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*Variations on a theme: The view from
generative morphology on verbal theme
vowels*

Relatore
Prof. Davide Bertocci

Laureando
Riccardo Manzato
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Contents

1	Introduction	3
1.1	What's in a theme?	3
1.2	How to handle a theme: some trends from the literature	6
1.3	Aims and organization	11
2	Distributed Morphology	13
2.1	Introduction	13
2.2	Grammatical architecture	14
2.3	Morphological operations	22
3	Theme vowels in DM: Case studies	32
3.1	Introduction	32
3.2	Catalan	32
3.3	Spanish	67
3.4	Slovenian	88
3.5	Latin	121
4	Discussion; or the Dark Side	128
4.1	Introduction	128
4.2	Oltra-Massuet's strategy under attack	128
4.3	A more general issue: A crisis of identification	132
5	Conclusion	144
5.1	Theme vowels as dissociated morphemes: Is there no alternative?	144
5.2	A promising alternative: Nanosyntax	144
5.2.1	Fábregas (2022)	152
5.2.2	Medová & Wiland (2018)	160
5.2.3	Bertocci & Pinzin (2020)	165
5.3	Prospects for future research	167

Chapter 1

Introduction

1.1 What's in a theme?

Theme vowels have always been a thorn in the side of morphological analysis. Traditionally, theme vowels have been defined as empty morphs belonging to no morpheme(s) (Hockett, 1947), as meaningless morphological material attached to a root to form a stem. The traditional function of theme vowels has been understood as merely taxonomic, namely, to classify the stems they contribute to form into distinct inflectional classes (or conjugations).¹ The character of theme vowels has been defined as idiosyncratic not only because there is no principled syntactic, semantic, or phonological reason why a given stem should belong to a particular inflectional class rather than to another, but also because the received wisdom is that some languages simply manage without theme vowels.

Meaningless and idiosyncratic, theme vowels are thus a problem with a name but without a solution;² one of the most severe symptoms of the “disease” of morphology.³ It is not surprising then that they have become

¹Although the notion of theme vowel can be extended to the nominal domain (see Oltra-Massuet, 1999b, § 6.1), we will nonetheless limit our discussion only to verbal theme vowels.

Unless specified otherwise, in what follows we will use the term “theme vowel(s)” as a shorthand for “verbal theme vowel(s)”.

²On this point, see the discussion in Anderson (2015, § 1.4).

³The “disease model of morphology” has been proposed by Aronoff (1998). In short, it holds that morphology is a “disease, a pathology of language” (Aronoff, 1998, p. 5) that manifests through the lack of a one-to-one correspondence (or isomorphism) between grammatical components. As Aronoff puts it: “That’s what morphology is; it’s an unnatural mapping between components.” (Aronoff, 1998, p. 13) The “pathological” nature of theme vowels stems from the fact that they do not correspond to anything phonological,

a hallmark of lexicalist approaches to language.⁴

But what is a Lexicalist approach? Or, more relevantly for our purposes, what distinguishes a Lexicalist approach from a non-Lexicalist one? Despite the “the polysemous morass of current usage” (Aronoff, 1988, p. 1) of the term “lexical”, what is at stake is a fundamental assumption about the overall architecture of the grammar, that is, an issue of modularity. On the one hand, we have the *Lexicalist Hypothesis*:⁵ the idea that words are somehow special, and hence warrant a dedicated grammatical module taking care of their formation, namely, the lexicon. The grammar has thus two distinct generative components, two places where complex objects are built out of atomic ones: the lexicon, which is responsible for everything word-related—for instance, word-formation, stem-formation, “paradigm-space” formation—and the syntax, which is responsible for the assembly of words (both simplex and complex) into phrases and sentences. The relation between these two components is strictly one-way as the lexicon feeds the syntax, but the syntax has no access to the inner workings of the lexicon. In sum, the syntax can only take lexical items and combine them together.

On the other hand, we have the *Single Engine Hypothesis* (Marantz, 2001): the idea that there is just a single module in the grammar responsible for the assembly of complex objects, namely, the syntax. Consequently, not only words have no special status in the grammar,⁶ but whatever the lexicon does must ultimately be reduced to the workings of the syntax together with its interfaces with the other grammatical components. As Heidi Harley has aptly put it: Lexicalists claim that sentences are built out of words; non-lexicalists that words are built out of sentences.⁷

What we are going to do in this thesis is to swim against the tide. We will explore the consequences of adopting a non-Lexicalist approach to the study of theme vowels. We do so, because we believe that proponents of Lexicalism have fully argued for their position, and that, as a consequence, the burden of proof is on those who deem such position not to be the best one to argue for a viable alternative.

What happens if theme vowels are taken to be part and parcel of the

syntactic, or semantic.

⁴The most thoroughly argued lexicalist approach to theme vowels thus far is Aronoff (1994).

⁵The exact formulation of this hypothesis or, for that matter, the exact meaning of the terms “Lexical/-ism/-ist” are not crucial here. For a discussion thereof, see Aronoff (1988, 1994).

⁶For a forcefully argued defence of this stance, see Marantz (1996, 1997, 2001).

⁷Heidi Harley.

inner workings of the grammar?

As we will see, this shift in theoretical perspective has many—and sometimes quite unexpected—consequences. The most striking of these consequences is that theme vowels end up playing a pivotal role in the explanation of a wide range of issues at the (morpho)syntax-phonology interface. Therefore, a non-Lexicalist approach does not merely provide a solution to the problem named “theme vowel”. More radically, it allows a re-conception of the notion itself; a re-conception that has far-reaching consequences for grammatical theory in general, and for hypotheses concerning the interaction among grammatical components in particular.

To get a sense of the range of phenomena in which theme vowels get involved as a consequence of adopting a non-Lexicalist approach, consider the following list of issues taken from a recent workshop held at the University of Graz (April 22–23, 2021), devoted precisely to the topic *Theme vowels in V(P) Structure and beyond*:⁸

- a) syntactic and post-syntactic interaction of thematic formatives with categories in the VP/*v*P;
- b) role played by thematic formatives in argument structure (alternations) and in semantic composition;
- c) dynamics of the interplay between thematic formatives and phonological structure;
- d) patterns of allomorphy involving thematic formatives (either as a trigger or as a target);
- e) patterns of allosemy involving thematic formatives;
- f) parallels and differences between thematic formatives in V(P) vs N(P);
- g) (constraints on) distribution of thematic formatives in lexical categories;
- h) origin and dismantlement of thematic formative systems;
- i) re-structuring of thematic formative systems in language contact.

⁸Theme Workshop.

In the list above, the term “thematic formative” is used instead of “theme vowel”. Although the two terms denote distinct—yet closely related— notions, they can be used interchangeably for our purposes.

This list is telling for at least two reasons. First, most issues on it cannot possibly be raised from a Lexicalist viewpoint. Indeed, theme vowels have nothing to say about argument structure alternations, allomorphy, or allosemy if they are understood as a whimsical aspect of lexically stored stems.⁹ Second, the variety of these issues is impressive: morphosyntactic (*a*, *f*, *g*, *b*), morpho-phonological (*c*, *d*), morpho-semantic (*e*), diachronic (*h*). Although space and competence limitations prevent us from discussing every issue on the list, we will point out the relevance of theme vowels to issues *b*), *c*), and *d*) as we proceed. In particular, we will see how theme vowels can become crucial in determining the placement of stress (3.2, 3.3, 3.4), in defining the context for allomorphy (3.4 and 3.5), and in argument structure alternations (3.4).

To answer the question that gives the title to this Section, we can say that in a theme there is certainly more than nothing. In particular, there is more than we would be led to expect from a traditional Lexicalist approach.¹⁰

1.2 How to handle a theme: some trends from the literature

Before delving into the details of Distributed Morphology—the non-Lexicalist framework we will examine here—and the way in which it handles theme vowels, let us briefly consider how the notion itself of theme vowel has been used in the literature.¹¹ A quick survey allowed to identify three major trends in the use of this notion. We call these trends *Descriptive*, *Ornamental*, and *Radical Decompositional*, respectively.¹²

It should be noted that although these trends have emerged at different stages in the development of grammatical theory, they have not superseded one another. To the contrary, these trends can coexist in the analysis of

⁹Moreover, absent a non-Lexicalist stance, such a workshop could have never been organized in the first place.

¹⁰Interestingly, Embick (2016) and Embick and Halle (2005), among others, hint at a lurking “laziness” on the part of the Lexicalists. These latter seem in fact to content themselves with the claim that “some part of ‘morphology’ [...] is sufficiently by itself to deflect any attempts at further analysis that connects with other parts of the grammar” (Embick, 2016, p. 304).

¹¹On the importance of considering not just the various definitions of a particular notion, but also the sometimes quite different, if not utterly contradictory, uses of that notion, see Anderson (2015) regarding the notion of morpheme.

¹²For a discussion of the various approaches to theme vowels in the formal literature, with special reference to Slavic languages, see Milosavljević and Arsenijević (2022, § 1).

ADJ/NOUN	Gloss	V-INF	V.PRS.1SG	Gloss
ope ɲ	‘open’	open-e ɲ	ope[n]	‘to open’
kete ɲ	‘chain’	keten- ɲ	kete[n]	‘to chain’
teke ɲ	‘sign’	teken-e ɲ	teke[n]	‘to draw’
wape ɲ	‘weapon’	wapen-e ɲ	wape[n]	‘to arm’

Table 1.1: Post-schwa n-deletion in Dutch.

one and the same phenomenon, and even in the same scholar. Additionally, although the notion of theme vowel has been mainly used in the analysis of Indo-European languages, it can also be invoked in the analysis of non-Indo-European languages in much the same way.

According to the *Descriptive* trend, “the theme vowel is used as an umbrella in order to protect the end of the stem from being affected.” (Zonneveld, 1982, p. 355) This trend derives from the work of Zonneveld on Dutch theme vowels ((Zonneveld, 1982)). Zonneveld points out six puzzles opposing Dutch verbs to all the other lexical categories. For instance, Dutch has a productive rule of post-schwa n-deletion (in (1)).

(1) $n \rightarrow \emptyset / \text{ə}_-\#$ (Zonneveld, 1982, p. 346)

This rule, however, does not apply in the 1SG forms of the present tense:

According to Zonneveld (1982, p. 355; emphasis in the original), the reason for this exception is that “each inflectional verb-form is followed by the *e*, the *theme vowel*” Thus, the theme vowel protects the stem from being affected by the deletion rule. Interestingly, the theme vowel is deleted once “having done its job” (Zonneveld, 1982, p. 355), thus never surfacing in Dutch.¹³ Additionally, this “invisible” theme vowel can also function as a trigger. For example, Dutch has a productive rule of open syllable lengthening (in (2)).

(2) $V \rightarrow VV / _C\text{-ə}$ (Zonneveld, 1982, p. 344)

Oddly, this rule also applies in the 1SG forms of the present tense, despite the surface absence of a [ə]:

Thus, as Zonneveld (1982, p. 342) observe, the Dutch theme vowel

¹³Vanden Wyngaerd (2018) has recently discussed some evidence for “invisible” theme vowels, including some puzzles highlighted by Zonneveld (1982).

NOUN.SG	NOUN-PL	Gloss	V-INF	V.PRS.1SG	Gloss
l[i]d	l[e:]d-en	‘member(s)’	ontl[e:]d-en	ontl[e:]d	‘to dismember’
b[a]d	b[a:]d-en	‘bath(s)’	b[a:]d-en	b[a:]d	‘to bathe’
sm[i]d	sm[e:]d-en	‘blacksmith(s)’	sm[e:]d-en	sm[e:]d	‘to forge’
sp[ɛ]l	sp[e:]l-en	‘game(s)’	sp[e:]l-en	sp[e:]l	‘to play’

Table 1.2: Open syllable lengthening in Dutch.

“triggers processes conditioned by the open syllable, and it blocks those conditioned by the word boundary.” Based on the “umbrella” function of the theme vowel, Zonneveld (1982, 357) further proposes to reanalyze the traditional distinction between “strong” and “weak” verbs. In short, “‘weak verb’ is simply a highly informal nomenclature for those verbs of Dutch taking a theme-vowel underlyingly.” (Zonneveld, 1982, p. 357) Consequently, “strong” verbs are athematic.

The *Descriptive* stance has recently been revived by Kayne (2016). In analyzing English past tense forms, Kayne (2016, § 3) proposes to parse a form such as *played* as *play-e-d*. In other words, he proposes that the suffix *-ed* is bimorphemic, with the morpheme *-e-* being a theme vowel. The function of the theme vowel is to protect “the stem from being affected by *-d*.” (Kayne, 2016, p. 4) Thus, the contrast between *tell* ~ *told* and *spell* ~ *spelled* can be accounted for by claiming that in *told* there is no the theme vowel. In this way, the correlation between irregularity and athematicity also holds for the English verbs. More specifically, a subset of the English verbs does not allow the merger of the theme vowel in the past tense forms.¹⁴

Kayne (2016, p. 15) further proposes that “the theme vowel is always present [...] in the present tense”, given the absence of stem irregularities concerning this tense.¹⁵ Consequently, Kayne (2016, p. 15) claims that “the theme vowel *-e-* shields the verbs from all stem alternations.”

Interestingly, the theme vowel is never pronounced in the present tense. In the past tense forms it can instead fail to be pronounced due to phonological reasons. In other words, in the present tense the theme vowel is always deleted. By contrast, in the past tense three scenarios are possible: the theme vowel is merged and gets pronounced (*repaired*); the theme vowel is merged but fails to get pronounced due to phonological reasons (*touched*); the theme vowel is not merged, and hence cannot be pronounced (*told*).

¹⁴As Kayne (2016, p. 2) notes, “Doublets such as *weeped*, *wept* are now to be interpreted as cases of verbs that show optional merger of the theme vowel.”

¹⁵The only exception is the verb *be* (Kayne, 2016, p. 16).

The *Ornamental* trend stems from the work of Oltra-Massuet.¹⁶ Oltra-Massuet (1999b,a) attempts to translate the descriptive insights about theme vowels into a non-Lexicalist framework. Assuming the Single Engine Hypothesis poses, however, a problem. In many languages, most notably Romance languages, theme vowels are syntactically irrelevant. Nonetheless, they are necessary because roots in such languages cannot appear bare. For example, the Spanish verb *cant-a-r* always appear with an accompanying theme vowel. The root *cant-* never appears alone. We discuss the “Ornamental” stance in greater detail in the rest of this thesis. For now, suffice it to say that the crucial mechanism allowing the integration of theme vowels into a non-Lexicalist architecture is the insertion of so-called “dissociated” or *ornamental morphemes*. Thus, theme vowels are assumed to be inserted post-syntactically as dissociated morphemes. In this way, theme vowels found a specific place in the grammatical architecture, while retaining all the properties highlighted by the *Descriptive* stance. For example, the correlation between irregularity and athematicity is explored from a non-Lexicalist perspective by Calabrese (2015).¹⁷¹⁸

In contrast to the *Ornamental* stance, the *Radical Decomposition* trend adopts “the working hypothesis that there is a fairly close correspondence between syntactic structure and morphological structure.” (Svenonius, 2004, p. 178). Ornamental morphemes are not allowed, and therefore theme vowels are taken to realize verbal projections.¹⁹ This trend is particularly widespread in the literature on Slavic languages.²⁰ For example, in presenting the basic properties of Slavic verbal morphology, Svenonius (2004, p. 196) proposes the following template for Slavic verbs:

- (3) The Slavic template
 $T > PST > Asp > v > V$

Slavic languages provide evidence for treating theme vowels as syntactic elements. For example, theme vowels may be involved in argument structure alternations. In the following examples from Russian, the causative-

¹⁶Fábregas (2022, p. 2) calls this trend “‘ThVs in morphology’”.

¹⁷See also Sec. 2.3 and Sec. 3.5.

¹⁸The correlation between irregularity and athematicity has recently been subsumed under the *Suppletion Generalisation* proposed by Vanden Wyngaerd (2018). See Vanden Wyngaerd (2018) for more details.

¹⁹Fábregas (2022, p. 2) calls this trend “‘ThVs in syntax’”.

²⁰However, it is not the only possible take on Slavic theme vowels. See, for instance, Gribanova (2015) for an argument in favor of the *Ornamental* stance based on data from Russian.

inchoative alternations is realized by a change in theme vowel:

- (4) Russian causative-inchoative pairs: CAUS ~ INCH
- a. op'janitj 'make (as) drunk' ~ op'janetj 'become drunk'
 - b. staritj 'make (appear) older' ~ staretj 'grow old'
 - c. obogatitj 'make rich' ~ bogatetj 'get rich'

In (4), the causative member of the pair shows the theme vowel *-i*. The inchoative member shows instead the theme vowel *-ej*.²¹ Moreover, as Svenonius (2004, p. 181) observes, “*-ej* generally derives unaccusative verbs, while *-i* derives transitive (or unergative) verbs”.

Additionally, there is evidence that theme vowels can be associated with aspectual properties. For example, in following verbs from Russian the imperfective ~ perfective contrast is realized by a change in the theme vowel:

- (5) Russian aspectual pairs: IMPF ~ PRF
- a. končatj ~ končítj 'end'
 - b. plenatj ~ plenítj 'captivate'
 - c. brosatj ~ brosíj 'throw'
 - d. stupatj ~ stupítj 'sleep'

Julien (2015) has pointed out similar correlations between theme vowel and aspectual/argument structure alternations in North Sāmi. Consider the following examples:

- (6) a. *ballat* 'fear' - *ballāt* 'to begin to fear'
b. *buollat* 'burn' (INTR) - *buollāt* 'to begin to burn'
c. *duoldat* 'boil' (INTR) - *buoldet* 'to begin to boil'
d. *čierrut* 'cry' - *čirrot* 'to begin to cry'
- (7) a. *čavgat* 'tighten, stretch' - *čavget* 'tighten, stretch once'
b. *leabbut* 'spread out' - *lebbet* 'spread out once'
c. *njuikut* 'jump several times' - *njuiket* 'jump once'
- (8) a. *borrat* 'eat' - *borrot* 'eaten'
b. *čällit* 'write' - *čallot* 'be written'
c. *goarrut* 'sew' - *gorrot* 'be sewn'

In (6), the alternation is between states or processes on the left, and inceptives on the right. In (7), the alternation is between continuatives on the left and semelfactives on the right. In (8), the alternation is between active verbs

²¹The glide gets deleted before a consonant by a general phonological rule.

on the left and passives on the right. In all these case, the alternation is realized by a change in theme vowel. Interestingly, Julien (2015, p. 2) points out that “these are the only derivational categories in North Sāmi that can have change of theme vowel as their own morphological manifestation”.

Recently, the *Radical Decomposition* stance has been advocated by Fábregas also in the Romance domain. As the title of his article aptly puts it: “Theme vowels are verbs” (Fábregas, 2018). Based on the complementary distribution between light verbs and theme vowels in Spanish, Fábregas (2018, p. 52) has proposed the following identity:²²

(9) Theme vowel = Light verb = Verbalizer

Interestingly, Fábregas (2018, p. 53) explicitly builds on Kayne (2016). Indeed, Kayne (2016, § 10) argues that the impossibility of **goed* is not due to the blocking by *went*. Rather, Kayne (2016, p. 12) argues, “*Go* belongs to the class of English verbs that is incompatible with theme vowel-*e*”. More specifically, *go* is a light verb, and light verbs in English are incompatible with a theme vowel in the past tense.

1.3 Aims and organization

Our aim is to show that by adopting a non-Lexicalist stance a new theoretical horizon opens up. Once the Single Engine Hypothesis is assumed, and theme vowels cease to be seen as whimsical idiosyncrasies of lexical items, many issues at the (morpho)syntax-phonology interface may receive a more principled, elegant, and economic explanation. More specifically, we will focus on Distributed Morphology, arguably the most prominent and widespread among non-Lexicalist frameworks, and see how its architecture allows to shed a new light on the notion of theme vowel.

The thesis is organized as follows: Chapter 2 introduces the framework of Distributed Morphology, that it, its grammatical architecture along with the morphological operations it assumes. Chapter 3 showcases Distributed Morphology in the realm of theme vowels and some of the theme-vowel-related issues mentioned above.

Although Distributed Morphology has many advantages over its Lexicalist competitors, it nonetheless has its own shortcomings. Therefore, in Chapter 4, we will discuss some of the major criticisms that have been levelled against this framework as well as against the notion of theme vowel it

²²Fábregas has further elaborated his account in Fábregas (2022).

proposes. Finally, in Chapter 5, we will point to an emerging trend in the recent literature on non-Lexicalist approaches to verbal theme vowels that promises to overcome the major flaws of Distributed Morphology.

Chapter 2

Distributed Morphology

2.1 Introduction

Distributed Morphology (henceforth DM) is undoubtedly the most prominent among non-Lexicalist approaches. It consists of “a set of hypotheses about the interaction among components of grammar” (Bobaljik, 2017, p. 1), and has been described by Marantz (1996, p. 13) as “an aggressively [sic] Item and Arrangement theory”.

Originally, DM was an attempt to show that the “disease” of morphology is not so severe as it may appear at first glance. Indeed, by assuming the Single Engine Hypothesis, and by placing morphology *after* syntax, the default case is a perfect match (or isomorphism) between syntactic structure and morphological structure. But since it is not always the case that syntax equals morphology, one has to account for the possible mismatches between the two components. These possible mismatches are handled in DM through a set of “well-motivated” (Halle and Marantz, 1993, p. 115) morphological operations, which can manipulate a syntactic representation, “but only in highly constrained and fairly well understood ways.” (Halle and Marantz, 1993, p. 121) More specifically, such operations must obey “strict syntactic locality conditions” (Halle and Marantz, 1994, p. 276).

This chapter is thus divided into two parts. The first part (Sec. 2.2) lays out the grammatical architecture underlying DM. The second part (Sec. 2.3) examines the morphological operations that DM uses to account for the “pathological” mismatches between syntax and morphology.

Before we move to the details of DM, let us stress an important characteristic of DM. DM is a versatile framework. It can work in tandem with

a derivation-by-phase approach to syntactic derivation;¹ it is compatible with different takes on the phonological component;² and new morphological operations can be proposed as long as they are defined to operate locally.³

Nevertheless, in what follows we will limit our discussion to the *basic* tenets of DM, that is, to the set of core assumptions shared by all the versions of the framework. Thus, Sec.2.3 will present only those operations that will be relevant for the case studies of Ch. 3. Likewise, in presenting the case studies of Ch. 3, we will only indicate the additions/modifications when needed, but we will not discuss them in detail. For more details, the interested reader is referred to the literature.⁴

2.2 Grammatical architecture

Figure 2.2 shows the grammatical architecture underlying Distributed Morphology. In this Section, we will present the salient characteristics of this grammatical architecture moving from top to bottom.

As the name suggests, Distributed Morphology “explodes” (Marantz, 1997, p. 203) the traditional Lexicon, and “distributes” it among three distinct *Lists*.

List 1 contains *feature bundles*, that is, the basic units manipulated by the syntax, which appear as terminal nodes in a syntactic representation.⁵ They come into two types: *roots* and *functional features*. Functional features are “abstract” in the sense of Halle (1990), that is, they lack phonological content. Roots are “radically underspecified” (Acquaviva, 2009, p. 17), lacking both phonological and semantic features.⁶ They are thus mere indices

¹See Embick (2010) and Sec. 3.4, among others.

²For instance, DM is compatible with Optimality Theory; see Svenonius (2012) and Sec. 3.4, among others. It is compatible with Metrical Stress Theory, as we will see in 3.2 and 3.3. It is also compatible with Element Theory; see Lampitelli (2017).

³For instance, Pruning (Embick, 2010, §2.3.3.) and Obliteration (Arregi and Nevins, 2007), among others.

⁴Two general overviews of the whole framework, also discussing the full range of morphological operations, are Embick and Noyer (2007) and Bobaljik (2017). More specifically concerned with the morphological operations are Halle (1997), Embick and Noyer (2001), and Embick (2007).

⁵In the literature, these elements are called, rather ambiguously, “abstract morphemes”. Even more ambiguously, Halle and Marantz (1993, p. 114) call “morphemes” the terminal nodes both before and after their phonological interpretation. Here we follow Harley (2014) in using the less ambiguous term “feature bundle”, or its equivalent “terminal”.

⁶Of course, one might ask whether roots have syntactic features, and therefore can project. This is a moot point, which we will not discuss here.

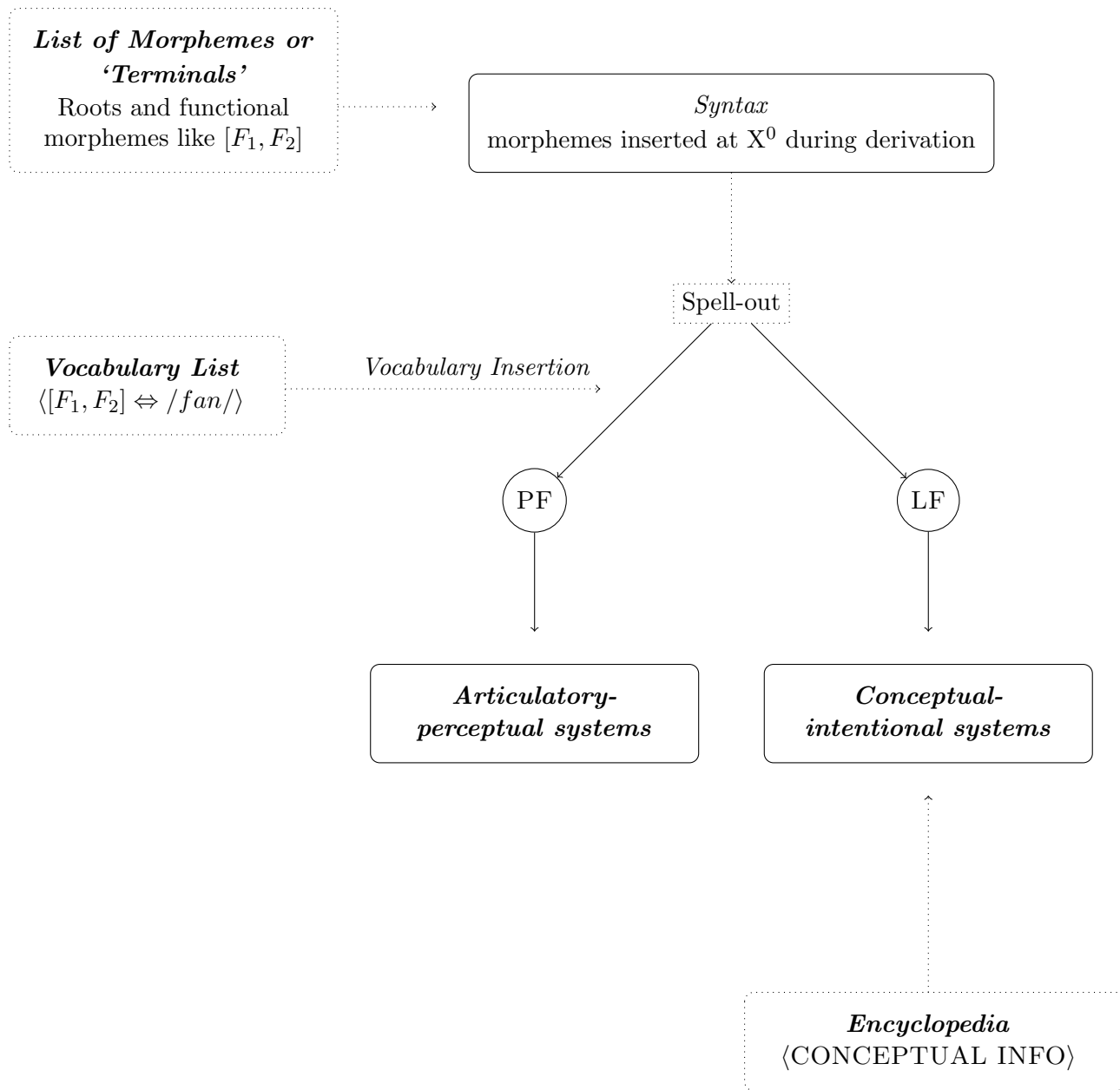


Figure 2.1: The grammatical architecture of Distributed Morphology (adapted from Baunaz and Lander, 2018, p. 11). The traditional Lexicon is “distributed” among three lists: List 1, the narrow lexicon, which contains the basic atoms of syntactic computation; List 2, the Vocabulary, which contains the instructions for pronouncing the elements of List 1 in a syntactically local context; and List 3, the Encyclopedia, which contains the instructions for interpreting the elements of List 1, once they have acquired a pronunciation via the elements of List 2, again in a syntactically local context.

with a differential value.⁷ Roots “act as name-tags which define identity and difference”, as Acquaviva (2009, p. 16) has put it.⁸ Moreover, roots are subject to the condition in (1).

- (1) **Categorization Assumption:** Roots cannot appear (cannot be pronounced or interpreted) without being *categorized*; they are categorized by merging syntactically with category-defining functional heads. (Embick and Marantz, 2008, p. 6).

DM is thus a “root and category”— $\sqrt{\quad}$ & c, for short; see Lowenstamm (2014, p. 234)—framework. This raises the interesting question of what happens to the notion of “word” in such a framework. In a $\sqrt{\quad}$ & c framework, a word corresponds to a syntactic structure of at least the format [Root + categorizer] (see Fig. 2.2).⁹ We say “at least” because the make-up of a word in such a framework depends on the “packaging” of the terminals. More precisely, therefore, a single word is a complex head obtained by successive applications of head-movement (see Fig.2.3).¹⁰

The ultimate consequence of adopting the Single Engine Hypothesis is thus that we have “*Syntactic Hierarchical Structure All the Way Down*” (Halle and Marantz, 1994, p. 276). In other words, by combining feature bundles and arranging them into terminals, syntax also takes care of word formation. No room is left for a generative lexicon, nor for the notion of “word” as a primitive of the theory.

List 2 is the *Vocabulary*, that is, the repository of the *Vocabulary Items* of a language. A Vocabulary Item is a pair of a phonological *exponent*—which is basically a phonological underlying representation (see Bobaljik,

⁷Conventionally, roots are notated by a three-figure number; for instance, $\sqrt{123}$, $\sqrt{258}$, and so on.

⁸The notion of “root” is slippery. It has been at the center of two long debates in the DM literature. The first one, initiated by Marantz (1996), revolved around the existence of root suppletion. The second one—the so-called *Early Insertion vs Late Insertion* debate—was initiated by Embick (2000), and revolved around the presence of a root’s idiosyncratic properties right from the start of a syntactic derivation; see Haugen and Siddiqi (2013) for a critical appreciation of this debate.

We take both debates to have convincingly been settled by Harley (2014) in favour of the existence of root suppletion and of the Late Insertion stance, respectively. Although other issues remain open—see, for instance, note 6—we take Harley’s article as our reference guide here. As always, the interested reader is referred to the literature for more details.

⁹On this point, see also Spyropoulos et al. (2015, p. 302).

¹⁰In general, head-movement is taken to be a syntactic operation. Although head-movement is the only syntactic operation building complex heads, it nonetheless is not the sole operation capable of doing so. See Embick and Noyer (2001) for two post-syntactic operations yielding the same result.

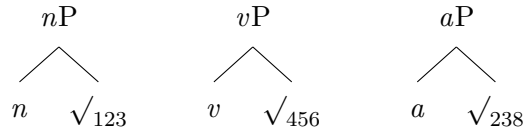


Figure 2.2:

How lexical words look like in a $\sqrt{\text{ \& c}}$ framework. From left to right: a noun, a verb, and an adjective. A $\sqrt{\text{ \& c}}$ framework handles cases of conversion by allowing the same root to occur in two, or even in all three structures.

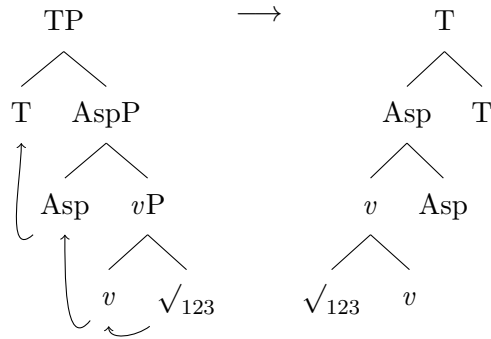


Figure 2.3: The formation of a complex head via successive cyclic head-movement. Since we are interested in the verbal domain, we illustrate the formation of a complex verbal head.

2017, p. 6)—and a feature bundle.¹¹ Vocabulary Items are thus *Rules of Exponence* (Bobaljik, 2012, p. 11), that is, instructions for pronouncing terminal nodes.¹²

DM is therefore a *Realizational* approach to morphology as morphology simply “realizes” an abstract syntactic representation by supplying it with phonological content.¹³ This “realization” is effected by the operation of *Vocabulary Insertion*, which applies according to the principles in (2) (adapted from Embick, 2010, p. 22).

- (2) **Ordering:** Vocabulary Items are ordered according to specificity;
- Uniqueness:** Only one Vocabulary Item may apply to a terminal node;
- Inside-out Cyclicity:** Vocabulary Items are inserted cyclically from the most deeply embedded terminal (the root) outwards (Bobaljik, 2000).

The first principle—Ordering—highlights a crucial aspect of Vocabulary Insertion: Vocabulary Items compete with each other to realize a given terminal. The specificity of Vocabulary Items depends on them being either *context-free* or *context-sensitive*. Each Vocabulary Item can come with or without a conditioning environment that constrains its insertion. In other words, the insertion of a Vocabulary Item may be conditioned by (or, alternatively, sensitive to) syntactic features that must be local to the terminal

¹¹As pointed out by Marantz (1996, p. 2), the notion of “Vocabulary Item” in DM is very close to the traditional, structuralist notion of “morpheme”. Unfortunately, this parallelism merely reinforces the ambiguity of the term “morpheme” in DM.

¹²The exact nature of exponence is debated in the literature. On the one hand, Bobaljik (2000, 2012), building on Halle (1990), claims that exponence amounts to rewriting (notated by \rightarrow) so that, when a Vocabulary Item is inserted into a terminal, the feature bundle of the latter is “exchanged” for the phonological features of former, thus becoming no longer available to further computations. On the other hand, Halle and Marantz (1993) and Embick (2010), among others, take exponence to be correspondence (notated by \Leftrightarrow) so that, when a Vocabulary Item is inserted, its exponent is simply “copied” (Halle and Marantz, 1993, p. 120) into the terminal, thus merely “augmenting” the feature bundle of the latter with the phonological features of the former. Although this difference is relevant in the domain of contextual allomorphy (see Bonet and Harbour, 2012, § 3.5.2), nothing here hinges upon it. We therefore remain agnostic, and use \Leftrightarrow throughout in a neutral way.

¹³The relevant dichotomy here is between “interpretation” and “filtering” (Marantz, 1996, p. 2). In other words, morphology merely realizes, that is, interprets phonologically, the output of the syntax, but cannot filter it by, for example, turning a grammatical syntactic representation into an ungrammatical one (Embick, 2000, note 29).

such Vocabulary Item realizes.¹⁴ A Vocabulary Item that comes without a conditioning environment, thus appearing “where other, more contextually specified items are not required” (Bonet and Harbour, 2012, p. 2), is called *Default* or *Elsewhere*.¹⁵

The winner of the competition between Vocabulary Items is decided by the principle in (3).¹⁶

- (3) **Subset Principle:** The phonological exponent of a Vocabulary Item is inserted into a morpheme in the terminal string if the item matches all or a subset of the grammatical features specified in the terminal morpheme. Insertion does not take place if the Vocabulary Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen. (Halle, 1997, p. 128)

The last clause of the Subset Principle—“the item matching the greatest number of features specified in the terminal morpheme must be chosen”—is a reformulation of the *Elsewhere Condition* proposed by Kiparsky (1973). In sum, it is the most specific item that wins the competition.

The Subset Principle explains why, when competing, Vocabulary Items arrange themselves into disjunctive blocks, first according to the feature bundle they realize—what Halle and Marantz (1993, p. 123) call their “substantive features”—and then, within each block, according to their conditioning environment(s) from the most contextually specified to the Elsewhere. It also explains why, in DM, Vocabulary Insertion is the mechanism of choice to deal with contextual allomorphy (including suppletion).¹⁷

To see this last point more clearly, consider the definition Bonet and Harbour (p. 6 2012, emphasis added) give of contextual allomorphy, the topic of their review: “we [...] use ‘allomorphy’ to refer only to differences arising

¹⁴That the context of insertion must be local is uncontroversial. But defining exactly how local this context must be, is a matter of intense debate; see Bonet and Harbour (2012) and Gouskova and Bobaljik (2020) for a discussion of different proposals.

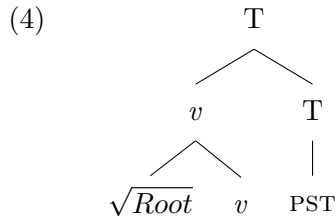
¹⁵Regarding defaults, Halle and Marantz (1993, pp. 133-134) propose that “It may be that Universal Grammar provides a zero spell-out as the default phonological realization of a morpheme in the unmarked case.”

¹⁶The Subset principle may not be sufficient to decide every instance of competition. But because it will be sufficient for the case studies examined here, we will not discuss this issue further; see Halle and Marantz (1993), Harley and Noyer (1999), and references therein.

¹⁷The close tie between Vocabulary Insertion and contextual allomorphy is the topic of Gouskova and Bobaljik (2020).

from *the existence of multiple underlying exponents.*” In the terminology of DM, “the existence of multiple underling exponents” means the existence of two distinct Vocabulary Items, one context-sensitive, the other context-free, that compete with each other to realize one and the same terminal.

To see how Vocabulary Insertion can be used to handle concrete cases of contextual allomorphy, let us briefly consider two examples from English. In (4), we have a complex verbal head, while in (5) we have the block of Vocabulary Items competing for insertion into the T[past] terminal (Embick, 2010, p. 22).¹⁸



- (5)
- a. T[PST] \Leftrightarrow -t / - { $\sqrt{\overline{Leave}}$, $\sqrt{\overline{Bend}}$, ...}
 - b. T[PST] \Leftrightarrow \emptyset / - { $\sqrt{\overline{Hit}}$, $\sqrt{\overline{Sing}}$, ...}
 - c. T[PST] \Leftrightarrow -d

In (5), the Ordering principle is clearly visible. The Vocabulary Items are arranged “in the order of decreasing complexity of the conditions on their insertion” (Halle and Marantz, 1993, p. 126). Thus, (5-a) is the most specific item as its conditioning environment contains more roots than the conditioning environment of (5-b). By contrast, (5-c) is the Elsewhere, as it can apply wherever a more contextually specified item is not required.¹⁹

With structure (4) in mind, consider now the Vocabulary Items in (6).

¹⁸In the examples above, notation is somewhat simplified for ease of exposition. In particular, standard orthography replaces detailed phonological representations, and, in (4), the root node is notated by $\sqrt{\overline{Root}}$ rather than by a numerical index.

¹⁹There might be a problem with (4). The v node intervenes between $\sqrt{\overline{Root}}$ and T[past], thus apparently preventing T[past] from “seeing” the root. This issue can be overcome in a variety of ways, all of which exploiting the fact that the exponent of v is \emptyset . For example, one can assume with Siddiqi (2009) that every zero-spelled-out terminal in a single extended projection is *fused* (see below, Sec. 2.3) with the root. Or one can invoke the \emptyset -*Transparency* property proposed by Embick (2003, p. 166), according to which “ \emptyset affixes are irrelevant for the purposes of linear adjacency”. Going one step further, one might claim that the zero-spelled-out v terminal is *pruned*, that is, deleted from concatenation statements (Embick, 2010, § 2.3.3). All these different solutions aim at the same result, namely, to get $\sqrt{\overline{Root}}$ and T[past] local enough to “see” each other.

- (6) a. $\sqrt{153} \Leftrightarrow \text{wen-} / _ \text{T[PST]}$
 b. $\sqrt{153} \Leftrightarrow \text{go}$

In (6), we have a textbook example of suppletion, namely, the alternation between *go* and *went*. The interesting point of (6) is that it highlights how, in DM, suppletion is treated as an instance of contextual allomorphy. Indeed, in this case, too, we have two distinct Vocabulary Items, one context-free, the other context-sensitive, that compete with each other to realize the same terminal.²⁰

The Subset principle also highlights another crucial property of Vocabulary Items, namely, their *Underspecification*. A Vocabulary Item, reads the principle, is inserted into a terminal “if the item matches *all or a subset* of the grammatical features specified in the terminal”. In other words, a Vocabulary item need not realize *all* the features of the terminal into which it is inserted, thus possibly being underspecified with respect to such features.²¹

The reason why the Underspecification of Vocabulary Items is worth emphasizing is that it provides a justification for the Realizational stance adopted by DM:²²

Since a given Vocabulary Item may thus carry only a small number of the features necessary for the syntax [...], its insertion must logically follow the selection of feature complexes in the syntax. Underspecification thus makes Late Insertion (Separation) mandatory (Halle and Marantz, 1994, p. 278).

Finally, List 3 is the *Encyclopedia*, that is, the collection of the *Idioms* of a language. Idioms are basically the semantic counterpart of Vocabulary Items, that is, instructions for interpreting—this time semantically—terminal nodes. There is, however, a crucial difference between an idiom and a Vocabulary Item. An idiom is in fact a pair of a *Vocabulary Item* and a meaning (Harley and Noyer, 1999, p. 4). The reason for pairing a Vocabulary Item—and not simply a feature bundle—with a meaning is clearly expressed by Marantz (1996, p. 17):²³

²⁰See note 19.

For a radically different analysis of both suppletion and the English past tense exponents, see Kayne (2016).

²¹In stark contrast, syntactic terminals must be fully specified; see Embick and Noyer (2007, p. 299) and Marantz (1996, p. 16), among others.

²²*Realization, Late Insertion, Separation* are different labels for the same architectural assumption, namely, that the two sides of a traditional morpheme are *separated* from each other, with the morpho-phonological side only coming *late* to *realize* the syntactico-semantic side.

²³In the quotation, “cat” is said to be inserted in the “phonology”. This phrasing might sound puzzling, but Marantz makes his terminology clear a few pages earlier: “we might

[...] If “cat” is inserted in the phonology at a node at which “dog” could just as well have been inserted – and if, as we assume, the difference between “cat” and “dog” makes a difference in semantic interpretation– then the phonological representation, specifically the choice of Vocabulary items, must also be input to semantic interpretation.

This passage from Marantz (1996) also highlights the differential value of roots. Indeed, absent an abstract index in the syntax, “there can be no way of telling apart syntactic structures that differ only by the choice of a root” (Acquaviva, 2009, p. 15). In other words, because both “cat” and “dog” correspond to a single syntactic representation—[Root + n] 24 —there must be something in the syntax—the index—that guides the insertion of a different Vocabulary Item and a different Idiom in the two cases. It is in this sense that root indices serve “as the linkage between a particular set of spell-out instructions and a particular set of interpretive instructions”, as Harley (2014, p. 1) has put it.

Because idioms or, for that matter, Encyclopedias more generally, will not concern us here, we do not discuss them any further. The interested reader is referred to the literature for more details.

2.3 Morphological operations

In Sec. 2.1, we said that DM was originally an attempt to show that morphology was not so severe a “disease” as it may appear at first glance. Let us somewhat qualify that claim. What DM proposed, was actually to “chronicize” the disease. Given that any syntactic representation needs to be interpreted—both phonologically and semantically—to be used, morphology is always there.²⁴ Thus, in non-pathological conditions, the disease is simply latent, and a perfect isomorphism between syntax and morphology ensues. By contrast, in pathological conditions, the disease manifests itself through various mismatches between syntactic and morphological structure.

However, by chronicizing the disease, DM also makes it “manageable”. The “symptoms” of the disease can now be “treated” by a set of operations whose application is constrained by syntactic locality conditions. It is for this reason that DM can be claimed to be a more restrictive framework than its lexicalist competitors:

well look at morphology as part of the Phonology, i.e., the interpretive component that relates an output of the computational system to PF” (Marantz, 1996, p. 13).

²⁴This stance is in stark contrast with Aronoff’s claim that “you don’t need morphology” (Aronoff, 1998, p. 6).

[...] it is a leitmotif of DM that there is a fundamental systematicity to morphology—that there is order to be discovered in the apparent chaos of morphological data, and that this order is indicative of the role of universal grammatical constraints, restricting the space of possible mismatches in observed syntactic and morphophonological structure. (Bobaljik, 2017, p. 13)

There are two key points about morphological operations. First, not only they are sensitive to syntactic locality, but they also operate on a syntactic representation, “tweaking” it so as to meet language-particular well-formedness (or morphological) requirements. Morphological operations are thus responsible for the observed inter-linguistic variation. Assuming syntax to be universal, the same syntactic output can be subject to different morphological operations, applying in different orders, in different languages. Morphology is therefore the *locus* of this observed variation. Because of their “trafficking” in syntactic structure, morphological operations apply *en bloc* before Vocabulary Insertion.

Second, the application of such operations is governed by the principle in (7), which highlights their “obligatory” nature (see Embick and Marantz, 2008, p. 27).²⁵

- (7) **Rules Apply:** Perform a computation when the structural description of the rule is met. (Embick and Marantz, 2008, p. 27)

Morphological operations are thus “minimal readjustments, motivated by language-particular requirements” (Embick and Noyer, 2007, p. 304). Three morphological operations will be particularly relevant for the case studies we will examine in the next Chapter: *Ornamental morphemes Insertion, Fusion, and Impoverishment*.

Let us begin with the insertion of ornamental morphemes, recently also known as *node-sprouting* (Choi and Harley, 2019). This operation consists in the insertion of syntactico-semantically irrelevant terminals into a syntactic representation.²⁶ The “ornamental” nature of the terminals inserted in this way follows from the architectural assumptions we discussed in the previous Section. Given that all syntax needs to run its computations is provided by List 1, the “extra” terminals that morphology may insert into a syntactic representation can only be syntactico-semantically unmotivated.

²⁵This principle leaves open the question regarding the order in which morphological operations apply. This is moot question, which does not directly concern us here. See Embick and Noyer (2001) for some discussion on this topic.

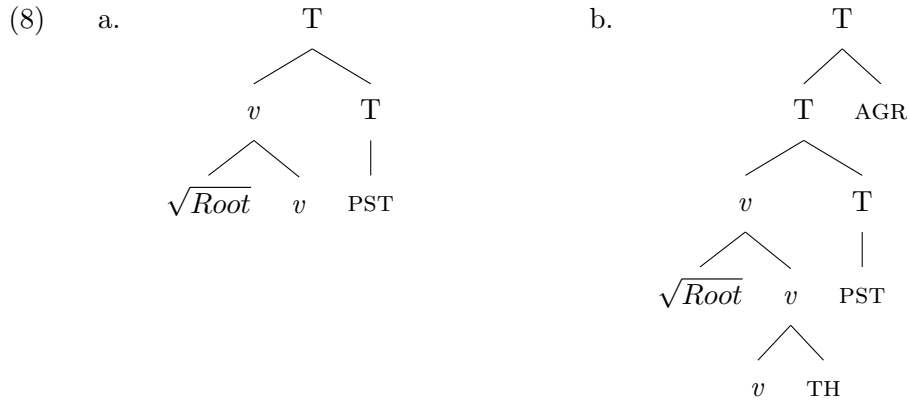
²⁶Bobaljik (2017, p. 18) aptly points out the epenthesis-like character of this operation by drawing a parallel between morphological and phonological operations.

Nonetheless, ornamental terminals are necessary in order to comply with language-specific well-formedness conditions.²⁷

By altering the number of terminals, “These ornamentations [...] introduce redundancy into the PF expression” (Embick and Noyer, 2007, p. 309), thus capturing the observed fact that “many languages show discrete pieces in morphology that evidently do not correspond to heads in a syntactic derivation” (Embick and Noyer, 2007, p. 310).

