On silent markedness

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Abstract

Empty categories – positions in phonological representations that have no direct phonetic counterpart – are (still) controversial in phonological theory. In this paper we give the main arguments for assuming such positions and we furthermore establish a markedness hierarchy for empty positions: some of them are stronger ('more marked') than others, and we can derive this from a combination of Element Theory and Turbidity Theory. We illustrate our point with Italian and Dutch dialects, and point out that the phonological hierarchy of empty positions may correspond to a hierarchy of syntactic positions.

The notion of emptiness plays an important role in many branches of grammatical theory: syntacticians, morphologists and phonologists have for a long time posited the existence of positions without a phonetic counterpart in their representations. This assumption is not without controversy, as there also have always been theorists adamantly claiming that a measurable phonetic trace is the ultimate, and possibly only, test for any assumed linguistic structure: only what is audible should have a place in our picture of the mental objects corresponding to linguistic reality in that school of thought.

In this article we propose, however, that there is little reason for such a restriction to phonetic measurability on the reality of positions in phonological structure and that one can put forward arguments for representational objects that do not correspond directly or even indirectly to measurable sound. We concentrate on so-called empty nuclei (EN) in this paper; in other words, on objects that stand for vowels (the nuclei of syllables) within the phonological representation but are phonetically either very weak or completely absent. After having established their ontological status, we set one step further and argue that there are different *types* of empty positions and that there is something like a markedness hierarchy among them, which corresponds to morphosyntactic markedness: the 'stronger' positions in morphosyntactic structure correspond to 'stronger' phonological positions, even if those positions are empty.

After discussing empty positions in syntax (Section 1) and phonology (Section 2), we aim to show in Section 3 that not all EN are empty in the same way: some of them are representationally more complex than others, and these differences in complexity may play out in the markedness of their morphosyntactic behavior. We will illustrate this point with some data from Dutch and Italian dialects in Section 4, and we show that some geographical patterns might be understood in terms of emptiness at different levels. The taxonomy of markedness can be best understood in representational terms, and this seems best done with empty positions of different types. The definition of markedness used (therefore) is one of structural complexity: we argue that some phonological representations are more complex than others even though none of them correspond to any phonetic event.

1. Empty positions in syntax

1.1. How to argue for silent syntactic elements

We first have to establish what are possible arguments in favor of empty positions in the first place. Such arguments typically come from the construction of a theory, which can be set up more elegantly if we assume that a certain position is there even if it receives no phonetic interpretation. Typically the 'theory-internal' nature of such positions is also the main point of criticism for the detractors of

abstract positions, because their inaudibility makes them less 'real' to their minds; such scholars would prefer a more complicated description of the data if it does not take recourse to such emptiness. A well-studied example of such a debate is found in generative syntax, in which empty positions have been recognized at least since the mid-sixties (Katz & Postal 1964), albeit never without controversy. Interestingly, recent theoretical developments suggest that the number of empty positions may be substantially larger than what has been suspected before. This issue was raised, for instance, by Cinque (1999: 127), who wonders "whether we should take the entire array of functional projections to be present in every sentence". Assuming a positive answer led to the blossoming field of cartography (Cinque 2002; Rizzi 2004; Cinque & Rizzi 2008; Shlonsky 2010 and many other works):

> "[the possibility for] the entire array of functional projections to be present in every sentence […] is the least costly assumption, once we recognize that each head comes with a marked and a default value. This conclusion, if correct, opens up a new view of clausal structure – one that is further removed from what we see, but no less interesting, for that" (Cinque 1999: 127)

An important implication of cartography is that all languages have the same positions in their structure, even if these are not filled by phonetic material – a language without overt Tense will still have Tense nodes in its functional spine, which even differ in some way from other empty nodes in the structure. According to the cartographic research program, as well as to e.g. Distributed Morphology (DM; Halle & Marantz 1993; Marantz 2007), there indeed seems to be substantial evidence that

> "humans are endowed with innate syntactic elements and structures that are independent of whether or how they are expressed. We need to realize that *silence variation* underlies a substantial part or even the lion's share of language variation. If we do not acknowledge this, the wonder of Babel will remain a mystery, kept with Jehovah for all eternity" (Sigurðsson 2004: 251)

1.2. Taxonomies of empty elements in syntax

Consider the observation that in English, sentences typically have a subject. There is a small set of counterexamples to this, including sentences such as the following, in which the embedded (non-tensed) miniature sentence *to please* does not have a subject:

