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, such as the Exoskeletal Model (Borer 2009, 2013:chapter6, to appear) or Distributed Morphology (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 acategorial. It does not contain categorial heads (i.e. little heads) and neither is it categorized otherwise. As such, the discussion substantiates the root-hypothesis (Halle and Marantz 1993, Borer 2005a,b,2013) and it supports the view that the root does not need to be licensed by superstructure in order to be interpretable or realizable (cf. Alexiadou & Lohndal 2013, pace Arad 2003, Marantz 2000, Ramchand 2008, Starke 2009).

1. Introduction

A derivation typically consists of functional structure that merged on top of a root. As a result, roots are rarely attested in the absence of functional projections. For example, the DP in (1) only enables us to observe a root that 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 compound[1] might be a unique syntactic domain. There is no obvious reason why such a non-head should necessarily merge with any functional structure. Hypothetically, it is therefore possible that the non-head *straat* 'street' in (2) is a bare root.

(2) straat-kat
street-cat
'street cat'

The non-head of the compound in (2) now becomes a position which can be used to determine the theoretical status of roots. If one proposes that the core of a lexical head consists of nothing but an acategorial root, as in Distributed Morphology (Halle and Marantz 1993) or as in the Exoskeletal Model (Borer 2005a,b, 2013), one expects the existence of compounds of which the non-head consists of nothing else than a root terminal node. After all, it is the most parsimonious structure imaginable for the non-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 nominal 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 successful in deriving categorial restrictions on the compound's non-head. There are

[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.

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 AN VN PN

NA AA PA

PV

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.[2] Borer (2013, to appear) proposes a Compound Frame, i.e. a specific structure, which renders the non-head equivalent to a noun.[3] 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 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 root-hypothesis.

The theoretical consequences of this article are not limited to evidence in favor of the root-hypothesis. Crucially, it does not only argue in favor of roots, it also emphasizes on the fact that this root can be bare. Consequently, a root can occupy a position that does not depend on categorial or functional heads to be interpretable or

[2] She further proposes that the root incorporates into this head.

[3] The equivalence should be understood distributionally.

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 Arad 2003, Marantz 2000, Harley 2012, see Alexiadou and Lohndal 2013 for an opposing view). The root in the non-head of a Dutch root primary compound does not merge with a categorial head, yet the compound is interpretable.[4] It is equally problematic for frameworks which claim that roots merge high in the structure as a modifier of functional structure (Harley 2005, Den Dikken 2008, Alexiadou and Lohndal 2013) or that they 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.

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 that invariably nominalizes the root in 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 categorial heads, in section 4 I present counter-evidence against the assumption that the non-head of this second compounding type is nominalized. In section 5 I discuss the derivation of root primary compounds. Section 6 concludes.

[4] It still holds that roots need to be embedded in a structure in order to be interpretable. What is sent to Encyclopedia for interpretation are not loose vocabulary item. It is rather a structure in which vocabulary items have been inserted. It will become clear that in the present approach the structure that is sent to Encyclopedia is the morphological structure (i.e. the syntactic structure which has been altered by Morphology, a post-syntactic module), see section 5.2 and footnote 47.

2. Two types of primary compounding in Dutch

In this section I argue that there are two different types of primary compounds in Dutch.[5] They can be distinguished empirically and historically. It will become clear that a first type invariably contains a root that is nominalized by means of nominal functional material as its non-head. The non-head of the second type, on the other hand, does not need to be co-extensive with a noun.[6] This type will be analyzed in detail in the present article. I will demonstrate that its non-head is invariably a bare 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	b. bakker-s-winkel	c. kat-en-luik	d. peer-en-boom
pig-LP[7]-pen	baker-LP-store	cat-LP-panel	pear-LP-tree
'pig's pen'	'bakery'	'cat door'	'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.[8] This type of compounding has been attested in Dutch since the

[5] 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-heads which are not co-extensive with nouns as well.

[6] Most approaches to Dutch morphology sort compounds according to the (assumed) category of the non-head (see, for example, de Haas and Trommelen 1993 and Don 2009). As a result, they distinguish more than two types.

[7] LP = linking phoneme

[8] Neijt et al. (2002) and Neijt (2003) have found that prosody may influence the choice of the linking phoneme as well.

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 phoneme[9] 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). In the remainder of this article I will mainly ignore this type of compounding. I will only discuss it in contrast with the second type. When I do refer to these compounds I will call them nominal primary compounds or NPCs, 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. Some examples are given below.

(5) a. kleer-kast
cloth-closet
'wardrobe'

b. speur-hond
track-dog
'tracking dog'

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'[10]

h. niet-verjaardag
not-birthday
'unbirthday'

i. frrrpl-geluidje
frrrpl-sound
'*frrrpl* sound'

j. rimmel-rijst
rimmel-rice
'*rimmel* rice'[11]

[9] The term *linking phoneme* is thus a misnomer.

[10] The OR gate is a digital logic gate that implements logical disjunction.

[11] *Rimmelrijst* is a nonsense word from the poem *Blauwbilgorgel* (Cees Buddingh', 1943)

It will become clear that the non-head of this type is invariably directly adjacent to the head, without any intervening material and that it does not need to be co-extensive with an existing noun (see sections 3 and 4 for careful discussion).

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 texts 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 b. frīt-hof c. hēt-muodi d. ēn-gimi
cow-smear enclose-garden hot-mood one-winter
'butter' 'atrium' 'anger' 'an one year old animal'

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-moeder[12]
buy-mother
'woman who receives a child from a surrogate mother'

[12] This example was added to *van Dale* dictionary in 2009.

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 meaning of the compound as a whole may be clearly related to the meaning of its subparts, as in (9)a, or the compound may be fully idiomatic, as in (9)b.[13]

(9) a. lees-moeder

read-mother

'mother who is a volunteer reading helper / a mother who reads a lot / a mother to whom you can read a lot / …'

b. baar-moeder

give.birth[14]-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.[15] I will therefore refer to this type of primary compounds as root primary compounds or RPCs.

[13] Of course, all idiomatic compounds may be interpreted literally as well.

[14] 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.

[15] Such an analysis has been pursued for root compounds with an adjectival non-head by De Belder and Van Koppen (2012). They show that for a specific subtype of AN(N) compounding the alleged A lacks all adjectival properties. As such, it contrasts with compounds which contain a genuine AN-phrase as their non-head. For the first type the alleged A remains uninflected and resists degree modification. The compound is assigned compounding stress. They conclude the alleged A is a root. For the second type they show that the A is inflected and can select degree modification. The AN non-head is assigned DP stress. They conclude the non-head of this type is a partial NP.

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 that 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 root-hypothesis.

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

3.1 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 v° or a°, before merging with the head (cf. Harley 2009). I point out that the presence of overt categorial heads leads to ungrammaticality. I assume late insertion of vocabulary items (Halle and Marantz 1993). 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 that seem to contain an overt verbal suffix. 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.

This section only contains a discussion of v° and a°, excluding n°. Recall that RPCs 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.[16] I will therefore postpone the discussion on nominal categorial heads till section 4 and I will restrict the discussion in this section to verbal and adjectival heads.

3.2 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). In this section I argue against the assumption that the non-head of a root primary compound merges with a null categorial head.[17]

Let us assume that RPCs actually contained a null categorial head, as in (10).

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

If the representations in (10) were correct, we predict that *overt* categorial heads can be present in RPCs as well. After all, null categorial heads and overt categorial heads are only distinguished at PF given late insertion. Structurally, they are identical. However, this prediction is not borne out. The compounds in (11) and (12) are highly degraded to say the least (see footnote 20), despite the fact that compounding is

[16] 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 (see section 4.4.4 for careful discussion).

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

highly productive in Dutch. (11) shows RPCs with intervening overt adjectival suffixes,[18] (12) shows examples with verbalizing affixes.[19] I made sure that the morphologically complex adjectives and verbs in the non-heads are common and acceptable words when occurring independently.[20]

(11) a. * spaar-zaam-attitude

save-ADJECTIVAL SUFFIX-attitude

b. * eet-baar-datum

eat-ADJECTIVAL SUFFIX-date

[18] Dutch affixes cannot be translated straightforwardly into English.

