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# Small syntactic terminal nodes, large Vocabulary Items: a spanning approach to irregular Romance verb inflection

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In a series of papers within the framework of Distributed Morphology (DM), Calabrese (2012 et seq.) has convincingly argued that there is a link between the (a)thematicity and the (ir)regularity of verbal forms: the presence of a Theme Vowel (ThV) has a direct effect on the regularity of the respective verbal forms whereas its absence may cause allomorphy. However, Calabrese posits numerous postsyntactic processes and idiosyncratic rules, which – in our opinion – lack cognitive plausibility. In this paper, we will show that *spanning* (Svenonius 2012; Merchant 2015) is an economical and adequate way to implement verbal allomorphy in Romance. We argue that morpho-phonologically realized ThVs function as a kind of intermediate domain delimiter and we show, following the DM-based Vocabulary Insertion-Only Model (Haugen & Siddiqi 2016), that many of the context-specific rules and processes proposed in other works can be reduced to Vocabulary Insertion. Our analysis keeps the elements in syntax as small as possible, but allows spanning Vocabulary Items (VIs), i.e. VIs that realize more than one syntactic terminal node at once. We will illustrate our approach through analyzes of grammatically determined athematicity, athematic conjugation classes (CC), and inherited athematicity in irregular Romance verb inflection.

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## 1 Introduction

In early Distributed Morphology (DM), Halle & Marantz (1993) propose a distinction between lexical morphemes (concrete morphemes or roots), with a fixed phonological expression, and abstract morphemes, whose phonological material is only inserted after syntax. Harley & Noyer (1999) argue instead that Late Insertion holds for all terminal nodes, but they still make a distinction between l-morphemes (i.e. open-class categories) and f-morphemes (i.e. closed-class categories): They assume that the features encoded in the terminal node and the feature specification of the Vocabulary Items (VI) are sufficient for determining one unique phonological expression (see also Marantz 1997) and that the spell-out of an f-morpheme is thus deterministic, although several (morpho-phonologically) unrelated forms may compete for insertion into an f-morpheme. For roots (= l-morphemes) Harley & Noyer (1999) claim that the VIs do not enter into competition with each other, which means that Vocabulary Insertion is unconditioned. In other words, there is a free choice in morpho-phonological spell-out: For instance, if a root is verbalized due to the combination with v°, it may be realized as *am(ar)* 'to love', *mov(er)* 'to move', *dorm(ir)* '(to) sleep' etc. (depending on its semantics). Variation in form (e.g. *mov(er)* vs. *muev(o)* '(I) move'), in their approach, is thus not captured by Vocabulary Insertion (Harley 2014), but rather by post-insertion readjustment rules.

One central problem regarding the distinction between l- and f-morphemes, however, concerns suppletion, which affects both f- and l-morphemes. In the approach outlined above, morpho-phonologically unrelated forms may compete for insertion in f-morphemes, but not in l-morphemes. However, it is simply impossible to derive, for example, the suppletive verbal form *fue* '(he/she) went' (and '(he/she) was') from the infinitive form *ir* '(to) go' (or *ser* '(to) be') by a well-motivated readjustment rule. The verb GO in Romance is particularly interesting in this context since it can be used as a lexical verbal form (containing a root or l-morpheme in the sense of Harley & Noyer 1999) as well as a functional verb (consisting only of f-morphemes). However, both uses have the same suppletive forms (Pomino & Remberger 2022a). The examples in (1) and (2) clearly show that suppletion and other patterns of allomorphy are not directly related to the distinction between l-morphemes and f-morphemes.

(1) a. Pedro va / iba / fue al cine. — lexical use of GO
'Pedro goes / went to the cinema.'
b. Pedro puede ir al cine.
'Pedro can go to the cinema.'

(2) a. Pedro va / iba / fue comiendo una manzana. — (progressive) — auxiliary use of GO
'Pedro is / was eating an apple.'
b. Este niño va a ser médico. — (future)
'This child is going to be a doctor.'

c. Va anocheciendo. (inchoative)
'Night is falling. / It's getting dark.'

Later work discusses whether allomorphy (including suppletion) is triggered by phonological or functional features (see Bobaljik 2000 for inward vs. outward context sensitivity) and which locality conditions must be met for allomorphy to occur. Considering the illustration in **Figure 1**, the form of the affix X may depend on the phonological form (here: /abc/) of the root and/or on the grammatical features [F2, F3] of Y. This means that the realization of X may be both inward and outward sensitive (**Figure 1a**). In contrast, for the realization of the root, only a grammatical feature of X may trigger root allomorphy. The realization of the root is therefore only outward sensitive (**Figure 1b**).

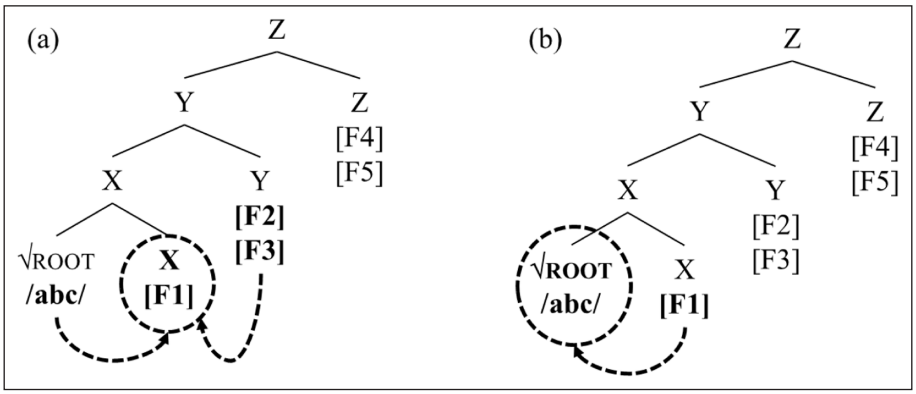


**Figure 1:** Inward (a) and outward (a, b) sensitivity (Bobaljik 2000).

With the two basic types of allomorphy introduced by Bobaljik (2000) the distinction between l- and f-morphemes disappears, in the sense that both types of morpheme can be outward sensitive, i.e. their form may be conditioned by the grammatical/functional features of an adjacent element.

In recent years, the distinction between l- and f-morphemes has become further blurred due to additional assumptions derived from locality restrictions observable in different contexts. Assuming, for example, that (structural) adjacency is a prerequisite for phenomena like allomorphy, allosemy, stress shift, and so on, traditional functional elements were analyzed as lexical, for instance by Lowenstamm (2014), whose argument is based on facts concerning stress shift, while others such as Acedo-Matellán & Real-Puigdollers (2019) proposed instead that the traditional lexical elements are functional, claiming that syntax only manipulates functional heads and that roots are VIs directly inserted into functional nodes. Both these proposals are motivated by the fact that elements behave differently according to different locality configurations and both argue for a (albeit differing) reinterpretation of roots and/or functional elements.

In our analysis of Romance verbal morphology, we assume that such reinterpretations are not necessary to explain the root allomorphy of Romance verbal forms. We argue that roots are part of the syntactic derivation, but that they are not necessarily realized by a one-to-one corresponding VI (the same holds for functional elements). In our approach based on *spanning* (Svenonius 2012; Merchant 2015), VIs may instead span over the √ROOT and other elements, thus altering the locality relation and making (root) allomorphy attainable. Root allomorphy is then a reflex of particular VIs that represent spans over a greater part of the syntactic input structure. Allomorphy is possibly triggered by adjacent spans, independent of the functional or lexical nature of the elements to be realized. For example, T° and/or φ-triggered root allomorphy is only possible if the verbal theme vowel (ThV) slot comprises one span with the √ROOT and v°, and is therefore not separately realized by a single VI. If the verbal ThV is separately realized as a proper VI, the context to its right cannot trigger root allomorphy. This means that, in our approach, verbal irregularity is reflected in spanning sizes, for both lexical and functional items. Also, independently of the presence or absence of a ThV, spans are useful representations of VI for other pieces of morphology that do not have a one-to-one correspondence between form and function, e.g. the portmanteau inflectional endings of the Spanish *indefinido* or the imperfect form of the 2nd conjugation class (CC) verbs, which lack overt or unmistakenly recognizable realizations of T°.

Our paper is structured as follows: We first illustrate the morpho-syntactic structure of Romance verbs within the framework of DM (§2). In Section 3 we introduce the theoretical background for the analysis of locality restrictions on allomorphy that we will propose in Section 4, and which will be illustrated by examples from different contexts of athematicity. Our main argument is that spanning is an appropriate way of capturing the locality restriction on allomorphy. Furthermore, the spanning approach also provides a plausible representation of underlying diachronic developments in a synchronic perspective.

## 2 The morpho-syntactic structure of Romance verbs within DM

In Distributed Morphology (DM; Halle & Marantz 1993 et seq.; Halle 1997; Marantz 1997; Harley & Noyer 1999[1]) the morpho-syntactic structure of verbs (and other elements) is generated primarily by syntax via Move and Merge. On the way to PF (phonological form), several additional processes (e.g. fusion, fission, impoverishment, dislocation) are employed that can alter the syntactic output. Post-syntactic operations such as Vocabulary Insertion or linearization are largely undisputed within the DM framework, whereas some other processes are much more controversial, leading to efforts being made to eliminate them (see for example Haugen & Siddiqi

[1] Overviews of DM are found, for example, in Bobaljik (2017) and De Belder & Don (2022).

2016 for the Vocabulary Insertion-only program). Our analysis follows Haugen & Siddiqi's idea. In what follows, we will first present some assumptions within the DM-framework regarding the structure of Romance verbs, and will illustrate some basic facts concerning irregular verbs with Spanish examples.

## 2.1 Well-formedness conditions and verb structure

Oltra-Massuet (1999 et seq.) assumes that the verbal structure in Catalan is derived in syntax by movement of the root to the category-assigning head v° that further moves to T° (which, as a general rule, can encode tense, mood and aspect conjointly). This cyclic head-to-head movement results in the structure $[[[\sqrt{\text{ROOT}}\ ]\ v^\circ]_{vP}\ T^\circ\ ]_{TP}$, which is post-syntactically further modified by two well-formedness conditions: (i) finite T° requires an Agr node (see also Marantz 1991) and (ii) ThV positions have to be adjoined. The first well-formedness condition may be implemented in several ways depending on how subject-verb agreement is conceived. Based on Marantz (1991), one could assume that the φ-features of the subject DP (the c-commanding DP in Spec,TP) are post-syntactically copied and adjoined to T° (**Figure 2a**). If one assumes instead that the presence of agreement features on the verb is syntactic, the φ-features are already part of T° in the syntactic output. In this case, one may assume that the φ-features must receive a separate slot for realization, i.e. they are split off from T° (**Figure 2b**). Essentially, the output will be the same in both cases.

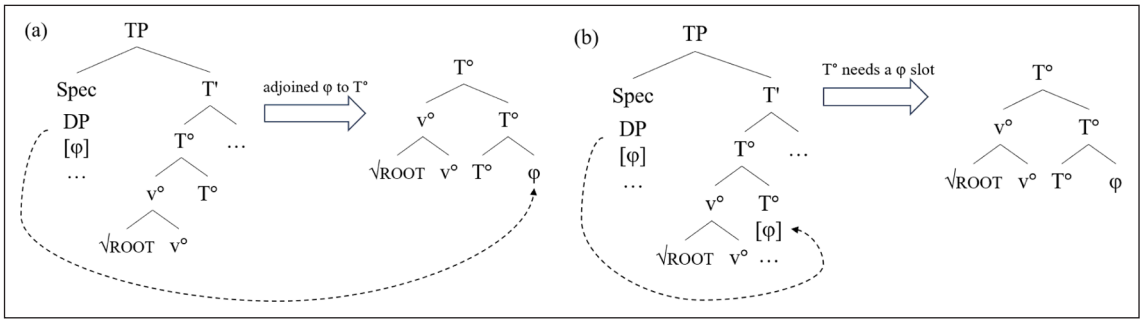


**Figure 2:** (a) Post-syntactic agreement vs. (b) syntactic agreement.

In those languages that have ThVs, the well-formedness condition for adding them obviously plays a central role, i.e. it is a language-specific condition. Despite many diachronic and synchronic differences, Spanish, Portuguese, Catalan and Italian have clearly preserved thematic CCs.[2] ThVs serve to distinguish between CCs and are considered by many linguists – as in Oltra-Massuet (1999) – to be mere ornamental elements without any effect on syntax and semantics

[2] Romanian has not only preserved thematic CCs but also developed new ones.

(see however Kayne 2016; 2019 and Fábregas 2017; 2022, who analyze ThVs as verbalizers), which is why they are added only post-syntactically. For Romance verbs, it is standardly assumed that a ThV is added to the verbal root to form a stem. Oltra-Massuet (1999) instead proposes that every functional head receives a ThV position, i.e. not only v° but also T° (and other functional categories such as Fut°). The ThV of these other functional heads are, however, not sensitive to CC features, but depend on morpho-syntactic and sometimes on phonological features (Oltra-Massuet 1999). The morpho-syntactic structure after the application of both well-formedness conditions is as illustrated in **Figure 3** (according to Oltra-Massuet 1999 et seq.; see also Pomino 2008 for Spanish).

