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The status of verbal theme vowels in contemporary linguistic theorizing: some recent developments. An Introduction

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Contemporary theoretical approaches to morphology have devoted considerable attention to verbal theme vowels, i.e., the issue of whether they can be shown to possess identifiable syntactic or semantic properties. The position that theme vowels are items without syntactic or semantic import has profound theoretical consequences, entailing the existence of an autonomous component of Grammar dedicated to Morphology (Anderson 1992; Aronoff 1994; Embick and Halle 2003). Approaches that dispense with a separate morphological module must assume that theme vowels do, in fact, have discernible semantic contributions (Jabłońska 2004; 2007).

In this paper, we review the arguments from both sides in order to set the stage for and critically examine a series of new contributions published in this Special Collection. On balance, evidence of a link between theme vowels and particular meaning components (either aspect or argument structure) can be observed, though only in the form of (often very strong) tendencies, which figure most prominently in 'minimal pairs' of verbs differing only in their theme vowel. We highlight this observation and the methodological approaches that were employed to extract it (quantitative corpus or experimental studies) as the main contribution of this Special Collection and discuss the theoretical significance of this finding. Our position is that it cannot be taken as a falsification of the view that theme vowels are 'pure morphology', to the extent that it would require proof of a perfect correlation between theme vowels and a particular semantic property. At the same time, following Marantz (1997) we consider the possibility that categorial rules are not necessarily to be expected in structures involving only a root and a little *v*, highlighting an innovative approach in terms of markedness hierarchies where aspect/argument structure is only one factor determining theme vowel selection (Milosavljević and Arsenijević 2022) as a possible way of deriving non-categorial rules observed in other papers from a mix of morphosyntactic and phonological factors.

1 Introduction

The contributions to this volume address the longstanding problem of the status of theme vowels (ThVs) in verbal morphology. ThVs can be descriptively defined as morphemes (typically just vowels) that are located between the stem/root and inflectional morphemes in verbs or between the stem/root and the derivational suffix in deverbal derivations. This is illustrated in (1) for Serbo-Croatian (SC), Ukrainian, French, and Latin. In the examples in (1), the ThV *-i-* occurs between the verbal stem (prefix + root in 1a and 1b, root in 1c and root + verbalizer in 1d) and the infinitival suffix.

(1) a. o-pamet-**i**-ti *Serbo-Croatian*
PFV-intelligence-THV-
'make/become smart'

b. (z)-dytyn-**i**-ty *Ukrainian*
(PFV)-child-THV-INF
'become child-like'

c. jaun-**i**-r *French*
yellow-THV-INF
'make/become yellow(ish)'

d. es-ur-**i**-re *Latin*
eat-DSD-THV-INF
'be hungry'

As the examples in (1) show, ThVs tend to, but do not always have to be located at the border between traditionally-understood derivational and inflectional morphology.

There are essentially two main issues regarding the morphological status and function of ThVs. The first issue concerns their autonomy as morphological building blocks. One perspective on this front is that ThVs are parts of verbal stems, which means that they are essentially listed together with roots, and these stems then combine with different inflectional and derivational morphemes. The alternative point of view holds that ThVs are morphological units in their own right, and they combine with verbal roots before other inflectional and derivational morphemes are introduced.

The second question derives from the latter assumption that ThVs are autonomous morphological units, and it deals with their syntactic and semantic function/contribution. One view, which we will refer to as 'the received view', because it is largely inherited from traditional grammar, holds that ThVs are semantically empty, 'ornamental' morphemes that are added to verbal derivations for language-specific reasons to signal conjugation class membership and/or satisfy certain morphophonological requirements. A challenge to this widespread position comes from a line of research according to which ThVs are associated with some syntactic or semantic

information (typically aspect or argument structure). We will use the label 'the syntactic view' to refer to this position.

Both of these questions about the status and function of ThVs have significant theoretical ramifications making research on ThVs a worthwhile enterprise. When it comes to the question of their autonomy as a morphological unit, the view that ThVs are listed together with verbal roots as parts of 'verbal stems' is incompatible with the basic tenets of essentially all neo-constructionist approaches, according to which all morphological structures are syntactically derived from categoryless roots (Embick and Halle 2005; Myler 2015).[1] The existence of stems as lexically-stored structures is, however, fully in line with various lexicalist approaches (Aronoff 1994; Stump 2001).

Whether ThVs are 'ornamental' or whether they have syntactic and semantic import is also a question of considerable theoretical significance. If 'the received view' is correct, then ThVs constitute evidence of the existence of (semantically) empty morphs, which further implies that there are pieces of morphological structure that come into existence for purely morpho(phono) logical reasons. If morphology is at least to some extent responsible for structure-building, it follows that morphology exists as a separate module of grammar. On the other hand, the implication of 'the syntactic view' is that ThVs do not constitute evidence for the existence of empty morphs, which means that absent other evidence of meaningless morphological structure, the more parsimonious option of deriving morphology directly from syntax remains an open and arguably more attractive alternative.

In an attempt to initiate dialogue on these important issues, a workshop titled *Theme Vowels in (V)P Structure and Beyond* was hosted at the University of Graz in April, 2021 (henceforth Graz Workshop). The majority of the contributions to this Special Collection have emerged from the talks presented at the workshop.

The goal of this introductory paper is to highlight the empirical, analytical, and methodological contributions derived from the Graz Workshop and the present Special Collection, which significantly extend the current state-of-the-art on the subject. To this end we review some prominent accounts that reflect the pre-Graz Workshop state-of-the-art on ThV research, the contributions to the Special Collection, as well as relevant work from the Graz Workshop participants who did not contribute papers to the volume but whose research on the topic of ThVs has been or will soon be published elsewhere. The intention is thus to provide a maximally comprehensive overview of the literature that aims to clarify the status and place of ThVs in

[1] The term 'neoconstructionist approaches' has come to be used as a cover term for the different frameworks which share the assumption that all natural language structures are built in syntax, i.e., Borer's (2005) Exoskeletal Model, Nanosyntax (Starke 2009; Caha 2018), and Distributed Morphology (Halle and Marantz 1993).

linguistic theorizing across frameworks through critical engagement with established and novel accounts viewed in the cross-linguistic perspective.