[19] 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.

[20] An anonymous reviewer, who is clearly a native speaker of Dutch, doubted whether the prefixes *ont-* and *be-* indeed give rise to ungrammaticality if they are contained in the non-head of a RPC. I have therefore tested twelve neologisms in a questionnaire. The questionnaire contained 18 fillers. Each new compound was introduced by means of a context of which the purpose was to make its use plausible from a pragmatic point of view. I asked the informants whether they could imagine a native speaker of Dutch would use the compound. The questionnaire was responded to by 509 native speakers of Dutch. The scale was a five-point scale with 1 being the score for utter ungrammaticality and 5 being the score for complete grammaticality. Yet, the scale was not represented by means of numbers to the informants, but by means of paraphrases of judgments ('sounds very strange' (1), 'sounds rather strange' (2), 'I am not sure' (3), 'sounds more or less OK' (4), 'sounds completely normal' (5)). The average score of the twelve test items was 2,6 on a scale of 1 to 5. I conclude the compounds are far from fully acceptable. Admittedly, the compounds improve if the verb contained in the non-head is part of common Dutch vocabulary and if the root is a trochee, thus improving the rhythm of the compound. The test item *be-tegel-ploeg* 'BE-tile-team' (tiling team, i.e. team which is responsible for tiling), for example, scored 3,3/5 as *betegelen* 'to tile' is a common Dutch verb and *tegel* is a trochee. For the same reasons, *ont-wortel-ploeg* 'ONT-root-team' (team responsible for removing roots of trees) even scored 3,8/5. As such, it was the test item with the highest score. Note that even the best test item on average still does not sound more or less OK to native speakers of Dutch. Note further that the mere fact that rhythm is relevant to these examples (and not to regular RPCs) indicates they are marked.

c. * vet-ig-dieet

fat-ADJECTIVAL SUFFIX-diet

(12) a. *? be-plant-seizoen

VERBAL SUFFIX-plant-season

b. *? menstru-eer-pijn

menstru-VERBAL SUFFIX-pain

c. *? ont-vlam-tijd

INCHOATIVE VERBAL SUFFIX -flame-time

Note that the illicitness is not due to the fact that newly formed RPCs are impossible words. Compounding is highly productive and the formations in (13), for example, are fully acceptable.

(13) a. spaar-attitude b. eet-datum c. vet-dieet

save-attitude eat-date fat-diet

'attitude towards saving' 'eating date'[21] 'diet based on fat'

Admittedly, the illicitness of the examples in (11) and (12) 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 (10) as well. After all, the examples in (10), (11) and (12) are structurally identical.[22] I conclude that the representations in (10) are wrong. RPCs do not contain an intervening null categorial head.

[21] The compounds are acceptable, even though it may not be very clear what they might refer to.

[22] 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.

3.3 Apparent counterexamples

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

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

(14) a. Het Belgische leger ver-vlaams-t.
the Belgian army VER-Flemish-3SG
'The Belgian army becomes more Flemish.'

b. De kat ver-dik-t.
the cat VER-thick-3SG
'The cat is fattening.'

(15) a. Oude honing ver-suiker-t.
old honey VER-sugar-3SG
'Old honey crystallizes.'

b. De relatie ver-water-t.
the relation VER-water-3SG
'The relationship is fizzling out.'

(16) 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.'

(17) 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
'Mary is twisting the truth.'

In (14) the verb with *ver-* refers to an increasing degree. The predicate the degree refers to is expressed by the root. In (15) the verb with *ver-* can be paraphrased as 'grow into the predicate expressed by the root'. The meaning may be metaphoric. In (16) *ver-* indicates that the direct object is wasted by doing the event expressed by the

root. Finally, in (17) *ver-* expresses that the result of the event the root refers to is undesirable.

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 unacceptability (see footnote 20). This can be deduced from the examples below.

(18) a. *? ver-dik-probleem
VER-thick-problem

b. *? ver-vlaams-tendens
VER-Flemish-tendency

(19) a. *? ver-suiker-honing
VER-sugar-honey

b. *? ver-water-relatie
VER-water-relation

(20) a. *? ver-slaap-tijd
VER-sleep-time

b. *? ver-gok-geld
VER-gamble-money

(21) a. *? ver-slaap-pech
VER-sleep-bad.luck

b. *? ver-draai-manier
VER-twist-manner

There is yet a fifth group of verbs that 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 not productive. Examples of this type are given in (22).

(22) 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. Deleerkracht vermaan-t Marie.
the teacher reprimand-3SG Mary
'The teacher reprimands Mary.'

e. Marie verdwijn-t.
Mary disappear-3SG
'Mary 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 (22)a and (22)b is probably accessible to the native speaker. In contrast, the internal structure of (22)d and (22)e has to be opaque as *maan* is archaic and peripheral and *dwijn* does not have an independent meaning in contemporary Dutch. The verb in (22)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 obscure this relation to the native speaker. However, it turns out that verbs with *ver-* belonging to the non-productive group can occur as the non-head of a root primary compound.

(23) 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 acceptability of the examples above, we have to conclude that what has been analyzed as the non-productive prefix *ver-* is actually not a prefix, but part of the root. The examples contrast with productive uses of *ver-*. The productive prefix *ver-* is

banned from the non-head of a RPC. I conclude that non-productive *ver-* does not have the status of a prefix -it is rather part of the root- unlike its productive version.

If one accepts the conclusion, we now have found an independent test 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.

The examples in (24) repeat the general observation that the affix *-eer* cannot be contained in a RPC.

(24) a. *? menstru-eer-pijn
menstru-VERBAL SUFFIX-pain

b. *? calcul-eer-programma
calcul-VERBAL SUFFIX-program

c. *? pollu-eer-niveau
poll-VERBAL SUFFIX-level

Yet, the compounds in (25) are fully acceptable.

(25) a. parkeer-garage
park-garage
'parking garage'

b. kampeer-terrein
camp-ground
'campground'

Parkeer 'park' and *kampeer* 'camp' are not the only items ending in *-eer* which can occur as the non-head of a RPC. (26) shows more examples.

(26) accentueer-stift 'marker pen', adresseer-machine 'addressing machine', arceer-lijn 'hatching line', balanceer-kunst 'balancing act', blokkeer-stift 'locking pin', calqueer-papier 'tracing paper', codeer-machine 'coding machine', defileer-mars 'parade march', doseer-dop 'dispensing cap', frankeer-zegel 'postage stamp', kalmeer-middel 'calmative' (Lit. calm-remedy), kampeer-terrein 'campground',

markeer-speld ‘marker pin’, parkeer-bon ‘parking ticket’, pikeer-mesje ‘knife for small plants’ (Lit. pick.out-knife), regeer-periode ‘period of office’ (Lit. govern-period), scalpeer-mes ‘scalping knife’, soldeer-bout ‘soldering iron’, sorteer-centrum ‘sorting center’

In order to capture the contrast between the data in (24) and the examples in (25)-(26) I propose that the non-heads in (25)-(26) are roots which simply happen to end in *-eer*, whereas the non-heads in (24) genuinely contain the verbal suffix *-eer*. In order to support this view, I will first present some properties of the verbal suffix *-eer* and I will then show that the examples in (25)-(26) do not have these properties.

First note that there surely is a verbal affix *-eer* in Dutch. Some more examples are given in (27).

(27) a. abstrah-eer-en
abstract-EER-INF
‘to abstract’

b. conserv-eer-en
preserv-EER-INF
‘to preserve’

c. oriënt-eer-en
orient-EER-INF
‘to orient’

There is little doubt it is indeed a derivational suffix and not a piece of verbal inflection, as it can precede the nominal derivational suffix *-ing*, as is shown in (28). In other words, it occurs within the derivational domain.

