen* 'brain' (see (20)). This is indeed possible, as can be deduced from the West-Flemish data in (23). The order of the

¹⁶ The English root *cloth* may head a mass DP. The gloss therefore wrongly suggests that *klee* functions as *cloth*. It does not. *Klee* is only attested as the root of the pluralia tantum *kleren* 'clothes' or as the non-head of a root primary compound.

¹⁷ The English roots *measle* and *maser* are etymologically related, but distinct roots, which might suggest that *mazel* is homonymic in Dutch. However, this is not the case. In Dutch *maserbout* and *mazellbout* are co-existing synonyms. This shows that *maser* 'maser' and *mazel* 'measle' are co-existing roots in Dutch as well. However, unlike in English, the root *mazel* 'measle' can be used to refer to the wood type as well.

roots is irrelevant (see section 5 for more details on coordinating roots in root primary compounds).

- (23) a. essen- en nek-chirurgie
 brain- and neck-surgery
 'surgery at the brain and neck'
- b. e nek- en essen-chirurgie
 a neck and brain-surgery
 'surgery at the neck and brain'

In sum, in this section I have shown that functional projections which are lexically selected by the root and which are obligatorily present when the root functions as a noun, are absent on the non-head of a root primary compound. I conclude that the non-head is a bare root.

3.4 Conclusion

In this section I have shown that root primary compounds cannot contain intervening functional heads. I have presented examples from the verbal domain, viz. agreement markers, past tense markers and participial inflection. Their presence on the non-head invariably leads to strong ungrammaticality. I have further shown that in the nominal domain functional markers which are otherwise obligatorily present on the noun, such as gender marking and number marking on pluralia tantum may be absent in a root primary compound. I conclude that the non-head cannot merge with functional material of any kind. In the next section I investigate whether categorial heads may merge with the non-head.

4. Evidence against intervening categorial heads ('little heads')

4.1 Introduction

In this section I argue against the hypothesis that the non-head of a root primary compound first merges with a null lexical categorial head, such as n° , v° or a° , before merging with the head. I point out that the presence of overt categorial heads leads to ungrammaticality. I assume late insertion of vocabulary items. It therefore stands to reason that if the presence of overt markers is ungrammatical, the presence of null markers is illicit as well. After all, the vocabulary item is only inserted post-syntactically and its phonological properties should not influence the grammaticality of the structure. This section further contains a discussion of apparent counterexamples. I present examples which seem to contain an overt categorial head. I will argue, however, that what could be considered to be a categorial head is part of the root in these examples. I conclude that the non-head of a root primary compound cannot merge with categorial heads.

4.2 The ungrammaticality of overt categorial heads

Proponents of Distributed Morphology argue that categorial heads may be either overt, in which case they are overt derivational affixes, or null, in which case they should be understood as null derivational affixes (see for example Embick and Marantz 2008). Below I present two arguments against the assumption that the non-head of a root primary compound merges with a null categorial head¹⁸. First, notice that the non-head may be realized by a functional vocabulary item¹⁹. This vocabulary item is an interjection in (24)a, a cardinal in (24)b (see Borer 2005 on the functional status of cardinals) and a conjunction in (24)c.

¹⁸ In Harley's (2009) approach to compounding in Distributed Morphology, the non-head invariably merges with a categorial head.

¹⁹ To be entirely clear, the non-head is a root syntactically. Post-syntactically, it is realized by a functional vocabulary item. For a thorough discussion on how and why functional vocabulary items may realize a root position, see De Belder & van Craenenbroeck (2011, 2013).

- (24) a. ja-woord
yes-word
'marriage vow'
- b. drie-luik
three-panel
'triptych'
- c. of-poort
or-gate
'or gate'

If roots first merge with a categorial head which assigns a lexical category to the root, it is not clear with which lexical categorial head these functional items should merge. Is *ja* 'yes' structurally nominalized or verbalized? These examples are difficult to capture in a principled way under the view that roots systematically select a lexical categorial head.

Secondly, let us check whether *overt* categorial heads are accepted in root compounds. In other words, can overt derivational affixes be found on the non-head of a primary root compound? Now recall that root primary compounds exist alongside nominal primary compounds (see section 2). We therefore expect that nominal categorial heads can licitly merge on top of the non-head of a primary compound, in which case a nominal primary compound is derived.²⁰ In the remainder of this section I will therefore ignore nominal categorial heads and I will restrict the discussion to verbalizing and adjectivizing overt affixes.

Let us assume that root primary compounds actually contained a null categorial head as in (25).

- (25) a. snel- \emptyset_A -trein
fast- \emptyset_A -train
'high-speed train'
- b. fris- \emptyset_A -drank
fresh- \emptyset_A -drink
'soft drink'
- c. slaap- \emptyset_V -pil
sleep- \emptyset_V -pill
'sleeping pill'
- d. speur- \emptyset_V -hond
track- \emptyset_V -dog
'tracking dog'

If the representation in (25) were correct, we predict that *overt* categorial heads can be present in root primary compounds as well. After all, null categorial heads and overt categorial heads are only disintegrated at PF given late insertion. Structurally, they are identical. However, this prediction is not borne out. The compounds in (26) and (27) are ungrammatical, despite the fact that compounding is highly productive in Dutch. (26) shows root primary compounds with intervening overt adjectival suffixes²¹, (27) shows examples with verbalizing affixes²². I made sure

²⁰ I thus propose that all primary compounds of which the non-head contains a nominal affix are instances of nominal primary compounds. Recall that nominal primary compounds contain a linking phoneme. Given that this linking phoneme instantiates a piece of nominal inflection, De Belder (2013) argues that it can be null. It is common for inflection to be realized as a null morpheme. Examples with a nominal affix are thus examples of nominal primary compounds, even if they do not contain an overt linking phoneme.

²¹ Dutch affixes cannot be translated straightforwardly into English. The glosses contain English affixes which are comparable to the Dutch ones.

that the morphologically complex adjectives and verbs which are the compounds non-head are common and acceptable words when occurring independently.

- (26) a. * spaar-zaam-attitude
save-some_A-attitude
- b. * eet-baar-datum
eat-able_A-date
- c. * vet-ig-dieet
fat-y_A-diet
- (27) a. * be-plant-seizoen
BE_V-plant-season
- b. * menstru-eer-pijn
menstru-ate_V-pain
- c. * ont-vlam-tijd
in_V-flame-time

Note that the illicitness is not due to the fact that newly formed root primary compounds are impossible words. Compounding is highly productive and the formations in (28), for example, are fully acceptable.

- (28) a. spaar-attitude
save-attitude
'attitude towards saving'
- b. eet-datum
eat-date
'eating date'²³
- c. vet-dieet
fat-diet
'diet based on fat'

Admittedly, the illicitness of the examples in (26) and (27) is not necessarily due to the fact that the non-head needs to be a root. I am sure alternative accounts can be proposed to exclude these examples. However, it is not clear to me how their ungrammaticality could be derived without excluding the structures in (25) as well. After all, the examples in (25) and in (26) and (27) are structurally identical²⁴. I conclude that the representations in (25) are wrong. Root compounds do not contain an intervening null categorial head.