(1) a. *John is eager to please.*
b. *John is easy to please.*

Generative grammar, in particular *Government and Binding Theory* (GB, Chomsky 1981), solves this conundrum by assuming that *to please* actually has an empty subject, called *PRO.* The alternative is to assume that some (non-tensed) verbs do not need a subject. If this fact existed in isolation, one might say that this is an acceptable exception to the universality of subjects; however, one still needs to account for the fact that semantically we understand that John is the pleaser in (1a), and the person to be pleased in (1b). In other words, it is still relevant that somebody does the pleasing, even if the phonetics does not tell us who it is. Stipulating that there is a 'silent' subject position for 'to please' in each case at least simplifies the description. Furthermore, we purportedly can make a taxonomy of 'stronger' and 'weaker' empty syntactic positions within GB, based on so-called *wanna* contraction, which is shown in (2)-(4):

(2) a. You want to visit me.
b. You wanna visit me.
(3) a. Who do you want to visit?
b. Who do you wanna visit?
(4) a. Who do you want to visit Fred?
b. *Who do you wanna visit Fred?

Adjacent *want* and *to* can 'contract' to *wanna* in (2b) and (3b) in many varieties of English; however, this is not possible in (4b). The idea put forward in Chomsky (1981) is that there are different kinds of empty positions involved. In (2) and (3), this is *PRO*, which is apparently invisible for contraction and which refers to *you*, but in (4) the subject of *visit* is *who* instead, which has moved to the front of the sentence, leaving a 'trace' between *want* and *to*. This trace is a different kind of empty position, which does block the contraction. While *PRO* is visible only to semantics and some layer of syntax, the trace is also visible at some level of phonology.
Our point here is not to defend this particular assumption, but to demonstrate the line of reasoning which it represents. Different empty categories have thus been proposed in the syntactic literature. However, "it is not clear whether non-pronunciation of syntactically active material is a unified phenomenon or not" (Leu 2008: 8), while it seems clear that "we have just begun to appreciate the depth and complexity of syntactic structure, above and especially below the 'word' level, and that statements about precise constraints of (non-) pronunciation are, at this point, necessarily highly speculative."[1]

The syntactic literature on empty categories mainly focuses on the mechanisms regulating the pronunciation of syntactic constituents, typically XPs or heads.[2] Less work has been done on the role played by silence "below the 'word' level". Considering the enrichment of the morphosyntactic representation of the word proposed by DM, though, 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. If the latter, then the formal properties of PF need to be explicitly laid out. Assuming that phonetics and phonology are different modules (e.g. 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

[1] The relevance of empty categories for syntax is discussed in many other works (e.g. Sigurðsson 2004; Baltin 2012; Sigurðsson & Maling 2012). Baltin (2012), for instance, focuses on the dichotomy between deleted phrases and null pro-forms, and concludes that such a dichotomy does not exist, insofar as also null pro-forms involve deletion. He claims that deletion occurs in the overt syntax, namely much earlier than suggested e.g. by Merchant (2001) and Fox & Lasnik (2003), who consider deletion a PF process. If we take a linguistic sign to be a bundle of formal, semantic and phonological features (section 1.3; Chomsky 1965), and we assume the DM late insertion hypothesis, the deletion (in syntax) of the relevant formal features bleeds vocabulary insertion. "By contrast, the traditional view of deletion as occurring at PF must stipulate a conjunction of two types of features that delete - formal as well as phonological" (Baltin 2012: 398). More recently, Lohndal & Samuels (2013) investigate the PRO/trace dichotomy, their visibility and the order of operations at PF, and provide an account for the distribution of unpronounced material that refers to (a problem in) linearization Lohndal & Samuels (2013: 72). Different from Baltin (2012), their account neatly distinguishes between unpronounced material whose 'silence' is lexically specified and unpronounced material resulting from deletion (which is argued to follow linearization).
[2] Cfr. Baltin (2012: 418): "different constructions that seem to involve deletion involve differing degrees of evidence for internal structure, an observation that has not even been made before, let alone explained. By allowing deletion to occur in the syntax, and to allow elements of different sizes to delete, we can begin to explain the different degrees of permeability of different constituents."

as, crucially, to its phonetic interpretation, for the absence of acoustic material doesn't necessarily imply the absence of phonological structure, just like the absence of phonological structure does not necessarily imply the absence of syntactic material (Section 2.3).