(28) a. abstrah-eer-ing
astract-EER-ING
‘abstraction’

b. conserv-eer-ing
preserv-EER-ING
‘preservation’

c. oriënt-eer-ing
orient-EER-ING
‘orientation’

The suffix *-eer* has some specific properties which are relevant to the discussion. Firstly, it only attaches to Latinate, bound roots. As such, it is in complementary distribution with the nominal suffix *-ie* (surfacing in various forms such as *-atie, -entie,* ..., see de Haas and Trommelen 1993) which also selects for Latinate, bound roots. This is illustrated in (29).

(29)

Verb		Noun	
abstrah-eer-en	‘to abstract’	abstrac-tie	‘abstraction’
administr-eer-en	‘to administrate’	administr-atie	‘administration’
arrest-eer-en	‘to arrest’	arrest-atie	‘arrest’
articul-eer-en	‘to articulate’	articul-atie	‘articulation’
calcul-eer-en	‘to calculate’	calcul-atie	‘calculation’
castr-eer-en	‘to castrate’	castr-atie	‘castration’
combin-eer-en	‘to combine’	combin-atie	‘combination’
communic-eer-en	‘to communicate’	communic-atie	‘communication’

Secondly, the suffix *-eer* triggers some systematic consonantal changes (De Haas and Trommelen 1993). Most notably, if the final consonant of the root contained within the noun derived by means of *-ie* surfaces as /k/, it will surface as /s/ in the verb derived by *-eer*. As a consequence, a root preceding the suffix *-eer* will never surface with a /k/ as its final consonant.

(30)

a.	publiceer	/pybli**s**er/
	publicatie	/pybli**k**asi/[23]
b.	provoceer	/provo**s**er/
	provocatie	/provo**k**asi/
c.	communiceer	/k**ɔ**myni**s**er/
	communicatie	/k**ɔ**myni**k**asi/

In sum, the verbal suffix *-eer* selects for bound, Latinate roots and as such it is in complementary distribution with the nominal suffix *-ie*. It may further trigger a

[23] The phonological transcription represents the Belgian Dutch pronunciation. Nothing hinges on this fact because there is no difference in the pronunciation of the relevant phonemes.

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consonantal change. Because of this consonantal change a root preceding *-eer* will never surface with a /k/ as its final consonant.

In the examples in (25)-(26) the properties of the suffix *-eer* cannot be recognized. Firstly, for none of the items in (26) exists a corresponding noun containing the nominal suffix *-ie*, as can be seen in (31).[24]

(31) *accentuatie, *adressatie, *arcatie, *balancatie, *blokkatie, *calquatie, *codatie, *defilatie, *dosatie, *frankatie, *kalmatie, *kampatie, *markatie, *parkatie, *pikatie, *regatie, *scalpatie, *soldatie, *sortatie

Secondly, the consonant /k/ may precede *-eer* in the examples in (32).

(32) calqueer /kɑl**k**er/, blokkeer /blɔ**k**er/, frankeer /frɑn**k**er/, markeer /mɑr**k**er/, parkeer /pɑr**k**er/, pikeer /pi**k**er/

In sum, the items in (25)-(26) do not reflect the properties of the suffix *-eer*. I therefore conclude that the examples in (25)-(26) do not contain the suffix *-eer* at all. The non-heads are simply roots. As such, it should not come as a surprise that exactly

[24] Admittedly, I did find about 10 counterexamples in Dutch dictionaries. Interestingly, they belong to jargonese (and the non-heads thus refer to a specific submeaning of the verb). Examples are *reageer-buis* 'test tube' (Lit. react-tube) (chemistry) and *separeerkamer* 'padded cell' (Lit. separate-room) (psychiatry) (versus *reactie-tijd* 'reaction time' and *separatie-angst* 'separation anxiety'). I have further found an example in which the non-head expresses a euphemism (*animeer-meisje* 'prostitute' (Lit. animate-girl). These examples support the hypothesis that jargons may have a distinct (non-natural) grammar (see Jaspers 2009 and references therein) or that otherwise complex structures may be relisted as roots if the root refers to a specific submeaning. A reviewer has further found two genuine counter-examples on Google of RPCs containing the verbal suffix *–eer*: *musiceerdagen* 'days to make music', *publiceerdrang* 'urge to publish'. Such rare counter-examples indeed seem to exist. Whether they are considered to be grammatical by all native speakers should be tested. It is clear that these data are not fully understood yet and deserve further research.

the same items may occur as the non-head of RPCs. The fact that they are morphologically simplex licenses their occurrence as non-heads in RPCs.[25]

I conclude that these observations indicate that whenever a form occurs as the non-head of a RPC, this form is morphologically simplex. Interestingly, if one adopts this conclusion RPCs can be used to determine whether a form is morphologically complex or not. As the non-head of such compounds can only contain roots, only non-derived word-forms can be attested in this syntactic context. We have seen that a form that at first sight might seem morphologically complex can still function as a root. Fewer words may be morphologically complex than has been hitherto assumed.

3.4 Conclusion

In this section I have argued that the non-head of a RPC cannot merge with a categorial head. I have 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 RPC can be used to test whether a form is morphologically complex or not.

In this section we have seen that verbal or adjectival heads are excluded from the non-head of a RPC. In the next section I address the more complex issue of nominal heads.

[25] One may wonder why the roots in the non-heads in (26) then so obviously contain the ending *-eer*. Note in this respect that most roots in (26) (except for *sorteer, frankeer,* and *scalpeer*) are borrowed from French infinitives (see *Woordenboek der Nederlandsche Taal* under each specific lemma). Hence, what one recognizes systematically is a French (or archaic French) infinitive. For each case the French infinitival marker *-eer* became part of the root, resulting in formal systematicity. One might even recognize the French root which is contained in the infinitive. For example, speakers of Dutch will recognize *adres* (address) and *kalm* (calm) which have been loaned independently.

4. The non-head of a RPC is not nominal

4.1 Introduction

In section 2 I have argued there are two types of primary compounds in Dutch, viz. nominal primary compounds and root primary compounds. Admittedly, postulating two different compounding types is not the most parsimonious starting point one can imagine. It is therefore tempting to hypothesize the two types can be reduced to a single type. In other words, one could argue that the distinction between nominal primary compounds and root primary compounds is only apparent and that there is only one type of primary compounding in Dutch. For the nominal primary compounds there is little reason to doubt we are on the right track by arguing the non-head is nominalized. It is striking that the set of licit non-heads of this type is fully congruent with the set of attested nouns in Dutch.[26] Yet, one might hypothesize the non-head of a RPC is in fact nominal, thereby postulating that all primary compounds are nominal primary compounds.

There is no overt nominalizing head in RPCs. Yet, it is not difficult to imagine a phonologically null nominalization strategy. One could postulate a zero nominalizing head, i.e. a null n° (cf. Harley 2009) or a Compound Frame which nominalizes the non-head by defining the non-head as a nominal position (Borer 2013). One could even argue a nominalization strategy is superfluous as all roots are nominal *in se* (Kayne 2009) or because the nominal category is the category which is assigned to a non-categorized root by default. As such, the absence of an overt nominalizer for RPCs does not count as a counter-argument.

[26] The term *noun* refers to a root in a nominal position, not to a lexical category.

Yet, in this section I argue that the hypothesis according to which the non-head of a RPC is nominal cannot be maintained. It is thus not possible to unify both types of primary compounds. I present three arguments. I first point out that the non-head of an RCP does not need to be co-extensive with an existing noun. I then illustrate that the non-head is not necessarily interpreted nominally. I finally show that even the lowest, otherwise obligatory nominal functional projections are absent in RPCs. In each section I contrast RPCs with nominal primary compounds. The non-head of each single nominal primary compound has the same distribution as roots that are licensed in a *bona fide* nominal positions, it is invariably interpreted nominally and it may retain nominal functional projections.