4.3 Apparent counterexamples

In this section I would like to discuss examples which at first sight seem to contradict the claim that the non-head of a root primary compound cannot contain a derivational affix. I will argue that the non-heads of the alleged counterexamples are not morphologically complex.

The compounds in (29) are fully acceptable.

²² Compounds with particle verbs as their non-head are perfectly well-formed, e.g. *weg-geef-prijs* 'away-give-price' (give away price, i.e. very low price). I assume they are phrasal compounds: their non-head is a phrase. See Harley (2009) for an analysis of phrasal compounding in Distributed Morphology.

²³ The compounds are acceptable, even though it is not very clear what they might refer to.

²⁴ The difference between the overt and covert categorial heads only comes at play at vocabulary insertion, i.e. post-syntactically. Syntactically, they are all identical.

- (29) a. park-eer-garage
park-EER-garage
'parking garage'
- b. park-eer-boete
park-EER-fine
'parking fine'

They seem to falsify the more general observation that the affix *-eer* cannot be contained in a root primary compound, as shown in (30).

- (30) a. * menstru-eer-pijn
menstru-ate-pain
- b. * calcul-eer-programma
calcul-ate-program
- c. * pollu-eer-niveau
poll-ute-level

Interestingly, the contrast between (29) and (30) correlates with another one. Unlike most verbs with the affix *-eer* *parkeer* 'to park' does not alternate with a noun with an affix *-(a)tie* as the ones in (31), but with the noun in (32).

- (31) a. menstru-atie
menstru-ation
'menstruation'
- b. calcul-atie
calcul-ation
'calculation'
- c. pollu-tie
poll-ution
'pollution'
- (32) parking
park-ing
'parking lot'

We may take the deviating alternation between *parkeer* 'to park' and *parking* 'parking lot' as a sign that these words are not recognized as being morphologically complex by the native speaker. The difference between the examples in (29) and (30) then follows immediately. *Parkeer* is simply not morphologically complex, but a root. The generalization that the non-head of a root primary compound cannot contain a derivational affix then still holds.

If one accepts the conclusion, we now have found an independent testing ground to establish whether a certain form is morphologically complex or not. If a form can occur as the non-head of a root primary compound, it is not morphologically complex. This is a significant result. I will present yet another set of examples below.

Consider word-forms which include the prefix *ver-* in Dutch. There are four uses which are productive. An overview is given below.

- (33) a. De kat ver-dik-t.
the cat VER-thick-3SG
'The cat is fattening.'

- b. Het Belgische leger ver-vlaams-t.
the Belgian army VER-Flemish-3SG
'The Belgian army becomes more Flemish.'
- (34) a. Oude honing ver-suiker-t.
old honey VER-sugar-3SG
'Old honey cristallizes.'
- b. De relatie ver-water-t.
the relation VER-water-3SG
'The relationship fizzled out.'
- (35) a. Marie ver-slaap-t haar tijd.
Mary VER-sleep-3SG her time
'Mary is wasting time by sleeping.'
- b. Marie ver-gok-t haar geld.
Mary VER-gamble-3SG her money.
'Mary is wasting money by gambling.'
- (36) a. Marie ver-slaap-t zich.
Mary VER-sleep-3SG self
'Mary overslept'
- b. Marie ver-draai-t de waarheid
Mary VER-twist-3SG the truth
'Marie is twisting the truth.'

In (33) *ver-* refers to an increasing degree. The predicate the degree refers to is expressed by the root. In (34), *ver-* can be paraphrased as 'grow into the predicate expressed by the root'. The meaning may be metaphoric. In (35) *ver-* indicates that the direct object is wasted by doing the event expressed by the root. Finally, in (36) *ver-* expresses that the result of the event the root refers to is wrong.

Given that these verbs are derived by means of a productive word-formation process, they are undoubtedly morphologically complex. As the non-head in root primary compounds they behave as expected. Their morphological complexity results in ungrammaticality. This can be deduced from the examples below.

- (37) a. * ver-dik-probleem
VER-thick-problem
- b. * ver-vlaams-tendens
VER-Flemish-tendency
- (38) a. * ver-suiker-honing
VER-sugar-honey
- b. * ver-water-relatie
VER-water-relation
- (39) a. * ver-slaap-tijd
VER-sleep-time
- b. * ver-gok-geld
VER-gamble-money

- (40) a. * ver-slaap-pech
VER-sleep-bad.luck
- b. * ver-draai-manier
VER-twist-manner

There is yet a fifth group of verbs which include *ver-*, which is by far the largest group. In these verbs the prefix has no clear, systematic meaning and the word-formation process is unproductive. Examples of this type are given in (41).

- (41) a. Marie ver-jaar-t
Mary VER-year-3SG
'Mary celebrates her birthday.'
- b. Marie ver-taal-t de tekst.
Mary VER-language-3SG the text.
'Marie translates the text.'
- c. De leerkracht verwen-t Marie.
the teacher spoil-3SG Mary
'The teacher is spoiling Mary.'
- d. De leerkracht vermaan-t Marie.
the teacher reprimand-3SG Mary
'The teacher reprimands Mary.'
- e. Marie verdwijn-t.
Marie disappear-3SG
'Marie disappears.'

Although it is clear that these words are morphologically complex from an etymological point of view, it is hard to determine whether they are indeed complex from a synchronic, morphological point of view. For some verbs this seems plausible, as they are quite transparent, for others this seems less likely. The internal structure of the examples (41)a and (41)b is probably accessible to the native speaker. In contrast, the internal structure of (41)d and (41)e has to be opaque as *maan* and *dwijn* do not have an independent meaning in contemporary Dutch. The verb in (41)c resembles (and is etymologically related to) the verb *wennen* 'to get used to', but a lack of a semantic relation between *verwennen* 'to spoil' and *wennen* 'to get used to' may be confusing to the native speaker. However, we now have a testing ground to settle the issue whether these words are morphologically complex. If a given form can be the non-head of a root primary compound, it is a bare root, otherwise it is morphologically complex. It turns out that verbs with *ver-* belonging to the unproductive group can occur as the non-head of a root primary compound.

- (42) a. verjaar-dag
celebrate.one's.birthday-day
'birthday'
- b. vertaal-bureau
translate-agency
'translation agency'
- c. verwen-dessert
spoil-dessert
'rich dessert'

- d. vermaan-brief
reprimand-letter
'letter with reprimands'
- e. verdwijn-truc
disappear-act
'disappearing act'

Given the licitness of the examples above, we have to conclude that what has been analyzed as the unproductive prefix *ver-* is actually not a prefix, but part of the root.

To conclude, if a form which seems to be morphologically complex can occur as the non-head of a root primary compound, this deviant behavior invariably correlates with other irregular properties. We have seen that *parkeren* 'to park' is an isolated verb ending in *-eer* in that it does not alternate with a noun with the suffix *-tie*. Precisely this deviant form is the only one which is attested in root primary compounds. Similarly, if a form with *ver-* can occur as the non-head of a root primary compound, it can be predicted that this verb is not the product of a productive word-formation process with the prefix *ver-*. I conclude that these observations indicate that whenever a form occurs as the non-head of a root primary compound, this form is morphologically simplex.