2. Empty positions in phonology

2.1. Empty nuclei as limited licensers

Empty positions in phonology, in particular EN, are most well-known from the Government Phonology literature. In its most 'classic' variant (Kaye, Lowenstamm & Vergnaud 1985, 1990), this theory proposes that syllabic constituency consists of a string of maximally binary-branching Onset (O) and Nucleus (N) constituents[3]:

(5) GP constituent structure

O	N	O	N
/\	/\	|	
d r	ɪ ŋ	k	

In a word-final consonant cluster, the final consonant thus appears in an onset which is followed by an empty nucleus. There are no other options, as biconsonantal codas are not allowed: that would make the nucleus ternary, and it is stipulated that ternary constituents are universally unavailable. The assumption of a final empty nucleus (FEN) does not just save this claim from cases in which words do end in two consonants, but it also makes it possible to capture a generalization about English, which is that clusters such as [ŋk] are always followed by a vowel (they cannot occur before another obstruent, for instance).[4]

The FEN has limited licensing capacities (throughout this paper we will use the term 'licensing' rather loosely in the sense of traditional Government Phonology). In English, it does *not* license a preceding complex onset, for instance, as there are no words such as **drinkl.* Such properties are considered to be under parametric control. There are languages which do not allow for final empty nuclei; Italian is sometimes claimed to be such a language, with a very limited set of possible word-final consonant clusters. Other languages have final empty nuclei that can also license complex onsets. Parisian French might be an example of this, which has words such as *tabl* (spelled as *table*), in which the *bl* cluster functions as an onset (Charette 1990, Van Oostendorp 1992). We will return to these limitations in Section 4.2.

Another phenomenon that may be evidence for the existence of EN is that these positions sometimes do get a phonetic interpretation. For instance, the Moroccan Arabic word *ktb* 'to write' (with three empty nuclei, one after every consonant) sometimes shows up with a schwa between *k* and *t*, and sometimes between *t* and *b* (Kaye 1990):

(6) a. *ktəb* 'he/she writes'

[3] As a matter of fact, the 'classic' version of Government Phonology would consider coda consonants as adjoining to the rhymal node (R) projected by the nucleus. We would hence have OR sequences, where R contains an obligatory N and an optional coda consonant. For the sake of simplicity, we do not display the R node in our representations, since it does not affect our arguments.

[4] Bridget Samuels (p.c.) points out that forms can be found in English in which [ŋk] is not followed by either a full vowel or a FEN. An example is form such as *inkling* [ˈɪŋklɪŋ]. In a case such as this, though, the relevant cluster may be heterosyllabic (/ˈɪŋ.klɪŋ/) and the ban against biconsonantal codas is thus still abided by.

b. *kətbu* ‘they write’

The generalization here is that an empty nucleus gets phonetic realization when it is followed by another, non-realized empty nucleus. Typically, these realizations are schwa-like vowels, for instance also in French:

(7) *rjəter / rəjter* ‘to throw back’

We assume that the stem of *rjter* (spelled *rejeter* in French orthography) has two empty nuclei, which in this case can each be realized optionally, although you cannot leave out both of them for reasons of government.
This thus already establishes a minimal hierarchy of phonological emptiness: there are (i) truly empty segments which have no phonetic reflex and (ii) ‘realized’ empty segments, which still have a phonetic realization that is fairly weak, viz. as a schwa. As a matter of fact, the empty positions in French strengthen even further (to [ɛ]) when they occur in a stressed position, i.e., if they are the last realized vowel in the word, according to Charette (1991):

(8) *rj*[ɛ]*t* ‘(he) throws back’

This thus gives us an indication that we have the following small hierarchy:

(9) zero < schwa < full vowel ([ɛ])

2.2. Schwa as almost empty

GP assumes that segments are represented by monovalent primitives, called *elements* (Backley 2011), such as |I|, |U| and |A|. For example, /i/ consists of the |I| element, /u/ of the |U| element and /a/ of the |A| element. We can combine |I| and |A| to get /e/ and |U| and |A| to get /o/. Adding the notion of headedness allows us to distinguish between /ɛ/ and /ɔ/ (where |A| is the head and |I|/|U| the dependent) and /e/ and /o/ (where |I|/|U| is the head and |A| the dependent). In such a view, schwa has no elements, but is an interpretation of bare structure.
Recent years have witnessed a revived debate within Element Theory about the nature of different elements (Backley 2011, 2012). The ‘basic’ vocalic elements, as |I|, |U| and |A|, do not seem to be as completely symmetrical as logic would imply. We have seen above that |I| and |U| each combine freely with |A|, giving us mid vowels. |I| and |U| can also combine with each other, to give the front rounded high vowel /y/ (and combining all three would give its mid vowel equivalent /ø/), but it is clear that front rounded vowels are more marked than mid vowels, both typologically and within a given language.
Furthermore, |A| is known to often interact with length. As it is the element which all open (and mid-open) vowels share, it functions in some sense as an indicator of vowel lowness, which in turn both phonetically and phonologically relates to length. Some authors (Pöchtrager 2006, Pöchtrager and Kaye 2013) have therefore suggested that there is no |A| element, and it should be replaced by a representation of length, which in an autosegmental framework means bipositionality. The vowels /ə a ɛ ɔ/ are then represented (roughly) as follows (to be slightly revised below):

(10) Vowel representations

a. x b. x c. x d. x

/ə/ = empty /a/ /ɛ/ /ɔ/

The x's in these representations are purely abstract representational nodes. We believe, however, that also the status of schwa is problematic in Element Theory. In the version we just outlined, it does not really have any phonological content at all, but that does not do justice to the fact that schwa is different from empty positions in some ways. For instance, in the Moroccan and French examples we have seen above, schwa counts as a vowel that can license an empty position to stay silent, which is not a property 'really' empty positions have themselves (otherwise there would be no alternation between the two vowels in the first place). There is thus a correlation between being able to license other empty nuclei and being interpreted itself as a schwa. That correlation is very important for the theory and at the same time it is not really expressed: the two properties are as it were independent from each other in the formal framework.