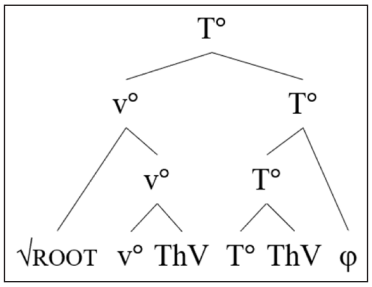


**Figure 3:** Morpho-syntactic structure after application of the well-formedness conditions (Oltra-Massuet 1999).

The six terminal elements contained in **Figure 3** may be realized with their respective phonological material at Vocabulary Insertion. This is the case for *atom-iz-á-b-a-mos*, for example. Not all verbal forms have an exponent for each slot, however (see **Table 1**): crucially, apart from the root, all other terminal nodes may remain unrealized, depending on the specific verb and on specific verbal forms.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 exponents | *atom* | *iz* | *á* | *b* | *a* | *mos* | imperfect, 1PL |
| 4 exponents | *am* | | *á* | *b* | *a* | *mos* | imperfect, 1PL |
| 3 exponents | *am* | | *a* | *b* | *a* | | imperfect, 1SG/3SG |
| 3 exponents | *am* | | *a* | | | *mos* | present, 1PL |
| 2 exponents | *am* | | *a* | | | | present, 3SG |
| 2 exponents | *am* | | | *é* | | | *indefinido*, 1SG |

**Table 1:** Selected (regular) verbal forms (Spanish).

The mismatches between the number of terminal elements and the respective realizations can be explained in multiple ways. For the present tense, Oltra-Massuet (1999) and Arregi (2000)

propose that morphological complexity is directly related to the syntactic-semantic features of the respective forms. They argue that T° fuses with φ whenever it encodes a semantically unmarked tense feature, i.e. a tense feature that is also never realized morpho-phonologically (see **Figure 4**).

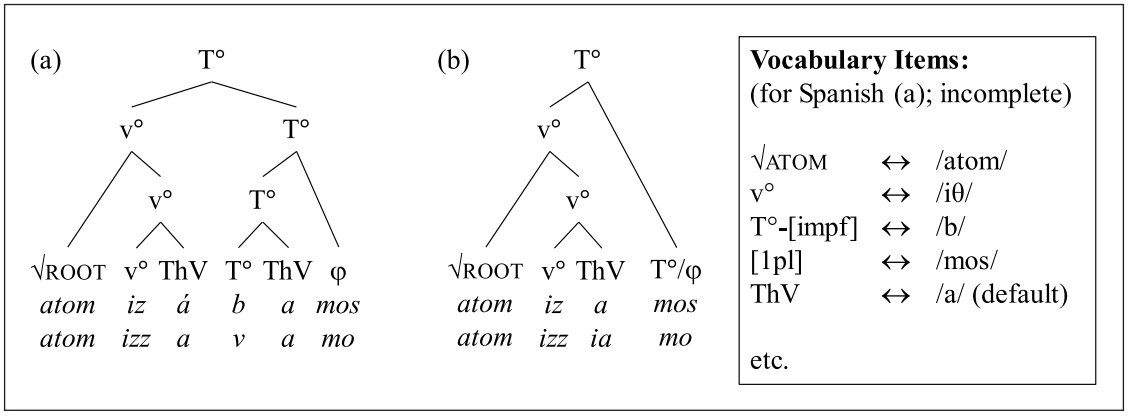


**Figure 4:** (a) split T and φ (imperfect) vs. (b) fused T/φ (present tense) in Spanish and Italian.

Fusion thereby cancels or reverses the well-formedness condition by which the position for φ and the ThV of T° were introduced. Trying to reduce the post-syntactic processes to a minimum, we argue against such redundant processes and instead propose that the φ-features encoded syntactically under T° do not receive a separate slot when T° encodes a semantically unmarked tense feature. Or, alternatively, T° and φ features receive separate slots only when T° encodes a marked feature value. From this perspective, the structure in **Figure 4b** is not the result of a fusion rule that reverses the well-formedness condition, but the result of the rule not applying when unmarked features are encoded in the syntactic output element (e.g. present indicative). Something similar holds for all verbal forms of the 3rd person singular: the φ-features of these forms are never realized separately (at least in Spanish), irrespective of tense (e.g. 3rd person *am-a*, *am-a-b-a* vs. 2nd person *am-a-s*, *am-a-b-a-s*). More precisely, T°/φ does not split in the present indicative, since the tense value is unmarked, nor in all forms of the 3rd person singular, because of the unmarked φ-value.[3] This means that the φ-features also play a role in determining whether or not they receive a separate slot. We thus suggest the following slight modification of the well-formedness condition proposed by Oltra-Massuet (1999) and Arregi (2000), which makes the fusion rule discussed above superfluous.

[3] It is also possible to assume that T° splits into T° and φ, but φ remains unrealized when it encodes 3rd person singular. However, it is more likely that something that is never realized is simply not there. Note that there is a further difference between something not realized and a position or feature that is not there at all.

(3) Well-formedness condition
The syntactic terminal node T° splits into T° and φ when it encodes marked[4] values. Otherwise, it remains one slot.

In sum, the morpho-syntactic structure of the present (indicative) is less complex than that shown in **Figure 3** in the sense that it has only 4 (not 6) terminal elements to be realized. The reverse is true for future tense and conditional: Both tenses have, according to Oltra-Massuet (1999) and Arregi (2000), one additional functional head. This is visible in the conditional forms, which are clearly more complex than the imperfect forms (Arregi 2000: 6), compare e.g. *cant-á-b-a-mos* vs. *cant-a-r-í-a-mos*.[5] Following Oltra-Massuet (1999: 66), Arregi (2000) assumes for Spanish that /i/ and /a/ each realize the ThV of different functional heads, namely Fut° and T°: *cant-*$Ø_{v°}$*-*$a_{VTh}$*-*$r_{Fut°}$*-*$í_{Th}$*-*$Ø_{T°}$*-*$a_{Th}$*-mos* (Oltra-Massuet 1999 proposes a ModP that encodes [future] as a modal feature). The structure of conditional verb forms is thus more complex and the conditional is interpreted as "future (or posteriority) in the past" (as in for example *María dijo que Juan cantaría una canción* 'Mary said that John would sing a song'). In other words, posteriority (or future) is detached from T° and has its own functional head, i.e. Fut°. Analogically, future tense does also consist of T° (= simultaneity) and Fut° (= posteriority). Further evidence can be found in diachrony: Roberts & Roussou (2003) discuss, for example, a comparable verb structure in their diachronic analysis of the future tense (which is derived from periphrastic *cantare* + $habeo_{[present],\ [obligation]}$ > *cantaré*) and the conditional (derived from periphrastic *cantare* + $habebam_{[imperfect],\ [obligation]}$ > *cantaría*). The features, formally encoded in the auxiliary, stem from two different functional heads, Mod° for [obligation] and T° for [present/imperfect].[6]

In summary, after the well-formedness condition discussed above is applied, future tense and conditional have the morpho-syntactic structures shown in **Figure 5**. Note that for the future tense (**Figure 5b**), T° encodes an unmarked tense relation (i.e. [present]), since the future meaning is a proper functional category derived from present tense mood, and thus, as discussed above, the φ-features do not receive a separate slot.

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[4] Of course, the notion of "markedness" is highly debated; however, we assume that present tense is the unmarked tense, in the sense that it does not need to be specified (as a tense), and that 3rd person singular is unmarked, in the sense that it refers neither to the speaker nor to the hearer and is also unmarked in number.

[5] ThVs in Spanish are either single vowels or diphthongs, but never a hiatus. It is thus not possible to analyze the hiatus /i.a/ as one exponent for ThV; see also fn. 6.

[6] Diachronically, the realization /r/ for Fut° is derived from the former ending of the infinitive, whereas the VI for T° in the conditional is derived from the imperfective form of the auxiliary *habēre*, in the case represented in **Figure 5** from *habebāmus* > *-íamos*, which again shows that the ThV /a/ of T° in the conditional was the former ThV of the Latin VI for the imperfect, namely /b/, which was lost in intervocalic position on its way to the Spanish form.

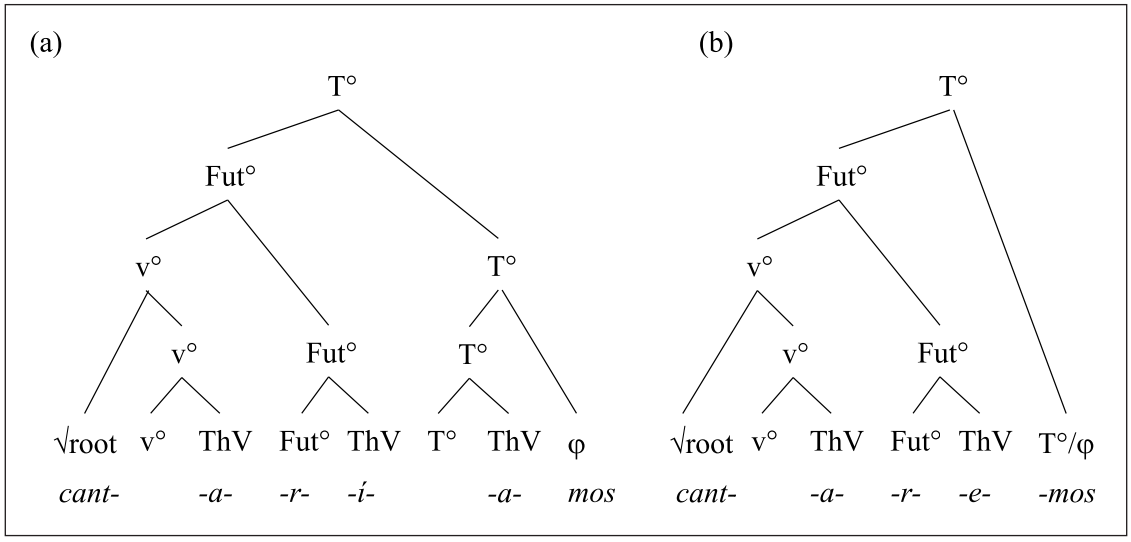


**Figure 5:** Conditional and future tense.

Let us turn now to the forms of the Spanish *indefinido,* which, rather like the present tense, are morpho-phonologically less complex than the imperfect forms (see **Table 2**); e.g. *cant-á-b-a-mos* vs. *cant-a-mos*). The verb forms of the *indefinido* are considered to be particularly problematic in Romance morphology as far as their segmentation is concerned. Ambadiang (1993), for example, claims that there are three different stems for the regular Spanish verb *cantar* 'sing' and divides the ending into four parts assuming several zero morph(eme)s, while Schpak-Dolt (1999) argues for one root which is followed by a ThV – the ThV of the 1st person singular is atypically *-é* (not *-a*) – and a complex (or fusioned) ending. Despite many differences, both proposals reflect the fact that in the *indefinido* there is no clear exponent of T° and/or φ.

**a. Ambadiang (1993)**

| | **X** | **tense** | **mood** | **number** | **person** |
|---|---|---|---|---|---|
| 1SG | cant | Ø | é | Ø | Ø |
| 2SG | cantast | Ø | e | Ø | Ø/(s) |
| 3SG | cant | Ø | ó | Ø | Ø |
| 1PL | cant | Ø | a | mos | Ø |
| 2PL | cantast | Ø | e | i | s |
| 3PL | cantar | Ø | o | n | Ø |

**b. Schpak-Dolt (1999)**

| **root** | **ThV** | **T/M/P/N** |
|---|---|---|
| cant | é | Ø |
| cant | a | ste |
| cant | Ø | ó |
| cant | a | mos |
| cant | a | steis |
| cant | a | ron |

**Table 2:** Two different proposals for segmentation of the *indefinido.*

In the framework of DM, Arregi (2000) again postulates a fusion operation to account for the short forms of the *indefinido* and the irregular endings: "we assume that T and Agr fuse in the perfective […]. Given that T and Agr fuse, we explain why there is only one slot for both morphemes and why Agr looks so different from other contexts" (Arregi 2000: 18f). The resulting structure (and segmentation) is then comparable to the proposal by Schpak-Dolt (1999) in **Table 2** and similar to that for the present indicative given in **Figure 4b**.

The main objection to Arregi's (and Oltra-Massuet's) analysis is the lack of motivation for the fusion rule that they postulate. For present indicative, both authors assume that it is the unmarked tense value that causes fusion, but this cannot be the reason for fusion in the *indefinido*, since this tense value is semantically not unmarked. Fusion remains thus unmotivated. For this reason, we want to argue that the morpho-syntactic structure of the *indefinido* is fundamentally the same as for the imperfect. The difference is, however, that in the *indefinido* the available VIs do not realize each slot one-by-one but cumulatively (see our analysis based on spanning in §4). The cumulative exponence in this tense is motivated diachronically by the loss of the Latin aspect marker, which in some cases led to root allomorphy, and subsequent phonological fusion processes (e.g. *-avit* > *-aut* > *-ót* > *-ó* for 3rd person singular; Alvar & Pottier 1983: 237). Before going into more detail on this point, we must first further explore ThVs and the question of which functional category they belong to. Note that only the ThVs of v° depend on CC features and are, thus, ThVs in a strict or traditional sense. When we speak of athematic verbal forms in what follows, we mean that the ThV of v° is not morpho-phonologically realized.