The contributions to the Graz Workshop and the Special Collection manifest in six ways. Firstly, no novel data or analyses supporting the perspective of ThVs as constituent parts of verbal stems have emerged. On the contrary, all the contributors to both the Workshop and this Special Collection explicitly or implicitly refute this viewpoint. Secondly, the papers converge on the idea that ThVs are situated within *v*, with the caveat that in certain languages they can reappear within the same verbal derivation (as also observed in Oltra Massuet 1999). Thirdly, the need for a more precise definition of ThVs is emphasized, and various inconsistencies in the usage of this term are identified. Fourthly, a number of papers in the Special Collection provide evidence that bolsters the connection between ThVs and argument structure properties thereby challenging certain aspects of 'the received view'. Methodological innovations can be taken as the fifth general contribution. They encompass the examination of 'minimal pairs' of verbs that exclusively differ in their ThVs, enabling the isolation of syntactico-semantic contributions of these morphemes. Additionally, the utilization of quantitative, data-driven investigations in morphology uncovers probabilistic rules, unveiling a significant departure from the deterministic rules traditionally relied on in linguistic theory. The status and significance of the tendencies identified in these papers thus assume a particularly prominent role. Finally, the Special Collection extends the empirical scope of the discussion on ThVs beyond contemporary Indo-European languages, incorporating data from Kipsigis, Latin, Ancient Greek, and Sanskrit.

2. Pre-*Graz Workshop* state-of-the-art

In this section, we map out points of agreement and disagreement about the status and function of ThVs in linguistic theory that provided an impetus for the Graz Workshop and the resulting Special Collection. We first lay out the two viewpoints regarding the autonomy of ThVs as morphological building blocks (Section 2.1.). The focus will be on the argumentation behind the approach that treats ThVs as parts of stems (i.e., not as autonomous morphemes), and the opposing view will only be hinted at through the critical appraisal of this approach because the analyses presented in Sections 2.2.–2.4. will all be based on the assumption that ThVs are independent morphemes. In Section 2.2., we point out that among the linguists who view ThVs as autonomous morphemes, there is a broad consensus that they are associated with *v,* and we outline the main arguments in favor of this position. Sections 2.3. and 2.4. present the two sides of the debate about the syntactic and semantic contribution of ThVs. The reasoning behind what we call 'the received view', which is that ThVs are purely morphological units without discernible syntactic or semantic contribution is sketched out in Section 2.3. Finally, in Section 2.4., we illustrate the reasoning behind the view that ThVs have syntactic and semantic effects ('the syntactic view').

2.1. ThVs, roots, and stems

As was pointed out in the introduction, the question of the autonomy of ThVs as morphological units has significant implications for linguistic theory. If the analysis wherein ThVs are integral parts of verbal stems that possess no morphological autonomy is proven correct, the inventory of listed lexical units which participate in morphological structure building cannot then be restricted to roots and functional morphemes only. In other words, one would be forced to include stems among the basic items that a native speaker has to store in the Mental Lexicon when acquiring a language that has ThVs. This conclusion goes directly against the 'neo-constructionist' view in which the (Mental) Lexicon consists of categoryless roots and functional elements which are combined in Syntax to produce what are traditionally thought of as words or lexemes (cf. Embick and Halle 2005).

Traditional grammars routinely operate with the notion of stems. One of the reasons for the recourse to stems in the descriptions of verbal conjugation classes is the fact that in some languages (e.g., Slavic), each verb has at least two stem forms that combine with inflectional morphemes. Traditional Slavic grammars, for instance, recognize the so-called Present Stem and Infinitival Stem (see Jakobson 1948 for Russian). Consider the SC verb *ples-a-ti* 'dance.inf'. The infinitival form of this verb contains the ThV *-a-*, which is retained in one part of its inflectional paradigm (for instance, in the *l*-participle as shown in **Table 1**). On the other hand, the present tense paradigm of this same verb involves the ThV *-e-* as illustrated in **Table 2**.

	singular	**plural**
masculine	ples-**a**-o	ples-**a**-li
feminine	ples-**a**-la	ples-**a**-le
neuter	ples-**a**-lo	ples-**a**-la

Table 1: the l-participle forms of the SC verb *plesati* 'dance'.

	singular	**plural**
1st person	ples-**e**-m /plěʃem/	ples-**e**-mo /plěʃemo/
2nd person	ples-**e**-š /plěʃeʃ/	ples-**e**-te /plěʃete/
3rd person	ples-**e**-Ø /plěʃe/	ples-**e**-u /plěʃu/

Table 2: the present tense forms of the SC verb *plesati* 'dance'.

Not all SC verbs whose infinitival forms contain the ThV *-a-* have the ThV *-e-* in the present tense paradigm. For instance, the verb crt-**a**-ti 'draw.inf' retains the same ThV throughout its paradigm (*crt-**a**-ti* 'draw.inf' → *crt-**a**-o* 'draw.ptcp.m' → *crt-**a**-m* 'draw.1sg.pres').

What this dataset seems to suggest is that (native) speakers of SC have to memorize that the present tense forms of the verb *plesati* 'dance' involve a stem that ends in /e/, the so-called Present Stem, which is different from the Infinitival Stem ending in /a/. If this description is really all there is to say about the verbal paradigms in SC (and more generally in Slavic), there seems to be no other way but to assume, contra 'neo-constructionist' approaches, that stems are stored in the Mental Lexicon along with roots and functional items. However, while there is no consensus around the algorithm that predicts Slavic Infinitival Stems from Present Stems (or vice versa), there is a widely shared intuition that such an algorithm exists, as evidenced by a history of attempts to account for it going back at least to Jakobson (1948). In that sense, the traditional use of the notions of Present and Infinitival Stems in the descriptions of Slavic cannot be taken as definitive evidence for the existence of stems and consequently against the 'neo-constructionist' approaches.

There are, however, analyses of ThVs that advance the theoretical claim that they must be parts of verbal stems. Bermúdez-Otero (2013) puts forth one such analysis of Spanish ThVs. He starts from the observation that for certain verbs, such as *pensar* 'think', the vowel inside the root undergoes diphthongization when stressed, while for others, like *tensar* 'tauten', the vowel remains unchanged regardless of stress. In the case of root-derived nouns, stress is assigned to the root itself, resulting in the diphthongization of the vowel. For example, in *contar* 'count' which gives rise to *cuento* 'tale', the stress falls on the root, implying that stress assignment is triggered by the presence of *n*. However, when it comes to verb-derived nouns, particularly agentive nominalizations, where *v* is assumed to be embedded under *n*, stress never falls on the root but rather on the nominalizing affix. As a consequence, diphthongization does not occur. For instance, in *cont-a-dor* 'counter', the stress is placed on the nominalizing affix, and no diphthongization takes place (cf. **cuent-a-dor*). This observation suggests that *v* does not assign stress in this context because if it were to do so, the vowel inside the root would undergo diphthongization and remain a diphthong regardless of subsequent stress shifts.