Thus, it is not surprising that in DM node-sprouting is the operation of choice to handle theme vowels.²⁸ But theme vowels are not the only nodes that are claimed to be “sprouted” in the morphology. For example, it has been argued in the literature that *Agreement* is another such node (see Halle and Marantz, 1993, p. 115, among others).²⁹

Let us now see how node-sprouting works in concrete. Consider the examples in (8).



Example (8-a) shows a complex verbal head (the same as example (4) above) as outputted by the syntax, while example (8-b) shows the same

²⁷Although language-specific well-formedness conditions are the essential trigger of node-sprouting, it is unclear what they are concretely. The only agreed-upon point in the literature seems to be that they must be “sufficiently transparent that speakers of the language may infer them without special difficulty during acquisition” (Embick and Noyer, 2007, p. 305).

²⁸Indeed, this operation is the theoretical device that allowed Oltra-Massuet (1999b) to translate the traditional, descriptive notion of theme vowel into a non-Lexicalist framework like DM; see Sec.1.2.

²⁹Nevertheless, as Bobaljik (2017, note 25) points out, “This is not a core assumption of DM; the overall DM architecture [...] is also compatible with agreement nodes (or features) being present in the syntactic representation”.

complex head after the ornamental morphemes TH and AGR have been inserted by the morphology according to some language-specific conditions. In these examples, the mismatch between morphological and syntactic positions is clearly visible, because (8-b) has more “positions of exponence”, that is, more terminals, than (8-a).

Node-sprouting also has a variant inserting only *features* that are absent from a syntactic representation. An instance of this variant is Vocabulary Insertion.

It is thus important to distinguish between the two variants of node-sprouting, and we can do so by adopting the definitions in (9) (adapted from Embick and Noyer, 2007, p. 309).³⁰

(9)

- a. **Dissociated Features:** A feature is dissociated if and only if it is added to a node under specified conditions at PF;
- b. **Dissociated Nodes:** A node is dissociated if and only if it is added to a structure under specified conditions at PF.

Interestingly, with the introduction of dissociated features, it becomes possible to draw a typology of the features acknowledged by DM (see Embick and Noyer, 2007, pp. 309–310). The typology rests on the different relevance these different types of feature have for the syntax versus for the morphology (see example (10)).

- (10)
- a. *Interpretable features.* Relevant for both syntax and morphology; in other words, these are the elements of List 1.
 - b. *Uninterpretable features.* Syntactically relevant but morphologically irrelevant; for instance, EPP and *uWH*.
 - c. *Dissociated features.* Syntactically irrelevant but morphologically relevant.
 - d. *Diacritic features.* These features are similar to dissociated features, except that they are introduced by Vocabulary Insertion along with the phonological exponents (Halle and Marantz, 1993, p. 136).³¹

³⁰ *Dissociated*, *Ornamental*, *Sprouted* are just different labels for the same items, namely, for the terminals and features that are inserted post-syntactically.

³¹ This is not the only possible take on diacritic features. In *Early Insertion* approaches (see note 8), for example, such features are assumed to be present in the “syntax” right from the start of a syntactic derivation. This assumption has sparked an intense debate in the literature; see in particular Acquaviva (2009) and Haugen and Siddiqi (2013) for an overview and a critique of the Early Insertion stance.

The interaction among the various types of feature is regulated by the principle in (11), which follows from the Realizational stance taken by DM.

- (11) **Feature Disjointness:** Features that are phonological, of purely morphological, or arbitrary properties of vocabulary items, are not present in the syntax; syntacticosemantic features are not inserted in morphology. (Embick, 2000, p. 188).

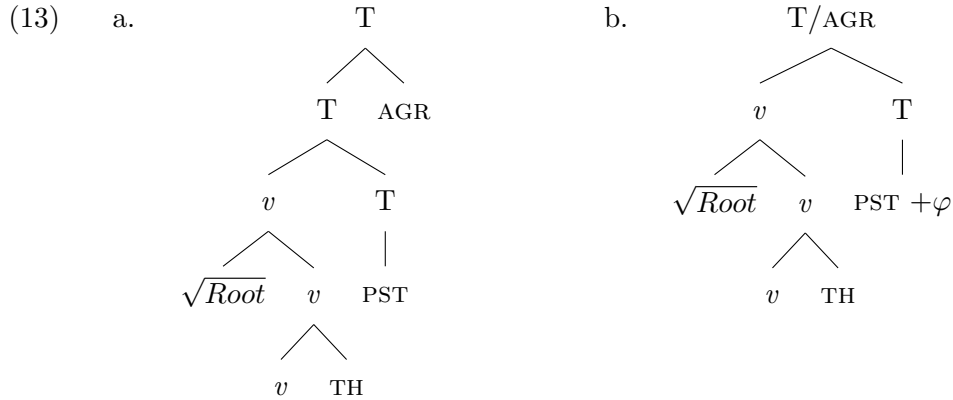
Regarding the distinction in (9), another interesting issue is how a featureless dissociated node receives its features. For example, how does the AGR node in (8-b) receive its features? This answer is “through contextually-determined rules, referred to as ‘agreement’ or ‘concord’ processes” (Embick and Noyer, 2007, p. 309). In other words, such nodes receive their features by means of an operation copying the features of a local—most commonly c-commanding—node onto them. In the example in question, such operation copies the φ -features of the DP in Spec,[TP] onto AGR. Consequently, also the distinction in (12) is worth having in mind (Embick and Noyer, 2007, p. 309).

(12)

- a. **Feature Copying.** A feature that is present on a node X in the narrow syntax is copied onto another node Y at PF;
- b. **Feature Introduction.** A feature that is not present in the narrow syntax is added at PF

The second relevant operation is *Fusion*. As the name suggests, this operation “takes two terminal nodes that are sister under a single category node and fuses them into a single terminal node” (Halle and Marantz, 1993, p. 116). The result is again a mismatch between syntactic and morphological positions. The only difference with respect to node-sprouting resides in the way such mismatch is effected because Fusion, as opposed to node-sprouting, subtracts positions of exponence so that “Only one Vocabulary item may now be inserted, an item that must have a subset of the morphosyntactic features of the fused node, including the features from both input terminal nodes.” (Halle and Marantz, 1993, p. 116)

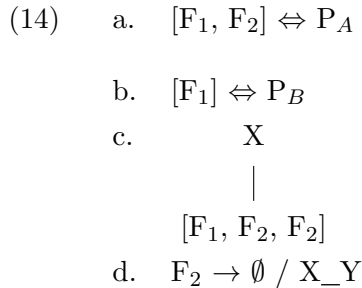
Given that in some languages Tense and Agreement features are expressed cumulatively, that is, by a single exponent, we can illustrate the functioning of Fusion by resuming example (8) above.

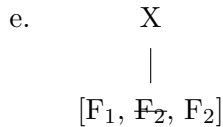


In (13), we have a possible continuation of (8), where after having sprouted the theme and AGR nodes, the morphology fuses T and AGR together, always in accordance with some language-specific requirement. The effect on terminals is again clearly visible: (13-b) has fewer terminals than (13-a), with the further provision that the Vocabulary Item that will ultimately get inserted into the T/AGR node must realize a subset of the features of *both* T and AGR, thus accounting for cases of cumulative exponence.

The last relevant operation is *Impoverishment*. This is a feature-deleting operation that removes one or more features from a given terminal in the context other specific terminals. Impoverishment is thus similar to Fusion, both being “subtractive” operations. But because it affects features rather than terminals, the result of the application of Impoverishment is slightly different from the result of the application of Fusion. The crucial effect of Impoverishment consists in an extension of the domain of an unmarked Vocabulary Item, a situation Halle and Marantz (1994, p. 278) call “retreat to the general case”.

To make the functioning of Impoverishment clearer, consider the general schema of this operation in (14) (adapted from Halle and Marantz, 1994, p. 279).





In (14), two Vocabulary Items—(14-a) and (14-b)—compete for insertion into node X (in (14-c)). Under normal circumstances, (14-a) would win the competition, being the most specific item. Yet the Impoverishment rule (14-d) deletes F_2 from X when X is sufficiently local to Y. As a result of this deletion (see (14-e)), (14-a) can no longer be inserted. Indeed, the Subset principle prevents a Vocabulary Item from being inserted into a terminal if it is specified for features that are absent from that terminal. Consequently, it is (14-b) that wins the competition in this case. It is in this sense that Impoverishment effects a “retreat to the general case”. In other words, Impoverishment yields a situation where “a more highly specified Vocabulary Item loses out to one that is less specific, more general.” (Halle and Marantz, 1994, p. 278)

Because of its effects, Impoverishment is the operation of choice in DM to deal with *Syncretism*, the phenomenon in which one and the same Vocabulary Item gets inserted into two or more distinct terminals.³²

A crucial aspect of Impoverishment is its close connection with markedness. As convincingly argued by Noyer (1998), there is a strict “directionality” to Impoverishment as it can only lead from a more marked representation to a less marked one, but never vice versa. However, because syntactic terminals must be fully specified (see note 21), Impoverishment always works in tandem with *Redundancy Rules*. Redundancy rules are “feature-filling” rules that are not part of the grammar of a language, but merely follow from general markedness considerations. Whenever Impoverishment deletes a marked value of a feature in a terminal, redundancy rules apply to reinsert the corresponding unmarked value, thus making that terminal again fully specified.

It is, therefore, possible to draw a typology of the possible changes Impoverishment can effect (adapted from Noyer, 1998, note 6):

- (15)
- a. $[mF] \rightarrow [\emptyset F] \rightarrow [uF]$
 - b. $[\alpha F] \rightarrow [\emptyset F]$
 - c. $[uF] \rightarrow [\emptyset F]$

³²The other operation utilized in DM to deal with Syncretism is Vocabulary Insertion, given the underspecified nature of Vocabulary Items.

Venire	Scrivere	Fare
'vɛnni	'skrissi	'fetsi
ve'nisti	skri'vesti	fa'tsesti
'vɛnne	'skrisse	'fetse
ve'nimmo	skri'vemmo	fa'tsemmo
ve'niste	skri'veste	fa'tseste
'vɛnnero	'skrissero	'fetsero

Table 2.1: The *Passato Remoto* paradigm of three irregular verbs from Italian. The distribution of the irregular allomorph is highlighted in gray, while the 1st and 2nd person plural are highlighted in light gray.

In (15-a), we have “Impoverishment-plus-Insertion” (Noyer, 1998, p. 283), that is, the deletion of a marked value of a feature followed by the insertion of the corresponding unmarked value. In (15-b), we have the deletion of *both* values, the marked as well as the unmarked one.³³ Finally, in (15-c), we have the deletion of only an unmarked value.

Let us now illustrate the connection of Impoverishment with both syncretism and markedness with just a single example.

In analysing the allomorphic alternations in the forms of the Italian perfect (*Passato Remoto*), Calabrese (2015, § 7) highlights an interesting pattern involving the first and second person plural: “Exponents in these two persons tend to be syncretic, to disappear (=be defective), or to display regular morphological behaviour.” (Calabrese, 2015, p. 89) This “1st and 2nd Plural conspiracy”, as Calabrese calls it, is so widespread as to be “one of the most characteristic general patterns governing Italo-Romance morphosyntax” (Calabrese, 2015, p. 89).³⁴

One case of this conspiracy is directly relevant to Calabrese’s analysis: “In all the paradigms characterized by irregular stem allomorphy, regular stem allomorph [sic] are found in 1st and 2nd plural verbal forms.” (Calabrese, 2015, p. 89) To see this distributional pattern, consider the perfect paradigm of three irregular verbs from Italian—*venire* ‘to come’, *scrivere* ‘to write’, and *fare* ‘to make’—in Table 2.1.³⁵

Calabrese’s account of this pattern rests on two key assumptions. First,

³³As Noyer (1998, note 6) points out, this is the only way in which a marked value can actually be *deleted* rather than just being replaced with the corresponding unmarked value.

³⁴See the original article for a list of the cases where this conspiracy manifests itself.

³⁵In Tab. 2.1, we slightly depart from Calabrese’s notational conventions.

1st and 2nd person plural are marked. Second, there is a diachronic tendency disfavouring marked exponence for marked categories. In other words, there is tendency to avoid “the cumulation of idiosyncratic exponence in words containing marked categories.” (Calabrese, 2015, p. 88)

Because considerations of markedness generally play a crucial role in the explanation of syncretism—in this case, syncretism amounts to the “1st and 2nd Plural conspiracy”—and given the close connection between markedness and Impoverishment, Calabrese resorts precisely to this operation to account for the pattern in Tab. 2.1.

Let us see how Calabrese’s account works in the case of *scrivere* ‘to write’.³⁶ The stem allomorphy for this verb involves the alternation between *skriv*—the regular allomorph—and *skris(s)*—the irregular allomorph. The key point of Calabrese’s account is that such alternations correlate with the presence of theme vowels. More specifically, irregular stem allomorphs can only appear if theme vowels are absent.³⁷ Consequently, Calabrese proposes that the roots displaying irregular stem allomorphy in the perfect come equipped with a diacritic feature that blocks the otherwise automatic insertion of the theme vowel—Root^[-TH].³⁸ This diacritic feature is what Impoverishment deletes when such roots occur in the marked context [+PRF, +PAR, +PL]_{AGR}:

$$(16) \quad \text{Root}^{[-\text{TH}]} \rightarrow \text{Root} / _ [+PRF, +PAR, +PL]_{\text{AGR}}$$

The effects of the application of Impoverishment are clearly visible in the derivation of the 1st singular form *skrissi* (in (17)) versus the derivation of the 1st plural form *skrivemmo* (in (18)).

- | | | | |
|------|----|---|----------------------|
| (17) | a. | [[[skriv ^[-TH]] _{root} +PRF] _T +PAR, +AUTH, -PL] _{AGR} | Syntax |
| | b. | [[[skriv] _{root} s] _T i] _{AGR} | Vocabulary Insertion |
| | c. | Skrissi | Output ³⁹ |
| (18) | a. | [[[skriv ^[-TH]] _{root} +PRF] _T +PAR, +AUTH, +PL] _{AGR} | Syntax |
| | b. | [[[skriv] _{root} +PRF] _T +PAR, +AUTH, +PL] _{AGR} | Impoverishment |
| | c. | [[[skriv] _{root} TH] +PRF] _T +PAR, +AUTH, +PL] _{AGR} | Sprouting |
| | d. | [[[skriv] _{root} e] ∅] _T mmo] _{AGR} | Vocabulary Insertion |
| | e. | Skrivemmo | Output |

³⁶The cases of *venire* and *fare* involve additional phonological complications, which are not relevant here.

³⁷We will return to this correlation in Sec.3.5.

³⁸Although Calabrese (2015) is not explicit about his stance on the Early vs Late Insertion debate, his account is compatible—at least in principle—with either approach.

³⁹After the total regressive assimilation of stem-final *v*-.

The derivation of the 2nd person plural form *skriveste* is the same as the derivation of *skrivemmo* in (18), except for the Vocabulary Item spelling out the AGR node. Setting aside considerations of locality—to which we will return in Sec. 3.5—examples (17) and (18) show how the interaction of Impoverishment with markedness considerations can account for the case of syncretism at hand. More specifically, Calabrese’s assumptions about markedness in tandem with the obligatory nature of morphological operations (see (7)) conspire to derive the attested forms while ruling out the unattested ones. For instance, forms exhibiting a “cumulation” of marked exponence, such as **skrissemmo* and **skrisseste*, cannot be derived.

Chapter 3

Theme vowels in DM: Case studies

3.1 Introduction

In the previous Chapter, we laid out the framework of DM. We saw that it consists of a grammatical architecture in which morphology operates after syntax along with a set of morphological operations capable of taking a syntactic representation and making it comply with language-specific well-formedness conditions. With this framework in place, we now discuss a few case studies from the literature to see how and to what extent such framework can change the Lexicalist understanding of theme vowels.

3.2 Catalan

The first detailed analysis of the notion of theme vowel carried out within the framework of DM was Isabel Oltra-Massuet's work on Catalan verbal morphology. Oltra-Massuet (1999b,a) were real breakthroughs, so much so that they have since become unavoidable references in the literature.

The goal was to provide a unified account of “three *a priori* unrelated issues that have remained unexplained in previous approaches: theme allomorphy, inflection allomorphy, and cases of total and partial syncretism that we find across and within tenses.” (Oltra-Massuet, 1999a, p. 280) Ultimately, the goal was very ambitious: to envisage a “grand unification” of the entire Catalan morpho-phonology, with possible extensions to other Romance languages. The key element that would have made such unification possible was precisely “a new approach to the notion of theme vowel”

(Oltra-Massuet, 1999b, p. 9); an approach that would have allowed to unify the verbal and the nominal domain as well as the assignment of stress in both domains.¹

The strategy consisted in three points. First, the conception of theme vowels as dissociated morphemes “sprouted” on the *v* node. Second, the extension of the well-formedness requirement triggering the insertion of theme vowels to *all* functional nodes. Third, the reanalysis of traditional conjugations in terms of bundles of abstract morphological features— $[\pm\alpha, \pm\beta, \pm\gamma]$.² Additionally, markedness considerations play a crucial role as we will see.

Before discussing Oltra-Massuet’s strategy in more detail, let us say a few words about Catalan verbal morphology. Traditionally, Catalan verbs are sorted into three conjugations depending on the theme vowel, with conjugation III being internally split “into two conjugations on the basis of a single morpheme, [‘ɛʃ]” (Oltra-Massuet, 1999b, p. 7). This morpheme only appears in some forms of the present (see Table 3.1).³

(1)	a.	Conjugation I: /a/	[kənt-‘a-n]	‘singing’
	b.	Conjugation II: /e/	[təm-‘e-n]	‘fearing’
	c.	Conjugation IIIa: /i/	[un-‘i-n]	‘joining’
	d.	Conjugation IIIb: /i/	[surt-‘i-n]	‘going out’

Aspect never heads its own projection, so it is always bundled together with other functional heads, “prior to the operations of the syntax.” (Oltra-Massuet, 1999a, p. 282) Tense and Mood features, too, are bundled together into a single terminal, always before syntactic operations, except in the future and in the conditional.

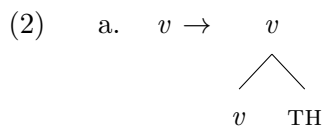
Back to Oltra-Massuet’s strategy, let us consider each point in turn. First, theme vowels are conceived of as “the realization of a morphological well-formedness requirement on the syntactic functional head *v*.” (Oltra-Massuet, 1999a, p. 290) They are introduced into a syntactic representation

¹See note 1 of Ch. 1.1. The unification of the verbal and the nominal domain is accomplished by the equivalence between verbal theme vowels and nominal class markers; see Oltra-Massuet (1999b, § 7) and Oltra-Massuet (1999a, § 6).

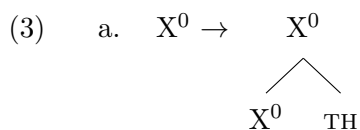
²Morphological features can be taken to be diacritic features given that their respective definitions in Oltra-Massuet (1999b) and Halle (1990) substantially overlap. On the one hand, Halle (1990, p. 155) defines morphological features as those features that “represent properties that are an integral part of the Vocabulary representation of particular Vocabulary Items.” On the other, Oltra-Massuet (1999b, p. 58) writes that “morphological features are inserted by VI [Vocabulary Insertion]”.

³We follow Oltra-Massuet (1999b, note 5) in exemplifying the different conjugations with the gerund form. We follow Oltra-Massuet (1999b, p. 32) also in adopting the four verbs in (1) as our running examples throughout this Section.

by the node-sprouting rule in (2).



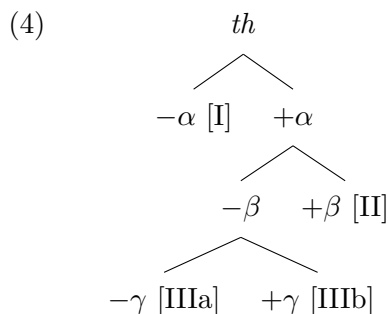
Second, the extension of this well-formedness requirement to all functional heads simply amounts to the generalization of rule (2) to all functional heads X^0 :



Ultimately, a theme vowel is defined as “a morphological requirement on functional morphemes that serves to signal, in the morphology, the category (N, V or A) created in the syntax” (Oltra-Massuet, 1999a, p. 294). This stance should not be surprising given the \surd & c nature of DM.

Third, conjugations are decomposed into bundles of binary morphological features. Conjugations are further hierarchically arranged based on their degree of markedness. The markedness of a conjugation negatively correlates with its productivity, so the more productive a conjugation is, the least marked it is. In Catalan, conjugation I is the most productive, whereas conjugations IIIb and II are the least productive.⁴

Based on these considerations, we have the theme markedness hierarchy in (4) (adapted from Oltra-Massuet, 1999b, p. 21).



And based on this hierarchy, we can rewrite the inflectional classes in (1)

⁴These are closed classes, with conjugation II containing the majority of irregular verbs (Oltra-Massuet, 1999a, p. 286).

as in (5).

- | | | |
|-----|---------------------|------------------------------|
| (5) | a. Conjugation I | $[-\alpha]$ |
| | b. Conjugation II | $[+\alpha, +\beta]$ |
| | c. Conjugation IIIa | $[+\alpha, -\beta, -\gamma]$ |
| | d. Conjugation IIIb | $[+\alpha, -\beta, +\gamma]$ |

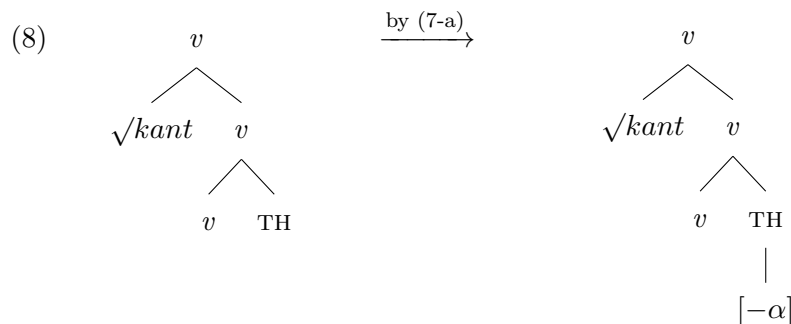
Conjugation I is thus the default one, being $[-\alpha]$; the others are marked, being all $[+\alpha]$. However, as Oltra-Massuet (1999b, p. 22) notes, there is actually a three-way distinction in (4). Indeed, if we define markedness in terms of the number of positive values of a feature, then conjugations II and IIIb are “doubly” marked:

- | | | | |
|-----|------------------------------|------------------------------|-----------------|
| (6) | a. Second Conjugation: | $[+\alpha, +\beta]$ | ‘doubly marked’ |
| | b. Third Conjugation (IIIb): | $[+\alpha, -\beta, +\gamma]$ | ‘doubly marked’ |
| | c. Third Conjugation (IIIa): | $[+\alpha, -\beta, -\gamma]$ | ‘marked’ |
| | d. First Conjugation: | $[-\alpha]$ | ‘unmarked’ |

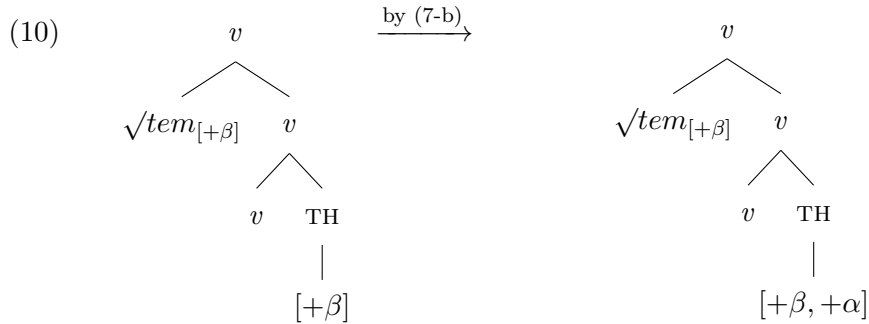
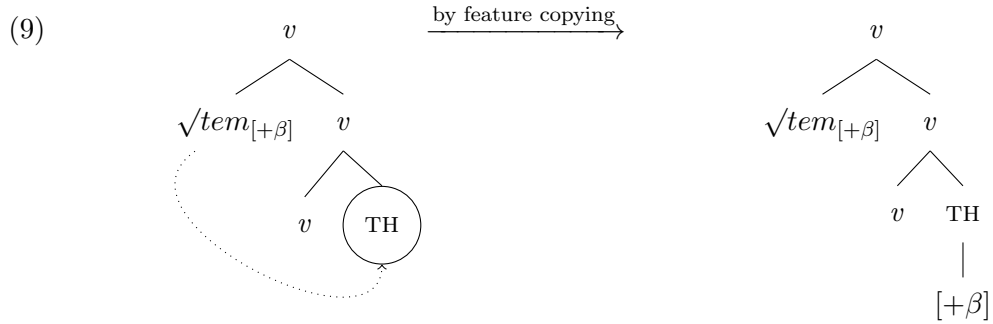
As discussed in the previous Chapter, a copying operation provides a dissociated morpheme with features. Additionally, redundancy rules provide a terminal with unmarked values so as to make it fully specified. The interaction of feature copying with the redundancy rules in (7) accounts for how theme positions get their features in Catalan.

- | | |
|-----|--|
| (7) | a. $[\emptyset] \rightarrow [-\alpha]$ |
| | b. $[+\beta] \rightarrow [+\alpha]$ |
| | c. $[+\alpha] \rightarrow [-\beta, -\gamma]$ |
| | d. $[+\gamma] \rightarrow [+\alpha, -\beta]$ |

The redundancy rule in (7-a) highlights a key point, namely, that “In the absence of any information, a default theme feature $[-\alpha]$ is inserted.” (Oltra-Massuet, 1999b, p. 27) This is how conjugation I verbs get their theme position on v filled:



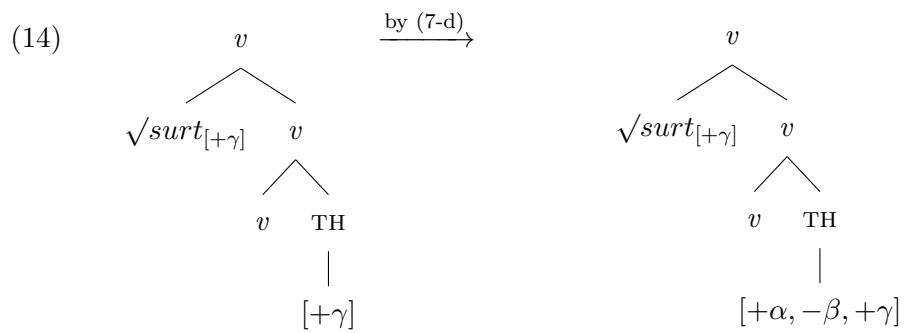
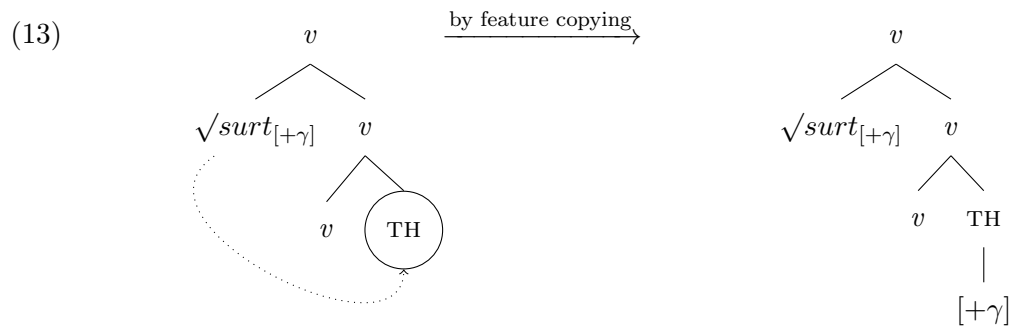
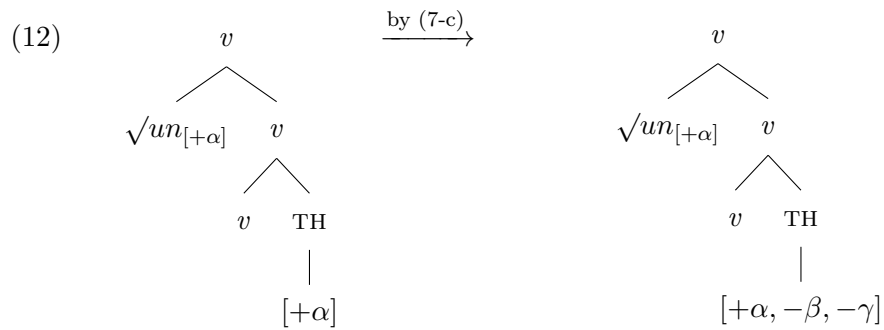
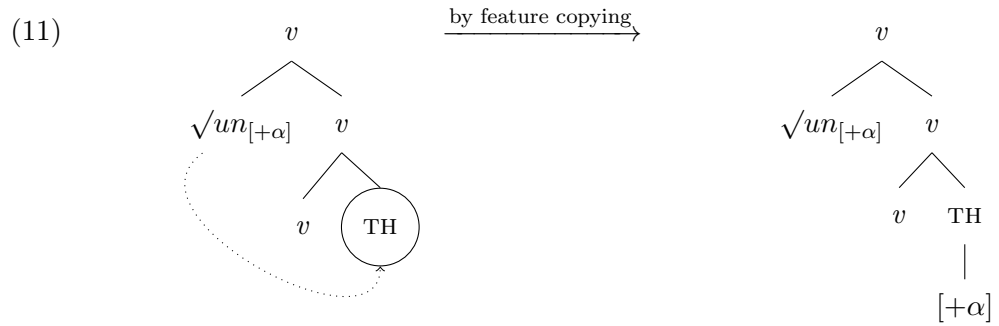
As for Conjugation II verbs, they get their theme position filled by a combination of feature copying—in (9)—and redundancy rules—in (10):⁵



Finally, conjugation III verbs get their theme position filled in the same way as conjugation II verbs:

⁵ Oltra-Massuet writes that “first conjugation verbs [...] have no information about the conjugation class they belong to. The traditional second and third conjugation verbs will include some conjugational information in their *lexical entries*, i.e. in the root morphemes.” (p. 20 Oltra-Massuet, 1999b, emphasis added) Although Oltra-Massuet’s work predates the Early vs Late Insertion debate, her account is nonetheless compatible with the Late Insertion stance. Indeed, she assumes that “Vocabulary Insertion is cyclic, starting from the most deeply embedded morpheme, i.e. the root” (Oltra-Massuet, 1999b, p. 17); and that “morphological features are inserted by VI [Vocabulary Insertion]” (Oltra-Massuet, 1999b, p. 58). Thus, examples (9)–(12) can be taken to be mere shorthand for more complex representations in which an underspecified root is spelled-out by a Vocabulary Item inserting a diacritic feature along with an exponent. For example, the root node in (9) could be spelled-out by a Vocabulary Item like the following:

(i) $\sqrt{_{123}} \Leftrightarrow \text{tem-}, [+β]$



The last key point of Oltra-Massuet’s strategy is the interaction of the markedness hierarchy in (4) with the markedness of the environment, that is, “concretely, with the degree of markedness determined by the tense morpheme.” (Oltra-Massuet, 1999b, p. 22) The markedness of the environment is defined in terms of the number of positive values of a feature:

- (15) a. [-PST] unmarked T
 b. [+PST, -SBJ] marked T
 c. [+PST, +SBJ] doubly marked T

Let us now see how this strategy accounts for theme vowel allomorphy in Catalan (see Table 3.1).

Tense	AGR	I	II	IIIb	IIIa
PRS.IND/SBJ	SG, 3PL	∅	∅	∅	'εf
	1PL, 2PL	'ε	'ε	'i	'i
IMP.SBJ	all	'e	'e	'i	'i
FUT/COND	all	'a	∅	'i	'i
IMP.IND	all	'a	'i	'i	'i
PRF	1SG	'i	'i	'i	'i
	rest	'a	'e	'i	'i

Table 3.1: Theme vowel allomorphy in Catalan (adapted from Oltra-Massuet, 1999a, p. 284). We have replaced the original idiosyncratic abbreviations with standard Leipzig ones. Theme syncretism is highlighted in gray. The combined conditioning effect of Tense and AGR on allomorphy is clearly visible in the first and last rows.

Tab. 3.1 is telling for at least two reasons. First, because it makes clear the deep interconnection among conjugations. More specifically, it highlights that theme allomorphy often amounts to theme syncretism. In other words, the theme allomorph of a conjugation is the characteristic theme vowel of another one. For example, in the imperfect subjunctive, conjugation I is syncretic with conjugation II—both take /e/. In imperfect indicative, conjugation II is syncretic with conjugation III—both take /i/. And in 1SG perfect, we have a case of total syncretism, that is, all conjugations take the characteristic theme vowel of conjugation III—/i/.⁶

⁶Tab. 3.1 also points out that the notion of default depends on the definition of markedness. Conjugation IIIa is indeed special, not only because its theme vowel is immune to allomorphy-as-syncretism—the theme allomorph [εf] is unique to this conjugation—but

In a traditional, Lexicalist approach, such interconnection would be overlooked. By contrast, we can capture it through the interaction of the markedness hierarchy and the markedness of the environment (see below).

Second, because it points out the conditioning role of Tense and AGR on theme allomorphy. This conditioning effect is clearly visible in the first and last rows, where theme allomorphs directly depend on particular combinations of Tense and AGR features.

The conditioning role of Tense and AGR is totally unexpected from a traditional, Lexicalist viewpoint. The traditional function of a theme vowel is to determine the affix set of the stem it contributes to form. In other words, its function merely reduces to determine “which inflectional affixes will realize the various morphosyntactic properties that the verb bears in a particular instance”, as Aronoff (1994, p. 46) has put it. There is an intrinsic, though implicit, directionality to this function—from the theme vowel to the affix set—so that once the theme vowel of a given stem is known, the inflectional endings that stem will take are known as well—or, at least, they are predictable.

What Tab. 3.1 shows is that the directionality is in fact the opposite one—from the affix set to the theme vowel. It is the “the morphosyntactic properties that the verb bears” in a particular context, that is, the tense and agreement features, that determine the theme vowel. In other words, as Oltra-Massuet writes, “The choice of the theme vowel always depends on the *availability of contextual information*.” (p. 26 Oltra-Massuet, 1999b, emphasis in the original)

To make this point clear, consider the paradigm of the imperfect indicative in 3.2.

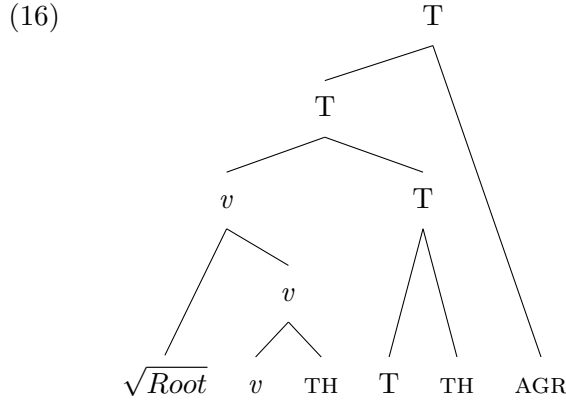
Each form in Tab. 3.2 corresponds to the representation in (16), which results from the application of the generalized node-sprouting rule in (3), plus the further insertion of an AGR node.⁷

also because its characteristic theme vowel is the target of the majority of allomorphy rules. In other words, allomorphy rules tend to change the characteristic theme vowel of another conjugation into /i/. Moreover, verbs belonging to this conjugation are fully regular. Therefore, “we can consider the first conjugation as the default one in terms of productivity, while this third conjugation [...] is the default one in terms of morphological regularity.” (Oltra-Massuet, 1999b, p. 25)

⁷That agreement is a dissociated morpheme, is a common assumption in the literature, as we hinted at in the previous Chapter; see also note 29.

Conjugation I 'cantar'	Conjugation II 'témer'	Conjugation IIIb 'sortir'	Conjugation IIIa 'unir'
kənt-'a-b-ə-∅	təm-'i-∅-ə-∅	surt-'i-∅-ə-∅	un-'i-∅-ə-∅
kənt-'a-b-ə-z	təm-'i-∅-ə-z	surt-'i-∅-ə-z	un-'i-∅-ə-z
kənt-'a-b-ə-∅	təm-'i-∅-ə-∅	surt-'i-∅-ə-∅	un-'i-∅-ə-∅
kənt-'a-b-ə-m	təm-'i-∅-ə-m	surt-'i-∅-ə-m	un-'i-∅-ə-m
kənt-'a-b-ə-w	təm-'i-∅-ə-w	surt-'i-∅-ə-w	un-'i-∅-ə-w
kənt-'a-b-ə-n	təm-'i-∅-ə-n	surt-'i-∅-ə-n	un-'i-∅-ə-n

Table 3.2: Imperfect indicative (adapted from Oltra-Massuet, 1999b, p. 39). Each form in the Table can be decomposed into the single template: $\sqrt{-v}$ -TH-IMP.IND-TH-AGR. The imperfect indicative can be decomposed into the bundle: [+PST, -SBJ](see (15-b) above).



As Table 3.2 shows, only conjugation I verbs take *-b-* as the exponent of the imperfect indicative, all the other conjugations taking *-∅-* instead.⁸

In this case, it seems that we are dealing with the traditional directionality— from the theme vowel to the affix:⁹

(17) kənt-'a-b-ə-z
sing-TH-IMP.IND-TH-2.SG

⁸This *-∅-* is a default zero, that is, a zero provided “for free” by Universal Grammar in the absence of a more specified Vocabulary Item; see note 15.

⁹In (17), we adopt the notational convention of Božič (2019, p. 487) regarding the directionality of allomorphy. More specifically, the boxed element is the target while the underlined element is the trigger.

We can capture this directionality by making the Vocabulary Item spelling-out the T[+PST, -SBJ] node sensitive to the presence of the default theme vowel:¹⁰

- (18) Vocabulary Items for the imperfect indicative; or T[+PST, -SBJ]
- a. $b \Leftrightarrow T[+PST, -SBJ]/[-\alpha]_{--}$
 - b. $\emptyset \Leftrightarrow [+PST, -SBJ]$

If we add the Vocabulary Items in (18) and those in (19) to the representation in (16), we have all that is needed to account for the paradigm of the imperfect indicative of conjugation I verbs.

- (19)
- a. Theme
 - a $\Leftrightarrow [-\alpha]$
 - b. Agreement
 - z $\Leftrightarrow [+PAR, -AUTH, -PL]$
 - m $\Leftrightarrow [+PAR, +AUTH, +PL]$
 - w $\Leftrightarrow [+PAR, -AUTH, +PL]$
 - n $\Leftrightarrow [+PL]$

For example, the derivation of the 2SG form (in gray in Tab. 3.2) is exemplified in (20).¹¹

(20)	\checkmark	<i>v</i>	TH	T	TH	AGR
			$[-\alpha]$	$[+PST, -SBJ]$	$[-\alpha]$	$[+PAR, -AUTH, -PL]$
	kant	\emptyset	a	b	a	z

In contrast to what we have said thus far about the imperfect indicative, consider the paradigm of the imperfect subjunctive (see Table 3.3).

As Tab. 3.3 shows, all conjugations take the same exponent for the im-

¹⁰This directionality, however, does not count as an exception to Oltra-Massuet’s claim that “the choice of the theme vowel always depends on the availability of contextual information”. Indeed, while the presence of *-b-* depends on the presence of $[-\alpha]$, the presence of $[-\alpha]$ itself is enforced by the redundancy rule in (7-a), whose application makes crucial reference to the contextual information available. More specifically, the default theme $[-\alpha]$ is inserted because no diacritic is inserted along with the exponent of the root node.

¹¹The forms in Tab. 3.2, as well as those in all subsequent tables, are the “output” forms, that is, the forms obtained after both Vocabulary Insertion and relevant phonological rules—such as stress assignment, vowel reduction, and final devoicing—have applied. By contrast, the forms in example (20), as well as those in all subsequent such examples, are the forms obtained after Vocabulary Insertion but *before* the application of phonological rules. In other words, they are the “input” forms to the phonological component.

Conjugation I 'cantar'	Conjugation II 'témer'	Conjugation IIIb 'sortir'	Conjugation IIIa 'unir'
kənt-'e-s	təm-'e-s	surt-'i-s	un-'i-s
kənt-'e-s-i-z	təm-'e-s-i-z	surt-'i-s-i-z	un-'i-s-i-z
kənt-'e-s	təm-'e-s	surt-'i-s	un-'i-s
kənt-'e-s-i-m	təm-'e-s-i-m	surt-'i-s-i-m	un-'i-s-i-m
kənt-'e-s-i-w	təm-'e-s-i-w	surt-'i-s-i-w	un-'i-s-i-w
kənt-'e-s-i-n	təm-'e-s-i-n	surt-'i-s-i-n	un-'i-s-i-n

Table 3.3: Imperfect subjunctive (adapted from Oltra-Massuet, 1999b, p. 39). Each form in the Table can be decomposed into the single template: $\sqrt{-v-TH-IMP.SBJ-TH-AGR}$. The imperfect subjunctive can be decomposed into the bundle: [+PST, +SBJ] (see (15-c) above).

perfect subjunctive, namely, -s-:

$$(21) \quad s \Leftrightarrow T[+PST,+SBJ]$$

Thus, in this case, the directionality is from the affix to the theme vowel:

$$(22) \quad \begin{array}{l} \text{kənt-}[\boxed{\text{e}}\text{-s-i-z} \\ \text{sing-TH-IMP.SBJ-TH-2.SG} \end{array}$$

Additionally, the imperfect subjunctive involves a case of theme syncretism (see Tab. 3.1 above). Specifically, conjugation I verbs take the characteristic theme vowel of conjugation II, namely, /e/:

$$(23) \quad e \Leftrightarrow [+β]$$

Oltra-Massuet's strategy allows to kill two birds with one stone. More specifically, it allows to capture both the theme-affix directionality and the theme syncretism through a single mechanism, that is, the interaction of the markedness hierarchy and the markedness of the environment.

In the case at hand, the environment is *doubly marked*, given that the imperfect subjunctive can be decomposed into the feature bundle [+PST, +SBJ] (see (15-c) above). In contrast, the theme vowel is the least marked, being the default theme of conjugation I verbs. The link between these two kind of markedness is provided by *Specific Redundancy Rules* like that

in (24).¹²

$$(24) \quad [-\alpha] \rightarrow [+ \beta] / _ [+PST, +SBJ]$$

Rule (24) turns an unmarked theme vowel into a marked theme vowel in a doubly marked environment.¹³

Specific Redundancy rules can be conceived of as the counterpoint to Impoverishment. More specifically, Specific Redundancy rules and Impoverishment can be understood as two opposite “pulls” that aim at keeping markedness “homeostasis” within a form. On the one hand, given that a category cannot be too marked in a marked environment, Impoverishment applies. On the other hand, given that a category cannot be too unmarked in a marked environment, Specific Redundancy rules apply.

Consequently, the doubly marked context of the imperfect subjunctive triggers the application of another specific redundancy rule—see (25)—this time targeting the theme node sprouted on T.¹⁴ This rule accounts for the fact that the vowel following the tense exponent in the imperfect subjunctive is always /i/, that is, the characteristic theme vowel of conjugation III verbs (see Tab. 3.3 and example (26)).

$$(25) \quad [\emptyset] \rightarrow [+ \alpha] / [+SBJ]_$$

$$(26) \quad i \Leftrightarrow [+ \alpha]$$

Thus, the derivation of the 2SG form of the imperfect subjunctive of conjugation I verbs (in gray in Tab. 3.3) is the following:

(27)	√	<i>v</i>	TH	T	TH	AGR
			[+β, +α]	[+PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]
	kant	∅	e	s	i	z

¹²Unfortunately, this terminology is slippery. *Specific Redundancy Rules* are in fact different from the redundancy rules in (7), and though both are related to markedness, only the former “are actual rules of the language and must be learned one by one” (Ultra-Massuet, 1999a, p. 290).

¹³Of course, the application of rule (24) is followed by that of redundancy rule (7-b). Ultra-Massuet (1999b, pp. 23, 43) gives a notational variant of the rule in (24):

$$(i) \quad [\emptyset] \rightarrow [+ \beta] / _ [+PST, +SBJ]$$

¹⁴The application of the rule in (25) is followed by that of redundancy rule in (7-c). Alternatively, we could have written this rule as follows:

$$(i) \quad [-\alpha] \rightarrow [+ \alpha] / [+SBJ]_$$

Before leaving the imperfect, let us briefly discuss two more points. First, also the imperfect indicative involves a case of theme syncretism as conjugation II verbs take the characteristic theme vowel of conjugation III (see Tab. 3.1 above).

This case of allomorphy-as-syncretism can be captured by the Impoverishment rule in (28), which turns a *doubly* marked theme vowel into a marked theme vowel in an *unmarked* environment, thus avoiding a markedness clash.¹⁵

$$(28) \quad [+β] \rightarrow \emptyset / _ [+PST, -SBJ]$$

The derivation of the 2SG form of the imperfect indicative of a conjugation II verb (in dark-gray in Tab. 3.2) is thus as follows:

$$(29) \quad \begin{array}{cccccc} \checkmark & v & TH & T & TH & AGR \\ & & [+α] & [+PST, -SBJ] & [-α] & [+PAR, -AUTH, -PL] \\ təm & \emptyset & i & \emptyset & a & z \end{array}$$

Second, there is a traditional link between the imperfect indicative and the conditional (see Table 3.4).

More specifically, there is a case of partial syncretism involving the inflectional endings. We illustrate this pattern of syncretism with the 2SG forms (the syncretic pieces are in boldface):

$$(30) \quad \begin{array}{ll} \text{a. 2SG Conditional} & \text{b. 2SG IMP.IND} \\ kənt-ə-ʼr- \mathbf{i-\emptyset-\emptyset-z} & kənt-ʼ\mathbf{a-b-\emptyset-z} \\ təm-\emptyset-ʼr- \mathbf{i-\emptyset-\emptyset-z} & təm-ʼ\mathbf{i-\emptyset-\emptyset-z} \\ surt-i-ʼr- \mathbf{i-\emptyset-\emptyset-z} & surt-ʼ\mathbf{i-\emptyset-\emptyset-z} \end{array}$$

To capture this pattern, a few words about the structure of the conditional forms are required. As we said above, a property of Catalan verbal morphology is that Tense and Mood cannot be bundled together in the

¹⁵Oltra-Massuet (1999b, pp. 23–24) writes that the Impoverishment rule (28) is followed by a redundancy rule inserting $[-β]$. This redundancy rule is then followed by another one, namely, $[-β] \rightarrow [+α, -γ]$.

It is possible to simplify the matter by claiming that the application of the Impoverishment rule in (28) is directly followed by that of redundancy rule in (7-c). In sum, a conjugation II root comes equipped with the diacritic $[+β]$, which is copied into the theme node (see (9) above); by redundancy rule (7-b), the theme node becomes specified as $[+β, +α]$ (see (10) above); by Impoverishment rule (28), it is reduced to $[+α]$; by redundancy rule (7-c), it ultimately becomes specified as $[+α, -β, -γ]$.