## 2.2 The notion of theme vowel (ThV): From Latin to Romance/Spanish

ThVs are a particular property of some Indo-European languages, among them Latin and its Romance descendants, which have preserved or further transformed them, depending on the language under investigation. They are commonly defined as vowels that appear after the root (including derivational affixes) and the inflectional suffixes. In traditional Latin grammar, root and ThV build the stem of the verb. In some Romance languages, as shown in Section 2.1, they are the marker of CC and, in the DM framework, they are inserted by a well-formedness condition. ThVs were already CC-markers in Latin, although the Latin CC system was different from that of Romance, not only because of the loss of phonematicity in vowel length in Romance (see **Table 3**).[7]

[7] The Latin ThVs either stem from derivational morphology (*ā, ē, ī*) or from aspectual markers (*ĭ, ĕ*); see Calabrese & Petrosino (2023), among others.

| CC | | Example | ThV |
|---|---|---|---|
| I | /a:/-conjugation | *amāre* | /a:/ |
| II | /e:/-conjugation | *dēbēre* | /e:/ |
| III | /e/-conjugation | *legere* | /e/[8] |
| IV | /i:/-conjugation | *audire* | /i:/ |
| III/IV | mixed conjugation | *sapere* | /i/ |

**Table 3:** Latin CCs.[9]

In Latin, there was a further distinction between CCs with and without ThVs, and this division led some scholars to distinguish, in contrast to **Table 3**, only two Latin CCs, one thematic and one athematic (Kühner & Holzweissig 1912: 659).[10] The athematic class is older and comprises Latin verbs like *ferre* 'to carry', *esse* 'to be', *velle* 'to want' etc. The Latin third CC, which is also called the consonantal conjugation, contains many irregular verbs and has many forms in the paradigm where there is no ThV, namely in the *perfectum*.[11] A visible vowel after the root is found instead in the *infectum*, e.g. in *leg-e-re* 'to read' or *leg-i-mus* 'we read'. In the *perfectum*, there are several possible types of inflectional marker, but the ThV is generally visible only in the I and the IV CC, so we find *am-ā-v-it* 's/he loved/has loved' and *aud-ī-v-it* 's/he heard/has heard' with the respective ThV *ā* and *ī,* but *mon-u-it* 's/he warned/has warned', *scrip-s-it* 's/he wrote/has written', *vēn-it* 's/he came/has come' etc. without the ThVs *ē* and *ĕ* (see also Calabrese & Petrosino 2023: 38). Furthermore, even in the most regular verbs, there are forms without a visible ThV, as the first person singular of the I CC, *am-ō* 'I love' without ThV[12] vs. *am-ā-s* 'you love' with ThV.

In any case, the function of the ThVs[13] is highly controversial, but here we want to emphasize that beyond the distinction between Latin thematic and athematic CCs, an important distinction

[8] Halle (2018), Calabrese (2023), and Calabrese & Petrosino (2023) note this ThV as *I*, since it appears as either /i/ or /e/, depending on phonological factors.

[9] Based on Leumann et al. ([5]1977: 518ff., §398), Halle (2018), Van der Spuy (2020).

[10] Note, in any case, that the notion "thematic" is not used in a uniform way in linguistics; see also Leumann et al. ([5]1977: 519), where the distinction "thematic" vs. "athematic" is attributed to Indo-European, whereas Latin has long and short vowels to distinguish between CCs. However, remainders of the old athematic verb class are still found in Latin, as above.

[11] The *infectum* comprises all tenses built with the stems of the Latin present system, whereas the *perfectum* comprises the tenses built with the stems of the Latin perfect system. The terminology was introduced by the ancient grammarian Varro (Leumann et al. [5]1977: 509).

[12] Several grammars and sources claim that there is an underlying form *am-ā-ō* (e.g. Halle 2018; Calabrese 2023: 4; also, *am-ā-i-ō*), but this form has never been attested; see also Leumann et al. ([5]1977: 518): "1. sing.: *-*a-ō* (> -*ō*)."

[13] As explained in Section 2.1 some researchers attribute a function to ThV (see Kayne 2016; 2019; for Latin e.g Bertocci & Pinzin 2020; 2021; for Spanish Fábregas 2017; for French Kastner & Martin 2020; 2021; for Ancient Greek Grestenberger 2022), whereas others see them as purely "ornamental" (Oltra-Massuet 1999; Calabrese 2015a;

must also be drawn between thematic verbal forms and athematic verbal forms. Furthermore, as will be shown in what follows, not every vowel following a root is automatically a ThV (in the sense defined at the end of §2.1).[14]

A further distinction concerning ThVs comes into play when we return to the claim made by Oltra-Massuet (1999) that every functional projection is subject to the well-formedness condition that there must be a syntactic slot for a ThV projected. That means that not only v°, but also T° and other verbal functional categories have ThV-positions (or are licensed by a ThV). For Romance, this has already been illustrated in Section 2.1, but it can also be shown for Latin, as in **Table 4**, where T/Asp°[15] has a ThV, independent of CC (note that the ThV is always the same, since it is the ThV conditioned by T°/Asp°[perfect]):

| **3SG perfect** | **√ROOT** | **v°** | **ThV** | **T/Asp°** | **ThV** | **φ** |
|---|---|---|---|---|---|---|
| I | *am* | | *ā* | *u*[16] | *i* | *t* |
| II | *mon* | | | *u* | *i* | *t* |
| III | *scrip* | | | *s* | *i* | *t* |
| III | *vēn* | | | | *i* | *t* |

**Table 4:** Selected verbal forms in the Latin perfect.

There can even be three ThVs when further functional projections are contained in the syntactic input, as shown in **Table 5**:

| **3SG pluperfect** | **√ROOT** | **v°** | **ThV** | **T/Asp°** | **ThV** | **T°** | **ThV** | **φ** |
|---|---|---|---|---|---|---|---|---|
| I | *am* | | *ā* | *u* | *e* | *r* | *a* | *t* |
| II | *mon* | | | *u* | *e* | *r* | *a* | *t* |
| III | *scrip* | | | *s* | *e* | *r* | *a* | *t* |
| III | *vēn* | | | | *e* | *r* | *a* | *t* |

**Table 5:** Selected verbal forms in the Latin pluperfect Latin.

b; a.o.). Calabrese & Petrosino sometimes also call them "vocalic pieces" (2023: 41). *Theme* is the traditional notion for stem + ThV.

[14] In this we go against Calabrese & Petrosino (2023: 41), who write that "one must conclude that all root-adjacent vocalic pieces are the same: they are devoid of syntactic and semantic properties and are, therefore, ornamental."

[15] In Latin, the perfect had both functions, that of an (older) aorist and that of a perfect (as illustrated by the translations above); thus, we assume a hybrid head T/Asp° (the Latin perfect continues both forms of the aorist and forms of the perfect, which were collapsed into one paradigm).

[16] We note both [v] and [u] as <u>, following the Latin tradition.

In **Table 5**, the ThV of the T/Asp° head of the pluperfect is /e/, whereas the ThV of pluperfective T° is always /a/, again, independent of CC. That is, verbal forms in Latin have several types of ThV, and only the ThV of v° is a CC-marker. Moreover, the CC-marker is visible in the verbal forms built with the perfect root allomorph only in the I and IV CC, whereas all the other verbs lack a CC-marker in these tenses.

If we adopt this analysis for the successor forms of Latin in Spanish, we will see the same effect: In the root allomorph used for the *indefinido*, the past subjunctive (which is derived from the Latin pluperfect, either the indicative or the subjunctive), and the future subjunctive (derived from the Latin future II), the vowel following the root allomorph is the ThV of v° only in the first Spanish CC in *-ar*, whereas in all the other cases the vowels are ThVs of other functional categories; see **Table 6** for 3rd person singular:

| **Latin** | **√ROOT** | **v°** | **ThV** | **T/Asp°** | **ThV** | **T°** | **ThV** | **φ** | |
|---|---|---|---|---|---|---|---|---|---|
| pluperfect | *am* | | *ā* | *u* | *e* | *r* | *a* | *t* | Latin (I) |
| past subj. | *am* | | *a* | | | *r* | *a* | | Spanish (*-ar*) |
| pluperfect | *ten* | | | *u* | *e* | *r* | *a* | *t* | Latin (II) |
| past subj. | *com* | | | | *ie* | *r* | *a* | | Spanish (*-er*) |
| pluperfect | *scrip* | | | *s* | *e* | *r* | *a* | *t* | Latin (III) |
| past subj. | *escrib* | | | | *ie* | *r* | *a* | | Spanish (*-ir*) |
| pluperfect | *dic* | | | *s* | *e* | *r* | *a* | *t* | Latin (III) |
| past subj. | *dij* | | | | *ie* | *r* | *a* | | Spanish (*-ir*) |
| Spanish | √ROOT | v° | ThV | T° | ThV | MOOD° | ThV | φ | |

**Table 6:** Selected verbal forms from Latin to Spanish 1.

The same pattern can be observed for the Latin pluperfect subjunctive, which became an alternative form for the past subjunctive in Spanish, and for the future subjunctive, which stems from the Latin future II; see **Table 7** for the 3rd person singular.

Of course, in Spanish in particular several verbs change CC and the supposedly five CCs reduce to three; however, many verbs of the III CC are also irregular in Spanish, and new irregularities also developed under analogical pressure. What can be said is that in the tenses and moods that feature the Latin stem known as the perfective, only the I CC exhibits a ThV connected to v° in the resulting form in Spanish. The other ThVs, including those that survived the phonological reductions in their development into Spanish, belong to other functional categories, which can clearly be seen from the fact that they are only dependent on CC distinctions insofar as they might have disappeared in the first CC, but are the same in the second and third CC in Spanish. To illustrate this, **Table 8** shows the strong *indefinido* forms of the verbs *andar* (1st CC), *saber* (2nd CC) and *decir* (3rd CC):

| LATIN | √ROOT | v° | ThV | T/Asp° | ThV | T/Mood° | ThV | φ | |
|---|---|---|---|---|---|---|---|---|---|
| pluperf.subj. | *am* | | *ā* | *u* | *i* | *ss*[17] | *e* | *t* | Latin (I) |
| past subj. | *am* | | *a* | | | *s* | *e* | | Spanish (*-ar*) |
| pluperfect | *ten* | | | *u* | *i* | *ss* | *e* | *t* | Latin (II) |
| past subj. | *com* | | | | *ie* | *s* | *e* | | Spanish (*-er*) |
| fut. II | *am* | | *ā* | *u* | *e* | *r*[18] | *i* | *t* | Latin (I) |
| fut. subj. | *am* | | *a* | | | *r* | *e* | | Spanish (*-ar*) |
| fut. II | *ten* | | | *u* | *e* | *r* | *i* | *t* | Latin (II) |
| fut. subj. | *com* | | | | *ie* | *r* | *e* | | Spanish (*-er*) |
| SPANISH | √ROOT | v° | ThV | T° | ThV | Mood° | ThV | φ | |

**Table 7:** Selected verbal forms from Latin to Spanish 2.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1SG | and uv | e | | sup | e | | dij | e | |
| 2SG | and uv | i | ste | sup | i | ste | dij | i | ste |
| 3SG | and uv | | o | sup | | o | dij | | o |
| 1PL | and uv | i | mos | sup | i | mos | dij | i | mos |
| 2PL | and uv | i | steis | sup | i | steis | dij | i | steis |
| 3PL | and uv | ie | ron | sup | ie | ron | dij | ie | ron |

**Table 8:** Strong *indefinido* forms.

Although these three verbs belong to different CCs, they all show the same ThVs – this is especially surprising for the first CC which is never usually neutralized with other CCs in Spanish. The element *-uv-* in *anduve* is a remnant of the Latin *-u*-preterite that was preserved in a handful of commonly used verbs. Interestingly, in those cases where this remnant is maintained, verbs of the first CC also have *-e-*, *-i-* or *-ie-* as the ThV (and never the default *-a-*). On the basis of the Latin forms exemplified above, it is our opinion that this clearly shows that these ThVs are not related to CC features, i.e. they are not ThVs of v°. This observation will be relevant in the next section, which looks at irregularities.

[17] Calabrese (2023: 5) assumes two separate heads for T° and Mood°, each being realized by /s/. However, we assume that there is a hybrid T/Mood-head, since there is only one ThV and, furthermore, /ss/ was also a geminate, i.e. one long consonantal phoneme, in Latin.

[18] This exponent /r/ could be modeled as a VI inserted in a *perfectum* context of the pluperfect or the future II, similar to /b/ in an *infectum* context for the imperfect or the future, as in the proposal by Halle (2018: 7). One might also find a correlation in function for the exponents /r/ and /s/ in the verbal paradigm because of the Latin rhotacism (Calabrese 2023: 5).

In summary, ThVs are different kinds of elements and it is important to distinguish between:

– verbs that belong to a CC that is specified by a certain ThV;
– verbal forms that require the realization of a ThV; and
– the functional elements that the ThV is required by.

The next section takes a closer look at irregular verbal forms (in Spanish) and makes a further distinction with respect to the presence of ThV slots and ThV realizations.

## 2.3 Irregular verbs in Spanish

The irregularities found in Spanish verbal inflection exhibit a certain systematicity.[19] Alcoba (1999) distinguishes between the external and the internal distribution of these irregularities: the external distribution focuses on which verbs are affected by an irregularity, while the internal distribution highlights which forms of a verb exhibit the corresponding irregularity. This subsection focuses on the latter, which is more systematic than the former and reveals an astonishingly regular pattern. Of the five internal distribution patterns described by Alcoba (1999: 4952ff.) three are related to athematic verbal forms (in the sense discussed in §2.2) and are thus the focus of our analysis in Section 4.