Interestingly, we can conclude that root primary compounds are an ideal testing ground to determine whether a form is morphologically complex or not. As the non-head of such compounds can only contain roots, only underived word-forms can be attested in this syntactic context. We have seen that a form which at first sight might seem morphologically complex can still function as a root. Interestingly, being morphologically simplex correlates with other morphological properties, such as unproductivity. It did not correlate with transparency. Less words may be morphologically complex than has been hitherto assumed.

4.4 Conclusion

In this section I have argued that the non-head of a root primary compound cannot merge with a categorial head. I have first pointed out that the non-head may be realized by a functional vocabulary item, for which it is not immediately clear why they should merge with a specific lexical categorial head. I have then demonstrated that the non-head cannot contain an overt derivational affix. I have finally discussed some apparent counterexamples for which I argued they are morphologically simplex. This result is interesting. It turns out that the non-head of a root primary compound is an ideal testing ground to determine whether a form is morphologically complex or not.

We have now arrived at the conclusion that neither a functional head or a categorial head follows the non-head root in Dutch root compounds. This leads to the conclusion that the non-head is a bare root. This conclusion is further supported in the following section, in which I present evidence in favor of a bare root analysis for the root primary compound's non-head.

5. Evidence in favor of a root status for the non-head

In the previous sections I have argued against the presence of functional or categorial heads on the non-head of the root primary compound. In this section I present evidence in favor of a root status from coordination.

The coordination of non-heads in Dutch root primary compounds is slightly marked, but quite acceptable. If what is contained in the non-head of these compounds is but a root, we expect that these roots can be coordinated (Chomsky 1959), even though they might be associated with different categories. After all, structurally they are but roots, devoid of any

categorial marking. This expectation is borne out, as can be deduced from the *ε*-examples below (example (43) is taken from De Belder & Van Koppen 2012).²⁵

- (43) a. straat-kunst
street-art
'street art'
- b. klein-kunst
small-art
'cabaret'
- c. straat- en klein-kunst
street- and small-art
'street art and cabaret'
- (44) a. snel-trein
fast-train
'high-speed train'
- b. boemel-trein
stop.frequently-train
'local train'
- c. per snel- en boemel-trein²⁶
by fast- and stop.frequently-train
'by highspeed train and local train'
- (45) a. voor-gerecht
before-course
'starter'
- b. hoofd-gerecht
head-course
'main dish'
- c. een voor- en hoofd-gerecht
a before and head-course
'a starter and a main dish'

The licitness of the coordination suggests that the category of the non-head is kept constant in this example. I conclude they are all roots.

One could assume that Dutch compounds are extremely liberal when it comes to coordinating a non-head. However, coordinating the non-head of nominal primary compounds with the non-head of root primary compounds results in degradedness. Although my informants disagree to which degree the examples in (46) are degraded, they all agree they are considerably worse than the examples in (47), which coordinate two non-heads of root primary compounds and which are considered to be fully acceptable. Furthermore, the order of the non-heads may improve the judgment (in either direction, depending on the informant) for the examples in (46), whereas such an effect is absent for the examples in (47).

²⁵ These examples are slightly marked, but this is due to the fact that coordinated elliptical compounds of this type are slightly marked. It does not follow from the fact that 'categories' are mixed. If the category does not vary, the examples do not improve. I do not have a different judgment, for example, for *gas- en zonlicht* 'gas- and sunlight' (gas light and sun light) than I do for *straat- en kleinkunst* (street art and cabaret).

²⁶ This example is taken from *Woordenboek der Nederlandsche Taal* (INL), lemma *volgen*, sublemma *volgtrein*: '*Slechts één mecanicien volgde hem... per snel- en boemeltrein*' (Only one mechanic followed him, on a high-speed train and on a local train).

- (46) a. *? slaap- en hormoon-en-pillen
sleep- and hormone-LP-pills
- b. *? hormon-en en slaap-pillen
hormone-LP-pills and sleep-pills
- (47) a. waak-en speur-honden
guard-and track-dogs
'guarding dogs and tracker dogs'
- b. speur-en waak-honden
track- and guard dogs
'tracker dogs and guarding dogs'

The conclusion presented above allows us to account for another observation on the categorial status of the non-head. Recall from the introduction that the non-head of a root primary compound can be 'of any category'. This lack of a categorial restrictions can be captured immediately if the non-head is a bare root, devoid of any specific categorial properties.

The evidence against an intervening functional or categorial head is supported with positive evidence for a root-status of the non-head in a root primary compound. I conclude that the non-head of a root primary compound is a bare root.

6. The structure of root primary compounds

We have seen in the sections above that there is evidence against the assumption that root primary compounds contain functional or categorial heads. Empirically, they just seem to contain bare roots and nothing else. Consequently, the structure of a root primary compound should be understood as a direct merger of two root. In what follows I will comment on the derivation of such a structure.

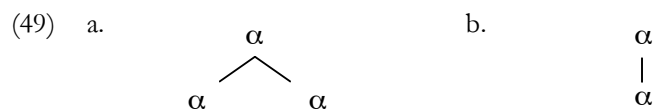
If a structure consists of nothing but roots, the question what the theoretical status of a root is is not trivial. In what follows I adopt the view from De Belder & van Craenenbroeck (2011) that a root is nothing but a featureless node, as it is the most parsimonious approach to roots to my knowledge.²⁷ They argue that the root is a by-product of primary merge. They propose that the first element which is taken from the numeration merges with the empty workspace. This empty workspace then becomes a node in the derivation, as in (48). By definition it is a featureless node. Given that this node is devoid of any featural specifications and given that it does not contain lexical items either as De Belder and van Craenenbroeck (2011) argue for late insertion, the root terminal node is a completely empty node. They therefore represent it by means of the symbol \emptyset .

- (48)
- $$\begin{array}{c} f \\ \swarrow \quad \searrow \\ f \quad \emptyset \end{array}$$

De Belder (2011) points out that two roots cannot be merged directly, as this would result in self-merge. Being empty nodes, two roots are completely identical. Although self-merge is not intrinsically excluded in Bare Phrase Structure (see Guimarães 2000, Kayne 2009 vs. Chomsky 1995:320), merging two roots directly with one another does not create a structure containing two roots. After all, merging an element with itself does not create a second instance of this element. First note that the set $\{\alpha, \alpha\}$ is identical to the singleton $\{\alpha\}$, since both sets have the

²⁷ Their proposal further allows functional vocabulary items to realize a root terminal node, which is an advantage when considering examples such as the ones in (24).

same members (see Partee, ter Meulen and Wall 1987:6). Hence, self-merging α (i.e. $\{\alpha\{\alpha,\alpha\}\}$) as illustrated in (49)a, is identical to $\{\alpha\{\alpha\}\}$ in (49)b.



