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RESEARCH

Empty morphemes in Dutch dialect atlases: Reducing morphosyntactic variation by refining emptiness typology

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In the literature on Dutch morphosyntactic microvariation, it is sometimes assumed that a sub-part of Dutch dialects lack certain morphemes, because they have no direct phonetic exponent. More careful analyses, however, suggest that these dialects display so-called zero morphemes, whose presence is argued for either on paradigmatic or phonological ground. In this contribution, we present some examples of such morphemes in the verbal inflection and adjectival concord systems, and develop an analysis that, by exploiting the formal mechanism relating underlying and surface phonological representations provided by Turbidity Theory, allows for the formalization of various degrees of emptiness: morphosyntactic, phonological and phonetic. This, in turn, allows for the shifting of the burden of (some instances of) microvariation from morphosyntax to PF.

Keywords: Emptiness; Dutch dialects; Phonology; Morphosyntax; inflection; agreement

1 Introduction

Syncretism patterns and so-called zero morphemes in the verbal paradigm of Dutch have recently attracted quite some attention. Debates concerning syncretism, understood as a mismatch between the distinctions operated on by the syntax and their morphological realization, concentrate on the routes possibly leading to such a mismatch in the verbal agreement paradigm (Baerman et al. 2005). Most of the accounts explain syncretism patterns as determined only by morphosyntactic factors, such as the change undergone by the pronominal system and the related need for a disambiguation mechanism, or paradigmatic principles of economy (Van den Berg 1949; Ackema & Neeleman 2003; 2013; Van Koppen 2005; Bennis & MacLean 2006; Postma 2011). Other accounts take into consideration also the role of non-syntactic components such as pragmatics, acquisition and phonology (De Vogelaer 2005, 2006; Aalberse 2007; Aalberse & Don 2009; 2011). The latter component – phonology – plays a crucial role in another case of morphosyntactic contrast neutralization: adjectival concord (Taeldeman 1980; Nijen Twilhaar 1990; Hermans 2009). In this case, it has been convincingly shown that the concord patterns of Dutch varieties have been shaped by a phonological process of schwa deletion, which resulted in the apparent loss of the relevant marker.

Despite the obvious differences concerning empirical domain and theoretical analysis, the papers just mentioned show some similarity, for they all deal with systems that diachronically lost some contrast. An interesting question is what it is that got lost: is it the Agree relation in the syntax? The morphological manifestation of such a relation? The phonological content of the relevant morphological exponent? Or is it rather the case that such phonological content is left unpronounced?

This brings us to the other point of discussion of the present paper: zero morphemes.¹ For instance, the resort to zero morphemes, i.e. to agreement markers that betray no acoustic trace of their presence, would allow us to maintain the generative hypothesis that syntax is universal and thus always deploys the same mechanisms, such as Agree.

In Dutch, the presence has been argued for of morphemes that lack any phonetic counterpart, both in the adjectival and the verbal agreement paradigms (Zonneveld 1982; van Oostendorp 2005). This is not unique to Dutch dialects, though, nor to verbal agreement and adjectival concord systems, as the presence of empty elements have been maintained in many other domains and languages, and many types of emptiness have been proposed.²

In syntactic theory the debate on empty elements has a long tradition (e.g. Katz & Postal 1964), and their presence is nowadays quite widely assumed. See for instance the work by Kayne, who argues that “many [more] heads in the sentential projection line (and elsewhere) are silent than is usually thought”, and that “all projecting heads are technically silent” (Kayne 2016: 37). Interestingly, he also explicitly claims that, “in order to account for morphosyntactic microvariation, an approach based on silent elements provides an alternative (one that is more tightly tied to other aspects of syntax) to an approach based on syncretism: languages are not more or less syncretic, they just happen to have a certain distribution of empty morphemes” (Kayne 2009: 266). As for the latter, even though accepted by many theorists, they actually still represent a quite controversial device, for “delimiting what counts as a zero morpheme is not a trivial matter. The concept must be carefully differentiated from others that intuitively also involve situations where there is no overt morphological marking: cumulative morphology, phonological deletion, etc.” (Dahl & Fábregas 2018).

In this paper, we discuss a problem related to the point raised by Dahl & Fábregas (2018), as well as to the relationship between syncretism and empty morphemes mentioned by Kayne (2009), namely the unnoticed difference between an ending being phonetically silent and it being phonologically empty. We maintain that phonology can give a diagnostic for the morphosyntactic presence of such elements as well as for its structural complexity and that, by recognizing the difference between phonetic silence and phonological emptiness, we can reduce the amount of morphosyntactic microvariation, which can in turn be explained in phonological terms.³

¹ As pointed out by an anonymous reviewer, even though discussions concerning syncretism and zero morphemes often overlap, they address two distinct issues. The former – syncretism – is broader, and deals the question whether two apparently identical exponents express the same meaning, or they rather represent two accidentally homophonous forms. The latter – zero morphemes – can be relevant to the former inasmuch as the presence of *apparently* empty morphemes can *wrongly* suggest the presence of a syncretic pattern (see below), but not necessarily, for zero morphemes can e.g. occur in paradigms showing no syncretism. Furthermore, syncretic patterns can result from the partial deletion of a marker, rather than of the entire marker (in this case, it would be impossible to talk about zero morpheme).

² See Leu (2008) for a list of empty elements in syntax, Trommer (2012) for morphology, and Bendjaballah & Heiden (2008) and Cavirani & van Oostendorp (2017) for phonology.

³ Considering the enrichment of the morphosyntactic representation of the word proposed by Distributed Morphology (Halle & Marantz 1993), the understanding of the role silence plays in morphosyntax is essential. For example, it could help us decide whether particular instances of deletion should be considered as occurring in the narrow syntax or at PF. Note that, in the case that deletion happened in narrow syntax, this would bleed vocabulary insertion. If, on the other hand, deletion happened at PF, then the formal properties of PF need to be explicitly laid out. Assuming that phonetics and phonology are different modules (Scheer 2011), the domains in which the role of silence needs to be investigated should include the mapping of a phonological form to the relevant piece of morphosyntactic structure as well as, as shown below, to its phonetic interpretation, for the absence of acoustic material does not necessarily imply the absence of phonological structure, just like the absence of phonological structure does not necessarily imply the absence of syntactic material.

Building on previous literature, we claim that we should distinguish between at least three different types of emptiness⁴:

- *morphosyntactic emptiness* – an object is inactive at all levels, including the morphosyntactic level.
- Ex.: functional projections proposed by cartographers, which are argued to universally occur in the functional spine, no matter whether they are used or not by a given language (see e.g. ‘Dual’ in languages which show no evidence for Dual at all; Cinque 2002; Cinque & Rizzi 2008; Sigurðsson & Maling 2012)
- *phonological emptiness* – an object is morphosyntactically present, but absent in the phonology as well as in the phonetics: it is not pronounced, and it also does not affect any tier-adjacent phonological object, for it does not have any phonological features and does not occupy any slot in the prosodic structure.
- Ex.: silent functional (Chomsky & Lasnik 1977; Chomsky 1982; Rizzi 1982; Marantz 2001; 2008; Embick 2014) and lexical categories (Emonds 1994; Van Riemsdijk 2002; 2005; Kayne 2006; Bendjaballah & Heiden 2008)
- *phonetic emptiness* – an object is morphosyntactically and phonologically present, but absent in the phonetics: it is not pronounced, but it does interact with phonological and morphosyntactic neighbours.⁵
- Ex.: empty CV structures replacing (some) SPE boundaries (Lowenstamm 1999; 2008; Charette 2003; Lampitelli 2010; Passino 2011; Scheer 2012) and encoding morphosyntactic information in templates (Lahrouchi 2001; Bendjaballah & Haiden 2003); phonological elements lacking the pronunciation relation (see section 2, and Cavirani & Van Oostendorp 2017)

The three levels of emptiness mentioned above are often conflated in dialect atlases: conclusions about emptiness are typically based on rather broad phonetic transcriptions, and even indirect phonological evidence pointing to the existence of some underlying, though unpronounced, structure is neglected. For instance, the absence of a word-final vowel in the transcription is considered tantamount to the absence of an affix. In these cases, thus, phonetic emptiness equates to phonological and morphosyntactic emptiness.⁶ When, on the other hand, indirect phonological evidence is taken into consideration, the presence

⁴ We assume that the relation between these different levels of emptiness is asymmetric: if an element is absent at a higher level, it is also absent at lower levels. That means, in turn, that if we can show that an element has to be assumed phonologically, it should also be granted existence at the morphosyntactic level. However, this is not necessarily true for every linguistic object. See, for instance, intrusive and epenthetic vowels (Hall 2006; 2011; Cavirani 2015), which can be argued to be empty at the phonological and morphosyntactic, and morphosyntactic level, respectively. Another instance of such an object is the word-final empty nucleus predicted by phonological theories such as Government Phonology (Kaye et al. 1985; 1990) and CVCV (Lowenstamm 1996; Scheer 2004), which is phonetically and morphosyntactically empty, while still containing (a minimal amount of) phonological structure.