The problem is solved in some versions of Element Theory by assuming that there is some element for schwa, such as |@|, which "can be thought of as a blank canvas to which the bold strokes represented by |A|, |I| and |U| can be applied" (Harris 1994:109). Yet this does not really solve the problem, as it is now unclear how the special phonetic interpretation of an element as 'canvas' leads to its special phonological behavior, i.e. the fact that it alternates with zero. Formally, |@| is an element like any other (Backley 2012). This problem gets even larger if we assume alternatively, with Backley (2011), that schwa can sometimes be a 'headless' segment, e.g. |A|; it is not clear why such headless elements are empty in some sense, or where the |A| comes from in case of epenthesis of schwa (Cavirani 2015), or how to represent this analysis if we replace |A| with length.

A solution may come from departing from classic GP as it relates to the structure of phonological computation. In particular, in the spirit of Turbidity Theory (TT; Goldrick 2000, Van Oostendorp 2007, Revithiadou 2007, Zimmermann 2017), we assume that instead of symmetrical association relations (if a segment is associated to an element, that the element is also associated to that segment), there are two independent relations:

(11) An element projects to a segment in the lexicon (the *projection* relation)
A segment pronounces an element in the phonetics (the *pronunciation* relation)

These relations can be marked with arrows: a downward arrow (from the prosodic node to the feature/element) represents the projection relation, whereas an upward arrow (from the feature/element to the prosodic node) represents the pronunciation relation:

(12) TT relations

TT was originally proposed by Goldrick (2000) to solve problems with opacity in Optimality Theory, i.e. those cases in which some material that is deleted, still behaves as active in the phonology. (Something that is done by rule ordering in some other accounts.) Van Oostendorp (2007) and Revithiadou (2007) showed that TT could have even wider applications in dealing also with other

forms of opacity. Although all of these works are framed in terms of OT, the idea behind TT can be easily adapted to other frameworks of representational computation.
Typically, the projection and pronunciation relations will co-occur, mirroring the symmetry of ordinary autosegmental association: if an element projects to a segment, the segment will pronounce that same element. But this does not always happen (e.g. it does not happen when an element gets 'deleted', which in this case means there is a projection relation but not a pronunciation relation; or when an element gets 'inserted', which means there is a pronunciation relation but no projection relation).
TT, in any of its guises, provides space for segments that are not pronounced although they are there: such segments may project phonological features, but not be pronounced by them. In the TT work done so far, this feature was used for describing traditional cases of 'opacity', where the active empty segments in earlier work were assumed to be 'deleted'. We argue that the mechanism can also be put to use to establish a hierarchy of emptiness.

2.3 The relation between emptiness on different levels

Recent work on the morphosyntax-phonology interface combines the empty structures proposed by Strict CV Theory (a version of GP; Lowenstamm 1996) with the theoretical insights provided by DM. For instance, building on the work by Marantz (2007) on the role of functional projections such as *n* and *v* in the derivation of nouns and verbs, Lowenstamm (2008:113) claims that "functional categories have phonetic content, viz. the minimal template CV". Interestingly, Bendjaballah & Maiden (2008: 29) elaborate on this claim and introduce a typology of empty functional categories, in which the silent categories are represented as structures lacking either featural (/βα/) and prosodic (CV) content (13d), or morphosyntactic features (F; 13e):

(13) Morpheme templates (Bendjaballah & Maiden 2008)

a. overt morpheme	b. floating element	c. empty site	d. empty category	e. zero
F	F	F	F	
|	|	|		
CV	|	CV		
|	|			
/βα/	/βα/			

TT allows for a further refinement of this typology. Basically, it allows an 'overt morpheme' (13a) to be phonetically invisible. This is shown in (14a), where, in an 'overt morpheme', the phonological features are both projected by the relevant prosodic node and pronounced (i.e. both the projection and the pronunciation relations are present). However, in the case in which the pronunciation relation is absent, as in (14b), the phonological exponence of the morphosyntactic feature F receives no phonetic interpretation, even though there is a projection relation which has been established in the lexicon:

(14) Morpheme templates - TT extension

/βα/ /βα/

The lack of the pronunciation relation primarily impacts the phonetic dimension. A 'silent overt morpheme' such as (14b) thus plays a role in phonology, in morphosyntax and semantics. The phonology can still see the lack of the pronunciation relation and be sensitive to it, so that (14b) is expected to behave differently than (14a).