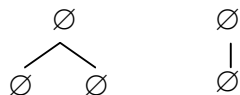
The tree in (49)b shows that self-merge results in one single terminal node (see Kayne 2009). Analogously, if we take into consideration the fact that all roots are identical it becomes clear that the structure in (50)a is equivalent to the one in (50)b.



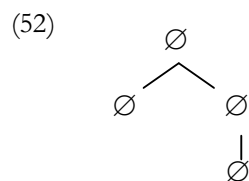
From the structures in (50) De Belder (2011) concludes that merging a root directly with another one results in one single root, not in two roots. She therefore suggests that whenever there are two roots in a structure, there is an intervening functional head. These conclusions are problematic in the present discussion as there is empirical evidence that root primary compounds involve direct root merger. I will therefore have to adjust the proposal in De Belder (2011).

Two roots can be built in the structure as follows. One first merges a root with another one. Technically, this can be done by merging an empty workspace with another one. The structure will project and will be labeled as an empty node, as in (50)a. The label identifies the derivation as completely empty, which is a correct representation of the state of affairs.²⁸ We have now derived the structure in (51) (see Chomsky 1995:243 on the definition of Merge).

(51) Merge (\emptyset, \emptyset) = $\{\emptyset, \{\emptyset, \emptyset\}\} = \{\emptyset, \{\emptyset\}\}$



Structurally, we have applied self-merge. As a consequence, the derivation contains only one node, as is shown in (51). Set-theoretically, however, we have derived an asymmetrical structure. We have derived a set which contains two different members: the empty set and a set containing the empty set. We can now safely merge yet another empty set with this derivation without creating an instance of self-merge as the empty set does not merge with the empty set directly, but rather with a set containing the empty set. In other words, as soon as we merge a third root terminal node, we derive a structure which actually contains two roots, as is shown in (52).



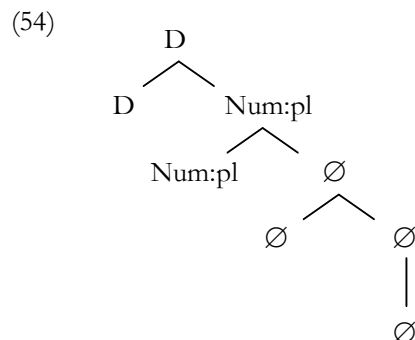
We now have successfully derived a structure which can host two roots, which is precisely what we need to derive root primary compounds.

The structure in (52) corresponds to a specific root primary compound as the one in (53) as follows.

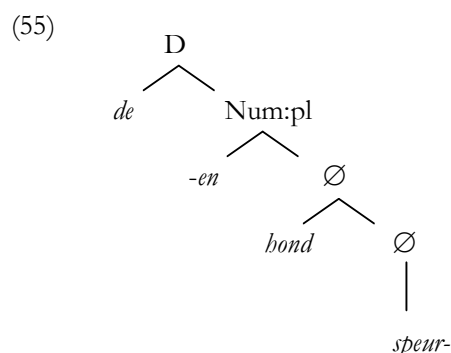
²⁸ De Belder and van Craenenbroeck (2011) argue that roots can never project, as the label will identify the structure as completely empty. This is indeed problematic if the structure already contains features, as in (48). However, if roots merge with one another, this objection does not apply. I therefore argue that roots can project if and only if they are merged with one another.

- (53) de speur-hond-en
 the track-dog-PL
 ‘the tracking dogs’

In (53) the compound heads a DP. It therefore merges with nominal functional material, which I simply assume to be plural marking and a D-head for ease of exposition.



After vocabulary insertion, a post-syntactic PF operation, the structure is realized as (55).



I propose that the head of the compound is the highest root as it is this root which determines agreement in the DP (see De Belder 2011:262). I assume that the surface order is derived via displacement at PF (see Embick and Noyer 2001). We have now derived the structure of a bipartite root primary compound. In the next section I will discuss root primary compounds in which more than two roots can be found.

7. Recursive root primary compounds

7.1 Introduction

In this section I show that root primary compounds can contain more than two roots. I will refer to root primary compounds with more than two members as recursive primary compounds. I then illustrate that the non-heads of (recursive) root primary compounds are a unique syntactic domain in which bare lexical projections may be observed. Their behavior differs from projections which contain functional heads as well. More specifically, I will show that recursive root primary compounds may contain interpretational clusters; some roots are interpreted together in an idiomatic fashion. I argue that these clusters do not correspond to constituents structurally. All examples of recursive root primary compounds instantiate one basic structure. It is thereby irrelevant whether the recursive root primary compound contains idiomatic parts. Support comes from phonological observations. I conclude that idiomaticity in this domain is derived differently than sentential idiomaticity (cf. Borer to appear, 2013), which depends on

constituency. More generally, one may conclude that domains which contain nothing but lexical projections are not subject to principles which are found in domains with functional projections.

7.2 Root primary compounds may consist of more than two roots

We have seen in the previous sections that the non-head of a root primary compound cannot contain any functional material or derivational heads. Root primary compounds thus do not allow any category-specific material. It does not follow, however, that root primary compounds have to be morphologically simplex in the sense that they have to be bipartite. If the restriction is that root primary compounds can only contain acategorical material, we predict that they can consist of more than two roots. After all, if two roots can merge to form a compound, why shouldn't it be possible for more roots? Indeed, one can easily find or produce examples which contain more than one root. Examples are given below.

- (56) a. fris-drank-automaat
fresh-drink-vending.machine
'vending machine for soft drinks'
- b. niet-verjaar-dag
not-celebrate.one's.birthday-day
'unbirthday'
- c. binnen-speel-tuin
inside-play-garden
'indoor playground'
- d. schuif-deur-kleer-kast
slide-door-cloth-closet
'wardrobe with a sliding door/sliding doors'
- e. zelf-doe-project-blog-foto
self-do-project-blog-picture
'picture on a blog on projects one can do oneself'
- f. lawine-zoek-hond-lei²⁹-band-doos
avalanche-search-dog-guide-band-box
'box for the leash(es) of (an) avalanche search dog(s)'

These compounds have the following properties. Firstly, the process is fully productive. Examples (56)d,e,f, are newly created. Secondly, they all have regular Dutch compound stress, which invariably assigns stress to the most left-hand part of the compound. This is illustrated in (57) below. Small caps indicate stress.

- (57) a. FRIS-drank-automaat
fresh-drink-vending.machine
'vending machine for soft drinks'
- b. ZELF-doe-project-blog-foto
self-do-project-blog-picture
'picture on a blog on projects one can do oneself'

²⁹ When the root *lei* occurs as a verb, it is followed by a *d*: *zij leiden* 'they guide'. D-deletion and schwa-deletion occur regularly in root primary compounds (see de Haas and Trommelen 1993:410). Presumably, the schwa and the *d* are not part of the root. They are rather inserted in non-root contexts. Hence, deletion may be a misnomer.