⁵ Cases such as ellipsis, deletion of two adjacent items under haplology (e.g. the *nie*-deletion in Afrikaans, “where there is evidence for two adjacent negative elements *nie*, but only one is pronounced”, Hartmann et al. 2008: 6; *er-er* reduction in Dutch, Den Besten 1989; copies/traces unpronunciation, Nuñez 2004) can be possibly included in this group. It is not clear yet, though, whether they should be considered cases of *phonological* or *phonetic* deletion. Further research is needed (see also Hartmann et al. 2008 for a discussion).

⁶ As pointed out by an anonymous reviewer, the equivalence between silence and absence of morphosyntactic content is not widely assumed, especially within the generative framework. However, even within this framework, cases can be found in which this equivalence is proposed and, as a matter of fact, exploited. Interestingly, the reviewer pinpoints a link between our work and Bybee (1994), who, in her discussion about the grammaticalization of zero, distinguishes between a “zero marker” (for Simple Present) and “the simple absence of a marker” (for Simple Past). As suggested by the reviewer, the three-way emptiness distinction proposed in the present paper might relate to Bybee (1994)’s grammaticalization of “zero grams”.

of an empty morpheme has been occasionally argued for (van Marle & Zonneveld 1980; Zonneveld 1982; van Oostendorp 2005; Bennis & MacLean 2006). In these cases, even though phonetic emptiness does not equate to morphosyntactic emptiness, it does equate to phonological emptiness. We maintain that a closer inspection of atlases gives us some closer view of the representational complexity of these silent linguistic objects, whose presence and internal structure can be detected by observing the phonological properties of adjacent objects, such as segments, tones and syllable structure (see Cavirani & van Oostendorp 2017 for similar arguments coming from Italian varieties).

In what follows, we first discuss some of these issues by focusing on verbal inflection and adjectival gender marking in Dutch dialects (section 2). We propose a refinement/expansion of the taxonomy of emptiness in linguistic structure, which results from the combination of a representational approach to emptiness (Bendjaballah & Heiden 2008) with an optimality theoretic computational technology responsible for the phonology-phonetics mapping – Turbidity Theory (Goldrick 2001; van Oostendorp 2008). This allows for the testing and the explicit formalization of the kind of emptiness we are dealing with in any individual case. The message from these data is: when accounting for (some instances of) morphosyntactic microvariation, the subtle relations holding between phonetics and phonology should be taken into close consideration, for it may reduce the amount of variation morphosyntax is burdened with. The latter can thus be shifted to (a non-trivial version of) PF, a move which is sound with recent minimalist developments, which assume a universal syntactic component and place variation in (the interaction of this component with) the mental lexicon, PF, pragmatics, processing, memory and society (Picallo 2014). This is summarized in section 3, where the relevance and consequences of the three-level emptiness distinction for the morphosyntax-phonology interface are also briefly dealt with.

2 \emptyset endings in Dutch dialects

In this section, we review the main instances of zero morpheme discussed in the literature on Dutch varieties, which generally builds on data collected in the Syntactic Atlas of Dutch Dialects (SAND, Barbiers et al. 2005; 2008) and to a lesser extent the Goeman-Taeldeman-Van Reenen Project Database (GTRP; Goeman & Taeldeman 1996). SAND and GTRP also represent the main source of the data discussed in the present paper. When necessary, though, data have been included that are collected in publications concerning specific Dutch varieties (indicated in the relevant sections). The case studies discussed below focus on verbal inflection (section 2.2) and adjectival concord (section 2.3). After introducing the relevant data and the main analyses that have been proposed, we suggest a refinement of the latter in terms of Turbidity Theory, which is illustrated in the next section.

2.1 Turbidity Theory

Turbidity Theory (Goldrick 2001; van Oostendorp 2008) is an optimality theoretic approach to faithfulness based on containment, which assumes an input-output relationship whereby the former – the input – is contained in the latter – the output.⁷ Crucially, since all the input elements are argued to be always contained in the output, this theory

⁷ Containment was the original faithfulness theory proposed by Prince & Smolensky (1993). In later works, though, it has been replaced by Correspondence, in which input and output are considered two independent representations. This allows for a one-to-many relationship between the elements of the two representations and, as a consequence, for operations such as coalescence (multiple input element – single output element), fission (single input element – multiple output elements), insertion (no input element – one output element) and, crucially, deletion (one input element – no output element). Even though Correspondence rapidly became the standard approach to faithfulness, Containment has been recently revived in the guise of Turbidity Theory and Coloured Containment (van Oostendorp 2007; Trommer 2011; Trommer & Zimmermann 2014).

does not allow deletion, which is rather understood as a case of underparsing: the element is not integrated in the prosodic structure, and is thus unpronounced. Technically, this is formalized as a violation of the PARSE constraint (“every phonological element needs to be parsed in the prosodic structure”). Besides, every prosodic position is supposed not to be empty, i.e. it has to be filled with melodic elements. This is forced by the FILL constraint (“syllable positions are filled with segmental material”).

In Turbidity Theory, PARSE and FILL roughly correspond to PRONOUNCE and PROJECT, which point at the two different relations a segment can entertain with a skeletal slot. Basically, this results from splitting the classic autosegmental association relation – if a segment is associated to a skeletal slot, the skeletal slot is also associated to that segment – in two independent relations. The projection relation encodes the (lexically established) association between a phonological element and its skeletal slot. This relation is enforced by the PROJECT constraint (“Assign a violation mark for every projected element that does not correspond to any pronunciation”), and is graphically represented by an arrow pointing from the skeletal slot to the phonological element. The other relation is pronunciation, which ensures the phonetic realization of a given phonological element. This is enforced by the PRONOUNCE constraint (“Assign a violation mark for every pronounced element that does not correspond to any projection”), and is graphically represented by an arrow pointing from the element to the skeletal slot. This is illustrated in (1), where representations are given that show either only the projection relation (1a.), or both the projection and pronunciation relation (1b.).⁸ As established by Turbidity Theory, the phonological element of the latter is faithfully pronounced whereas that of the former does not receive any phonetic interpretation. In other words, a. represents an instance of *phonetic* emptiness.

(1)	a. Projection	b. Projection & Pronunciation
skeletal slots	x	x
	↓	↕
phonological elements	A	A
phonetic interpretation	∅	[a]

Despite the difference in phonetic interpretation, (1a.) and (1b.) are representationally identical, and they thus display the same phonological behavior. This is not the case for representations showing (some degree of) phonological emptiness (e.g. a skeletal slot that projects no phonological element): they are acoustically identical to phonetically empty representations, but they are representationally different and thus display a different phonological behavior. In other words, phonetically empty representations pattern with phonologically empty representations at the level of phonetic interpretation, but with phonologically contentful representations at the level of phonological behavior. As we show below, by allowing for this refinement of the zero morpheme typology, Turbidity Theory help us in better understanding the syncretism patterns characterizing the verbal inflection and adjectival concord of Dutch dialects.

2.2 Verbal inflection

The high degree of variation displayed by the inflectional systems of Dutch dialects proves to be a challenging ground for testing typological generalizations and fine-grained theoretical hypotheses regarding the morphosyntax and its interface with phonology (Ackema

⁸ In (1), we represent the phonological element in terms of Element Theory (Bacley 2011; 2012). Note that Turbidity Theory is not committed to any specific theory of subsegmental representation: the input-out mapping mechanism would stay the same whatever feature one wants to adopt. Thus, in order to avoid unnecessarily complicated representations, in the rest of the paper we will use segments.

& Neeleman 2003; Baerman, Brown & Corbett 2005; Van Oostendorp 2005; 2008; Bennis & MacLean 2006; Aalberse 2007; Aalberse & Don 2009; 2011).

The observed synchronic microvariation results from a diachronic process of deflection that has affected all Germanic language varieties in the course of millennia: while in older stages they displayed a rich inflectional system, the amount of distinctions conveyed by verb-final morphemes has been generally reduced (an extreme case is represented by Afrikaans, whose finite verbs display no inflectional marker at all). This process affected the varieties spoken in the Netherlands and in the northern part of Belgium (Flanders) to a different extent, resulting in a set of inflectional systems ranging from 4 to 1 affixes. As discussed in Bennis & MacLean (2006; henceforth B&M), out of the 253 dialects, more than a half (147 dialects) display (5 different) 3-affixes systems. The dialects spoken along the north-eastern (Groningen and Friesland) and south-eastern (Limburg) borders show 4-affixes systems (19 dialects), unlike the dialects spoken in West- and East-Flanders, Lower Saxony and the River area, where (3 different) 2-affixes systems can be found (86 dialects). Finally, a 1-suffix system can only be found in Beekbergen (Gelderland).⁹ The latter system is assumed to display a zero morpheme.¹⁰ A list of the present-tense inflectional paradigms drawn by B&M¹¹ from the SAND (Barbiers et al. 2005; 2008) is given in Table 1.

⁹ Note that, in the MAND, 3 dialects can actually be found with just one inflectional ending, which is different from \emptyset (Aalberse 2007: 127). These dialects are spoken in the East (F098p, M009p and G248p) and display a *-en* marker for all the persons.