Conjugation I 'cantar'	Conjugation II 'témer'	Conjugation IIIb 'sortir'	Conjugation IIIa 'unir'
kənt-ə-'r-i-θ-ə-θ	təm-θ-'r-i-θ-ə-θ	surt-i-'r-i-θ-ə-θ	un-i-'r-i-θ-ə-θ
kənt-ə-'r-i-θ-ə-z	təm-θ-'r-i-θ-ə-z	surt-i-'r-i-θ-ə-z	un-i-'r-i-θ-ə-z
kənt-ə-'r-i-θ-ə-θ	təm-θ-'r-i-θ-ə-θ	surt-i-'r-i-θ-ə-θ	un-i-'r-i-θ-ə-θ
kənt-ə-'r-i-θ-ə-m	təm-θ-'r-i-θ-ə-m	surt-i-'r-i-θ-ə-m	un-i-'r-i-θ-ə-m
kənt-ə-'r-i-θ-ə-w	təm-θ-'r-i-θ-ə-w	surt-i-'r-i-θ-ə-w	un-i-'r-i-θ-ə-w
kənt-ə-'r-i-θ-ə-n	təm-θ-'r-i-θ-ə-n	surt-i-'r-i-θ-ə-n	un-i-'r-i-θ-ə-n

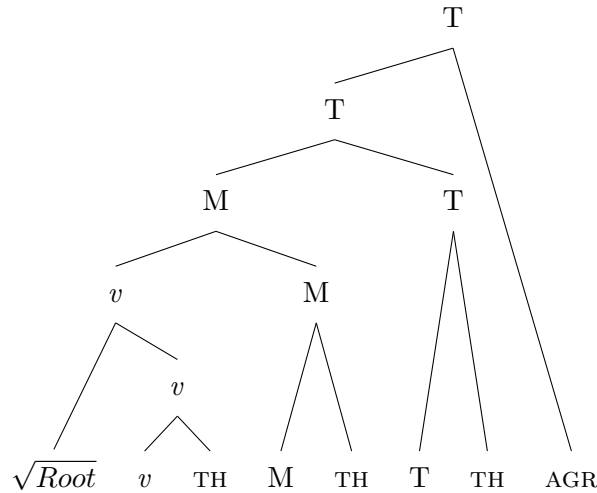
Table 3.4: Conditional (adapted from Oltra-Massuet, 1999b, p. 32). Each form can be decomposed into the single template: $\sqrt{-v-TH-FUT-TH-PST-TH-AGR}$. The conditional can be decomposed into the feature bundle: [+FUT, +PST].

conditional, so each head heads its own projection.¹⁶

¹⁶Unfortunately, the reasons preventing Tense and Mood from bundling together in the context of a [+FUT] feature are rather vague; “perhaps for semantic reasons”, writes Oltra-Massuet (1999b, p. 34), without further qualifications.

Of course, that the feature [+FUT] appears in the specification of the conditional is no accident. The future and the conditional pattern quite the same—so much so that Oltra-Massuet always treats these two tenses together—with only slight differences between the two. However, we will not discuss the future in detail here, as our goal in this Section is to show how the “new approach” to theme vowels put forward by Oltra-Massuet can shed a new light on the notion of theme vowel, on the one hand, and on various grammatical patterns that would otherwise go unnoticed, on the other. As always, the interested reader is referred to Oltra-Massuet’s original work for more details.

(31)



Moreover, being a marked environment—[+PST]—the conditional triggers the application of a specific redundancy rule, which is akin to the rule triggered by the imperfect subjunctive (see (25) above). The only difference is that the specific redundancy rule applying in the conditional targets the theme node sprouted on Mood instead of the node sprouted on T:

(32) $[\emptyset] \rightarrow [+α] / [+FUT]_{-}[+PST]$

With the addition of the Vocabulary Items in (33) to our list, we can now account for all the forms of the conditional for all conjugations.

(33) a. $r \Leftrightarrow [+FUT]$
b. $\emptyset \Leftrightarrow [+β] / _ [+FUT]$

As is now customary, we exemplify the derivation of the 2SG forms (in gray in Tab. 3.4):

	√	<i>v</i>	TH	M	TH	T	TH	AGR
(34) a.			[−α]	[+FUT]	[+α]	[+PST]	[−α]	[+PAR, -AUTH, -PL]
	kant	∅	a	r	i	∅	a	z
	√	<i>v</i>	TH	M	TH	T	TH	AGR
b.			[+β]	[+FUT]	[+α]	[+PST]	[−α]	[+PAR, -AUTH, -PL]
	təm	∅	∅	r	i	∅	a	z
	√	<i>v</i>	TH	M	TH	T	TH	AGR
c.			[+α]	[+FUT]	[+α]	[+PST]	[−α]	[+PAR, -AUTH, -PL]
	surt	∅	i	r	i	∅	a	z

With these clarifications in place, we can come back to the pattern of partial syncretism shown in (30). Compare the forms in (34) to the corresponding forms of the imperfect indicative:

(35)	a.	√	<i>v</i>	TH	T	TH	AGR
				[−α]	[+PST, -SBJ]	[−α]	[+PAR, -AUTH, -PL]
		kant	∅	a	b	a	z
	b.	√	<i>v</i>	TH	T	TH	AGR
				[+α]	[+PST, -SBJ]	[−α]	[+PAR, -AUTH, -PL]
		təm	∅	i	∅	a	z
	c.	√	<i>v</i>	TH	T	TH	AGR
				[+α]	[+PST, -SBJ]	[−α]	[+PAR, -AUTH, -PL]
		surt	∅	i	∅	a	z

As the comparison makes clear, the pattern of syncretism emerges due to the presence of the feature [+α] in all the forms involved in the pattern. In other words, “the /i/ of the conditional and the /i/ of the imperfect indicative are instances of one and the same entity” (Ultra-Massuet (1999b, p. 46), namely, of the conjugation III theme vowel. There is just a minor difference as /i/ realizes the theme node sprouted on Mood in the conditional but the theme node sprouted on *v* in the imperfect indicative. A similar point can be made for /ə/, which is “the default theme taken by the node T in both cases.” (Ultra-Massuet, 1999b, p. 46)

Additionally, the specific redundancy rule in (32) explains why this pattern of syncretism is only partial. By turning the otherwise unmarked theme vowel on Mood into a marked one, it blocks the insertion of Vocabulary Item (18-a), thus excluding conjugation I verbs from the pattern.¹⁷

Let us now see how Ultra-Massuet’s strategy can account for the issues posed by the two “problematic” tenses of Catalan—the perfect and the present. Let us begin with the perfect, whose paradigm is shown in Table 3.5. Each form in Tab. 3.5 has the same structure as the corresponding imperfect form (see Tab. (16)). Consequently, with the only addition of the Vocabulary Item in (36), we can readily account for the majority of its forms.¹⁸

¹⁷Interestingly, the special redundancy rule in (32) yields what is otherwise effected by an Impoverishment rule. In other words, it yields a “retreat to the general case”, blocking the insertion of a more specified Vocabulary Item—*-b-*—in favour of the default one—*-∅-*; see (18) above. This is a clear instance of the “counterpoint” between specific redundancy rules and Impoverishment rules.

¹⁸The Vocabulary Item in (36) is just homophonous with the Vocabulary Item in (33-a).

Conjugation I 'cantar'	Conjugation II 'témer'	Conjugation IIIb 'sortir'	Conjugation IIIa 'unir'
kənt-'i	təm-'i	surt-'i	un-'i
kənt-'a-r-ə-z	təm-'e-r-ə-z	surt-'i-r-ə-z	un-'i-r-ə-z
kənt-'a	təm-'e	surt-'i	un-'i
kənt-'a-r-ə-m	təm-'e-r-ə-m	surt-'i-r-ə-m	un-'i-r-ə-m
kənt-'a-r-ə-w	təm-'e-r-ə-w	surt-'i-r-ə-w	un-'i-r-ə-w
kənt-'a-r-ə-n	təm-'e-r-ə-n	surt-'i-r-ə-n	un-'i-r-ə-n

Table 3.5: Perfect; or Simple Past (adapted from Oltra-Massuet, 1999b, p. 39). Each form can be decomposed into the single template: $\sqrt{-v-TH-PRF-TH-AGR}$. Perfect can be decomposed into the feature bundle: [+PST, +PRF].

$$(36) \quad r \Leftrightarrow [+PST, +PRF]$$

As usual, we exemplify the derivation of the 2SG forms (in dark-gray in Tab. 3.5):

$$(37) \quad \begin{array}{ll} \begin{array}{l} \sqrt{} \quad v \quad TH \quad T \\ \phantom{\sqrt{}} \quad \quad [-\alpha] \quad [+PST, +PRF] \quad TH \quad AGR \\ \text{kant} \quad \emptyset \quad a \quad r \quad a \quad z \end{array} \\ \begin{array}{l} \sqrt{} \quad v \quad TH \quad T \\ \phantom{\sqrt{}} \quad \quad [+ \beta] \quad [+PST, +PRF] \quad [-\alpha] \quad [+PAR, -AUTH, -PL] \\ \text{təm} \quad \emptyset \quad e \quad r \quad a \quad z \end{array} \\ \begin{array}{l} \sqrt{} \quad v \quad TH \quad T \\ \phantom{\sqrt{}} \quad \quad [+ \alpha] \quad [+PST, +PRF] \quad [-\alpha] \quad [+PAR, -AUTH, -PL] \\ \text{surt} \quad \emptyset \quad i \quad r \quad a \quad z \end{array} \end{array}$$

However, two forms—the 1SG and the 3 SG (highlighted in gray and light-gray, respectively, in Tab. 3.5)—are still in need of an explanation. Given that these are “highly idiosyncratic forms” (Oltra-Massuet, 1999b, p. 43), their explanation warrants some further ad hoc adjustment.

First, both forms lack the Tense node. We can capture this fact by invoking the Impoverishment rule in (38).¹⁹

¹⁹As Oltra-Massuet highlights, this Impoverishment rule only “deletes the T node that is the sister to the AGR node in the context of first and third persons.” But, crucially, “the higher T node [...] is still present in the structure after the application of this rule.” (Oltra-Massuet, 1999b, p. 44)

$$(38) \quad \begin{array}{c} \text{T} \\ | \\ [+PST, +PRF] \end{array} \rightarrow \emptyset / _ [+AUTH, +PAR, -PL], [-AUTH, -PAR, -PL]$$

With this rule in place, we can account for the 3SG forms:²⁰

$$(39) \quad \begin{array}{l} \text{a.} \\ \text{b.} \\ \text{c.} \end{array} \begin{array}{l} \checkmark \\ \checkmark \\ \checkmark \end{array} \begin{array}{l} v \\ v \\ v \end{array} \begin{array}{l} \text{TH} \\ \text{TH} \\ \text{TH} \end{array} \begin{array}{l} \text{AGR} \\ \text{AGR} \\ \text{AGR} \end{array} \begin{array}{l} [-\alpha] \\ [+ \beta] \\ [+ \alpha] \end{array} \begin{array}{l} [-PAR, -AUTH, -PL] \\ [-PAR, -AUTH, -PL] \\ [-PAR, -AUTH, -PL] \end{array} \\ \begin{array}{l} \text{kant} \\ \text{təm} \\ \text{surt} \end{array} \begin{array}{l} \emptyset \\ \emptyset \\ \emptyset \end{array} \begin{array}{l} \text{a} \\ \text{e} \\ \text{i} \end{array} \begin{array}{l} \emptyset \\ \emptyset \\ \emptyset \end{array}$$

Second, however, Impoverishment rule (38) is not enough to account for the 1SG forms because these forms also show total theme syncretism (see the last row of Tab. 3.1). Therefore, we need “a morphological rule with the effect of collapsing the first person singular form for all conjugations to class III.” (Oltra-Massuet, 1999b, p. 45)

Oltra-Massuet offers two such rules. For conjugation II verbs, she proposes an Impoverishment rule akin to the rule applying in the imperfect indicative of these same verbs (see example (28)):

$$(40) \quad [+ \beta] \rightarrow \emptyset / _ [+PST, +PRF, +AUTH, +PAR, -PL]$$

For conjugation I verbs, she proposes a specific redundancy rule akin to those applying in the imperfect subjunctive and in the conditional (see examples (25) and (32), respectively):

$$(41) \quad [\emptyset] \rightarrow [+ \alpha] / _ [+PST, +PRF, +AUTH, +PAR, -PL]$$

With these rules in place, we can capture both “problematic” forms:

²⁰There is, however, an opportunity cost in Impoverishment rule (38). Although it allows to capture the 3SG forms of the perfect, it nonetheless does so at the cost of overlooking another instance of partial syncretism, that is, the “stem” syncretism between the 1SG and 3 SG forms of the perfect and the corresponding forms of the imperfect subjunctive (see the forms highlighted in light-gray in Tab. 3.3).

Oltra-Massuet (1999a, p. 45) explicitly acknowledges this shortcoming, but she leaves it as a topic for future research. Unfortunately, as far as we know, nobody has ever tried to remedy it.

(42)	a.	√	<i>v</i>	TH	AGR
				[+α]	[-PAR, -AUTH, -PL]
		kant	∅	i	∅
	b.	√	<i>v</i>	TH	AGR
					[+α]	[-PAR, -AUTH, -PL]
		təm	∅	i	∅

However, there is an important shortcoming in Oltra-Massuet’s analysis. The shortcoming concerns the ordering of the morphological operations applying in the derivation of the 1SG forms. As example (42) makes clear, Impoverishment rule (40) and specific redundancy rule (41) must apply *before* Impoverishment rule (38) in order to meet their respective structural descriptions. But if we consider the types of feature that occur in the structural description of these rules, we find that the proposed ordering is the exact opposite of the expected one. Indeed, because they operate on *morphological* features, Impoverishment rule (40) and specific redundancy rule (41) can only apply *after* Vocabulary Insertion, whereas Impoverishment rule (38), being triggered by *syntactic* features, must apply *before* Vocabulary Insertion. Therefore, although the analysis put forward by Oltra-Massuet accounts for the problematic 1SG forms, it nonetheless does so in violation of the so-called *No Lookahead Condition*.²¹

Oltra-Massuet justifies the aberrant behaviour of the 1SG forms by invoking their highly idiosyncratic character: “This [ordering] will not undermine our generalizations, since these cases are very idiosyncratic and specific. It is thus expected that they do not follow the generalizations underlying the verbal system as a whole.” (Oltra-Massuet, 1999b, p. 46)

Let us now turn to the second “problematic” tense—the present. Table 3.6 and Table 3.7 illustrate the paradigm of the present indicative and present subjunctive, respectively.

The comparison between the two Tables highlights two interrelated puzzles. First, conjugation IIIa verbs stand out. When these verbs take [εf] as their theme vowel, all the other conjugations take ∅, or no theme vowel at all. Second, we have another instance of the “1st and 2nd Plural conspiracy” (see Calabrese, 2015, p. 88). More specifically, the 1PL forms are totally

²¹The No Lookahead Condition follows from the derivational, step-by-step approach to the inner workings of the grammar. Loosely speaking, it says that every grammatical operation has access only to the information of the current stage of a derivation, plus the information of the previous stage(s). In other words, a grammatical operation cannot “look ahead” to the next step of a derivation.

This principle has played a key role in discussions concerning the directionality of contextual allomorphy; see in particular Bobaljik (2000), and, more recently, Božić (2019).

Conjugation I 'cantar'	Conjugation II 'témer'	Conjugation IIIb 'sortir'	Conjugation IIIa 'unir'
k'ant-u	t'em-u	s'urt-u	un-'ɛʃ-u
k'ant-∅-ə-z	t'em-z	s'urt-z	un-'ɛʃ-z
k'ant-∅-ə-∅	t'em-∅	s'urt-∅	un-'ɛʃ-∅
kənt-'ɛ-m	təm-'ɛ-m	surt-'i-m	un-'i-m
kənt-'ɛ-w	təm-'ɛ-w	surt-'i-w	un-'i-w
k'ant-∅-ə-n	t'em-ən	s'urt-ən	un-'ɛʃ-ən

Table 3.6: Present indicative.(adapted from Oltra-Massuet, 1999b, p. 48). Each form can be decomposed into the single template: $\sqrt{-v-TH-PRS.IND.AGR}$. Present indicative corresponds to the feature [-PST].

Conjugation I 'cantar'	Conjugation II 'témer'	Conjugation IIIb 'sortir'	Conjugation IIIa 'unir'
k'ant-∅-i-∅	t'em-∅-i-∅	s'urt-∅-i-∅	un-'ɛʃ-∅-i-∅
k'ant-∅-i-z	t'em-∅-i-z	s'urt-∅-i-z	un-'ɛʃ-∅-i-z
k'ant-∅-i-∅	t'em-∅-i-∅	s'urt-∅-i-∅	un-'ɛʃ-∅-i-∅
kənt-'ɛ-m	təm-'ɛ-m	surt-'i-m	un-'i-m
kənt-'ɛ-w	təm-'ɛ-w	surt-'i-w	un-'i-w
k'ant-∅-i-n	t'em-∅-i-n	s'urt-∅-i-n	un-'ɛʃ-∅-i-n

Table 3.7: Present subjunctive (adapted from Oltra-Massuet, 1999b, p. 48). Each form can be decomposed into the single template: $\sqrt{-v-TH-PRS.SBJ-TH-AGR}$. Present subjunctive can be decomposed into the feature bundle: [-PST, +SBJ].

syncretic across the indicative and the subjunctive, just as the 2PL ones. Additionally, these are the only forms where the $[\epsilon f] \sim \emptyset$ alternation breaks down, with conjugation IIIa verbs taking their characteristic theme vowel /i/.

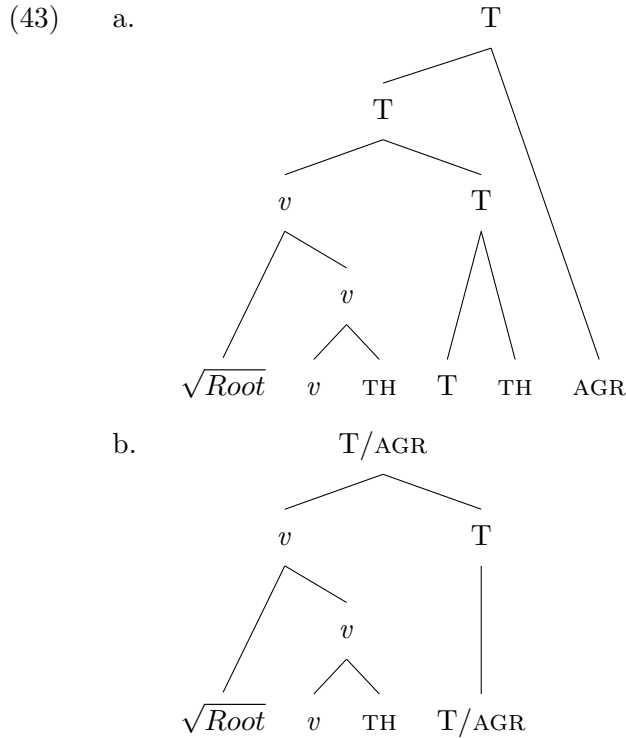
Before examining Ultra-Massuet’s proposed solution to these puzzles, let us say a few words about the structure of the forms of the present.

Present tense forms have the same structure as past tense forms (see (16) above) except in the present indicative, where, due to an idiosyncratic property of Catalan verbal morphology, tense and agreement nodes are *fused* together. The present subjunctive forms have thus the structure in (43-a), while the structure of the present indicative forms is shown in (43-b).²² Conjugation I verbs are, however, “special” (Ultra-Massuet, 1999b, p. 52) because they are immune to Fusion in the indicative.

²²Fusion is triggered by the unmarked environment [-PST] (see (15-a) above) of the indicative. By contrast, being a marked environment—[+SBJ]—the present subjunctive is immune to Fusion.

Nevertheless, one might wonder whether Fusion is a legitimate operation in (43), given that the TH node sprouted on T apparently intervenes between T and AGR, thus disrupting the sisterhood relation required for the application of Fusion. Ultra-Massuet solves this issue by pointing to the stage of the derivation at which this operation applies. More specifically, given that *before* Vocabulary Insertion the TH node is empty, “there is no feature that can block the fusion operation.” (Ultra-Massuet, 1999b, p. 38). However, one might argue that this claim is in fact not true. Indeed, the TH node on T does not have to wait until Vocabulary Insertion to get filled because the redundancy rule in (7-a) supplies it with a default theme—[- α]—as a consequence of markedness considerations. This observation thus undermines Ultra-Massuet’s proposed solution.

An alternative solution based on the different nature of Fusion and redundancy rules can be proposed. Because redundancy rules are not part of the grammar, they can be claimed to apply only *after* grammatical rules such as Fusion have applied. Unfortunately, this solution merely stipulates the facts, without providing any explanation thereof. In principle, nothing prevents the ordering from been the exact opposite, with redundancy rules applying first due to, say, the universal nature of markedness considerations, and Fusion only applying later, given that its triggers are language-particular considerations. We do not have a solution to this issue, so we leave it open.



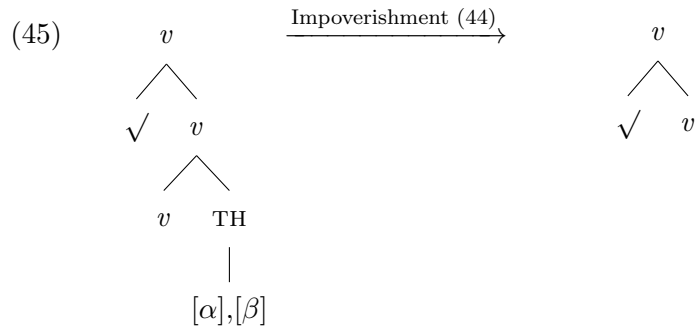
With these clarifications in place, let us consider the first puzzle—the $[\varepsilon f] \sim [\emptyset]$ alternation. Oltra-Massuet takes $[\varepsilon f]$ to be a contextually specific allomorph of conjugation III theme vowel, “since it appears in the same position as the other theme vowels.” (Oltra-Massuet, 1999b, p. 52)²³ As for $[\emptyset]$, “The question is whether we have a zero-morpheme that realizes each theme vowel in this context or whether the position is not there for insertion at all” (Oltra-Massuet, 1999b, p. 55). Instead of multiplying $[\emptyset]$ allomorphs—a “costly” solution—Oltra-Massuet opts for the second hypothesis, which she implements through the Impoverishment rule in (44).

$$(44) \quad [\pm\alpha, \pm\beta]_v \rightarrow \emptyset / _[-\text{PST}]$$

²³Taking $[\varepsilon f]$ to be a theme allomorph has the theoretical advantage of unifying conjugation III. Under this view, conjugation III is no longer split into two conjugations, but has two theme allomorphs instead. Somewhat paradoxically, this unification is made possible precisely by abandoning the notion of “conjugation” in favour of abstract morphological features. We have been using the term “conjugation(s)” throughout just for the ease of exposition. But, as Oltra-Massuet highlights, “under this view, there are only $[+\alpha]$, $[+\beta]$, $[+\gamma]$ roots.” (Oltra-Massuet, 1999a, note 19)

This rule is an instance of case (15-b) above, as it deletes any value of the features $[\alpha]$ and $[\beta]$ that might be present on the theme node sprouted on v in the context of the present tense. Consequently, “no Redundancy rule can rescue these positions by any means.” (Oltra-Massuet, 1999b, p. 55) In other words, “for first and second conjugations, when the theme feature is deleted, the position is deleted as well.” (Oltra-Massuet, 1999b, p. 56)²⁴

The effect of rule (44) on conjugation I and II verbs is thus the following:

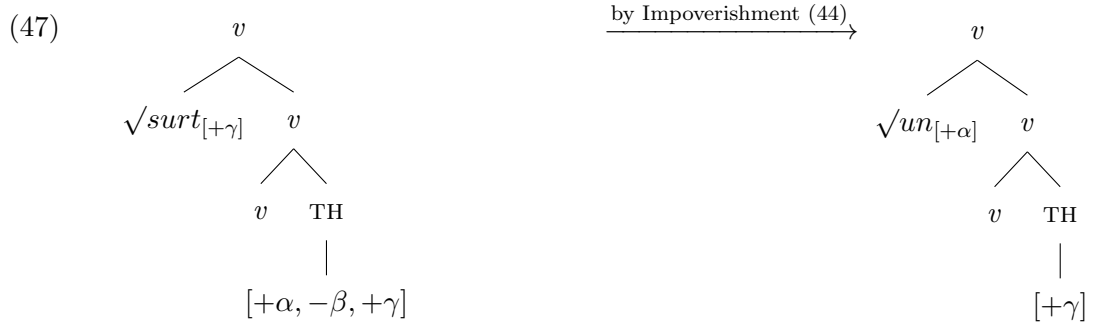


By contrast, being also specified for $[\pm\gamma]$ —either “intrinsically” in the case of conjugation IIIb verbs, or “extrinsically”, via the redundancy rule in (7-c), in the case of conjugation IIIa verbs—conjugation III verbs retain their theme position:



²⁴See note 33.

Oltra-Massuet takes this “no feature–no node” principle to derive from the “purely morphological” nature of the theme node. As she argues, “it is a position projected in the morphology by a morphological well-formedness requirement. The only content that it has are morphological features. Once these features are deleted the position automatically evaporates.” (Oltra-Massuet, 1999b, p. 56)



With the addition of the Vocabulary Item in (48-a) to our list, and the key facts regarding the present tense summarized in (48-b) in mind, we can account for the $[\epsilon f] \sim [\emptyset]$ alternation.

- (48)
- a. Theme Allomorphs for conjugation III
 $\epsilon f \Leftrightarrow [-\gamma] / _[-\text{PST}]$
 $i \Leftrightarrow [+ \alpha]$
 - b. Specific Redundancy Rule
 $[\emptyset] \rightarrow [+ \alpha] / [+ \text{SBJ}] _$
 - c. T does not fuse with AGR in present indicative for conjugation I verbs.

As usual, we illustrate the derivation of the 2SG forms (in gray in both Tab. 3.6 and Tab. 3.7):

(49) Present Indicative

a.	$\sqrt{}$	v	T	TH	AGR
			$[-\text{PST}]$	$[-\alpha]$	$[+\text{PAR}, -\text{AUTH}, -\text{PL}]$
	kant	\emptyset	\emptyset	a	z
b.	$\sqrt{}$	v	T/AGR		
			$[-\text{PST}, +\text{PAR}, -\text{AUTH}, -\text{PL}]$		
	tem	\emptyset	z		
c.	$\sqrt{}$	v	TH	T/AGR	
			$[+\gamma]$	$[-\text{PST}, +\text{PAR}, -\text{AUTH}, -\text{PL}]$	
	surt	\emptyset	\emptyset	z	
d.	$\sqrt{}$	v	TH	T/AGR	
			$[-\gamma]$	$[-\text{PST}, +\text{PAR}, -\text{AUTH}, -\text{PL}]$	
	un	\emptyset	ϵf	z	

(50) Present Subjunctive

a.	√	<i>v</i>	T		TH	AGR
			[-PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]	
		kant	∅	∅	i	z
b.	√	<i>v</i>	T		TH	AGR
			[-PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]	
		tem	∅	∅	i	z
c.	√	<i>v</i>	TH	T		TH AGR
			[+γ]	[-PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]
		surt	∅	∅	i	z
d.	√	<i>v</i>	TH	T		TH AGR
			[-γ]	[-PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]
		un	∅	εʃ	∅	i z

Let us now turn to the second puzzle—the “1st and 2nd Plural conspiracy”. It is not surprising that Oltra-Massuet resorts to Impoverishment to solve this puzzle.²⁵ Indeed, Impoverishment is a good fit for the pattern at hand. On the one hand, we have a pattern of total syncretism, with the 1PL forms of the present indicative being totally syncretic with the corresponding subjunctive forms; the same is true of the 2PL forms. On the other hand, we have a “retreat to the general case” because conjugation III verbs take the default theme allomorph—/i/—instead of the most specific allomorph—/εʃ/.

The Impoverishment rule put forward to account for the “conspirational” forms of the present is akin to that proposed to account for the “problematic” forms of the perfect (compare (51) with (38) above):²⁶

$$(51) \quad \begin{array}{c} T \\ | \\ [-PST] \end{array} \rightarrow \emptyset / _ [+PAR, +PL]$$

Rule (51) has the further advantage that its ordering with respect to rule (44) need not be stipulated, as the former bleeds the latter.

²⁵As we saw above, also Calabrese (2015) resorts to Impoverishment to account for an instance of this conspiracy in the Italian *Passato Remoto*; see Sec. 2.3.

²⁶The reason for deleting the entire T node rather than just the [-PST] feature is that the subjunctive is also specified for the feature [+SBJ]. This feature would survive to Impoverishment, thus possibly affecting further operations. More specifically, if just the feature [-PST] were deleted, nothing would prevent the formation of incorrect subjunctive forms such as 1PL **kənt-ε-i-m*, **təm-ε-i-m*, **surt-i-i-m*, and **un-i-i-m*.

With the addition of the Vocabulary Item in (52-a) to our list,²⁷ we have all that is needed to account for the “1st and 2nd Plural conspiracy” (see (53)).

(52) Theme Allomorphs for conjugation I

- a. $\varepsilon \Leftrightarrow [-\alpha] / _ [+PAR, +PL]$
 b. $a \Leftrightarrow [-\alpha]$
- (53) a. $\begin{array}{cccc} \sqrt{} & v & TH & AGR \\ & & [-\alpha] & [+PAR, +AUTH, +PL] \\ kant & \emptyset & \varepsilon & m \end{array}$
- b. $\begin{array}{cccc} \sqrt{} & v & TH & AGR \\ & & [+ \alpha, -\beta, +\gamma] & [+PAR, +AUTH, +PL] \\ surt & \emptyset & i & m \end{array}$
- c. $\begin{array}{cccc} \sqrt{} & v & TH & AGR \\ & & [+ \alpha, -\beta, -\gamma] & [+PAR, +AUTH, +PL] \\ un & \emptyset & i & m \end{array}$

Still unexplained, however, is the pattern of theme syncretism involving the 1PL and 2PL forms of conjugation I and II verbs. Because this pattern of syncretism involves a “retreat to the general case”, with the doubly marked II conjugation taking the theme allomorph of the unmarked I conjugation—[ε]²⁷—it is not surprising that another Impoverishment rule is invoked to account for it:

(54) $[+\alpha, +\beta] \rightarrow \emptyset / _ _ [unmarked\ context]$

This rule applies *after* the Impoverishment rule in (51). This ordering explains why the context of rule (54) is somewhat strange, being “a negative context that is hard to express formally”, as Oltra-Massuet (1999b, note 52) puts it. Indeed, once rule (51) has deleted the unmarked environment [$-PST$], the context becomes “completely unmarked” (Oltra-Massuet, 1999b, note

²⁷As we pointed out in note 23, in Oltra-Massuet’s model there is no room for the notion of “conjugation”, so the phrasing “Theme Allomorphs for conjugation I” we use in (52) is at best imprecise. The Vocabulary Items in (52) are, properly speaking, the allomorphs of the feature [$-\alpha$]. Consequently, their distribution is not confined to conjugation I verbs, but extends to any other context in which the feature [$-\alpha$] occurs. For example, the Vocabulary Item in (52-a) is inserted in the 1PL and 2PL forms of the future in all conjugations, as it realizes the theme node sprouted on Mood; see Oltra-Massuet (1999b, p. 32).

Nonetheless, the phrasing in (52) is still acceptable given our purposes here.

52), and it is precisely in such a context that rule (54) applies.²⁸

With this last Impoverishment rule in place, the account of the “1st and 2nd Plural conspiracy” is complete:

	\checkmark	v	TH	AGR
			$[-\alpha]$	$[+\text{PAR}, +\text{AUTH}, +\text{PL}]$
(55)	a.	kant	\emptyset	ε m
		təm	\emptyset	ε m

Thus far, Oltra-Massuet’s strategy, which “heavily relies on a new conception of the notion of the theme vowel” has allowed to account “for the generalizations that underlie the Catalan verbal system” (Oltra-Massuet, 1999b, p. 86). In particular, it has provided “a more natural account of the interrelations among the different conjugations, as well as between conjugations and the contexts in which they appear in terms of different degrees of markedness.” (Oltra-Massuet, 1999b, p. 86)

Let us now see how this strategy has something to bear also on the theme-vowel-related issues mentioned in Ch. 1.1. In particular, we will see how Oltra-Massuet’s strategy allows to unify the assignment of stress in Catalan.

Traditionally, “Stress in Catalan [...] is usually taken to be highly idiosyncratic and lexically determined.” (Oltra-Massuet, 1999b, p. 62) Instead, Oltra-Massuet claims that “the position of stress for verbs is fully predictable and systematic” given that “stress assignment is the result of the application of a single rule” (Oltra-Massuet, 1999b, p. 15). This single rule can be formulated in this way: “for *all* verbs and for *all* tenses, [...], stress falls on the stress-bearing unit immediately preceding the T node.” (p. 15 Oltra-Massuet, 1999b, emphasis in the original)

In order to implement this rule, Oltra-Massuet resorts to the stress model put forward by Halle and Idsardi (1996). This model rests on the assumption that “a formal account of stress phenomena will require at least [...] three

²⁸The Impoverishment rule in (54) is followed by the application of the redundancy rule in (7-a) supplying the unmarked $[-\alpha]$ feature.

Nevertheless, one might wonder why the Impoverishment rule in (54) does not cause the theme node to “evaporate” given that it deletes all the features of the theme node, as did the Impoverishment rule in (44) above. In this case, markedness considerations provide an explanation. Rule (54) only deletes the *marked* values— $[\alpha]$ and $[\beta]$ —so the node can be “rescued” by redundancy rule (7-a). By contrast, rule (44) deletes *any* value, that is, both the unmarked and the marked one, so no redundancy rule can possibly rescue the node, which therefore “evaporates”. In other words, Impoverishment rule (54) is an instance of rule (15-a) above, whereas Impoverishment rule (44) is an instance of rule (15-b) above.

devices” (Halle and Idsardi, 1996, p. 404). More specifically, it requires a device for identifying the stressable elements in a string of phonemes, that is, “the elements in the sequence that are capable of bearing stress” (Halle and Idsardi, 1996, p. 404). It further requires a device for delimiting the groupings or constituents (called *feet*) such stressable elements form. Finally, it requires a device for identifying the *head* of each foot, that is, “the element in the constituent to which prominence is assigned.” (Halle and Idsardi, 1996, p. 403)

These devices are formally implemented either as abstract marks—x— or as parentheses—left “(” or right “)”. Abstract marks signal stressable elements, thus forming the so-called “line 0”.²⁹ Parentheses serve instead to delimit feet. Moreover, abstract marks also signal the head of each foot.³⁰

The arrangement of abstract marks and parentheses gives rise to a metrical grid (Halle and Idsardi, 1996, p. 405). A metrical grid is constructed through the application of the principles (56)–(58).

(56) **Projection:** Project a line 0 element for each *syllable head*. (p. 407 Halle and Idsardi, 1996, emphasis in the original.)

(57) **Head Location Parameter:** Project the $\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right\}$ -most element of each constituent onto the next line of the grid. (Halle and Idsardi, 1996, p. 408)

(58) **Edge-Marking Parameter:** Place a $\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right\}$ parenthesis to the $\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right\}$ of the $\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right\}$ -most element in the string. (Halle and Idsardi, 1996, p. 408)

When applied to Catalan, these principles yield the stress algorithm in (59).³¹

²⁹Given that Line 0 runs parallel to the sequence of phonemes, and that two parallel lines define a plane, the so-called “metrical plane” amounts to “the plane defined by the parallel sequences of phonemes and abstract marks”, as Halle and Idsardi (1996, p. 404) note.

³⁰This double use of abstract marks is acknowledged by Halle and Idsardi as a peculiar aspect of their model: “Note in particular the we locate the heads of constituents [...] by the same formal mechanism that marks elements in the phoneme sequence as stress-bearing.” (Halle and Idsardi, 1996, p. 406)

³¹The reason why we take the formulation of the stress algorithm from Oltra-Massuet and Arregi (2005), which deals with stress assignment in Spanish rather than in Catalan, is that the algorithm is the same for both these languages; see Sec. 3.3 below.

- (59) Stress Algorithm (p. 49 Ultra-Massuet and Arregi, 2005, emphasis in the original.)
- a. Project a line 0 mark for each syllable nucleus.
 - b. *Insert a right parenthesis to the left of T on line 0.*
 - c. Project the rightmost mark if each line 0 foot onto line 1.
 - d. Insert a right parenthesis to the right of the rightmost mark on line 1.
 - e. Project the rightmost mark of each line 1 foot onto line 2.

In Catalan, the Head parameter is always set to *right* (see (59-c) and (59-e)). The Edge-Marking parameter is set to *right, right, right* only on line 1 (see (59-d)) because on line 0 it makes crucial reference to the T node (see (59-b)). This “natural extension” (Ultra-Massuet and Arregi, 2005, note 11) of the notion of Edge-marking, according to which a syntactic node can directly project a foot boundary, is a novelty given that Halle and Idsardi (1996) do not discuss this possibility. Yet it is precisely this extension that allows stress to fall on “the stress-bearing unit immediately preceding the T node”, thus making stress assignment in Catalan fully predictable.

- (60) Parameter Setting in Catalan
- | | | |
|--------|--------------|--------|
| Line 0 | Edge:RL-to-T | Head:R |
| Line 1 | Edge:RRR | Head:R |

Let us now see how the stress algorithm works given the parameter setting in (60). For reasons of consistency, we simply add the metrical grid to some of the examples we have discussed thus far.³²

Let us begin with the unproblematic tenses—the conditional (in (61)) and the imperfect (in (62) and (63)).

- (61) 2SG Conditional

³²We can do so, because stress assignment takes place after both the morphological operations we have discussed above and Vocabulary Insertion. Therefore, it is as if we were resuming the derivation of the examples from where we have left it. Additionally, given that just a single abstract mark will be projected onto Line 1, we omit Line 2 from our examples.

		√	<i>v</i>	TH	M	TH	T	TH	AGR
				[-α]	[+FUT]	[+α]	[+PST]	[-α]	[+PAR, -AUTH, -PL]
a.	kant	∅	a	r	i	∅	a	z	
	Line 0	x	x		x)		x		
	Line 1				x				
		√	<i>v</i>	TH	M	TH	T	TH	AGR
				[+β]	[+FUT]	[+α]	[+PST]	[-α]	[+PAR, -AUTH, -PL]
b.	təm	∅	∅	r	i	∅	a	z	
	Line 0	x			x)		x		
	Line 1				x				
		√	<i>v</i>	TH	M	TH	T	TH	AGR
				[+α]	[+FUT]	[+α]	[+PST]	[-α]	[+PAR, -AUTH, -PL]
c.	surt	∅	i	r	i	∅	a	z	
	Line 0	x	x		x)		x		
	Line 1				x				

(62) 2SG Imperfect Indicative

		√	<i>v</i>	TH	T	TH	AGR
				[-α]	[+PST, -SBJ]	[-α]	[+PAR, -AUTH, -PL]
a.	kant	∅	a	b	a	z	
	Line 0	x	x)		x		
	Line 1		x				
		√	<i>v</i>	TH	T	TH	AGR
				[+α]	[+PST, -SBJ]	[-α]	[+PAR, -AUTH, -PL]
b.	təm	∅	i	∅	a	z	
	Line 0	x	x)		x		
	Line 1		x				

(63) 2SG Imperfect Subjunctive

		√	<i>v</i>	TH	T	TH	AGR
				[+β, +α]	[+PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]
a.	kant	∅	e	s	i	z	
	Line 0	x	x)		x		
	Line 1		x				
		√	<i>v</i>	TH	T	TH	AGR
				[+β, +α]	[+PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]
b.	təm	∅	e	s	i	z	
	Line 0	x	x)		x		
	Line 1		x				

We now turn to the problematic tenses, starting with the unproblematic forms of the perfect:

(64) 2SG Perfect

		✓	<i>v</i>	TH	T		TH	AGR
				[-α]	[+PST, +PRF]		[-α]	[+PAR, -AUTH, -PL]
a.	kant	∅	a	r		a	z	
	Line 0	x	x)			x		
	Line 1		x					
		✓	<i>v</i>	TH	T		TH	AGR
				[+β]	[+PST, +PRF]		[-α]	[+PAR, -AUTH, -PL]
b.	təm	∅	e	r		a	z	
	Line 0	x	x)			x		
	Line 1		x					
		✓	<i>v</i>	TH	T		TH	AGR
				[+α]	[+PST, +PRF]		[-α]	[+PAR, -AUTH, -PL]
c.	surt	∅	i	r		a	z	
	Line 0	x	x)			x		
	Line 1		x					

Next, we turn to the problematic forms:

(65) 3SG Perfect

		✓	<i>v</i>	TH	AGR			
				[-α]	[-PAR, -AUTH, -PL]			
a.	kant	∅	a	∅				
	Line 0	x	x)					
	Line 1		x					
		✓	<i>v</i>	TH	AGR			
				[+β]	[-PAR, -AUTH, -PL]			
b.	təm	∅	e	∅				
	Line 0	x	x)					
	Line 1		x					
		✓	<i>v</i>	TH	AGR			
				[+α]	[-PAR, -AUTH, -PL]			
c.	surt	∅	i	∅				
	Line 0	x	x)					
	Line 1		x					

(66) 1SG Perfect

	√	<i>v</i>	TH	AGR
			[+α]	[-PAR, -AUTH, -PL]
a.	kant	∅	i	∅
Line 0	x		x)	
Line 1			x	
	√	<i>v</i>	TH	AGR
			[+α]	[-PAR, -AUTH, -PL]
b.	təm	∅	i	∅
Line 0	x		x)	
Line 1			x	

Finally, we turn to the present, starting with the “1st and 2nd Plural conspiracy”:

(67) 1PL Present Indicative and Subjunctive

	√	<i>v</i>	TH	AGR
			[-α]	[+PAR, +AUTH, +PL]
a.	kant	∅	ε	m
Line 0	x		x)	
Line 1			x	
	√	<i>v</i>	TH	AGR
			[-α]	[+PAR, +AUTH, +PL]
b.	təm	∅	ε	m
Line 0	x		x)	
Line 1			x	
	√	<i>v</i>	TH	AGR
			[+α, -β, +γ]	[+PAR, +AUTH, +PL]
c.	surt	∅	i	m
Line 0	x		x)	
Line 1			x	
	√	<i>v</i>	TH	AGR
			[+α, -β, -γ]	[+PAR, +AUTH, +PL]
d.	un	∅	i	m
Line 0	x		x)	
Line 1			x	

Next, we turn to the forms showing the [εf] ~ [∅] alternation:

(68) 2SG Present Indicative

		√	<i>v</i>	T	TH	AGR
				[-PST]	[-α]	[+PAR, -AUTH, -PL]
a.	kant	∅	∅	a	z	
	Line 0	x)		x		
	Line 1	x				
		√	<i>v</i>	T/AGR		
				[-PST, +PAR, -AUTH, -PL]		
b.	tem	∅	z			
	Line 0	x)				
	Line 1	x				
		√	<i>v</i>	TH	T/AGR	
				[+γ]	[-PST, +PAR, -AUTH, -PL]	
c.	surt	∅	∅	z		
	Line 0	x)				
	Line 1	x				
		√	<i>v</i>	TH	T/AGR	
				[-γ]	[-PST, +PAR, -AUTH, -PL]	
d.	un	∅	εʃ	z		
	Line 0	x	x)			
	Line 1	x				

(69) 2SG Present Subjunctive

		√	<i>v</i>	T	TH	AGR
				[-PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]
a.	kant	∅	∅		i	z
	Line 0	x)			x	
	Line 1	x				
		√	<i>v</i>	T	TH	AGR
				[-PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]
b.	tem	∅	∅		i	z
	Line 0	x)			x	
	Line 1	x				
		√	<i>v</i>	TH	T	TH
				[+γ]	[-PST, +SBJ]	[+α]
c.	surt	∅	∅	∅	i	z
	Line 0	x)			x	
	Line 1	x				

	√	<i>v</i>	TH	T	TH	AGR
			[-γ]	[-PST, +SBJ]	[+α]	[+PAR, -AUTH, -PL]
d.	un	∅	εf	∅	i	z
	Line 0	x	x)		x	
	Line 1		x			

Before we move on, let us say a few more words about the stress algorithm in (59). First, it captures the “arrhizotony~rhizotony” alternation in stress assignment. In other words, stress falls on the theme vowel immediately preceding the T node, be it that sprouted on Mood—as in (61)—or that sprouted on *v*—as in (62)–(66). But if the theme position is absent or empty—as in (68-a)–(68-c)—stress falls instead on the root.

Second, the “conspirational” forms of the present (in (67)), the “problematic” forms of the perfect (in (65) and (66)), and the present indicative of conjugation IIIa (in (68-d)) highlight the crucial role played by the “extension” of the Edge-Marking parameter. Indeed, if we adopted the “non-extended” setting of this parameter on line 0, that is, Edge:RLL—project a *right* parenthesis to the *left* of the *left*-most element—we would have rhizotonic forms in these cases—a clearly wrong result:

(70) Incorrect 1PL Present Indicative and Subjunctive

	√	<i>v</i>	TH	AGR
			[-α]	[+PAR, +AUTH, +PL]
a.	kant	∅	ε	m
	Line 0	x)	x	
	Line 1	x		
	√	<i>v</i>	TH	AGR
			[-α]	[+PAR, +AUTH, +PL]
b.	təm	∅	ε	m
	Line 0	x)	x	
	Line 1	x		
	√	<i>v</i>	TH	AGR
			[+α, -β, +γ]	[+PAR, +AUTH, +PL]
c.	surt	∅	i	m
	Line 0	x)	x	
	Line 1	x		

		✓	<i>v</i>	TH	AGR
				[+α, -β, -γ]	[+PAR, +AUTH, +PL]
d.		un	∅	i	m
	Line 0	x)		x	
	Line 1	x			

(71) Incorrect 3SG Perfect

		✓	<i>v</i>	TH	AGR
				[-α]	[-PAR, -AUTH, -PL]
a.		kant	∅	a	∅
	Line 0	x)		x	
	Line 1	x			

		✓	<i>v</i>	TH	AGR
				[+β]	[-PAR, -AUTH, -PL]
b.		təm	∅	e	∅
	Line 0	x)		x	
	Line 1	x			

		✓	<i>v</i>	TH	AGR
				[+α]	[-PAR, -AUTH, -PL]
c.		surt	∅	i	∅
	Line 0	x)		x	
	Line 1	x			

(72) Incorrect 1SG Perfect

		✓	<i>v</i>	TH	AGR
				[+α]	[-PAR, -AUTH, -PL]
a.		kant	∅	i	∅
	Line 0	x)		x	
	Line 1	x			

		✓	<i>v</i>	TH	AGR
				[+α]	[-PAR, -AUTH, -PL]
b.		təm	∅	i	∅
	Line 0	x)		x	
	Line 1	x			

(73) Incorrect Present Indicative for conjugation IIIa

	√	<i>v</i>	TH	T/AGR
			[−γ]	[−PST, +PAR, −AUTH, −PL]
	un	∅	εf	z
Line 0	x)		x	
Line 1	x			

3.3 Spanish

Oltra-Massuet concluded her work suggesting “that the basic structures proposed in our morphological analysis, as well as our analysis of stress, should be extended [...] to other Romance languages as well.” (Oltra-Massuet, 1999b, p. 87) A few years later, Arregi (2000) and Oltra-Massuet and Arregi (2005) followed in Oltra-Massuet’s footsteps, and showed that the analysis originally proposed for Catalan could indeed be extended to other Romance languages, in particular to Spanish.

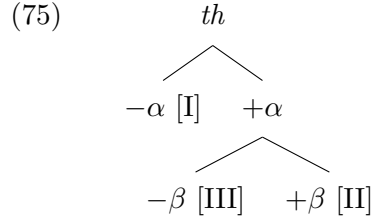
The strategy for Spanish is thus the same as that for Catalan, with theme vowels being the realization of a well-formedness requirement on all functional nodes; conjugations being replaced by bundles of morphological features; and allomorphy and syncretism resulting from the interaction between the markedness of the theme vowels and the markedness of the environment. Moreover, as we said in note 31, the stress algorithm is the same for the two languages (we repeat the stress algorithm in (74)). Finally, the “problematic” tenses in Spanish are the same as in Catalan, namely, the perfect and the present.