Thirdly, as can be deduced from the examples in (56) they can contain any number of roots, although examples with many roots, such as the one with six roots in (56)f, may be more difficult to parse. Fourthly, there is never any intervening material in between any of the roots³⁰. Fifthly, the compound can contain stored combinations of roots. They can merge with newly formed combinations within one compound. The compounds in (56) contain the fixed combinations in (58). The letters of the examples correspond to the letters of the examples in (56) in which these combinations are contained.

- (58) a. fris-drank
fresh-drink
'soft drink'
- b. verjaar-dag
celebrate.one's.birthday-day
'birthday'
- c. speel-tuin
play-garden
'playground'
- d. schuif-deur
slide-door
'sliding door'
- d.' klee-kast
slide-door-cloth-closet
'wardrobe with a sliding door/sliding doors'
- f. lei-band
guide-band
'leash'

Sixthly and finally, roots cluster interpretationally. They thereby observe the following patterns. Adjacent roots are clustered together. For example, (59)a and (59)b are both commonly attested compounds. Note that they are both assigned a listed meaning. The newly formed compound in (59)c only allows an interpretation which clusters adjacent roots.

- (59) a. teddy-beer
teddy-bear
'teddy bear'
- b. was-beer
wash-bear
'raccoon'
- c. was-teddy-beer
wash-teddy-bear
'teddy bear which can be washed'
* 'teddy raccoon'

³⁰ Marginally and unproductively, one can find examples with an intervening *-s-*: *kreeft-s-keer-kring* 'lobster-s-turn-circle' (tropic of Cancer). In this case, the intervening *-s-* is not an instance of a so-called linking phoneme one can find in nominal primary compounds. (The linking phoneme in nominal primary compounds for the root *kreeft* is *-en-*: *kreeft-en-soep* 'lobster-LP-soup'.) I think the *-s-* is a remnant of a compounding procedure which was active in an earlier stage of Dutch. Other examples are *drie-trap-s-ruket* 'three-stage-S-rocket' (three stage rocket), *verjaar-dag-s-feest* 'celebrate.one's.birthday-day-S-party' (birthday party). It can be found in bipartite root primary compounds as well: *hart-s-geheim* 'heart-S-secret' (secret of the heart).

Fixed³¹ combinations are invariably recognized as belonging together and are interpreted as such. For example, the lexicalized combinations in (58)d and (58)d' are recognized in (60) and interpreted accordingly.

- (60) a. [[schuif-deur]-[kleer-kast]]
slide-door-cloth-closet
'wardrobe with a sliding door/sliding doors'

Finally, in the absence of fixed combinations, the most left-hand parts are clustered, as is shown in (61).

- (61) [[[zelf-doe]-project]-blog]-foto]
self-do-project-blog-picture
'picture on a blog on projects one can do oneself'

However, this effect is rather weak. It is overridden immediately if another clustering pattern makes more sense. For example, (62) is more likely to be interpreted as (62)a and not as (62)b, even though (62)b is not excluded. The example in (62) differs from the one in (59) as *zoekhond* 'search dog' is not a listed combination. For example, it cannot be found in common dictionaries of Dutch (such as *van Dale* or *Woordenboek der Nederlandsche Taal*), unlike *wasbeer* 'raccoon'.

- (62) a. [lawine-[zoek-hond]]
avalanche-search-dog
'search dog which works on avalanches'
- b. [[lawine-zoek]-hond]
avalanche-search-dog
'dog which has to find avalanches'

Combining these principles, an endless combinations of clusters belong to the hypothetical possibilities, as is illustrated in (63).

- (63) a. [[frisdrank]automaat]
fresh-drink-vending.machine
'vending machine for soft drinks'
- b. [binnen[speeltuin]]
inside-play-garden
'indoor playground'
- c. [[schuif-deur]-[kleer-kast]]
slide-door-cloth-closet
'wardrobe with a sliding door/sliding doors'
- d. [[[zelf-doe]-project]-blog]-foto]
self-do-project-blog-picture
'picture on a blog on projects one can do oneself'
- e. [[[lawine-[zoek-hond]]-[lei-band]]-doos]
avalanche-search-dog-guide-band-box
'box to store the leash of an avalanche search dog'

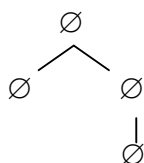
³¹ A fixed, listed or lexicalized combination is a combination which is recognized by the speech community as a stored combination. As a result, it can often be found in dictionaries. Fixed combinations may be idiomatic, but this is not necessarily the case (see De Belder and Van Koppen 2012 for discussion).

In sum, the interpretational clustering of roots in recursive root primary compounds is rather loose from a structural point of view. The only structural property which is respected is adjacency. An interpretation based on the order of the roots is easily overridden by the recognition of listed combinations and something as trivial as world knowledge. I will come back to this observation in the next section.

7.3 The structure of recursive root primary compounds and idiomaticity

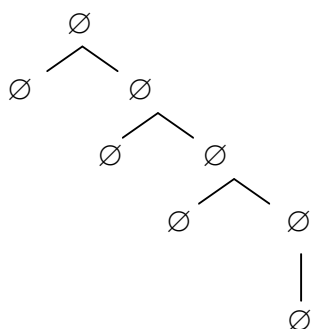
More than two roots can merge in a syntactic structure as the merger of roots can be applied recursively if needed. If yet another root is merged to the structure in (64), it will not merge with an empty set, but with sets containing empty sets.

(64)



This allows us to derive recursive root primary compounds. Adhering to the idea that root primary compounds contain nothing but roots, we can immediately derive a structure which hosts more than two roots. A structure containing four roots, for example, is given in (65).

(65)



In what follows I propose to adopt this structure even if the root primary compound contains idiomatic subunits. We have seen in section 7.2 that root primary compounds indeed may contain clusters of roots which are idiomatic wholes. Yet another example is given in (66).

(66) bruin-vis-baar-moeder
brown-fish-give.birth-mother
'womb of a porpoise'

(67) bruin-vis
brown-fish
'porpoise'

(68) baar-moeder
give.birth-mother
'womb'

The example in (66) contains the idioms in (67) and (68). (68) is fully idiomatic, as a *bruinvis* is neither brown or a fish. One might expect that such idiomatic parts form a constituent structurally, as is the case for sentential idioms. Marantz (1984) shows that idioms are constituents. He observes that English has countless object idioms, i.e. combinations of a verb and an object with an unusual semantics as in (69), whereas subject idioms that are not full

phrasal idioms do not seem to exist. The only subject idioms that can be found are full clauses, in which case the direct object is also part of the idiom, see (70) (Marantz 1984:27).

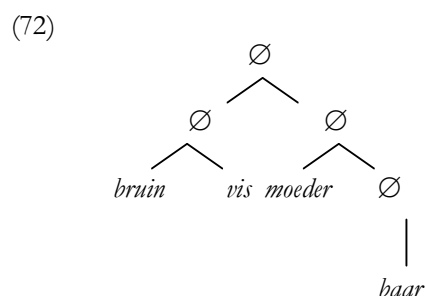
- (69) a. The chair / the pen / the book / the laptop gathered dust.
b. Mary / Anna / the surgeons / the butterfly kissed the dust.