TT representations also provide us some conceptual space to show the similarities and distinctions between a purely empty vowel (15a), a phonologically contentful empty vowel (15b) and a schwa (15c):

(15) Emptiness typology

	a. EN	b. /ə/	c. /ə/	d. /a/	e. /a/
Prosodic/skeletal tier	x	x	x	x	x
TT relations					
Melodic tier		x	x	x x	x x
Phonetic interpretation	[Ø]	[Ø]	[ə]	[ə]	[a]

Like before, the x's in these representations are abstract nodes without a label. In (15), a phonologically contentful empty vowel (15b) receives the same phonetic interpretation of a purely empty vowel (15a): [Ø]. This is because, in both the cases, the phonetic module does not receive any (elemental) structure to interpret, insofar as (15a) lacks melodic content altogether and (15b) lacks the TT pronunciation relation. (15a) and (15b), thus, are phonetically identical, but phonologically different. (15b), though, is phonologically similar to (15c), even if they 'sound' different. This is still a matter of phonetic interpretation, for (15c) displays the TT pronunciation relation lacking in (15b). (15d) can be considered a 'reduced' /a/ (section 3.2), meaning that it displays the same phonological structure of (15e), even though it 'sounds' as /ə/ (15c). Also in this case, thus, the difference between (15d) and (15e) is a matter of 'pronunciation', as (15d) lacks the pronunciation relation displayed by (15e).

The structures in (15) are arranged left to right according to a complexity hierarchy, which is defined by both their elemental composition and the TT relations the display. Furthermore, we claim that phonological complexity must be morphosyntactically licensed, which basically means that the 'melodic' content hosted by a given nucleus must co-occur with some morphosyntactic feature (i.e., in representations such as the ones in (13), with F)[5].

As already pointed out above, the phonological representations in (15) build on the hypothesis that |A|, which is traditionally considered an element (Backley 2011), should be rather thought of as pure structure; more precisely, it seems "to make bigger structure possible" (Pöchtrager 2015: 261). We slightly depart from this view by assuming a minimal pure structural configuration corresponding to *schwa* (15b, c), which projects to the prosodic tier and takes as a complement either another (empty) structure x (15d, e), giving /a/, or one among the |I U| elements, giving /e o/. Alternatively, the 'empty complement' of schwa can be further expanded by hosting further structure. This is shown in (10), where the 'empty complements' of (10c) and (10d) host the structures corresponding to /i/ and /u/. Given their configuration, (10c) and (10d) are phonetically interpreted as [ɛ] and [ɔ], respectively (notice that, in these cases, |I| and |U| are headed by the x representing the complement of the higher 'melodic' x). To sum up, we assume that x (i.e. /ə/) a) projects and is interpreted as N on the prosodic

[5] This is not the case, for instance, of empty nuclei whose presence can be established on purely phonological grounds, as the one traditionally proposed by GP. Arguably, they lack any morphosyntactic information.

tier[6], b) can take |I U| or another x as complement that c) can be further expanded by merging another structure projected by a lower x which, in turn, can take |I U| as complement.

3. Empirical tests

3.1 Silent markedness and simplex onsets

As we discussed in Section 2, each onset needs to be licensed by the following nucleus within the GP tradition. This holds for word-final consonants too, which count as onsets and are thus followed by FEN. The licensing strength of those FEN arguably is a matter of parametric variation. In a language like Italian, for instance, FEN have no licensing strength and (content)[7] words thus do not end in a consonant. Other languages assign more licensing strength to FEN, which means that in those languages consonants (or consonant clusters) are allowed.
Final devoicing as it is occurring in Dutch, among many other languages, is an instance of the former, inasmuch as its FEN is apparently not a strong enough licensor to sustain the voicing of its onset (see Harris 2009 for a detailed account of devoicing in terms of weakening, whereby weakening is formalized as the removal of featural/elemental content). However, exceptions to otherwise regular final devoicing can be found.
In Dutch, word-final consonants regularly undergo devoicing. This is shown in (16), where an underlyingly voiced obstruent devoices when occurring at the end of a syllable:

(16)	/bɛd/	[bɛt]	/bɛd+ən/	[bɛdən]
	‘bed’		‘beds’	
	/bɛt/	[bɛt]	/bɛt+ən	[bɛtən]
	‘(I) wet’		‘(we) wet’	