4.2 A distributional contrast between RPCs and nominal primary compounds

There are many roots which surface as the non-head of a RPC, while they are not licit in *bona fide* nominal positions.[27] For example, the non-heads of the RPCs in (33) cannot occur as the lowest projection in a DP, as is shown in (33).[28, 29]

[27] Root-based models overgeneralize as they predict that any root can be used in any syntactic context, a prediction which is clearly false. To the best of my knowledge, an overall solution to this problem has not yet been found, though see Borer (2005b: chapter 11 and 2013:chapter 13) for suggestions.

[28] Admittedly, any vocabulary item can be nominalized by using it to refer to itself, as *not* in *The 'not' on the blackboard*. De Belder and van Craenenbroeck (to appear b) present five tests to distinguish between regular vocabulary items in a root position and specific cases of self-reference. Most tests cannot be applied to items contained in a compound, yet, De Belder and van Craenenbroeck point out that self-referring items always have a quotative nature. The actual phonetic form should be at stake meaningwise. For example, if *niet* in (33)c had been used self-referringly, it would only refer to the phonetic string /nit/ and it would thus not imply negation. In other words, the meaning of self-referring items differs sharply from the meaning of the non-head in the examples under discussion. Of course, self-referring items can be used in a RPC, as in *frrrpl-geluidje* 'frrrpl-sound'.

[29] I have noted in section 2 that RPCs are at least as old as the oldest written sources of Dutch. Unsurprisingly, then, the non-head of a RPC may be archaic. The root in the non-head of some RPCs was co-extensive with a noun

(33) a. speur-hond b. achter-deur c. niet-verjaardag
track-dog back-door not-birthday
'tracking dog' 'backdoor' 'unbirthday'

(34) a. * de speur b. * de achter c. * de niet
the track the back the not

Under the assumption that the roots in the non-heads in (33) are nominalized, it is unclear why they do not have the distribution of nouns elsewhere. Under the proposal that they are bare roots, in contrast, it follows immediately. I therefore conclude these data support the view that the non-heads in (33) are bare roots.

Nominal primary compounds contrast sharply with RPCs in this respect. The set of roots which can occur as the non-head of nominal pimary compounds is a subset of the roots which can occur as the lowest projection in a DP.[30] This claim is not new. It is common knowledge in the literature on Dutch morphology that the presence of the overt linking elements *-s* and *-en* (the hallmark of nominal primary compounds, see

in an earlier stage of Dutch, but it is no longer co-extensive with a noun in present-day Dutch. Yet, it has been preserved within the RPC. They are now *cran*-morphemes. For example, the roots *wal* and *sperzie* ceased to occur as independent nouns. Yet, they still occur as the non-head of RPCs, as in *wal-vis* 'whale' (Lit. whale-fish) and *wal-dieren* 'members of the family of the whale' (Lit. whale-animals) and as in *sperzie-boon* 'green bean' (Lit. asparagus-bean) and *sperzie-torretje* (specific kind of beetle, lit. *asparagus-beetle*). It is unclear to me whether these words are seen as morphologically complex by the native speaker (see section 3.3 on archaisms and morphological complexity). If they are, they show that the non-head of a RPC does not need to be co-extensive with a noun.

[30] I imagine some rare roots may be found within a DP, while they cannot be found as the non-head of a nominal primary compound. For example, it should be tested whether native speakers accept a primary compound with the proper name *De Haan* as its non-head (? een *dehaantoerist/haantoerist*, i.e. a tourist who visits *De Haan*). I therefore suspect the set of roots that can occur in a DP is a superset of those that occur as the non-head of a nominal primary compound.

section 2) implies the nominality of the non-head.[31] The claim can be illustrated by means of derivational suffixes. Derivational suffixes may select an overt linking phoneme, as is shown in (35).[32]

(35) a. prins-es-en-jurk
prince-ess-LP-dress
'gown as worn by princesses'

b. over-heid-s-instelling
above-HEID-LP-institution
'governmental institution'

If a derivational suffix that is contained in a non-head selects an overt linking element it can be predicted the suffix is nominal. In other words, there are no non-nominal suffixes that select an overt linking phoneme if they are part of a compound's non-head. Again, this shows that the non-head of nominal primary compounds is obligatorily nominal. In this respect, they contrast with RPCs.

4.3 An interpretational contrast between RPCs and nominal primary compounds

[31] There is a schwa that may occur in other types of compounding to improve the rhythm of the compound, e.g. *drinkebroer* 'alcoholic' (Lit. drink-E-brother) and *oudejaar* 'New year's Eve' (Lit. old-E-year)(see De Belder and Van Koppen 2012).

[32] There are nominal derivational suffixes which do not select an overt linking phoneme, such as *-(at)ie* in *menstru-atie-pijn* 'menstruational pain'. It may be the case that these suffixes may be followed by a null linking phoneme (see section 2). Alternatively, one might hypothesize that whatever role is fulfilled by linking phonemes can be fulfilled by these derivational suffixes as well, in which case they are in complementary distribution with linking phonemes. Note in this respect that De Belder (2013) argued that linking phonemes are class markers. Note further that the suffixes that do not select an overt linking phoneme are Latinate suffixes. Lowenstamm (2007) and Kramer (2009) have argued that loaned morphemes may function as class markers in Jiddisch and Amharic. As such, it is plausible that Latinate suffixes function as class markers in Dutch. Under these assumptions the fact that they are in complementary distribution with the linking phonemes *-en* and *-s* then follows immediately. (Note that it is not the case that a loaned suffix cannot surface with an overt linking phoneme. The suffix *-eut*, for example, which is borrowed from Greek, selects *-en*, as in *techn-eut-en-conferentie* 'boffin conference'.)

The non-head of a RPC does not need to be interpreted nominally. For example, the compound in (36) is ambiguous between a nominal and a verbal reading for the non-head. This corresponds with the fact that the root in the non-head occurs commonly in both nominal and verbal contexts, as can be seen in (37).

(36) antwoord-centrum
answer-center
'center where answers are stored / center where answers are provided/…' (nominal readings)
'center where one answers the phone/…' (verbal reading)

(37) a. ik antwoord b. het antwoord
I answer the answer
'I answer' 'the answer'

This fact suggests that the nominal nature of the non-head is not syntactically implied.

In contrast, the presence of an overt linking phoneme forces a nominal interpretation. For example, *a priori* one may expect the compound in (38) to be ambiguous between a nominal and verbal reading, as the RPC above. Yet, the nominal primary compound triggers an exclusive nominal interpretation of the non-head.

(38) antwoord-en-centrum
answer-LP-center
'center where answers are stored / center where answers are provided/…' (nominal readings)
* 'center where one answers the phone/…' (verbal reading)

The fact that the non-head is necessarily interpreted nominally indicates that the nominality of the non-head is syntactically implied for nominal primary compounds. I

conclude the data show that the nominality of the non-head of the NPC is syntactically implied, whereas the non-head of the RPC can be associated with various categories. Note that this observation supports the view that roots are acategorial.

4.4 A structural contrast between RPCs and nominal primary compounds

4.4.1 Introduction

In this section I show that RPCs and nominal primary compounds differ in the fact that the non-head of a RPC is invariably bare, whereas the non-head of a nominal primary compound may contain nominal inflection. In the first subsection I show that even the lowest, most expected nominal projections are absent on the non-head of a root primary compound. In the second subsection I contrast RPCs with nominal primary compounds that may contain nominal inflectional elements. In a third subsection I provide further support for the view that the empirical contrasts observed in the previous two subsections indeed should be ascribed to the fact that there are two different compounding types.

4.4.2 The non-head of a RPC cannot contain nominal inflection

In this section I show that even the most expected nominal inflectional markers are absent on the non-head of a RPC. More specifically, I discuss three instances of inflection from Dutch, viz. gender marking in West-Flemish, number marking on pluralia tantum and a remnant of an archaic class marker on dialectal neuter nouns. I will finally discuss a Swedish inflectional marker. For these projections 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°, which attaches

directly to the root (see Lowenstamm 2007 for gender as n°, see Acquaviva 2008 for plural marking on pluralia tantum as n°, see Kihm 2005 for class markers as n°).