- (70) a. The shit hits the fan.
b. The dust settles.

Marantz concludes that it is a general principle that idioms should not contain gaps in their syntactic representation. They are full constituents. If we further assume that idiomaticity is a unified phenomenon and that there is no crucial difference between idiomaticity at the sentence level and the word level (see Marantz 1997), we might hypothesize that (66) contains the idiomatic constituent *bruinvis*, i.e. the non-head, in a specifier, parallel to the sentential idiomatic effect in the subject DP in (71).

- (71) Het vlijtig liesje bloeit.
the busy Lizzie blooms
'The busy Lizzie is blooming.'

When it comes to subject DPs, De Belder & van Craenenbroeck (2011) propose that they are created in a separate workspace. This separately constructed structure is added as an opaque ordered feature set to the numeration. As such, it can be merged into the subject position of the sentence. One could argue for a similar procedure for idioms in recursive root primary compounds. One could postulate that idiomatic subparts are first created separately and merged into the compound's main spine as opaque subunits. This hypothetical possibility is illustrated in (72). For ease of exposition, I present the structure with inserted vocabulary items.



However, such a line of reasoning may not be on the right track for reasons I will discuss below. Note that there is a conceptual difference between, for example, a subject DP and an idiomatic root primary compound which is part of a recursive root primary compound. The subject DP will consist of a root which merges with functional projections. The root and its functional projections merge with one another in a single workspace.³² This single workspace is an opaque domain. Root primary compounds differ in this respect. Recall that each root is the start of a new derivation (and see De Belder & van Craenenbroeck 2011). Hence, if two roots merge, two different workspaces will have merged. As a result, for root primary compounds, we do not expect opacity per constituent, we expect opacity per root.

The fact that each root should behave as a unit on its own is not reflected interpretationally, but there is a phonological effect which may correspond to this theoretical postulate. First consider that from a semantic point of view, one does not find opacity per root. We have seen many examples in which roots cluster with other roots interpretationally in recursive root compounds, as in (73) (see also section 7.2).

³² For ease of exposition, I am ignoring the possibility of merging an adjective in a DP.

- (73) [[bruin-vis]-[baar-moeder]]
brown-fish-give.birth-mother
'womb of a porpoise'

Phonologically, however, we do find evidence that each root in a root primary compound stands on its own. For example, roots invariably induce a phonological word-boundary, resulting in final devoicing. This is illustrated in the examples below. (74) shows that the final phoneme of the root *zwerv* 'wander' is underlyingly a voiced /v/. (75) illustrates that in a root primary compound it is devoiced into an /f/.

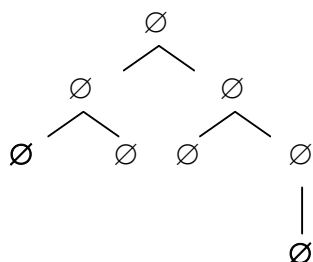
- (74) Ze zwerv-en.
they wander-PL
'They are wandering.'

- (75) zwerf-afval
wander-waste
'street litter'

Final devoicing takes place regularly in the domain of root primary compounds. Each single root induces a phonological word boundary. It is thus absolutely not the case that final devoicing is only restricted to non-idiomatic root primary compound, as one might expect if idiomatic clusters were derived as a whole.

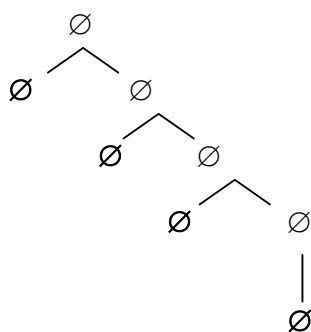
Stress patterns further support the idea that idiomatic subparts of recursive root primary compounds differ from subject DPs. Needless to say, subject DPs show DP stress in Dutch. Formulated more generally, separately derived opaque structure reflect the stress pattern which is associated with this constituent. Similarly, if idiomatic subparts of recursive root primary compounds were derived as separate root primary compounds, they should have compound stress, which should be present as (secondary) stress in the recursive root primary compound. This possibility is shown in (76). In this example the compound in the specifier is built separately and bears compound stress, which is assigned to the most left-hand part of the compound in Dutch. The lowest root in the structure, which will be the compound's most left-hand part, will be assigned primary stress in the compound. Stress is represented in boldface.

- (76)



If, on the other hand, these idiomatic subparts do not coincide with subcompounds structurally, but rather with a random subpart of the spine in (77), we expect each root to be as eligible for secondary stress as any other root. In this case, stress is not expected to reflect the interpretational clusters.

(77)



A full exposition on Dutch stress patterns will take us too far afield. Yet, note that Dutch is a trochaic language. In order to filter out the effect that stress will spread in the recursive root primary compound trochaically, I will select roots which are trochees themselves, as in (78).

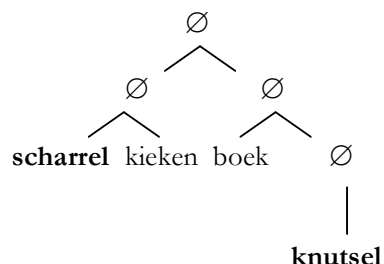
- (78) [[scharrel-kieken]-[knutsel-boek]]
scratch-chicken-do.crafts-book
'book on doing crafts related to free-range chickens'

Example (78) contains two interpretational clusters, as can be deduced from (79).

- (79) scharrel-kieken³³
scratch-chicken
'free-range chicken'
- (80) knutsel-boek
do.crafts-book
'book on doing crafts'

We know independently that primary stress will fall on the most left-hand part of the recursive root primary compound, as this part gets compound stress. Secondary stress is more interesting, though. If secondary stress reflects idiomatic subunits, we expect it to fall on the left-hand part of each interpretational cluster, as in (81). In (81)b small caps indicate primary stress, underlining represents secondary stress. I indicate stress on the syllable which bears it. The square brackets delineate interpretational clusters.

- (81) a.

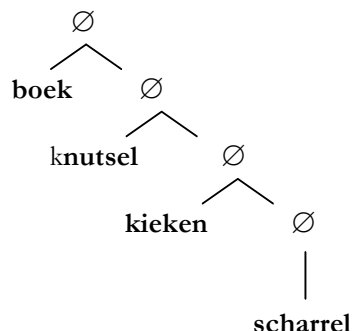


- b. [[SCHArrel-kieken]-[knutsel-boek]]
scratch-chicken-do.crafts-book
'book on doing crafts related to free-range chickens'

³³ I used the substandard word *kieken* 'chicken' instead of Standard Dutch *kip* 'chicken' as the substandard form is a trochee.

If interpretational clusters do not correspond to constituents, we expect each root to be an eligible candidate for secondary stress, as in (82).