¹⁰ As a matter of fact, besides the \emptyset -affixed *leef* 'I/you/he/she/it/we/you/they live(s)', the SAND also gives a distinct form for PRS.1PL (in non-inverted contexts) such as *leve* (see, among others, test sentence nr. 449 – *als we sober leve* 'if we live soberly'). Furthermore, in inverted contexts, we also find PRS.1SG and PRS.2SG *lev* (test sentence nr. 467, *levik zoas mien ouders wilt* 'I live like my parents want' and test sentence nr. 474, *levie langer* 'you live longer', respectively). This variation can also be found in other verbs. For instance, in the test sentence nr. 494, we find both *geloof* and *gelooft* for PRS.2SG (*je geloof* 'you believe' vs *u gelooft*, 'you believe' formal) and in test sentences nr. 499, 500 and 501 we find, respectively, *hi hef*, *hij heef* and *hi hef* 'he has'). The *-t* suffix occurs also in test sentences nr. 513 and 514, where we have, respectively, *Marie en Piet wijst noar mekaar* 'Marie and Piet point at each other' and *Toon wast zich* 'Toon washes (him)self'.

¹¹ As pointed out in the previous footnotes, some differences can be found between the data presented by B&M and the ones available in MAND and SAND. In order to verify the extent of such discrepancies we have attempted to reproduce the relevant data, namely the paradigms of the Dutch verb *leven* 'to live' from 267 different locations in the Dutch-speaking language area collected in the SAND. The selection steps for the data were described reasonably well in the paper, so it was relatively easy to reproduce their procedure. Still we have been unable to extract the same data set. We found three main differences:

- a) 71 of the 267 locations did not contain a complete paradigm, whereas B&M had found only 13;
- b) in some locations (e.g. Lokeren and Beekbergen), PRS.3SG and PRS.1PL display multiple markers, whereas in other locations (e.g. Lokeren and Diksmuide), PRS.3PL and PRS.2PL display different markers than the one given by B&M;
- c) for the variety of Lemmer, B&M mentions six verb forms, while we found only three. For PRS.1SG, the form mentioned in B&M is only available in the inverted subject-verb order. The PRS.2SG form is available in the polite form, but this is different from the one reported in B&M (*leven* vs *leef*). The same holds for the PRS.2PL form, which is *leven* in B&M, but *leef* in the database.

To sum up, even though they are mostly similar to our data, the data of B&M a) contain only single forms, whereas in some cases we found multiple alternatives, b) they sometimes contain different forms than in our data, and c) they sometimes contain forms where we found none. In order to harmonize the two data sets we would have to remove some competing forms, change others and add forms where no data is present, but it is unclear how this should be done. See Kim Sang (2016) for a full report on the reproduction of B&M data.

Table 1: Dutch inflectional paradigms of *leven* ‘to live’ (IND.PRS).

1 Affix		2 Affixes		3 Affixes		4 Affixes	
Beekbergen (Gelderland)		Diksmuide (Flanders)		Leuven (Brabant)		Lemmer¹² (Friesland)	
<i>leef-∅</i>	<i>leef-∅</i>	<i>lev-en</i>	<i>lev-en</i>	<i>leef-∅</i>	<i>lev-en</i>	<i>leef-∅</i>	<i>lev-en</i>
<i>leef-∅</i>	<i>leef-∅</i>	<i>leef-t</i>	<i>lev-en</i>	<i>leef-t</i>	<i>leef-t</i>	<i>leef-st</i>	<i>leef-t</i>
<i>leef-∅</i>	<i>leef-∅</i>	<i>leef-t</i>	<i>lev-en</i>	<i>leef-t</i>	<i>lev-en</i>	<i>leef-t</i>	<i>lev-en</i>
		Lower Saxony		St. Dutch		Bree (Flemish Limburg)	
		<i>leef-e/-∅</i>	<i>leef-t</i>	<i>leef-∅</i>	<i>lev-en</i>	<i>leef-∅</i>	<i>lev-en</i>
		<i>leef-t</i>	<i>leef-t</i>	<i>leef-t</i>	<i>lev-en</i>	<i>leef-s</i>	<i>leef-t</i>
		<i>leef-t</i>	<i>leef-t</i>	<i>leef-t</i>	<i>lev-en</i>	<i>leef-t</i>	<i>lev-en</i>
		Hasselt (Flemish Limburg)		Stellingwerf		Groningen	
		<i>leef-∅</i>	<i>lev-en</i>	<i>leef-∅</i>	<i>lev-en</i>	<i>leef-∅</i>	<i>lev-en</i>
		<i>leef-∅</i>	<i>leef-∅</i>	<i>leef-en</i>	<i>lev-en</i>	<i>leef-st</i>	<i>lev-en</i>
		<i>leef-∅</i>	<i>lev-en</i>	<i>leef-t</i>	<i>lev-en</i>	<i>leef-t</i>	<i>lev-en</i>
		SE Limburg/ River area		Limburg			
		<i>lev-∅/-t</i>	<i>lev-en</i>	<i>leef-∅</i>	<i>lev-en</i>		
		<i>lev-∅/-t</i>	<i>lev-en</i>	<i>leef-s</i>	<i>lev-en</i>		
		<i>lev-∅/-t</i>	<i>lev-en</i>	<i>leef-∅</i>	<i>lev-en</i>		
				Friesland			
				<i>leef-en</i>	<i>lev-en</i>		
				<i>leef-st</i>	<i>lev-en</i>		
				<i>leef-t</i>	<i>lev-en</i>		
				[no coherent distribution]			
				<i>leef-∅</i>	<i>lev-en</i>		
				<i>leef-∅</i>	<i>lev-en</i>		
				<i>leef-t</i>	<i>lev-en</i>		

Some generalizations that seem to hold for the whole set of dialects have been proposed by B&M, according to whom a) all the 4-affixes systems display a *-st* PRS.2SG verbal ending and a *du/dich* 2SG pronoun¹³ and b) the PRS.3SG verbal ending is spelled out by *-t*. Interestingly, though, there are dialects with a 4-suffixes system that seem to violate a). The variety spoken in Bree, for instance, displays a PRS.2SG *-s* ending, rather than the

¹² Some variation can be found by comparing SAND and GTRP data. For instance, the GTRP database gives [ɪk le:f], [doː le:fst/joː le:və], [hɛi le:ft], [vɛi le:və], [jim le:və], [sɛi le:və], whereas the SAND gives PRS.1SG *leef* (test sentence nr. 157), PRS.3SG *leeft* (test sentence nr. 158), PRS.1PL *leve* (test sentences nr. 168, 169), PRS.2PL *leve* (test sentence nr. 161), PRS.3PL *leve* (test sentences nr. 162, 166 and 167). See also the test sentences nr. 163 and 164, which give, respectively, *as je gezond leve dan leefje langer* and *ast gezond leefst dan leefst langer* ‘if you live healthily you’ll live longer’.

¹³ In the dialects in which this pronoun no longer exists, the PRS.2SG inflectional marker assimilated with the PRS.3SG *-t* (St. Dutch, West-East-Flanders and Lower Saxony). An exception is the dialect of Stellingwerf, where the PRS.2SG ending is *-en*, together with a few isolated dialects in which PRS.2SG is spelled out by a zero morpheme (B&M: 298).

expected *-st*. Similarly, there are dialects, such as the 3-affixes ones spoken in Limburg and the majority (12 out of 17) of the ones spoken in South-East Limburg and in the River area, in which the PRS.3SG affix is $-\emptyset$, contradicting b).

As shown by Goeman (1999), many Dutch dialects show an optional process of word final *t*-deletion, which is particularly productive in the Betuwe region.¹⁴ This process is conditioned by the morphological category of the relevant form, as *-t* deletes more frequently along the following scale: (regular) SUP < N < PST.PTCP < PRS.3SG < PRS.2SG < PST.¹⁵ Together with the presence of the *du/dich* 2SG pronoun, which otherwise occurs only in varieties displaying the *-st* PRS.2SG inflectional ending, the morphological properties of *t*-deletion suggest that what surfaces in Bree as *-s* might underlyingly be *-st*.¹⁶ In other words, the 3-ways distinction in the verbal paradigm of Limburg dialects (PRS.1,3SG $\Rightarrow -\emptyset$, PRS.2SG $\Rightarrow -s$, PRS.1,2,3PL $\Rightarrow -en$) derives from an underlying 4-way distinction (PRS.1SG $\Rightarrow -\emptyset$, PRS.2SG $\Rightarrow -st$, PRS.3SG $\Rightarrow -t$, PRS.1,2,3PL $\Rightarrow -en$) by means of word-final *t*-deletion. The *-st* \Leftrightarrow *du/dich* correlation, thus, can be maintained. Furthermore, note that the varieties displaying an *-s* PRS.2SG inflectional ending show a “preference for applying *t*-deletion” (B&M fn 21), and are geographically adjacent to the ones displaying *-st*.