Paradoxically, another morphological phenomenon in Spanish seems to call for an analysis wherein *v* is capable of assigning stress. Consider the distinction between the patterns in (2) and (3) as a case in point. Namely, with the verb *limpiar* 'to clean', the third person singular form (2a) is stressed on the initial syllable of the stem (i.e., the stem ending is unstressed), and as a result, the vowel /i/ in the final syllable of the stem is realized as [j] or the onset of a diphthong. All the forms that are derived from this stem retain this realization of /i/ despite the fact that stress can, in fact, land on the diphthong it is the onset of (2b). By contrast, the vowel /i/ in the verb *ampliar* 'to extend' is stressed in the basic form (3a), and even though it might not remain stressed in other forms derived from this stem (3b), it is always realized as a syllable-carrying [i].

(2) a. [lím.pja] ‘clean.3SG’
b. [lim.pjá.mos] ‘clean.1PL’
[lim.pjá.ßle] ‘cleanable’

(3) a. [am.plí.a] ‘extend.3SG’
b. [am.pli.á.mos] ‘extend.1PL’
[am.pli.á.ßle] ‘extendable’ (Bermúdez-Otero 2013, p. 69)

According to Bermúdez-Otero (2013), to account for the different stress patterns in (2) and (3) under the assumption that stress is assigned by functional heads, one would have to assume that in these cases *v* assigns stress, producing the observed syllabification effects at the level of the ‘first phase’. The stress assigned by *v* can subsequently be altered, but the corresponding syllabification effects that piggyback on stress assignment remain in place throughout the derivational paradigms of these verbs. The problem is, of course, that the former dataset dealing with the relationship between diphthongization and stress assignment points in precisely the opposite direction, namely that *v* is unable to assign stress. In order to avoid this paradoxical position, Bermúdez-Otero (2013) proposes an analysis whereby alternative stem forms of the same underlying verb consisting of a root and a ThV are lexically stored. The choice between these alternatives is, then, made based on the morphological environment, but crucially, ThVs must be analyzed as parts of verbal stems.

The postulation of competing verbal stems forces Bermúdez-Otero (2013) to develop elaborate vowel deletion mechanisms to account for the various instances in which verbal stems surface without ThVs (essentially as bare roots) in their derivational paradigms. In addition, as Myler (2015) points out, echoing Embick and Halle (2005), the postulation of stems loses the distinction between what looks like morphological re-adjustment (essentially allomorphy) of the kind observed, for instance, in English with *sell* → *sold* and suppletion, as in *go* → *went,* by precluding an analysis whereby the difference between *sell* and *sold* is the result of some morphological alternation of the same root. The danger of losing a generalization with this move is clear, given the existence of close analogs such as *tell* → *told*, but also of not so obvious ones, such as *think* → *thought* or *sleep* → *slept*. These conceptual counterarguments to Bermúdez-Otero (2013) notwithstanding, Myler (2015) offers an alternative wherein the resolution of the paradox arises from the seemingly ambivalent behavior of *v* with respect to stress assignment. Specifically, Myler (2015) disappears this paradox by assuming, following a more general cross-linguistic pattern (see Bobaljik 2008 and Smith 2011 a.o.), that, unlike *n*, *v* does not assign stress at all and the syllabification patterns observed in (2) and (3) arise not as a consequence of stress cycles, but rather through other means, i.e., they are the result of a separate morphophonological rule responsible for denuclearizing unstressed /i/ that occurs in a hiatus outside of verbal contexts.

Summarizing this subsection, we note the existence of two broad viewpoints on the putative autonomy of ThVs as morphological units. One perspective regards ThVs as integral parts of verbal stems, providing evidence for the existence of stems as morphological entities. The alternative stance asserts that ThVs are separate morphemes. While the former viewpoint draws support from traditional descriptions of Slavic languages and contemporary formal stem-based approaches (Bermúdez-Otero 2013), it lacks a thoroughly convincing argument thus far. The opposing viewpoint, on the other hand, aligns with the prevailing perspective, particularly evident in the more recent literature, as demonstrated in Sections 2.2-2.4.

2.2. ThVs and inflection

In traditional Indo-Europeanist work, which capitalizes on the notion of 'stems' as an analytical tool, the presence vs. absence of a theme vowel (*thematischer Vokal*, Brugmann 1933: 490) determines a split into thematic vs. athematic inflectional classes, for both verbs (conjugation) and nouns (declension; cf. Meier-Brügger 2010: 290–311 and Oltra-Massuet 2020 for extensive literature reviews). In particular, in a language like Latin, verbal theme vowels are assigned a specific morphophonological function of determining "which inflectional affixes will realize the various morphosyntactic properties that the verb bears in a particular instance" (Aronoff 1994: 46). By way of an example, consider the alternation in future tense exponence between Latin verbs with the ThV *-ā-* (traditionally, 1st conjugation) and verbs with the ThV *-ī-* (4th conjugation; cf. Halle 2019 for a formal analysis couched in DM):

(4) **ThV = -ā- (/a:/)** *Latin*

a. am-a-re
love-THV-INF
'to love'

b. am-a-b-o
love-THV-FUT-1SG
'I will love'

c. *am-a-a-m→ *amam (assuming /a:/ → Ø / _/a/)
love-THV-FUT-1SG

(5) **ThV = -ī- (/i:/)**

a. aud-i-re
hear-THV-INF
'to hear'

b. *aud-i-b-o
hear-THV-FUT-1SG

c. aud-i-a-m
hear-THV-FUT-1SG
'I will hear'

Similar examples of correlation between theme vowels and exponence of inflection can be found in contemporary Indo-European languages, like Serbo-Croatian, where theme vowel classes correlate with Person/Number exponence (cf. (6) vs. (7)).

(6) **ThV = a/a**

a. pad-a-ti
fall-THV-INF
'to fall'

b. pad-a-ju
fall-THV-3PL
'They fall'

c. *pad(-a)-e/je → *pade/*padaje (assuming /a/ → Ø / _/e/)
fall-THV-3PL

(7) **ThV = i/i**

a. grad-i-ti
build-THV-INF
'to build'

b. grad-i-e → grade (assuming /i/ → Ø /_/e/)
build-THV-3PL
'They build'

c. *grad(-i)-u/ju // *gra[dz̪]-u
build-THV-3PL

However, the analysis of theme vowels as morphemes that unidirectionally determine exponents of inflection ("the function of the theme vowel is to select the verb endings" Aronoff 1994:52) faces some challenges. First, theme vowels seem to be able to determine exponent selection of only the morphemes immediately adjacent to them, but not of the more distant ones. Consider again the difference(s) between Latin *-ā*-verbs (1st Conjugation) and *-ī*-verbs (4th Conjugation) with respect to the exponence of the 1sg indicative future, repeated here as (8a) vs. (8b).