(74) Stress Algorithm

- a. Project a line 0 mark for each syllable nucleus.
- b. *Insert a right parenthesis to the left of T on line 0.*
- c. Project the rightmost mark of each line 0 foot onto line 1.
- d. Insert a right parenthesis to the right of the rightmost mark on line 1.
- e. Project the rightmost mark of each line 1 foot onto line 2.

Despite this striking parallelism, there are nonetheless some differences between Spanish and Catalan. First, only two morphological features are

needed to capture the three conjugations into which Spanish verbs are traditionally sorted. Thus, the theme vowel hierarchy for Spanish is shown in (75); the three conjugations, in decreasing order of markedness, are shown in (76); and the corresponding redundancy rules are shown in (77).



- (76)
- | | | | |
|----|--------------------------|--------------------|-----------------|
| a. | Second Conjugation: | $[\alpha, +\beta]$ | ‘doubly marked’ |
| b. | Third Conjugation (III): | $[\alpha, -\beta]$ | ‘marked’ |
| c. | First Conjugation: | $[-\alpha]$ | ‘unmarked’ |

- (77)
- | | |
|----|-------------------------------------|
| a. | $[\emptyset] \rightarrow [-\alpha]$ |
| b. | $[+\beta] \rightarrow [+\alpha]$ |
| c. | $[+\alpha] \rightarrow [-\beta]$ |

Second, there is just a two-way distinction regarding the markedness of the environment in Spanish (see (78)). The feature [+SBJ]—which makes the environment “doubly marked” in Catalan; see (15-c) above—is syntactically and semantically “inert” in Spanish. Consequently, Arregi takes it to be a mere morphological feature that is inserted into “the highest syntactic functional head in the structure in certain syntactic environments.” (Arregi, 2000, p. 24)³³

- (78)
- | | | |
|----|-----------------|------------|
| a. | $[-\text{PST}]$ | unmarked T |
| b. | $[\text{+PST}]$ | marked T |

Finally, in Spanish any node containing only unmarked features gets deleted before Vocabulary Insertion.³⁴ According to Arregi, this “early deletion” merely “implements” the observation that “There is a transparent

³³Unfortunately, the syntactic environments into which the feature [+SBJ] is inserted are not explicitly defined. Arregi (2000, p. 25) seems in fact more preoccupied with backing up his claim about the inert nature of [+SBJ] than with pinpointing the exact contextual conditions determining its insertion.

³⁴This deletion is reminiscent of the “radical Pruning rule” proposed by Embick to account for the “general idea that present, indicative tense (T[pres]) plays no role in Latin morphology.” (Embick, 2010, p. 63) This rule, which crucially applies “early in PF derivations” (Embick, 2010, p. 63), removes the relevant node—in the case of Latin, T[+PRS]—from the representation.

relation between syntactic (featural) markedness and morphophonological markedness.” (Arregi, 2000, p. 13) In other words, the more the environment is marked, the longer the forms will be. For example, consider the present indicative (in Tab. 3.11), the imperfect indicative (in Tab. 3.11), and the conditional (in Tab. 3.10). In these tenses, as the markedness of the environment increases—passing from [-PST] to [+PST] to [+FUT, +PST], respectively—the forms become longer and longer.³⁵

This observation also supports Arregi’s choice of treating [+SBJ] as a mere morphological feature. Compare the indicative forms to the subjunctive forms in the present and in the imperfect (in Tables 3.11- 3.12 and 3.8- 3.9, respectively). If the observation is correct, then we expect subjunctive forms to be longer than the corresponding indicative forms in contrast to what we actually find.

With these clarifications in place, let us now see how Oltra-Massuet’s strategy can be carried over to the Spanish data. We will use the verbs *cant-a-r* ‘to sing’, *tem-e-r* ‘to fear’, and *part-i-r* ‘to leave’ as our running examples.

We begin with the imperfect, in both its indicative and subjunctive variant (see Tables 3.8 and 3.9, respectively).

Conjugation I	Conjugation II	Conjugation III
cantar	temer	partir
cant-'a-b-a-∅	tem-'i-∅-a-∅	part-'i-∅-a-∅
cant-'a-b-a-s	tem-'i-∅-a-s	part-'i-∅-a-s
cant-'a-b-a-∅	tem-'i-∅-a-∅	part-'i-∅-a-∅
cant-'a-b-a-mos	tem-'i-∅-a-mos	part-'i-∅-a-mos
cant-'a-b-a-is	tem-'i-∅-a-is	part-'i-∅-a-is
cant-'a-b-a-n	tem-'i-∅-a-n	part-'i-∅-a-n

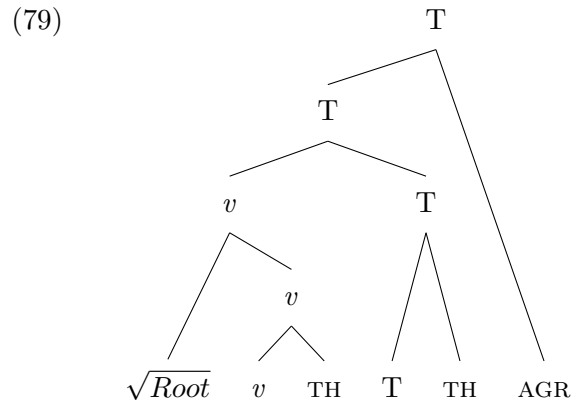
Table 3.8: Imperfect indicative (adapted from Oltra-Massuet and Arregi, 2005, p. 50). Each form in the Table corresponds to the template: $\sqrt{-v-TH-IMP.IND-TH-AGR}$. Imperfect indicative can be decomposed into the feature bundle: [+PST, -SBJ].

Each form in Tab. 3.8 and Tab. 3.9 has the structure in (79), the only difference being the specification of the tense node—[+PST, -SBJ] for the indicative; [+PST, +SBJ] for the subjunctive.

³⁵In the relevant Tables, we highlight in gray the 2SG forms, which we use as our examples.

Conjugation I cantar	Conjugation II temer	Conjugation III partir
cant-'a-r-a-∅	tem-'ie-r-a-∅	part-'ie-r-a-∅
cant-'a-r-a-s	tem-'ie-r-a-s	part-'ie-r-a-s
cant-'a-r-a-∅	tem-'ie-r-a-∅	part-'ie-r-a-∅
cant-'a-r-a-mos	tem-'ie-r-a-mos	part-'ie-r-a-mos
cant-'a-r-a-is	tem-'ie-r-a-is	part-'ie-r-a-is
cant-'a-r-a-n	tem-'ie-r-a-n	part-'ie-r-a-n

Table 3.9: Imperfect subjunctive (adapted from Oltra-Massuet and Arregi, 2005, p. 51). Each form in the Table corresponds to the template: $\sqrt{-v}$ -TH-IMP.SBJ-TH-AGR. Imperfect subjunctive can be decomposed into the feature bundle; [+PST, +SBJ].



Given the Vocabulary Items in (80) and (81), and the stress algorithm in (74), we can account for all the forms of the imperfect of conjugation I verbs.

(80) Vocabulary Items for the imperfect

- a. Indicative
 - b \Leftrightarrow T[+PST,-SBJ]/[- α]
 - $\emptyset \Leftrightarrow$ [+PST, -SBJ]
- b. Subjunctive
 - r \Leftrightarrow T[+PST,+SBJ]

(81) a. Theme
a \Leftrightarrow [- α]

e ⇔ [+β]
i ⇔ [-β]

- b. Agreement
s ⇔ [+PAR, -AUTH, -PL]
mos ⇔ [+PAR, +AUTH, +PL]
is ⇔ [+PAR, -AUTH, +PL]
n ⇔ [+PL]

As usual, we illustrate the derivation of the 2SG forms:

(82) Imperfect Indicative

	√	<i>v</i>	TH	T	TH	AGR
			[-α]	[+PST, -SBJ]	[-α]	[+PAR, -AUTH, -PL]
a.	cant	∅	a	b	a	s
Line 0	x		x)		x	
Line 1			x			
b. Imperfect Subjunctive						

	√	<i>v</i>	TH	T	TH	AGR
			[-α]	[+PST, +SBJ]	[-α]	[+PAR, -AUTH, -PL]
(i)	cant	∅	a	r	a	s
Line 0	x		x)		x	
Line 1			x			

Conjugations II and III, however, show theme syncretism in both the indicative and the subjunctive. To capture this pattern, Arregi (2000, p. 6) proposes two distinct theme allomorphs (in (83)) realizing the feature that is shared by these two conjugations—[+α]; see (75).³⁶³⁷

³⁶By contrast, Oltra-Massuet opts for an Impoverishment rule to account for a similar case of theme syncretism in Catalan; see (28) above.

³⁷The allomorph in (83) has the property of being marked as syllabic. It is an idiosyncratic property of Spanish that some high vowels must be marked in this way. As Arregi writes, “Theme *i* must be exceptionally marked as syllabic in the imperfective, since it is in a position where we would expect it to form a complex nucleus with the following vowel” Arregi (2000, note 3). In other words, if allomorph (83) were not marked as syllabic, we would expect a form such as 1SG *temia* to be syllabified as *[te.mia] instead of [te.mi.a].

As for the pattern of syncretism at hand, one might wonder whether Arregi’s solution based on the multiplication of allomorphs fares better than Oltra-Massuet’s solution based on Impoverishment (see the previous note). Indeed, one might have proposed an Impoverishment rule deleting [+beta] in the second conjugation in the marked context determined by [+PST], thus neutralizing the distinction between conjugation II and III

- (83) Theme Allomorphs for [+ α]
 i. \Leftrightarrow [+ α]/- [+PST]
 ie \Leftrightarrow [+ α]/- [+PST, +SBJ]

With the addition of these two allomorphs, we can also account for all the forms of the imperfect of conjugations II and III (again illustrated with the 2SG forms):

- (84) Imperfect Indicative

	✓	<i>v</i>	TH	T	TH	AGR
			[+ α , + β]	[+PST, -SBJ]	[- α]	[+PAR, -AUTH, -PL]
a.	tem	∅	i	∅	a	s
Line 0	x		x)		x	
Line 1			x			
	✓	<i>v</i>	TH	T	TH	AGR
			[+ α , - β]	[+PST, -SBJ]	[- α]	[+PAR, -AUTH, -PL]
b.	part	∅	i	∅	a	s
Line 0	x		x)		x	
Line 1			x			

- (85) Imperfect Subjunctive

	✓	<i>v</i>	TH	T	TH	AGR
			[+ α , + β]	[+PST, +SBJ]	[- α]	[+PAR, -AUTH, -PL]
a.	tem	∅	ie	r	a	s
Line 0	x		x)		x	
Line 1			x			
	✓	<i>v</i>	TH	T	TH	AGR
			[+ α , - β]	[+PST, +SBJ]	[- α]	[+PAR, -AUTH, -PL]
b.	part	∅	ie	r	a	s
Line 0	x		x)		x	
Line 1			x			

We now turn to the conditional (see Table 3.10).

Each form in Tab. 3.10 has the structure in (86), where the feature [+FUT] heads its own projection as in Catalan.³⁸

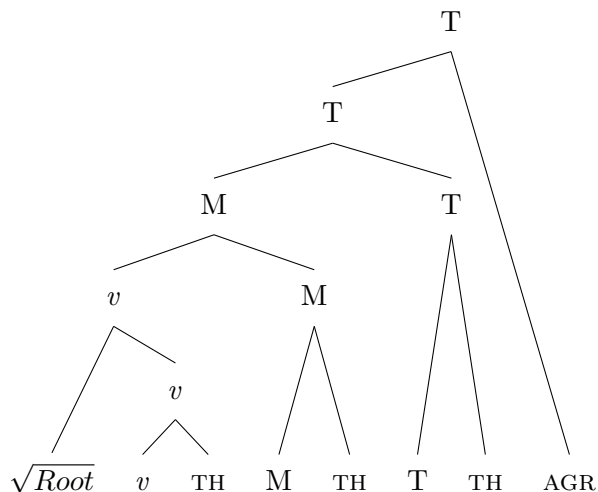
in the imperfect. We do not have a definitive answer to this question. But, given that Distributed Morphology has been criticized precisely because of its overreliance on morphological operations like Impoverishment (see Ch. 4), some are likely to prefer Arregi's solution to Oltra-Massuet's one.

³⁸See note 16.

Conjugation I cantar	Conjugation II temer	Conjugation III partir
cant-a-r-'i-a-∅	tem-e-r-'i-a-∅	part-i-r-'i-a-∅
cant-a-r-'i-a-s	tem-e-r-'i-a-s	part-i-r-'i-a-s
cant-a-r-'i-a-∅	tem-e-r-'i-a-∅	part-i-r-'i-a-∅
cant-a-r-'i-a-mos	tem-e-r-'i-a-mos	part-i-r-'i-a-mos
cant-a-r-'i-a-is	tem-e-r-'i-a-is	part-i-r-'i-a-is
cant-a-r-'i-a-n	tem-e-r-'i-a-n	part-i-r-'i-a-n

Table 3.10: Conditional (adapted from Oltra-Massuet and Arregi, 2005, p. 53). Each form in the Table corresponds to the single template: $\sqrt{-v-TH-FUT-TH-PST-TH-AGR}$. Conditional can be decomposed into the feature bundle: [+FUT, +PST].

(86)



Being a marked environment, the conditional triggers the specific redundancy rule in (87), which turns an unmarked theme vowel into a marked theme vowel.³⁹

³⁹The only difference between the rule in (87) and that in (32) above is the markedness of the environment. Given that in Spanish only the tense node determines markedness—and not also the number of positive values of the features—an unmarked theme becomes marked in a *marked* environment, whereas in Catalan an unmarked theme becomes marked in a *doubly* marked environment. Yet, the reason behind the application of all specific redundancy rules is the same, namely, to maintain markedness homeostasis within a form.

(87) $[\emptyset] \rightarrow [+α] / [+FUT]_-[+PST]$

(88) Vocabulary Item for the conditional
 $r \Leftrightarrow [+FUT]$

Given the redundancy rule in (87) and the Vocabulary Item in (88),⁴⁰ we can account for all the forms of the conditional of all conjugations. As usual, we illustrate the derivation of the 2SG forms (in gray in Tab. 3.10):

		√	<i>v</i>	TH	M	TH	T	TH	AGR
				[-α]	[+FUT]	[+α]	[+PST]	[-α]	[+PAR, -AUTH, -PL]
(89)	a.	cant	∅	a	r	i	∅	a	s
		Line 0	x	x		x)		x	
		Line 1				x			
		√	<i>v</i>	TH	M	TH	T	TH	AGR
				[+β]	[+FUT]	[+α]	[+PST]	[-α]	[+PAR, -AUTH, -PL]
	b.	tem	∅	e	r	i	∅	a	s
		Line 0	x	x		x)		x	
		Line 1				x			
		√	<i>v</i>	TH	M	TH	T	TH	AGR
				[-β]	[+FUT]	[+α]	[+PST]	[-α]	[+PAR, -AUTH, -PL]
	c.	part	∅	i	r	i	∅	a	s
		Line 0	x	x		x)		x	
		Line 1				x			

We now turn to the two problematic tenses, which, as we said above, are the same as in Catalan. Let us begin with the present in both its indicative (Table 3.11) and subjunctive variant (Table 3.12).

Because it contains only the unmarked feature [-PST], the tense node gets always deleted early on in the derivation. Consequently, all the present forms have the structure in (90).

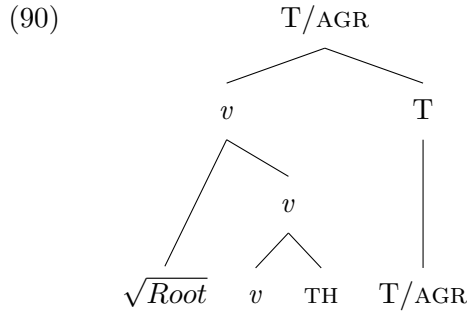
⁴⁰The Vocabulary Item in (88) is just homophonous with the Vocabulary Item in (80-b). We saw a similar case of homophony in Catalan; see note 18 above.

Conjugation I cantar	Conjugation II temer	Conjugation III partir
'cant- \emptyset -o	'tem- \emptyset -o	'part- \emptyset -o
'cant-a-s	'tem-e-s	'part-e-s
'cant-a- \emptyset	'tem-e- \emptyset	'part-e- \emptyset
cant-'a-mos	tem-'e-mos	part-'i-mos
cant-'a-is	tem-'e-is	part-'i-s
'cant-a-n	'tem-e-n	'part-e-n

Table 3.11: Present indicative (adapted from Oltra-Massuet and Arregi, 2005, p. 59). Each form in the Table can be decomposed into the single template: $\sqrt{-v}$ -TH-PRS.IND.AGR. Present indicative corresponds to the feature [-PST].

Conjugation I cantar	Conjugation II temer	Conjugation III partir
'cant-e- \emptyset	'tem-a- \emptyset	'part-a- \emptyset
'cant-e-s	'tem-a-s	'part-a-s
'cant-e- \emptyset	'tem-a- \emptyset	'part-a- \emptyset
cant-'e-mos	tem-'a-mos	part-'a-mos
cant-'e-is	tem-'a-is	part-'a-is
'cant-e-n	'tem-a-n	'part-a-n

Table 3.12: Present subjunctive (adapted from Oltra-Massuet and Arregi, 2005, p. 59). Each form can be decomposed into the single template: $\sqrt{-v}$ -TH-PRS.SBJ.AGR. Present subjunctive can be decomposed into the feature bundle: [-PST, +SBJ].



We can account for the 1PL and 2PL forms of the present indicative without further qualifications:

(91) 1PL

	✓	<i>v</i>	TH	T/AGR
			$[-\alpha]$	$[+\text{PAR}, +\text{AUTH}, +\text{PL}]$
a.	cant	∅	a	mos
Line 0	x		x)	x
Line 1			x	
	✓	<i>v</i>	TH	T/AGR
			$[\beta]$	$[+\text{PAR}, +\text{AUTH}, +\text{PL}]$
b.	tem	∅	e	mos
Line 0	x		x)	x
Line 1			x	
	✓	<i>v</i>	TH	T/AGR
			$[-\beta]$	$[+\text{PAR}, +\text{AUTH}, +\text{PL}]$
c.	part	∅	i	mos
Line 0	x		x)	x
Line 1			x	

(92) 2PL⁴¹

⁴¹In conjugation III, phonological rules complicate somewhat the matter. The high vowel of the ending *-is-* starts its life as a nucleus, so it is associated with an abstract mark. But given a general rule of denuclearization targeting unstressed high vowels immediately following another vowel, we have the following: [par.ti.is] → [par.tijs]. Ultimately, the glide gets deleted, as Spanish does not allow long vowels. Consequently, we have the following: [par.tijs] → [par.tis] (see Oltra-Massuet and Arregi, 2005, note 23).

	√	<i>v</i>	TH	T/AGR
			[-α]	[+PAR, -AUTH, +PL]
a.	cant	∅	a	is
	Line 0	x	x)	x
	Line 1		x	
		√	<i>v</i>	TH
			[+β]	[+PAR, -AUTH, +PL]
b.	tem	∅	e	is
	Line 0	x	x)	x
	Line 1		x	
		√	<i>v</i>	TH
			[-β]	[+PAR, -AUTH, +PL]
c.	part	∅	i	is
	Line 0	x	x)	x
	Line 1		x	

With the addition of the deletion rule in (93), we can also account for the 1SG forms.⁴²

(93) Theme Vowel Deletion

$$\begin{array}{ccc}
 V_1 & \rightarrow \emptyset / _ & V_2 \\
 | & & | \\
 \text{-high} & & \text{-high}
 \end{array}$$

(94) 1SG

	√	<i>v</i>	TH	T/AGR
			[-α]	[+PAR, +AUTH, -PL]
a.	cant	∅	a	o
	Line 0	x	x)	x
	Line 1		x	
		√	<i>v</i>	TH
			[+β]	[+PAR, +AUTH, -PL]
b.	tem	∅	e	o
	Line 0	x	x)	x
	Line 1		x	

⁴²As pointed out by Arregi, rule (93) must be restricted to [-high] vowels, “since there are cases of high theme vowels before a vowel [...], and of theme vowels before a high vowel.” (Arregi, 2000, p. 17) We just saw some examples of the latter case, namely, the 2PL present indicative forms *cantais* and *temeis*. We also saw examples of the former case, namely, the imperfect indicative forms *temias* and *partias*.

	√	<i>v</i>	TH	T/AGR
			[-β]	[+PAR, +AUTH, -PL]
c.	part	∅	i	o
	Line 0	x	x)	x
	Line 1		x	

The application of the deletion rule in (93) causes stress to shift to the left, thus giving rise to rhizotonic forms.

Still unexplained are however the 2SG, 3SG, and 3PL forms. According to the stress algorithm in (74), these forms are expected to be—incorrectly—arrhizotonic (we exemplify only the 2SG forms):

(95) Incorrect 2SG

	√	<i>v</i>	TH	T/AGR
			[-α]	[+PAR, +AUTH, -PL]
a.	cant	∅	a	s
	Line 0	x	x)	
	Line 1		x	
		√	<i>v</i>	TH
			[+β]	[+PAR, +AUTH, -PL]
b.	tem	∅	e	s
	Line 0	x	x)	
	Line 1		x	
		√	<i>v</i>	TH
			[-β]	[+PAR, +AUTH, -PL]
c.	part	∅	i	s
	Line 0	x	x)	
	Line 1		x	

The solution to this issue lies in an idiosyncratic property of stress assignment in the present. Indeed, only in this tense the configuration in which a parenthesis occurs to the right of the rightmost mark on Line 0 is not allowed. We therefore need rule (96), which deletes the rightmost abstract mark on Line 0 whenever it ends up preceding a parenthesis, thus causing stress to shift to the left.⁴³

(96) Stress Deletion Rule

⁴³The reason for the presence of the word boundary (#) in the context of rule (96) is that this rule can alternatively be said to apply whenever “the parenthesis projected by T is to the right of the final vowel in the *word*.” (p. 61 Oltra-Massuet and Arregi, 2005, emphasis added)

$x \rightarrow \cdot / x_)\#$

The correct, rhizotonic forms are thus derived as follows:

- (97) 2SG
- | | | | | | | |
|----|--------|--------|------|----------|------|--------------------|
| a. | Line 0 | Line 1 | √ | <i>v</i> | TH | T/AGR |
| | | | | | [-α] | [+PAR, +AUTH, -PL] |
| | | | cant | ∅ | a | s |
| | | | | | .) | |
| | | | x | | | |
| | | | x | | | |
| | | | √ | <i>v</i> | TH | T/AGR |
| | | | | | [+β] | [+PAR, +AUTH, -PL] |
| | | | tem | ∅ | e | s |
| | | | | | .) | |
| | | | x | | | |
| | | | x | | | |
| | | | √ | <i>v</i> | TH | T/AGR |
| | | | | | [-β] | [+PAR, +AUTH, -PL] |
| | | | part | ∅ | i | s |
| | | | | | .) | |
| | | | x | | | |
| | | | x | | | |

However, this solution leaves unexplained another issue. In precisely the forms that are subject to the rule in (96)—2SG, 3SG, and 3PL—Conjugation III verbs take /e/ as their theme vowel instead of the expected /i/. In this case, though, considerations of markedness cannot be invoked. The present is the unmarked environment *par excellence*, so there is no reason why a marked theme would turn doubly marked in such a context. The solution can only be phonological. As Arregi (2000, p. 16) observes, “What these forms have in common is that their theme vowel is post-tonic”. Thus, we need rule (98), which lowers a theme vowel that occurs precisely in a post-tonic position.⁴⁴

(98) Theme Vowel Lowering

⁴⁴The derivation of the 1SG form of conjugation III (in (94-c)) warrants some further comment. In this form, the theme vowel, being high, is syllabified with the following vowel—[par.tio]—so it does not project an abstract mark. Consequently, stress falls directly on the root—[pàr.tio]. After stress is assigned, rules (98) and (93) can apply, their respective context being met. More specifically, these rules feed each other, with Lowering—[pàr.teo]—setting the stage for deletion—[pàr.to].

$$i \rightarrow e / \text{ V C}_0__ \\ \quad \quad \quad | \\ \quad \quad \quad *$$

Let us now turn to the subjunctive (see Tab. 3.12). The most striking characteristic of the subjunctive forms is the shift involving the theme vowels. More specifically, conjugation I takes /e/ instead of /a/, while conjugations II and III both take /a/ instead of /e/ and /i/ respectively, thus showing syncretism.

Arregi (2000, p. 25) proposes to capture this pattern of syncretism by means of an Impoverishment rule triggered by markedness considerations:⁴⁵

$$(99) \quad [+α] \rightarrow \emptyset / __[+SBJ]$$

The “theme shift” involving conjugation I cannot, however, be accounted for by relying on markedness considerations. There is no reason why the default theme should turn “doubly” marked in an *unmarked* environment. Therefore, Arregi resorts again to a phonological solution. More specifically, he proposes a rule changing “*a* to *e* in certain morphological contexts.” (Arregi, 2000, p. 9)⁴⁶

$$(100) \quad a \rightarrow e / __ \text{morphological contexts}$$

Apart from theme shift, the subjunctive poses no further challenge; the assignment of stress follows the same rules that apply in the indicative.

We illustrate the derivation of the 1PL and 2SG forms (in light-gray in Tab. 3.12).⁴⁷

⁴⁵Nevertheless, the solution based on Impoverishment does not seem to be the best fit for the case at hand. While proposing the deletion of a marked theme in an unmarked environment is perfectly reasonable, one might wonder why rule (99) does not also apply in the indicative, given that it is as unmarked as the subjunctive. In other words, rule (99) seems to suggest an “active” role of the feature [+SBJ] in the determination of the markedness of the environment, in stark contrast to Arregi’s assumption about the “inert” nature of this feature. See also note 47.

⁴⁶These “morphological contexts” are the following: the future—for which see Arregi (2000, pp. 6–9) and Ultra-Massuet and Arregi (2005, § 2.2)—the 1SG perfect form (for which, see below), and the present subjunctive forms of conjugation I. The heterogeneity of these contexts lends support to Arregi’s choice of a phonological rule to capture the shift at hand.

⁴⁷See note 45. The Impoverishment rule in (99) has an additional shortcoming. By deleting [+α], it changes the feature specification of conjugation II and III in this way: [+α, +β] → [+β] and [+α, –β] → [–β], respectively (see (76) above). At this point, the redundancy rule supplying the unmarked value [–α] applies, further changing the feature

(101) 1PL (Theme shift; “a-changing”; regular stress assignment)

	√	<i>v</i>	TH	T/AGR
			[−α]	[+PAR, +AUTH, +PL]
a.	cant	∅	a	mos
Line 0	x		x)	x
Line 1			x	
	√	<i>v</i>	TH	T/AGR
			[−α]	[+PAR, +AUTH, +PL]
b.	tem	∅	a	mos
Line 0	x		x)	x
Line 1			x	
	√	<i>v</i>	TH	T/AGR
			[−α]	[+PAR, +AUTH, +PL]
c.	part	∅	a	mos
Line 0	x		x)	x
Line 1			x	

(102) 2SG (Theme shift; “a-changing”; stress deletion)

	√	<i>v</i>	TH	T/AGR
			[−α]	[+PAR, +AUTH, -PL]
a.	cant	∅	a	s
Line 0	x		.)	
Line 1	x			
	√	<i>v</i>	TH	T/AGR
			[−α]	[+PAR, +AUTH, -PL]
b.	tem	∅	a	s
Line 0	x		.)	
Line 1	x			

specification of the conjugations in question in this way: [+β] → [−α, +β] and [−β] → [−α, −β], respectively. Next, Vocabulary Insertion applies. But given the Vocabulary Items in (81-a), we have a tie. In other words, Vocabulary Insertion can choose between two Vocabulary Items for the realization of the theme node of conjugation II and III. More specifically, it can choose between /a/—realizing [−α]—and /e/—realizing [+β]—for conjugation II, and between /a/—again realizing [−α]—and /i/—realizing [−β]—for conjugation III. The Subset Principle cannot decide, because all the relevant Vocabulary Items are context free. Thus, in the examples (101) and (102), we write [−α] for all conjugations simply because it is the feature that ultimately gets realized. Yet we have no clue as to why it is precisely this feature—and not another one—that gets realized in the end. Unfortunately, Arregi (2000) completely overlooks this issue.

	√	v	TH	T/AGR
			[-α]	[+PAR, +AUTH, -PL]
c.	part	∅	a	s
Line 0	x)	
Line 1	x			

Let us now turn to the second problematic tense—the perfect (see Table 3.13).

Conjugation I	Conjugation II	Conjugation III
cantar	temer	partir
cant-'e-∅	tem-'i-∅	part-'i-∅
cant-'a-ste	tem-'i-ste	part-'i-ste
cant-∅-'o	tem-i-'o	part-i-'o
cant-'a-mos	tem-'i-mos	part-'i-mos
cant-'a-steis	tem-'i-steis	part-'i-steis
cant-'a-ron	tem-'ie-ron	part-'ie-ron

Table 3.13: Perfect (adapted from Oltra-Massuet and Arregi, 2005, p. 57). Each form in the Table can be decomposed into the single template: $\sqrt{-v-TH-PRF.AGR}$. Perfect corresponds to the feature bundle: [+PST, +PRF].

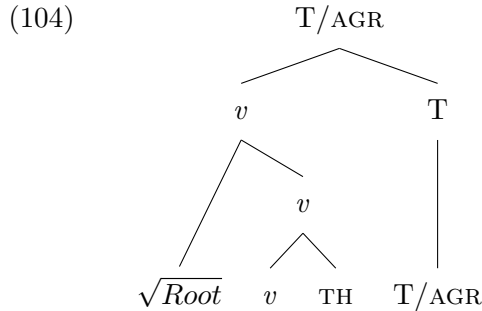
This tense is problematic for two reasons. First, because it is the only tense having a dedicated set of Vocabulary Items for the agreement node:

- (103) Agreement for the perfect
- ∅ ⇔ [1SG]
 - ste ⇔ [2SG]
 - ò ⇔ [3SG]
 - mos ⇔ [1PL]
 - steis ⇔ [2PL]
 - ron ⇔ [3PL]

Second, because it is the only tense where T and AGR *fuse* together.⁴⁸

⁴⁸Fusion of T and AGR in the perfect is exceptional. As we said above, Arregi (2000, p. 3) assumes that a node gets deleted only when it contains exclusively unmarked values. Oltra-Massuet and Arregi (2005, pp. 54–55) make a slightly different assumption, arguing that in Spanish tense and agreement fuse together only in the unmarked environment, as in Catalan. Although these different takes do not alter the exceptional character of

The structure of the perfect forms is thus the same as the structure of the present forms, the only difference being the specification of the T node—[+PRF] for the perfect; [-PST] for the present:



Stress assignment in the perfect also poses some issues. First, the 3SG forms are always stress-final, contrary to we expect from the stress algorithm. The solution proposed by Oltra-Massuet and Arregi (2005, pp. 57–58) consists in specifying the Vocabulary Item for the T/AGR[3SG] node so that it exceptionally projects a *right* parenthesis to its *right* on Line 0 (see example (109)).

Second, the 1SG and 3SG forms of conjugation I verbs are problematic as in Catalan. More specifically, the 1SG form ends in /e/ rather than in /a/—another instance of the “a-changing rule” in (100)—while the theme vowel of the 3SG form gets deleted by rule (93)—*cant-a-o* → *cant-o*.

Third, because both take /i/, conjugations II and III show theme syncretism. Arregi (2000, p. 19) proposes another Impoverishment rule to capture this pattern:⁴⁹

Fusion applying in the perfect, they nonetheless raise the question of which assumption fares better.

Given that the focus of Arregi (2000) is more on the structure of the verbal forms than on stress assignment, and that, on the contrary, the focus of Oltra-Massuet and Arregi (2005) is more on stress assignment than on structure, we decided to follow the former as to structure, while the latter as to stress assignment.

⁴⁹Although this rule is specified to apply only in the perfect, one might wonder why it does not also apply in the present given the markedness considerations underlying it. The rule turns a doubly marked theme into a marked theme in a marked context—[+PST, +PRF]—thus maintaining markedness homeostasis. Therefore, there should be no plausible reason for the presence of the doubly marked theme—/e/—in the most unmarked context—the present—contrary to what we actually find (see Tab. 3.11 above). Additionally, the application of rule (105) results in the coalescence of conjugation II and III, with both conjugations becoming specified as [+α, -β]. Arregi (2000, p. 20) assumes that Vocabulary Insertion targets [-β], thus inserting /i/. However, the Vocabulary Item

$$(105) \quad [+β] \rightarrow [-β] / _ [+PRF]$$

Moreover, in the 3PL forms, these conjugations take the same theme allomorph that characterizes all the forms of their imperfect subjunctive paradigm—/ie/. In this case, it suffices to enlarge the context of the Vocabulary Item in (83) above so as to also include the feature bundle [+PRF, 3, PL]:

$$(106) \quad \text{Theme Allomorphs for } [+α] \text{ (see (83))}$$

$$\text{ie} \Leftrightarrow [+α] / _ \begin{cases} [+PST, +SBJ] \\ [+PRF, 3PL] \end{cases}$$

$$\text{i.} \Leftrightarrow [+α] / _ [+PST]$$

With these adjustments in place, we can account for all of the perfect forms of all conjugations. We illustrate just the singular forms:

$$(107) \quad \text{1SG}$$

	✓	<i>v</i>	TH	T/AGR
			$[-α]$	$[+PAR, +AUTH, -PL]$
a.	cant	∅	a	∅
	Line 0	x	x)	
	Line 1		x	
	✓	<i>v</i>	TH	T/AGR
			$[-β]$	$[+PAR, +AUTH, -PL]$
b.	tem	∅	i	∅
	Line 0	x	x)	
	Line 1		x	
	✓	<i>v</i>	TH	T/AGR
			$[-β]$	$[+PAR, +AUTH, -PL]$
c.	part	∅	i	∅
	Line 0	x	x)	
	Line 1		x	

$$(108) \quad \text{2SG}$$

	✓	<i>v</i>	TH	T/AGR
			$[-α]$	$[+PAR, +AUTH, -PL]$
a.	cant	∅	a	ste
	Line 0	x	x)	x
	Line 1		x	

in (83)—which realizes [+α] in the context of [+PST]—should be preferred, as it is context-sensitive. Unfortunately, Arregi (2000) completely overlooks this issue.

		√	<i>v</i>	TH	T/AGR
				[-β]	[+PAR, +AUTH, -PL]
b.		tem	∅	i	ste
	Line 0	x		x)	x
	Line 1			x	
		√	<i>v</i>	TH	T/AGR
				[-β]	[+PAR, +AUTH, -PL]
c.		part	∅	i	ste
	Line 0	x		x)	x
	Line 1			x	
(109)	3SG				
		√	<i>v</i>	TH	T/AGR
				[-α]	[+PAR, +AUTH, -PL]
a.		cant	∅	a	o
	Line 0	x		x)	x)
	Line 1			x	x)
	Line 2				x
		√	<i>v</i>	TH	T/AGR
				[-β]	[+PAR, +AUTH, -PL]
b.		tem	∅	i	o
	Line 0	x		x)	x)
	Line 1			x	x)
	Line 2				x
		√	<i>v</i>	TH	T/AGR
				[-β]	[+PAR, +AUTH, -PL]
c.		part	∅	i	o
	Line 0	x		x)	x)
	Line 1			x	x)
	Line 2				x

Spanish has also a handful of verbs showing irregularity precisely in the perfect. We show three of them in Table 3.14.⁵⁰

As Tab. 3.14 makes clear, the irregularity that characterizes these verbs is root suppletion. Additionally, the 1SG and 3SG forms (in gray in Tab. 3.14) are rhizotonic, contrary to our expectations. Given that “in both first and third person singular, there is a parenthesis to the right of the rightmost mark in the metrical grid”, Oltra-Massuet and Arregi (2005, p. 61) propose

⁵⁰For a complete list of such verbs, see Arregi (2000, p. 22) and Oltra-Massuet and Arregi (2005, note 21).

poner ‘to put’	saber ‘to know’	querer ‘to want’
'pus-e-∅	'sup-e-∅	'quis-e-∅
pus-'i-ste	sup-'i-ste	quis-'i-ste
'pus-∅-o	'sup-∅-o	'quis-∅-o
pus-'i-mos	sup-'i-mos	quis-'i-mos
pus-'i-steis	sup-'i-steis	quis-'i-steis
pus-'ie-ron	sup-'ie-ron	quis-'ie-ron

Table 3.14: Irregular perfect, illustrated with three verbs: *poner* ‘to put’, *saber* ‘to know’, and *querer* ‘to want’ (adapted from Oltra-Massuet and Arregi, 2005, p. 58).

that “these irregular perfective verbs are exceptionally marked as being subject to Stress Deletion.”

Thus, the extension of the context of rule (96), together with the further assumption that irregular verbs belong to conjugation III in the perfect (Arregi, 2000, p. 22), allow to account for the 1SG forms.⁵¹

(110)	1SG				
		√	<i>v</i>	TH	T/AGR
				$[-\beta]$	$[+\text{PAR}, +\text{AUTH}, -\text{PL}]$
a.	pus	∅	i	∅	
	Line 0	x	.		
	Line 1	x			
		√	<i>v</i>	TH	T/AGR
				$[-\beta]$	$[+\text{PAR}, +\text{AUTH}, -\text{PL}]$
b.	sup	∅	i	∅	
	Line 0	x	.		
	Line 1	x			

⁵¹This assumption is justified by the exponents of the theme node, which “are more similar to the regular 2nd/3rd conjugation forms than to the regular 1st conjugation.” (Arregi, 2000, [p. 22] Though “observationally” correct—the 3PL form takes /ie/ while all the other forms take /i/—this assumption does not seem strong enough to justify a shift in conjugation. In fact, most irregular verbs take /e/ or /a/ as their theme vowel in the infinitive, thus apparently belonging to conjugation II or I in “non-perfective” forms.

	√	v	TH	T/AGR
			$[-\beta]$	[+PAR, +AUTH, -PL]
c.	quis	∅	i	∅
Line 0	x)	
Line 1	x			

Because it ends up in a post-tonic position, final /i/ ultimately lowers to /e/ as in the present indicative (see rule (98) above).

As for the 3SG forms, Oltra-Massuet and Arregi (2005, p. 62) give the following derivations:

(111) 3SG

	√	v	TH	T/AGR
			$[-\beta]$	[+PAR, +AUTH, -PL]
a.	pus	∅	∅	o
Line 0	x)	.)
Line 1	x)
Line 2	x			
	√	v	TH	T/AGR
			$[-\beta]$	[+PAR, +AUTH, -PL]
b.	sup	∅	∅	o
Line 0	x)	.)
Line 1	x)
Line 2	x			
	√	v	TH	T/AGR
			$[-\beta]$	[+PAR, +AUTH, -PL]
c.	quis	∅	∅	o
Line 0	x)	.)
Line 1	x)
Line 2	x			

While stress assignment is captured, still unexplained, however, is why the theme vowel is realized as /∅/ instead of as /i/. According to Arregi (2000, p. 23), the answer lies in the interaction between Lowering (in (98)) and Deletion (in (93)), with the former feeding the latter: first [*pusio*] → ; then [*puseo*][*puseo*] → [*puso*]. However, this solution has a shortcoming regarding the context of application of the rules involved. Because it targets theme vowels in post-tonic position, Lowering can only apply *after* stress has already been assigned. In (111), by contrast, this operation must apply *before* stress is assigned so as to avoid the derivation of incorrect forms such

as *pusi*o:⁵²

(112)	Incorrect <i>pusi</i> o	√	<i>v</i>	TH	T/AGR
				[-β]	[+PAR, +AUTH, -PL]
		pus	∅	i	o
	Line 0	x	x)	.)	
	Line 1		x		

3.4 Slovenian

Thus far, theme vowels have occupied center stage. Oltra-Massuet (1999b,a) has put forward a new conception of the notion of theme vowel, and explored its consequences for Catalan morpho-phonology. Building on this work, Arregi (2000) and Oltra-Massuet and Arregi (2005) have shown that the new conception as well as its morpho-phonological consequences could be extended to Spanish.

In contrast, Slovenian theme vowels have mainly been discussed in passing. They have been included in discussions whose main focus was a different issue of Slovenian verbal morphology, such as the role of syntactic structure in the placement of stress (Marvin, 2003); “the intricate relation between theme vowels, stress and argument structure” (Simonovič and Mišmaš, 2022, p. 28); or the proper locality conditions of root suppletion (Božič, 2016; Simonovič and Mišmaš, 2023).⁵³

Marvin (2003) was the first work discussing Slovenian theme vowels in the framework of DM. As the title suggests—*Topic in the Stress and Syntax of Words*—the goal was to show that “the syntactic structure in word formation [...] is necessary to make generalizations about the meaning and stress properties of words” (Marvin, 2003, p. 3). To achieve this goal, Marvin relied, on the one hand, on the theory of Lexical Stress, and, on the other

⁵²Unfortunately, Oltra-Massuet and Arregi (2005) do not discuss this issue, while Arregi (2000, p. 23) “forgets” to project the abstract mark corresponding to /i/ in his representations.

⁵³This is not to say that Slovenian theme vowels have never been discussed *per se* in the literature; see Simonovič and Mišmaš (2022, § 2) for a quick overview of various traditional takes on theme-vowel classes in Slovenian. Nonetheless, to the best of our knowledge, there is no work regarding Slovenian that is akin to Oltra-Massuet’s work regarding Catalan. For example, while Simonovič and Mišmaš focus “on the e/i theme vowel class of verbs”, they do so only “to bring together two seemingly unrelated debates: (i) the debate on the correlation between theme-vowel classes and certain argument structure and (ii) the debate on the status of derivational affixes” (Simonovič and Mišmaš, 2022, p. 1).

hand, on the Derivation-by-Phase approach to syntactic derivation, which she extended to word formation. This extension follows from the \surd & c nature of DM. Indeed, if there is “syntax all the way down” and syntactic derivation proceeds by phases, then word formation, too, should proceed in the same fashion.

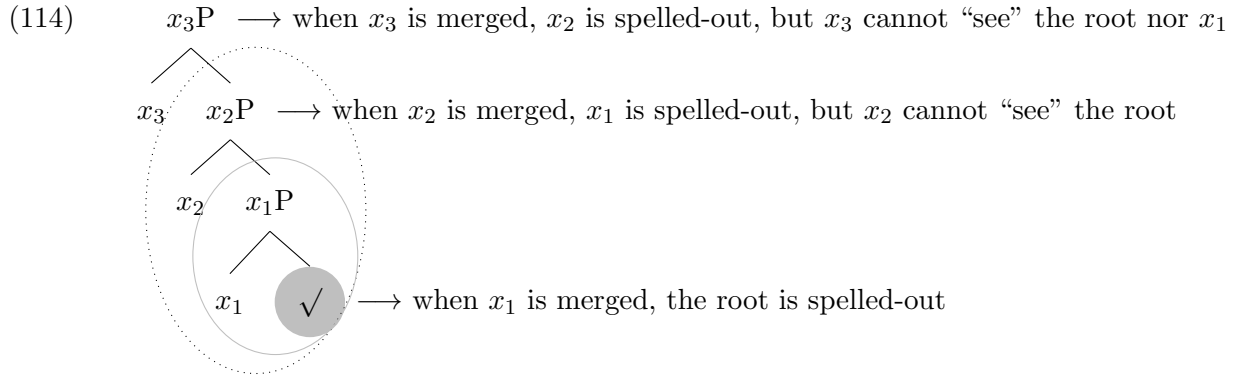
Let us say a few words about phases at the word level. First, category-defining heads—little v , little n , and little a —are phasal, and therefore trigger the spell-out of their complement.⁵⁴ Second, phases at the word level are subject to a slightly revised, “loosened” (Marvin, 2003, p. 23) version of the *Phase Impenetrability Condition* (PIC) holding in the syntax:

- (113) Phase Impenetrability Condition at the word level
A phasal head H and its edge (specifiers and adjuncts) are spelled-out at the next (higher) phase. The domain of H is spelled out at the phase of HP. A head adjoined to H is in H’s domain. (adapted from Marvin, 2003, p. 26)

The reason for “loosening” the PIC at the word level is that otherwise we “lose the connection between the impenetrability of a certain chunk of structure and the attachment site of an affix that can potentially influence the PF of a word.” (Marvin, 2003, p. 26) To see this point more clearly, consider the abstract structure in (114).

⁵⁴Embick (2010) proposes a different implementation of the derivation-by-phase model within a DM architecture according to which phasal—or *cyclic*, as Embick (2010, p. 9) calls them—heads trigger the spell-out of the *cyclic* domains in their complement (Embick, 2010, p. 13).

Despite this difference, both Marvin and Embick assume a “static” view of phases. In other words, they assume that certain heads—such as category-defining ones—are phasal by definition. Recently, however, a new trend has emerged in the syntactic literature, which takes a “dynamic” view of phases. Instead of being an intrinsic property, the phasal character of a head depends upon the stage of the derivation at which that head is merged. For a morphological implementation of this dynamic approach, see Bobaljik and Wurmbrand (2013).



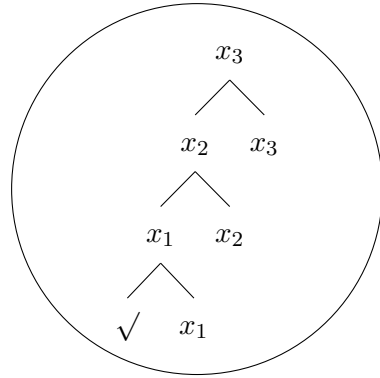
If x_1, x_2 , and x_3 are assumed to be phasal heads, and the *syntactic* version of the PIC is adopted, then the derivation of the structure in (114) would proceed as follows. When x_1 gets merged, the root gets spelled-out, thus becoming “impenetrable for the operations from above.” (Marvin, 2003, p. 19)⁵⁵ When x_2 gets merged, only x_1 gets spelled-out, thus becoming “impenetrable” in turn. Finally, when x_3 gets merged, only x_2 gets spelled-out, the root and x_1 having become impenetrable in the previous steps.

The issue motivating the loosening of the PIC concerns the interaction of the derivation just discussed with head-movement. In the syntax, head-movement serves as “escape hatch”, allowing a head to “escape” from the spell-out domain of a lower head, and therefore to be spelled-out at the next higher phase. However, this property of head-movement can backfire when it is translated into morphology without further provisions. If head-movement successively applies in (114), it would yield a structure like (115). In this structure, the root, x_1, x_2 , and x_3 are in the *same* phase, and therefore can “see” each another freely. In other words, x_2 has access to the root, while x_3 has access to both the root and x_1 . Consequently, an affix inserted into x_2 can affect the root in (115) because it is in the same phase as the root. By contrast, such affix cannot affect the root in (114), because the root has already been spelled-out by the time the affix gets inserted. In sum, the PIC at the word level enforces a head that is adjoined to a phasal head to not escape from the spell-out domain of the phasal head.⁵⁶

⁵⁵This property of the derivation-by-phase model is called “forgetting-of-the-spelled-out-chunk” by Marvin (see 2003, Ch. 2, note 5).

⁵⁶See, however, Lowenstamm (2014, §11.2) for a critique of Marvin’s reformulation of the PIC.