The properties of *t*-deletion can also provide some support for the generalization according to which the PRS.3SG marker is *-t* in the whole Dutch-speaking area (B&M; see also Aalberse & Don 2009). Indeed, if we extend the *-t* deletion account to the varieties showing only the $-\emptyset$ ending, such as the Beekbergen and Limburg dialects referred to above, the PRS.3SG $\Rightarrow -t$ generalization holds without exceptions (notice that the dialect of Beekbergen is spoken in a “strong *t*-deletion area”; B&M: fn 22). The 3SG ending of these dialects, thus, can be considered a morpheme whose underlying phonological content does not make it to the surface. We conclude, then, that together with the PRS.2SG *-st* ending, the PRS.3SG ending of the dialects just mentioned represents an instance of a *phonetically* empty morpheme: there is some morphosyntactic content that is spelled out by a phonological exponent – *-t* – that receives no phonetic interpretation. This is represented in (2). As shown, the verbal root is underlyingly followed by the expected markers (*-st* and *-t*), whose coronal stop, though, lacks the pronunciation relation:

(2)		PRS.2SG	PRS.3SG
		x	x
		x	x
phonological representation	↕	↓	↓
		s	t
phonetic interpretation		[s]	∅

Besides the optionality of *t*-deletion, the presence of *-t* in the underlying representation of the relevant endings is betrayed by the activation of progressive voicing assimilation:

(3)	kom-t	van
	come-PRS.3SG	from
	‘(s/he) comes from’	
	[^h komp fan]	
	[^h kom fan]	

¹⁴ This change starts in the Middle Ages and spreads within the Dutch speaking area as a consequence of dialect contact (internal short and long distance migrations; Goeman 1999: 196).

¹⁵ Other conditioning factors are frequency and the phonological properties of *-t* context (Goeman 1999: 199).

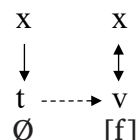
¹⁶ The fact that *-t* is retained in the PRS.3SG ending of these varieties is in line with the “PRS.3SG. < PRS.2SG” chunk of implicational hierarchy given above. However, note that, as pointed out by a reviewer, PRS.2SG *-t* is most likely an innovation, resulting from a reanalysis of the first segment of the 2SG pronoun *tu* following the verbal ending *-s* as belonging to the agreement morpheme. It is thus not clear whether Bree dialect had *-st* and then *t*-deletion, or whether it never had *-st*.

As shown in (3), the word-initial fricative of the preposition – /van/ – gets devoiced – [fan] – even if the preceding verbal form – [kom] – does not overtly end in a voiceless consonant. It is interesting to note that, in the 19th century, dialects showing a particularly productive *t*-deletion process, such as the ones spoken in Betuwe, displayed compensatory lengthening (Goeman 2007: 73):

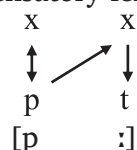
- (4)
- | | | |
|--------------|------|------------------|
| lo:p-en | hei | lo:p-t |
| walk-INF | he | walk- PRS.3SG |
| ‘to walk’ | ‘he | walks’ |
| [ˈlopə] | [hei | ˈlop:] |
| gelo:v-en | hei | gelo:v-t |
| believe-INF | he | believe- PRS.3SG |
| ‘to believe’ | ‘he | believes’ |
| [ˈglovə] | [hei | ˈglɔf:] |

In the forms given in (4), the length of the word-final consonant of the PRS.3SG forms can be argued to result from a process of progressive place/manner assimilation (similarly to what happens in the forms in (1)): /p-t/ > [p:] and /v-t/ > [f:]. The processes in (3) and (4) are shown in (5), where progressive assimilation of /t/ voicelessness (5a) and compensatory lengthening of /p/ (5b) are represented by the rightward arrow. Letting aside the details of the assimilation process (see Cavirani & van Oostendorp 2017 for a proposal in terms of voicing licensing), note that, despite it being silent (i.e. lack of the pronunciation relation), *-t* is still part of the phonological representation, and is thus allowed to interact with adjacent segments. In (5a), it ‘suppresses’ /v/ voicing, which hence surfaces as [f]. In (5b), it is still projected by its skeletal slot, which is though spelled-out by the preceding /p/.

- (5) a. Progressive assimilation



- b. Compensatory lengthening



Besides the PRS.3SG and PRS.2SG ending, the PRS.1SG inflectional marker also shows interesting properties. Even if there is no trace of the marker itself in the acoustic signal, the phonological behavior of adjacent segments suggests that this inflectional marker is actually equipped with some phonological content. This is supported by the observation that the 1SG inflectional marker can prevent word-final devoicing to apply: whereas word-final devoicing applies systematically throughout the whole Dutch speaking area, if we focus on PRS.1SG forms and their diatopic distribution in the SAND, MAND and GTRP atlases, many exceptions can be found (van Marle & Zonneveld 1980; Zonneveld 1982; Goeman 1999; 2007; van Oostendorp 2005; Cavirani & Van Oostendorp 2017). An example of this exceptional behaviour is represented by the dialect of Tilligte, in which word-final fricatives resist devoicing only when (following long vowels and) occurring root-finally in PRS.1SG verbs.

(6)	yelø:v	yelø:v-Ø
	faith.SG	believe- PRS.1SG
	‘faith’	‘I believe’
	[yelø:f]	[yelø:v]
	yelø:v-en	yelø:v-en
	faith-PL	believe- PRS.3PL
	‘faiths’	‘we believe’
	[yeløvən]	[yeløvən]

Apparently, when we look at the forms for ‘faith’ and ‘I believe’, nothing follows the root-final segment. However, whereas the former undergoes devoicing – [yelø:f] –, the latter keeps its underlying voicing specification – [yelø:v]. Given that devoicing applies regularly in word-final position also in this variety, we are led to conclude that the fricative of the PRS.1SG form does not really occupy the word-final position, and that it is indeed followed by a *phonetically* empty PRS.1SG ending that, as in the case of those for PRS.3SG and PRS.2SG, is equipped with morphosyntactic and phonological content. The PRS.1SG marker of the Tilligte dialect would thus be represented as in (7a), where it is compared with a fully pronounced PRS.1SG marker (7b) (see Cavirani & van Oostendorp 2017: 114 for further discussion):

(7) a. phonetically empty PRS.1SG

x
↓
ə
Ø

b. fully pronounced PRS.1SG

x
↑
ə
[ə]

Something similar can be observed in the Stellingwerven dialect (Eastern Friesland), in which, besides to fricatives (preceded by a long vowel), devoicing optionally applies to coronal stops only when they occur in the *apparently* word-final position of PRS.1SG verbs:

(8)	ig bʌt ok	ɲ	kɪ:ər	hɛj	də	hu:t	al	op
	ig bʌd ok	ɲ	kɪ:ər	*hɛj	də	hu:d	al	op
	I bet	also	one time	have	the	hat	already	on
	‘I also make one offer.’			‘Are you already wearing your hat?’				

As shown in (8), whereas devoicing obligatorily applies to the word-final coronal segment of nouns – /hu:d/ > [hu:t] ‘hat’ –, it is not obligatory in PRS.1SG verbs – /bʌd/ > [bʌt/bʌd] ‘I bet’. We conclude that the PRS.1SG marker in the Stellingwerven dialect is represented as in (7a).¹⁷ PRS.1SG-final stops resist devoicing also in Limburg and South-Brabant dialects. As for the former, Goossens (1977) reports forms such as *ix heb* ‘I have’, where the bilabial stop keeps its underlying voicing specification (cfr. *hebben* ‘to have’). As for South-Brabant dialects, see for instance De Vriendt & Goyvaerts (1989), who report the case of the Brussels dialect, where velar stops resist devoicing (when following a nasal

¹⁷ The fact that (the resistance to) devoicing is optional, could be due to an ongoing process turning a *phonetically* empty PRS.1SG marker into a *phonologically* empty one, which cannot protect from devoicing any longer.

segment), as in *ik bring* ‘I bring’ (cfr. *brenge* ‘to bring’). More recently, Van Oostendorp (2005) proposes that the root-final velar stop does not belong to the underlying representation, which should actually end with a velar nasal. The stop, thus, would result from a process of epenthesis that applies in word-final position. Crucially, *k*-epenthesis applies only to singular nouns (/puliŋ/ ‘eel’ > [puliŋk]), and not to PRS.1SG verbs (/ik ziŋ-Ø/ ‘I sing’ > [ik siŋ]), no matter if the velar nasal is not followed by any audible segment in both cases:

(9)	puliŋ	ik ziŋ-Ø
	eel	I sing- PRS.1SG
	‘eel’	‘I sing’
	[puliŋk]	[ik siŋ]
	puliŋ-en	wej ziŋ-en
	eel-PL	we sing- PRS.3PL
	‘eels’	‘we sing’
	[puliŋə]	[wej siŋə]

The facts in (9) are represented in (10), which shows the contrast between the phonologically empty noun marker and the phonetically empty PRS.1SG marker. As discussed above, only the latter triggers *k*-epenthesis. We argue that this is due to the fact that the velar nasal is a complex segment, which needs to be licensed by a following non-empty nucleus, as the PRS.1SG marker in (10b). Since noun markers are apparently phonologically empty, they cannot license such a complex structure, which needs to be supported by two skeletal positions. This is represented in (10a) as the spreading to and pronunciation by a following skeletal slot of nasal’s velarity, symbolized by *k* (see Ulfsbjorninn & Larouchi 2016 for similar ideas).