(8) a. am-a-b-o
love-THV-FUT-1SG
'I will love'

b. aud-i-a-m
hear-THV-FUT-1SG
'I will hear'

Contrasts like (8) might lead one to claim that the ThV determines not only the exponent of Future Tense (*-b-* vs. *-a-*), but also the exponent of Person + Number, namely *-o* (for *-ā-*verbs) vs. *-m* (for *-ī-*verbs). However, it is easy to show that the latter connection does not hold, as both Person + Number exponents can be found in the other conjugation as well, as seen in (9a-b).

(9) a. am-a-ba-m
Love-THV-PST-1SG
'I used to love'

b. aud-i-o
hear-THV-1SG
'I hear'

Therefore, it is not the whole 'verb ending' (e.g., *-bo* in (8a) and *-am* in (8b)) that is 'determined' by the theme vowels, but only the immediately right-adjacent morpheme. Moreover, some languages display evidence of a connection going in the opposite direction: the exponent of the theme vowel is determined by morphemes pertaining to inflection, as has been shown by Oltra Massuet (1999: 29) for Catalan. While in the verb form in (10a) the ThV affects exponence assignment of Mood + Tense, the opposite obtains in (10b), where the Mood + Tense morpheme triggers the allomorph /e/ instead of (the elsewhere) /a/ for the verb *cantar* 'to sing'.

(10) a. [kənt 'a b-ə- s] *Catalan*
sing THV IND.IMPF 2SG
'You used to sing'

b. [kənt 'e s- Ø]
sing THV SUBJ.IMPF 3sg
'(if) (s)he sang'

The evidence examined so far thus suggests that the connection between ThVs and (the morphemes corresponding to) inflection might be captured more precisely within a principled theory of locality (in Morphology or in Syntax, depending on the framework).

2.3. ThVs and locality

Locality effects associated with or involving ThVs are observed in a number of languages, and those data can be seen as informing recent theories of locality. Another example, similar to (8b) and (9a), where it is obvious that the addition of another morpheme on top of a ThV

changes the inflectional ending can be found in secondary imperfectives in SC. Namely, in SC primary imperfectives such as *grad-i-ti* (build-THV-INF), the present tense paradigm, which might seem as though it were fully determined by the ThV, changes if the verb in question undergoes secondary imperfectivization because this process is signaled by the insertion of a morpheme directly in between the ThV and the person/number exponent (see **Table 3**, where <đ> corresponds to [dʒ]). The cells which make the changes in the paradigm most obvious are those that contain 3rd person plural forms where the entire inflection is different (*-e* for the primary imperfective and *-u* for the secondary imperfective). This fact suggests, again, that the link between the ThV and Tense inflection is crucially sensitive to locality (Oltra-Massuet 2020; Svenonius 2007).

	grad-i-ti		**iz-građ-i-v-a-ti**	
	singular	**plural**	**singular**	**plural**
1st person	grad-i-m	grad-i-mo	iz-građ-uj-e-m	iz-građ-uj-e-mo
2nd person	grad-i-š	grad-i-te	iz-građ-uj-e-š	iz-građ-uj-e-te
3rd person	grad-i-Ø	grad-e	iz-građ-uj-e	iz-građ-uj-u

Table 3: Present tense paradigms of primary and secondary imperfective forms for the verb *graditi* 'build' in SC.

Another way in which ThVs inform locality considerations is observed in cases where the ThV itself blocks root sensitive allomorphy in the domain of inflection. For instance, in Italian, overt exponence of perfect/past tense as in *per-**Ø***$_{\text{THV}}$*-**s***$_{\text{T}}$*-i* 'I lost' is possible only with verbs that have no (overt) ThV. If a(n overt) ThV is present, the exponent of perfect/past T has to be null (e.g., *am-**a***$_{\text{THV}}$*-**Ø***$_{\text{T}}$*-i* 'I loved').

The investigation of the paradigms for the Ukrainian primary and secondary imperfective forms *bisyty* and *vybišuvaty* 'to drive (someone) crazy' (see **Table 4**) reveals a similar instance of allomorphy in the 3rd person plural forms to that observed for SC earlier. Note, however, that there are several cases of allomorphy here. First, there is the root allomorphy. Applying at morpheme boundary, the change [s]→ [ʃ] /_[u] (further conditioned by stress), thus affects the realization of the root in the primary imperfective 1st person singular form *bišu* 'I drive (someone) crazy' and throughout the secondary imperfective paradigm. This instance of root allomorphy is likely phonological in nature, however, and hence less of interest for our current purposes. Next, there is the question of what causes the allomorphy of the 3rd person plural inflection, the theme vowel or the secondary imperfectivizer? This question arises due to the uncertainty regarding the shape of the secondary imperfectivizing morpheme and its surface realizations, i.e., is it *-uva-*, as suggested by traditional grammars, or, perhaps, *-uv-/-u-*,

followed by the theme vowel *-a-*? Interestingly, some evidence in favor of the latter analysis comes from the fact that primary imperfective forms that take the *-a-* theme have paradigms that show significant overlap in their segmental realization with the conjugation patterns observed in **Table 4** for the secondary imperfective form *vybišuvaty*. (The conservative parsing notation below is chosen so as not to potentially prejudge the issue. Stressed vowels are bolded throughout):

	bis-**y**-ty		vy-biš-u-v-a-ty	
	singular	**plural**	**singular**	**plural**
1st person	b**i**š-Ø-u	b**i**s-y-mo	vy-biš-u-j-Ø-u	vy-biš-u-j-e-mo
2nd person	b**i**s-y-š	b**i**s-y-te	vy-biš-u-j-e-š	vy-biš-u-j-e-te
3rd person	b**i**s-y-t^{j}	b**i**s^{j}-Ø-at^{j}	vy-biš-u-j-e	vy-biš-u-j-Ø-ut^{j}

Table 4: Present tense paradigms for primary and secondary imperfective forms *bisyty* and *vybišuvaty* 'to piss (someone) off, to drive (someone) crazy' in Ukrainian.

	ček-**a**-ty		koh-**a**-ty		pys-**a**-ty	
	singular	**plural**	**singular**	**plural**	**singular**	**plural**
1p	ček-**a**-j-Ø-u	ček-**a**-j-e-mo	koh-**a**-j-Ø-u	koh-**a**-j-e-mo	pyš-Ø-u	pyš-e-mo
2p	ček-**a**-j-e-š	ček-**a**-j-e-te	koh-**a**-j-e-š	koh-**a**-j-e-te	pyš-e-š	pyš-e-te
3p	ček-**a**-j-e	ček-**a**-j-Ø-ut^{j}	koh-**a**-j-e	koh-**a**-j-Ø-ut^{j}	pyš-e	pyš-Ø-ut^{j}

Table 5a: Present tense paradigms for primary imperfective forms *čekaty* 'to wait', *kohaty* 'to love' and *pysaty* 'to write' in Ukrainian.