(115)



As for stress, “Slovenian is a language with lexical stress” (Marvin, 2003, p. 133). In other words, in Slovenian “the position of stress cannot be predicted solely on the basis of the phonological properties of the word or from syllable counting.” (Marvin, 2003, p. 134) More specifically, stress is the “result of the interaction of lexically determined *accentual* properties of vocabulary items and the rule that assigns *stress* to the leftmost accented vowel or, in the absence of an accent, to the leftmost vowel.” (p. 135 Marvin, 2003, emphasis added)

The distinction between “accent” and “stress” is an important one. Accent is defined as “a property of the lexical representation of a vocabulary item” (Marvin, 2003, p. 136). In other words, the Vocabulary Items for roots and affixes may come equipped with a parenthesis in their specifications. Stress, by contrast, is defined as “a property of the metrical domain” (Marvin, 2003, p. 136), and is computed according to the parameter setting in (116).⁵⁷

(116) Parameter Setting in Slovenian (adapted from Marvin, 2003, p. 135)

Line 0	Edge:RRR	Head:L
Line 1	Edge:LLL	Head:L

We now turn to theme vowels. Marvin (2003, p. 95) identifies five theme vowels in Slovenian: -aj, -ī, -ē, -ā, and -∅. While assuming that “The theme vowel appears solely for morphological reasons and is part of the morphological well-formedness of words”, Marvin (2003, p. 95) takes theme vowels to be adjoined to the root rather than to functional nodes, in

⁵⁷In order to dispense with the lexical specification of stress, Simonovič proposes that “the default prosodic pattern” in Slovenian is stem-final. More specifically, “stem-final stress is assigned to all words in which lexical prosody is not present or not available.” Simonovič (2020, p. 109)

contrast to Oltra-Massuet’s strategy. Marvin explicitly acknowledges this difference, which she justifies by claiming that “while one could argue that themes are adjoined to category-forming heads, [in Slovenian] it is not the case that they are adjoined to any other functional head” (p. 96 Marvin, 2003, note 12).⁵⁸

With these clarifications in place, we can now see how the derivation-by-phase model in tandem with the theory of lexical stress can account for “instances of stress alternations”, that is, “situations in which the stress of one and the same root differs according to the form in which the root appears” (Marvin, 2003, p. 133), as well as the role played by theme vowels in such account.

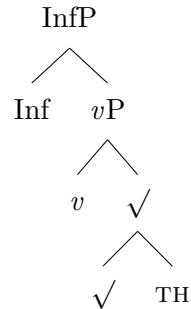
Slovenian has three basic stress patterns. In pattern A, stress always falls on the root. In pattern B, stress falls on the root in some forms, but on the syllable following the root in some others. In pattern C, stress always falls on the syllable following the root.⁵⁹ Marvin (2003, p. 142) proposes to account for the different stress patterns of Slovenian by invoking three types of root with different accentual properties, and by matching each type of root to a different stress pattern. More specifically, she claims that roots participating in pattern A are accented; roots participating in pattern B are post-accenting; and roots participating in pattern C are unaccented.

To see how Marvin’s account works, consider the structure of the infinitive, along with the corresponding Vocabulary Item in (117).

(117) a. Structure

⁵⁸Simonovič and Mišmaš (2023, p. 4) point out “a conceptual problem” regarding Marvin’s take on theme vowels. This problem can be characterized either as a violation of the Lookahead condition (see note 21) or as a violation of the categorization assumption (see (1) in Sec. 2.2). As they write: “this account predicts that the categorial affiliation of verbal roots [...] will be encoded already on the root.” (Simonovič and Mišmaš, 2023, p. 4) More specifically, the morphology must “know” that a given root will ultimately get verbalized in order to sprout a theme node on it. But by the time the root gets spelled-out, the morphology cannot “know” which category-defining head has selected the root because, under the derivation-by-phase approach assumed by Marvin, the root and its corresponding categorizer are spelled-out in different phases. Consequently, either morphology is allowed to “lookahead” and thus “see” the category-defining head, or the roots that will ultimately get verbalized are somewhat different from all the other roots as they bear category-related information.

⁵⁹Although there are a few exceptions to pattern C, they are not relevant for our purposes; see note 68 below.



- b. Vocabulary Item
 ti \Leftrightarrow inf

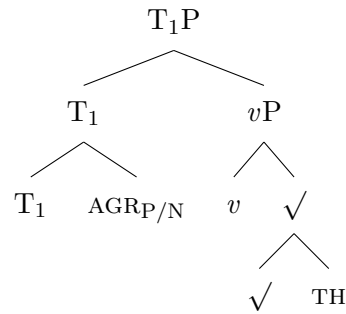
It is possible to account for the placement of stress in the infinitive if we assume the following: that roots have the different accentual properties discussed above; that all the theme vowels are accented—-(\bar{a} , -(\bar{e} , -(\bar{i} , -(aj , -(\emptyset); that a set of phonological rules applies on Line 0 (Marvin, 2003, p. 147, note 8), the most relevant for our purposes being those in (118). We follow Marvin (2003, p. 147) in taking (*del-*, *bran(-*, and *let-* as our running examples of an accented, post-accenting, and unaccented root, respectively.

- (118) a. $V \rightarrow \emptyset / _V$
 b. $j, w \rightarrow \emptyset / _C$
 c. $aje \rightarrow a / _aj$ class
 d. $V_1V_2 \rightarrow jV_2 / _V_1$ long, V_2 short
- (119) a. Pattern A: *delati* ‘to work’
 \checkmark TH v Inf
 del aj \emptyset ti
 Line 0 (x (x x (118-b) applies
 Line 1 (x x
 Line 2 x
- b. Pattern B: *braniti* ‘to defend’
 \checkmark TH v Inf
 bran \bar{i} \emptyset ti
 Line 0 x((x x
 Line 1 x
- c. Pattern c: *leteti* ‘to fly’
 \checkmark TH v Inf
 let \bar{e} \emptyset ti
 Line 0 x (x x
 Line 1 x

As example (119) makes clear, assuming the roots participating in each stress pattern to have different accentual properties is crucial in order to account for the three stress patterns. Indeed, stress falls on the root in pattern A precisely because the root is accented. Likewise, stress falls on the syllable following the root in pattern B precisely because the root is post-accenting. In pattern C, stress falls on the syllable following the root because the root is unaccented whereas the theme vowel is accented.

Let us now turn to the problematic cases—the present and the *(e)n/t*-participle. The structure and attendant Vocabulary Items of the present are in (120).⁶⁰

(120) a. Structure



b. Vocabulary Items

$\bar{i} \Leftrightarrow [\text{pres}]/ \text{ - theme } -\bar{e} \text{ and } -\bar{i}$
 $e \Leftrightarrow [\text{pres}]$

Patterns A and C pose no particular challenge, except that, when a phonological rule deletes a vowel or a glide, only its corresponding abstract mark gets deleted, and not the corresponding parenthesis when present. For instance, in pattern A we have the following:⁶¹

(121) a. Pattern A: *delamo* ‘work.1.PL’

	√	TH	T ₁	AGR	
	del	aj	e	mo	
Line 0	(x	(x	x	x	(118-c) applies

⁶⁰We take the structure of the present forms directly from Marvin (2003, p. 147), without discussing its possible (in)correctness. For a justification of this structure as well as of the other structures we take from her work, Marvin (see 2003, Ch. 4, §2).

⁶¹Because it is always zero, we omit the *v* node from our examples for expository ease.

		√	TH	T ₁	AGR
		del		a	mo
b.	Line 0	(x	(	x	x
	Line 1	(x		x	
	Line 2	x			

Likewise, in pattern C we have the following:

(122)	a.	Pattern C: <i>letimo</i> ‘fly.1.PL’				
		√	TH	T ₁	AGR	
		let	ī	ī	mo	
	Line 0	x	(x	x	x (118-a) applies	
		√	TH	T ₁	AGR	
		let		ī	mo	
	b.	Line 0	x	(	x
		Line 1			x	

By contrast, pattern B is problematic. Instead of falling on the syllable following the root—as we would expect—stress falls on the root, the correct form being *brànimò* and not *branìmo*.

(123)	a.	Incorrect Pattern B: <i>branimò</i> ‘defend.1.PL’				
		√	TH	T ₁	AGR	
		bran	ī	ī	mo	
	Line 0	x(	(x	x	x (118-a) applies
		√	TH	T ₁	AGR	
		bran		ī	mo	
	b.	Line 0	x(	(	x
		Line 1			x	

To address this issue, Marvin (2003, § 4.5.1) proposes to integrate the theory of lexical stress with a stress retraction rule, which makes crucial reference to syntactic structure. As she writes: “Tense [...] has the property of influencing the stress assignment in words by inserting a left parenthesis one asterisk to the left of the SBU it is linked to.” (Marvin, 2003, p. 151)⁶²

(124) Present Tense Retraction

⁶²In the quotation, the acronym “SBU” stands for “stress-bearing unit”, that is, the stressable element(s) in a string of phonemes. The “asterisk” is just a notational variant for abstract marks.

*((* → *(((*
 |
 T₁

- (125) a. Convention
 Parentheses that group no stress-bearing units are deleted.
 b. Ordering
 Stress Retraction precedes Convention.

Rule (124)—which causes stress to shift to the left—works in tandem with the convention and ordering relation in (125) to account for pattern B:⁶³

- (126) a. Correct Pattern B: *branimō* ‘defend.1.PL’
- | | | | | | |
|--------|------|----|----------------|-----|-----------------------------------|
| | √ | TH | T ₁ | AGR | |
| | bran | ī | ī | mo | |
| Line 0 | x(| (x | x | x | (118-a), (124), and (125-a) apply |
- b.
- | | | | | |
|--------|------|----|----------------|-----|
| | √ | TH | T ₁ | AGR |
| | bran | | ī | mo |
| Line 0 | (x | (| x | x |
| Line 1 | x | | | |

The second problematic case is the *(e)n/t*-participle. Its the structure and attendant Vocabulary Items are in (127).⁶⁴

- (127) a. Structure
- PASSP

```

graph TD
  PASSP --- PASS
  PASSP --- vP
  PASS --- PASS2[PASS]
  PASS --- AGR[AGRG/N]
  vP --- v
  vP --- check1[√]
  check1 --- check2[√]
  check2 --- TH
  
```
- b. Vocabulary Items
- t ⇔ [PASS]/_ List⁶⁵
n ⇔ [PASS]/_ class -ā
and class ē
en ⇔ [PASS]

⁶³One might wonder why the stress retraction rule in (124) only applies to the post-accenting roots of pattern B, and not to the unaccented roots of pattern C. The answer lies in the number of parentheses preceding the tense node. As pointed out by Marvin (2003, p. 150), only post-accenting roots have two parentheses on Line 0, one belonging to the root, the other belonging to the theme vowel. By contrast, unaccented roots have just the parenthesis belonging to the theme vowel. To see this point more clearly, compare (122-a) to (123-a).

⁶⁴See note 60.

⁶⁵This list comprises root verbs of class \emptyset ending in a sonorant (Marvin, 2003, p. 152).

Patterns A and C pose no problem:⁶⁶

- (128) a. Pattern A: *delan* ‘worked.M.SG’
- | | | | | | |
|--------|-----|----|------|-----|-----------------|
| | √ | TH | PASS | AGR | |
| | del | aj | n | ∅ | |
| Line 0 | (x | (x | | | (118-b) applies |
| | √ | TH | PASS | AGR | |
| | del | a | n | ∅ | |
- b. Line 0 (x (x
Line 1 (x x
Line 2 x
- (129) Pattern C: *leten* ‘flown.M.SG’
- | | | | | |
|--------|-----|----|------|-----|
| | √ | TH | PASS | AGR |
| | let | e | n | ∅ |
| Line 0 | x | (x | | |
| Line 1 | | x | | |

Instead, pattern B is again problematic. In particular, as Marvin (2003, p 153) observes, “Post-accenting roots [...] show an asymmetry with respect to their theme vowel—roots that take *-aj* and *ī* as their theme retract the stress [...] but roots that take *ā* do not.” To solve this issue, Marvin proposes to extend the stress retraction rule in (124), along with the conventions in (125), to the *(e)n/t*-participle:

- (130) Stress Retraction Extended
- $$*((* \rightarrow *(((*$$
- |
- T₁/PASS

Still unexplained, however, is the asymmetry observed in post-accenting roots. In this case, the solution lies in the different Vocabulary Items that realize the Pass node. As shown in example (127-b), classes *-aj* and *ī* take the default /en/ as the exponent of the Pass node. This exponent plays a crucial role in the placement of stress because “the vowel /e/ in /en/ triggers j-insertion [...] and causes the deletion of the theme vowel” (Marvin, 2003, p. 154). In addition, it projects an abstract mark, thus meeting the structural description of the stress retraction rule in (130):

- (131) a. Pattern B: Class *ī*: *branjen* ‘defended.M.SG’

⁶⁶See note 61.

		√	TH	PASS	AGR	
		bran	ī	en	∅	
	Line 0	x(	(x	x		(118-d) applies
b.		√	TH	PASS	AGR	
		branj		en	∅	
	Line 0	x(	(	x		(130) and (125-a) apply
		√	TH	PASS	AGR	
		branj		en	∅	
c.	Line 0	(x	(	x		
	Line 1	(x		x		
	Line 2	x				

By contrast, “Class \bar{a} [...] is special” (Marvin, 2003, p. 154) because it only takes /n/ as the exponent of the Pass node (see (127-b)). Consequently, j-insertion and the subsequent deletion of the theme vowel cannot apply. Additionally, being consonantal, this exponent does not project an abstract mark and therefore cannot trigger the application of the stress retraction rule in (130).⁶⁷

(132) Pattern B: Class \bar{a} : *česan* ‘combed.M.SG’

		√	TH	PASS	AGR
		čes	ā	n	∅
	Line 0	x(	(x		
	Line 1		x		

As Marvin (2003, p. 155) notes, her account of stress retraction is similar to the one proposed by Oltra-Massuet and Arregi (2005) for Spanish (see Sec 3.3 above).⁶⁸ However, there is a crucial difference between these two

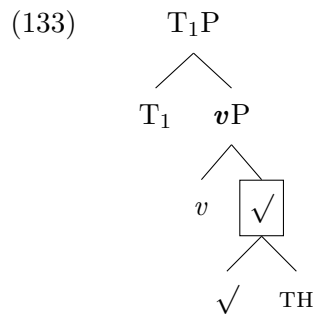
⁶⁷This solution might seem a clever, ad hoc one. Indeed, we ensured that precisely those post-accenting roots that do not retract stress take a consonantal exponent of the Pass node, which cannot trigger the stress retraction rule. However, there is a phonological justification for this solution. If post-accenting roots of class \bar{a} were to take the default exponent /en/, then we would expect not only the retraction of stress, but also the insertion of the glide: *čes-ā-en* → **češen*, through **česjen*, with the glide ultimately triggering the palatalization of the preceding consonant. However, the correct form is *česan*, with no glide inserted.

⁶⁸There is actually another stress retraction rule in Slovenian, which involves post-accenting roots as well as some unaccented roots in the *l*-participle and short infinitive, though “optionally” (Marvin, 2003, p. 158, note 15). This rule is a purely phonological one, as it makes reference only to the number of syllables. Marvin (2003, p. 159) calls this rule *Disyllabic retraction*. Because we are interested in the interaction between syntax and phonology, and not in phonology *per se*, we do not discuss Disyllabic retraction further here; see Marvin (2003, §4.7) for more details. In addition, based on the behaviour of the

accounts. In Spanish, the tense node projects a right parenthesis to its left as part of the general algorithm that assigns stress in the language. By contrast, in Slovenian the tense node can retract stress only if its corresponding abstract mark is preceded by two parentheses on Line 0. Consequently, two conditions must hold in Slovenian as opposed to Spanish. First, the tense node must project an abstract mark.⁶⁹ Second, the abstract mark projected by the tense node must be preceded by two parentheses on Line 0. In other words, in Slovenian the tense node has somehow to “see” the metrical plane in order to influence the assignment of stress, whereas in Spanish it does not have to.

But given the derivation-by-phase model assumed by Marvin, this requirement poses a problem. As Marvin (2003, p. 159) points out, “at the point of TP the root pronunciation has already been negotiated and Tense should not have [sic] be able to change that.”

To see this point more clearly, consider again the structure of the present (setting aside the AGR node):



The root is spelled-out as soon as the phasal head *v* (in boldface in (133)) is merged, thus becoming impenetrable for the operations from above. Consequently, the tense node has no access to the root, and therefore cannot influence its spell-out. This situation, however, incorrectly predicts that the present form of a post-accenting root such as *bran-* would be **branìmo* (compare (123) to (126) above).

To resolve this issue, Marvin proposes “to restate the notion of pene-

unaccented roots, Marvin herself argues against the unification of the two stress retraction rules of Slovenian. As she writes: “the root *let-*, which can be stress-retracting in its Past Participle [the *l*-participle] and Short Infinitive is never stress-retracting in its Present Tense form.” (Marvin, 2003, p. 159, note 16)

⁶⁹This condition explains why stress retraction cannot apply in (132). Although there are two parentheses on Line 0, the tense node does not project an abstract mark because its exponent is consonantal.

trability.” (Marvin, 2003, p. 164) Given the properties of the derivation-by-phase approach in connection with stress assignment (see (134)), Marvin (2003, p. 164) claims that the extended stress retraction rule in (130) has the property in (134-b) while lacking the property in (134-a). In other words, this rule *adds* a parenthesis, but cannot remove the lexical parenthesis, that is, the accent, of a given constituent. As Marvin puts it: “The underlying representation of accent of a spelled-out constituent is not accessible to higher occurring phases for *change*, but only for *addition* of new material to the metrical grid.” (p. 164 Marvin, 2003, emphasis in the original) Nonetheless, Marvin acknowledges that this solution is only “tentative” Marvin (2003, p. 164).

- (134) Properties of Phase Spell-Out (adapted from Marvin, 2003, p. 163)
- a. Accessing the already created metrical structure of a constituent to change the constituent’s pronunciation;
 - b. Adding new information to the already created metrical structure of a constituent.

Let us now turn to Simonovič and Mišmaš (2022). Based on a corpus search looking for the distribution of unaccusative verbs among the different theme-vowel classes in Slovenian, they find a strong correlation between the e/i class and unaccusativity.⁷⁰ This finding is rather surprising because “theme-vowel classes found in Slovenian are typically assumed not to categorically correlate with argument structure” (Simonovič and Mišmaš, 2022, p. 6).

However, the data are uncontroversial. More than a half of the unac-

⁷⁰Slovenian theme-vowel classes are notated by TH1/TH2, where TH1 is the theme vowel occurring in non-finite forms, and TH2 is the one occurring in finite forms. This notation stems from a few facts about Slovenian theme vowels (see Simonovič and Mišmaš, 2022, §2). First, it is not possible to predict the theme vowel based on the phonological properties of the root. Second, Slovenian verbs may take different theme vowels in finite and non-finite forms, “but they do not have to” (Simonovič, 2020, p. 2). Additionally, as Simonovič and Mišmaš (2022, p. 5) point out, “While assuming a single exponent of each theme-vowel class marker and deriving its allomorphs by phonological rules is clearly preferable, we are not aware of any way to achieve this for all theme-vowel classes in modern Slovenian.” Consequently, they claim that “Combinations of theme vowels define conjugation classes.” (Simonovič and Mišmaš, 2022, p. 3) This claim implies that the number of theme-vowel classes in Slovenian depends on how such combinations are identified. For example, Marvin identifies five theme-vowel classes based only on TH1, while others have identified five classes based only on TH2. Interestingly, although both Simonovič and Mišmaš (2022, p. 5) and Simonovič and Mišmaš (2023, p. 13) identify ten theme-vowel classes, these classes nonetheless do not overlap given the different criteria used to identify them. See Sec. 4.3 for some further comments on this issue.

cusative verbs in the corpus belong to the e/i class. (Simonovič and Mišmaš, 2022, p. 12) Moreover, as Simonovič and Mišmaš (2022, p. 16) highlight, “the exceptionality of this class is not restricted to an exceptionally high number of unaccusatives.”

First, in inchoative/causative pairs, inchoatives consistently belong to the e/i class, whereas their causative counterparts consistently belong to the i/i class.⁷¹ Although not all the inchoatives in e/i are necessarily unaccusative, they nonetheless reinforce “the general tendency of the e/i class not to take an accusative argument.” (Simonovič and Mišmaš, 2022, p. 16)⁷²

Second, “The e/i class displays extremely uniform behavior with respect to stress”, with 97% of all the e/i verbs having the theme vowel stressed in both finite and non-finite forms. (Simonovič and Mišmaš, 2022, p. 17) To see this point more clearly, consider the different stress patterns in an inchoative/causative pair:

- (135) a. bel-é-ti
white-TH-INF
‘to become white’
- b. bel-í-mo
white-TH-PRS.1PL
‘we become white’
- (136) a. bel-í-ti
white-TH-INF
‘to make x white’
- b. bél-i-mo
white-TH-PRS.1PL

⁷¹Marvin (2003, p. 100) has already highlighted this correlation in the case of deadjectival verbs. For instance, *rumeneti* ‘to become yellow’ versus *rumeniti* ‘to make yellow’.

⁷²The fact that not all the inchoatives in e/i are unaccusative is due to what Simonovič and Mišmaš (2022, §4.1) call “the issue of aspect”. This issue derives from the diagnostics they used to identify unaccusative verbs in the corpus. This diagnostics almost invariably identified a specific kind of verb. More specifically, out of 111 unaccusative verbs identified in the corpus, 108 were both perfective and telic. Simonovič and Mišmaš (2022, p. 15) thus ask: “is there an issue with the tests [...] or is it the case that imperfective/atelic verbs are never unaccusative?” Although they leave this issue open, they nonetheless assume that a relation between unaccusativity and telicity actually exists.

In sum, not all inchoatives in the e/i class are unaccusative because some of them are imperfective, and therefore cannot be unaccusative.

‘we make x white

In the inchoative member of the pair ((135)), stress consistently falls on the theme vowel. By contrast, the causative member of the pair ((136)) shows an alternating pattern, with stress falling on the theme vowel in non-finite forms and on the root in finite forms.⁷³

Finally, the e/i class is a “prominent exception” (Simonovič and Mišmaš, 2022, p. 2) regarding the L-participle morpho-syntax. The L-participle is involved in the formation of compound tenses, so all verbs have a verbal L-participle. But only the L-participle of unaccusative verbs can also be used attributively, as an adjective. Additionally, as Simonovič and Mišmaš (2022, p. 2) highlight, “in Slovenian adjectival active L-participles, theme vowels are generally either mute, or deleted or modified”. The theme vowel in the e/i class, by contrast, is preserved in both verbal and adjectival L-participles (in boldface in (137-c)).

- (137) a. Infinitive
dozor-e-ti
ripen-TH-INF
‘to ripen’
- b. Verbal L-participle
je dozor-e-l
AUX ripen-TH-ACT.PTCP
‘has ripened’
- c. Adjectival L-participle
dozor-**e**-l-o sadje
ripen-TH-ACT.PTCP-N fruit.N
‘ripened fruit’

Thus, the e/i class “is not ‘well-behaved’ with respect to the standard understanding of theme vowels.” (Simonovič and Mišmaš, 2022, p. 16) To safeguard the standard understanding of theme vowels, Simonovič and Mišmaš propose to analyse e/i not as a theme vowel but rather as a derivational

⁷³As Simonovič and Mišmaš (2022, p. 17) point out, there is some degree of inter-speaker variation in the pronunciation of the causative member. For some speakers, stress consistently falls on the root in both finite and non-finite forms. This variations makes the contrast between the inchoative and the causative member of the pair with respect to stress placement even clearer.

affix. Building on Lowenstamm (2014), Simonovič and Mišmaš (2022, p. 20) take *e/i* to be a root.⁷⁴ More specifically, they take *e/i* to be a bound root, that is, a root selecting another root as its complement.⁷⁶

Under this new perspective, *e/i* is reanalysed as a root with a contextually-specified allomorph:

- (138) Allomorphs for the former *e/i* class
 $\sqrt{E} \Leftrightarrow i/_- [+finite]$
 $\sqrt{E} \Leftrightarrow e$

Given this reanalysis, the structure of the inchoative verb *beleti* in (135) is as follows:

- (139)
- $$\begin{array}{c}
 vP \\
 \swarrow \quad \searrow \\
 v \quad \sqrt{P} \\
 \swarrow \quad \searrow \\
 \sqrt{E} \left[\begin{array}{c} \text{tt} \\ \sqrt{\text{V}} \end{array} \right] \quad \sqrt{BEL}
 \end{array}$$

This revised structure accounts for the consistency of stress placement in the former *e/i* class. Building on Simonovič (2020, p. 109), Simonovič and Mišmaš (2022, p. 23) claim that “all radical cores have the default stress,

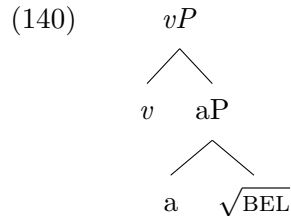
⁷⁴Assuming that “categories have no exponents”, Lowenstamm (2014, p. 232) claims that what surface as category-defining affixes are actually roots. The claim that categorizers are always phonologically null accords with the treatment of zero morphemes in Halle and Marantz (1993, §4); see note 15.

⁷⁵One shortcoming of the proposal in Lowenstamm (2014) is the lack of widespread general criteria for distinguishing a genuine derivational affix from a root. One such criterion seems to be “categorial flexibility”, that is, the ability of an element to occur in more than one categorial context. In the case at hand, \sqrt{E} seems to meet this criterion, as it also appears in the nominal and adverbial contexts (see Simonovič and Mišmaš, 2022, p. 24). However, it is far from clear how flexible an element must be to be amenable to a root analysis. Simonovič and Mišmaš (2022, p. 27) explicitly acknowledge this issue when they observe that “it is all but clear how versatile an element needs to be in order to be considered a bona fidae [sic] root, since many unbound roots fail to appear in various categories”. We do not discuss this issue further here.

⁷⁶Lowenstamm (2014) classifies roots based on their ability to project. Free roots can project on their own. Bound roots, by contrast, “need the help of a complement”, thus bearing an uninterpretable feature (Lowenstamm, 2014, p. 243). Bound roots are further classified based on the types of complements they select. Some bound roots select another root as their complement. Others select an already categorized constituent. Others still are “universal selectors” (Lowenstamm, 2014, p. 249), being able to take both roots and *xP*’s as their complement.

which in Slovenian is stem final”.⁷⁷⁷⁸ In other words, stress falls “on the syllable preceding the inflectional ending.” (Simonovič, 2020, p. 108)

Causative verbs have a different structure from inchoatives. More specifically, inchoatives are *deradical* (see (139)), whereas causatives are *deadjectival* (see (140)).



This structural difference explains the different stress patterns exhibited by these two types of verbs. In contrast to inchoatives, which receive default stress, causatives show root-stress at least in finite forms.⁷⁹ This different pattern stems from the fact that the root in causative verbs gets spelled-out as soon as *a* is merged. Once stress is negotiated at this cycle, it cannot subsequently be modified.

Given the revised structure in (139), the correlation between e/i and unaccusativity disappears. Unaccusativity is not “a consequence of the \sqrt{E} root” (Simonovič and Mišmaš, 2022, p. 23). Instead, it depends on the “flavor” of the *v* that embeds the radical core. As Simonovič and Mišmaš (2022, p. 27) observes, “Such treatment also has the advantage of separating \sqrt{E} from v_{BECOME} , which means that unaccusative verbs that do not have \sqrt{E} are still possible”. For example, *odras-θ-ti* ‘to grow up’ is one such verb.

However, the revised structure in (139) is not enough to account for “the preservation of the theme vowel” (Simonovič and Mišmaš, 2022, p. 18) in the L-participle. Thus, Simonovič and Mišmaš (2022, p. 25) further assume that the L-component of the active participle is itself a root— \sqrt{L} .⁸⁰

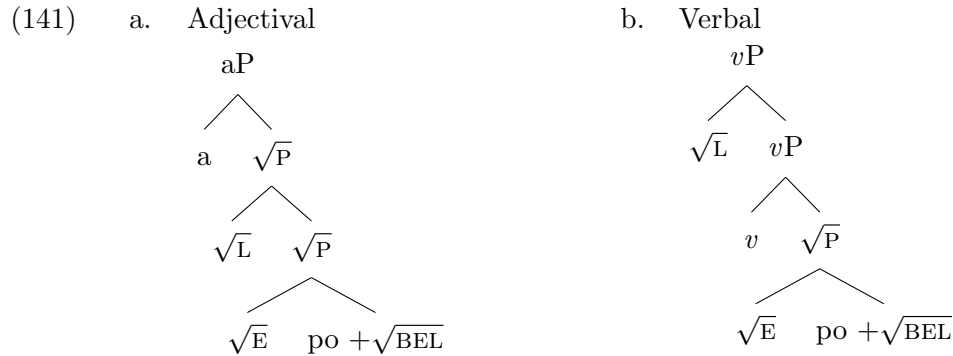
⁷⁷Lowenstamm (2014, p. 256) defines radical cores as the portion of a representation that “consists exclusively of roots”.

⁷⁸See also note 57.

⁷⁹See note 73.

⁸⁰Interestingly, the idea that *l*-component of the active participle was akin to a root was already present, though *in nuce*, in Marvin (2003). In discussing what she calls “Root *l*-Participle Nominalizations”, Marvin observes: “The *l*-Participle component in Root *l*-Participle nominalizations is basically an *extended root*. [...] It appears as if the language is making use of the process of *root extension* to introduce non-compositional meanings that for some reason could not be introduced by nominalizing just a bare root.” (pp. 110–11 Marvin, 2003, emphasis added)

Because an L-participle can both be verbal and adjectival, Simonovič and Mišmaš (2022, p. 25) take \sqrt{L} to be a universal selector:⁸¹⁸²



The structures in (141) contain no theme vowel. Consequently, the problem of the exceptional preservation of the theme vowel in the adjectival L-participle does not arise in the first place. Indeed, as Simonovič and Mišmaš (2022, p. 25) notes, “the fact that e/i surfaces in adjectival participles [...] is evidence that e/i is not a theme vowel. [...] The preservation of \sqrt{E} in these cases is not surprising if \sqrt{E} is a root.” Additionally, the placement of stress in L-participles pose no problem. In the adjectival participle ((141-a)), stress is stem-final. But because \sqrt{L} cannot be stressed, it falls on the preceding vowel. By contrast, in the verbal participle ((141-b)), stress is negotiated at *vP*, which explains why “we find the same stress in the infinitive and verbal L-participles” (Simonovič and Mišmaš, 2022, p. 25).

Taking \sqrt{E} to be a root thus allows to account for the exceptional behaviour of the e/i class. Nevertheless, this solution has a cost regarding the standard understanding of theme vowels. Simonovič and Mišmaš (2022, p. 28) assume that all the other theme-vowel classes are ornamental, so “all verbs include a position for theme vowels” Simonovič and Mišmaš (2022, p. 27). But assuming \sqrt{E} to be a root results in “allowing a very limited number of verbs to surface without an overt theme vowel.” In other words, “a \emptyset/\emptyset class would be added to the list of theme-vowel classes a [sic] Slovenian [...] with the former e/i theme-vowel class subsumed under this class.” (Simonovič and Mišmaš, 2022, p. 27)

Let us now turn to Božič (2016). His goal is to safeguard the local theory of allomorphy put forward by Embick (2010) against an apparent

⁸¹See note 76.

⁸²In discussing the structure of participles, Simonovič and Mišmaš (2022, p. 25) set aside “the issue of prefixation.”

counterexample from Slovenian. More specifically, in Slovenian “a small set of roots shows one type of exponent in simple verbs, but another type in participles and other non-tensed verbal structures.” (Božič, 2016, p. 1) This pattern is shown in Table 3.15.

Root	1.PL.PRS	<i>l</i> -PTCP	(<i>e</i>) <i>n</i> / <i>t</i> -PTCP	INF
√kolij-	'kolj-e-m	'kl- a -l-a	'kl- a -n	'kl- a -ti
√poj-	'poj-e-m	'p- e -l-a	'p- e -t	'p- e -ti
√boj-	bo'j-i-m	'b- a -l-a		'b- a -ti
√zanj-	'zanj-e-m	'z- e -l-a	'z- e -t	'z- e -ti
√koln-	'kown-e-m	'kl- e -l-a	'kl- e -t	'kl- e -ti
√ber-	'ber-e-m	'br- a -l-a	'br- a -n	'bra- a -ti

Table 3.15: Root allomorphy in Slovenian (adapted from Božič, 2016, p. 3). In non-tensed forms—the infinitive and the two types of participle—some roots have one or more of their segments deleted. The root glosses are: √kolij- ‘slaughter’, √poj- ‘sing’, √boj- ‘fear’, √zanj- ‘reap’, √koln- ‘swear’, and √ber- ‘read, select’

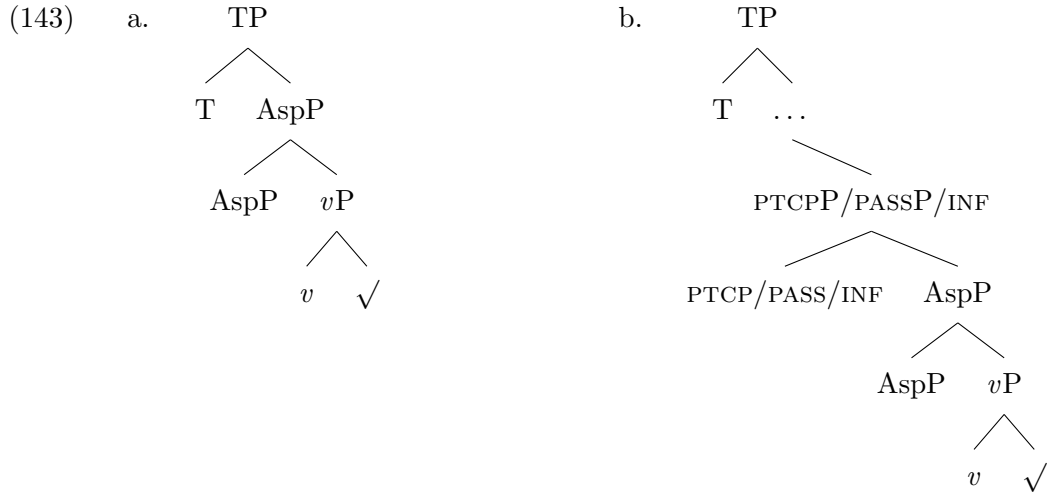
The data in Tab. 3.15 cannot be accounted for in terms of phonology. In Slovenian, there is no synchronic phonological process of deletion that can possibly explain the alternation seen in Tab. 3.15. For example, strings of sonorants ([l], [n]) and glide ([j]) are permitted: ['sanj-a-m] ‘dream.1.PL.PRS’ ~ ['sanj- a-l-a] ‘dream.PTCP.F.SG (Božič, 2016, p. 4). As Božič (2016, p. 4) observes: “If anything, the cross-paradigmatic retention of such segments is much more common than their deletion.” Thus, the data in Tab. 3.15 show a genuine pattern of contextual root allomorphy.

Because root-forms with deleted segments occur “in a subpart of the non-tensed verbal complex”, thus forming a natural class, Božič (2016, p. 4) takes them to be the contextual allomorphs.⁸³ For instance, the Vocabulary Items for the root √zanj- in Tab. 3.15 are the following:

$$(142) \quad \begin{aligned} \sqrt{\text{REAP}} &\Leftrightarrow \text{z}/_ \text{PTCP}^0/\text{INF}^0/\text{PASS}^0 \\ \sqrt{\text{REAP}} &\Leftrightarrow \text{zanj} \end{aligned}$$

As for the structure of the forms in Tab. 3.15, Božič (2016, [p. 2) proposes the following:

⁸³By contrast, root-forms with non-deleted segments “occur in a variety of constructions: simple verbs, active participles, and also in nouns” (Božič, 2016, p. 4).



The comparison between Božič’s proposed structures in (143) and Marvin’s proposed structures in (120-a) and (127-a) above highlights a crucial difference. Marvin’s proposed structures lack the aspect node. By contrast, Božič’s proposed structures contain the aspect node but lack the theme vowel node.⁸⁴ Thus, Božič takes a *Radical Decomposition* stance on theme vowels.⁸⁵ ⁸⁶ In other words, theme vowels are not taken to be ornamental morphemes, but rather elements of a syntactic representation. As Božič (2016, p. 3) writes: “since theme vowels in Slovenian are in complementary distribution with other aspectual suffixes, we treat them as spell-outs of Asp⁰.” The correlation between theme vowels and aspect in Slovenian was already observed by Marvin. Indeed, Marvin (2003, Ch.4 note 23) points out the existence of “aspectual pairs”, which she defines as “pairs consisting of a perfective and an imperfective verb [...] that do not differ in lexical semantics”. For example, [pik-a-ti] ‘stab.INF.IMP’ ~ [piŋ-i-ti] ‘stab.INF.PRF’, with the regular palatalization of root-final [k] before [i] (see Božič, 2015, p. 126).⁸⁷

⁸⁴As for the PTCP⁰/INF⁰/PASS⁰ heads in (143-b), Božič (2016, p. 3) “speculates” that they might be the same head with just “different featural compositions”, given that their exponents are in complementary distribution.

⁸⁵See Sec. 1.2.

⁸⁶Simonovič and Mišmaš briefly discuss but dismiss the possibility of taking a Radical Decomposition stance in their account. As they write: “While our account is in principle compatible with such approaches, we are not making this assumption because [...] the morpheme under consideration seems attested in other categorial contexts as well.” (Simonovič and Mišmaš, 2022, note 13) See also note 75.

⁸⁷The claim that theme vowels are exponents of Asp⁰ is based on the distribution of

The central idea of Embick’s theory is that “a node can be sensitive to another node for the purposes of allomorphy only when the two nodes are linearly adjacent to one another.” (Embick, 2010, p. 21) Merhant (2015, p. 273) summarizes this idea in his *Node Adjacency Hypothesis*:

- (144) Node Adjacency Hypothesis
 The appearance of a particular outward-sensitive allomorph μ can be conditioned only by morphosyntactic features of an element that is linearly adjacent to μ .

In the Slovenian pattern of Tab. 3.15, the PTCP/INF/PASS head is the trigger of the allomorphy while the root is the target. Given the structure of a non-tensed form in (143-b) and the Vocabulary Items in (142), we find that the Asp node always intervenes between the trigger and the target:⁸⁸⁸⁹

- (145) Non-local Allomorphy in Slovenian
- | | | | | | | |
|----|---|-------|---|-------------------------|---|--|
| √ | ⊗ | v^0 | ⊗ | Asp ⁰ | ⊗ | <u>PTCP⁰/INF⁰/PASS⁰</u> |
| 3- | ⊗ | ∅ | ⊗ | <i>e</i> | ⊗ | └ |

The pattern in Tab. 3.15 is thus a case of long-distance, outward-sensitive allomorphy. More specifically, in this pattern the exponent of the root is sensitive to morphosyntactic features that are not linearly adjacent to the root node. However, such cases of allomorphy pose a serious problem for Embick’s local theory, as they are deemed to be impossible.

Merhant (2015) proposes to solve this problem by loosening the locality conditions on contextual allomorphy. More specifically, building on the notion of “span” developed by Svenonius (2012), he proposes to replace the Node Adjacency Hypothesis with the Span Adjacency Hypothesis:

theme vowels in Novo Mesto Slovenian, a non-standard variety of Slovenian. Božič (2015, pp. 123–128) shows that in this variety theme vowels never co-occur with aspectual markers such as semelfactive or secondary imperfective suffixes, thus being in complementary distribution with such markers. Nevertheless, as Simonovič and Mišmaš (2022, note 1) point out, “Novo Mesto Slovenian is in many respects quite different from Standard Slovenian.” Although the pattern Božič (2016) is concerned with is from Standard Slovenian, he nonetheless does not provide any evidence to show that his claim about Novo Mesto Slovenian can be carried over to Standard Slovenian.

⁸⁸In Tab. 3.15, theme vowels, now reanalyzed as exponents of the Asp node, are boxed.

⁸⁹In example (145), we use the same notational conventions we used for Catalan; see note 9. We only add the symbol ‘⊗’ to indicate linear adjacency or, as Embick (2007, 2010) calls it, *concatenation*. We, however, set aside the issue of the timing of linearization, that is, the issue of when and how a syntactic structure gets linearized. For some proposals regarding this issue, see Embick (2007) Embick (2010, § 2.1.3), and Embick and Noyer (2001).

- (146) Span-Adjacency Hypothesis (p. 294 Merhant, 2015, emphasis in the original)
 Allomorphy is conditioned only by an adjacent *span*.

A span is defined by Svenonius (2012, p. 1) as “a complement sequence of heads, normally in a single extended projection”. A single head is “a trivial span.” (Svenonius, 2012, p. 2) Additionally, in the version of DM put forward by Svenonius (2012), spans are the targets of Vocabulary Insertion. Thus, given that spans are the targets of Vocabulary Insertion, and that adjacent spans can condition allomorphy, the non-local pattern of Tab. 3.15 can be said to be local:

- (147) Allomorphy in Slovenian is local: the Spans Adjacency Hypothesis
 $\sqrt{\text{REAP}} \Leftrightarrow \exists / - \langle v^0, \text{Asp}^0, \text{PTCP}^0 / \text{INF}^0 / \text{PASS}^0 \rangle$
 $\sqrt{\text{REAP}} \Leftrightarrow \exists \text{anj}$

More specifically, the Span Adjacency Hypothesis makes the pattern of allomorphy in Tab. 3.15 look less non-local. In fact, as Merhant (2015, p. 294) notes, the Span Adjacency Hypothesis “lets in a restricted amount of nonadjacency”. In particular, it “permits nonadjacent heads [...] to participate in the conditioning of an allomorph, but requires that such nonadjacent heads [...] form a span with heads [...] up to and including the head that is adjacent to the conditioned form.” (Merhant, 2015, p. 294) The Slovenian pattern meet this requirement. Although the PTCP/INF/PASS head is not adjacent to the root node, it nonetheless belongs to the same span as *v*, which is the head that is adjacent to the root node.

Nevertheless, according to Božič (2016, p. 7), Merchant’s solution is flawed. In particular, the amount of nonadjacency the Span Adjacency Hypothesis permits, is not as restricted as Merhant (2015, p. 294) claims.

To make his point, Božič (2016, p. 7) constructs the paradigm of the *l*-participle for a toy-language, Slovenian’, and compares it to the *l*-participle paradigm of Slovenian (see (148-b) and (148-a), respectively).

- (148) a. Participial Paradigm in Slovenian (Božič, 2016, p. 7)

	SG	DU	PL
M	$\sqrt{\text{jok-}} \boxed{\text{a}} \text{-l-}\emptyset$	$\sqrt{\text{jok-}} \boxed{\text{a}} \text{-l-a}$	$\sqrt{\text{jok-}} \boxed{\text{a}} \text{-l-i}$
N	$\sqrt{\text{jok-}} \boxed{\text{a}} \text{-l-o}$	$\sqrt{\text{jok-}} \boxed{\text{a}} \text{-l-i}$	$\sqrt{\text{jok-}} \boxed{\text{a}} \text{-l-a}$
F	$\sqrt{\text{jok-}} \boxed{\text{a}} \text{-l-a}$	$\sqrt{\text{jok-}} \boxed{\text{a}} \text{-l-i}$	$\sqrt{\text{jok-}} \boxed{\text{a}} \text{-l-e}$

- b. Participial Paradigm in Slovenian’

	SG	DU	PL
M	√jok- [a]-l-∅	√jok- [i]-l-a	√jok- [o]-l-i
N	√jok- [e]-l-o	√jok- [ɛ]-l-i	√jok- [u]-l-a
F	√jok- [i]-l-a	√jok- [a]-l-i	√jok- [ɔ]-l-e

In Slovenian, theme vowels—now reanalyzed as exponents of the aspect node—show “*stable exponence*” (p. 7 Božič, 2016, emphasis in the original). For example, the theme vowel of the root √jok- is always /a/. By contrast, in Slovenian’ theme vowels show a pattern of allomorphy that is conditioned by the features on the AGR node.

The pattern of allomorphy of Slovenian’ is not attested, whereas “the construction of ‘stable’ paradigms is commonly observed cross-linguistically.” (Božič, 2016, p. 7) The problem with the Span Adjacency Hypothesis is that it can account for both the attested pattern of allomorphy in Slovenian, and a pattern of allomorphy “potentially yielding a different allomorph for every possible ϕ -feature combination” Božič (2016, p. 7), such as the one in Slovenian’. For example, possible allomorphs for the theme vowel/Asp node of Slovenian’ are the following:

- (149) Vocabulary Items for Asp in Slovenian’: the singular
 Asp \Leftrightarrow a /- \langle PTCP, AGR[M.SG] \rangle
 Asp \Leftrightarrow e /- \langle PTCP, AGR[N.SG] \rangle
 Asp \Leftrightarrow i /- \langle PTCP, AGR[F.SG] \rangle

In other words, AGR can condition the realization of the Asp node because it belongs to the same span as PTCP, which is the head that is adjacent to the Asp node.

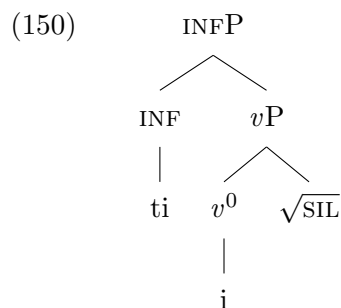
Thus, the Span Adjacency Hypothesis overgenerates. Additionally, as Božič (p. 7 2016, emphasis in the original) points out, under the Span Adjacency Hypothesis “the stable exponence in Slovenian can only be interpreted as a *lexical accident*”.

By contrast, under the Node Adjacency Hypothesis patterns of allomorphy such as the one in Slovenian’ are impossible. Consequently, the Node Adjacency Hypothesis can account for the cross-linguistic construction of stable paradigms, although it cannot account for the pattern of allomorphy in Tab 3.15.⁹⁰

⁹⁰As Božič (2016, p. 8) notes, “some sort of non-locality seems to be needed” even under the Node Adjacency Hypothesis in order to account for cases of long-distance allomorphy such as the one observed in Slovenian. Such patterns crucially involve the

Recently, Simonovič and Mišmaš (2023) have engaged with the problematic pattern highlighted by Božič (2016), and proposed a solution. Based on the analysis of a larger set of verbs than Božič (2016), they claim that the pattern in Tab. 3.15 above is a case of phonologically conditioned allomorph selection rather than of root suppletion (Simonovič and Mišmaš, 2023, p. 2). In other words, instead of assuming distinct Vocabulary Items for the root node (as in (142) above), “a single Vocabulary Item with a complex phonological representation gets inserted and then phonological constraints select the final shape of the exponent” (Simonovič and Mišmaš, 2023, p. 2). Thus, in their account DM works in tandem with Optimality Theory (henceforth OT). More importantly, Simonovič and Mišmaš (2023, p. 33) claim that the root allomorphy pattern in Tab. 3.15 is actually local.