(10)	a.	<i>k</i> -epenthesis
		x x
		↓ ↑
		ŋ --> k
		[ŋ k]
	b.	no <i>k</i> -epenthesis
		x x
		↓ ↓
		ŋ ə
		[ŋ] Ø

In the same dialect, voiced coronal stops undergo a process of intervocalic weakening – *bieden* ‘to offer’ > *biejen* -, which applies also in 1SG, no matter if no audible vocalic segment follows the stop – *ik bieje* (**ik biet*). As shown in (11), the PRS.1SG of ‘to dress’, which shows *d*-weakening – [klej] -, contrasts with PRS.3SG, which instead shows final devoicing – [klɪt]:

(11)	ik kle:d-Ø	ma	a kle:d-t	əm
	I dress- PRS.1SG	myself	he dress- PRS.3SG	himself
	‘I dress myself.’		‘he dresses himself.’	
	[ik klej ma]		[a klɪt əm]	

As in the case of the dialects of Stellingwerf and Tilligte, the presence of a vocalic PRS.1SG ending can be thus argued for despite its phonetic absence (as in (7a)).

In Standard Dutch, word-final devoicing applies systematically to all the forms displaying the right structural description, PRS.1SG verbs included (e.g. *ik schaad* ‘I damage’ > [ɪk sxat]). PRS.1SG verbs, though, display another interesting property. Whereas word-final nasals can be deleted when they occur after /ə/ in prepositions, adjectives, nouns and infinitival endings, they resist deletion when they represent the root-final segment of PRS.1SG forms (Zonneveld 1982; van Hout & van de Velde 2000):

(12)	Preposition	Adjective	Noun	Infinitive	PRS.1SG
	tegen	open	teken	teken-en	ik teken
	against	open	sign	draw-INF	I draw
	‘against’	‘open’	‘sign’	‘to draw’	‘I draw’
	[teyən]	[opən]	[tekən]	[tekənən]	[ɪk tekən]
	[teyə]	[opə]	[tekə]	[tekənə]	*[ɪk tekə]

In Standard Dutch, too, the PRS.1SG ending seems to be endowed with some minimal amount of phonological content that prevents root-final segment from occurring in word-final position, in spite of its phonetic emptiness. As a consequence, the nasal cannot be unpronounced (see Cavirani & van Oostendorp 2017 for a formalization of the various degrees of phonological emptiness and the related phonological activity).

2.3 Adjectival concord

When occurring in predicative constructions, Dutch adjectives show no inflectional ending. When used attributively, though, they agree with the noun phrase they modify.

In Standard Dutch, we can identify two inflectional ending, *-/ə/* and *-∅*, which are selected according to the semantic, syntactic and phonological properties of the relevant noun phrase (Broekhuis 2014). When adjectives modify common gender nouns (i.e. *de*-words, as in (13a)), they always get the *-/ə/* ending, no matter if the noun is singular or plural, definite or indefinite. The (in)definiteness parameter matters, though, if the noun is neuter (i.e. a *het*-word, as in (13b)), for if indefinite and singular, adjectives take the *-∅* ending:

(13)	a.	de oudə stoel	de oudə stoelen
		the old chair	the old chairs
		‘the old chair’	‘the old chairs’
		een oudə stoel	oudə stoelen
		an old chair’	old chairs’
		‘an old chair’	‘old chairs’
	b.	het oudə boek	de oudə boeken
		the old book	the old books
		‘the old book’	‘the old books’
		een oud-∅ boek	oudə boeken
		an old book	old books
		‘an old book’	‘old books’

Beside these syntactic restrictions, the selection of the inflectional ending is conditioned by phonological constraints.¹⁸ This is shown in (14), where the syntactic conditions would require *-/ə/* to appear on both the adjectives preceding the nouns:

¹⁸ There seems to be some semantic restriction as well. For instance, *-/ə/* alternates with *-∅* when the adjective is combined with singular nouns denoting persons (*een wijs-∅/-ə man* ‘a wise man’), leading to two different readings. Furthermore, *-∅* is selected also when the adjective denotes a material (usually, these adjectives end in *-/ən/* and can hence be given a phonological explanation (see below), which, however,

- (14) de oudə kaki-∅ broek
 the old khaki trousers
 ‘the old khaki trousers’
 de blauwə open-∅ deur
 the blue open door
 ‘the blue open door’

The relevant phonological factors conditioning the apparent failure of agreement on the rightmost adjectives in (14) concern the root-final segment, as the $-\text{/ə/}$ ending is absent when adjectives end in the long vowels $/a/$, $/o/$, $/i/$, or in $/ə/$ and $/ən/$:¹⁹

- (15) $/a/$ een prima-∅ opmerking
 an excellent remark
 ‘an excellent remark’
 $/o/$ een albino-∅ muis
 an albino mouse
 ‘an albino mouse’
 $/i/$ de kaki-∅ broek
 the khaki trousers
 ‘the khaki trousers’
 $/ə/$ de beige-∅ stoel
 the beige chair
 ‘the beige chair’
 $/ən/$ de dronken-∅ soldaat
 the drunken soldier
 ‘the drunken soldier’

The difference between $/a/$, $/o/$ and $/i/$, and $/e/$, $/y/$ and $/u/$ is arguably due to the prosodic structure of the words containing them: whereas the forms ending in $/e/$, $/y/$ and $/u/$ are stress-final, the ones ending in $/a/$, $/o/$ and $/i/$ are paroxitones. The $-\text{/ə/}$ ending thus only appears if the stem-final vowel is stressed.

Let us stress here that, by allowing for phonological structure not to necessarily reach the phonetic surface, we could think of the spell-out generalization in (16) as exceptionless:

- (16) a. $[+N][+INDF][+SG] \Rightarrow \text{adjective} + \text{-}\emptyset$
 b. otherwise: adjective + $-\text{/ə/}$

When *syntactically* licensed, the $-\text{/ə/}$ ending undergoes Vocabulary Insertion. Its pronunciation, though, is phonology’s business: if *phonologically* licensed, it gets phonetically interpreted, otherwise it stays silent. More precisely, assuming that a) roots universally end in a nucleus (represented by ‘V’; Lowenstamm 1996; 2008) and b) $-\text{/ə/}$ is a floating vowel, we derive the fact that this ending can only be pronounced if licensed by a nuclear position, namely if it can land on the empty nucleus following a root-final consonant (including the glide of forms such as *vrij* ‘free’). This is shown in (17), where the failure of $/ə/$ integration in the phonological structure is represented by the barred line in (17a).

would not hold for an adjective such as *plastic*-∅ ‘plastic’. Note that if the orthographic form of this adjective is *plastiek*, it tends to take $-\text{/ən/}$. Apart from these restrictions, there seem to be a bunch of loan words that do not take $-e$ (*aluminium*, *privé*, *gratis*, etc.). These rather marginal data cannot be given a straightforward analysis in the proposed theory.

¹⁹ When it ends in the long $/e/$, $/y/$ and $/u/$, an intervocalic glide is epenthesized between the root and $-\text{/ə/}$; this can be orthographically represented by $\text{-}\ddot{e}$ [$-\text{jə}$]. Beside the set of long vowels in (15) $-\text{/ə/}$ appears also after adjectives ending in a diphthong: *een vrij*- $-\text{/ə/}$ *stoel* ‘a free chair’.

This contrast with (17b), where /ə/ docks on the word-final empty V and is therefore integrated in the phonological structure and pronounced.

- (17) a. kaki ‘kaki’
 C V C V C V
 | \ | |
 k a k i ə
 [ˈkaki]
- b. oud ‘old’
 C V C V
 | | | ↑
 a u d ə
 [ˈaʊdə]

(17a) thus represents a case of *apparently zero morpheme*. Abiding by the Vocabulary Insertion rule given in (16), /ə/ enters the derivation, but it fails to be integrated in the structure and gets no phonetic interpretation. Note that this is slightly different from the cases of phonetic emptiness discussed in section 2.2, represented as in (7a). In those cases, the phonological element – /ə/ – is integrated in/part of the phonological structure, i.e. it displays the projection relation. What makes it phonetically empty is the absence of the pronunciation relation. In contrast, in (17a), the schwa has no projection relation (by virtue of it being a floating element), and cannot be pronounced by the word-final empty V, as the latter is already pronouncing the root-final /i/. As a consequence, the schwa keeps on floating. We maintain that a similar analysis holds for adjectives ending in *-/ən/* (e.g. *opən* ‘open’). As discussed above, the root final nasal of adjectives can be left unpronounced (see ex. (12)). We argued that this does not happen to PRS.1SG verbs because the latter are followed by a phonetically empty morpheme (7a). Given what we have just said about adjective concord (e.g. (16)), the question is then how is it possible that there is nasal deletion in this case, while we would expect there to be a schwa that expresses the agreement relation. Put differently, how do the representations of the verbal form and the attributive adjective differ? Building on the hypothesis that the “ideal” Dutch word consist of exactly one trochaic foot (Kooij & van Oostendorp 2003), and on the observation reported above that *-/ə/* only appears if the stem-final vowel is stressed, we argue that the floating /ə/ of attributive adjectives fails in being integrated in the word-final empty V slot of */opənV/* because that would create an illicit metrical structure (a dactyl). In other words, a constraint on the metrical structure would make the word-final empty V unavailable to host the floating /ə/, which would keep on floating (as in (17a)). As a consequence, the nasal occurs in word-final position and it can be left unpronounced. This would not happen in PRS.1SG verbs, as in this case /ə/ is not a floating element: as shown in (7a), it comes with its skeletal slot. This means that, when it enters the derivation at Lexical Insertion, /ə/ is already integrated in the phonological representation: it displays the projection relation, which cannot be deleted by the metrical constraint favoring trochaic feet.²⁰ Thus, despite being unpronounced (no pronunciation relation), the PRS.1SG marker prevents /n/ from occurring in word-final position. As a consequence, the latter cannot be left unpronounced.