When we focus on Dutch dialects, however, exceptions to final devoicing can be found (Goeman 1999, 2007; van Oostendorp 2007 and references therein). Many of these exceptions involve 1SG.PRES forms of verbs (and are restricted to word-final fricatives; van Oostendorp 2005). This is shown in (17), where the cognate forms for ‘faith(s)’ and ‘(I/we) believe’ are presented as pronounced by the speakers of the Tilligte dialect:

(17)	/ɣelø:v/	[ɣelø:f]	/ɣelø:v/	[ɣelø:v]
	‘faith’		‘(I) believe’	
	/ɣelø:v+ən/	[ɣeløvən]	/ɣelø:v+ən/	[ɣeløvən]
	‘faiths’		‘(we) believe’	

The word apparently ends in a FEN both in ‘faith’ and ‘I believe’ in (17), so we would need to say that FEN in one case licenses voicing of the onset and in the other case it does not. It is relevant in this respect that exceptions to final devoicing typically involve 1SG.PRES verbs[8]. In a diachronically

[6] This is somehow similar to the *v* primitive proposed by Van der Hulst (2000), whose interpretation depends on the level it occurs into.
[7] Some function words, one the other hand, do end in a consonant. The distinction between function and content words cannot be discussed here due to space limitation.
[8] Within the Dutch speaking area, 1SG.PRES verbs behave exceptionally with respect to other phenomena as well. For instance, they protect the word-final /n/ from the (optional) deletion it undergoes in Standard Dutch when preceded by a schwa ([opə] / [opən] ‘open’ (adj) *vs* [ɪk *tekə] / [tekən] ‘I draw); it blocks /k/ epenthesis after word-final /ŋ/ (/puliŋ/ [puliŋk] ‘eel’ vs /ik siŋ/ [ik siŋ] ‘I sing’) and it triggers /d/ lenition, a process that

preceding stage, the phonological exponence of 1SG.PRES was represented by schwa in the whole Dutch area (Goeman 1999, 2007). Furthermore, an examination of the so-called GTR-database, in which we find information on the phonologies of all Dutch dialects (van Oostendorp 2014), shows that Tilligte, like other varieties displaying the same exceptional behavior (e.g. Ghent; Goeman 1999), borders an area in which the 1SG.PRES marker is still represented by schwa. Furthermore, a form such as *ik geleuve* with a final schwa has been reported as optionally occurring in Tilligte (and Ghent) itself (Goossens 1977). Building on these pieces of evidence, Goeman (1999) claims that the exceptional resistance to final devoicing displayed by these varieties can be explained as being due to the fact that schwa has been deleted quite recently: the 1SG.PRES schwa has just gone and final devoicing has not taken place 'yet'. In other words, these varieties behave as if the etymological 1SG.PRES schwa *is* still there.

The theoretical devices introduced in the previous section allow us to give this idea a formal basis. Given the fact that the FEN occurring after the word-final consonant of 1SG.PRES verbs and the noun-final FEN are both silent, the difference should reside in their representations. This is shown in (18), where the representations are given of the FEN occurring in noun-final position (18a) and as a 1SG.PRES marker, both in dialects in which it is pronounced (18c) and in those where it is not (18b):

(18) FEN *vs* $FEN_{1SG.PRES}$

a. FEN	b. $FEN_{1SG.PRES}$	c. $FEN_{1SG.PRES}$
N	$N_{1SG.PRES}$	$N_{1SG.PRES}$
	↓	↕
	$x_{1SG.PRES}$	$x_{1SG.PRES}$
[Ø]	[Ø]	[ə]

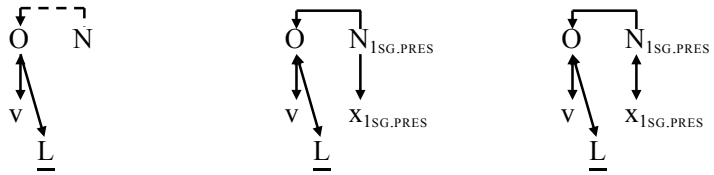
Crucially, (18a) and (18b) are phonetically similar (both silent) but phonologically different, whereas (18b) and (18c) are phonetically different but phonologically similar (both have projection relationship). As a consequence, (18b) is expected to display more or less the same phonological behavior as (18c), and thus it is not surprising that both (18b) and (18c) shelter the word-final consonant from final devoicing.