First consider 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. More specifically, dialects that belong to this group have overt gender marking on feminine nouns by means of a schwa ending (Haegeman 2000). This is illustrated in (39).[33] (39)d shows that this gender marking is obligatory in a DP.[34]

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

In RPCs this gender marking is absent, as shown in (40).[35]

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

The non-heads of these compounds do 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 (40) is smaller than the noun. It is a bare root.

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

(41) a. hersen-en b. kleer-en
brain-PL cloth[36]-PL

[33] The 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.

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

[35] Nominal primary compounds retain gender inflection (see De Belder 2013). For example, the feminine noun *sirope* 'syrup' keeps its ending in *siropeflasche* 'syrup bottle'. See section 4.4.4 for careful discussion.

‘brains’ ‘clothes’

Number marking on pluralia tantum is lexically selected by the root. It is obligatorily present on the noun to derive the intended meaning. In its absence, the noun is either non-existent, as in (42)a, or has a different meaning, as in (42)b.

(42) a. * de/het hersen b. het kleed[37]
the$_{COMMON}$/the$_{NEUTER}$ brain the$_{NEUTER}$ dress
‘the dress’

Interestingly, the plural markers are absent in RPCs. Yet, the meaning that is contained in the compound refers back to the meaning of the pluralis tantum.

(43) a. hersen-helft b. kleer-kast
brain-half cloth-closet
‘cerebral hemisphere’ ‘wardrobe’

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

Some neuter nouns in dialects from East-Flanders, West-Flanders and Zeeland may contain a schwa marking. The examples given below are from Blankenberge Dutch.[38]

(44) a. het hert-e b. het oor-e

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[36] The English root *cloth* may head a mass DP. The gloss therefore wrongly suggests that *kleer* functions as *cloth*. It does not. *Kleer* is only attested as the root of the pluralium tantum *kleren* ‘clothes’ or as the non-head of a root primary compound.

[37] The plural *kleren* is a contracted version of the archaic form *klederen*, which is the plural form of *kleed*.

[38] The dictionary *Woordenboek der Nederlandsche Taal* mentions the gender of *oog* ‘eye’ and *oor* ‘ear’ may vary between neuter and feminine, De Bo (1892) mentions they are feminine in West-Flemish. Yet, native speakers of West-Flemish whom I have consulted (Katlijn Van Audenaerde, Jan Van Coillie, Lut Lams and Monica Roose) all agree they select neuter articles. Liliane Haegeman (p.c.) assigns feminine gender to *oor* ‘ear’ and accepts both genders for *oog* ‘eye’.

	the$_{NEUTER}$ heart-ə		the$_{NEUTER}$ ear-ə
	'the heart'		'the ear'
c.	het oog-e	d.	het strang-e
	the$_{NEUTER}$ eye-ə		the$_{NEUTER}$ beach-ə
	'the eye'		'the beach'

The schwa-ending on these nouns is a remnant of an ancient inflectional class marker; it marked weak neuter nouns (Freek Vandevelde p.c.). It is not clear whether it has any role in present-day Dutch, yet it is obligatorily present in those dialects which retained it, as can be seen in (45).

(45) a. * het hert
the heart

Interestingly, it is absent in RPCs, as can be seen in (46). The examples are again from Blankenberge Dutch.[39]

(46)	a. hert-zeer	b. oor-dokteur	c. oog-lenze	d. strand-cabine[40]
	heart-ache	ear-doctor	eye-lens	beach-cabine
	'heart ache'	'ear doctor'	'contact lens'	'cabana'

Again, the non-head of the RPC is structurally smaller than the noun.

Finally, consider Swedish compounds. As in Dutch, there are Swedish primary compounds that select an overt linking element. The linking element can only be used if the non-head is nominal (Holmberg 1992:32, Josefsson 1997:62,64). It is mostly *-s*, as in (47).

[39] The marker is not obligatorily absent. If it is present on the non-head, as in *hert-e-klop* 'heart beat', we are dealing with nominal primary compounds (see below).

[40] Unsurprisingly, there is lexical variation in this domain. Liliane Haegeman informed me that she never omits the schwa of *strange* in compounds, yet my informants from Blankenberge were very clear on the fact that the schwa should be dropped in (46)d.

(47) a. moder-s-mjölk
mother-LP-milk
'breast milk'

b. kök-s-dörr
kitchen-LP-door
'kitchen door'

Swedish has strong and weak nouns. Weak nouns are nouns which end in *-e* or *-a* in the nominative singular, as in (48).

(48) a. kvinn-a
woman-INFL
'women'

b. gat-a
street-INFL
'street'

This ending may be dropped in primary compounds. This is illustrated in (49). (The examples are taken from Josefsson 1997:64.)

(49) a. kvinn-folk
woman-people
'women'

b. gat-lykta
street-light
'street light'

The non-head of these primary compounds is thus smaller than the noun. Josefsson (1997, p.c.) argues the non-head is a root in these cases. I assume they are RPCs.

In sum, the non-head of a RPC lacks nominal inflectional markers. I conclude this follows immediately from the fact that the non-head is a bare root structurally.

4.4.3 The non-head of a nominal primary compound does contain inflection

In the previous section we have seen that the non-head of a RPC does not contain any inflectional elements. However, inflectional markers are not banned in general from the non-heads of primary compounds. The same roots that occurred bare in the previous section may select an inflectional element as well as the non-head of a

primary compound. I argue that in these cases they are part of nominal primary compounds.[41]

First consider feminine roots in West-Flemish. They do not only occur bare as the non-head in RPCs, but they may occur with inflection as the non-head in nominal primary compounds as well, as in (50) (compare the examples with the examples in (40)).[42]

(50) a. vrouw-e-klooster
woman-INFL-convent
'convent for nuns'

b. stroat-e-loper
street-INFL-runner
'tramp'

c. school-e-gemeenschap
school-INFL-community
'network of schools'

Secondly, consider the roots that are part of pluralia tantum. In nominal primary compounds they may select an inflectional marker, as can be seen in ((51)) (cf. (43)).[43]

(51) a. kleer-en-winkel
cloth-INFL-shop'
'clothes shop'

[41] The reader may have observed that linking phonemes, gender markers, plural markers and inflectional markers in Dutch are all /ə/ or /ən/. Due to n-deletion and considerable variation in the pronunciation of the string /ən/ (see Hanssen 2012) the difference between /ə/ and /ən/ is further often hardly audible. I am therefore facing a methodological problem. I can observe that the non-head in nominal primary compounds selects an inflectional element, i.e. a schwa, but I cannot establish the exact nature of the schwa. I therefore gloss all inflectional markers in this section by means of INFL, which is short for inflectional marker. Yet, the observations in section 4.4.4 indicate the markers in (50) are most likely gender markers, rather than linking phonemes.

[42] The examples in (50)a-c may give the impression the inflectional marker denotes plurality. However, this is due to happenstance given that examples with clear singular denotation may be found as well: *kat-e-stêrt* 'cat-INFL-tail' (the tail belongs to a single cat) and *kat-e-stroent* 'cat-INFL-shit'. A reviewer points out that it may still be a plural marker, which is simply interpreted generically (a tail as cats have it). See Mattens 1984 for discussion.

[43] I was not able to find an example with *hersenen* 'brains'. I guess it is disfavored as the non-head of a compound because it contains a sequence of schwas.

Thirdly, neuter nouns that select a schwa marking in dialects from East-Flanders, West-Flanders and Zeeland may retain his marking as the non-head in nominal primary compounds in these dialects as well, as in the examples in (52) from Blankenberge Dutch.

(52) a. hert-e-klop
heart-INFL-beat
'heart beat'

b. strang-e-café
beach-INFL-café
'beach bar'

Fourthly, Swedish weak nouns may contain a linking element as well when they are the non-head in a nominal primary compound. The linking element which is selected by a weak noun is not the regular linking element *-s*, but *-o* or *-u*, as in (53). These linking elements are remnants of the weak noun's genitival marker (Josefsson 1997). (The examples are taken from Josefsson 1997:61, 64.)