(82) a.



b. [[SCHARrel-kieken]-[knutsel-boek]]

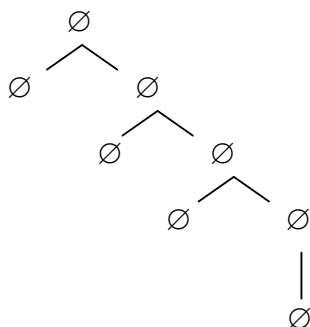
scratch-chicken-do.crafts-book

‘book on doing crafts related to free-range chickens’

The stress pattern in (82) corresponds to what is attested empirically. Each root is assigned secondary stress independently, despite the presence of interpretational clusters. Secondary stress thus ignores interpretational clusters and instead treats each single root as a relevant unit. This is fully compatible with the observation that each root induces a word-boundary in a root primary compound. Even though a single root may not be an interpretational unit in the (recursive) root primary compound, it surely is a phonological unit.

From the phonological observations above, I conclude that all recursive root primary compounds are instances of the recursive structure in (83) (needless to say, the number of roots may differ per compound).

(83)



The structure thus does not contain any constituents which coincide with idiomatic subunits. The consequence is that idiomatic or listed meaning in root primary compounds differs from idiomatic meaning in the sentential domain, which obligatorily coincides with constituency.

The idea that word idiomaticity might differ from sentential idiomaticity has been proposed by Borer (2013, to appear). She argues that word idiomaticity is based on the absence of functional heads.³⁴ Word idioms cannot contain any functional heads as they block En-search. En-search is a content assigning operation which relies on stored meaning in a list called Encyclopedia. It operates on phonologically realized structures. What is relevant for the discussion at hand is that only the merger of a functional head blocks idiomaticity. For recursive root primary compounds it now follows that idiomaticity is not blocked at any point. The fact that this domain may contain idiomaticity follows immediately from this proposal. However, what does not follow immediately is the fact that idiomaticity does not respect constituency in

³⁴ She argues that plural marking and aspectual heads are exceptions to this generalization.

recursive root primary compounds³⁵. Morphologically complex words containing derivational morphology cannot contain comparable constituency gaps. Consider the example in (84).

- (84) heer-schap-ij-achtig-heid
 lord-schap-ij-achtig-heid
 ‘suzerainty-like-ness’

The example contains the idiom which is given in (85). The idiom consists of a root and two following suffixes. The fact that the two suffixes are contained in the idiom can be deduced from the fact that the meaning of (85) is not related to the meaning of (86).

- (85) heer-schap-ij
 lord-schap-ij
 ‘suzerainty’
- (86) heer-schap
 lord-schap
 ‘man (pejorative)’

It is thus perfectly possible for a derived word-form to contain an idiom. On top of this idiom one may even add more affixes, as is the case in (84). What is unattested, however, is a situation in which these higher suffixes form an idiomatic combination on their own: *-achtig* and *-heid* cannot form an idiom independently. One might interpret these data in two ways. One may conclude that idiomaticity follows constituency. This conclusion is the common one. If we adopt this conclusion, we expect idiomatic clusters in recursive root primary compounds not to occur, contrary to fact. Alternatively, one may conclude that a word idiom should start from a root. This conclusion equally excludes idiomatic meaning for a combination of two derivational affixes which does not include a root, a desirable result. However, it freely allows recursive root primary compounds to contain idiomatic clusters. We have now arrived at two conclusions regarding word idioms:

- (87) a. Functional projections block en-search (Borer 2013, to appear)
 b. Word idioms start from a root.

We have seen in section 7.2 that if a cluster of roots can be assigned a stored meaning, it will be assigned a stored meaning. Only in the absence of listed meaning the combination of roots will be interpreted in a creative way. Finally, a combination of roots in a root primary compound will refer to a single concept. We now have all the ingredients to derive meaning assignment to recursive root primary compounds:

- (88) a. Functional projections block En-search (Borer 2013, to appear)
 b. Word idioms start from a root.
 c. En-search favors listed meaning and clusters roots accordingly. If no listed meaning is available for the entire structure as a whole, an *ad hoc* interpretation will be construed on the basis of the structural order of the (idiomatic clusters of) roots. The rightmost root is interpreted as the head.
 d. If a root projects³⁶, the structure which it contains refers to a single concept.

These principles allow En-search to derive the meaning of (89).

³⁵ Borer (2013:chapter 10, page 22) assumes en-search respects constituency structure.

³⁶ Recall that roots only project if a root merges with a root (see section 6). As such, only direct mergers of roots are subject to this principle.

- (89) bruin-vis-baar-moeder
brown-fish-give.birth-mother
'womb of a porpoise'

The structure of a recursive root primary compound does not contain any intervening functional heads. As such, the entire structure can be subject to En-search. As was noted above, (89) contains two idioms, viz. (90) and (91).

- (90) bruin-vis
brown-fish
'porpoise'
- (91) baar-moeder
give.birth-mother
'womb'

En-search will recognize these idiomatic parts and will assign them their idiomatic meaning. It is not a problem that even though the structure is one constituent structurally, it contains two idioms. Word idioms may start from any root. Given the last principle, these idioms should refer together to a single concept. The right-hand part is the head and the order of the idioms is respected, resulting in the interpretation that (89) refers to the womb of a porpoise.

7.4 Conclusion

In this section I have argued that the structure of a root primary compound consists of nothing but roots which have merged directly with one another, regardless whether the compound contains two or more roots. If there are more than two roots, each subpart of the structure may be idiomatic, as idioms in this domain are not necessarily constituents. Word idiomaticity is thus derived in a different way than sentential idiomaticity (Borer 2013, to appear). More generally, a domain which only consists of lexical projections behaves differently than a phrase which contains functional heads. Root primary compounds are an ideal testing ground to study the behavior of lexical projections.

8. Conclusion

In this article I have supported the thesis that a lexical projection starts from a root by presenting a subtype of Dutch primary compounds which I called root primary compounds. The non-head of these compounds can be associated with any category. In fact, it seems to be category-free. I further showed that root primary compounds do not allow any intervening functional heads, such as gender marking or number marking. This holds even if it could be argued that the functional head is lexically selected by the root, which is clearly the case for gender marking and for number marking in pluralia tantum. It even holds despite the fact that these heads are obligatorily present on the noun in a DP. I then demonstrated that the non-head in root compounds is not followed by a lexical categorial head, i.e. a little head, either. I concluded that it is a bare root. This view is supported by the fact that the non-heads of root compounds can be coordinated, even if they are associated with different categories. It further captures why the categorial nature of the non-head is unrestrained; its structure does not contain any material which would categorize it. In sum, in this article I have shown that one can find examples of primary compounds of which the non-head is a bare root. As such, this article fills a gap by providing empirical support for a theoretical prediction of root-based frameworks. As such, it contributes to the claim that the most minimal lexical projection is a category-free root. It further entails that roots occupy a slot in the structure and that they do not depend on the presence of functional or categorial heads in order to be interpreted or to be realized.

Given that the non-head of root primary compounds are bare roots we now consist of an empirical testing ground to study the behavior of lexical projections. I have shown that this syntactic context can be used to determine whether a form is morphologically complex or not. If it can occur as the non-head of a root primary compound, i.e. as a root, it is necessarily morphologically simplex. I have further studied recursive root primary compounds in which clusters of roots can be found which are mapped to stored meaning. These clusters are not necessarily constituents, unlike sentential idioms. Idiomaticity thus behaves differently in a purely lexical domain, a conclusion we have arrived at now we have access to a strict lexical domain.