Simonovič and Mišmaš’s account rests on two key points. First, theme vowels are analyzed as “the spell out of the verbalizing head v^0 ” (Simonovič and Mišmaš, 2023, p. 6), so the structure of an infinitive form such as *sil-i-ti* ‘to force’ is as follows:

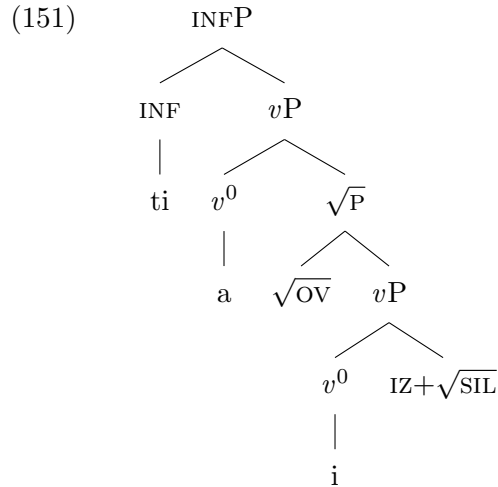


Thus, Simonovič and Mišmaš depart from Božič’s analysis of theme vowels as exponents of the Asp node while still taking a Radical Decomposition stance. To make their point, they observe that theme vowels are not necessarily in complementary distribution with aspectual markers such as secondary imperfective suffixes. These markers can in fact “be reanalyzed as combinations of suffixes and theme vowels.” (Simonovič and Mišmaš, 2023,

root node as the target of allomorphy. Božič (2016, p. 8) points to a generalization according to which “Roots may be subject to laxer locality restrictions on exponence than affixes in cases of outward allomorphy.” As Božič (2016, p. 8) acknowledges, however, this generalization only expresses a tendency, and “must be treated as tentative without more extensive typological investigation.” We do not discuss this issue further. For an overview of the phenomenon of contextual allomorphy and attendant issues, see Bonet and Harbour (2012). See also Božič (2019), where a revised mechanism of Vocabulary Insertion is proposed, which promises to constrain long-distance allomorphy while avoiding the shortcomings of the Span Adjacency Hypothesis.

p. 5)

For example, the secondary imperfective suffix *-ova-* can be reanalyzed as the root \sqrt{ov} plus the theme *-a-*. Thus, the structure of the secondary imperfective form of the verb *sil-i-ti* is the following:⁹¹⁹²



The second key point relates to stress. There are two possible stress patterns in the Slovenian verb: “stress either falls on the theme vowel or on the syllable preceding it.” (Simonovič and Mišmaš, 2023, p. 8) Simonovič and Mišmaš (2022, pp. 7-8) build on Marvin’s derivation-by-phase approach to stress assignment, and assume with her that Slovenian is a language with lexical stress. Yet, contrary to Marvin, they do not assume all theme vowels to be accented. Instead, they proposed that “theme vowels are underlyingly either stressed or stressless.” (Simonovič and Mišmaš, 2023, p. 8) Thus, the two stress patterns found in the Slovenian verb arise “a consequence of a selective incorporation of the theme vowel in the spellout of the *vP*.” (Simonovič and Mišmaš, 2023, p. 8) More specifically, underlyingly stressed theme vowels get incorporated into the verbal phase, whereas underlyingly unstressed theme vowels get spelled-out at the next phase. Thus, verbal stress is controlled by the theme vowel, and “Every *vP* is spelled out with

⁹¹The underlying representation of this form is /iz+sil+i+ov+a+ti/. Due to productive phonological rules of Slovenian, it surfaces as [issiljeˈvati] (see Simonovič and Mišmaš, 2023, p. 7).

⁹²Simonovič and Mišmaš also note that the relation between theme vowels and (im)perfectivity is not strict. As they write: “While it does hold that the majority of simplex verbs in Slovenian are imperfective [...] Prefixless perfective verbs belonging to the same theme-vowel classes also exist” (Simonovič and Mišmaš, 2023, p. 5).

final stress” (Simonovič and Mišmaš, 2023, p. 8).

As said above, Simonovič and Mišmaš (2023) adopt an OT architecture of the phonological component. The constraints that are relevant for their account of stress assignment are the following:

- (152) OT constraints (Simonovič and Mišmaš, 2023, § 2.2 and p. 26)
- a. CULMINATIVITY
Assign a violation mark for every candidate that does not have exactly one stress mark.
 - b. RIGHTMOST
Assign a violation mark for every stress mark that is not at the right edge of the prosodic word.
 - c. *INCORPORATE
Assign a violation mark to each candidate that includes the phase head into the spellout.
 - d. FAITHSTRESS
Assign a violation mark for every candidate that has different stress specifications in input segments and the corresponding output segments.
 - e. PREFERENCE
If a morpheme’s underlying representation is the ordered pair (a, b), assign a violation mark for every candidate in which b is the exponent of that morpheme.

The CULMINATIVITY constraint implements a minimality requirement on the spellout of the *v*P. This requirement follows from an observation on the possible shapes of roots in the regular verbs of Slovenian. More specifically, verbs belonging to theme-vowel classes with a vocalic exponent of the theme vowel permit both syllabic and consonantal roots (see (153)). In contrast, verbs belonging to theme-vowel classes with a null exponent of the theme vowel only permit syllabic roots (see (154)).

- (153) a. 'del-a-ti, 'del-a-mo (a/a)
√-TH-INF, √-TH-PRS.1PL
'to work', 'we work'
- b. 'sp-a-ti, 'sp-i-mo (a/i)
√-TH-INF, √-TH-PRS.1PL
'to sleep', 'we sleep'
- (154) a. 'pas-∅-ti, 'pas-e-mo (∅-e)
√-TH-INF, √-TH-PRS.1PL

- ‘to pasture’, ‘we pasture’
 b. *s-∅-ti, s-e-mo (∅-e)
 √-TH-INF, √-TH-PRS.1PL
 unattested

The impossibility of cases such as the one in (154-b) is what motivates the minimality requirement implemented by the CULMINATIVITY constraint. In other words, such cases show that “there has to be a stress foot projected and for this, a vowel is necessary” (Simonovič and Mišmaš, 2023, p. 9).

The RIGHTMOST constraint implements the fact that every *v*P in Slovenian is spelled out with final stress.

The constraint *INCORPORATE implements the possible incorporation of the theme vowel into the spellout of *v*P. In other words, it implements the idea that in some cases the phasal head v^0 , which under the current analysis is realized by a theme vowel, will be part of its own spellout domain along with the root. Yet, as Simonovič and Mišmaš (2023, p. 10) highlight, “the incorporation of the head into the spellout domain is available but dispreferred”. This dispreference stems from the fact that in the normal case, which results in default final stress assignment, only the complement—the root—is spelled-out, the head— v^0 —getting instead spelled-out in the subsequent phase (Simonovič and Mišmaš, 2023, p. 10). It also explains why *INCORPORATE is ranked lower than RIGHTMOST.

The constraint FAITHSTRESS works in tandem with the constraint *INCORPORATE. More specifically, “*INCORPORATE gets violated when this violation helps satisfy FAITHSTRESS” (Simonovič and Mišmaš, 2023, p. 10). In other words, the incorporation of an underlyingly stressed theme vowel applies so as to avoid assigning epenthetic stress. Consequently, *INCORPORATE is ranked lower than FAITHSTRESS.

Finally, PREFERENCE implements the claim that the pattern in Tab. 3.15 above involves phonologically conditioned allomorph selection rather than root suppletion. As Simonovič and Mišmaš (2023, p. 26) write: “We implement the underlying representations of roots with unpredictable root allomorphy as ordered pairs (a,b), where a and b are the elsewhere and the context-dependent allomorph, respectively”. Thus, instead of the Vocabulary Items in (142) above, Simonovič and Mišmaš (2023, p. 2) propose the following Vocabulary Item for the allomorphic root $\sqrt{\text{REAP}}$:

$$(155) \quad \sqrt{\text{REAP}} \Leftrightarrow /3 \sim 3 \text{anj}/$$

With these assumptions in place, the pattern of allomorphy in Tab. 3.15 can be accounted for in local terms. As an example, consider the pattern

3 ~ 3anj + é	CULMINATIVITY	R-MOST	FAITHSTRESS	*INCORPORATE	PREFERENCE
3	*!				
3e	*!		*	*	
'3e				*	
3anj	*!				*
'3anj			*!		*
3anje	*!		*	*	*
'3anje		*!	**	*	*
3a 'nje				*	*!

Table 3.16: Complex UR + stressed theme: '3-e-ti 'to reap'

'3-e-ti ~ '3anj-e-mo 'to reap' ~ 'we reap'. Given the complex underlying representation (henceforth UR) in (155) and the constraint ranking in (156), the “the allomorphy is derived by the ranking” (Simonovič and Mišmaš, 2023, p. 28); see Tab. 3.16 and Tab.3.17.⁹³

(156) Constraint ranking
 CULMINATIVITY ≫ R-MOST ≫ FAITHSTRESS ≫ *INCORPORATE ≫ PREFERENCE

As Tab. 3.16 and Tab. 3.17 show, only stressed theme vowels can condition root allomorphy, because only stressed theme vowels are spelled-out in the same phase as the root, though in violation of the *INCORPORATE constraint. Root allomorphy in Slovenian is thus triggered locally, as it is “restricted to the domain of the phonological cycle in which the root is spelled out.” (Simonovič and Mišmaš, 2023, p. 33)

As Simonovič and Mišmaš (2023, p. 29) point out, the vast majority of the verbs with unpredictable root allomorphy in Slovenian can be accounted for in this fashion.⁹⁴

⁹³In the Tables, the winning candidate is highlighted in light-gray.

⁹⁴There are a few cases for which the phonological conditioning alone is not enough. The pattern 'b-a-ti ~ bo'j-i-mo 'to fear' ~ 'we fear' in Tab. 3.15 is a case in point. For such cases, Simonovič and Mišmaš (2023, p. 26) propose an additional, root-specific constraint that is ranked above CULMINATIVITY. In the case at hand, given the underlying representation (boj, b), the root-specific constraint *BOJ+A assigns a violation mark for every candidate in which the preferred allomorph is adjacent to the theme vowel /a/. Nevertheless, as Simonovič and Mišmaš (2023, p. 29) note, out of the 16 types of allomorphic roots they

$\mathfrak{z} \sim \mathfrak{z}anj + e$	CULMINATIVITY	R-MOST	FAITHSTRESS	*INCORPORATE	PREFERENCE
\mathfrak{z}	*!				
$\mathfrak{z}e$	*!			*	
' $\mathfrak{z}e$			*	*!	
$\mathfrak{z}anj$	*!				*
' $\mathfrak{z}anj$			*		*
$\mathfrak{z}anje$	*!			*	*
' $\mathfrak{z}anje$		*!	*	*	*
$\mathfrak{z}a \ 'nje$			*	*!	*

Table 3.17: Complex UR + unstressed theme: ' $\mathfrak{z}anj$ -e-mo 'we reap'

Moreover, their account, which is based on complex URs, optional incorporation of the theme vowel, and constraint ranking, makes two interesting predictions. First, it predicts that the pattern of allomorphy exemplified by ' \mathfrak{z} -e-ti \sim ' $\mathfrak{z}anj$ -e-mo is possible only if the preferred allomorph is the consonantal one. A complex UR with a syllabic preferred allomorph would give rise to a regular verb without root allomorphy. For example, the unattested complex UR ($\mathfrak{z}anj$, \mathfrak{z}) would give rise to the following regular pattern:

As Simonovič and Mišmaš (2023, p. 29) observe, in Tab. 3.18 and Tab. 3.19 “the dispreferred allomorph never surfaces”, so “it can be excluded from the UR without any consequences.”

Second, their approach predicts that complex URs consisting of allomorphs of a single shape can only give rise to regular verbs. To test this prediction, Simonovič and Mišmaš (2023, pp. 30–31) consider an unattested complex UR consisting of two syllabic allomorphs ($\mathfrak{z}anj$, bum) (in Tab. 3.20 and Tab. 3.21), and an unattested complex UR consisting of two consonantal allomorphs (\mathfrak{z} , b) (in Tab. 3.22 and Tab 3.23). In both cases, the dispreferred allomorph never surfaces, and can therefore be excluded from the UR.

One key observation of Simonovič and Mišmaš is that “root allomorphy in Slovenian only occurs in a very limited number of theme-vowel classes”

identify, “13 can be analyzed as ' \mathfrak{z} -e-ti \sim ' $\mathfrak{z}anj$ -e-mo without any further assumptions, two [...] require some further assumptions regarding the internal structure of the root, and only the type illustrated by ' b -a-ti \sim bo' j -i-mo 'to fear' \sim 'we fear' definitely requires a root-specific constraint.”

ʒanj ~ ʒ+ é	CULMINATIVITY	R-MOST	FAITHSTRESS	*INCORPORATE	PREFERENCE
ʒ	*!				*
ʒe	*!		*	*	*
'ʒe				*	*!
ʒanj	*!				
'ʒanj			*!		
ʒanje	*!		*	*	
'ʒanje		*!	**	*	
ʒa 'nje				*	

Table 3.18: Unattested complex UR + stressed theme

ʒanj ~ ʒ+ e	CULMINATIVITY	R-MOST	FAITHSTRESS	*INCORPORATE	PREFERENCE
ʒ	*!				*
ʒe	*!			*	*
'ʒe			*	*!	*
ʒanj	*!				
'ʒanj			*		
ʒanje	*!			*	
'ʒanje		*!	*	*	
ʒa 'nje			*	*!	

Table 3.19: Unattested complex UR + unstressed theme

zanj ~ bum + é	CULMINATIVITY	R-MOST	FAITHSTRESS	*INCORPORATE	PREFERENCE
zanj	*!				
'zanj			*!		
zanje	*!		*	*	
'zanje		*!	**	*	
za 'nje				*	
bum	*!				*
'bum			*!		*
bume	*!		*	*	*
'bume		*!	**	*	*
bu 'me				*	*!

Table 3.20: Unattested complex UR + stressed theme

zanj ~ bum + e	CULMINATIVITY	R-MOST	FAITHSTRESS	*INCORPORATE	PREFERENCE
zanj	*!				
'zanj			*		
zanje	*!			*	
'zanje		*!	*	*	
za 'nje			*	*!	
bum	*!				*
'bum			*		*!
bume	*!			*	*
'bume		*!	*	*	*
bu 'me			*	*!	*

Table 3.21: Unattested complex UR + unstressed theme

$\exists \sim b + \acute{e}$	CULMINATIVITY	R-MOST	FAITHSTRESS	*INCORPORATE	PREFERENCE
\exists	*!				
$\exists e$	*!		*	*	
$\acute{\exists}e$				*	
b	*!				*
be	*!		*	*	*
'be				*	*!

Table 3.22: Unattested complex UR + stressed theme

$\exists \sim b + e$	CULMINATIVITY	R-MOST	FAITHSTRESS	*INCORPORATE	PREFERENCE
\exists	*!				
$\exists e$	*!			*	
$\acute{\exists}e$			*	*	
b	*!				*
be	*!			*	*
'be			*	*	*!

Table 3.23: Unattested complex UR + unstressed theme

(Simonovič and Mišmaš, 2023, p. 1). In particular, “an overwhelming majority of verbs with root allomorphy is ambiguous” (Simonovič and Mišmaš, 2023, p. 1) because it is amenable to be parsed as belonging to different theme-vowel classes.⁹⁵ For example, the verb 'zeti ~ 'zanjemo 'to reap' ~ 'we reap' can be parsed as follows:

- (157) a. 'ze- \emptyset -ti, 'zanj-e-mo (\emptyset /e)
 $\sqrt{\text{-TH-INF}}$, $\sqrt{\text{-TH-PRS.1PL}}$
 'to reap', 'we reap'
 b. 'z-e-ti, 'zanj-e-mo (e/e)
 $\sqrt{\text{-TH-INF}}$, $\sqrt{\text{-TH-PRS.1PL}}$
 'to reap', 'we reap'

Simonovič and Mišmaš (2023, p. 15) call this issue “the issue of theme-vowel indeterminacy”. As they note, this issue underscores the importance of “establishing the correct parsing into roots and theme vowels” (Simonovič and Mišmaš, 2023, p. 17) to the correct analysis of root allomorphy. We return to the issue of theme-vowel indeterminacy in Sec. 4.3. For now, let us conclude this Section by pointing to four generalizations concerning the unattested patterns of root allomorphy in Slovenian proposed by Simonovič and Mišmaš:

- (158) Generalizations concerning unattested patterns of root allomorphy (Simonovič and Mišmaš, 2023, § 3.3)
- a. There is no verb with unpredictable root allomorphy belonging to the classes a/a, i/i, ni/ne, or e/i.⁹⁶
 - b. There is no verb with unpredictable root allomorphy taking the same exponent of the theme vowel in both finite and non-finite forms.
 - c. There is no verb with unpredictable root allomorphy taking

⁹⁵In Simonovič and Mišmaš’s sample, there are only three verbs with unpredictable root allomorphy that are amenable to a single parsing. These are: 'st-a-ti ~ sto'j-i-mo 'to stand', which belongs to the a/i class; 'b-a-ti ~ bo'j-i-mo 'to fear' ~ 'we fear', which belongs to the a/i class; and 'jes- \emptyset -ti ~ 'j-e-mo 'to eat', which belongs to the \emptyset /e class; see Simonovič and Mišmaš (2023, p. 20, Table 2).

⁹⁶It should be noted that these classes are somehow special. The classes a/a and i/i have been recognized as the default classes in Slovenian since Marvin (2003, p. 110). The ni/ne class correlates with syntactic/semantic effects. In particular, as Simonovič and Mišmaš (2023, p. 14) note, “The morpheme ni/ne arguably marks semelfactivity [...] and is potentially a complex item n-i/n-e.” The exceptionality of the e/i class with respect to the standard understanding of theme vowels is explored in Simonovič and Mišmaš (2022).

overt theme vowels and having root stress in both finite and non-finite forms.

- d. In the vast majority of cases, verbs with unpredictable root allomorphy have one syllabic allomorph and one consonantal allomorph.

As an example, consider again the verb 'z-e-ti ~ 'zanj-e-mo 'to reap' ~ 'we reap'. First, under the parsing proposed by Simonovič and Mišmaš (2023), this verb belongs to the e/e class. Second, it does not take the same exponent of the theme vowel in finite and non-finite forms. As Simonovič and Mišmaš (2023, p. 28) observe, the stress pattern 'z-e-ti ~ 'zanj-e-mo “indicates that the theme vowel of the non-finite forms is stressed, whereas the theme vowel of finite forms is unstressed.” Third, the stress pattern also shows that it has root stress only in non-finite forms, though it takes overt theme vowels in both finite and non-finite forms. Finally, it has a syllabic allomorph—zanj—and a consonantal allomorph—z.

3.5 Latin

Embick and Halle (2005, § 2) put forward the most influential account of Latin inflectional morphology couched in DM terms..⁹⁷ Because this account essentially relies on Oltra-Massuet’s strategy, this Section only provides a basic outline. Our goal here is to highlight the crucial role played by theme vowels in determining the context for allomorphy. To do so, we focus on the perfect given that “Perfect tenses [...] exhibit more allomorphy than the non-Perfect tenses.” (Embick and Halle, 2005, p. 71)

Traditionally, Latin verbs belong to one of four conjugations. We illustrate the relationship between theme vowels and conjugations in Tab. 3.24.⁹⁸

Conjugations III and III(i) differ in their theme vowel. Recently, Halle (2019) has argued that the theme vowel of Conjugation III has the feature structure in (159-a). The theme vowel of Conjugation III(i) has instead the feature structure in (159-b).⁹⁹

(159) a. i: [+back, -round, +high]

⁹⁷Recently, Calabrese (2021) has provided an in-depth morpho-phonological analysis of the Latin verbal system using a slightly revised version of DM.

⁹⁸We follow the tendency in the literature to exemplify Latin conjugations with 1PL forms. As Embick and Halle (2005, note 8) note, 1PL forms allow “to side-step a number of phonological issues”. In this Section, all the examples will be taken from 1PL forms.

⁹⁹Halle (2019, p. 4) thus takes the theme vowel of Conjugation III to be underlyingly /i/. We notate the theme vowel of Conjugation III as -i- following Embick (2010).

Conjugation	Example	Theme Vowel	Gloss
I	laud-ā-mus	-ā-	‘we praise’
II	mon-ē-mus	-ē-	‘we warn’
III	dūc-i-mus	-i-	‘we lead’
III(i)	cap-i-mus	-i-	‘we take’
IV	aud-ī-mus	-ī-	‘we hear’

Table 3.24: Conjugations and theme vowels (adapted from Embick, 2010, p. 55)

Conjugation	1SG	1PL	Gloss
I	laud-ō	laud-ā-mus	‘I/we praise’
II	monē-ō	mon-ē-mus	‘I/we worn’
III	dūc-ō	dūc-i-mus	‘I/we lead’
III(i)	cap-i-o	cap-i-mus	‘I/we take’
IV	aud-ī-ō	aud-ī-mus	‘I/we hear’

Table 3.25: 1SG ~ 1PL oppositions.

b. i: [-back, -round, +high]

Halle’s account is motivated by the different behaviour of these two theme vowels in front of vowels. For instance, contrast the 1PL forms in Tab 3.24 to the corresponding 1SG forms:

As Tab. 3.25 shows, the theme vowel of Conjugation III is deleted in the 1SG form. By contrast, the theme vowel of Conjugation III(i) appears in both 1SG and 1PL forms.¹⁰⁰ To account for this contrast, Halle (2019, p. 4) proposes the following deletion rule targeting the theme vowel of Conjugation III verbs:

(160) Delete [+back, -round] in ev. $_ + V$

Nevertheless, as Halle (2019, p. 5) notes, the theme vowel of Conjugation III “when non deleted [...] surfaces as /i/”. Consequently, he further proposes the fronting rule in (161). This fronting rule must be ordered after the deletion rule in (160).¹⁰¹

(161) [+back] → [-back] / $_[-round, +high]$

¹⁰⁰Also the theme vowel of Conjugation I gets deleted by a regular phonological rule.

¹⁰¹If the ordering between these two rules had been the opposite, then, Halle (2019, p. 5) observes, “There would have been no [+back, -round] vowels to be deleted”.

Given that “Membership in one of the conjugation classes is an arbitrary property of the Roots” (Embick and Halle, 2005, p. 71), each root in Latin must come equipped with a diacritic feature specifying its Conjugation class membership.¹⁰²

$$(162) \quad \sqrt{\text{LAUD}}_{[\text{I}]}, \sqrt{\text{MON}}_{[\text{II}]}, \sqrt{\text{DUC}}_{[\text{III}]}, \sqrt{\text{CAP}}_{[\text{III}(i)]}, \sqrt{\text{AUD}}_{[\text{IV}]}$$

Moreover, given that theme nodes are assumed to be sprouted in the morphology, they acquire their features through a concord process, much as in Catalan and Spanish. The relevant insertion rules are as follows:

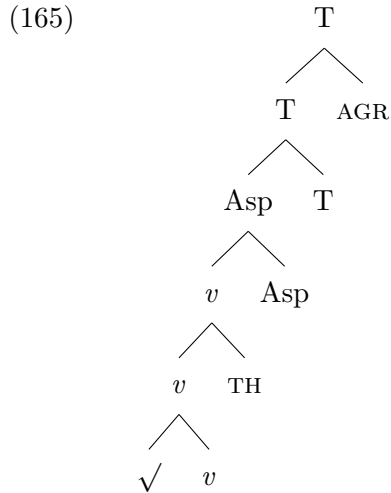
$$(163) \quad \text{TH} \rightarrow \text{TH}[\text{X}] / _ \text{ROOT}_{[x]}$$

- (164)
- a. $\text{TH}[\text{I}] \Leftrightarrow \text{-}\bar{\text{a}}\text{-}$
 - b. $\text{TH}[\text{II}] \Leftrightarrow \text{-}\bar{\text{e}}\text{-}$
 - c. $\text{TH}[\text{III}] \Leftrightarrow \text{-}\bar{\text{i}}\text{-}$
 - d. $\text{TH}[\text{III}(i)] \Leftrightarrow \text{-}\bar{\text{i}}\text{-}$
 - e. $\text{TH}[\text{IV}] \Leftrightarrow \text{-}\bar{\text{i}}\text{-}$

Finally, the basic structure of the Latin verb is the following (adapted from Embick and Halle, 2005, p. 72):¹⁰³

¹⁰²It should be noted that Embick and Halle (2005) as well as Embick (2010) still take an Early Insertion stance; see Sec. 2.2, note 8. Nonetheless, such a stance can be seamlessly translated into a Late Insertion stance by claiming that diacritic features are inserted by the Vocabulary Items realizing the root node; see also Sec. 3.2, note 5.

¹⁰³Calabrese (2021, p. 14) assumes a richer structure also comprising Voice and Mood nodes. As for the number of theme vowels, Calabrese (2021, p. 11) notes that “there can be a maximum of three TVs” in the Latin verbal complex. Consequently, he proposes that “in addition to the position after v^0 , a Thematic vowel is always present after a [+perfect] Asp⁰ and after the highest node that contains a [+F] feature in the verbal complex” (Calabrese, 2021, p. 11). We do not discuss Calabrese’s approach further. See the original article for more details.



Against this background, the derivations of the 1PL forms in Tab. 3.24 are as follows:

	√	<i>v</i>	TH	AGR	
(166) a.			[I]	[-PST, -SBJ]	[+PAR, +AUTH, +PL]
	laud	∅	ā	∅	mus
	√	<i>v</i>	TH	AGR	
b.			[II]	[-PST, -SBJ]	[+PAR, +AUTH, +PL]
	mon	∅	ē	∅	mus
	√	<i>v</i>	TH	AGR	
c.			[III]	[-PST, -SBJ]	[+PAR, +AUTH, +PL]
	duc	∅	ī	∅	mus
	√	<i>v</i>	TH	AGR	
d.			[III(i)]	[-PST, -SBJ]	[+PAR, +AUTH, +PL]
	cap	∅	i	∅	mus
	√	<i>v</i>	TH	AGR	
e.			[IV]	[-PST, -SBJ]	[+PAR, +AUTH, +PL]
	aud	∅	ī	∅	mus

Let us now turn to the perfect. Embick (2010, p. 131) provides a broad overview of the associations between perfect types and conjugation classes (see Tab. 3.26.)

The most telling aspect of Tab. 3.26 for our purposes is that Conjugations II, III, and III(i) are always athematic. Crucially, athematicity correlates with allomorphy. For instance, consider the following oppositions between

Conjugation	Verb	PRF	Gloss	TH	Exponent
I	laudāre	laud-ā-v-ī	‘praise’	Thematic	-vi-
I	crepāre	crep-v-ī	‘rattle’	Athematic	-vi-
I	iuvāre	iūv-ī	‘help’	Athematic	-ī
II	monēre	mon-v-ī	‘warn’	Athematic	-vi-
II	sedēre	sed-ī	‘sit’	Athematic	-ī
II	manēre	man-s-ī	‘remain’	Athematic	-si-
III	vomere	vom-v-ī	‘vomit’	Athematic	-vi-
III	vertere	vert-ī	‘turn’	Athematic	-ī
III	dūcere	dūc-s-ī	‘lead’	Athematic	-si-
III(i)	rapere	rap-v-ī	‘seize’	Athematic	-vi-
III(i)	capere	cēp-ī	‘take’	Athematic	-ī
III(i)	-spicere	spec-s-ī	‘peer’	Athematic	-si-
IV	audīre	aud-ī-v-ī	‘hear’	Thematic	-vi-
IV	aperīre	aper-v-ī	‘open’	Athematic	-vi-
IV	venīre	vēn-ī	‘come’	Athematic	-ī
IV	farcīre	far-s-ī	‘stuff’	Athematic	-si-

Table 3.26: Perfect type by Conjugation (adapted from Embick, 2010, p. 131)

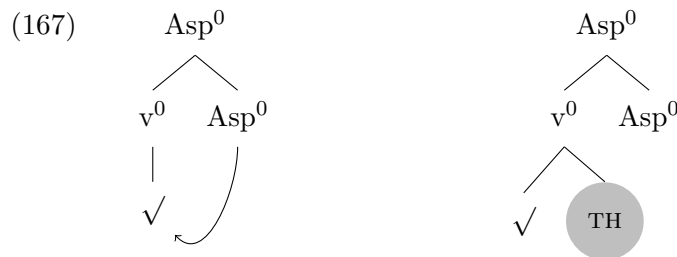
imperfective and perfective forms:¹⁰⁴

Conjugation	1PL.IMPV	1PL.PRF	Gloss
III	legimus	lēgimus	‘we read.PRS/read.PRF’
III(i)	capimus	cēpimus	‘we take/took’
III	rumpimus	rūpimus	‘we break/ broke’
III	cernimus	crēvimus	‘we distinguish/distinguished’
III	fallimus	fefellimus	‘we fall/fell’

Table 3.27: Imperfective ~ perfective oppositions (adapted from Calabrese, 2021, pp. 19–20)

In the perfective form, the root undergoes various morpho-phonological alternations vis-à-vis the imperfective form. Such alternations involves lengthening (*l[e]g-* versus *l[e:]g-*), ablaut (*cap-* versus *cēp-*), nasal deletion (*rump-* versus *rūp-*), metathesis (*cer-* versus *crē-*), and reduplication (*fal-* versus *fefel-*). Crucially, none of these alternations is observed in thematic perfective forms.¹⁰⁵ Moreover, athematic perfect forms take a different exponent of the Asp node vis-à-vis thematic forms. More specifically, thematic forms always take *-vi-*,¹⁰⁶ whereas athematic forms may take *-vi-*, *-s-* or \emptyset .

These patterns of allomorphy can be accounted for by assuming a local theory of allomorphy, such as the one proposed by Embick (2010). As Calabrese (2021, p. 21) highlights: “Root-conditioned [+perfect] Asp⁰ exponents, as well as aspect-conditioned root morpho-phonological changes [...] can only appear in athematic contexts insofar as morpheme-to-morpheme interactions can occur only under adjacency.” In order for the Asp node to be adjacent to the root, the theme vowel must be absent (see (167)).



¹⁰⁴The vowel *-i-* that appears after the root in the forms of Tab. 3.27 is understood as the realization of the theme node sprouted on Asp⁰; see Embick and Halle (2005, p. 74) and Calabrese (2015, p. 19).

¹⁰⁵For a phonological account these alternations, see Calabrese (2021, pp. 19–20).

¹⁰⁶This element can be decomposed so that *-v-* is the real exponent of the Asp head, while *-i-* realizes the theme vowel associated to it. See also note 104.

In other words, the theme vowel intervenes between the Asp node and the root, thus disrupting the locality conditions required for allomorphy to arise.

Consequently, there must be an Impoverishment rule deleting the theme vowel on *v* in the perfect (Embick and Halle, 2005, p. 74):¹⁰⁷

- (168) a. TH \rightarrow \emptyset / LIST_v_Asp[PRF]
 b. LIST = {[II], [III], [III(i)], $\sqrt{\text{CREP}}$, $\sqrt{\text{CUB}}$, $\sqrt{\text{SEC}}$, ...}

As Embick and Halle (2005, p. 74) point out, “the list includes both Roots and diacritic conjugation features [...] since the conjugation II, III, and III(i) do not form a natural class”. The roots included in the list correspond to the verbs of Conjugation I and IV that are exceptionally athematic in the perfect.

Finally, the Vocabulary Items spelling-out the Asp node in the athematic forms of the perfect must be sensitive to root information (Embick and Halle, 2005, p. 75):¹⁰⁸

- (169) a. Asp[PRF] \Leftrightarrow -s- in env. LIST 1 _ T
 LIST 1 = { $\sqrt{\text{AUG}}$, $\sqrt{\text{FULG}}$, $\sqrt{\text{DIC}}$, $\sqrt{\text{SCRIB}}$...}
 b. Asp[PRF] \Leftrightarrow - \emptyset in env. LIST 2 _ T
 LIST 2 = { $\sqrt{\text{PRAND}}$, $\sqrt{\text{STRID}}$, $\sqrt{\text{TOND}}$, $\sqrt{\text{MORD}}$...}
 c. -v- elsewhere

¹⁰⁷Calabrese (2021, p. 18) proposes instead a Pruning operation. Halle (2019, § 2) proposes an account based on delinking.

¹⁰⁸For a different set of Vocabulary Items spelling-out the Asp node, see Embick (2010, p. 132) and Calabrese (2021, p. 23).

Chapter 4

Discussion; or the Dark Side

4.1 Introduction

Thus far, we have discussed the strengths of the DM approach to verbal theme vowels. In particular, Oltra-Massuet's strategy paved the way for all subsequent work analyzing verbal theme vowels under the assumptions of DM. This strategy has proven helpful in accounting for cases of syncretism, stress placement, and locality conditions on allomorphy.¹

Nevertheless, this strategy has its shortcomings. Some of these shortcomings were pointed out in Ch. 3, especially in footnotes.² This Chapter discusses the shortcomings of the DM approach to verbal theme vowels in more detail. In particular, we discuss the criticisms that have been levelled against Oltra-Massuet's strategy in Sec. 4.2. Sec. 4.3 discusses a more general issue arising from the notion of theme vowel as understood within DM.

4.2 Oltra-Massuet's strategy under attack

The main points of Oltra-Massuet's strategy can be summarized as follows:

- (1) Oltra-Massuet strategy's key points

¹Although Božič (2016) and Simonovič and Mišmaš (2023) take a Radical Decomposition stance instead of Oltra-Massuet's Ornamental stance, they nonetheless assume a DM grammatical architecture.

²See notes 20, 45, 47, 49, 51, 52, 70. See also the discussion on the Catalan perfect in Sec. 3.2 and note 27 in Ch. 2.

- a. Theme vowels are dissociated morphemes sprouted in the morphology to meet language-specific well-formedness requirements.
- b. Conjugation classes are decomposed into bundles of abstract morphological features— $[\pm\alpha, \pm\beta, \pm\gamma]$.
- c. Markedness considerations play a crucial role in determining the realization of theme vowels.

Each point in (1) can be subject to criticisms. First, Kayne and Collins (2023) have recently criticized DM due to its overreliance on post-syntactic operations.³ According to Kayne and Collins (2023, p. 16), the main problem with post-syntactic operations is that “even though they have syntactic structures as both input and output, they are not syntactic operations.”⁴ For example, the node-sprouting rule inserting theme vowels (repeated in (2)) is “redundant with syntactic operations of UG.” (Kayne and Collins, 2023, p. 12)⁵ As to Impoverishment, they write: “adding impoverishment rules introduces a new kind of unconstrained second syntactic component, operating outside of the core syntactic system.” (Kayne and Collins, 2023, p. 20)^{6 7}

³As the title of their article suggests, Kayne and Collins (2023) attempt to formulate “a theory of morphology as syntax” based on the assumption that “you cannot separate morphology and syntax in any natural way.” (Kayne and Collins, 2023, p. 1) More specifically, they claim that “Morphological generalizations are accounted for in terms of syntactic operations and principles.” (Kayne and Collins, 2023, p. 1) Thus, in the terminology introduced in Sec. 1.2, they adopt a Radical Decomposition stance. Nonetheless, their critique of DM is only part of their broader critique of Late Insertion. Because the grammatical model put forward by Collins and Kayne has not gain wide currency to date, we do not discuss it further. See the original article for more details.

⁴In the terminology of minimalist syntax, post-syntactic operations violate the No Tampering Condition (see Kayne and Collins, 2023, p. 16).

⁵Unfortunately, Kayne and Collins (2023, p. 12) proposed solution falls short of providing a convincing alternative. In their account, rule (2) is replaced with the rule: Merge(TV, X^0). This rule combines a lexical item TV with a syntactic head X^0 . In their model, a lexical item is defined as a set of formal and phonological features—LI: {FF, PHON} (Kayne and Collins, 2023, p. 2). The problem with the proposed rule is that Collins and Kayne do not identify the formal features of the lexical item TV. In other words, it is not clear what TV corresponds to in the syntax.

⁶Recall that Oltra-Massuet relied heavily on Impoverishment rules to account for the problematic forms of the present tense in Catalan; see Sec. 3.2.

⁷Kayne and Collins (2023, p. 20) further observe that “The possibility of ordering Impoverishment rules adds further to the unrestrictiveness of the system, since each choice of ordering leads to a new I-language.”

$$(2) \quad \text{a.} \quad X^0 \rightarrow \begin{array}{c} X^0 \\ \diagdown \quad \diagup \\ X^0 \quad \text{TH} \end{array}$$

Collins and Kayne’s critique amounts to the claim that DM is a Lexicalist approach in disguise. More specifically, by allowing “operations [...] that operate on syntactic structures and produce syntactic structures, but are not syntactic operations”, Collins and Kayne argue, “DM cannot be characterized by the expression ‘single generative engine’.” (Kayne and Collins, 2023, pp. 22–23) As discussed in Sec. 1.1, non-Lexicalist approaches adopt the Single Engine Hypothesis, according to which there is a single generative component in the grammar, namely, the syntax. Lexicalist approaches, by contrast, adopt the Lexicalist Hypothesis, according to which there is a second generative component in the grammar, namely, the lexicon. As Marantz (1996, p. 16) notes, the major flaw of Lexicalist approaches consists in “recreating the syntax within the Lexicon”. Collins and Kayne highlight a similar flaw in DM by pointing to “the general problem of second syntax.” (Kayne and Collins, 2023, p. 20) In other words, just as Lexicalist approaches recreates the syntax within the Lexicon, DM recreates the syntax within the morphological component.

Second, in “An effort to improve the terminological clarity [...] of theoretical and experimental linguistics” (Leivada, 2020, p. 3), Evelina Leivada has recently reviewed ten misused terms in Linguistics (see Leivada (2020)). The term “feature” is one such term. In particular, Leivada (2020, p. 4) points out the “custom made” character of features. In other words, linguists have used the term “feature” to refer to a heterogeneous set of properties of different linguistic objects. As she writes: “features can be anything from roundness in phonology to the extended projection principle (EPP) in syntax.” (Leivada, 2020, p. 4) Additionally, “Linguists propose new features at will” (Leivada, 2020, p. 4). Such is the case of the abstract morphological features $[\pm\alpha, \pm\beta, \pm\gamma]$ proposed by Oltra-Massuet.⁸ It is far from clear what these features are or to what they correspond in the syntax or morphology. As Leivada (2020, p. 4) observes, “the real problem is that we have no hint of a theory of features.”⁹ Milosavljevič and Arsenijevič (2022) also point to this flaw in Oltra-Massuet’s strategy. As they write: “the failure to identify them [the abstract features] reduces the gain of the

⁸Other such cases are the class and diacritic features proposed by Embick and Halle (2005) and Calabrese (2015, 2021).

⁹Leivada (2020, p. 4) attributes this observation to Norbert Hornstein.

analysis.” (Milosavljević and Arsenijević, 2022, p. 3)

The types of morphemes and corresponding features that can be sprouted in the morphological component are heterogeneous. For example, we saw that also the agreement node can be inserted post-syntactically. Assuming honorific features to be agreement features, Choi and Harley (2019, p. 1337) further propose that honorific morphemes are sprouted in the morphology. Given such heterogeneity, Kayne and Collins (2023, p. 12) ask “whether each dissociated morpheme will need its own special rule” or whether the node-sprouting rule in (2) is capable of inserting whatever dissociated morpheme or feature. In other words, one might ask whether there is a common core shared by all features that are inserted in the morphology. Absent a theory of features, however, this question cannot be properly answered.¹⁰

Finally, although it is not among the misused terms reviewed by Leivada, “the term ‘markedness’”, Haspelmath (2006, p. 25) argues, “is superfluous”. On the basis of a large survey of the relevant literature, Haspelmath (2006) identifies twelve different senses in which the term “markedness” has been used in 20th-century linguistics. He claims that “the term ‘markedness’ developed a multiplicity of sometimes widely diverging senses that linguists who use it are unaware of.” (Haspelmath, 2006, p. 27) Consequently, Haspelmath (2006, p. 27) proposes “the downright elimination of ‘markedness’ from linguists’ theoretical arsenal.” More specifically, he proposes to replace the notion of markedness with “substantive factors like frequency of use, phonetic difficulty, and generalized conversational implicatures.” (Haspelmath, 2006, p. 27)

In *Oltra-Massuet’s* strategy, markedness plays a key role. For instance, Catalan conjugations are hierarchically arranged according to their degree of markedness.¹¹ *Oltra-Massuet* first defines markedness in substantive terms as the relative productivity of each conjugation. But then, in order to highlight the three-way distinction in the markedness hierarchy—unmarked I conjugation versus marked IIIa conjugation versus doubly marked II and IIIb conjugations—she resorts to a formal definition of markedness as the

¹⁰Collins and Kayne’s critique can be carried over to *Oltra-Massuet’s* generalization of rule (2) to all functional projections in the verbal domain. Although in this case the sprouted node is the same—a theme node—one might still wonder whether each functional head requires its own node-sprouting rule. Moreover, it is far from clear whether the generalization proposed by *Oltra-Massuet* holds outside closely-related Romance languages. For example, Marvin observes that this generalization does not hold in Slovenian. As she writes: “while one might argue that themes are adjoined to category-forming heads, it is not the case that they are adjoined to any other functional head, such as Tense heads [...] Aspect or Passive.” (Marvin, 2003, Ch. 3, note 12)

¹¹See example (4) in Sec. 3.2.

number of positive values of an abstract feature. This shift from a substantive definition to a formal definition of markedness is, however, not justified.

Moreover, the markedness hierarchy interacts with the markedness of the environment determined by T to determine the realization of theme vowels. In this respect, it should be noted that the two most problematic tenses in both Catalan and Spanish are the perfect and the present. The perfect is a “marked” environment, being specified as [+PRF], whereas the present is defined as the most unmarked environment. Oddly, despite these different markedness specifications, the present and the perfect pattern in a very similar way.¹² For example, in Catalan the tense node is impoverished in both the 1SG and 3SG forms of the perfect and the 1PL and 2PL forms of the present. Similarly, in Spanish tense and agreement nodes fuse together in the unmarked environment [-PST], that is, in the present, but also exceptionally in the perfect. Additionally, verbs showing root suppletion in the perfect are subject to the same Stress Deletion rule applying in the present. Following Haspelmath’s suggestion, one might attempt to account for these similarities by invoking substantive factors. For example, given that “frequency is [...] the major determinant of markedness effects in morphosyntax” (Haspelmath, 2006, p. 43), one might claim that the “marked” behaviour of the present derives from its frequency of use. However, it is far from clear how best to implement this hypothesis in the formal analysis of Catalan and Spanish morphosyntax proposed by Oltra-Massuet and Arregi.

4.3 A more general issue: A crisis of identification

We call “crisis of identification” the issue arising from the lack of well-established criteria for identifying theme vowels both within a single language and across different languages. In other words, so far as we can see, there is no well-defined set of properties that a linguistic object must possess in order for that linguistic object to be identified as a theme vowel. As Fábregas (2022, p. 14) writes: “I do not think there is any cross-linguist grammatical property that allows us to say that the label ‘Theme vowel’ has been applied to a grammatically-defined natural class of elements.” This issue derives from the prototype character of the notion of theme vowel. As Milosavljevič and Arsenijevič (2022, p. 7) observe, theme vowels “stand for a set of different properties, which specify a spectrum ranging between the prototypical ThVs which instantiate all of these properties and the highly questionable ones which instantiate only a few.” Among the properties that

¹²See Sec 3.2 and Sec. 3.3.

permit the identification of a linguistic object as a theme vowel are the following, moving from the center to the periphery of the prototypical theme vowel: regular occurrence between the base and the inflection; realization by a single vowel; realization including a vowel; a set of available realizations; a relatively large set of selected bases at least for some realizations; absence of systematic semantic effects; absence of systematic semantic, structural, or phonological conditioning (see Milosavljevič and Arsenijevič, 2022, p. 7).¹³

The issue of theme-vowel indeterminacy pointed out by Simonovič and Mišmaš (2023, § 2.4) is part of the crisis of identification. As discussed in Sec. 3.4, Simonovič and Mišmaš (2023, p. 1) observe that root allomorphy in Slovenian is found only in some theme-vowel classes but not others. The key point is that the majority of verbs with root allomorphy is amenable to be parsed as belonging to more than one theme-vowel class.

Interestingly, the very guidelines they follow to identify the different theme-vowel classes in Slovenian illustrate the crisis of identification.¹⁴ Simonovič and Mišmaš follow two main guidelines. On the one hand, they consider as theme vowels “items that determine conjugation classes” (Simonovič and Mišmaš, 2023, p. 14).¹⁵ This guideline leads them to consider as theme vowels items that clearly “correlate with argument structure or aspectual properties” (Simonovič and Mišmaš, 2023, p. 14). For instance, they identify the *e/i* class although in a previous article (see Simonovič and Mišmaš (2022)) they argued for the exclusion of this class from the inventory of theme-vowel classes of Slovenian.¹⁶ They also identify the *ni/ne* class, although they explicitly acknowledge that “The morpheme *ni/ne* arguably marks semelfactivity” (Simonovič and Mišmaš, 2023, p. 14). On the

¹³Milosavljevič and Arsenijevič (2022) propose an account of theme vowels that combines the Radical Decomposition stance with Oltra-Massuet’s observation about the key role played by markedness considerations. In short, Milosavljevič and Arsenijevič (2022, p. 6) claim that “all ThVs have the same feature specification”. More specifically, “all verbal themes only carry the categorial feature [v].” (Milosavljevič and Arsenijevič, 2022, p. 30) On the other hand, the realization of a theme vowel in a given context is determined by a complex markedness calculus taking into account both the markedness of the environment and that of the theme vowel being realized. See the original work for more details.

¹⁴Simonovič and Mišmaš (2023, p. 15) explicitly acknowledge the “issues that emerge in determining the inventory of theme-vowel classes in Slovenian.”

¹⁵This guideline amounts to a tautology. On the one hand, theme vowels are defined as those items that determine conjugation classes. On the other hand, conjugation classes are assumed to be determined by theme vowels. Thus, conjugation classes are defined in terms of theme vowels, and theme vowels are in turn defined in terms of conjugation classes. There is no independent notion of conjugation class nor of theme vowel.

¹⁶See also Sec. 3.4.

other hand, Simonovič and Mišmaš (2023, p. 14) “assume as few classes as possible to capture as much data as possible.” This guideline leads them to exclude the ova/uje class because of the reanalysis of the element o-va as a combination of the bound root \sqrt{ov} and the theme vowel *-a*.¹⁷ Thus, they subsume the ova/uje class under the a/je class.

Among the ten theme-vowel classes identified following these guidelines, only three have the same exponent of the theme vowel in both finite and non-finite forms—a/a, i/i, and e/e. Thus, Simonovič and Mišmaš (2023, p. 15) define the issue of theme-vowel indeterminacy as “One analytical problem that arises for some of the classes with two different exponents of the theme vowel”. They identify four different scenarios in which theme-vowel indeterminacy can manifest. In the simplest scenario, none of the possible parsings involves unpredictable root allomorphy. In this scenario, Simonovič and Mišmaš (2023, p. 16) “assume that verbs join the most common class”.

In the second scenario, theme-vowel indeterminacy gives rise to parsings involving unpredictable root allomorphy and parsings avoiding root allomorphy. In this scenario, the pattern to be preferred is the one that avoids unpredictable root allomorphy.¹⁸ For instance, consider example (3).

- (3) a. o'r-a-ti, 'or-je-mo (a/je)
 $\sqrt{-\text{TH-Inf}}$, $\sqrt{-\text{TH-PRS.1PL}}$
 ‘to plow’, ‘we plow’
- b. o'r-a-ti, 'orj-e-mo (a/e)
 $\sqrt{-\text{TH-Inf}}$, $\sqrt{-\text{TH-PRS.1PL}}$
 ‘to plow’, ‘we plow’
- c. o'ra- \emptyset -ti, 'orj-e-mo (\emptyset /e)
 $\sqrt{-\text{TH-Inf}}$, $\sqrt{-\text{TH-PRS.1PL}}$
 ‘to plow’, ‘we plow’

Two out of three possible parsings involve unpredictable root allomorphy. In particular, the parsing in (3-b) involves the alternation *or* ~ *orj* and the parsing in (3-c) involves the alternation *ora* ~ *orj*. Thus, the parsing to be preferred is the one in (3-a).

In the third scenario, none of the possible parsings avoid unpredictable root allomorphy. For instance, consider example (4).

¹⁷See example (151) in Sec. 3.4.

¹⁸Simonovič and Mišmaš (2023, note 11) point out that the need to avoid unpredictable root allomorphy is not only a helpful analytical tool but “has also been assumed to be part of the constraint set in many OT approaches”.