As shown in (4a), the root allomorphy that is found with strong *indefinido* forms internally spreads over the imperfect subjunctive and future subjunctive (Alcoba 1999). As shown in Section 2.2, these tense forms all share the property of being athematic: more precisely, they have ThVs for T° (and/or Fut°), but not for v°. What has changed from Spanish to Latin is that in Latin a perfect stem, like *scripsit* 's/he said/has said' or *dixit* 's/he said/has said', was still segmentable in that as the /s/ was recognizable as a VI (i.e. as a morpho-phonological realization) for T/Asp°, but in Spanish the *indefinido* has lost the aspectual meaning of the perfect and it is no longer segmentable. Allomorphic forms such as *dij-* thus do not exhibit a recognizable realization of T°, but represent a portmanteau-morpheme, i.e. a VI that realizes the root, v° and its ThV slot in the context of a $T°_{[indefinido]}$, which is itself realized as part of a span (cf. §3).

Something similar is true for the future tense and the conditional in (4b): verbs that show root allomorphy in these tenses leave the ThV of v° unrealized in Spanish (compare **poneré/*ponedré*; **ponería/*ponedría,* where a morpho-phonological realization ThV of v° leads to ungrammaticality). And finally, (4c) illustrates the internal distribution pattern of consonantal root allomorphy found in the present indicative and the present subjunctive. Note that in the present indicative 1st person singular is always athematic, including in regular verbs (e.g.

[19] For reasons of space, we will illustrate the basic facts of Romance irregular verbal forms only based on Spanish.

*beb-o/*beb-e-o*[20] vs. *beb-e-s*). This was already the case in CC I and III in Latin, so the athematic form is partially inherited (see §4 for more details). What is more, it is important to note that the vowel *-a-* in the present subjunctive is not the ThV of v°, but of T°.[21] These forms also leave the ThV of v° unrealized in Latin.

(4) Root allomorphies which are linked to athematicity

a. Internal distribution I (strong *indefinido*)

| | 1SG | 2SG | 3SG | 1PL | 2PL | 3PL |
|---|---|---|---|---|---|---|
| *indefinido* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| imperfect subjunctive | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| future subjunctive | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

*saber* 'know': *supe*, *supiste*, *supo*, *supimos*, *supisteis*, *supieron / supiera*, *supieras*, *supiera*, *supiéramos*, *supierais*, *supieran / supiere*, *supieres*, *supiere*, *supiéremos*, *supiereis*, *supieren*

b. Internal distribution II (future tense and conditional)

| | 1SG | 2SG | 3SG | 1PL | 2PL | 3PL |
|---|---|---|---|---|---|---|
| future indicative | × | × | × | × | × | × |
| conditional | × | × | × | × | × | × |

*poner* 'put': *pondré, pondrás*, *pondrá*, *pondremos*, *pondréis*, *pondrán/ pondría*, *pondrías*, *pondría*, *pondríamos*, *pondríais*, *pondrían*

c. Internal distribution III: consonantal alternation in the present tense[22]

| | 1SG | 2SG | 3SG | 1PL | 2PL | 3PL |
|---|---|---|---|---|---|---|
| present indicative | * | | | | | |
| present subjunctive | * | * | * | * | * | * |

*tener* 'have': *tengo / tenga*, *tengas*, *tengamos*, *tengáis*, *tengan*

[20] The hiatus *-eo-* is well documented in Spanish words (e.g. *escaneo* 'I scan', *el paseo* 'the walk'), i.e. it is not an active phonological process that makes **teneo* impossible. Thus, the non-realization or non-existence of ThV in *tener* (**teneo*, **tenego*) and similar verbs must have a different explanation.

[21] For reasons of space, we cannot discuss here whether or not we are dealing with a type of morphological reversal, a "situation where the members of a morphological opposition switch their functions in some context" (Baerman 2007: 33). In our case, the present subjunctive would shift the ThV /e/ (and /i/) to /a/ while the ThV /a/ is shifted to /e/ (see for example Wunderlich 2012 for an analysis of this type). We instead assume that in the subjunctive the corresponding vowels are ThVs of T° and depend on the mood feature [subjunctive], see **Tables 15, 16** and **17**.

[22] This is the famous L-pattern, identified as a morphome by Maiden (2016).

We have argued form a diachronic and a synchronic point of view that all the verb forms listed in (4) are athematic and we offer an analysis based on spanning for these forms in Section 4.

We want to highlight, however, that there are two other patterns of root allomorphy in Spanish that are not related to athematicity, but to prosodic and/or phonological factors. Consider first the vocalic alternations in (5) and their internal distribution: As is well-known, the common feature of all these irregular verbal forms is that the stress falls onto the root.

(5) Vocalic alternation: Diphthongization (/e/ and /i/ → /je/, /o/ and /u/ → /we/)[23] and apophony (/e/ → /i/) in root stressed verb forms (Alcoba 1999)

| | 1SG | 2SG | 3SG | 1PL | 2PL | 3PL |
|---|---|---|---|---|---|---|
| present indicative | + | + | + | | | + |
| present subjunctive | + | + | + | | | + |
| Imperative | | + | | | | |

*pensar* 'think': *pienso*, *piensas*, *piensa*, *piensan* / *piense*, *pienses*, *piensen* / *piensa*;
*servir* 'serve': *sirvo*, *sirves*, *sirve*, *sirven* / *sirva*, *sirvas*, *sirvan* / *sirve* (also affected by (7) below)

From a synchronic point of view, it is not possible to assume a pure phonological process that predicts the appearance of the monophthong vs. diphthong, i.e. we cannot postulate a phonological process that automatically (re)adjusts the output of Vocabulary Insertion.[24,25] It is also not possible, however, to assume that certain morpho-syntactic features trigger the respective alternation. That means that one would be forced to postulate a morpho-phonological readjustment rule valid for a list of verbs or a diacritic marker for those verbs that are affected by the respective rule(s) (Embick 2004, among others), e.g. /pEn-/ ↔ √PENSAR and a rule that

[23] In addition to the alternations of the vowel /e/ to /je/ and /o/ to /we/, there is the alternation between /u/ and /we/ in *jugar* 'to play', though this is the only verb with this pattern and thus constitutes an idiosyncratic exception. In other words, the majority of irregular verbs in Spanish (over 100 verbs) exhibit the same irregularity as *pensar*, while the diphthongization /u/ → /we/ is only found with *jugar* 'play'.

[24] In older approaches that operate with an underlying representation it is either assumed that the diphthong is derived from the monophthong (e.g. *ten-* → *tien-* when stressed) or that the monophthong is derived from the diphthong (e.g. *tien-* → *ten-* when not stressed; Harris 1980). However, both approaches face some difficulties, e.g. assuming diphthongization we would predict **tiemo* instead of *temo*, while with monophthongization we would predict the imperative **tien* instead of *ten* (see e.g. Hualde 2005: 194 for further counterexamples).

[25] Nevertheless, the segmental environment in which /e/ and /o/ diphthongize seems to be restricted in Spanish. Albright, Andrade & Hayes (2000: 25), who test the diphthongization environment using so-called *wug* forms, state the following: "if the stressless allomorph contains [e] in the context/[ X __ rr], the stressed allomorph must contain [jé]." With the verbs *aterrar*, *desenterrar*, *serrar*, *cerrar*, *errar* etc., this interplay of stress and segmental environment is particularly clear. However, a similar generalization is not possible for the other verbs showing this alternation. For example, in many of these irregular verbs /e/ appears in the environments [X __ nt] and [X __ nd]. However, there are forms in exactly these environments in which stressed /e/ does not diphthongize (e.g. *alimento* vs. **alimiento* and *aprendo* vs. **apriendo*).

states that /E/ is realized as a diphthong when stressed. In DM it is however also possible to explain the alternation mentioned above via Vocabulary Insertion by assuming one VI that must be inserted whenever the root is stressed (e.g. *pien*-) and another VI that can only be inserted in an unstressed root (e.g. *pen*-).[26] For these cases of root allomorphy, some kind of listing seems to be inevitable.

(6) Vocabulary Items for √PENSAR
   a. /pjen-/ ↔ √PENSAR, when stress falls onto the root
   b. /pen-/ ↔ √PENSAR (elsewhere)

Another type of vocalic alternation found in the verbal inflection of Spanish, which always co-occurs with that shown in (5), is the raising of /e/ → /i/ and /o/ → /u/ (see the internal distribution in (7)). In contrast to what we saw above, stress does not fall on the root in these verb forms and only verbs of the third CC (i.e. the "i-conjugation", e.g. *pedir*) are affected by this root alternation. There are different traditional explanations for this kind of apophony (see Togeby 1972 for more details and counterexamples): (i) metaphony due to a following *yod* (e.g. Menéndez Pidal 1904 et seq: §§11, 105, 114) – but why is metaphony restricted to the third CC rather than also affecting verbs of the second CC in the same phonological context?, (ii) monophthongization of /je/ to /i/ (see Malkiel 1966; lat. *vesto* > **viesto* > *visto*), (iii) dissimilation of /i/ to /e/ under the influence of a tonic I in the following syllable (e.g. *dicere* > *decir* not **dicir*; *ridere* > *reír* not **riir*; see Togeby 1972: 258), (iv) analogy among others. Whatever the correct diachronic explanation is, synchronically this alternation can no longer be motivated solely by an active phonological process. Thus, one of the possibilities above (or some other explanation) must be postulated, but this lies outside the scope of our paper.

(7) Vocalic alternation: apophony /e/ → /i/ and /o/ → /u/ (only *dormir* and *morir*) (Alcoba 1999: 4954)

| | 1SG | 2SG | 3SG | 1PL | 2PL | 3PL |
|---|---|---|---|---|---|---|
| *Indefinido* | | | • | | | • |
| present subjunctive | | | | • | • | |
| imperfect subjunctive | • | • | • | • | • | • |
| future subjunctive | • | • | • | • | • | • |

*pedir* 'ask for': *pidió*, *pidieron* / *pidamos*, *pidáis* / *pidiera*, *pidieras*, *pidiéramos*, *pidierais*, *pidieran* / *pidiere*, *pidieres*, *pidiéremos*, *pidiereis*, *pidieren*

[26] *Tener* in the present subjunctive is also stressed on the root, but the form is not **tien-a* (1sg), because another irregularity interferes. We will argue that the vocabulary item *teng*- wins in this case, since it has a greater spanning size; see Section 4.3.

Finally, we want to mention an observation made by Alcoba (1999: 4955) regarding the overlapping of different alternations. The verb *tener* shows, for example, a vowel alternation and a consonant alternation, the latter being associated with athematicity. The internal distribution of these alternations partially overlaps (see the highlighted cells in (8)). In this case, it is the consonantal alternation that wins in this kind of competition. As we will show in Section 4, our analysis based on spanning naturally explains why the correct root is *teng-*: *teng-* is the VI that, due to its spanning size, optimally fits into the context of insertion and blocks any other competing VI.

(8) Overlap of distribution I and IV

| | 1SG | 2SG | 3SG | 1PL | 2PL | 3PL |
|---|---|---|---|---|---|---|
| present indicative | * | + | + | | | + |
| present subjunctive | * | * | * | * | * | * |

*tener* 'have': *tengo* not **tieno*, *tenga* not **tiena*, *tengas* not **tienas*, *tengan* not **tienan*

We have seen, based on Spanish verbal forms, that there are different kinds of alternation with different internal distributions. However, our paper focusses on those that are linked to athematicity, i.e. the absence of a visible ThV, though we acknowledge that there are other alternations, mostly conditioned by stress, that may require other explanations (e.g. readjustment rules, specific VIs as proposed above for /tjen-/).

## 3 Theoretical background

As mentioned in Section 2, we agree with Oltra-Massuet's idea that ThVs should not be confused with the realizations of the verbalizer v°, but we would like to claim that they are not as ornamental as one may think: ThVs have an impact on the (ir)regularity of verbal forms (Calabrese 2013; 2015a; b). A realized ThV at the right edge of the phase head specified by v° conditions the interaction between the root and its grammatical environment. More precisely, it blocks allomorphy. Athematic forms may instead show allomorphy. In what follows, we will illustrate and give an explanation for the link between athematicity and irregularity in Romance.

There are different types of athematic verbal forms in Romance: We distinguish between (a) grammatically determined (or context induced, e.g. depending on contextual φ, Asp, or T°) athematicity (examples (i)–(iii) in **Table 9** where grammatical features of the verb trigger athematicity); (b) athematic CCs (example iv) (a case still present in Latin, but less applicable to Spanish and Italian, in contrast to French); and (c) inherited athematic forms (example (v)).