Indeed, as shown in (19), $FEN_{1SG.PRES}$ licenses the voicing specification of the preceding consonant (licensing is represented by the leftward arrow, which is dotted in the case FEN is laterally not strong enough to license the voicing specification of the preceding consonant, which, in turn, is represented by |L|, see Backley 2011):

(19) FEN *vs* $FEN_{1SG.PRES}$ - Licensing

regularly applies in intervocalic position ([a klɪt əm] 'he dresses himself' *vs* [ik klej ma] 'I dress myself') in Brussel Dutch (van Oostendorp 2005). Such behavior can be given a similar treatment.

a. *geloo*/vØ/ b. *geloo*/vØ/ c. *geloo*/və/



geloo[f] *geloo*[v] *geloo*[və]
'belief' (noun) 'I believe' 'to believe'

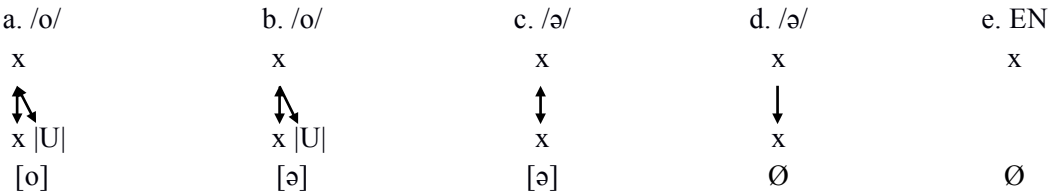
What (19) shows, thus, is the relationship between the representational complexity of a N and its licensing strength: a N displaying some amount of elemental content exercises its lateral strength on the preceding O, no matter whether the representational content of N is phonetically interpreted or not.

3.2 Silent markedness, RT and TR

As mentioned above, the representational complexity of a nucleus correlates with its ability to license simplex onsets as well as complex onsets (TR) and coda-onset sequences (RT). This is explicitly claimed for instance by Cyran (2008: 450), who maintains that "weak licensing [i.e. by schwa] will also have influence on the distribution of RT and TR clusters and will be responsible for weakening processes such as epenthesis, metathesis, or cluster simplification"[9]. We now turn to a case in which such syllabic structures are licensed by apparently empty nuclei.
Lunigiana dialects of Italian underwent a diachronic change in which unstressed vowels were gradually reduced. Starting in France, where this change had been carried through to completion around the 6th-7th century (Loporcaro 2011), vowel reduction radiated throughout the Romance-speaking continuum. Crucially, the change seems to have reached the Lunigiana area relatively recently; the change is thus in progress here and varieties can be found that display various stages of vowel reduction. Carrarese and Pontremolese are two illustrative dialects from this region, the former currently representing a stage that the latter has already gone through in the past (Cavirani 2015). For instance, a form such as the proto-Romance /ˈmagro/ 'thin.M.SG' corresponds to [ˈmagɐr] and [ˈmagr] in Pontremolese and Carrarese, respectively. Interestingly, other Lunigianese varieties display intermediate stages [ˈmagrə] and [ˈmagər] (Maffei Bellucci 1977; Loporcaro 2005-2006), in which the word-final vowel has not been deleted and the epenthetic vowel has not become a full vowel yet. In line with the "life cycle of a phonological process" described by Bermúdez-Otero (2015), vowel reduction is argued to start out as a phonetic process that is "at first exhaustively determined by extragrammatical factors (physics and physiology)" and then "becomes ever more deeply embedded in the grammar of a language". Coupling this proposal with the formalism proposed in this paper, we can describe this diachronic process as involving the successive removal of the relevant pronunciation and projection relations. This is shown in (20), where the change is represented of the proto-Romance -$o_{\text{M.SG}}$ morpheme occurring e.g. in **magro* 'thin.M.SG':

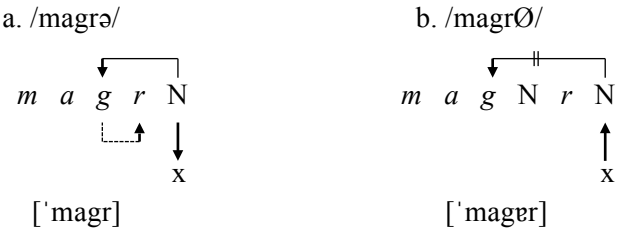
[9] Cyran (2008) builds on the longstanding distinction between Direct Government Licensing - RT - and Indirect Government Licensing - TR (Charette 1990): "Government licensing is a special form of licensing where the preceding Onset is involved in a governing relation. In this sense, government licensing is not much different from normal licensing, but it is a stronger version of it, as it licenses more complex formal structures. It is easier to license simplex onsets than governing relations. On the other hand, as regards the two types of government licensing, RT clusters are easier to license than TRs because the head of this governing relation is directly adjacent to the licenser, while in TRs the licenser is removed from the head by the intervening governee" (Cyran 2008: 470). In what follows (see in particular (21)), we abide by these assumptions.