(53) a. kvinn-o-dräkt
woman-LP-dress
'woman's dress'

b. gat-u-korsning
street-LP-junction
'crossing'

To summarize, the non-head of a nominal primary compounds may contain nominal inflectional markers that are absent on the non-heads of RPCs. This shows there is a structural difference between the two compounding types. The non-head of the RPC is a bare root, whereas the non-head of the nominal primary compound contains nominal inflection.

4.4.4 On null linking phonemes

In the two previous sections I have argued that compounds with an overt inflectional marker, as the compounds containing a linking phoneme in (54), instantiate nominal primary compounds, whereas the ones without such an overt inflectional marker, as in

(55), are RPCs. I have shown that one and the same root may occur in both types of compounds.

(54) a. kat-en-staart
cat-LP-tail
'cat tail'

b. kat-en-luik
cat-LP-flap
'cat flap'

(55) a. kat-god
cat-god
'cat god'

b. kat-fret
cat-ferret
'ringtail'

One might argue the data in (54) and (55) have been misinterpreted. One might postulate the examples do not involve variation in compounding types, but rather variation in linking elements. This alternative hypothesis would then imply that the examples in (55) contain a null linking element. Indeed, if the linking elements in nominal primary compounds realize nominal inflection, one may hypothesize that they are null. It is after all common for inflection to be realized by means of a null morpheme. In this section I will argue that there is indeed a null linking element alongside the overt ones *-s* and *-en*. Most importantly, however, I argue this null linking element is not present in the root primary compounds in (55).

Interestingly, in Standard Dutch roots that refer to mass concepts never select an overt linking element. An example of such a root is *zand* 'sand', as in (56).

(56) a. zand-kasteel
sand-castle
'sand castle'

b. zand-bak
sand-box
'sandbox'

In Dutch dictionaries one does not find a single instance of a compound of which the non-head *zand* selected either one of the overt linking elements, i.e. *-en* or *-s*. I will

refer to these roots as the mass concept roots. Some more examples of such roots are given in (57).

(57)

a. kaas-boer	b. zand-grond	c. vuur-steen
cheese-farmer	sand-soil	fire-stone
‘cheese farmer’	‘sandy soil’	‘flint’
d. siroop-fles	e. klei-grond	f. wol-fabriek
syrup-bottle	clay-soil	wool-factory
‘syrup bottle’	‘clay soil’	‘wool factory’

One may hypothesize the systematic absence of an overt linking phoneme should be ascribed to the fact that mass concept roots are illicit in nominal primary compounds and are only contained in RPCs. Yet, such a proposal seems counterintuitive. We have reasons to assume the mass concept roots in (57) occur in a nominal position. Mass concept roots are a subset of the roots that may occur in *bona fide* nominal positions. In other words, mass concept roots systematically may be used as nouns as well, as in (58).

(58)

a. de kaas	b. het zand	c. het vuur
the cheese	the sand	the fire
‘the cheese’	‘the sand’	‘the fire’
d. de siroop	e. de klei	f. de wol
the syrup	the clay	the wool
‘the syrup’	‘the clay’	‘the wool’

Alternatively, one may hypothesize the compounds in (57) invariably lack an overt linking phoneme as mass concept roots systematically select a null linking phoneme. This hypothesis seems to be on the right track. An indication that mass concept roots select a null morpheme comes from their behavior in West-Flemish.

First note that, as in Standard Dutch, mass concept roots are not followed by an overt marker in West-Flemish if they are the non-head of a primary compound. However, crucially, this fact only holds for non-feminine mass nouns in this dialect, as can be seen in (60). (59) shows that the roots contained in the non-heads are indeed not feminine, as they do not select a feminine gender marker.

(59) a. de koas-(*e)
the cheese-(*F)
'the cheese'

b. het zand-(*e)
the sand-(*F)
'the sand'

c. het vier-(*e)
the fire-(*F)
'the fire'

(60) a. koas-boer
cheese-farmer
'cheese farmer'

b. zand-groend
sand-soil
'sandy soil'

c. vier-stêen
fire-stone
'flint'

In contrast, if the root that refers to a mass concept is feminine, as in (61), its schwa ending is retained within the compound, as in (62).[44]

(61) a. de siroop-e
the syrup-F
'the syrup'

b. de kliet-e
the clay-F
'the clay'

c. de sjet-e
the wool-F
'the wool'

d. de col-e
the glue-F
'the glue'

(62) a. siroop-e-flasche
syrup-F-bottle
'syrup bottle'

b. kliet-e-groend
clay-F-soil
'clay soil'

c. sjet-e-fabriek
wool-F-factory
'wool factory'

d. col-e-fabriek
glue-F-factory
'glue factory'

The fact that gender marking is present in these examples, indicates that the root is followed by nominal inflection in general. Hence, the non-head in these compounds is not a bare root, but a root under nominal inflection. If we do not want to multiply the assumed types of compounding in Dutch beyond necessity, it stands to reason that

[44] Note that, as expected, the schwa is not present in Standard Dutch examples, which lack overt gender marking on the noun (e.g. *siroop-fles* 'syrup bottle' and *klei-grond* 'clay soil').

West-Flemish compounds containing a feminine mass noun followed by a gender marker as their non-head are nominal primary compounds. I extend this conclusion to the non-feminine mass concept roots in West-Flemish and to the mass concept roots in Standard Dutch. I propose that compounds with a root referring to a mass concept contain nominal markers, albeit covertly. I therefore postulate the presence of a null linking element for mass concept roots. In sum, the linking element may be null. Yet, when the linking element is null, nominal primary compounds may still project nominal inflectional markers such as gender marking.

If the compounds in section 4.4.2 contained a null linking element, on a par with mass concept roots, one predicts they may still select other nominal markers in West-Flemish when they occur as the non-head of a primary compound. However, section 4.4.2 emphasized on the fact that they do not select such markers. We have seen, for example, that the feminine roots *straat* 'street' en *school* 'school' do not select nominal inflection in RPCs, as is shown in (63).

(63) a. stroat-kat-e b. school-gebouw
street-cat school-building
'street cat' 'school building'

The absence of any nominal marker in (63) is telling. Even if these examples contained a null linking phoneme, nothing should prevent the non-head from selecting a gender marker if it were truly nominal. I therefore submit the non-heads of the examples in (63) are not nominal, but bare roots. In sum, the examples in (54) are nominal primary compounds, whereas the ones in (63) are RPCs. I thus conclude that the variation that is shown through the contrast between (54) and (63) does not involve variation in linking elements (overt versus null), but rather variation in

compounding types. The examples in (54) are instances of nominal primary compounds, whereas those in (63) are root primary compounds.

4.4.5 Conclusion

The non-heads of RPCs systematically lack inflectional markers, whereas inflectional markers are present on the non-heads of nominal primary compounds. It is further clear that it is not the case that the absence of an overt inflectional marker in RPCs can be ascribed to a null linking phoneme. I have discussed a class of roots which select null linking elements and which still may select gender marking. I conclude RPCs differ from nominal primary compounds structurally. Whereas the former contain a bare root as their non-head, the latter contain a non-head which is nominalized syntactically by means of nominal functional projections.

4.5 Conclusion

In this section I have discussed three contrasts between RPCs and nominal primary compounds. I first showed that the non-head of a RPC may contain roots which are not attested in *bona fide* nominal positions, such as a DP, whereas nominal primary compounds contain exactly those roots which are attested in DPs. In other words, there is a distributional difference between roots that may be found in RPCs and those which may be found in nominal primary compounds. I have then pointed out that the non-head of a RPC does not necessarily trigger a nominal interpretation, whereas the non-head of a nominal primary compound is restricted to nominal denotations. In sum, the compounding types differ meaningwise. Thirdly, I have shown there is a structural difference between RPCs and nominal primary compounds. RPCs cannot contain nominal inflectional markers, whereas nominal primary compounds do

contain such markers. I conclude that the absence of nominal properties for the non-head of the RPC follows immediately if one does not assume the non-head of this compounding type is nominal. They follow automatically under the proposal that the non-head of a RPC is a bare root.