In short, in this article I have shown that there is a syntactic domain which consists of nothing but bare roots. It supports the hypothesis that the most minimal lexical projection is a root and it allows us to study lexical projections in the absence of functional projections.

Acknowledgements

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References

- Acquaviva, Paolo (2008) *Lexical Plurals: A Morphosemantic Approach*. Oxford: Oxford University Press.
- Bilderdijk, Willem (1826) *Nederlandsche Spraakleer*. Den Haag: J. Immerzeel Junior.
- Booij, Geert (2001) *The morphology of Dutch*. Oxford: Oxford University Press.
- Borer, Hagit (2005) *In name only. Structuring Sense Volume I*. Oxford: Oxford University Press.
- Borer, Hagit (2009) Compounds: the view from Hebrew. In Lieber, R. & P. Štekauer (eds.) *The Oxford handbook of compounding*. Oxford: Oxford University Press.
- Borer, Hagit (2013) *Taking Form. Structuring Sense Volume III*. Oxford: Oxford University Press.
- Borer, Hagit (to appear) The syntactic domain of content. In Becker, M. et al. (eds.) *Generative linguistics and acquisition: Studies in honor of Nina M. Hyams*. Philadelphia: Benjamins.
- Chomsky, Noam (1959) A review of B. F. Skinner's "Verbal behavior". *Language* 35, pp.26-58.
- Chomsky, Noam (1995) *The Minimalist Program*. Cambridge, MA: The MIT Press.
- de Haas, Wim & Mieke Trommelen (1993) *Morfologisch handboek van het Nederlands: een overzicht van de woordvorming*. 's-Gravenhage: SDU Uitgeverij.
- De Belder, Marijke and Jeroen van Craenenbroeck (2011) *How to merge a root*. Utrecht University & HUBrussel, ms.
- De Belder, Marijke and Jeroen van Craenenbroeck (2013) *On vocabulary insertion*. HUBrussel, ms.
- De Belder, Marijke and Marjo van Koppen (2012) *On AN(N) compounds*. Talk presented at BCGL7, Brussels, December 17-18, 2012.
- De Belder, Marijke (2011) *Roots and Affixes. Eliminating lexical categories from syntax*. Utrecht: LOT.
- De Belder, Marijke (2013) Linking phonemes are class markers. Talk presented at TIN-dag, Utrecht, February 9, 2013.
- Don, Jan (2009) IE, Germanic: Dutch. In Lieber, R. & P. Štekauer (eds.) *The Oxford handbook of compounding*. Oxford: OUP.
- Embick, David & Alec Marantz (2008) Architecture & blocking. *Linguistic Inquiry* 39(1): 1-53.
- Embick, David & Rolf Noyer (2001) Movement Operations after Syntax. *Linguistic Inquiry* 32(4): 555-595.
- Giorgi, Alessandra, & Fabio Pianesi (1997). *Tense and aspect: From semantics to morphosyntax*. Oxford: Oxford University Press.
- Guimarães, Maximiliano (2000) *In defense of vacuous projections in Bare Phrase Structure*. University of Maryland Working Papers in Linguistics, vol.9: 90-115.
- Haegeman, Liliane (2000) Gender and word markers in West-Flemish. Ms., Université de Lille
- Haeseryn et al. (1997) *Algemene Nederlandse Spraakkunst*. Groningen: Martinus Nijhoff Uitgevers.
- Halle, Morris & Alec Marantz (1993) Distributed Morphology and the pieces of inflection. In: Hale, Kenneth & Samuel Jay Keyser (eds.) *The view from building 20*. Cambridge: MIT Press, 111-176.

- Harley, Heidi & Rolf Noyer (1999) State-of-the-Article: Distributed Morphology. *Glott International* 4.4: 3-9.
- Harley, Heidi (2009) Compounding in DM. In Lieber, R. & P. Štekauer (eds.) *The Oxford handbook of compounding*. Oxford: OUP.
- Harley, Heidi (2012) Semantics in Distributed Morphology. In C. Maienborn, K. von Stechow and P. Portner (eds.) *Semantics: An International Handbook of Natural Language Meaning*, vol.3. Berlin: Mouton de Gruyter.
- Kayne (2009) Antisymmetry and the Lexicon. In: Van Craenenbroeck, Jeroen (ed.) *The Linguistic Variation Yearbook 2008*. Amsterdam: John Benjamins Publishing, 1-32
- Lowenstamm, Jean (2007) On little n, √, and types of nouns. In: Hartmann, J. et al. (eds.) *The sounds of silence: empty elements in syntax and phonology*. Amsterdam: Elsevier.
- Marantz, Alec (1984) *On the nature of grammatical relations*. Cambridge, MA: The MIT Press.
- Marantz, Alec (1997) No escape from syntax: Don't try morphological analysis in the privacy of your own lexicon. In: Dimitriadis, Alexis et al. (eds.) *Proceedings of the 21st Annual Penn Linguistics Colloquium: Penn Working Papers in Linguistics 4.2*, 201-225.
- Neijt, Anneke and Robert Schreuder (2009) De rol van *en* en *s* in samenstellingen. Veranderend Nederlands verandert gedachten over het taalsysteem. In Boogaert, R. et al. (eds.) *Woorden wisselen*. Leiden: Stichting Neerlandistiek Leiden, pp. 93-104.
- No author / no date. *Oudnederlands Woordenboek*. Leiden: Instituut voor Nederlandse Lexicologie.
- No author / no date. *Woordenboek der Nederlandsche Taal*. Leiden: Instituut voor Nederlandse Lexicologie.
- No author / no date. *Dikke Van Dale*. Online woordenboek Antwerpen: Van Dale Uitgevers.
- Partee, Barbara, Alice Ter Meulen & Robert Wall (1987) *Mathematical methods in linguistics*. Dordrecht: Kluwer Academic Publishers.
- Ramchand, Gillian (2008) *Verb meaning and the lexicon*. Cambridge: Cambridge University Press.
- Ruissen, Marion (2011) *Oudnederlandse woordvorming. Een overzicht van Oudnederlandse afleidingen, samenstellingen, leenwoorden en leenvertalingen uit de Wachtendonckse Psalmen, vergeleken met hun Latijnse tegenhangers*. Universiteit Gent, master thesis.
- Schoorlemmer, Erik (2009) *Agreement, dominance and doubling. The morphosyntax of DP*. Doctoral Dissertation, Leiden University.
- Selkirk, Elisabeth (1982) *The syntax of words*. Cambridge(MA): The MIT Press.
- Starke, Michal (2009) Nanosyntax - a short primer to a new approach to language. *Nordlyd* 36:1, 1-6.
- Tiel, Bob van, Margit Rem and Anneke Neijt (2011) De historische ontwikkeling van de tussenklank in Nederlandse nominale samenstellingen. *Nederlandse Taalkunde* 16:2, pp.120-140.