Comparing the paradigm for the secondary imperfective form *vybišuvaty* in **Table 4** with the first two paradigms in **Table 5a** (i.e., for *čekaty* and *kohaty*) we note that the segmental content following *-u-* in the former and *-a-* in the latter is identical across the three paradigms (-e- encodes Tense). Thus, we are led to conclude that the segment *-u-* in **Table 4** must be the surface realization of the secondary imperative morpheme (within this SC, see Matushansky 2024 for a detailed discussion of the status of the secondary imperfectivizing suffix and the immediately following theme in Russian). The segment *-aj-* in **Table 4** could perhaps be analyzed as the allomorphic realization of the theme vowel *-a-*. Reasoning along these lines might suggest that the *-j-* segment in the secondary imperfective paradigm in **Table 4** immediately following the aspectual morpheme *-u-* represents the remaining portion of the theme *-aj-*. An alternative analysis could claim that *-j-* is unrelated to the theme vowel, e.g., is epenthetic, inserted to break a sequence of two vocalic segments. Assuming epenthesis is a surface-level phonological

phenomenon, we could maintain that the secondary imperfectivizer is in an appropriately local relation to inflection (Cf. **Table 4**), hence exerting influence on the allomorphic realization of the latter. That the segment *-j-* is present in all the forms in the first two paradigms in **Table 5a** as well as throughout the secondary imperfective paradigm in **Table 4** can be seen as an argument in favor of the epenthesis analysis of *-j-*, as its presence appears to have no effect on the realization of the following inflection.

Finally, the status of the theme vowel *-a-* in the above forms is another consequential issue to be addressed. Specifically, the fact that the morphological material following the aspectual morpheme *-u-* in **Table 4** and that following the theme *-a-* in **Table 5a** is fully identical implicates identity of the morpheme exerting influence on inflection, and it is now difficult to maintain that the morpheme in question could be the aspectual suffix *-u-*. Instead, it appears that the theme vowel *-a-* makes for a better candidate, despite its disappearance from the secondary imperfective forms (Cf. also the paradigm for the verb *pysaty* 'to write' in **Table 5a**, where the theme is only present in the infinitival form. Notice, too, that the disappearance of the ThV *-a-* in these forms correlates with the absence of *-j-*. This, however, is to be expected on either of the above hypotheses about its provenance). A further complication is the occurrence of *-a- after* the secondary imperfective morpheme, which strongly suggests that this theme vowel occupies a structurally higher position than the theme *-a-* does in the forms in **Table 5a**. The latter forms are simple imperfectives, which suggests that the ThV in **Table 5a** might be a different *-a-* theme.

There is, however, further evidence to suggest that the ThV *-a-* is in fact the same one in the cases under consideration. Compare the paradigm of the primary imperfective form *čekaty* ‹to wait› from **Table 5a** with its secondary imperfective counterpart *očikuvaty* (Cf. **Table 5b**):

	ček-**a**-ty		o-čik-u-v-a-ty	
	singular	**plural**	**singular**	**plural**
1st person	ček-**a**-j-Ø-u	ček-**a**-j-e-mo	o-**č**ik-u-j-Ø-u	o-**č**ik-u-j-e-mo
2nd person	ček-**a**-j-e-š	ček-**a**-j-e-te	o-**č**ik-u-j-e-š	o-**č**ik-u-j-e-te
3rd person	ček-**a**-j-e	ček-**a**-j-Ø-ut^{j}	o-**č**ik-u-j-e	o-**č**ik-u-j-Ø-ut^{j}

Table 5b: Present tense paradigms for the primary and secondary imperfective forms *čekaty* and *očikuvaty* 'to wait' in Ukrainian.

What we see is that the *-a-* vowel in the secondary imperfective disappears again. Crucially though, the material following the secondary imperfective *-u-* is fully identical to that found in the primary imperfective forms of *čekaty*. This now strongly suggests that in all the relevant cases under discussion the morphological shape of inflection is determined by the theme vowel

-a-. Incidentally, another way to visualize the data that supports this conclusion is suggested by the traditional approaches to conjugation classes in Ukrainian. Class I and Class II in traditional classification are illustrated by the two paradigms in **Table 4**: the verbs ending in *-utʲ* or *-jutʲ* in the 3rd person plural form are classified as Conjugation Class I (as are all the verbs in **Table 5a** and **Table 5b**), and verbs ending in *-atʲ* or *-jatʲ* are Conjugation Class II. A quick examination of all the paradigms in the three tables reveals that what Class I verb forms have in common is that they all take the ThV *-a-*, whether in primary imperfective or in secondary imperfective. In other words, a secondary imperfective form will always belong to Class I, irrespective of the classification of its primary imperfective counterpart (Cf. **Table 4**). And while the disappearance of the theme in secondary imperfective forms is yet to be explained, along with what appears to be a structural height difference of the theme in primary and secondary imperfective forms, the influence of the theme *-a-* on the allomorphic realization of 3rd person plural inflection, as well as the local character of this relation appear to us to be established at this point. (Notice that an analysis of *-j-* as epenthetic, inserted in order to break the sequence of two vowels, if correct, strongly suggests that the *-a-* theme in secondary imperfective forms might be deleted for the same purely phonological reason, i.e., due to an intolerance of vowel clusters at morpheme boundary. On the other hand, a strong argument in favor of the *-aj-* analysis is the fact that *-j-* is retained in imperative forms, as in *kohaj!* or *kohajmosja!* ('love!', 'let us love!') where *-j-* is either word final or followed by a consonant).

The patterns of interaction between ThVs and the inflectional domain as well as interactions between the root and the inflection mediated by ThVs illustrated in this subsection can be captured straightforwardly within locality-based theories of allomorphy (e.g., Embick 2015: 178-9). In Embick's approach, two morphemes can interact allomorphically only if they are found within the same cycle and if they are linearly adjacent within that cycle (with the proviso that Vocabulary Insertion starts from the bottom of the tree). With these conditions in place, we have an account for why, for instance, the lower ThV in SC no longer determines the person/number exponence if the secondary imperfectivizer intervenes between them (**Table 3**), why the higher theme vowel, local to the inflection, does (Cf. **Table 4-5a-b**) as well as why an intervening overt ThV in Italian blocks root-sensitive exponence of perfect/past Tense.