As can be seen in **Table 9**, the presence of a ThV has a direct effect on the regularity (and productivity) of the respective verbal forms, whereas its absence may cause allomorphy. In Section 4.1 we analyze examples (i)–(iii) and then in Section 4.2 we discuss (iv). Finally, we turn to (v) in Section 4.3. First, in Section 3, we will introduce the theoretical background.

| | trigger | | thematic (regular) | athematic (irregular) |
|---|---|---|---|---|
| (i) | Asp° | It. | *amato* 'love$_{\text{PST.PRTC}}$' | *perso* 'lose$_{\text{PST.PRTC}}$' |
| (ii) | φ | It. | *andate* 'go$_{\text{2Pl}}$' | *vai* 'go$_{\text{2SG}}$' |
| (iii) | T° | Sp. | *queremos* 'want$_{\text{1PL.PRES}}$' | *quisimos*[27] 'want$_{\text{1PL.INDEF}}$' |
| | | | *ponemos* 'put$_{\text{1PL.PRES}}$' | *pondremos* 'put$_{\text{1PL.FUT}}$' |
| (iv) | CCs | Fr. | *arriver* ~ *arrives* 'arrive$_{\text{INF ~ 2SG}}$' | *vivre* ~ *vis* 'live$_{\text{INF ~ 2SG}}$' |
| (v) | $_{\text{1SG}}$ | Sp. | --- | *pongo* 'put$_{\text{1SG}}$' |

**Table 9:** Overview of thematic and athematic verbal forms.

## 3.1 Locality conditions on allomorphy

Since DM is a realizational morphological theory, syntactic elements do not carry phonological information and the phonological material is instead provided post-syntactically via Vocabulary Insertion, as explained in Section 1. The realization of the terminal nodes may be conditioned, however, by various features (inward and outward sensitivity, as shown in **Figure 1** based on Bobaljik (2000) in §1). The question is under which locality condition a grammatical feature may or may not trigger allomorphy. Consider **Figure 6**: There seems to be consensus in the literature that, when it comes to the realization of the root, the element X with the feature [F1] can impinge on the form of the root because it is linearly and hierarchically adjacent to the root. One point of controversy, however, is whether or not non-adjacent elements (here: Y and Z) can influence the realization of the root, i.e. trigger root allomorphy.

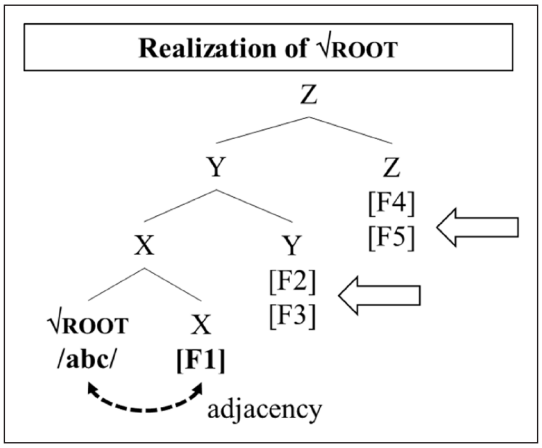


**Figure 6:** Root adjacent vs. non-adjacent elements.

[27] Note again that the second *-i-* in *quis-i-mos* is not the ThV of v°, but rather T° (or the ThV of T°, following Oltra-Massuet 1999); see also fn. 40 as well as Section 2.

Let us illustrate this using further examples: Departing from the morphological structure proposed by Oltra-Massuet (1999) in **Figure 3**, the following question arises: Under which conditions may T° and/or φ (or other apparently non-adjacent features, e.g. Asp°) trigger root allomorphy? In line with Calabrese (2015a; b), we will argue (see §4) that root allomorphy is possible whenever the ThV of v° is not separately realized. Our assumption is based on Bobaljik's (2012; 2015) observation that there are certain locality domains within complex words that are determined by domain delimiters.

In Romance, as we want to argue, it seems as if morpho-phonologically realized ThVs also have a domain delimiting function of this type: An overtly realized ThV blocks the interaction between the context to its left and the context to its right; see. **Figure 7**. Therefore, the default realization of the root cannot spread further than v° and, more importantly for our analysis in Section 4, in these cases, T°, T°-ThV and φ cannot trigger root allomorphy. The situation is different, however, with athematic verbal forms: As soon as there are more specific VIs that contain the ThV of v° (by spanning) such that it cannot be separately realized (or visibly present) the domain delimiting effects of visible ThVs vanish and root allomorphy can be triggered by properties of T° or φ.

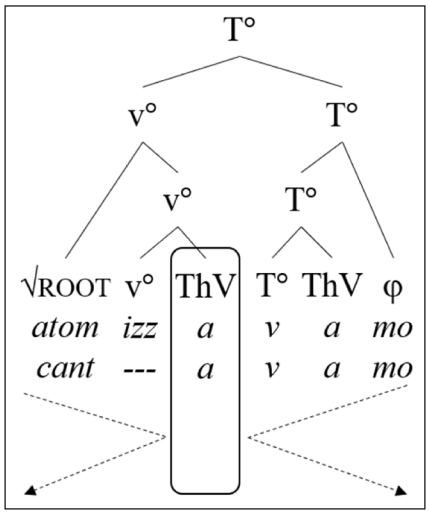


**Figure 7:** Italian ThV as domain delimiter in the sense of Bobaljik (2015) (the structure is based on Oltra-Massuet 1999).

We will illustrate this in the following sections using a spanning approach in order to account for the interplay of athematicity and allomorphy with examples from Romance verbal inflection.

## 3.2 Suppletion generalization

Work on verbal suppletion has shown that, in addition to domain delimiting effects, there is also a relation between the irregularities of a verbal form and the number of affixes that form has; see the two generalizations in (9).

(9) a. The Comparative Suppletion Generalization (CSG) (Caha et al. 2019): "If there is root suppletion, the number of overt markers of the comparative is reduced."
b. The Suppletion Generalization (SG) (Vanden Wyngaerd 2018: 1): "If there is irregularity in the form of either the root or the suffixes, the number of suffixes gets reduced".

To illustrate his ideas, Vanden Wyngaerd (2018) refers to Calabrese (2015b: 70) who noted that there is a striking correlation between the presence and absence of regular morphology and the presence and absence of ThVs. This correlation is reflected, for instance, in the past participle forms given in **Table 10**. In the regular past participles *amato*, *battuto* and *partito*, the √ROOT is extended by a ThV to form a stem. The irregular past participles *perso*, *corso* and *eccelso* are instead athematic, i.e. the √ROOT is not extended by a ThV and thus constitutes the stem in Calabrese's segmentation. According to Calabrese, the irregularity of the Italian past participles is not reflected in the √ROOT itself, but in the ending (here *-s-* not *-t-*).

| **regular and thematic** | | | | | **irregular and athematic** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stem | | ending | | | Stem | | Ending | | |
| √ROOT | ThV | | | | √ROOT | ThV | | | |
| *am-* | *-a-* | *-t-* | *-o* | 'loved' | *per-* | Ø | *-s-* | *-o* | 'lost' |
| *batt-* | *-u-* | *-t-* | *-o* | 'beaten' | *cor-* | Ø | *-s-* | *-o* | 'run' |
| *part-* | *-i-* | *-t-* | *-o* | 'left' | *eccel-* | Ø | *-s-* | *-o* | 'excelled' |

**Table 10:** Italian past participles (the segmentation corresponds to that given in Calabrese 2015b).

In contrast to Calabrese, we have argued in Pomino & Remberger (2022a; b; c) that the segmentation given in **Table 10** for the irregular past participle, which is based on the Latin sigmatic perfect, is not tenable from a synchronic point of view. We propose instead that Italian *pers-*, *cors-*, *eccels-* etc. should be synchronically represented as allomorphic VIs to *perd-*, *corr-*, *eccell-* etc. and thus should no longer be segmented (see **Table 11**). In other words, the generalization in (9b) can be paraphrased as follows: The loss of an affix (and its features) is

formally reflected in the irregularity of the root (note that this is also a plausible reflex of the underlying diachronic development).

| **regular and thematic** | | | | | **irregular and athematic** | | | |
|---|---|---|---|---|---|---|---|---|
| stem | | ending | | | stem | | ending | |
| √ROOT | ThV | | | | √ROOT | ThV | | |
| *am-* | *-a-* | *-t-* | *-o* | ‘loved’ | *pers-* | | *-o* | ‘lost’ |
| *batt-* | *-u-* | *-t-* | *-o* | ‘beaten’ | *cors-* | | *-o* | ‘run’ |
| *part-* | *-i-* | *-t-* | *-o* | ‘left’ | *eccels-* | | *-o* | ‘excelled’ |

**Table 11:** Italian past participles (simplified).

As will be shown in Section 4, our proposal can be implemented as follows: the irregular form *pers-* does not only realize the root slot, but spans over far more than one final element. As a direct consequence, the irregular verbal form will be shorter or have fewer affixes than the regular form.

## 3.3 Grammatically determined athematicity in DM approaches

In this section, we will briefly discuss how the absence of a ThV can be implemented in the framework of DM (see Pomino & Remberger 2022a; b; c for more details). There are several proposals in the literature regarding the analysis of athematicity, but it can be reduced to three major types (we will leave aside proposals in which verbal forms are not segmented into √ROOT + ThV, e.g. Bermúdez-Otero 2013).[28] One option is to assume that a terminal does not surface because it is realized by Ø (*zero exponence* with pruning of Ø) (e.g. Calabrese 2012). Another option would be to postulate that a terminal node does not surface since it fuses with another terminal before Vocabulary Insertion (see §1 for the unmarked present tense and the unmarked 3rd person singular). A third possibility is to assume that a terminal node does not surface because it is realized cumulatively with other features (encoded in other terminal elements): this is the proposal that we will follow here. These three possibilities are exemplified in **Figure 8**: the proposal in **Figure 8a** is based on Calabrese (2012 et seq.) and exemplifies zero exponence; **Figure 8b** illustrates fusion (in this case of the √ROOT and X); **Figure 8c** shows the solution based on the mechanism of spanning. In what follows, we will briefly highlight some shortcomings of

[28] Bermúdez-Otero (2013) proposes, for example, that “roots” are stored in the lexicon with (or without) their corresponding ThVs, i.e. (a)thematicity is memorized. Psycholinguistic studies have shown, however, that even in French ThVs are segmented (Estivalet & Meunier 2015; 2016).

Calabrese's analysis from 2012, based on zero exponence (**Figure 8a**) with subsequent pruning (Embick 2010), and will propose our own analysis based on spanning in Section 4 (**Figure 8c**).

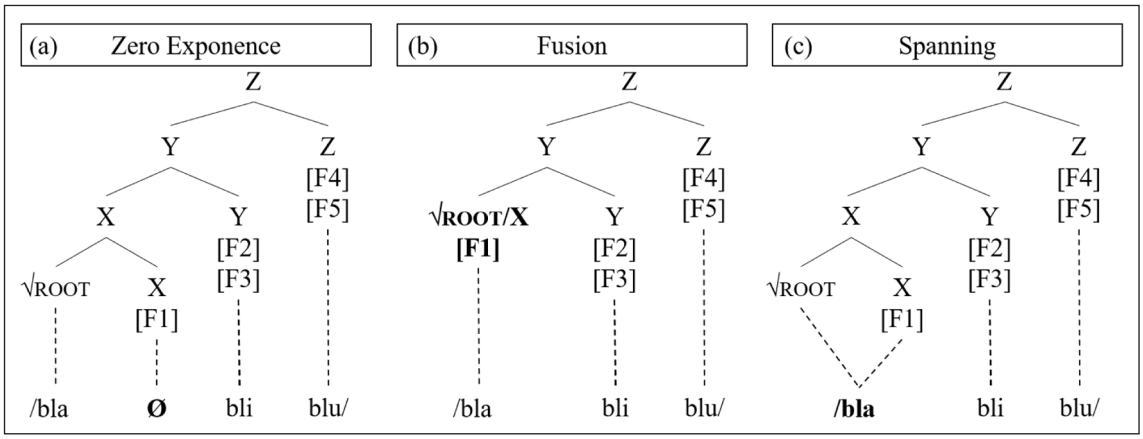


**Figure 8:** Zero exponence, fusion and spanning (Pomino & Remberger in submitted)

Pomino & Remberger (2022a; b; c) have repeatedly shown that an analysis based on zero exponence is far too complex and makes use of several, in our opinion unnecessary, processes. Calabrese (2012; 2013; 2015a; b) posits well-formedness conditions, exceptions to these conditions, zero exponence, different diacritic features, impoverishment (of diacritic features), listing of roots, highly context-sensitive VIs (that are soon afterwards deleted), and so on (Pomino & Remberger submitted).

Fusion also seems not to be the correct explanation, however: In an earlier paper, Pomino & Remberger (2019) did indeed argue in favor of an analysis based on fusion (**Figure 8b**) which they later had to reject. The reason for this change of mind is threefold: (i) as discussed in Section 2.1, fusion is even in the present tense a redundant process, since it simply reverses the well-formedness condition that introduces positions for φ (and ThV) and thus seems to be unnecessary, (ii) fusion, if assumed at all, is related to semantically unmarked tense features (as in the present tense) and it is thus not motivated for other tense forms such as the *indefinido* (the forms of which are as short as the present tense forms, e.g. *cant-o* and *cant-é*), and (iii) fusion, if one is willing to admit it in the *indefinido* (as e.g. Arregi 2000), would not alter the locality condition between the root and T°/φ in the necessary way in the case of *quis-i-mos*, for example. If one assumes fusion of T° and φ for the *indefinido*, the *-i-* cannot be interpreted as the ThV of T°; it has to be the ThV of v°. Apart from the fact that we have already shown in 2.2 that *-i-* is not the ThV of v°, we would generate a structure (see **Figure 9**) where allomorphy could not be motivated, that is it would be blocked because the root and the T/φ-features would be neither structurally nor (in most cases) linearly adjacent to the root, since there is an intervening ThV.