(20) Diachronic removal of TT relations: -$o_{M.SG}$



As shown in (20), we can describe the first step of this diachronic development as a process involving the phonetic interpretation of an underlying /o/, which surfaces as [ə] as a consequence of the removal of |U|'s pronunciation relationship. Indeed, assuming that for some sociolinguistic reason the (formerly variable) 'reduced' pronunciation becomes systematic[10], the learner would arguably represent reduction as due to a phonological process that deletes the relevant pronunciation relationship (20b). Suppose now that, in a second stage, the reduction process becomes fully systematic (i.e. it applies in every morphophonological domain). In such a situation, it is highly unlikely for the learner to hypothesize the presence of something else (*viz* more) than /ə/ in word-final position and she may thus (re)structure the relevant representation accordingly. This is represented in (20c) by the removal of |U| (or, equivalently, of |U|'s projection relation). The same mechanism may now reapply: the word-final schwa starts being reduced more and more regularly, i.e. the learner deletes the pronunciation relation in less and less restricted phonological contexts ((20c)-to-(20d)), until she has no more evidence to infer the presence of any contentful word-final nucleus: only a FEN is left ((20e); see Cavirani 2015 for a detailed discussion of these claims).
The last two stages of the diachronic development given in (20) represent the stages currently reached by Carrarese and Pontremolese, respectively. It may be noted that there is no difference concerning the phonetic interpretation of the word-final nucleus: in both cases it leaves no acoustic trace. What changes is the behavior of the preceding consonant cluster, which is broken up by means of epenthesis only in Pontremolese. Indeed, 'weak licensing' will also influence the distribution of complex consonant clusters and "will be responsible for weakening processes such as epenthesis, metathesis, or cluster simplification by deletion" (Cyran 2008: 450). The difference in behavior between Carrarese and Pontremolese with respect to complex onsets, thus, together with diachronic considerations, provides an indication of the different licensing *strength* and, as a consequence, of the representational complexity of these final silent nuclei. This is represented in (21), where the leftward arrow represents Licensing and the rightward dotted arrow represents Government (see fn. 9):

(21) Silent nuclei & lateral strength



[10] For instance, varieties can be found in which unstressed vowel reduction applies phrase-medially but not phrase-finally: Ortonovese [ɖ ˈɔmo] 'the man' *vs* [ɖ ˈɔm ˈnero] 'the black man' (see Loporcaro 2005-2006 for other varieties).

As shown in (21), while the Carrarese word-final silent nucleus licenses TR ([magr] 'thin.M.SG'), as well as simplex onset ([lup] 'wolf') and RT ([kolp] 'blow'), the Pontremolese one licenses only simplex onsets ([luv] 'wolf') and RT ([kurp] 'blow'). Thus, even though the Pontremolese and the Carrarese FEN are both inaudible, the former is a weaker licenser than the latter. This is suggested by the fact that the Potremolese FEN (21b) does not seem to be able to license complex onsets. Adopting the formalism proposed by Charette (1990) and Cyran (2008), this means that the Pontremolese FEN cannot license *g* to govern *r*. As a consequence, the complex onset *gr* breaks up via epenthesis. This is formalized in (21) as the insertion of a pronunciation relation from x to N (as a matter of fact, we predict a further stage in which a projection relation is inserted. This would correspond to the alternating vowel of e.g. Scheer 2004).

Given the tight correlation between lateral strength and representational complexity, we can conclude that the two varieties present two representationally different nuclei, only the one in Pontremolese being really empty[11]. The Carrarese final silent nucleus, on the other hand, is not as empty as it looks, and is thus able to dispense the full range of licensing possibilities.

4. Conclusion

If we take the assumption that there are empty positions in phonology or in syntax seriously, we inevitably are led to a differentiation of such positions: some positions are emptier than others, and there is a hierarchy of markedness among 'silent' elements. We need some representational means to make such a distinction, and after having established what emptiness means, we have proposed that combining Element Theory with an idea taken from Turbidity Theory can give us exactly such a miniature hierarchy of emptiness.

Underlying this discussion is the notion that there might also some relation between the content, or lack thereof, of the phonological representation and that of the syntactic representation. It should be noted, for instance, that the fact that the first person singular in Dutch has an ending that is phonologically 'less empty' than e.g. the singular of nouns in the same language, may be due to the fact that the first person singular is obviously a morpheme with content, whereas singular may just be the default number, just like the fact that empty categories in syntax function like pronouns or functional heads and not like full verbs (except in circumstances like ellipsis) may also not be a coincidence. It remains a task for future research to see how such relations can be made more precise.

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[11] Notice that the weak licensing strength of Pontremolese is possibly suggested also by the outcome of word-final (etymological) stops (Carr. [lup] *vs* Pontr. [luv]) and word-internal lateral 'codas', which are reduced either to |U| (Pontr. [kau̯d] *vs* Carr. [kald]) or to |A| (Pontr. [kurp] *vs* Carr. [kolp]; Cavirani 2015).

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