2.4. ThVs are in *v*

Both the proponents of 'the received view' and 'the syntactic view' seem to be in agreement regarding the association of ThVs with the *v* position. One example of this type of analysis comes from Panagiotidis et al. (2017) who argue that ThVs in Greek (and possibly more broadly) are one of the possible realizations of *v* along with causative morphemes (e.g., in Turkish) and verbalizing affixes found in other languages (e.g., the English suffix *-en* used for deriving degree achievements, *black* → *black-en*). This view is conceptually aligned with the '*v*P shell

Hypothesis' proposed by Larson (1988) and the notion that verbs consist of categoryless roots and verbalizers, as suggested by Marantz (1997). Namely, if the verb phrase is dominated by a projection introducing the causing sub-event (Larson 1988; Ramchand 2008 *inter alia*) and verbs are derived by combining a categoryless root with a categorizing *v* (Marantz 1997), we expect to see morphological exponents of this projection, which can differ across languages. From this perspective, it is rather plausible that in those languages in which ThVs are part of verbal morphology, they might serve as exponents of *v*.

The evidence that Panagiotidis et al. (2017) provide in support of this general idea stems from a specific group of Greek verbs referred to as the Second Conjugation. Second Conjugation verbs exhibit distinctive characteristics that set them apart from verbs in other classes. Notably, these verbs incorporate vocalic extensions in specific cells of their paradigms (the boldfaced **-í-** in 12b). Additionally, they do not feature derivational verbal suffixes, distinguishing them from other verb types. Furthermore, second conjugation verbs demonstrate a tendency to avoid placing stress on the root (cf. 11 and 12).

(11) First Conjugation

a. ɣráf-o 'write-NONPAST.SG'
ɣráf-is 'write-NONPAST.SG'

b. ɣráp-s-o 'write-PFV-NONPAST.SG'
ɣráp-s-is 'write-PFV-NONPAST.SG'

(12) Second Conjugation

a. aɣap-ó 'love-NONPAST.SG'
aɣap-ás 'love-NONPAST.SG'

b. aɣap-**í**-s-o 'love-?-PFV-NONPAST.SG'
aɣap-**í**-s-is 'love-?-PFV-NONPAST.SG' (Panagiotidis et al. 2017: 30)

Panagiotidis et al. (2017) contend that in Greek, *v* can be realized in two distinct ways: as a vocalic element in the second conjugation or as an overt verbalizing morpheme in other classes. In the case of the Second Conjugation, this vocalic element is overt in certain positions within the verbal paradigm, while remaining covert in others. However, regardless of the overt or covert nature of the vocalic element, it consistently exerts a phonological influence by preventing stress on the root. This phonological impact is seen as evidence that the vocalic element resides in the *v* position. The notion of locality, as proposed by Marantz (1997; 2001), suggests that phonological or semantic interactions between roots and affixes are restricted so as to occur only if these elements are within the same phase. Therefore, since Greek ThVs exhibit phonological interaction with the root, they must be root-adjacent, and the only position that secures root-adjacency in a verbal derivation is that of *v*.

2.5. ThVs are pure morphology → 'the received view'

While the morphological autonomy of ThVs is certainly a contentious topic, many, if not most, authors of a variety of theoretical persuasions have adopted the view that ThVs are autonomous morphological units. It also seems that the majority view within this camp is that they are nothing more than that. In other words, ThVs are purely morphological units without semantic and syntactic import. A direct implication of this view is, of course, that there are parts of morphological structure that are put in place solely for morphological purposes. The theoretical importance of this implication stems from the fact that the existence of purely morphological objects entails that morphological rules participate in structure building alongside other operations, warranting the conclusion that the architecture of Grammar must accommodate a module dedicated to Morphology. This can be achieved in various ways, for instance, by postulating some form of 'pre-syntactic' Generative Lexicon, where Morphology derives lexemes and Syntax operates on already formed words, as in the GB Model (cf. Chomsky 1970; Aronoff 1994). Alternatively, one could assume, as is done in Distributed Morphology (DM), that Morphology does not create linguistic structures, but is, nonetheless, a separate module that can (re)adjust syntactically-derived abstract structures before they are finally transformed into linear (phonological) strings (Halle and Marantz 1993). In this subsection, we outline the main empirical arguments for the view that ThVs are semantically and syntactically empty forms.

We will outline Aronoff's (1994) rendition of the argument for Latin ThVs as pure morphology while noting that various versions of this argumentation have their roots in traditional grammar. The essence of this view is that theme vowels are syntactically and semantically empty, and they are inserted to satisfy language-specific morpho(phono)logical requirements and/or signal conjugation class membership. As shown in (13), the presence of a ThV in Latin is obligatory as a signal of conjugation class membership, and the morphophonological function could be that it prevents the formation of various consonant clusters at the boundary between the root and the inflection, as the ungrammatical form in (13b) might suggest.

(13) a. es-ur-**i**-re *Latin*
eat-DSD-THV-INF
'be hungry'

b. *es-ur-re
eat-DSD-THV-INF
'be hungry'

Aronoff (1994) does not provide a definitive argument in favor of the view that ThVs are purely morphological forms. Instead, he argues against the perceived rival position which is that they are verbalizing morphemes, and formulates three main counterpoints. First, he argues that if ThVs are verbalizers, there would be very few underived verbs in Latin. That is, because virtually

all Latin verbal forms involve ThVs, the assumption that ThVs are verbalizers would entail that almost all Latin verbs are derived. Aronoff (1994) believes that this is a rather unwelcome consequence because of his assumption that the lexical inventory of each language must consist of a certain number of underived lexemes belonging to the basic word classes and morphological operations such as verbalization are used to change the categorial membership of these lexemes (i.e., there must be a set of underived verbs, a set of underived nouns, etc).

The second point against the analysis of Latin ThVs as verbalizers that Aronoff (1994) raises stems from their purported lack of semantic contribution. The example in (13a) can be taken as a case in point – the suffix *-ur-*, glossed as 'dsd' for 'desiderative', can be seen as one of the typical Latin verbalizers whose semantic contribution is clearly recognizable, though it might not be completely straightforward to pin it down. By contrast, the ThV *-i-* does not seem to contribute anything to the semantic composition of the derived verbal form. This contrast between the ThV and typical verbalizers is crucial for the argument on the assumption that verbalizers must contribute a clearly identifiable semantic contribution.

The third argument against treating ThVs as verbalizers that Aronoff (1994) proposes comes from the fact that they are not incompatible with other verbalizers. The evidence is, again, available in (13a), where the ThV follows the desiderative verbalizer *-ur-*. If the ThV were a verbalizer, Aronoff argues, it would not be able to combine with an already verbalized form.