5. The structure of RPCs

5.1 Against a syntactic approach

In this section I discuss the derivation of RPCs. I first point out that a syntactic derivation, which involves the direct merger of roots, fails to capture the observations. I then propose in a following section to derive the cluster of roots at PF via fission.

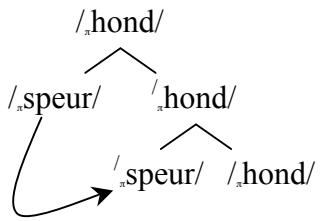
We have seen that the non-head of a RPC cannot contain any functional or categorial heads. Empirically, they just seem to contain bare roots and nothing else. The structure of a RPC might therefore be understood as a direct merger of (phonological indexes of) roots. Borer (2013:chapter 6) proposes exactly such a structure for primary compounds. Adopting bare phrase structure she proposes that indexes of roots merge directly with one another. The non-head root incorporates into the root that is the head of the compound for reasons of linearization. The root that projects is the head of the structure. It will be categorized eventually by the functional superstructure. This is illustrated in (64).[45]

[45] The π symbolizes that what has been merged is a phonological index of a root.

(64) speur-hond

track-dog

'tracking dog'



Borer (chapter 6, fn 9) submits that the non-head position in the resulting structural configuration is a position that renders the head occupying it equivalent to a noun, at least in English. It is clear that this last aspect of her proposal is undesirable for the root primary compounds in Dutch. We have seen that the non-head of the Dutch RPC is not nominal (see section 4). One might argue that the categorial effects of the structure vary cross-linguistically.

The structure in (64) is attractive for various reasons. It licitly allows a direct merger of roots and it expresses the long-standing insight that primary compounds involve incorporation (see Mithun 1984, 1986, Baker 1988). However, it faces an immediate problem. RPCs may be recursive, as can be seen in (65).

(65) a. fris-drank-automaat
fresh-drink-vending.machine
'vending machine for soft drinks'

b. was-beer-val
wash-bear-trap
'raccoon trap'

It is not clear how head incorporation can be applied two more than two roots in bare phrase structure. When two miminal projections incorporate, the resulting structure is by definition not-minimal and thus ceases to be a head. Hence, the recursive compound cannot be derived via head movement into a third root. One further wrongly predicts that if a phrase merges with a head, the phrase will be interpreted as the complement of the head (Johnson 2002). To add insult to injury, a RPC may even contain subconstituents, as in (66). By definition it is impossible to incorporate a constituent.

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

b. [[[lawine-[zoek-hond]]-[lei-band]-doos]
avalanche-search-dog-guide-band-box
'box to store the leash of an avalanche search dog'

There are ways to circumvent this problem.[46] One could assume that one first builds each subconstituent in a separate derivational workspace. The subconstituent is subsequently spelled out and re-admitted to the numeration (Johnson 2002, cf. Harley 2009 on quotative compounds). In the eventual structure the phrase is selected as an opaque element from the numeration and it merges as a minimal projection (cf. Uriagereka 1999). Hence, it can be used as a minimal node and it can incorporate.

This type of derivation faces some problems. Firstly, the assumptions are at odds with the behavior of other opaque domains in syntax. It has been argued that islands such as adjuncts (Johnson 2002) and subjects (De Belder & van Craenenbroeck (to appear)) are equally derived in separate workspaces and renumerated before they merge in the eventual structure, hence deriving their islandhood (Johnson 2002). Yet, within the sentence these islands exhibit the movement properties of phrases even

[46] Carnie (2000) proposes to eliminate the terminal stipulation from bare phrase structure. As such, phrases and heads are no longer structurally defined. Nodes can show head-like or phrase-like behavior qua features and movement. Hence, we may conceive them as heads or phrases, but these notions have no theoretical status in syntax. It is thus even possible for a given node to show mixed behavior. Resultatively, adjunction of a phrase to a head is not excluded and recursive RPCs may be derived by means of incorporation. However, even in this more liberal approach it is still not clear to me how the constituency of (66)a, for example, can be derived successfully via incorporation. The system further overgenerates. One predicts that just any phrase may incorporate. In other words, just any phrase should be able to become the non-head of a primary compound. Clearly, this expectation is not borne out.

though they are arguably minimal projections (see, however, Uriagereka 1999 and Carnie 2000). As such, it is surprising that opaque domains at the word-level may be subject to incorporation, a type of movement that is associated with heads. In sum, the proposed derivation on RPCs cannot be reconciled straightforwardly with derivations above the word-level.

Secondly, the analysis fails to capture the observed categorial restrictions on the non-head of primary compounds. More specifically, it overgenerates. One predicts that just any phrase may incorporate. In other words, just any phrase should be able to become the non-head of a RPC. Clearly, this expectation is not borne out. It does not follow that only clusters of roots can occupy the non-head position of a RPC. Neither do we understand why phrases containing verbal heads and adjectival heads are explicitly ruled out (see section 3). Finally, one fails to capture the observation that the Dutch RPC exists alongside NPCs or that Dutch has precisely these two types of primary compounds. In sum, a syntactic approach to RPCs should thus be enriched with stipulations in order to account for their most basic properties. This indicates we still fail to understand the essence of what is going on.

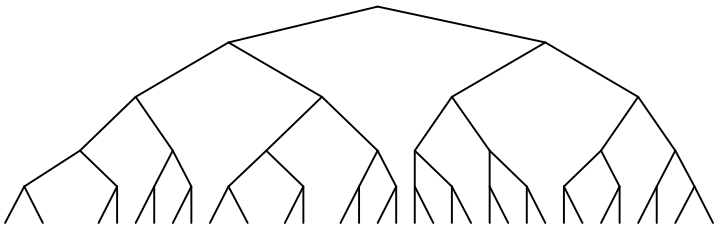
5.2 In favor of a PF approach

We have seen above that a derivation involving incorporation is at odds with syntactic principles above the word-level. Because of the mere fact that the design of recursive RPCs is at odds with known syntactic principles I submit that RPCs are not built in syntax. I propose they are derived through a post-syntactic operation, i.e through fission (Noyer 1992, 1997, Halle 1997) of the root.

Root fission may proceed as follows. Syntax builds a structure that contains a single root terminal node. This node is categorized through the functional structure

with which it merges (Borer 2005a,b, 2013). Morphology, a post-syntactic module (Halle and Marantz 1993), splits the node into two separate nodes. This operation is recursive and may split each resulting node into two separate nodes. Each newly derived node is a clone of the previous one, i.e. it is a new root. As such, one post-syntactically derives a fractal-like tree of root terminal nodes from a single syntactic position, as shown in (67).

(67)



The *PF* structure in (67), for example, can host 32 roots, while there is only a single *syntactic* root position. As such, one may insert more than one vocabulary item in the root position post-syntactically.

Below I discuss the mechanism in detail. Note first that the present proposal has three immediate advantages. Firstly, one immediately derives that RPCs contain nothing but roots, i.e. it follows immediately that they cannot contain any intervening functional projections or that they are not restricted to one category meaningwise. Secondly, it is a welcome result that at narrow syntax the structure contains only a single root position. As such, RPCs are still in compliance with previously formulated insights on the syntax of roots. More specifically, it follows that at least *at syntax* each root position is categorized (Arad 2003, Marantz 2001, Borer 2013), that each derivational workspace contains exactly one root (see De Belder and van Craenenbroeck (to appear a)) and that nominal primary compounds are the only type

of compounds which can be derived in syntax (Borer 2013).[47] Thirdly and finally, it follows that RPCs are language-specific, as the possibility to fission a morpheme is language-specific and morpheme-specific as well (Noyer 1992, 1997, Halle 1997).