Moving south to the Dutch-speaking Belgium, the set of adjectival inflectional endings becomes much richer. Taeldeman (1980) identifies four inflectional endings: *-/ən/*_M, *-/ə/*_F, *-∅*_N and *-/ə/*_{PL}. However, even if adjectives agreeing with neuter nouns systematically display

²⁰ This follows from the Consistency of Exponence hypothesis (McCarthy & Prince 1994): “Gen can neither insert nor delete lexical material, hence it simply cannot change projection lines, but it can freely manipulate pronunciation lines” (Van Oostendorp 2008: 137).

the $-\emptyset$ ending, “synchronically [...] there remain indications of a historical $-\emptyset$ ” (Taeldeman 1980: 225 fn. 3). For instance, in Flanders and in the northern half of Antwerp, adjectives ending in a long vowel followed by /d/ show no ending when occurring in predicative constructions. As a consequence, the voiced coronal undergoes devoicing: /d/ > [t]. When occurring in attributive constructions, no ending apparently follows the root-final consonant either. However, rather than undergoing devoicing, the coronal consonant turns into a glide:

- (18) hij is kwaa[t] een kwaa[j] wijf
 he is angry an angry woman
 ‘he is angry’ ‘an angry woman’
 het is ou[t] ou[w] bier
 it is old stale beer
 ‘it is old’ ‘stale beer’

As in the case of the PRS.1SG ending in Brussels Dutch (see (11)), the root-final coronal behaves as if it were intervocalic, as shown by the fact that the root-final /d/ shows the same behavior in masculine, feminine and plural adjectives, as well as in infinitives and comparatives, whose inflectional endings display an audible vowel:

- (19) doo[j]- \emptyset doo[j]- $\text{\textcircled{a}n}$ doo[j]- $\text{\textcircled{e}}$ laa[j]- $\text{\textcircled{a}n}$ roo[j]- $\text{\textcircled{e}r}$
 dead-N dead-M dead-F/PL load-INF red-COMP
 ‘dead’ ‘dead’ ‘dead’ ‘to load’ ‘more red’

We take these facts as evidence of $-\emptyset_N$ actually being a vocalic ending, crucially different from the (absence of any) ending in predicatively used neuter adjectives. This is represented in (20), where the representations are given of ‘dead’ in predicative position (20a) and of ‘dead’ agreeing with N (20b) and F/PL (20c) nouns in attributive position.

- (20) a. ‘dead’ PRED
 C V C V C V
 | / |
 d o d
 [do:t]
 b. ‘dead_N’ ATTR
 C V C V C V
 | / | ↑
 d o d ə
 [do:j]
 c. ‘dead_{F/PL}’ ATTR
 C V C V C V
 | / | ↓
 d o d ə
 [do:jə]

Turbidity Theory allows for the formalization of the difference between the forms in (20): at Vocabulary Insertion, when ‘dead’ occurs in predicative position, no segment is inserted, and the word-final nucleus stays *phonologically* and *phonetically* empty. As a con-

sequence, the root-final stop gets devoiced. When ‘dead’ occurs in attributive position and agrees with a N noun, a floating /ə/ is inserted and integrated in the word-final empty nucleus. By virtue of it being integrated in the phonological structure, the phonological process of intervocalic weakening can apply to the root-final stop, which turns into a glide. However, since it lacks the pronunciation relation, /ə/ does not make it to the phonetic modules and is thus inaudible. If the attributive ‘dead’ agrees with a F/PL noun, though, /ə/ enjoys both a projection and a pronunciation relation. As a consequence, it triggers intervocalic weakening and is audible.²¹

A similar approach also holds for the Limburg dialects data shown below. In these dialects, feminine, plural and neuter attributive adjectives all lack the schwa ending. Nevertheless, feminine and plural adjectives contrast with neuter adjectives (Van Oostendorp 2005; Hermans 2009). Given the absence of any ending, the contrast needs to be expressed in another way: the tonal profile. As shown in (21), whereas neuter adjectives display Accent 1, feminine, schwa-less adjectives display Accent 2, namely the same tonal profile of masculine adjectives, which crucially end in schwa²²:

(21)	Accent 2		Accent 1
	wíís	wîís-Ø	wîíz-ə
	wise.N	wise-F	wise-M
	‘wise’	‘wise’	‘wise’

Interestingly, the same tonal contrast can be observed in feminine adjectives when occurring in predicative vs attributive position: *gríís* ‘grey.PRED’ vs *grîís* ‘grey.ATTR.F’. According to Hermans (2009: 363), “the forms where the accent alternates [...] are morphologically complex [and] have lost an old schwa”. Note that “this morphological bifurcation occurs in all major categories. In adjectives, the empty morpheme presumably marks the feminine gender in attributive position, because in this position all adjective have Accent1, provided their stem ends in a voiced consonant. In verbs, the empty vowel presumably marks the present tense in strong verbs, because all strong verbs have Accent1 in the present tense, provided, of course, their stem ends in a voiced consonant and no other overt suffix follows. Finally, in nouns it denotes class membership.”

Limburg dialects, thus, can be argued to resort to a (set of) phonologically empty vocalic morpheme(s), etymologically corresponding to /ə/, and representationally similar to the ones given in (20b).

3 Phonological emptiness is irrelevant for morphosyntax

As we pointed out in section 1, there is quite some morphosyntactic literature about zero inflection, which suffers from the problem that it assumes that certain forms have no inflectional ending, simply because there is no audible exponent. When the presence of a zero morpheme is instead argued for, phonetic silence is usually equated to phonological emptiness. However, as discussed in the previous section, the absence of an audible signal does not mean that there is no phonological material. In fact, behind the ‘monolithic’ concept of zero morpheme, phonological objects of various nature and degrees of complexity can be found. In this paper, we suggested that, by closely inspecting the representational nature of zero morphemes – e.g. non-integrated floating /ə/ (17a), empty V slots (20a),

²¹ The representation of the segment preceding /ə/ in (20) and (17) should be understood as enjoying both the projection and the pronunciation relation. Since they were not crucial for the argument, the arrows representing these relations have not been included to keep the representations as simple as possible.

²² Phonetically, the pitch change is realized relatively early in the stressed syllable in Accent 1, whereas, in Accent 2, the change is realized much later and can show up in the post-stress syllable (Hinskens & Taeldeman 2013: 339).

/ə/-filled V slots (17b) – and introducing a Turbidity Theory kind of computation – e.g. projection ((7a), (20b)) vs projection & pronunciation relation ((7b), (20c)) -, a substantial amount of the variation burden can be shifted from the morphosyntactic to the phonological component and its interface with phonetics.

As for the upper phonology interface, syntax is known to be usually insensitive to phonological material (there are no syntactic rules that refer to labiality or to voiced consonants). How does emptiness fit this picture? Are empty phonological objects any different from filled ones?

Scheer (2011), after careful consideration of all possible counterexamples to the so-called phonology-free syntax hypothesis, such as heavy NP shift, points out that these always seem to involve phonological weight: it is the size of phonological constituents that seems to matter. He proposes (see also Scheer 2012) that syntax and phonology share a skeletal tier, on which size is measured, but that they do not see each other's featural content. Van Oostendorp, Putnam and Smith (2016) point out that this relation is indeed mutual, and that phonology also only sees syntactic structure (mostly edges of constituent structure), and no syntactic features.

Given these observations, however, we do not expect empty elements to be any different at all from filled elements. There is no specific reason why an element with no features should show a different morphosyntactic behaviour from other elements. There is no specific reason why the skeletal slots should behave any differently in the syntax if they have no features, and we have seen that they do not. In this sense, then, phonological emptiness is irrelevant for morphosyntax.

However, we have also observed at several places that within the phonology, we need to distinguish between empty elements (i.e. elements without a realization in the phonetics) that have no special morphosyntactic status either, and thus are present for purely phonological reasons (e.g. the word-final empty V slots in (20a)), and those that do have such a status, e.g. because they are a separate morpheme. The Limburg examples discussed at the end of the previous section are an example of this: if an empty element is a morpheme, it tends to have more phonological licensing power. The reason may be that in this way, the morpheme is somehow 'recoverable' in the phonological component, and even detectable in the phonetic output.²³ Such a (non-local) recoverability is also claimed to underlie e.g. *pro*-drop in some analyses: phonologically empty material is only allowed to occur if we can recover the features elsewhere (e.g. in the verbal inflection). Note that under such a recoverability analysis, the emptiness of certain morphemes or even (function) words is irrelevant for morphosyntax proper: it is a property of the interface between morphosyntax and phonology.

But, paradoxically, this irrelevance means that phonologically null elements should not be underestimated: to the contrary, one needs to be on the constant lookout for these elements and their internal complexity.

Abbreviations

ATTR = attributive, COMP = comparative, F = feminine, IND = indicative, INDF = indefinite, N = neuter, M = masculine, PL = plural, PRED = predicative, PRS = present, PST = past, PTCP = participle, SG = singular, SUP = superlative.