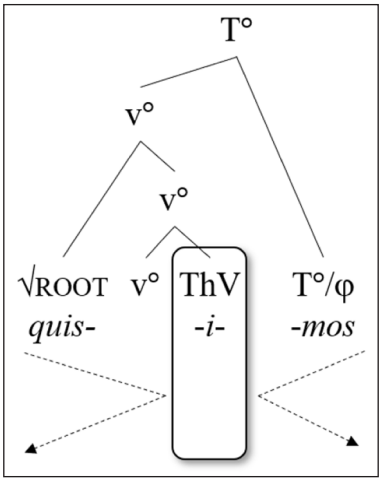


**Figure 9:** Spanish indefinido *quisimos* if fusion were an option (an approach that we do not follow).

The third possibility, which we will pursue in the next section, is the non-realization of certain terminals by spanning, which can insert phonological material in more than one terminal node at a time (**Figure 8c**). Spanning is a way to formalize cumulative exponence.[29]

## 4 Analysis of irregular verbs based on spanning

One central assumption of our analysis is that at least some exponents traditionally associated with the realization of the root slot realize more than just the root. As illustrated in **Figure 10**, the VI /atom-/ realizes only the root slot, whereas /kant-/ "spans"[30] over the root and v°. Due to this greater spanning size of /kant-/, v° cannot be separately realized (there is no morpho-

[29] Another approach, which can be compared to spanning in DM at least in some respects is Nanosyntax (Starke 2009; Taraldsen 2018), which does not operate with spans inserted for more than one terminal node, but with the insertion of complex syntactic structures that are bigger than just heads. However, some of the assumptions of Nanosyntax have repercussions on narrow syntax, which we would prefer not to adopt. In Nanosyntax, every syntactic terminal node has only one single feature, whereas minimalism allows a certain type of hybridity with more than one feature in a head (for an overview, see also De Belder & Don 2022). Moreover, DM is most readily combined with a minimalist view on syntax, whereas Nanosyntax is definitely cartographic. Note also that Starke (2020), in a talk on the nanosyntactic approach, has no representations for ThVs (nor even for French CCs), which are a key aspect of Calabrese's argumentation and ours. Nevertheless, Nanosyntax and DM have similar views on morphology, although they implement it in different ways. For a discussion of Starke's talk (2020) by several authors, see *Isogloss* (2021), vol. 7 (https://revistes.uab.cat/isogloss/issue/view/11); for a (nanosyntactic) view on DM in comparison with Nanosyntax, see Caha (2018).

[30] Svenonius (2016: 205) proposes that Vocabulary Insertion targets spans which he defines as follows: "A span is a contiguous sequence of heads in a head-complement relation". This definition is not directly applicable to our case since ThV-slots are added post-syntactically and do represent this configurational constraint only through the head to which they attach.

phonological realization/VI for "neutral" v° in any case). Now, the VI /pus-/ (of the verb *poner*) has an even greater spanning size that also includes the ThV-slot and leads thus to an obviously athematic verbal form. What is more, the larger spanning size of the respective VI leads to distinct locality relations: Since /pus-/ spans over <root, v°, Th> this VI is span-adjacent to T°, which means that the features encoded there can act as contextually relevant for Vocabulary Insertion (outward sensitivity). In contrast, *atom-* and *cant-* are not span-adjacent to T° and thus no T°-triggered allomorphy is expected.

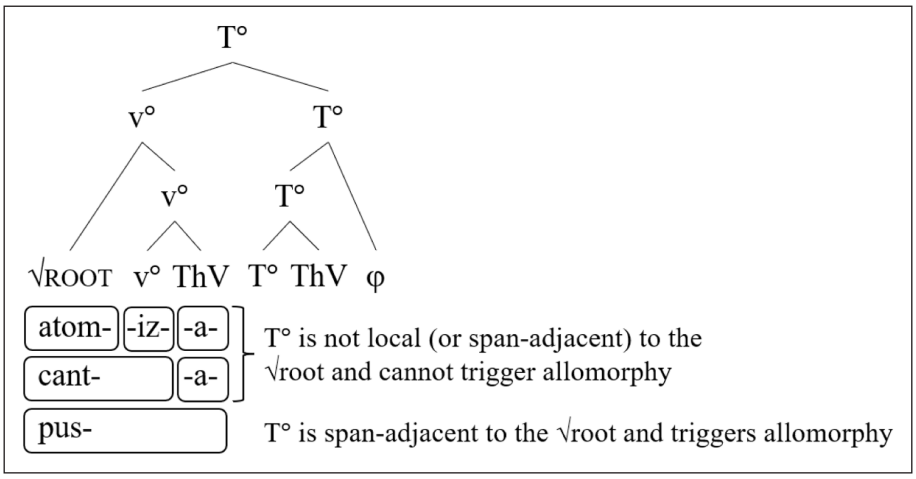


**Figure 10:** Different spanning sizes for Spanish *atomizar* '(to) atomize', *cantar* '(to) sing' and *poner* '(to) put'.

In the next sections we will illustrate this idea with examples of grammatically determined athematicity (§4.1), athematic CCs (§4.2) and inherited athematic forms (§4.3) (see the classification and examples given in **Table 9**).

## 4.1 Grammatically-determined athematicity

Consider again the irregular forms of the Italian past participles in **Table 10–11** in Section 3.2: Calabrese (2015) proposes that Italian past participles do not have a ThV position for Asp°. Although there is never[31] an overt exponent for a ThV for this functional head in the sense of Oltra-Massuet (1999), we would like to retain her proposal, and assume that every functional head receives a ThV (see **Figure 11**). That is, although we do not see a phonologically realized ThV of Asp° in the Italian past participle, we still assume – for reasons of parallelism – that there is a position for it, even if it is realized only within a span (even without the assumption of a ThV for Asp° our proposal would work in the same way). For the time being, we represent the

[31] One could argue that in Latin, at least at a certain point, the future participle hosted an Asp°-related ThV of this kind, e.g. in *ven-t-**u**-r-us*.

participle Asp° with a structural position for ThV; see the structure given in **Figure 11** for Italian past participles:

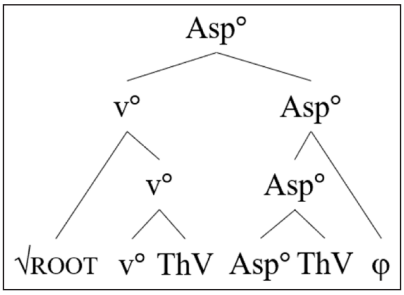


**Figure 11:** Morpho-syntactic structure of Italian past participles.

If in this structure the ThV of v° is overtly realized, it functions as a domain delimiter and it will block root allomorphy triggered by Asp°.[32] The feature Asp°-[participle][33] cannot impinge on the form of √ROOT. Instead, if the ThV is within the span containing the root, allomorphy is possible. Moreover, the original status of /s/ as an exponent of Asp° is now reflected in a more widely spanning item, namely a VI that spans over <√ROOT, v°, Th, Asp°-[participle], Th>. Our analysis is illustrated in **Figure 12** with the participles *temuto* and *perso*.

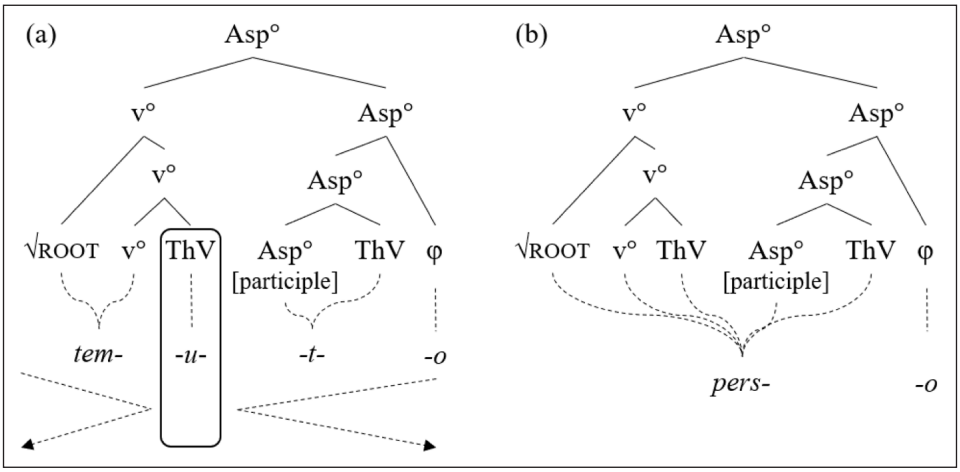


**Figure 12:** (a) regular *temuto* 'feared' vs. (b) irregular *perso* 'lost' (Pomino & Remberger submitted).

[32] There is one really exceptional case in Italian, where an irregular stem appears with a ThV, namely the participle *viss-u-t-o* from *vivere* 'to live'.

[33] For the sake of simplicity, we follow the feature specification used by Calabrese (2015a). The annotation [participle] is, however, a placeholder for whatever features Asp° encodes in past participles (which is a matter of long-standing debate).

For the verb *perdere* '(to) lose' we assume (at least[34]) the VIs in (10): the irregular form *pers-*, which spans over <√LOSE, v°, ThV, Asp°-[participle], ThV> leading to an athematic form and the (regular) default realization *perd-* (for reasons of space we do not list VIs that are not crucial for the argumentation; see Pomino & Remberger submitted for more details). Note that (10a) is a highly specialized item, which realizes several syntactic input nodes at once:

(10) VI for √ROOT (+ v°)
*a.* *pers-* ↔ <√LOSE, v°, ThV, Asp°-[participle], ThV]>
*b.* *perd-* ↔ <√LOSE, v°> (*elsewhere*)

The form of the Italian suppletive verb *andare* '(to) go' can be analyzed in a similar vein (see Pomino & Remberger 2022c for more details). In Italian, suppletion of the verb GO only occurs in the present tense, where it is context-sensitive. In all other verbal categories, the root /and-/ is generalized, i.e., it is the default realization for √GO (see **Table 12**).

| | **1SG** | **2SG** | **3SG** | **1PL** | **2PL** | **3PL** |
|---|---|---|---|---|---|---|
| Pres. | *va-do* | *va-i* | *va* | *and-ia-mo* | *and-a-te* | *va-nno* |
| Impf. | *and-a-v-o* | *and-a-v-i* | *and-a-v-a* | *and-a-v-a-mo* | *and-a-v-a-te* | *and-a-v-a-no* |

**Table 12:** Italian present tense and imperfect of GO.

As can be seen from this partial paradigm, since *andare* is regular and formally a first CC verb, it is equipped with the ThV /a/ in all the cells of the paradigm where it appears, parallel to other regular verbs like *cantare* 'to sing'. In contrast, the suppletive forms based on *va-* are all athematic.[35] In line with what has been said before, we assume that the spanning size of *va-* is <√GO, v°, Th>, whereas *and-* is the default realization with the spanning size <√GO, v°>. Again, as can be seen in **Figure 13**, T° (including its φ-features) is adjacent to the preceding span

[34] Note that *perdere* in Italian has co-occurring regular and irregular forms and thus is a case of overabundance in the sense of Thornton (2011; 2012); we will not discuss this issue here.

[35] An anonymous reviewer notes that there is suppletion even if the two verbs share a CC, giving the example of DARE/DONARE in some Gallo-Romance and Southern Italian varieties, as exemplified in Maiden (2009: 57). The interesting thing here is that DONARE, and not DARE, is the new source item – as VADERE, and then ANDARE, is for IRE; we would claim that both IRE and DARE do not contain a ThV at all, although they superficially belong to the *a-* and *i*-CC. If the *i* in IRE were a ThV, the verb itself would be completely substance-less, whereas if *a* was a ThV in DARE, the verb would be represented by a consonant only. However, there are no consonant-only lexical elements in Italo-Romance, since this is forbidden by syllable structure. Thus, the root of IRE must be *i-* and the root of DARE must be *da-*; i.e. the suppletive verbal forms of *dare* in the DARE/DONARE example simply do not have ThVs.

and may trigger allomorphy, or function rather as context for insertion, in the *va*-forms, but not in the *and*-forms, since here there is an intervening ThV.[36]

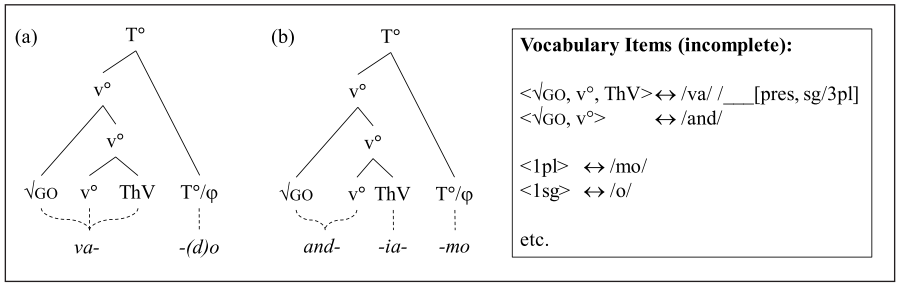


**Figure 13:** Italian suppletive verb (slightly modified from Pomino & Remberger 2022c: 17).[37]

This analysis is not only applicable to Italian verbal inflection, but also to other Romance languages. Consider the Spanish verbal forms in **Figure 14** and **Figure 15**: The irregular future form *pondremos* '(we) will put' in **Figure 14** as well as the irregular *indefinido*[38] form in **Figure 15** differ from the respective imperfect form in the spanning size of the VI for the realization of the root. In both cases, it spans over the ThV and is adjacent to T°. That is, the features encoded in T° serve as a context of insertion.

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[36] In this paper, we mainly focus on the realization of the root (or stem) leaving aside a detailed discussion of the other exponents of inflection and a detailed description of the feature encoding. Note, however, that one main reason for assuming spanning is the avoidance of zero exponence. We assume that in the 3rd person singular present indicative there are no features encoded in T°/φ (since all these values are the unmarked values). That is, T°/φ remains completely unrealized (since there are no features for realization).