The status of ThVs as 'empty morphs' ('pure morphology') is of central importance in Aronoff's (1994) system. The architecture of grammar Aronoff (1994) proposes builds on the Lexicalist approach of the GB model wherein Syntax operates on already formed words/lexemes and there is a strict division of labor between inflectional morphology (e.g., case), which falls within the purview of Syntax and derivational morphology (e.g., nominalization), which is confined to the Lexicon. Crucially, the semantic emptiness of ThVs is taken as evidence of the autonomy of Morphology as a pre-syntactic/lexical module within this framework.

The same perspective on ThVs plays a crucial role in Anderson's (1992) A-Morphous Morphology. Anderson (1992: 53) argues that the existence of Morphology as a distinct module is justified by the presence of forms that lack any substantive content. ThVs serve as primary examples of such forms. To account for their functioning, the concept of Morphosyntactic Representation (MSR) comes into play, acting as an interface between Syntax and Phonology. The MSR module operates on syntactic structures, manipulating them prior to their transfer to Phonology. Importantly, this manipulation does not affect the meaning of linguistic expressions.

The idea that ThVs are 'pure morphology' is pivotal in DM, as well. According to Halle and Marantz (1993), the presence of ThVs in a language provides the foundation for positing a distinct post-syntactic module responsible for morphophonology, as illustrated in **Figure 1**. ThVs themselves are considered semantically empty formatives, devoid of specific meaning, and they

are observed across numerous languages, including Latin, Spanish, Latvian, Russian, and more. Therefore, semantically empty formatives are not a cross-linguistically marginal phenomenon. Halle and Marantz (1993) therefore suggest that ThVs are inserted into verbal derivations post-syntactically, to ensure morphological well-formedness. This process aligns with the concept of *Late Insertion,* as proposed by Embick and Halle (2003).

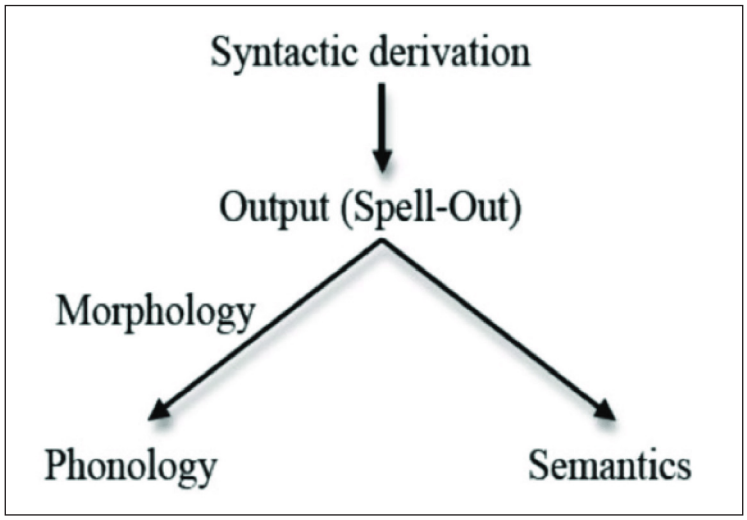


Figure 1: Architecture of Grammar in DM.

This view was formalized in a series of works by Oltra Massuet (1999; *inter alia*) on the basis of Catalan data, and by Oltra-Massuet and Arregi (2005) for Spanish. The argumentation builds on Aronoff (1994) and Halle and Marantz (1993) and the formal analysis goes as follows. ThVs are associated with *v*, but they are not direct instantiations of *v*. Instead, they are inserted into a node that is postsyntactically adjoined to *v* to create a position for a ThV. The selection of the ThV to be merged in a specific verbal derivation proceeds according to a feature-matching algorithm. Each ThV corresponds to a specific feature bundle where the relevant inventory of features is [±α, ±β, ±γ]. The feature combinations map onto individual ThVs via a markedness hierarchy in (14) for Catalan (Oltra Massuet 1999).

(14) Feature to ThV mapping via markedness:
- [–α] – unmarked → I conjugation /a/ ;
- [+α , +β] – marked → II conjugation /e/;
- [+α , –β, –γ] – more marked → IIIa /i/;
- [+α , -β, +γ] – most marked → IIIb /i/[4]

[2] Class III is split into two subgroups owing to different realizations of the morpheme *-eix* /ɛʃ/, which occurs with these verbs.

Individual roots carry conjugation class specifications in the form of features in (14). ThVs are assumed to adjoin to every functional head in the extended verbal projection. The empirical gain of this account is, for instance, the fact that it correctly predicts that newly coined verbs and loans would fall into the conjugation Class I because they do not have any conjugation class marking. Additionally, Oltra Massuet (1999) argues that the analysis captures the possible directions of "migration" of individual verbs from one class to another. Specifically, what is observed is that certain verbs can move from Class II to Class III , which can be seen as a consequence of the "neutralization" of the [β] feature (i.e. going from [+β] to [–β]). Finally, [+β] marked verbs (Class II) can also migrate into Class I by losing the [β] feature altogether. Other types of class-shift arguably do not take place, as predicted by this account (Oltra Massuet 1999).

An appraisal of the 'received view' reveals both empirical and conceptual considerations. If we examine Aronoff's (1994) three main reasons for dismissing the idea that ThVs are verbalizers, it becomes clear that the argumentation boils down to the empirical question of whether or not ThVs carry semantic/syntactic information. The first two reasons are purely conceptual. Firstly, the conclusion about the (near) absence of underived verbs in Latin that follows from the assumption that ThVs are verbalizers is not problematic for derivational approaches like Distributed Morphology (DM) and Nanosyntax, where *all* categories are derived from categoryless roots. Secondly, the co-occurrence of verbalizers and thematic vowels (ThVs) poses no issue if ThVs function as categorizers (exponents of *v*), while traditional verbalizers act as non-categorizing derivational morphemes (roots), as proposed in Lowenstamm (2014). The third objection regarding the lack of semantic content represents an empirical issue, and it disappears if evidence of semantic contribution is presented.

We should also mention two important conceptual challenges to 'the received view'. The first challenge is posed by the general problem of purely morphological operations. Namely, the postulation of purely morphological operations of the kind assumed in DM (i.e., the idea of tampering with the syntactic structure before it reaches PF) is an undesirable complication to the architecture of Grammar, as there is no principled way of constraining the number and the applicability of these operations (Bobaljik 2017). The assumed lack of syntactic and semantic import of ThVs is one of the main empirical motivations for creating a theoretical loophole through which these unconstrained operations begin to sneak in.

The second conceptual problem concerns the specific implementation of the 'received view' of ThVs in DM. Taking Oltra Massuet's (1999) account as arguably the most advanced attempt within DM to explain how ThVs are inserted into verbal derivations, we observe that it does not move our understanding of the phenomenon at hand much further than a mere recasting of empirical observations in a manner which is compatible with the overall theoretical framework. The rules governing the insertion of ThVs that she proposes are based on abstract and stipulative

features [α], [β], and [γ]. Furthermore, to get the analysis off the ground, Oltra Massuet (1999) is forced to match these features with corresponding root diacritics.