Competing Interests

The authors have no competing interests to declare.

²³ As similar point is made by Goeman (2006), who claims that "it is not a new fact that language users use phonetic/phonological characteristics to anchor the information that incorporated a disappearing or lost morpheme elsewhere in the word, so that this information is not lost".

References

- Aalberse, Susan. 2007. The typology of syncretisms and the status of feature structure. Verbal paradigms across 355 Dutch dialects. *Morphology* 17(1). 109–149. DOI: <https://doi.org/10.1007/s11525-007-9111-0>
- Aalberse, Susan & Jan Don. 2009. Syncretism in Dutch dialects. *Morphology* 19(1). 3–12. DOI: <https://doi.org/10.1007/s11525-009-9132-y>
- Aalberse, Susan & Jan Don. 2011. Person and number syncretisms in Dutch. *Morphology* 21(2). 327–350. DOI: <https://doi.org/10.1007/s11525-010-9164-3>
- Ackema, Peter & Ad Neeleman. 2003. Context-sensitive spell-out. *Natural Language & Linguistic Theory* 21(4). 681–735. DOI: <https://doi.org/10.1023/A:1025502221221>
- Ackema, Peter & Ad Neeleman. 2013. Person features and syncretism. *Natural Language & Linguistic Theory* 31. 901–950. DOI: <https://doi.org/10.1007/s11049-013-9202-z>
- Backley, Philip. 2011. *An introduction to element theory*. Edinburgh: Edinburgh University Press.
- Backley, Philip. 2012. Variation in element theory. *Linguistic Variation* 12(1). 57–102. DOI: <https://doi.org/10.1075/lv.12.1.03bac>
- Baerman, Matthew, Dunstan Brown & Greville Corbett. 2005. *The syntax-morphology interface: A study of syncretism*. Cambridge: Cambridge University Press. DOI: <https://doi.org/10.1017/CBO9780511486234>
- Barbiers, Sjef, Hans Bennis, Gunther de Vogelaer, Magda Devos & Margreet van der Ham. 2005. *Syntactische atlas van de Nederlandse dialecten/Syntactic atlas of the Dutch dialects, Volume I*. Amsterdam: Amsterdam University Press. DOI: <https://doi.org/10.5117/9789053567005>
- Barbiers, Sjef, Johan van der Auwera, Hans Bennis, Eefje Boef, Guther De Vogelaer & Margreet van der Ham. 2008. *Syntactic atlas of the Dutch dialects, Volume II*. Amsterdam: Amsterdam University Press.
- Bendjaballah, Sabrina & Martin Haiden. 2003. Templatic architecture. *Recherches Linguistiques de Vincennes* 32. 157–168. DOI: <https://doi.org/10.4000/rlv.489>
- Bendjaballah, Sabrina & Martin Haiden. 2008. A typology of emptiness in templates. In Jutta Hartmann, Veronika Hegedus & Hans van Riemsdijk (eds.), *The Sounds of Silence*, 21–57. Amsterdam: Elsevier.
- Bennis, Hans & MacLean A. 2006. Variation in verbal inflection in Dutch dialects. *Morphology* 16(2). 291–312. DOI: <https://doi.org/10.1007/s11525-007-9109-7>
- Broekhuis, Hans. 2014. *Syntax of Dutch: Adjectives and adjective phrases*. Amsterdam: Amsterdam University Press. DOI: https://doi.org/10.26530/OAPEN_462289
- Bybee, Joan. 1994. The grammaticization of zero: Asymmetries in tense and aspect systems. In William Pagliuca (ed.), *Perspectives on grammaticalization*, 235–254. Amsterdam: John Benjamins. DOI: <https://doi.org/10.1075/cilt.109.02byb>
- Cavirani, Edoardo. 2015. *Modeling phonologization: Vowel reduction and epenthesis in Lunigiana dialects*. Utrecht: LOT publishing.
- Cavirani, Edoardo & Marc van Oostendorp. 2017. On silent markedness. In Bridget Samuels (ed.), *Beyond markedness in formal phonology*, 101–120. Amsterdam: John Benjamins. DOI: <https://doi.org/10.1075/la.241.05van>
- Charette, Monik. 2003. Empty and pseudo-empty categories. In Stefan Ploch (ed.), *Living on the Edge: 28 papers in honour of Jonathan Kaye*, 465–479. Berlin and New York: Mouton de Gruyter.
- Chomsky, Noam. 1982. *Some concepts and consequences of the theory of government and binding*. Cambridge MA: MIT Press.
- Chomsky, Noam & Howard Lasnik. 1977. Filters and control. *Linguistic Inquiry* 8(3). 425–504.

- Cinque, Guglielmo. (ed.) 2002. *Functional structure in DP and IP* (The Cartography of Syntactic Structures 1). New York: Oxford University Press.
- Cinque, Guglielmo & Luigi Rizzi. 2008. The cartography of syntactic structures. *Working Papers on Language and Cognition* 2. 43–59. DOI: <https://doi.org/10.1093/oxfordhb/9780199544004.013.0003>
- Dahl, Eystein & Antonio Fábregas. 2018. Zero morphemes. *Oxford research encyclopedias, Linguistics*. <https://oxfordre.com/linguistics/view/10.1093/acrefore/9780199384655.001.0001/acrefore-9780199384655-e-592>. DOI: <https://doi.org/10.1093/acrefore/9780199384655.013.592>
- De Vriendt, Sera & Didier Goyvaerts. 1989. Assimilation and sandhi in Brussels. *Leuvense Bijdragen* 78(1). 1–93.
- den Besten, Hans. 1989. *Studies in Westgermanic syntax*. Amsterdam: Rodopi.
- Embick, David. 2014. Phase cycles, φ -cycles, and phonological (in) activity. In Sabrina Bendjaballah, Mohamed Lahrouchi, Noam Faust & Nicola Lampitelli (eds.), *The form of structure, the structure of forms: Essays in honor of Jean Lowenstamm*, 270–286. Amsterdam: John Benjamins.
- Emonds, Joseph. 1994. Two principles of economy. In Guglielmo Cinque, Jan Koster, Jean-Yves Pollock & Luigi Rizzi (eds.), *Paths towards universal grammar: Studies in honor of Richard S. Kayne*. Georgetown: Georgetown University Press.
- Goeman, Antonie Cornelis Marie. 1999. *T-deletie in Nederlandse dialecten. Kwantitatieve analyse van structurele, ruimtelijke en temporele variatie*. Den Haag: Holland Academic Graphics.
- Goeman, Antonie Cornelis Marie. 2007. De morfologische atlas van de Nederlandse dialecten (MAND); Zero en bewaard gebleven morfologische informatie. *Taal en Tongval* 18. 66–92.
- Goeman, Antonie Cornelis Marie & Johan Taeldeman. 1996. Fonologie en morfologie van de Nederlandse dialecten. Een nieuwe materiaalverzameling en twee nieuwe atlasprojecten. *Taal en Tongval* 48. 38–59.
- Goldrick, Matthew. 2001. Turbid output representations and the unity of opacity. In Masako Hirotani, Andries Coetzee, Nancy Hall & Jeong-Young Kim (eds.), *Proceedings of NELS 30*, 231–245. Amherst, MA: GLSA.
- Goossens, Jan. 1977. *Inleiding tot de Nederlandse dialectologie*. Groningen: Wolters-Noordhoff.
- Hall, Nancy. 2006. Cross-linguistic patterns of vowel intrusion. *Phonology* 23. 387–429. DOI: <https://doi.org/10.1017/S0952675706000996>
- Hall, Nancy. 2011. Vowel epenthesis. In Marc van Oostendorp, Colin Ewen, E. Hume & Karen Rice (eds.), *The Blackwell companion to phonology, Volume III*, 1576–1596. Oxford, UK: Wiley-Blackwell. DOI: <https://doi.org/10.1002/9781444335262.wbctp0067>
- Halle, Morris & Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In K. Hale & S. J. Keyser (eds.), *The view from building 20*, 111–176. MIT Press, Cambridge.
- Hartmann, Jutta, Hagedüs Veronika & Henk van Riemsdijk. 2008. Introduction. In Jutta Hartmann, Veronika Hegedus & Henk van Riemsdijk (eds.), *The sounds of silence*, 1–20. Amsterdam: Elsevier.
- Hermans, Ben. 2009. The phonological structure of the Limburg tonal accents. In Kuniya Nasukawa & Philip Backley (eds.), *Strength relations in phonology*, 325–380. Berlin/New York: Mouton de Gruyter. DOI: <https://doi.org/10.1515/9783110218596.2.317>
- Hinskens, Frans & Johan Taeldeman. 2013. *Language and space. An International handbook of linguistic variation. Volume 3: Dutch*. Amsterdam/Philadelphia: Mouton de Gruyter.