[37] The ThV *-ia-* in the 1st person plural is a particular feature of the Florentine basis of modern Italian and is taken over from the subjunctive form; it has been generalized for all CCs. That is, for the insertion of ThV in the context of the 1st person plural in the present tense (and only there, since only here φ in T/φ can condition the choice of the VI for the ThV) has a default /ja/ for all CCs. Seen from a diachronic perspective, *cantiamo* < CANTEAMUS, thus /ja/ < [e.'a], which is the realization of a subjunctive T° (or a span <T°, ThV>, with the ThV of v° being in a span with the root). Since ThV-T°-ThV are adjacent, driven by the frequency of 1st person plural subjunctive (exhortative) forms, after the dissolution of the hiatus the /ja/ could be reinterpreted as the ThV for 1st person plural in general, also in the context of the present tense indicative and for all CCs, with no subjunctive interpretation anymore.

[38] In **Figure 15**, we have used the annotation [indef] to refer to the features [past, perfective, indicative] (opposed to the imperfect, i.e. [past, imperfective, indicative]) for sake of simplicity. Note that a detailed feature annotation of the structures would distract too much from our central assumption and put the focus on something that we are not dealing with here.

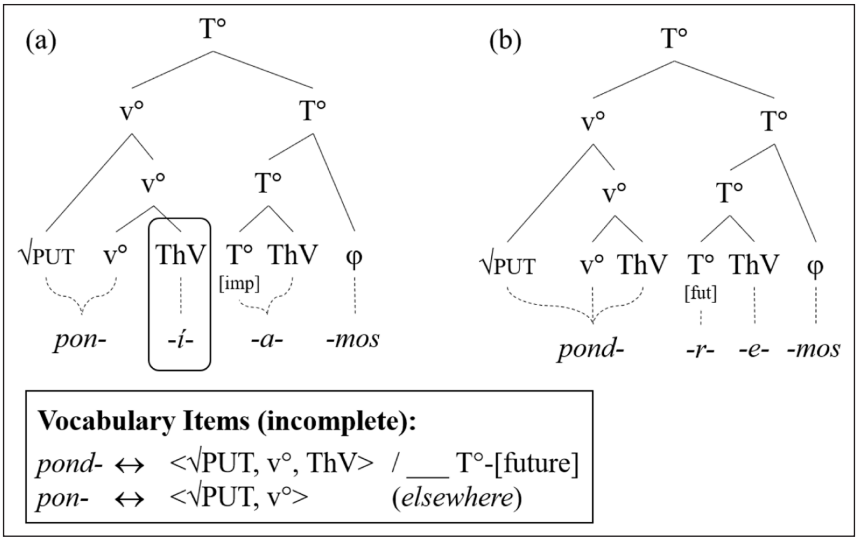


**Figure 14:** (a) Spanish imperfect vs. (b) future tense.[39]

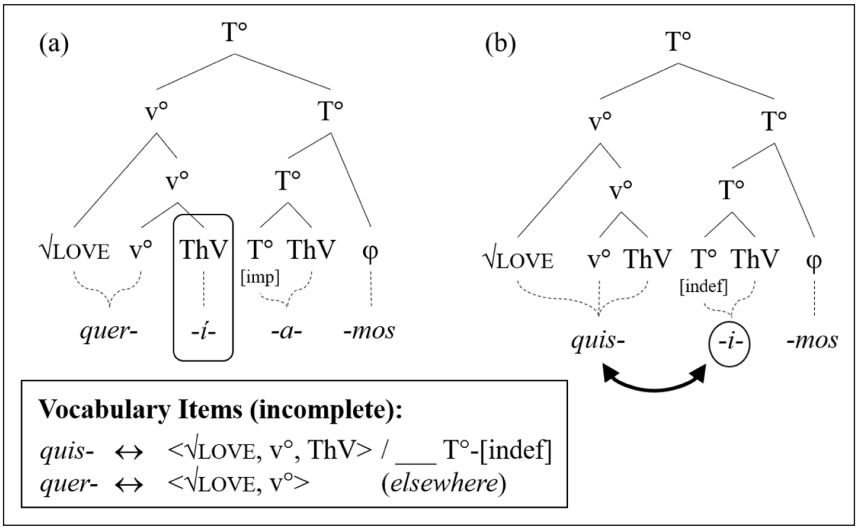


**Figure 15:** Spanish imperfect vs. *indefinido* (= indef).[40]

In the next section we will discuss the second type of athematicity that is not triggered by grammatical features.

[39] Note that the stem allomorph appears also in the conditional, which can be syntactically interpreted as a future in the past, thus including a T°-[future], too (see §3.2).

[40] See fn. 27, as well as Section 2. Note that the /i/ in *querŕamos* is the ThV of v°, whereas the second /i/ in *quisimos* is the ThV of T° – we motivate this with the historical development of these forms (Pomino & Remberger submitted). As pointed out by an anonymous reviewer, sychronically the /i/ in *quisimos* can also be interpreted as the ThV of v°. However, we are convinced that the diachronic development, as given in (i), is still underlyingly effective even in synchrony, since the tense interpretation of the *indefinido* is still semantically there (this is different from the reinterpretation in Italian of *-ia-* as a ThV of v°, and not of T°, since the subjunctive in T° is not semantically there,

## 4.2 Athematic conjugation classes (French)

The distinction between thematic and athematic CCs is crucial for our analysis of French verbal forms (Pomino & Remberger 2022b). Modern French verbs are traditionally divided into three CCs based on the form of the infinitive (see e.g. Meyer-Lübke 1908: 202): Verbs of the first CC have an infinitival form ending in *-er* [-eʁ], e.g. *aimer* [ɛ'me] '(to) love'. This CC does not only include 90% of all French verbs, but is also highly productive. Apart from *aller* 'to go', which shows suppletion and therefore only belongs in part to the first CC since it unites forms derived from verbs from different CCs, most verbs ending in *-er* are classified as being regular, in the sense that they have only one single stem for all tense forms.[41] The second CC is characterized by infinitives ending in *-ir* [-iʁ] and the verbs of this class have a short and a long or extended stem, e.g. *finis* [fini] '(I) finish' vs. *finissons* [finisɔ̃n] '(we) finish'. This CC is also considered to be fully regular; according to Gertner (1973: 19) the number and the proportion of regular verbs within this CC is even higher than in the first CC. However, the second CC includes only 2.8% of all French verbs and it is generally – with a few exceptions, including some recent newcomers – considered to be no longer productive, a fact that makes it more marked than the first CC. The third CC is in essence a smorgasbord of all other verbs that do not belong to the first or second CC. Verbs belonging to this class are, for instance, *romp-re* 'to break', *peind-re* 'to paint', *voul-oir* 'to want', *dorm-ir* 'to sleep' (infinitive in *-ir* but without *-ss*-extension). This CC contains many irregular verbs with stem allomorphy. It goes without saying that this CC is unproductive and counts as the most marked class.

There is no consensus in the literature with respect to whether or not French still has ThVs, and proposals for the classification of French CCs diverge considerably. We cannot discuss all the insights here (Pomino & Remberger 2022b), but we assume that only the first and second CCs are thematic in French. The assumption of the presence of a ThV for the CC of *finir* 'to finish' is straightforward for many linguists, since here the ThV surfaces as either [i] or [is]. With respect to the [i]-[is]-alternation, Schwarze (2009) proposes that the underlying form of the ThV is, in all cases, /is/. The /s/ of this theme element surfaces only when it can occupy an onset position in the syllable structure (as in the plural forms of *finir* in **Table 13**); otherwise it is deleted. As

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cf. fn. 37); see also Italian, where the *passato remoto* forms, with the exception of the first CC, maintain phonological material of the ThV of T° (not of v°):

| (i) | Lat. | √ | v | ThV | T/Asp | ThV | φ |
|---|---|---|---|---|---|---|---|
| | | *laud-* | | *ā-* | *v-* | *i -* | *mus* |
| | | *mon-* | | | *u-* | *i -* | *mus* |
| | | *fēc-* | | | | *i -* | *mus* |

[41] There are some first CC verbs that show stem allomorphy, but – as shown e.g. by Meunier & Marslen-Wilson (2004) – these all count as phonologically predictable changes. For example, the stem allomorphy found in *lever* [lə.veʁ] 'to lift' vs. *lève* [lɛv] '(I) lift' can be explained based on the distinction between (phonetically) open and closed syllables.

can be seen from this example, it is sufficient to assume only one root/stem and one ThV; the corresponding surface forms result from regular phonological processes.

| | morphological structure | | | syllable structure | surface form[42] | | spelling |
|---|---|---|---|---|---|---|---|
| | root | ThV | φ | | –liaison | +liaison | |
| 1SG | fin | is | z | fi.nisz | [fi.ni] | [fi.ni.zV] | *finis* |
| 2SG | fin | is | z | fi.nisz | [fi.ni] | [fi.ni.zV] | *finis* |
| 3SG | fin | is | t | fi.nist | [fi.ni] | [fi.ni.tV] | *finit* |
| 1PL | fin | is | õz | fi.ni.**s**onz | [fi.ni.**s**õ] | [fi.ni.sõ.zV] | *finissions* |
| 2PL | fin | is | ez | fi.ni.**s**ez | [fi.ni.**s**e] | [fi.ni.se.zV] | *finissez* |
| 3PL | fin | is | ət | fi.ni.**s**ət | [fi.ni**s**] | [fi.nis.tV] | *finissent* |

**Table 13:** Forms of *finir* (in Pomino & Remberger 2022b adapted from Schwarze 2009).

Evidence for the existence of ThVs in French for the first CC comes from the consonant-zero-alternation mentioned in **Table 9** (iv): The root-final consonant of *viv(re)* 'to live', which belongs to an athematic CC, is maintained if there is a possibility for it to appear in a syllable onset; as final coda consonant it is instead deleted (e.g. *vivons* [vi.võ] in onset position vs. *vis* [vi] in coda position, not *[viv]).[43] The same final consonant of *arriv(er)* 'to arrive', which is thematic, is never deleted: *arrivons* [a.ʁi.võ] in onset position and *arrives* [a.ʁiv] in coda position (not *[a.ʁi]). Schane (1966; 1968) and others assume that in this case the ThV /ə/ (e.g. /aʁiv + (ə) + (z)/), which does not surface since it is deleted at some point in the derivation,[44] blocks consonant deletion. Schane's (1966; 1968) conclusion can be easily translated into our analysis of spanning.

If one is willing to assume ThVs for the first CC in French,[45] the alternation between having a root-final consonant or not, i.e. the allomorphy between *viv-* and *vi-*, can be explained

[42] In the phonic realization of French, the phenomenon of *liaison* is one of the most striking *sandhi* phenomena of the language. *Liaison* is understood as the overt realization of a latent word-final consonant which (in a specific syntactic/prosodic context) is not pronounced before a following word-initial consonant, but is realized in front of a following word-initial vowel.

[43] The consonant [v] is maintained in the infinitive (e.g. *vivre* [vivʁ]), since, even if it is in the coda of the syllable, it is not in word-final position. Alternatively, *vivre* can be analyzed as underlyingly bi-syllabic.

[44] i.e. the rules are chronologically (hierarchically) ordered.

[45] Despite several studies, such as those by Schane (1966; 1968), which argue for ThVs in French, the CC system of French is not traditionally described in terms of ThVs. There are however several recent papers by Meunier & Marslen-Wilson (2004) and Estivalet & Meunier (2016), for example, that discuss the existence of ThVs in French

by assuming that the exponent /viv-/ spans over root, v° and ThV. The final consonant is maintained whenever it can move into the onset position of the VI of the following node. Otherwise, the final consonant is deleted by a phonological rule, i.e. the fact that the final consonant does not surface in some forms is phonologically conditioned. Thus, as illustrated in **Figure 16**, in *vivons* the root-final consonant surfaces, because it can move into the onset position of the span-adjacent element (i.e. the exponent *-ons* of T°/φ). In *vis*, the consonant never surfaces, because it cannot move into the onset position; it is thus deleted phonologically. Things are different for *arriver*: The element *arriv-* spans only over root and v°. This means that the span-adjacent element is a ThV, although later deleted, and thus the final consonant will always be "saved".