- (4) a. 'kl-a-ti, 'kol-je-mo (a/je)
 $\sqrt{-\text{TH-INF}}$, $\sqrt{-\text{TH-PRS.1PL}}$
 'to slaughter', 'we slaughter'
- b. 'kl-a-ti, 'kolj-e-mo (a/e)
 $\sqrt{-\text{TH-INF}}$, $\sqrt{-\text{TH-PRS.1PL}}$
 'to slaughter', 'we slaughter'
- c. 'kla- \emptyset -ti, 'kolj-e-mo (\emptyset /e)
 $\sqrt{-\text{TH-INF}}$, $\sqrt{-\text{TH-PRS.1PL}}$
 'to slaughter', 'we slaughter'

As Simonovič and Mišmaš (2023, p. 17) observe, in this scenario “there is no obvious way of choosing between the three options.”

The fourth scenario is a particular case of the third. In (26), all possible parsings involve a different exponent of the theme vowel in finite and non-finite forms. In the fourth scenario, while none of the possible parsings avoid unpredictable root allomorphy, “there is a choice between parsings with (segmentally) identical theme vowels in finite and non-finite forms and parsings with different theme vowels.” (Simonovič and Mišmaš, 2023, p. 17) For instance, consider example (5).

- (5) a. 'wz-e-ti, 'wzam-e-mo (e/e)
 $\sqrt{-\text{TH-INF}}$, $\sqrt{-\text{TH-PRS.1PL}}$
 'to take', 'we take'
- b. 'wze- \emptyset -ti, 'wzam-e-mo (\emptyset /e)
 $\sqrt{-\text{TH-INF}}$, $\sqrt{-\text{TH-PRS.1PL}}$
 'to take', 'we take'

As Simonovič and Mišmaš (2023, p. 17) observe, the choice among different parsings in this scenario “may be non-trivial for the analysis of root allomorphy.” More specifically, assuming the parsing in (5-a) would mean allowing allomorphy “to be triggered non-locally, across the theme vowel.” (Simonovič and Mišmaš, 2023, p. 17) Assuming instead the parsing in (5-b), one could argue that allomorphy is conditioned locally, being triggered by the theme vowel itself in finite forms and by the linearly adjacent inflectional ending in non-finite forms. Simonovič and Mišmaš (2023, p. 17) further observe that the majority of verbs with root allomorphy in Slovenian falls within the third and fourth scenarios.

Simonovič and Mišmaš’ proposed solution to the issue of theme-vowel indeterminacy also illustrates the crisis of identification. In order to assign verbs with unpredictable root allomorphy to theme-vowel classes, Simonovič and Mišmaš (2023, p. 23) “follow the guideline ‘if it looks like a theme vowel,

it is a theme vowel”’. This guideline consists in “analyzing theme vowels as being maximally big and roots as being maximally small.” (Simonovič and Mišmaš, 2023, p. 24) This guideline allows Simonovič and Mišmaš (2023, p. 23) to identify “five theme-vowel classes that can host verbs with unpredictable root allomorphy: a/je, a/e, \emptyset /e, \emptyset /ne and e/e.”¹⁹ Nonetheless, in light of the considerations above, this guideline seems too “impressionistic”. In the absence of well-established criteria for identifying theme vowels, one has to resort to such vague criteria. In sum, despite having highlighted the issue, Simonovič and Mišmaš (2023) do not provide precise guidelines allowing to overcome the issue of theme-vowel indeterminacy.

The crisis of identification is also discussed in a recent article by Remberger and Pomino (see Pomino and Remberger (2022)). The title of their article—“Does French have theme vowels?”—vividly encapsulates the crisis. On the basis of a survey of the literature on French theme vowels, Pomino and Remberger (2022, p. 7) conclude that “there is no consensus in the literature with respect to whether Modern French has ThVs and how CCs [conjugation classes] are to be described.”

Traditionally, French verbs are sorted into three conjugation classes based on the form of the infinitive. Conjugation I verbs are characterized by the infinitival ending *-er* [-e^ʃ], such as *aimer* [ɛme] ‘to love’.²⁰ Conjugation II verbs are characterized by the infinitival ending *-ir* [-iʁ], such as *finir* [finiʁ] ‘to finish’. Finally, conjugation III is defined as “a smorgasbord of all other verbs that do not belong to the 1st of 2nd CCs.” (Pomino and Remberger, 2022, p. 8) However, (Pomino and Remberger, 2022, p. 13) point out that “there is no consensus at all in the literature with respect to the shape of French infinitival suffixes.” They add: “There are several proposals and researchers count with up to six different infinitival endings.” (Pomino and Remberger, 2022, p. 13). For example, the verb *aimer* is amenable to be parsed in the following three different ways:

(6) Possible parsings of the verb *aimer*

¹⁹Simonovič and Mišmaš (2023, p. 23) also discuss the opposite guideline, which suggests “concentrating all verbs with unpredictable root allomorphy in as few theme-vowel classes as possible.” Following this guideline, unpredictable root allomorphy would be limited to only two theme-vowel classes, \emptyset /e and a/i. However, Simonovič and Mišmaš (2023, p. 24) reject this guideline due to considerations regarding the phonological properties of the roots in the \emptyset /e class. See the original work for more detail.

²⁰We follow Pomino and Remberger (2022, p. 2) notational conventions. In particular, the superscript consonant represents a floating consonant that is overtly realized only if there is an onset position available in the following syllable.

Stem	IS	INF	Gloss	Stem consonant	CC
$\varepsilon\text{m-}$	e^{B}	<i>aimer</i>	‘to love’	PC	1 st
kur-	i_{B}	<i>courir</i>	‘to run’	PC	3 rd
$\text{fini}^{\text{s-}}$	B	<i>finir</i>	‘to finish’	FC	2 nd
$\text{paB}^{\text{t-}}$	i_{B}	<i>partir</i>	‘to leave’	FC	3 rd
$\text{di}^{\text{z-}}$	B	<i>dire</i>	‘to say’	FC	3 rd
$\text{ku}^{\text{z-}}$	T_{B}	<i>coudre</i>	‘to sew’	FC	3 rd
$\text{vu}^{\text{l-}}$	wa_{B}	<i>vouloir</i>	‘to want’	FC	3 rd

Table 4.1: Classification of French verbs based on PC versus FC (adapted from Pomino and Remberger, 2022, p. 12)

- | | | |
|----|--|--|
| a. | <i>aimer</i> $[\varepsilon\text{m-e}^{\text{B}}]$ | The vowel is part of the ending |
| b. | <i>aimer</i> $[\varepsilon\text{m-e}^{\text{-B}}]$ | The vowel is autonomous |
| c. | <i>aimer</i> $[\varepsilon\text{me}^{\text{-B}}]$ | The vowel is part of an unsegmented stem |

Only the parsing in (6-b) involves a theme vowel appearing between the root and the inflectional ending. In the other two parsings, the verb *aimer* is understood as athematic. Thus, it seems that the issue of theme-vowel indeterminacy observed in Slovenian also manifests in French, although in a slightly different way. In French, the possible parsings do not lead to assigning a verb to different theme-vowel classes. Rather, in French a single verb can be parsed so as to be thematic or athematic.

Moreover, the proposed solutions to the parsing indeterminacy in French are similar to those discussed by Simonovič and Mišmaš (2023, § 4) regarding the issue of theme-vowel indeterminacy in Slovenian. As Pomino and Remberger (2022, p. 15) observe, some approaches “try to keep the stems as regular as possible, which means that they have to assume various allomorphic suffixes for the same verbal form”. By contrast, “other approaches strive for minimal allomorphy of inflectional endings [...] but then have to shift irregularity to the stem” (Pomino and Remberger, 2022, p. 15). As an example of the first approach, Pomino and Remberger (2022, pp. 10–13) discuss the approach of El Fenne (2020). According to this approach, all French verbs are athematic and “must be classified based on whether the verb stem ends in a permanent consonant (PC) or in a floating consonant (FC).” (Pomino and Remberger, 2022, p. 10) The resulting classification of the French verbs is as follows:²¹

The advantage of this approach is that it limits stem allomorphy to a

²¹In Tab. 4.1, IS stands for “Inflectional suffix”.

Stem	IS	INF	Gloss	Theme vowel	CC
$\epsilon\text{m-}(\partial\text{-})$	-e	<i>aimer</i>	‘to love’	Theme vowel	1 st
fin-i-	-ʁ	<i>finir</i>	‘to finish’	Theme extension	2 nd
paʁt- i-	-ʁ	<i>partir</i>	‘to leave’	Theme vowel	3 rd
di-	-ʁ	<i>dire</i>	‘to say’	Athematic	3 rd
ku-d-	-ʁ	<i>coudre</i>	‘to sew’	Theme consonant	3 rd
vul-wa-	-ʁ	<i>vouloir</i>	‘to want’	Theme diphthong	3 rd

Table 4.2: Classification of French verbs based on the infinitive ending (adapted from Pomino and Remberger, 2022, p. 14)

minimum. Nonetheless, this approach has several shortcomings. First, it multiplies the inflectional endings of the infinitive (highlighted in light-gray in Tab. 4.1). Second, as Pomino and Remberger (2022) point out, it “has to posit specific stems for the future (and conditional) [...] even for the completely regular 1st CC”. For example, the verb *aimer* would have two stem allomorphs, $[\epsilon\text{me}^{\text{ʁ}}]$ and $[\epsilon\text{m}\partial^{\text{ʁ}}]$, the latter only occurring in the future and conditional. Finally, this approach has to posit a special ending for 1PL agreement, $j\tilde{o}$, that is limited to occur in the imperfect indicative and the conditional. Nevertheless, as Pomino and Remberger (2022, p. 12) observe, “the 1st person plural is always realized as $[\tilde{o}]$ in French”.

On the second approach, all French verbs are thematic. Pomino and Remberger (2022, p. 13) note that such approaches “have proposed a binary opposition for the infinitive ending”. More specifically, the infinitive ending for Conjugation I verbs is $[e]$ while it is $[\text{ʁ}]$ for all the other verbs (see Tab. 4.1).

The advantage of this approach is that it limits inflectional endings allomorphy to a minimum. Nevertheless, also this approach has shortcomings. As the fifth column of Tab. 4.2 shows, it far from clear what constitutes a theme vowel for several verbs. In addition, for some verbs there seems to be no evidence that they can be parsed as a combination of a root and a theme vowel (*dire*). As Pomino and Remberger (2022, p. 15) observe: “while the combination of the root and the ThV is straightforward for verbs of the type *aimer* and *finir*, it is not clear how this can be done for the remaining verbs unless one is willing to propose unmotivated diacritic features and/or (readjustment) rules.”²²

²²Pomino and Remberger (2022, p. §3) eventually adopt a mixed approach, according to which only verbs of the types *aimer* and *finir* are thematic, all the others being athematic. We do not discuss their proposal further because it essentially follows in Oltra-Massuet’s

Finally, as they aptly point out, “in both general approaches it remains unclear how the correct combination of stems and suffixes is achieved” (Pomino and Remberger, 2022, p. 16). Thus, not only there are no widely accepted guidelines to parse a given verbal form in French. There is also no guideline suggesting how to combine the pieces when an uncontroversial parsing is available.

The crisis of identification leads to weak claims. For example, recently Milosavljević and Arsenijević (2022, p. 1) has quantitatively tested “two hypothesis regarding the role of theme vowels (ThVs) in Serbo-Croatian (SC)”. The first hypothesis is that theme vowels realize different features. Focusing on the most productive theme vowels of SC— ji, i_i and ja, a_i —the first hypothesis is that ji, i_i realizes the features $[\text{v}]$ and $[\text{SCALE}]$ whereas the theme vowel ja, a_i only realizes the feature $[\text{v}]$. Under this hypothesis, “all verbs that are realized with the theme ji, i_i and no verbs realized with the theme ja, a_i are predicted to denote scalar predicates.” (Milosavljević and Arsenijević, 2022, p. 5) This is the stronger hypothesis. The second hypothesis is that all theme vowels only realize the feature $[\text{v}]$. Under this hypothesis, theme vowels only differ in terms of markedness. More specifically, “the various ThVs attested in SC are markedness-based realizations of the same syntactic feature specification” (Milosavljević and Arsenijević, 2022, p. 1). The realization of a theme vowel results from “a special procedure operating on degrees of markedness” (Milosavljević and Arsenijević, 2022, p. 5). This procedure takes into account the intrinsic markedness of the theme vowel being realized as well as the markedness of the context of insertion.²³ This is the weaker hypothesis.

Based on a corpus search, Milosavljević and Arsenijević (2022, p. 27) ultimately conclude that “the strongest generalization that can be made” is that “If a verb has a scalar interpretation and the base does not provide this component, the theme cannot be ja, a_i , but when the verb is not scalar—both themes are possible.” Indeed, the corpus search highlighted “a decent portion of root ji, i_i verbs without a prototypical scalar component” (Milosavljević and Arsenijević, 2022, p. 27). Thus, the stronger hypothesis should be rejected.

Nevertheless, as Milosavljević and Arsenijević (2022, p. 30) observe, the weaker hypothesis is weaker in at least two respects. First, it makes a weaker claim. Under this hypothesis, the correlations between theme vowels and

footsteps. See the original work for more detail.

²³We do not discuss this procedure further here. See Milosavljević and Arsenijević (2022) for more details.

aspectual properties are “only tendential” (Milosavljevič and Arsenijevič, 2022, p. 1). These correlations are determined by the interaction of the markedness hierarchies involved in the realization of different theme vowels. Second, it is has “nothing to say about the way scalarity, telicity or other properties that correlate with the ThVs are syntactically represented and morphologically realized.” (Milosavljevič and Arsenijevič, 2022, p. 30)

Guekguezian and Dolatian (2021) also come to similar weak conclusions. They examine the distribution of theme vowels in Western Armenian simple verbs, causatives, and compounds. Despite the fact that “both the appearance and the choice of theme vowel depends on *v* and on Voice”, they conclude that “theme vowels are ornamental, because they cannot be identified solely with either *v* or with Voice.” (Guekguezian and Dolatian, 2021, p. 2) For instance, Western Armenian theme vowels, *-e-*, *-i-*, *-a-*, can be used to verbalize roots that otherwise surface as nouns or adjectives. When such roots are affixed with a theme vowel, they can take verbal inflection (see (7)).

- (7) Theme vowels as verbalizers (Guekguezian and Dolatian, 2021, p. 2)
- a. jerk, jerk-e-l
 $\sqrt{\quad}$, $\sqrt{-\text{TH-}\text{INF}}$
 ‘song’, ‘to sing’
 - b. nəman, nəman-i-l
 $\sqrt{\quad}$, $\sqrt{-\text{TH-}\text{INF}}$
 ‘similar’, ‘to resemble’
 - c. xaʁ, xaʁ-a-l
 $\sqrt{\quad}$, $\sqrt{-\text{TH-}\text{INF}}$
 ‘game’, ‘to play’

However, theme vowels alone do not determine transitivity. Although there are “correlations between *-e-* being transitive, and *-i-,a-* being intransitive” (Guekguezian and Dolatian, 2021, p. 2), there nonetheless are exceptions (see (8)).

- (8)
- a. *azad-e-l* ‘to free’ TR ~ *pampas-e-l* ‘to gossip’ INTR
 - b. *sorv-i-l* ‘to learn’ TR ~ *məs-i-l* ‘to feel cold’ INTR
 - c. *aʁ-a-l* ‘to grind’ TR ~ *mən-a-l* ‘to remain’ INTR

Thus, Guekguezian and Dolatian (2021, p. 2) conclude that roots in simple verbs are equipped with a class feature conditioning the insertion of the theme vowel.

Western Armenian has “a small subset of roots that are equipollent”

(Guekguezian and Dolatian, 2021, p. 3). In such roots, the correlations between theme vowels and transitivity are grammaticalized, so they take *-e-* in their transitive variant and *-i-* in their intransitive variant (see (9)).

- (9) Equipollent verbs in Western Armenian
- a. *jep-e-l* ‘to cook’ TR ~ *jep-i-l* ‘to be cooked’ INTR
 - b. *gədr-e-l* ‘to cut’ TR ~ *gədr-i-l* ‘to be cut’ INTR
 - c. *godr-e-l* ‘to break’ TR ~ *godr-i-l* ‘to be broken’ INTR

As Guekguezian and Dolatian (2021, p. 3) observe, the simplest analysis of such verbs “is that the roots are under-specified for class features”, in contrast to the roots in simple verbs. Consequently, “the transitivity features on Voice determine the theme vowel” (Guekguezian and Dolatian, 2021, p. 3) in equipollent verbs. However, there are exceptional equipollent verb, such as *kajt-e-l* ‘to slip’ INTR ~ *kajt-i-l* ‘to slip’ INTR. Therefore, at least for these exceptions, “the root must provide theme vowel information” (Guekguezian and Dolatian, 2021, p. 4). In other words, the rules inserting the theme vowel in exceptional equipollent verbs must be sensitive to both root information and *v*/Voice information.²⁴

Causatives show that a single verbal form can have more than one theme vowel. A causative is formed by adding the causative suffix *-tsən-* to a simple verb (see (10)).

- (10)
- a. *ker-e-l*, *ker-e-tsən-e-l*
 $\sqrt{-\text{TH-INF}}$, $\sqrt{-\text{TH-CAUS-TH-INF}}$
 ‘to scratch’, ‘to make scratch’
 - b. *xos-i-l*, *xos-i-tsən-e-l*
 $\sqrt{-\text{TH-INF}}$, $\sqrt{-\text{TH-CAUS-TH-INF}}$
 ‘to speak’, ‘to make speak’
 - c. *gart-a-l*, *gart-a-tsən-e-l*
 $\sqrt{-\text{TH-INF}}$, $\sqrt{-\text{TH-CAUS-TH-INF}}$
 ‘to read’, ‘to make read’

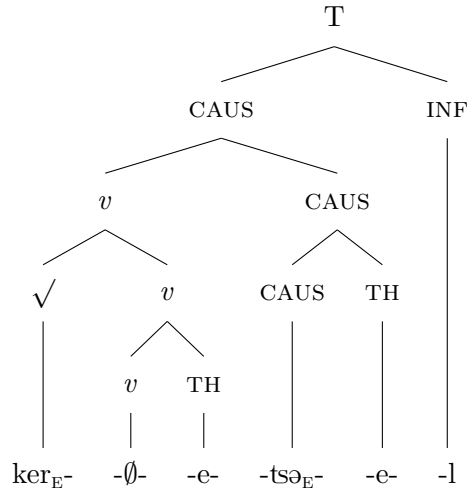
As example (10) show, the simple verb preserves its theme vowel when causativized.²⁵ The causative in turn selects its own theme vowel, *-e-*. However, as Guekguezian and Dolatian (2021, p. 5) note, “there is semantic and

²⁴Guekguezian and Dolatian (2021, p. 3) assume that *v* and Voice are bundled together.

²⁵There are two exceptions. First, theme vowel *-i-* changes to *-e-* due to a regular phonological process. Second, some verbs allow a syncopated version of the causative. For instance, the verb *xax-a-l* ‘to play’ allows both *xax-a-tʃən-e-l* and *xax-tʃən-e-l* ‘to make play’ as its causative.

syntactic evidence that these causative verbs consist of only a single Voice head over the entire verb.” Consequently, although the theme vowel *-e-* systematically correlates with causative semantics, Guekguezian and Dolatian (2021) are forced to analyze it as sprouted on the causative head (see (11)).²⁶

(11) Structure of the causative verb *ker-e-tsən-e-l* ‘to make scratch’



Western Armenian compounds are “formed by combining two words with the linking vowel *-a-*.” (Guekguezian and Dolatian, 2021, p. 6) Compounds whose second member is a verb are exocentric. Interestingly, as Guekguezian and Dolatian (2021, p. 7) note, such compounds “must have a (covert) little *v* that licenses the verbal semantics of the compound.” Nonetheless, such compounds cannot “take verbal inflection or syntactically act as a verb.” (Guekguezian and Dolatian, 2021, p. 7) In order to take verbal inflection and syntactically act as verbs, these compounds need a theme vowel (see (12-b)).²⁷

²⁶Since Oltra-Massuet (1999b, p. 29), the co-occurrence of an overt verbalizer with a theme vowel has been taken as evidence of the ornamental nature of theme vowels. In this respect, Western Armenian *-tsən-e-* is akin to Spanish *-ific-a-*. See, however, Fábregas (2018, § 4.3) for an alternative proposal. In short, given that in Spanish *--ific-* never appears without *-a-*, and that it never selects for a different theme vowel, Fábregas (2018) takes it to be an allomorph of the theme vowel itself. The same argument seems to carry over in Western Armenian.

²⁷The theme vowel in Western Armenian X+V compounds seems to function as a “bridge” from a linguistic object with verbal semantics to a full verb. Interestingly, Bertocci and Pinzin (2022, p. 48) have recently argued that the element *t-* of the Latin agentive morpheme *-tor* similarly functions as a bridge. As they write: “In informal terms, the functional head realized by *-t* makes it possible for a verbal derivation to host a non-

- (12) X+V Compounds: *ned* + *har-e-l* ‘arrow’ + ‘to churn’
- a. *ned-a-har*
X-a-√
‘archer’
 - b. *ned-a-har-e-l*
X-a-√-TH-INF
‘to throw arrows’

As Guekguezian and Dolatian (2021, p. 7) observe, “In the compounds [...] where the second member lacks a theme vowel, there is no Voice, no external argument, and no possibility to add Asp, T or AGR above the structure.” Consequently, Guekguezian and Dolatian (2021, p. 7) take the theme vowel in X+V compounds to “depend on Voice in addition to the root and *v*.” In summary, in the absence of well-established criteria for identifying theme vowels, the correlations between theme vowels and verbal semantics in Western Armenian are only tendencies as in Serbo-Croatian.

The crisis of identification seems to undermine the gains derived by adopting DM and its assumptions. We deem this crisis to be the most challenging problem non-Lexicalist approaches to theme vowels have to face. In the next Chapter, we point to a recent non-Lexicalist approach that promises to overcome this crisis.

inalizer [...] i.e., it ‘bridges’ the verbal layers to the subsequent nominal ones.” (Bertocci and Pinzin, 2022, p. 48)

Chapter 5

Conclusion

5.1 Theme vowels as dissociated morphemes: Is there no alternative?

The strengths of the DM approach to verbal theme vowels discussed in Ch. 3 are to be balanced with the weaknesses discussed in the previous Chapter. Thus, one might ask whether the theoretical and empirical gains obtained by adopting DM outweigh the shortcomings or whether the shortcomings outweigh the gains, and hence the DM approach should be rejected. We would like to conclude this thesis in an optimistic vein. We believe that the gains outweigh the shortcomings. Nonetheless, we also believe that in order to overcome the shortcomings of DM, a more radical grammatical architecture is needed. Thus, in Sec. 5.2 we briefly discuss Nanosyntax, a recent non-Lexicalist approach proposed by Starke (2009). We believe Nanosyntax should be the null hypothesis when it comes to non-Lexicalist approaches to verbal theme vowels. Sec 5.3 briefly discusses some trends that are underway in the recent literature on non-Lexicalist approaches to verbal theme vowels.

5.2 A promising alternative: Nanosyntax

Nanosyntax is a “heretic” framework.¹ As Starke (2009, p. 1) points out, Nanosyntax emerged out of the “need to reconsider the orthodoxy, ques-

¹Here discussion will be limited to the basic tenets of Nanosyntax so as to highlight its potential benefits over DM. A critical assessment of the strengths and weaknesses of Nanosyntax is beyond the scope of this work. The most recent and in-depth presentation of the nanosyntactic framework is Baunaz et al. (2018).

tioning the very premise that syntax operates on lexical items.” The grammatical architecture underlying Nanosyntax is shown in Fig. 5.1.

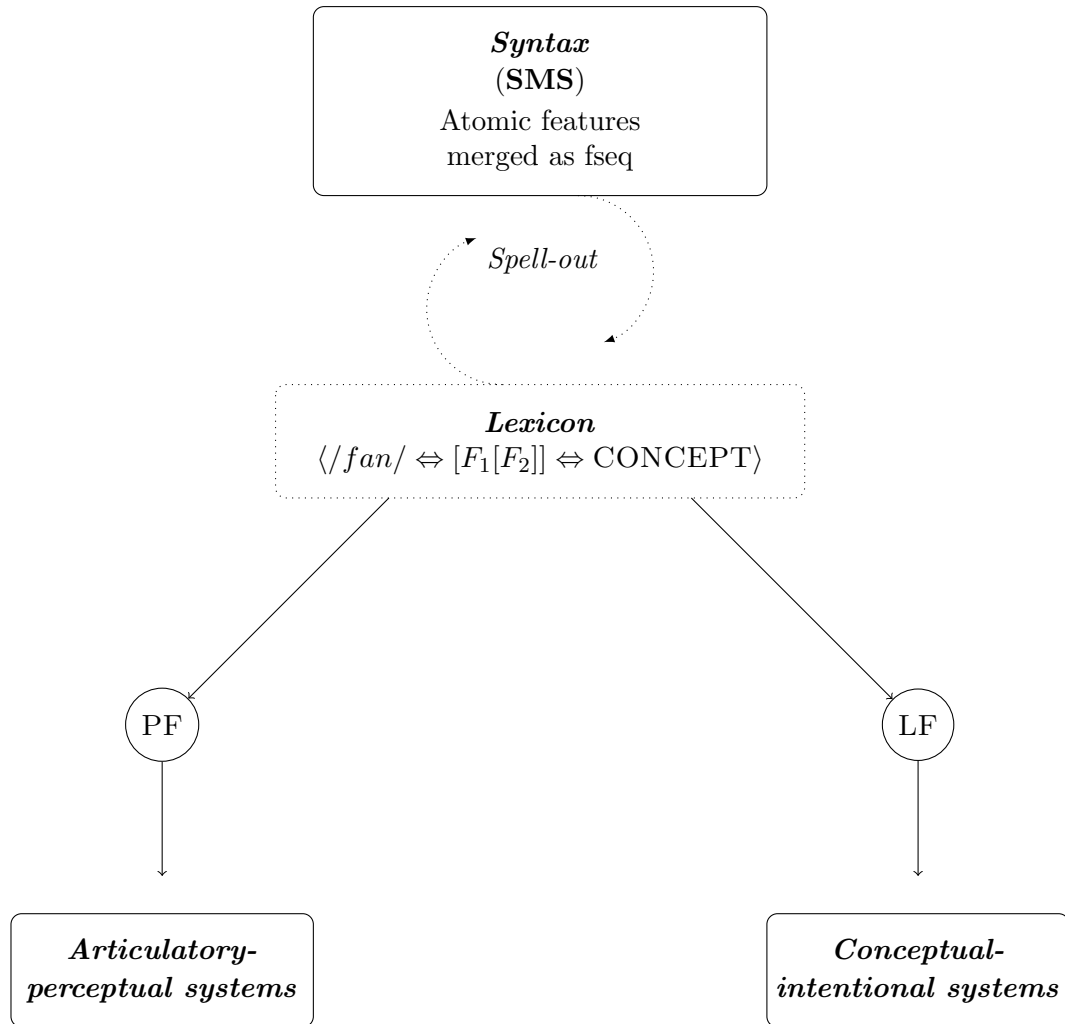


Figure 5.1: The grammatical architecture of Nanosyntax

Building on the success of the cartographic enterprise,² Starke (2014, p. 3) claims that “syntactic terminals have reached and passed the point of being smaller than individual morphemes.” Thus, Nanosyntax adopts the cartographic maxim “one feature–one head” (OFOH) (Baunaz and Lander,

²For an overview of the cartographic enterprise, see Cinque (2010) and Enoch et al. (2022).

2018, p. 16).³ In other words, syntax merges single features and arranges them “into familiar binary branching trees, eventually attaining the size of a morpheme, a word, and a phrase.” (Starke, 2009, p. 6) As Starke (2009, p. 6) aptly puts it: “Syntax doesn’t build on morphemes, it builds morphemes.” Another assumption Nanosyntax draws from cartography is that “there is a strict mapping between syntax and semantics.” (Baunaz and Lander, 2018, p. 5). As Baunaz and Lander (2018, p. 5) write: “syntax is assumed to be the vehicle for expressing grammatical semantics, and it does so by means of abstract syntactico-semantic features that are arranged by syntax into a hierarchy.”⁴

Assuming syntactic terminals to be submorphemic has several consequences. First, as Starke (2009, p. 2) observes, Nanosyntax is the only framework where “there is no lexicon feeding syntax.” Thus, Nanosyntax is non-Lexicalism on steroids. There is no need to assume even feature bundles feeding syntactic computation as in DM. Indeed, as Starke (2014, p. 2) points out, “a ‘feature bundle’ is equivalent to a constituent.” Consequently, he argues, “a syntactic representation with ‘feature bundles’ in its terminals is composed of two types of trees” (Starke, 2014, p. 2). The problem of recreating syntax outside syntax presents itself again.⁵ This problem is avoided in Nanosyntax by allowing syntax to directly operate on features. As Starke (2009, p. 6) puts it: “Syntax projects from single features and nothing else.”

A second consequence of assuming syntactic terminals to be submorphemic is that lexical items are allowed to spell-out entire constituents. More specifically, “spellout becomes an operation matching the tree constructed by syntax to the (sub-)trees stored inside lexical entries” (Starke, 2009, p. 2). Thus, a lexical entry in Nanosyntax has the format shown in Fig. 5.1. More specifically, a lexical entry in Nanosyntax comprises three slots: one

³“If”, as Cinque (2010, pp. 51–52) observe, “it is a virtual truism that cartography can be construed as a topic and not as a framework”, then Nanosyntax can be understood as the framework of cartography. As Baunaz and Lander (2018, p. 49) writes: “Nanosyntax is in essence a cartographic approach to linguistic structure”. On the relationship between cartography and Nanosyntax, see also Baunaz and Lander (2018, § 1.1).

⁴In this respect, it should be noted that the acronym SMS in Fig. 5.1 stands for “syntax, morphology, and semantics”, which are collapsed into the same module in Nanosyntax.

⁵Starke’s critique is thus akin to Kayne and Collins (2023) critique discussed in Sec. 4.2. Nanosyntax shares with Collins and Kayne’s proposal the “morphology-as-syntax idea” Baunaz and Lander (2018, p. 19). As Kayne and Collins (2023, p. 21) acknowledge “only MS [Morphology as Syntax] and NS [Nanosyntax] fall under the rubric of ‘single generative engine’.” Nonetheless, Collins and Kayne’s proposed model differs from Nanosyntax because it eschews Late Insertion.

for the phonological form, one for the syntactico-semantic structure, and one for the conceptual/encyclopedic content. In this way, Nanosyntax dispenses both with the Vocabulary and the Encyclopedia.⁶ Consequently, not only there is no pre-syntactic lexicon, but there is single post-syntactic lexicon. This lexicon, moreover, “contains nothing but well formed syntactic expressions” (Starke, 2014, p. 2).⁷ The lexicon interprets the output of a syntactic computation by matching the tree generated by the syntax, called *S-tree*, with the tree stored in a lexical entry, called *L-tree*. The matching between an S-tree and an L-tree is governed by the *Superset Principle* in (1).

- (1) **Superset Principle:** A lexical tree L can match a syntactic tree S if L is a superset (proper or not) of S. L matches S if L contains a node that is identical to a node in S and all the nodes below are also identical. (Baunaz and Lander, 2018, p. 27)

It should be noted that the last clause of the Superset principle establishes a “strict constituenthood condition”, by which “only constituents can be targeted for spellout.” (Baunaz and Lander, 2018, p. 36) In other words, phrasal spellout, as understood within Nanosyntax, does not allow spans or other portions of a syntactic representation not forming a constituent to be spelled-out.⁸

A third consequence of assuming syntactic terminals to be submorphemic follows from the second. Because lexical items can store entire trees, they can be of different sizes.⁹ In other words, “different lexical items may correspond to different amounts of syntactic structure.” (Starke, 2009, p. 2)

The idea of “different sizes for different lexical items” (Starke, 2009, p. 2) is one of the most important in Nanosyntax. First, it allows to

⁶Because there is no Vocabulary, in Nanosyntax the term “lexical item/entry” is used instead of the term “Vocabulary item”. Likewise, as Baunaz and Lander (2018, p. 12) note, “The closest analogue of Vocabulary Insertion in nanosyntax is usually called *spellout* or *lexicalization*.” For a discussion of the differences between DM and Nanosyntax as to the nature of the lexicon, see Baunaz and Lander (2018, §1.2.3).

⁷Allowing lexical items to store entire trees has the additional benefit of allowing a seamless account of idioms. In short, idioms “are cases in which a relatively high-level constituent has been stored.” (Starke, 2011, p. 6). On the nanosyntactic approach to idioms see in particular Baunaz and Lander (2018, §1.3.3.3).

⁸For an argument in favor of constituent lexicalization over spanning, see Taraldsen (2018).

⁹As Starke points out, “*phrasal spellout enables a clean and principled lexicon.*” (p. 7 Starke, 2014, emphasis in the original) Thus, Nanosyntax can be claimed to be a “post-Lexicalist” approach. Not only it rejects the assumption of a lexicon feeding the syntax, but it also rejects “The equation of lexical with idiosyncratic” (Aronoff, 1988, p. 2). Lexical items are idiosyncratic only insofar as they are of different sizes.

account for cross-linguistic variation. Because “each language [...] will have its own idiosyncratic inventory of lexical entries” (Baunaz and Lander, 2018, p. 26), Starke conjectures that the differences in size among lexical items “are enough to express all cross-linguistic variation.” (Starke, 2011, p. 3) As the title of his article vividly puts it: “variation reduces to the size of lexically stored trees” (Starke, 2011). In this sense, Nanosyntax can be said to adopt a *divide and conquer* strategy to language variation. First, the features previously bundled together into terminal nodes are “divided” and distributed among a fine-grained syntactic representation where each feature heads its own projection. Then, the complexity of the ensuing representation is “conquered” by lexical items of different sizes capable of spelling out different portions of the representation.¹⁰¹¹

Second, the idea of “different sizes for different lexical items” is important because lexical items of different sizes “will now compete between themselves in order to spell out whatever tree syntax has produced.” (Starke, 2009, p. 3) Such competition is decided by the principle in (2).¹²

- (2) **Elsewhere Principle:** If more than one L-tree can realize the same S-tree (by the Superset Principle), then the L-tree with the least amount of superfluous material is chosen. (Baunaz and Lander, 2018, p. 30)

Finally, let us say a few more words about the lexicon-syntax interface in Nanosyntax. First, as shown in Fig. 5.1, there is a direct relationship between the lexicon and the syntax. In particular, there is no morphological component between the two. Thus, morphological operations such as node-sprouting, Fusion, and Impoverishment “have no natural place in the architecture of nanosyntax.” (Baunaz and Lander, 2018, p. 15)

Second, as shown in Fig. 5.1, there is “a feedback-loop” (Starke, 2011,

¹⁰As Baunaz and Lander (2018, § 1.4) note, this is the nanosyntactic version of the Principle and Parameters framework. Indeed, Starke (2011, p. 3) writes that “What we thought of as ‘parameters’ are just differing sizes of lexical items.”

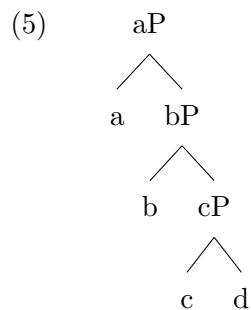
¹¹We believe that this strategy might lead to strong claims; see the discussion in Sec. 4.3. For example, Milosavljevič and Arsenijević (2022, p. 27) “do not exclude that a modified version of the stronger analysis [...] may fit the data.” In particular, they point to “a more sophisticated analysis of ThVs and/or scalarity (*or a finer syntactic specification driving the realization of ThVs*)” (Milosavljevič and Arsenijević, 2022, p. 27; emphasis added). Although Milosavljevič and Arsenijević (2022, p. 27) reject Nanosyntax, we nonetheless believe it is the best candidate for providing the necessary adjustments in this respect.

¹²As Baunaz and Lander (2018, p. 30) note this principle is also known in the literature as the BestFit principle or Minimize Junk. It amounts to the nanosyntactic version of the Elsewhere Condition proposed by Kiparsky (1973).

p. 7) between the syntax and the lexicon. In Nanosyntax, a syntactic derivation proceeds as follows. After each step of Merge, the lexicon is consulted in order to find a matching lexical entry. If a matching lexical item is found, the derivation can either terminate or continue to the next step of Merge. Given the “Exhaustive Lexicalization principle” in (3), “every syntactic feature has to be identified by the lexicon.” (Fábregas, 2007, p. 167) Consequently, when no lexical entry matches the current syntactic structure, “something must be done to save it.” (Starke, 2011, p. 11) The solution to this derivational problem resides in the so-called “spellout-driven movement”. Spellout-driven movement is governed by the Spell-out algorithm in (4).¹³

- (3) **Exhaustive Lexicalization Principle:** Every syntactic feature must be lexicalized. (adapted from Fábregas, 2007, p. 167)
- (4) The Spell-out Algorithm (Starke, 2018, p. 245)
- a. Insert a feature and spell out.
 - b. If fail, try a cyclic (spec-to-spec) movement of the node inserted at the previous cycle and spell out.
 - c. If fail, try a snowball movement of the complement of the newly inserted feature and spell out.

Let us see how the algorithm works. Consider the abstract structure in (5)



At the first cycle, syntax merges *c* and *d* into a constituent, *cP*. At this point, the lexicon is consulted in order to find a lexical entry matching this constituent. In the simplest scenario, a lexical entry such as (6-a) is found. Given the Superset principle, this entry can directly spell-out *cP* ((6-b)).

¹³Baunaz and Lander (2018, p. 37) rephrase the algorithm as *STAY > CYCLIC > SNOWBALL*.

This scenario corresponds to clause (4-a) of the Spell-out algorithm.

- (6) a. /bla/ ⇔ [c[d]]
- b. cP ⇔ bla
- $$\begin{array}{c} \wedge \\ c \quad d \end{array}$$

At this point, the derivation may terminate or continue. Suppose it continues by the merger of b. A new lexical access is performed in order to find a matching entry for bP. Suppose now that the only matching entry is (7-a). Given the Superset principle, this entry can spell-out b. However, it cannot spell-out the whole structure in (7-b), because b does not form a constituent in (7-b).

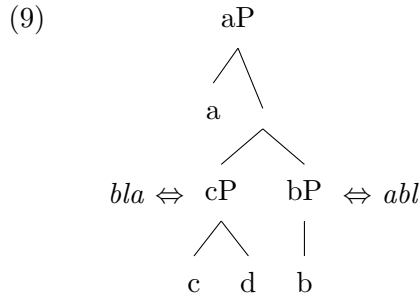
- (7) a. /abl/ ⇔ [a[b]]
- b. bP
- $$\begin{array}{c} \wedge \\ b \quad cp \Leftrightarrow bla \\ \wedge \\ c \quad d \end{array}$$

In this scenario, spellout-driven movement applies so as to prevent the derivation from crashing. Because in (7-b) there is no specifier, clause (4-b) of the Spell-out algorithm cannot apply. Instead, clause (4-c) applies, moving cP to the left of b.¹⁴ In this way, b ends up forming a constituent, thereby allowing being lexicalized by (7-a).

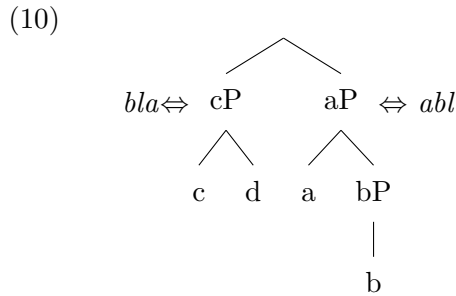
- (8)
- $$\begin{array}{c} \wedge \\ bla \Leftrightarrow cP \quad bP \Leftrightarrow abl \\ \wedge \quad | \\ c \quad d \quad b \end{array}$$

At this point, suppose the derivation continues by the merger of a.

¹⁴As Baunaz and Lander (2018, p. 38) point out, “the landing site for spellout-driven movement is an unlabeled specifier”. Additionally, spellout-driven movement does not leave traces.



The lexical entry in (7-a) matches both a and b. However, in (9) these features do not form a constituent to the exclusion of cP. Therefore, spellout-driven movement applies. In this case, clause (4-b) of the Spell-out algorithm applies, moving cP from Spec[bP] to Spec[aP]. In this way, a and b end up forming a constituent, thereby allowing being lexicalized by (7-a).¹⁵



Finally, let us consider another scenario. Suppose we are at stage in (7-b). Suppose now the lexicon contains the lexical entry in (11).

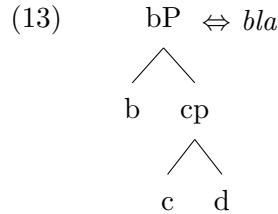
(11) $\text{blah} \Leftrightarrow [\text{bP}[\text{cP}]]$

This lexical entry can directly spell-out the entire structure in (7-b) without recourse to spellout-driven movement. Yet cP has been spelled-out in the previous cycle by (6-a). In this scenario, the “Principle of Cyclic Override” in (12) ensures that the lexical entry in (6-a) is overridden by the lexical entry in (11) (see (13)).

(12) **Cyclic Override:** Previous lexicalizations are overridden or canceled by later lexicalizations. (Baunaz and Lander, 2018, p.

¹⁵The Spell-out algorithm as formulated in (4) only gives rise to suffixal structures. In order to account for PRE markers, such as prefixes, some clauses need to be added to the algorithm. For a nanosyntactic analysis of the prefix-suffix asymmetry, see Starke (2018).

32)



As Baunaz and Lander (2018, p. 32) note, the principle of Cyclic Override is also known in the literature as the Biggest Win Theorem. Indeed, it is a theorem following from the assumption of spellout being cyclic and bottom-up. In other words, spellout “must keep track of what it has done at lower nodes” (Caha et al., 2019, p. 6). As Caha et al. (2019, p. 6) explains:¹⁶

When spellout is successful at a given node, this means that a matching lexical entry has been found. This, however, does not mean that this lexical entry is immediately shipped to PF. It is remembered, and it will eventually be sent to PF; but if later on, a lexical item matching a higher node is found, then the first (lower) candidate is not sent to PF at all: only higher spellout survives.

With the basic tenets of Nanosyntax in place, let us briefly discuss a few recent articles where Nanosyntax has been put to use in the realm of verbal theme vowels.¹⁷

5.2.1 Fábregas (2022)

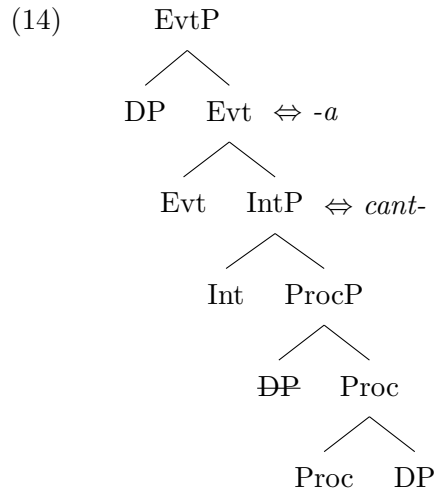
In the terminology introduced in Sec. 1.2, Nanosyntax takes a Radical Decomposition Stance. For example, Fábregas (2022) has recently argued that theme vowels in Spanish spell-out a specific syntactic head, the Event head (Evt).¹⁸ The Event head is responsible for tagging “the eventuality description with time and world parameters”, thus allowing a lexical verb “to

¹⁶Nanosyntax also allows for “Backtracking”. More specifically, it allows spellout to come back to the previous cycle and try another option of spellout for that cycle. We do not discuss Backtracking further. See Starke (2018) for more details.

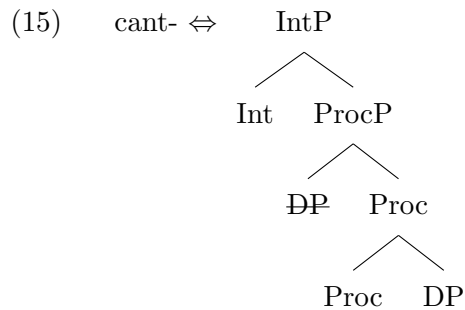
¹⁷See note 1. Our goal is to highlight the potential benefits of a nanosyntactic approach to verbal theme vowels. A critical assessment of the articles discussed is beyond the scope of this work.

¹⁸Fábregas (2022, p. 3) assumes theme vowels to be allomorphic realizations of the Event head, with *-a* being the default realization. Nevertheless, this might not be the best fit for analyzing Spanish theme vowels. Fábregas (2022, notes 10, 11) explicitly acknowledges the limitations of this allomorphy-based approach.

project as a clause in the syntactic spine.” (Fábregas, 2022, p. 3) Building on the event decomposition proposed by Ramchand (2018), Fábregas (2022, p. 9) proposes the following representation for the “stem” *cant-a* ‘sing’:¹⁹



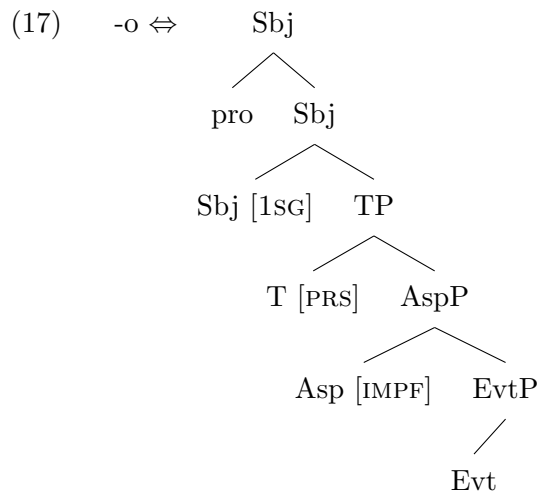
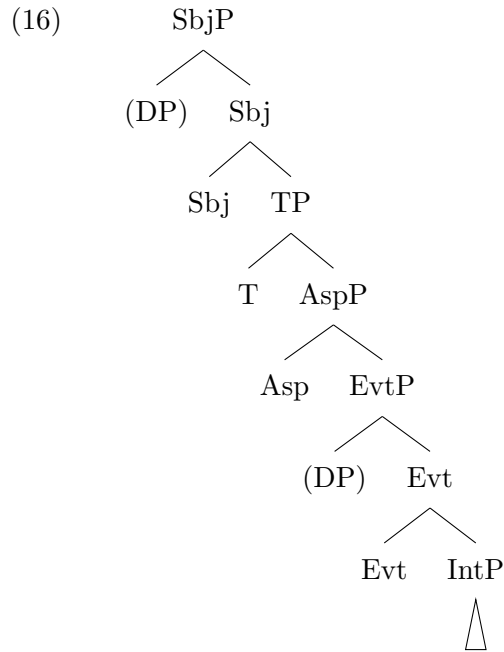
Thus, *cant-* corresponds to the sub-tree in (15), while the theme vowel spells-out Evt.



Given this assumption, Fábregas sets out to account for a few, seemingly unrelated facts regarding Spanish verbal inflection. First, he points out that 1SG forms are the only forms in the present indicative paradigm lacking a theme vowel (Fábregas, 2022, p. 4). His solution crucially relies on the different sizes of lexical entries. Assuming the structure of the present indicative to be as in (16), Fábregas (2022, p. 20) proposes that the 1SG

¹⁹At some stage of the derivation, IntP must undergo spellout-driven movement, so as to allow the Event head to be lexicalized by the theme vowel. We set aside the fine details of this derivation.