In order to see how fission may derive a RPC, I now present a sample derivation. Suppose Vocabulary Insertion needs to realize the RPC in (68). It has selected six vocabulary items to do so, as can be seen in (69).

(68) [[[lawine-[zoek-hond]]-[lei-band]]-doos]
avalanche-search-dog-guide-band-box
'box to store the leash of an avalanche search dog'

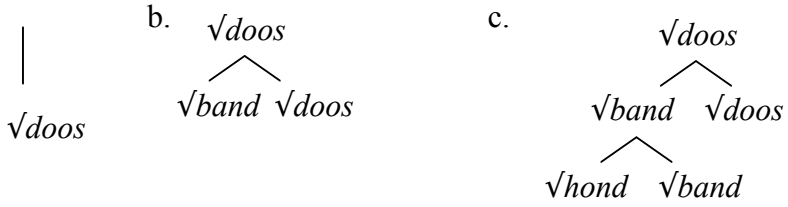
(69) a. lawine ↔ √
b. zoek ↔ √
c. hond ↔ √
d. lei(d) ↔ √
e. band ↔ √
f. doos ↔ √

Let us now assume that supplementary roots are created at morphology when needed (cf. Noyer 1997). Consequently, a root morpheme in Dutch may undergo fission at PF. Fission is applied when more positions are needed. For example, at PF the six vocabulary items in (69) should be inserted, while Syntax created only a single root terminal node. Morphology detects there is only a single root terminal node and it inserts a first vocabulary item, as is illustrated in (70)a. However, five items remain to be inserted. It therefore fissions the node. A subsidiary node is created, as in (70)b.

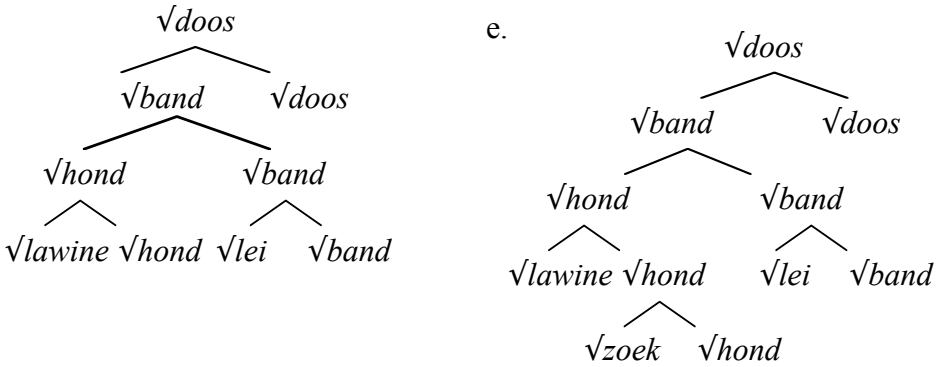
[47] The idea that two types of Dutch compounds can be distinguished on the basis of their syntactic complexity, in particular the idea that in one type we are dealing with a syntactically simplex structure that corresponds to a phonologically complex one, has a precursor for verbal compounds at least in Ackema (1999).

Vocabulary insertions inserts a second vocabulary item. Vocabulary insertion failed to insert the remaining four vocabulary items and it fissions a node. The newly created node may host a vocabulary item. I assume that for each node fission is optional, but that fission applies until all vocabulary items are inserted.

(70) a. b. c.



d. e.



As such, any subconstituency may be derived. One may wonder how a blind process such as Vocabulary Insertion knows when to fission and what to insert when. I suppose the operation is ignorant and is a trial and error based mechanism. It creates a structure and it subsequently sends it to Encyclopedia. If the structure makes sense at Encyclopedia, it is kept.[48] If it does not, Vocabulary Insertion tries again.

Under the assumption that the order of insertion determines headedness and linear order, they can be read off from the structure. The head is contained in the mother cell. It is interpreted as the head, its gender values are used for phi agreement in the DP and it is categorized through its superstructure. This view is in line with the observation that there is always a primary item amongst items realizing a fissioned

[48] Heidi Harley (p.c.) pointed out to me that if Encyclopedia is able to interpret this structure, it follows that its input not the syntactic structure, but the morphologically altered structure under this approach.

structure (Halle 1997). I leave a principled approach to these issues for further research.

I assume that the mother cell inherits and reflects the syntactic status of the single root terminal node in syntax. As the daughter cells are not present in syntax, I assume they do not have a syntactic status whatsoever. As such, they do not have a categorial status either.

Previous work on fission exclusively addressed functional terminal nodes. For terminal functional nodes the supplementary node allows to realize features that were not matched by insertion at the first node according to the Subset Principle. For example, suppose a language contains the vocabulary items in (71). Suppose further (72) is a functional terminal node which syntax created in this language.

(71) a. /i/ ↔ {a,b}

b. /s/ ↔ {c}

(72) Functional morpheme: {a,b,c}

If the functional terminal node is fissioned at PF both /i/ and /s/ may be inserted. As such, all features of the functional morpheme will be realized. Given that the saturation of features is involved in fission one might conclude it belongs to the realm of functional morphemes. However, fully satisfying the realization of functional morphemes does not *trigger* fission in languages. Functional nodes simply do not trigger fission each time fission might have been the most optimal choice (Halle 1997:137). Whether fission occurs is rather a morpheme-specific and language-specific peculiarity.

Fission is motivated by economy. The learner will prefer to assume fission in order to be able to use a sequence of already existing vocabulary items rather than to postulate a new vocabulary item (Noyer 1992, 1997, Halle 1997). Suppose the

speaker has learned that morphemes with the feature set {a,b} are realized as /i/ and those with the feature set {c} as /s/. Suppose further that the learner has independent evidence that the functional terminal node {a,b,c} is indeed a single morpheme rather than a sequence of two separate ones (through the number of specifiers, for example). The learner will then prefer to analyze the string /is/ for the feature set {a,b,c} as a composition of the exponents /i/ and /s/ rather than storing it as a new vocabulary item.

Applied to RPCs fission prevents the learner from coining a new vocabulary item for each RPC. For example, a learner will prefer to fission a root in order to spell-out the RPC *speurhond* 'tracking dog'. As such, she can recycle the independently existing vocabulary items *speur* 'track' and *hond* 'dog' and she does not need to postulate the new vocabulary item *speurhond* 'tracking dog'. In short, the ratio behind fission applies to functional morphemes and to roots equally. I therefore do not see a principled reason to restrict fission to functional morphemes. In sum, I conclude that RPCs are built post-syntactically through fission of the root terminal node.

7. Conclusion

In this article I have distinguished between two types of primary compounds in Dutch. The first type, the nominal primary compound, contains a non-head that is nominalized through nominal functional projections. The second type, the root primary compound, has a bare root as its non-head. I showed that the root in the non-head of the root primary compound cannot merge with a categorial head (i.e. a derivational affix). I further illustrated at length it is not nominalized. The non-head did not show the same distribution of roots as *bona fide* nominal positions, it is not necessarily interpreted nominally and it cannot contain any nominal projections such

as gender marking and other inflectional markers. In these respects root primary compounds contrast sharply with nominal primary compounds.

The non-head of a root primary compound cannot contain any functional or categorial heads. Empirically, they just seem to contain bare roots and nothing else. I derived this structure through fission of the root terminal node at PF.

The proposal entails a methodological advantage. Given that the non-head of root primary compounds are bare roots we now consist of a syntactic position to study their behavior. 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.

The proposal has several theoretical consequences. By showing that one can find examples of primary compounds of which the non-head is a bare root this article provides empirical support for the root-hypothesis (Halle and Marantz 1993, Borer 2005a,b, 2013). It supports the view that roots are acategorial. Otherwise, it does not follow that non-heads may not contain categorial affixes, while they may contain a cluster of roots. 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 (Arad 2003, Marantz 2000) or to be realized (Ramchand 2008, Starke 2009). Neither are they a modifier of functional structure (Harley 2005, Den Dikken 2008). In short, this article supports the existence of roots and it implies roots occupy a node in the structure.

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