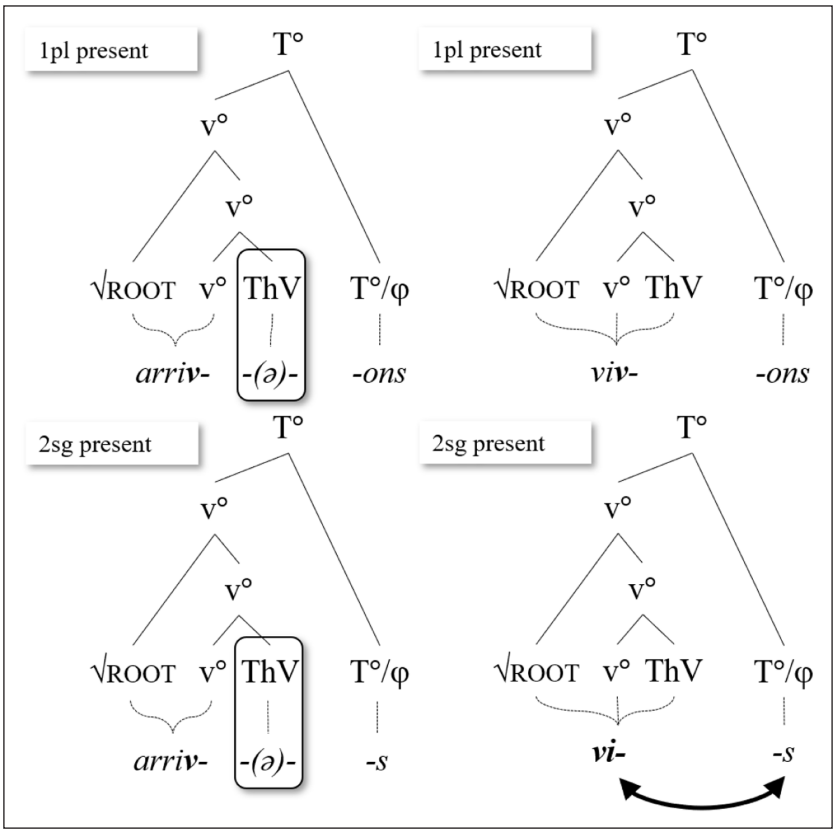


**Figure 16:** Thematic *arriver* vs. athematic *vivre*.

from a psycholinguistic perspective. Their results seem to speak in favor of a segmentation of the verb stem into root and ThV (at least for the first CC).

In summary, we assume that the well-formedness condition that adds ThVs is still valid for French, i.e. there is no structural difference between the roots of thematic *arriver* and athematic *vivre*. However, there is only one exponent for *vivre*: *viv-* (in all cases). The fact that the final consonant does not surface in some forms is phonologically conditioned.[46] If it is not linked to an onset slot of the span-adjacent element, it is deleted. The essential difference when compared to thematic *arriver* is that *arriver* always has an onset slot available that avoids consonant deletion, because of the presence of a realized ThV.

## 4.3 Inherited athematicity

Let us turn to the last type of athematicity, which we have termed inherited or reanalyzed athematicity. In order to understand our first tentative approach to this kind of athematicity, we will briefly discuss the analysis of van der Spuy (2020) for Latin, in which he argues for a phonological explanation of the Latin verbal inflection. He claims that all regular Latin verbs have the structure [stem]-[tense/mood]-[person/number]. Each of these components may receive a respective phonological realization and the resulting form may be further subject to a reduced number of (morpho-)phonological rules. Two of these rules are the phonological rules affecting ThVs proposed by van der Spuy (2020: 5), as shown in (11).

(11) a. "The theme vowel /a:/ of the first conjugation is elided before a vowel-commencing affix, specifically the [1sg] suffix /o:/" (van der Spuy 2020: 5).
b. "The vowel /i/, the theme vowel of the third conjugation, which also occurs in the future suffix /bi/, is deleted before another vowel" (van der Spuy 2020:5).

For instance, 1st person present indicative is subject to the rule in (11) as illustrated in **Table 14**, as are all persons of the present subjunctive, since the subjunctive marker is either /e/ or /a/ (see **Table 15**).

| | **stem** | **tense/ mood** | **person/ number** | **stem** | **tense/ mood** | **person/ number** |
|---|---|---|---|---|---|---|
| | /lauda:/ | Ø | /o:/ | /legi/ | Ø | /o:/ |
| rule (11)a | /laud/ | | | | | |
| rule (11)b | | | | /leg/ | | |
| surface form | /laudo:/ 'I praise' | | | /lego:/ 'I choose/read' | | |

**Table 14:** 1st person present indicative *laudo* and *lego* according to van der Spuy (2020: 5).

[46] This is also reflected in the corresponding orthographic forms of the verb, e.g. *vis* and *vit* vs. *vivons*.

| | **stem** | **tense/ mood** | **person/ number** | **stem** | **tense/ mood** | **person/ number** |
|---|---|---|---|---|---|---|
| | /lauda:/ | /e/ | /m/ | /legi/ | /a/ | /m/ |
| rule (11)a | /laud/ | | | | | |
| rule (11)b | | | | /leg/ | | |
| surface form | /laudem/ | | | /legam/ | | |

**Table 15:** 1st person present subjunctive *laudo* and *lego* according to van der Spuy (2020: 3, 5).

However, the rules in (11) postulated by van der Spuy (2020) are not easily traceable in diachrony, since there are simply no attested forms of the type *laud-ā-ō* (see also fn. 12); furthermore, this /a:/, following the Latin stress rule, would be accented and would constitute a really quite rare case of a stressed long vowel, in addition the central low vowel, which is the most stable in diachrony, being deleted. Let us simply state, then, that certain verbal forms were already athematic in Latin, even in the first CC.

Whatever the explanation is for the verbal forms in Latin, the corresponding verbal forms in Spanish (and in other Romance languages and varieties) are still athematic today; see the highlighted cells in **Table 16**.

| | **present indicative** | | | **present subjunctive** | | | | |
|---|---|---|---|---|---|---|---|---|
| | **√+v°** | **ThV** | **T°/φ** | **√+v°** | **ThV** | **T°** | **ThV**[47] | **φ** |
| 1SG | com | | o | com | | | a | |
| 2SG | com | e | s | com | | | a | s |
| 3SG | com | e | | com | | | a | |
| 1PL | com | e | mos | com | | | a | mos |
| 2PL | com | é | is | com | | | á | is |
| 3PL | com | e | n | com | | | a | n |

**Table 16:** Present tense forms of regular *comer* '(to) eat'.

In the analysis we have proposed so far, this means that the span-adjacent element T° (or T°/φ) can condition the form of the root. This is exactly what we observe in the forms of irregular *poner* in **Table 17**: In the present indicative we have φ-triggered root allomorphy and in the present subjunctive root allomorphy is triggered by mood encoded in T°.

[47] We follow Harris (1972: 249) and others and consider the vowel /a/ to be the exponence of mood together with the ThV of T° that encodes subjunctive mood. Note that *comer* belongs to the second CC and, as a general rule, does not have the ThV /a/ (of the first CC).

| | present indicative | | | present subjunctive | | | | |
|---|---|---|---|---|---|---|---|---|
| | √+v° | ThV | T°/φ | √+v° | ThV | T° | ThV | φ |
| 1SG | pong | | o | pong | | | a | |
| 2SG | pon | e | s | pong | | | a | s |
| 3SG | pon | e | | pong | | | a | |
| 1PL | pon | e | mos | pong | | | a | mos |
| 2PL | pon | é | is | pong | | | á | is |
| 3PL | pon | e | n | pong | | | a | n |

**Table 17:** Present tense forms of irregular *poner* '(to) put'.

How can we explain under a synchronic point of view, however, that the highlighted forms are athematic? One possibility, which is pursued by Oltra-Massuet (1999) and Arregi (2000), is to assume some kind of impoverishment rule that deletes the ThV in the respective contexts, as in (12).

(12) Impoverishment rule for 1st person present indicative
ThV → Ø / v° __ [$_{T°/φ}$ 1sg, present indicative]

Another possibility, which we want to propose despite being unable to trace the details of the diachronic evolution here, is to argue that the athematic Latin forms *laudo*, *lego* etc. (whether they are the output of a former Latin phonological rule as in (11) or not;) were reanalyzed as a form that completely lacks a ThV slot in its input form. Synchronically, this would mean that – also for regular verbs – v° lacks a ThV in 1st singular present indicative (**Figure 17**) and in all persons in the present subjunctive. These forms, i.e. v° in the context of T°/φ are thus not affected by the well-formedness condition[48] that adds a ThV to functional heads (Oltra-Massuet 1999). Note that *cant-* has the same spanning size in both cases.

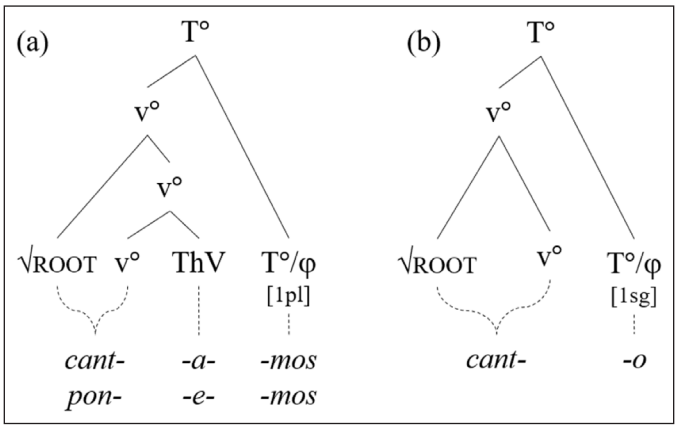


**Figure 17:** (a) thematic vs. (b) athematic present tense forms (based on Oltra-Massuet 1999).

[48] Note that this well-formedness condition can be called morphomic (Maiden 2016).

If this generalization holds, we can once again use spanning to explain the irregularities in the Spanish verbal inflection that affect 1sg present indicative and all persons of the present subjunctive: *pon-e-mos* is regular and thematic, whereas *pong-o, pong-a, pong-a-s* etc. are irregular and athematic. Being athematic, the span-adjacent T°(/φ)-node can trigger root allomorphy; see **Figure 18** and the VI in (13a)

(13) a. *pong-* → <√PUT, v°> / ___[$_{T°/φ}$ 1sg, present indicative] / [present subjunctive]
b. *pon-* → <√PUT, v°> (elsewhere)

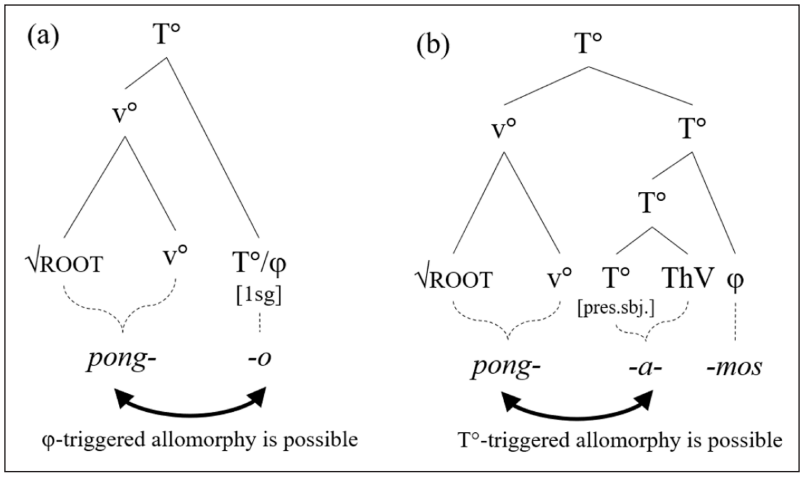


**Figure 18:** Irregular forms of *poner* '(to) put' (1st person singular (a) and all present subjunctive forms (b)).

What the irregularities discussed in these subsections all have in common is that the verbal forms analyzed here are all athematic. The reasons for their athematicity are different, however (see **Table 9**): they may be athematic in the form (see the examples in §4.1) or in the morpho-syntactic structure (see the examples in §4.2, conditioned by CC, and §4.3, inherited conditions).

## 5 Conclusion

In this paper, we have identified three types of athematicity (see **Table 9**): (a) grammatically conditioned athematicity, (b) athematic CCs and (c) reanalyzed or inherited athematicity. We have shown that all these types of athematicity are related to some kind of irregularity. This means that ThVs are not just ornamental elements, but instead, once separately realized they have a domain delimiting effect in Romance, blocking allomorphy in thematic forms. If the ThV of v° is overtly realized, the context to its right cannot trigger root allomorphy (→ default realization). If the ThV of v° is realized together with √root and v° as one span, there is no domain delimiting effect and T°, Asp° and/or φ-triggered root allomorphy is possible. The fact that irregular forms have a reduced number of affixes is explained by allowing Vocabulary Insertion to target not only single terminal nodes but also spans of terminal nodes (see *spanning*; Merchant

2015; Svenonius 2016). Larger span sizes in the case of irregular forms also result in shorter or less complex forms.

The spanning approach also has further advantages: First, it reflects diachronic developments in synchrony[49] that are not particularly clearly visible in the linearized form of the derived structure; see e.g. the different types of ThV, the realization of a marked T° like the *indefinido* as a span together with its ThV, and /ja/ in the 1st person plural in Italian, see fn. 37. Second, it might also be helpful for the analysis and modelling of other phenomena for which locality conditions are essential.

[49] Although we do not agree with the analyses proposed by Calabrese in detail, we agree with Calabrese & Petrosino (2023: 45) who claim that "DM can account for diachronic change along both the cross-linguistic (i.e., among cognate languages belonging to the same linguistic family) and the inter-linguistic (i.e. throughout the historical development of a single language) dimensions […]."

## Abbreviations

1 = 1st person; 2 = 2nd person; 3 = 3rd person; a = "little" a; adj = adjective; Asp = Aspect; CC = Conjugation Class; CSG = Comparative Suppletion Generalization; DM = Distributed Morphology; fem/FEM = feminine; Fr = French; fut = future; Gen = gender; impf = imperfect; indef = *indefinido*; inf = infinitive; Lat = Latin; n = "little" n; pl = plural; POS = positive; pres = present tense; prtc = participle; pst = past; sbj = subjunctive; sg = singular; SG = Suppletion Generalization; Sp = Spanish; T = tense; ThV = theme vowel; v = "little" v; VI = Vocabulary Item; φ = agreement (person and number); √ = root.

## Competing interests

The authors have no competing interests to declare.

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