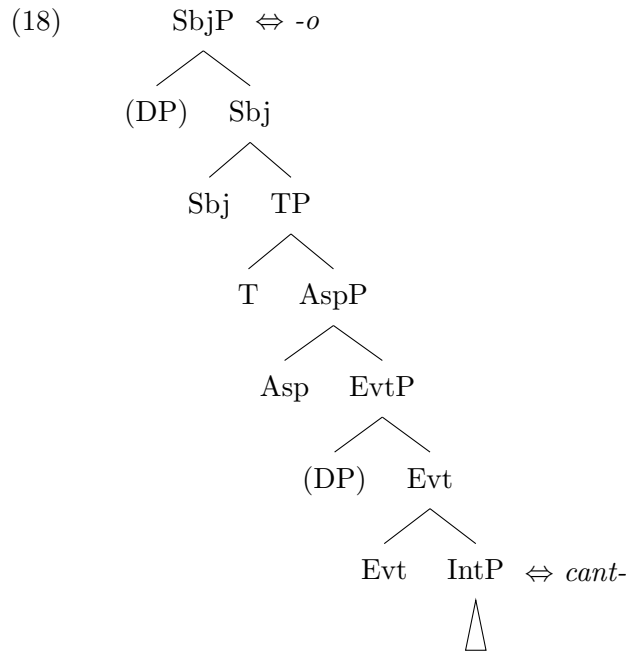
marker *-o* is exceptionally big (see (17)).²⁰



The lexical entry for *-o* thus spells-out “the whole clausal structure, from SubjP to Evt.” (Fábregas, 2022, p. 20) Notably, it also spells-out Evt, the head also lexicalized by the theme vowel. As Fábregas (2022, p. 21) puts it,

²⁰Fábregas (2022, p. 16) assumes an independent Subject Phrase above Tense.

“This means that *-o* consumes the material that would otherwise be spelled out by the ThV.” In nanosyntactic terms, the 1SG marker, being bigger, overrides the theme vowel.²¹ In other words, when the derivation reaches Evt, the theme vowel wins over *-o* by the Elsewhere Principle. However, when the derivation builds more structure above Evt, the theme vowel is no longer a possible match, eventually getting overridden by *-o* (see (18)).



The trade-off between the size of the theme vowel and the size of inflectional endings allows Fábregas to account for another puzzle of the present indicative paradigm. Some verbs of Conjugation III display “an irregular exponent ending in *-g* for the 1SG form” (Fábregas, 2022, p. 5). This irregular exponent also characterizes the paradigm of the present subjunctive of such verbs. For example, the relevant paradigms for the verb “sal-i-r” ‘to go out’ are as follows:

²¹Interestingly, Fábregas (2022, p. 5) rejects the widely held hypothesis that the theme vowel in 1SG forms is deleted before *-o* so as to avoid creating a hiatus. First, the theme vowel of Conjugation III, *-i*, could give rise to a diphthong. Nonetheless, a 1SG present indicative form such as **vivio* is ungrammatical. Second, as Fábregas (2022, p. 5) points out, the verbalizer *-ea(r)* “consists in fact of a hiatus”, thus showing that hiatus avoiding is not a sufficient condition to trigger the deletion of the theme vowel.

(19)	salg-o	sal-e-s	sal-e	sal-i-mos	sal-i(i)s	sal-e-n
	salg-a	salg-a-s	salg-a	salg-a-mos	salg-a-is	salg-a-n

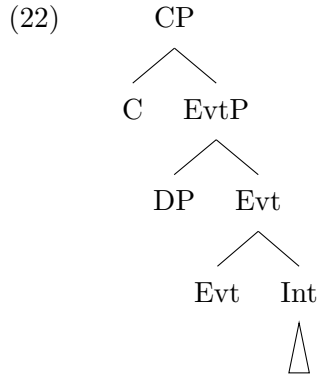
This distributional pattern is known as L-pattern.²² Fábregas (2022, p. 6) also notes that G-marked verbs also show an irregular 2SG imperative form. For example, compare the 2SG imperative forms of the verbs *salir* and “part-i-r” ‘to leave’:

- (20) a. sal-i
 go.out-TH
 ‘Go out’
 b. ¡Sal!
 go.out.IMP
 ‘Go out!’
- (21) a. part-i
 leave-TH
 ‘leave’
 b. ¡Part-e!
 leave-TH.IMP
 ‘Leave!’

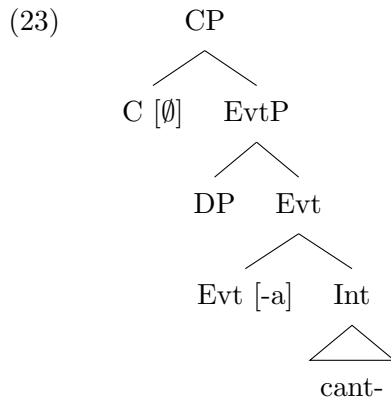
As shown in (20), G-marked verbs “lose their traditional ThV in the 2SG imperative” (Fábregas, 2022, p. 6). The solution to these two puzzles—presence of an irregular *-g* in present tense forms and lack of the theme vowel in the 2SG forms of the imperative—resides, according to Fábregas, in the different sizes of the lexical items spelling-out the structures in question.

First, Fábregas (2022, p. 24) assumes the following structure for the imperative in (22).

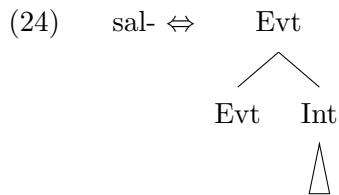
²²For a detailed overview of the L-pattern, see Maiden (2018, § 5).



He further assumes that “C is spelled out as zero in the imperative.” (Fábregas, 2022, p. 24) Thus, the 2SG form of the imperative for a regular verb such as *cant-a-r*, is spelled-out as follows:

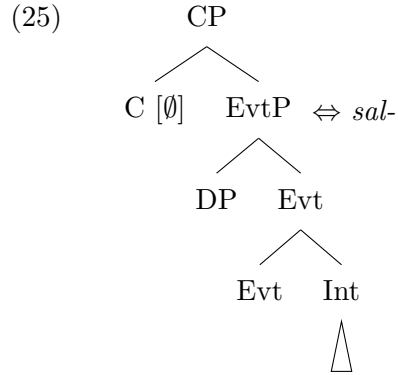


On the other hand, because they lose their theme vowel in the 2SG imperative, Fábregas (2022) proposes G-marked verbs to correspond to the structure in (24).

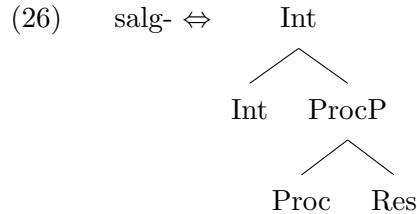


In this case too, the lexical item spelling-out the verb consumes the Evt head, otherwise lexicalized by the theme vowel. In nanosyntactic terms, the

lexical entry in (24) overrides the lexical entry of the theme vowel in the imperative. Thus, the 2SG imperative form of *salir* is spelled-out as follows:



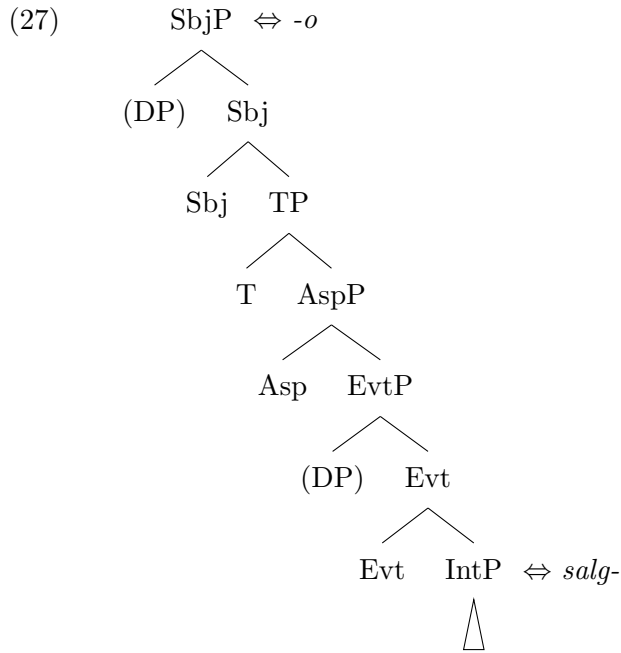
As for the irregular *g-* appearing in present tense forms, Fábregas (2022, p. 26) proposes that G-marked verbs “store two exponents for the verbal stem”. In other words, such verbs have a bigger allomorph and a smaller allomorph. The bigger allomorph is the one that appears in the imperative. The smaller allomorph for the verb *salir* is as follows:²³



In this way, Fábregas can account for the 1SG forms of the present indicative for G-marked verbs:²⁴

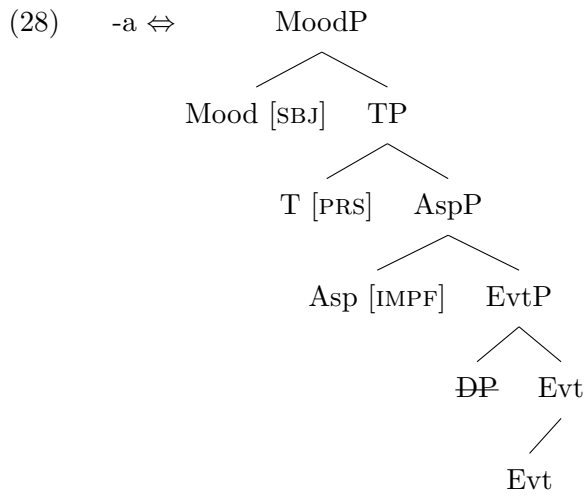
²³For a different account of G-marked verbs in Italian, see Lampitelli (2017).

²⁴As for “the apparent ThV that is visible with these verbs in the present indicative”, Fábregas (2022, p. 25) assumes that it “is, in fact, a spell out of the T head”. Under normal circumstances, the T head is spelled out as \emptyset in the present indicative. But with G-marked verbs, it “gets exceptionally spelled out with an *-e/-i* exponent.” (Fábregas, 2022, p. 25) Thus, in a form such as 2SG present indicative *sal-e-s*, the vowel *-e* realizes T.

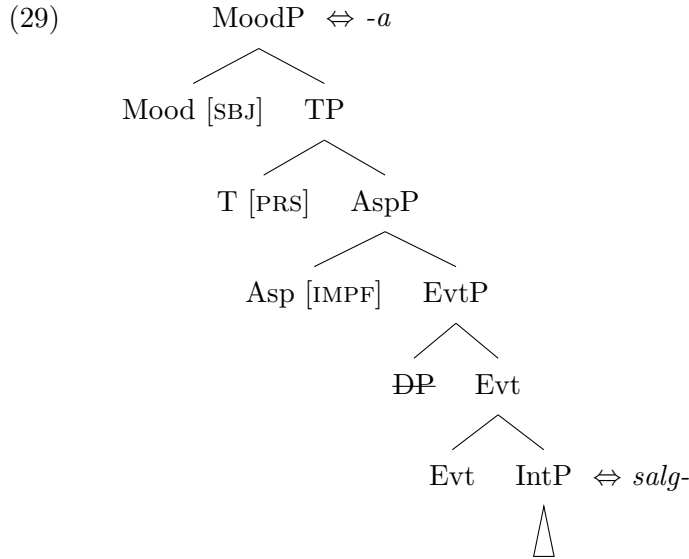


More specifically, in the 1SG form of the present indicative, the inflectional ending *-o* overrides the bigger allomorph in (24).

Finally, the occurrence of the smaller allomorph in the present subjunctive forms can be accounted for by assuming that subjunctive markers can spell-out an entire clausal constituent, much as 1SG marker *-o*. For instance, the lexical entry for the subjunctive marker *-a* is as follows:



This marker overrides the bigger allomorph of G-marked verbs:



5.2.2 Medová & Wiland (2018)

Medová and Wiland (2019, p. 1) have recently argued that “semelfactives are bigger than degree achievements” in Czech and Polish, although “the morphemes they are made of are often syncretic”. In particular, as Medová and Wiland (2019, p. 1466) highlight, “semelfactive stems are syntactically bigger than degree achievement stems in two ways.” First, semelfactive roots are bigger than degree achievements roots. Second, “semelfactive stems spell out the argument structure of a larger size than degree achievements do.” (Medová and Wiland, 2019, p. 1466) Thus, in Medová and Wiland’s account a central role is played by the different sizes of the lexical entries spelling-out the different syntactic structures involved in semelfactives and degree achievements.

In short, Medová and Wiland (2019) build on the following sets of assumptions.²⁵

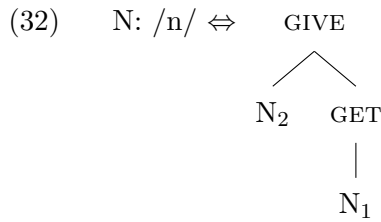
(30) Empirical assumptions concerning NU-stems (Medová and Wiland, 2019, p. 1465)

- a. Semelfactive NU-stems have nominal roots.

²⁵We do not discuss these assumptions further. See the original article for more details.

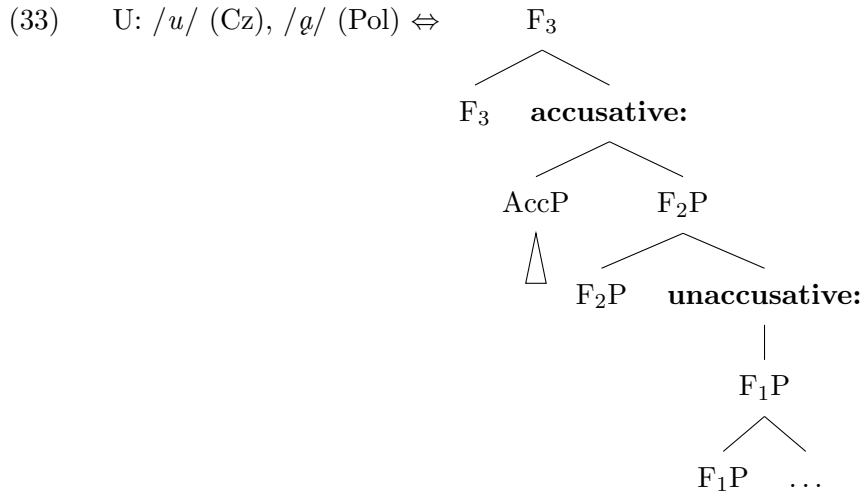
- b. Degree achievement NU-stems have adjective roots.
 - c. Semelfactive NU-stems are accusative and unergative.
 - d. Degree achievement NU-stems are unaccusative.
- (31) Containment assumptions (adapted from Medová and Wiland, 2019, p. 1464)
- a. verb > noun > adjective
 - b. GIVE > GET
 - c. unergative > accusative > unaccusative

The Czech suffix -NU as well as its Polish equivalent Ną is involved in the formation of both semelfactives and degree achievements. As Medová and Wiland (2019, p. 1477) observe, “NU is rather specific among the Slavic themes: not only it creates two aspectually distinct types of verbs, it is also the only Slavic theme that has a consonant in the onset.” Indeed, they claim it should be decomposed into the morpheme *N-* and the true theme *-U*. The morpheme *N* spells-out a light verb structure that is responsible for both the *get*-reading of the degree achievements and the *give*-reading of semelfactives.²⁶ The theme *U* is instead responsible for the differences in argument structure properties between degree achievements and semelfactives. Their lexical entries are thus as follows:²⁷



²⁶For a justification of this stance, see Medová and Wiland (2019, § 4).

²⁷The lexical entry for the theme *U* contains an accusative layer. The possibility for lexical entries to store stranded case layers is called *Peeling*. We do not discuss this possibility further. See Medová and Wiland (2019, § 2.3) for more details.



The suffix NU attaches to both nominal and adjectival roots.²⁸ When attached to adjectival roots, it gives rise to degree achievements. Consider the following examples:

- (34) Czech Degree achievements
- a. tmav-ý - tmav-NOU-t
√-ADJ - √-TH-INF
'dark' - 'darken'
 - b. trpk-ý - trpk-NOU-t
√-ADJ - √-TH-INF
'bitter' - 'get bitter'
 - c. tuh-ý - tuh-NOU-t
√-ADJ - √-TH-INF
'stiff' - 'become stiff'
- (35) Polish Degree achievements
- a. blad-y - blad-N̄a-ć
√-ADJ - √-TH-INF
'pale' - 'become pale'
 - b. głuch-y - gł-N̄a-ć
√-ADJ - √-TH-INF
'deaf' - 'become deaf'

²⁸Medová and Wiland (2019, note 20) note that “a lexical category of a Slavic root is essential in determining its possibility to form larger grammatical categories upon merger with functional affixes.” Consequently, they “reject the idea that roots are acategorical.” (Medová and Wiland, 2019, note 20)

- c. gorzk-y - gorzk-N_ā-ć
 $\sqrt{\text{-ADJ}}$ - $\sqrt{\text{-TH-INF}}$
 ‘sour’ - ‘become sour’

Thus, “The format of a degree achievement stem is [...] ‘an adjectival root + NU’” (Medová and Wiland, 2019, p. 1479).

Likewise, the format of a semelfactive stem is: nominal root + NU. Consider the following examples:

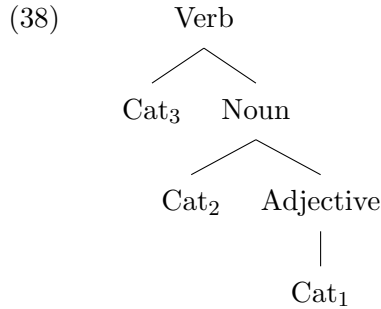
(36) Czech Semelfactives

- a. písk - písk-NOU-t
 $\sqrt{\text{.NOUN}}$ - $\sqrt{\text{-TH-INF}}$
 ‘whistle’ - ‘whistle once’
- b. vzlyk - trpk-NOU-t
 $\sqrt{\text{.NOUN}}$ - $\sqrt{\text{-TH-INF}}$
 ‘sob’ - ‘give a sob’
- c. klik - klik-NOU-t
 $\sqrt{\text{.NOUN}}$ - $\sqrt{\text{-TH-INF}}$
 ‘click’ - ‘click once’

(37) Polish Semelfactives

- a. pisk - pisk-N_ā-ć
 $\sqrt{\text{.NOUN}}$ - $\sqrt{\text{-TH-INF}}$
 ‘squeak’ - ‘give a squeak’
- b. kop - kop-N_ā-ć
 $\sqrt{\text{.NOUN}}$ - $\sqrt{\text{-TH-INF}}$
 ‘kick’ - ‘kick once’
- c. krzyk - krzyk-N_ā-ć
 $\sqrt{\text{.NOUN}}$ - $\sqrt{\text{-TH-INF}}$
 ‘click’ - ‘click once’

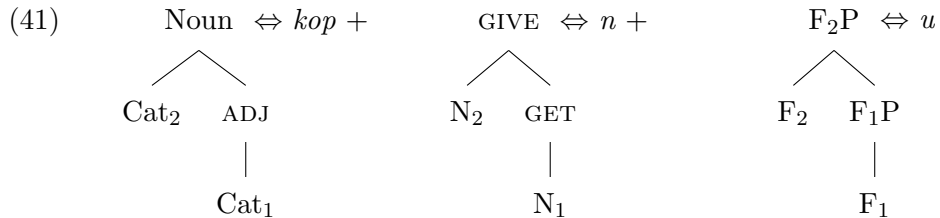
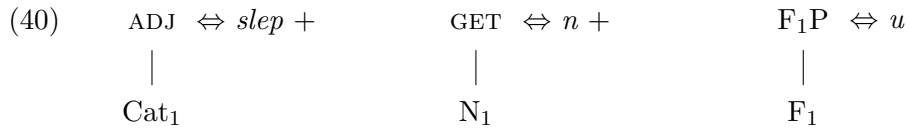
The key point of Medová and Wiland’s account is that “the relation between the size of the N morpheme and the category of the root can be reduced to a general size-to-size selectional relation under a containment theory of lexical categories” (Medová and Wiland, 2019, p. 1491). Similarly, “the relation between how much argument structure U spells out is dependent on the syntactic size of the root and the light N morpheme.” (Medová and Wiland, 2019, p. 1501)

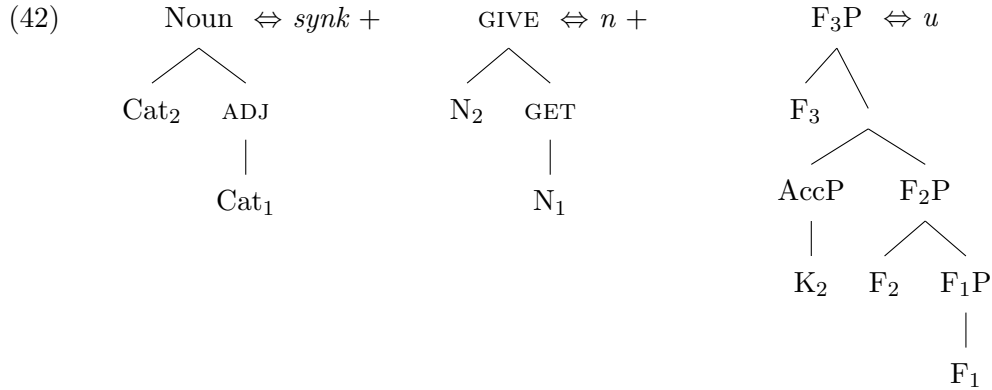


Given the containment hypothesis regarding the lexical categories in (38) and the lexical entries in (32) and (33), this means that the small adjectival roots of degree achievements are selected by the small N_{GET} of (32), which in turn, is selected by the small F_1P of (33). By contrast, the big nominal roots of semelfactives are selected by the big N_{GIVE} of (32). The big N_{GIVE} can be selected by the big F_2P of (33), in the case of accusative semelfactives, or by the even bigger F_3P in the case of unergative semelfactives. Thus, the structures of such verbs can be summarized as follows:

- (39)
- a. Degree achievement: $[[[ADJ-root]N_{GET}] U_{UNACC}]$
 - b. Accusative semelfactives: $[[[N-root] N_{GIVE>GET}] U_{ACC>UNACC}]$
 - c. Unergative semelfactives: $[[[N-root] N_{GIVE>GET}] U_{UNERG>ACC>UNACC}]$

In this way, it is possible to account for both the semantic and argument structure properties of these two classes of verbs in a principled way. Here we illustrate the simplified derivation of the degree achievement *slep-n-u* ‘get blind’ (in (40)), of the accusative semelfactive *kop-n-u* ‘give a kick’ (in (41)), and of the unergative semelfactive *synk-n-u* ‘hiss once’ (in (42)).





5.2.3 Bertocci & Pinzin (2020)

Recently, Bertocci and Pinzin (2022, p. 49) have provided an account of an asymmetry observed in the domain of agentive nominalizations in Latin, based on the idea that “not all roots are equal with respect to the functions they are capable of realizing.” The asymmetry in question opposes Conjugation III verbs to all the other verbs. Bertocci and Pinzin (2022) focus on three strategies to derive agentive nouns: -tor formations, agentive root nouns (agentive RN), and root compounds (RC). Only Conjugation III verbs “admit nominal agentive derivations in which there is no overt nominalizer” (Bertocci and Pinzin, 2022, p. 31). In other words, only Conjugation III verbs allow for agentive root nouns and root compounds.²⁹

Bertocci and Pinzin (2022) set out to account for this asymmetry by rephrasing the traditional distinction between “weak” and “strong” morphology in terms of different sizes of the relevant lexical entries. In particular, they claim that “there are two main classes of lexical bases forming verbs in Latin” (Bertocci and Pinzin, 2022, p. 41). On the one hand, there is the thematic class. In this class, the verbalizing function is played by the theme vowel \bar{a} or $-\bar{i}$.³⁰ The lexical basis of the verb is instead “inserted as a modifier of the theme vowel” (Bertocci and Pinzin, 2022, p. 40). Thus, the lexical entries for *laud- \bar{a}* ‘praise’ are as follows:

²⁹Interestingly, both these strategy are unproductive. In particular, there are only three agentive root nouns that are “transparently related to synchronically attested verbs” (Bertocci and Pinzin, 2022, p. 28). These are: *cleps*, *dux*, and *rēx*. All three are related to Conjugation III verbs: *clep̄ere*, *duc̄ere*, and *reḡere*, respectively.

³⁰As Bertocci and Pinzin (2022, p. 41) point out, they consider “only \bar{a} and $-\bar{i}$ as real verbalizers.” The other theme vowels are instead taken to spell-out “functional features related to the actional-aspectual domain” (Bertocci and Pinzin, 2022, p. 41).

- (43) a. /*laud*/ ⇔ [mdfP]
 b. /*ā*/ ⇔ [VP]

On the other hand, there is the athematic class. In this class, “the lexical basis of the verb directly realizes the basic verbal function” (Bertocci and Pinzin, 2022, p. 40). Thus, athematic roots are bigger than thematic roots, because they can spell-out the verbalizing function without needing a theme vowel. For example, the lexical entry for *duc-* is as follows:

- (44) /*duk*/ ⇔ [mdfP [VP]]

This difference in size is all that is needed to account for the asymmetry in question. For example, agentive RNs can be accounted for in terms of syncretism. In other words, athematic roots are big enough to spell-out both the verbal and nominal-agentive functions. By contrast, as Bertocci and Pinzin (2022, p. 46) observe, if a root needs a theme vowel to realize the verbalizing function, it “will not be capable of realizing by itself any function higher than VP, including a possible nominalizer.”

As for RCs, Bertocci and Pinzin (2022, p. 42) note that they generally involve the incorporation of the theme argument of the verb. For example, the RC in (45) is formed by merging a verbal basis—*fāc*—with a nominal theme—*pont*—through the linking element *ī*.

- (45) [[[*pont-ī*]_{NOUN}-[*fak*]_{ROOT}]_{COMP-S}]_{NOM.S}

Thus the structure of a RC is the following:

- (46) [ThemeP[mdfP [VP]]]

Given the different sizes of thematic and athematic roots and the lexical entries in (47), “there is an incompatibility between ‘thematic’ derivations and theme incorporation.” (Bertocci and Pinzin, 2022, p. 43) Bertocci and Pinzin (2022, p. 43) define such incompatibility as syntagmatic. As they write: “two formations are syntagmatically incompatible when they compete for the realization of the same function” (Bertocci and Pinzin, 2022, p. 43). In the case at hand, the competition involves the lexical basis of the thematic roots and the nominal theme of RCs. For example, the lexical entry in (43-a) competes with the lexical entry in (47-a) for the realization of mdfP. When the derivation builds more structure above mdfP, the lexical entry in (43-a) can no longer match the structure, thus being overridden by (47-a). Because the structure of a RC always involves ThemeP (see (46)), thematic roots will never appear in such structures.

- (47) a. /*pont(i)*/ ⇔ [[themeP [mdfP]]]
 b. /*fǎc*/ ⇔ [VP]

Moreover, as Bertocci and Pinzin (2022, pp. 48–49) point out, size differences also explain three seemingly unrelated facts concerning RCs. First, RCs are incompatible with *-tor* nominalization.³¹ Second, only a small subset of athematic roots is used in RCs. Third, verbal derivation involving theme-incorporation, such as **pontifacio*, is unproductive. According to Bertocci and Pinzin (2022, p. 49), the explanation of these facts lies in the relative big size of RCs. In particular, as Bertocci and Pinzin (2022, p. 49) point out, “the incorporation of the theme directly leads to the realization of the nominalizing function, without the projection of the vP.” Thus, the revised structure of RCs is as follows:

- (48) [nP [themeP [themeP [mdfP]] [VP]]]

A RC such as /*pontifǎc*/ spells-out the entire structure:

- (49) /*pontifǎc*/ ⇔ [nP [themeP [themeP [mdfP]] [VP]]]

Because, as Bertocci and Pinzin (2022, p. 49) observe, “Both the nominalization in *-tor* and the inflected form of the verb require the vP layer”, RCs are incompatible with both formations.

5.3 Prospects for future research

Research on verbal theme vowels is thriving. A special collection devoted to the topic “Thematic formatives and linguistic theory” recently appeared in the journal *Glossa: a journal of general linguistics*. We conclude this work by pointing to three trends which we deem to be the most promising for future research.

First, we agree with Fábregas (2022, p. 37) that “a syntactic analysis of ThVs will always force us to ask deeper questions about the internal structure of inflection.” Thus, the first trend consists in following in Fábregas’ footsteps. For instance, as he acknowledges (Fábregas, 2022, p. 16), a complete analysis of the Spanish verbal inflection under the assumptions of Nanosyntax has not yet been attempted. Nor his account of the G-marked

³¹As Bertocci and Pinzin (2022, p. 31) note, this fact is surprising. Indeed, athematic roots such as *cap-* can combine with *-tor*: *captor*. On the other hand, *cap-* also allows the formation of RCs: *au-cep-s*. Thus, the absence of a form such as **avi-cap-tor* is unexpected.

verbs can be extended to “all verbs that follow and [sic] L-shaped irregularity pattern in Spanish.” (Fábregas, 2022, p. 33). To date, there is no alternative to the morphomic account of the L-pattern proposed by Maiden (2018). Moreover, so far as we can tell, there are no attempts in the literature to use the nanosyntactic tools in other Romance languages.

The second trend relates to diachrony. As Grestenberger (2022, p. 2) points out, “the diachrony of verbalizers and other categorizers is somewhat understudied from a formal perspective”. In this respect too, Nanosyntax might prove helpful. For example, Calabrese (2021, pp. 30–31) observes that “there is no reason to postulate ornamental vocalic elements for Sanskrit or Greek, or for PIE [Proto-Indo-European].” Consequently, identifying the diachronic paths that led to the development of such elements can shed an insightful light on the nature of the elements in question.³² Additionally, Bertocci and Pinzin (2022, note 25) acknowledge that their analysis “works in a strictly synchronic perspective, or provided that the Latin system underwent deep reanalysis.” It would be interesting to apply the nanosyntactic tools, especially the idea of “different sizes for different lexical items”, to the diachronic problem of the development of theme vowels.

Finally, the third trend is an extreme version of the Radical Decomposition stance. We would like to call this trend *Radical Eliminativism*. According to this trend, there are no conjugation classes. As Kouneli (2022, p. 1) puts it: “what looks like conjugation classes can be reduced to the spellout of a verbalizing head”. For example, Kastner and Fabienne (2020, p. 6) have argued, based on psycholinguistic evidence, that “French has no conjugation classes as such.” According to them, French “has regular verbs (-er, ‘Gr. 1’), a small set of irregulars (‘Gr.3’), and regular verbs with the /i(s)/ suffix (‘Gr. 2’).” (Kastner and Fabienne, 2020, p. 6) In particular, they show that the morpheme /i(s)/, traditionally associated with Conjugation II, is not ornamental. Rather, it is a productive suffix associated with change-of-state semantics. Kastner and Fabienne (2020, p. 6) takes /i(s)/ to spell-out v_{CAUSE} . Kouneli (2022, p. 2) has similarly argued

³²Calabrese (2021, § 3.0) proposes an account of the development of theme vowels in Latin couched in DM terms. His account rests on the assumption that there is “an overarching generalization” (Calabrese, 2021, p. 33) characterizing Latin verbal morphophonology. More specifically, “whereas only consonants could be the exponents of functional nodes; vocalic pieces could only be the exponents of non-functional nodes, i.e., ornamental morphology” (Calabrese, 2021, p. 33). He further contends that the tendency “for vocalic pieces to become ornamental” in Latin reflects “a clear Indo-European tendency” (Calabrese, 2021, note 60). Thus, in Latin “the original vocalic exponents of v^0 -forming derivatives [...] became analyzed as [...] ‘ornamental’ pieces added to all instances of v^0 by a general rule.” (Calabrese, 2021, p. 33)

that the Nilotic language Kipsigis “does not have conjugation classes”. In particular, “what is traditionally called the second conjugation (Class II) in the Nilotic literature [...] involves a prefixal empty mora spelling out the verbalizing head” Kouneli (2022, p. 2). Kouneli (2022, § 3.2) further argues that the prefixal mora of traditional Class II verbs spells-out v_{CAUSE} , given that “most verbs participating in the causative alternation [...] do so by alternating between Class I (intransitive, anticausative variant) and Class II (transitive, causative variant)” (Kouneli, 2022, p. 14). Additionally, Kouneli (2022, § 4.2) points out an interesting typological generalization concerning theme vowels. There seems to be “an asymmetry between nouns and verbs: nouns have declension classes and theme vowels, while verbs have neither.” (Kouneli, 2022, p. 26) More generally, it seems that cross-linguistically nouns have more classes than verbs. It would be interesting to explore this generalization in light of the containment hypothesis about lexical categories adopted by Medová and Wiland (2019). Kouneli (2022, p. 2) explicitly builds on the proposal put forward by Spyropoulos et al. (2015) regarding second conjugation verbs in Modern Greek. In short, traditional second conjugation verbs in Modern Greek “take a vocalic extension consisting of an abstract vocalic slot.” (Spyropoulos et al., 2015, p. 299) Although the abstract vocalic slot may have different realizations (see Spyropoulos et al. (2015, p. § 7)), it consistently realizes the verbalizing function, that is, v . Assuming this abstract vocalic slot allows to account for the irregular stress pattern of second conjugation verbs. More specifically, “the distinct stress patterns of 2nd Conjugation verbs [...] result from the interplay between the mode of surface manifestation of this abstract vowel and the rules that regulate stress-assignment in Greek verbs.” (Spyropoulos et al., 2015, p. 306) As Spyropoulos et al. (2015, p. 321) acknowledge, the major gain of their analysis is that “it allows us to offer a unified treatment of the Greek verbal morphology and derivations without retreating extensively to stem allomorphy”. In particular, it is possible to dispense with conjugation class features because “the conjugation-specific inflection pattern [...] derives from the morphophonological properties” of the exponent spelling out v (Spyropoulos et al., 2015, note 17). Nanosyntax should to be the null hypothesis in exploring the Radical Eliminativism trend.

Bibliography

- Acquaviva, P. (2009). Roots and lexicality in distributed morphology. In Galani, A., Rendinger, D., and Yeo, N., editors, *York-Essex Morphology Meeting 5*, pages 1–21. University of York.
- Anderson, S. R. (2015). The morpheme: Its nature and use. In Baerman, M., editor, *The Oxford Handbook of Inflection*, pages 11–33. Oxford University Press, Oxford.
- Aronoff, M. (1988). Two senses of lexical. In *Eastern States Conference on Linguistics (ESCOL '88)*, pages 1–11. University of Pennsylvania, Philadelphia, PA.
- Aronoff, M. (1994). *Morphology by Itself: Stems and Inflectional Classes*. MIT Press, Cambridge, MA.
- Aronoff, M. (1998). Isomorphism and monotonicity: or, the disease model of morphology. In Lapointe, S., Brentani, D. K., and Feller, P., editors, *Morphology and its Relation to Syntax and Phonology*, pages 411–417. CSLI, Stanford.
- Arregi, K. (2000). How the spanish verb works. *Talk at LSRL 30*.
- Arregi, K. and Nevins, A. (2007). Obliteration vs. impoverishment in the basque g-/z- constraint. *Penn Working Papers in Linguistics*, 13(1):1–14.
- Baunaz, L., Clerq, K. D., Haegeman, L., and Lander, E., editors (2018). *Exploring Nanosyntax*. Oxford University Press, Oxford.
- Baunaz, L. and Lander, E. (2018). Nanosyntax: the basics. In Baunaz, L., Clerq, K. D., Haegeman, L., and Lander, E., editors, *Exploring Nanosyntax*, pages 3–56. Oxford University Press, Oxford.

- Bertocci, D. and Pinzin, F. (2022). Two kinds of verbal root in latin: evidence from thematic vowels and word-formation processes. *Lingue antiche e moderne*, 9:23–56.
- Bobaljik, J. D. (2000). The ins and outs of contextual allomorphy. In Grohmann, K. K. and Struijke, C., editors, *University of Maryland Working Papers in Linguistics*, volume 10, pages 35–71. University of Maryland, College Park.
- Bobaljik, J. D. (2012). *Universals in comparative morphology: Suppletion, superlatives, and the structure of words*. MIT press, Cambridge, MA.
- Bobaljik, J. D. (2017). Distributed morphology. In *Oxford Research Encyclopedia of Linguistics*. Oxford University Press, Oxford.
- Bobaljik, J. D. and Wurmbrand, S. (2013). Suspension across domains. In Matushansky, O. and Marantz, A., editors, *Distributed Morphology today: Morphemes for Morris Halle*, pages 185–198. MIT press, Cambridge MA.
- Bonet, E. and Harbour, D. (2012). Contextual allomorphy. In Jochen, T., editor, *The morphology and phonology of exponence*, pages 195–235. Oxford University Press Oxford, Oxford.
- Božič, J. (2015). *Spell-out of phonological domains: The case of Slovenian*. PhD thesis, University of British Columbia MA thesis.
- Božič, J. (2016). Locality of exponence in distributed morphology: Root suppletion in slovenian. *Lingbuzz/003032*.
- Božič, J. (2019). Constraining long-distance allomorphy. *The Linguistic Review*, 36(3):485–505.
- Caha, P., De Clercq, K., and Wyngaerd, G. V. (2019). On the difference between a and a root. *Lingbuzz/004391*.
- Calabrese, A. (2015). Irregular morphology and athematic verbs in italo-romance. *Isogloss. A journal on variation of Romance and Iberian languages*, pages 69–102.
- Calabrese, A. (2021). Latin verbal morphology and the diachronic development of its thematic and athematic constructions. Ms. University of Connecticut.

- Choi, J.-H. and Harley, H. (2019). Locality domains and morphological rules: Phases, heads, node-sprouting and suppletion in Korean honorification. *Natural Language and Linguistic Theory*, 37(4):1319–1365.
- Cinque, Guglielmo e Rizzi, L. (2010). The cartography of syntactic structures. In Heine, B. and Narrog, H., editors, *The Oxford Handbook of Linguistic Analysis*, pages 51–65. Oxford University Press, Oxford.
- El Fenne, F. (2020). Paradigm structure in French verbal inflection. *SCRIPTA*, 24(51):103–135.
- Embick, D. (2000). Features, syntax, and categories in the Latin perfect. *Linguistic inquiry*, 31(2):185–230.
- Embick, D. (2003). Locality, listedness, and morphological identity. *Studia linguistica*, 57(3):143–169.
- Embick, D. (2007). Linearization and local dislocation: Derivational mechanics and interactions. *Linguistic analysis*, 33(3-4):303–336.
- Embick, D. (2010). *Localism versus Globalism in morphology and phonology*, volume 60. MIT Press.
- Embick, D. (2016). On the distribution of stem alternants: *Separation* and its limits. In Bermúdez-Otero, R. and Luis, A., editors, *The morpheme debate: Diagnosing and analysing morphomic patterns*, pages 276–305. Oxford University Press, Oxford.
- Embick, D. and Halle, M. (2005). On the status of stems in morphological theory. In Geerts, T. and Jacobs, H., editors, *Romance languages and linguistic theory 2003: Selected papers from 'Going Romance' 2003*, pages 59–88, Amsterdam. John Benjamins.
- Embick, D. and Marantz, A. (2008). Architecture and blocking. *Linguistic inquiry*, 39(1):1–53.
- Embick, D. and Noyer, R. (2001). Movement operations after syntax. *Linguistic inquiry*, 32(4):555–595.
- Embick, D. and Noyer, R. (2007). Distributed morphology and the syntax/morphology interface. In Ramchand, G. and Reiss, C., editors, *The Oxford handbook of linguistic interfaces*, pages 289–324. Oxford University Press, Oxford.

- Enoch, O. A., Cinque, G., Carr, A., Gutiérrez-bravo, R., Ramchand, G., and Samek-Lodovici, V. (2022). The romance interviews: Cartography. *Isogloss*, 8(1):1–10.
- Fábregas, A. (2007). Nanosyntax: A short primer to a new approach to language. *Nordlyd*, 34(2):165–199.
- Fábregas, A. (2018). Theme vowels are verbs. In *The unpublished manuscript: A collection of LingBuzz papers to celebrate Michal Starke's 50th birthday*. Lingbuzz.
- Fábregas, A. (2022). What 1sg forms tell us about spanish theme vowels. *Glossa: a journal of general linguistics*, 7(1):1–40.
- Gouskova, M. and Bobaljik, J. D. (2020). Allomorphy and vocabulary insertion. In Alexiadou, A., Kramer, R., Marantz, A., and Oltra-Massuet, I., editors, *The Cambridge Handbook of Distributed Morphology*. Cambridge University Press, Cambridge.
- Grestenberger, L. (2022). To *v* or not to *v*? theme vowels, verbalizers, and the structure of the ancient greek verb. *Glossa: a journal of general linguistics*, 7(1):1–42.
- Gribanova, V. (2015). Exponence and morphosyntactically triggered phonological processes in the russian verbal complex. *Journal of Linguistics*, 51(1):519–561.
- Guekguezian, P. and Dolatian, H. (2021). Distributing theme vowels across roots, verbalizers and voice in western armenian verbs. Lingbuzz/006027.
- Halle, M. (1990). An approach to morphology. In *Proceedings of the North East Linguistics Society 20*, volume 1, pages 150–184, Amherst, GLSA. University of Massachusetts, Amherst.
- Halle, M. (1997). Distributed morphology: Impoverishment and fission pf: Papers at the interface. In *MIT Working Papers in Linguistics*, volume 30, pages 425–450. MIT press, Cambridge MA.
- Halle, M. (2019). Aspects of the morphophonology of the verb in latin and in german and english. *Linguistic Inquiry*, 50(1):3–12.
- Halle, M. and Idsardi, W. (1996). General properties of stress and metrical structure. In Goldsmith, J. A., editor, *The Handbook of Phonological Theory*, pages 403–443. Blackwell, Oxford and Cambridge.

- Halle, M. and Marantz, A. (1993). Distributed morphology and the pieces of inflection. In Hale, K. and Keyser, S. J., editors, *The View from Building 20: Essays in Honor of Sylvain Bromberger*, pages 111–176. MIT press, Cambridge MA.
- Halle, M. and Marantz, A. (1994). Some key features of distributed morphology. In Carnie, A., Harley, H., and Bures, T., editors, *Papers on Phonology and Morphology*, volume 21, pages 275–288. MIT, Cambridge, MA.
- Harley, H. (2014). On the identity of roots. *Theoretical linguistics*, 40(3-4):225–276.
- Harley, H. and Noyer, R. (1999). Distributed morphology. *Glott international*, 4(4):3–9.
- Haspelmath, M. (2006). Against markedness (and what to replace it with). *Journal of Linguistics*, 42(1):25–70.
- Haugen, J. D. and Siddiqi, D. (2013). Roots and derivation. *Linguistic Inquiry*, 44(3):493–517.
- Hockett, C. F. (1947). Problems of morphemic analysis. *Language*, 23(4):321–343.
- Julien, M. (2015). Theme vowels in north sámí: Spanning and maximal expression. *Lingua*, 164:1–24.
- Kastner, I. and Fabienne, M. (2020). Dissolving the french conjugation classes. In *Going Romance 34th*.
- Kayne, R. S. (2016). What is suppletive allomorphy? on ‘went’ and ‘*goed’ in english. Ms. New York University.
- Kayne, R. S. and Collins, C. (2023). Toward a theory of morphology as syntax. Ms. New York University.
- Kiparsky, P. (1973). ‘elsewhere’ in phonology. In Anderson, S. R. and Kiparsky, P., editors, *A festschrift for Morris Hale*, pages 93–106. Holt, Reinhart and Winston, New York.
- Kouneli, M. (2022). Inflectional classes in kipsigis. *Glossa: a journal of general linguistics*, 7(1):1–33.

- Lampitelli, N. (2017). A morphophonological analysis of the velar insert in Italian verbs. *Glossa: a journal of general linguistics*, 2(1):1–26.
- Leivada, E. (2020). Misused terms in linguistics. *Inference: International Review of Science*, 5(2):3–10.
- Lowenstamm, J. (2014). Affixes as roots. In Alexiadou, A., Borer, H., and Schäfer, F., editors, *The syntax of roots and the roots of syntax*, pages 230–258. Oxford University Press, Oxford.
- Maiden, M. (2018). *The Romance verb, Morphomic structure and diachrony*. Oxford University Press, Oxford.
- Marantz, A. (1996). Cat as phrasal idiom: consequences of late insertion in distributed morphology. Ms.
- Marantz, A. (1997). No escape from syntax: Don’t try morphological analysis in the privacy of your own lexicon. In Dimitriadis, A., Siegel, L., Surek-Clark, C., and Williams, A., editors, *Proceedings of the 21st Penn Linguistics Colloquium*, pages 201–225, Philadelphia. UPenn Working Papers in Linguistics.
- Marantz, A. (2001). Words. WCCFL XX Handout, UCS.
- Marvin, T. (2003). *Topics in the Stress and Syntax of Words*. PhD thesis, Massachusetts Institute of Technology.
- Medová, L. T. and Wiland, B. (2019). Semelfactives are bigger than degree achievements. *Natural Language & Linguistic Theory*, 37(4):1463–1513.
- Merhant, J. (2015). How much context is enough? two cases of span-conditioned stem allomorphy. *Linguistic Inquiry*, 46(2):273–303.
- Milosavljevič, S. and Arsenijevič, B. (2022). What differentiates serbo-croatian verbal theme vowels: content or markedness? *Glossa: a journal of general linguistics*, 7(1):1–36.
- Noyer, R. (1998). Impoverishment theory and morphosyntactic markedness. In Lapointe, S. G., Brentari, D. K., and M.Ferrell, P., editors, *Morphology and Its Relation to Phonology and Syntax*, pages 264–285. CSLI Publications, Stanford, CA.
- Oltra-Massuet, I. (1999a). On the constituent structure of Catalan verbs. *MIT Working Papers in Linguistics*, 33:279–322.

- Oltra-Massuet, I. (1999b). *On the notion of theme vowel: A new approach to Catalan verbal morphology*. PhD thesis, Massachusetts Institute of Technology.
- Oltra-Massuet, I. and Arregi, K. (2005). Stress-by-structure in spanish. *Linguistic Inquiry*, 36(1):43–84.
- Pomino, N. and Remberger, E.-M. (2022). Does french have theme vowels? *Glossa: a journal of general linguistics*, 7(1):1–32.
- Ramchand, G. (2018). *Situations and syntactic structures*. MIT Press, Cambridge, MA.
- Siddiqi, D. (2009). *Syntax within the Word: Economy, allomorphy, argument selection in Distributed Morphology*. John Benjamins, Amsterdam.
- Simonovič, M. (2020). Categories, root complexes and default stress. *Linguistica*, 60(1):103–117.
- Simonovič, M. and Mišmaš, P. (2022). Lowest theme vowels or highest roots? an ‘unaccusative’ theme-vowel class in slovenian. *Glossa: a journal of general linguistics*, 7(1):1–31.
- Simonovič, M. and Mišmaš, P. (2023). Theme-vowel class indeterminacy and root allomorphy in slovenian. *Glossa: a journal of general linguistics*, 8(1):1–38.
- Spyropoulos, V., Anthi, R., and Panagiotidis, P. (2015). Verbalizers leave marks: Evidence from greek. *Morphology*, 25(3):299–325.
- Starke, M. (2009). Nanosyntax: A short primer to a new approach to language. *Nordlyd*, 36(1):1–6.
- Starke, M. (2018). Complex left branches, spellout, and prefixes. In Baulanz, L., Clerq, K. D., Haegeman, L., and Lander, E., editors, *Exploring Nanosyntax*, pages 239–249. Oxford University Press, Oxford.
- Starke, M. (2011). Towards elegant parameters: Language variation reduces to the size of lexically stored trees. lingbuzz/001183.
- Starke, M. (2014). Cleaning up the lexicon. lingbuzz/004309.
- Svenonius, P. (2004). Slavic prefixes and morphology: and introduction to the nordlyd volume. *Nordlyd*, 32(2):177–204.

- Svenonius, P. (2012). Spanning. Ms. CASTL.
- Taraldsen, T. K. (2018). Spanning versus constituent lexicalization. In Bauraz, L., Clerq, K. D., Haegeman, L., and Lander, E., editors, *Exploring Nanosyntax*, pages 88–107. Oxford University Press, Oxford.
- Vanden Wyngaerd, G. (2018). Suppletion and affix reduction. *Lingbuzz/004095*.
- Zonneveld, W. (1982). The descriptive power of the dutch theme vowel. *Spektator*, 11:342–365.