- Katz, Jerrold & Paul Postal. 1964. *An integrated theory of linguistic descriptions*. Cambridge MA: The MIT Press.
- Kaye, Jonathan, Jean Lowenstamm & Jean-Roger Vergnaud. 1985. The internal structure of phonological representations: A theory of charm and government. *Phonology Yearbook* 2. 305–328. DOI: <https://doi.org/10.1017/S0952675700000476>
- Kaye, Jonathan, Jean Lowenstamm & Jean-Roger Vergnaud. 1990. Constituent structure and government in phonology. *Phonology* 7. 193–231. DOI: <https://doi.org/10.1017/S0952675700001184>
- Kayne, Richard. 2006. Hans Broekhuis, Norbert Corver, Riny Huybregts, Ursula Kleinhenz & Jan Koster (eds.), *Organizing grammar. Linguistic studies in honor of Henk van Riemsdijk*, 289–299. Berlin: Mouton de Gruyter.
- Kayne, Richard. 2016. The silence of heads. *Studies in Chinese Linguistics* 37(1). 1–37. DOI: <https://doi.org/10.1515/scl-2016-0001>
- Kim Sang, Erik Tjong. 2016. Verb inflection in the SAND. Internal Report, Meertens Institute.
- Kooij, Jan & Marc van Oostendorp. 2003. *Fonologie. Uitnodiging tot de klankleer van het Nederlands*. Amsterdam: Amsterdam University Press. DOI: <https://doi.org/10.5117/9789053566220>
- Lahrouchi, Mohamed. 2001. *Aspects morpho-phonologiques de la dérivation verbale en berbère (parler chleuh d'Agadir)*. Paris: University of Paris 7 dissertation.
- Lampitelli, Nicola. 2010. Nounness, gender, class and syntactic structures in Italian nouns. In Reineke Bok-Bennema, Brigitte Kampers-Manhe & Bart Hollebrandse (eds.), *Romance languages and linguistic theory 2008*, 195–214. Amsterdam: Benjamins. DOI: <https://doi.org/10.1075/rllt.2.11lam>
- Leu, Thomas. 2008. *The internal syntax of determiners*. New York: New York University dissertation.
- Lowenstamm, Jean. 1996. CV as the only syllable type. In Jacques Durand & Bernard Laks (eds.), *Current trends in phonology. Models and methods*, 419–441. Salford, Manchester: ESRI.
- Lowenstamm, Jean. 1999. The beginning of the word. In John Rennison & Klaus Kühnhammer (eds.), *Phonologica 1996*, 153–166. The Hague: Holland Academic Graphics.
- Lowenstamm, Jean. 2008. On n, nP and √. In Jutta Hartmann, Veronika Hegedus & Henk van Riemsdijk (eds.), *The sounds of silence*, 105–144. Amsterdam: Elsevier.
- Marantz, Alec. 2001. *Words*. Paper presented at 20th West Coast Conference on Formal Linguistics, University of Southern California, February 23–25.
- Marantz, Alec. 2008. Phases & words. In Sook-Hee Choe (ed.), *Phases in the theory of grammar*, 191–222. Seoul: Dong In.
- McCarthy, John & Alan Prince. 1994. The emergence of the unmarked: Optimality in prosodic morphology. In Mercé González (ed.), *Proceedings of NELS 24*, 333–379. Amherst, MA: GLSA.
- Nijen Twilhaar, Jan. 1990. *Generatieve fonologie en de studie van Oostnederlandse dialecten*. Amsterdam: University of Amsterdam dissertation.
- Nuñez, Jairo. 2004. *Linearization of chains and sideward movement*. Cambridge, Mass.: MIT Press. DOI: <https://doi.org/10.7551/mitpress/4241.001.0001>
- Passino, Diana. 2011. Phonological traces of morphosyntactic phases: The phonology/syntax interface in the varieties of Italian. In Giovanna Massariello Merzagora & Serena dal Maso (eds.), *I luoghi della traduzione*, 849–864. Rome: Bulzoni.
- Picallo, Maria Carme. 2014. *Linguistic variation in the minimalist framework*. Oxford: Oxford University Press. DOI: <https://doi.org/10.1093/acprof:oso/9780198702894.001.0001>

- Postma, Gertjan. 2011. Het verval van het pronomen *du* – dialectgeografie en historische syntaxis. *Nederlandse Taalkunde* 16. 56–87. DOI: https://doi.org/10.5117/NEDTAA2011.1.HET_466
- Rizzi, Luigi. 1982. *Issues in Italian syntax*. Dordrecht: Foris. DOI: <https://doi.org/10.1515/9783110883718>
- Scheer, Tobias. 2004. *A lateral theory of phonology. What is CVCV and why should it be?* Berlin: Mouton de Gruyter. DOI: <https://doi.org/10.1515/9783110908336>
- Scheer, Tobias. 2011. *A guide to morphosyntax-phonology interface theories. How extra-phonological information is treated in phonology since Trubetzkoy's Grenzsignale*. Berlin: Mouton de Gruyter. DOI: <https://doi.org/10.1515/9783110238631>
- Scheer, Tobias. 2012. *Direct interface and one-channel translation. A non-diacritic theory of the morphosyntax-phonology interface*. Berlin: Mouton de Gruyter. DOI: <https://doi.org/10.1515/9781614511113>
- Sigurðsson, Halldór Ármann & Joan Maling. 2012. Silent heads. In Laura Bruge, Anna Cardinaletti, Giuliana Giusti, Nicola Munaro & Cecilia Poletto (eds.), *Functional heads (The Cartography of Syntactic Structures 7)*, 368–378. Oxford: Oxford University Press. DOI: <https://doi.org/10.1093/acprof:oso/9780199746736.003.0028>
- Smolensky, Paul & Alan Prince. 1993. *Optimality theory: Constraint interaction in generative grammar*. Wiley-Blackwell.
- Taeldeman, Johan. 1980. Inflectional aspects of adjectives in the dialects of Dutch-speaking Belgium. In Wim Zonneveld (ed.), *Studies in Dutch phonology*, 265–292. The Hague: Martinus Nijhoff. DOI: https://doi.org/10.1007/978-94-009-8855-2_11
- Trommer, Jochen. 2011. *Phonological aspects of Western Nilotic mutation morphology*. Leipzig: University of Leipzig dissertation.
- Trommer, Jochen. 2012. \emptyset -exponence. In Jochen Trommer (ed.), *The morphology and phonology of exponence*, 326–354. Oxford: Oxford University Press. DOI: <https://doi.org/10.1093/acprof:oso/9780199573721.003.0010>
- Trommer, Jochen & Eva Zimmermann. 2014. Generalised mora affixation and quantity-manipulating morphology. *Phonology* 31(3). 463–510. DOI: <https://doi.org/10.1017/S0952675714000220>
- Ulfsbjorninn, Shanti & Mohamed Larouchi. 2016. The typology and distribution of $|\text{?}|$: the propensity for bipositionality. *Papers in Historical Phonology* 1(1). 109–129. DOI: <https://doi.org/10.2218/pihph.1.2016.1696>
- van der Berg, Berend. 1949. De conjugatie van het praesens in de noordnederlandse dialecten. *Taal en Tongval* 1. 6–13.
- van Hout, Roeland & Hans van de Velde. 2000. N-deletion in reading style. *Linguistics in the Netherlands* 17. 209–219. Amsterdam: John Benjamins. DOI: <https://doi.org/10.1075/avt.17.20van>
- van Koppen, Marjo. 2005. *One probe, two goals. Aspects of agreement in Dutch dialects*. Utrecht: LOT publishing.
- van Marle, Jaap & Wim Zonneveld. 1980. De theoretische consequenties van stemhebbende finale obstruenten in Nederlandse dialecten. *Tijdschrift voor Nederlandse Taal-en Letterkunde Leiden* 96(2). 81–100.
- van Oostendorp, Marc. 2005. The first person singular in dialects of Dutch. In Eric Mathieu, Leah Bateman & Cherlon Ussery (eds.), *Proceedings of NELS 35*, 134–166. Amherst: GLSA.
- van Oostendorp, Marc. 2007. Derived environment effects and consistency of exponence. In Sylvia Blaho, Patrick Bye & Martin Krämer (eds.), *Freedom of analysis?*, 123–149. Berlin: Mouton de Gruyter. DOI: <https://doi.org/10.1515/9783110198591.123>

- van Oostendorp, Marc. 2008. Incomplete devoicing in formal phonology. *Lingua* 118(9). 127–142. DOI: <https://doi.org/10.1016/j.lingua.2007.09.009>
- van Oostendorp, Marc, Michael Putnam & Laura Catherine Laura Smith. 2016. Intersecting constraints: why certain constraint-types overlap while others don't. In Geraldine Legendre, Michael Putnam, Henriëtte de Swart & Erin Zaroukian (eds.), *Optimality-theoretic syntax, semantics, and pragmatics: From uni- to bidirectional optimization*, 33–54. Oxford: Oxford University Press. DOI: <https://doi.org/10.1093/acprof:oso/9780198757115.003.0002>
- van Riemsdijk, Henk. 2002. The unbearable lightness of GOing. The projection parameter as a pure parameter governing the distribution of elliptic motion verbs in Germanic. *Journal of Comparative Germanic Linguistics* 5. 143–196. DOI: <https://doi.org/10.1023/A:1021251312697>
- van Riemsdijk, Henk. 2005. Silent nouns and the spurious indefinite article in Dutch. In Mila Vulchanova & Tor Anders Åfarli (eds.), *Grammar & beyond: Essays in honour of Lars Hellan*, 163–178. Oslo: Novus Press.
- Zonneveld, Wim. 1982. The descriptive power of the Dutch theme-vowel. *Spektator* 11. 342–365.

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