2.6. ThVs have syntactic-semantic effects: 'the syntactic view'

The approach to ThVs that we refer to as 'the syntactic view' shares some similarities with 'the received view' but also departs from it in crucial respects. Where it agrees with 'the received view' is in the assumption that ThVs are located in *v*. However, as the label itself suggests, under this approach, ThVs are directly linked with *v*. This means that they are not inserted into this node following a morphophonological alteration that creates room for them by merging (adjoining) another head with it. Instead, on this view, ThVs are exponents of *v*, and, importantly, ThV differences are associated with syntactic and/or semantic effects.

It is important to note that in the majority of literature that can be placed under the umbrella of 'the syntactic view' of ThVs, the notion that ThVs carry syntactic and/or semantic information is not directly argued. Instead, it is assumed that there is a link between ThVs and the properties of *v* (generally, argument structure), and this relationship is then integrated into a broader argument about the verbal domain. For instance, Svenonius (2004; 2007) makes an explicit claim to the effect that ThVs are exponents of *v*, and ThV differences signal argument structure alternations. He cites Milićević's (2004) observation that in SC, there are 'minimal pairs' of verbs differing only in their ThVs, and in such pairs, the difference in the ThV tends to correlate with argument structure properties. Consider (15), where the two verbs *bel-**e**-ti* and *bel-**i**-ti* differ only in their ThV while the root is the same. As is obvious from the examples, in (15a), the ThV *-e-* is associated with an unaccusative inchoative syntax and semantics while in (15b), the ThV *-i-* comes with a causative transitive interpretation.

(15) a. List hartije je postepeno bel-**e**-o na suncu.
sheet.NOM paper.GEN AUX gradually white-**e**-PST.M on sun.LOC
'The sheet of paper gradually whitened in the sun.'

b. Petar je satima bel-**i**-o list hartije.
Petar.NOM AUX hours.INS white-**i**-PST.M sheet.ACC paper.GEN
'Petar was whitening a sheet of paper for hours.'

We should note right away that the contrast in (15) does not hold for all native speakers of SC as some varieties do not allow the option with the ThV *-e-*. Moreover, it is impossible to motivate a generalization based on the contrast in (15) since counterexamples in both directions are relatively easy to come by (16). However, the potential generalization based on (15) is a lot stronger in 'minimal pairs' in which two verbs differ only in their theme vowel, a point that was developed in detail in several contributions to the Graz Workshop and to this Special Collection (Kastner and Martin 2021; Milosavljević and Arsenijević 2022; Kovačević et al. accepted).

(16) a. Jabuka je trul-**i**-la u korpi.
apple AUX rot-i-PST.F in basket
'The apple was rotting in the basket.'

b. Petar je vrt-**e**-o loptu.
Petar AUX spin-e-PST.M ball
'Petar was spinning the ball.'

Jabłonska (2004) offers an elaborate schema of verbal morphological segments including ThVs together with their syntactic positions and semantic effects for Polish where ThVs are taken as an indication of argument structure properties. However, the claims about the links between ThVs and argument structure are merely stated in her paper citing Rubach (1984) and no direct evidence to support these claims is provided.[3]

The claim that ThVs are linked with syntactic/semantic properties is of special importance for Nanosyntax. As a theoretical approach that does not make room for an autonomous module dedicated to Morphology, Nanosyntax is committed to 'the syntactic view' (Starke 2009; Caha 2018)[4]. Nanosyntax allows neither morphological re-adjustment rules nor *Late Insertion*. This entails that an analysis of ThVs as empty morphemes inserted into a node that is post-syntactically-adjoined to *v*, in the spirit of Oltra Massuet (1999), cannot be formulated in Nanosyntax. Nanosyntacticians, thus, typically assume that ThVs are associated with argument structure and/or aspect.

One clear conceptual advantage of 'the syntactic view' over 'the received view' comes from parsimony considerations. Namely, the former does not invoke purely morphological operations in the analysis of ThVs. This is an inherently desirable theoretical result because it leads to an overall simpler architecture of Grammar. Analytically, 'the syntactic view' does not resort to devices such as root diacritics or purely abstract features. Empirically, the idea that ThVs are associated with syntactic and/or semantic effects has the ability to capture (potential) correlations between ThV differences and argument structure properties reported for Slavic. However, as we saw in (16), there is no one-to-one mapping between ThVs and argument structure properties, therefore whatever is gained by an analysis that links ThV differences and argument structure alternations comes at the price of having to deal with (numerous) exceptions.

[3] Rubach (1984) deals primarily with phonology, and while it engages with conjugation classes in Polish, it does not provide evidence for the links between conjugation classes (i.e., ThVs) and argument structure properties referenced in Jabłonska (2004).

[4] This would apply to any 'neo-constructionist' approach that does not allow post-syntactic morphological operations (Cf. Collins & Kayne 2023).

2.7. Interim summary

Summarizing the state-of-the-art before the Graz Workshop and the ensuing Special Collection, one could say (generalizing over some differences in individual approaches) that there exists a rough consensus that ThVs are in some way associated with *v* (either as a direct spellouts of *v* or as being adjoined to *v*). The point of major disagreement revolves around the nature of the link between ThVs and their syntactic/semantic correlates. On this point, what we call 'the received view' holds that TVs are 'ornamental' elements, meaning that they have no impact on syntax and semantics. In DM, this intuition is couched in an analysis whereby ThVs are inserted post-syntactically (*Late Insertion*) in an autonomous module dedicated to purely morphological operations. What we call 'the syntactic view' represents the opposite perspective, which is that ThVs are associated with syntactic/semantic effects, typically related to argument structure or aspect. In this family of analyses, ThVs are direct spellouts of syntactic heads. It can also be said that the majority of analyses belonging to 'the syntactic view' are framed within Nanosyntax, primarily based on Slavic data.

3. Contributions from Graz Workshop and Glossa's Special Collection

In this section, we point out the ways in which the current understanding of ThVs in linguistic theory has been augmented by this Special Collection and the Graz Workshop. First, the contributions to this volume further solidify the growing consensus that ThVs are associated with *v*, but that they can also reappear in higher positions in the functional hierarchy dominating the VP. Second, several authors argue that more attention should be devoted to the issue of the definition of ThVs, as the elements that are traditionally subsumed under this label might not constitute a natural class. Third, the Graz Workshop and *Glossa*'s Special Collection volume deliver considerable crosslinguistic evidence in favor of the hypothesis that ThVs are associated with syntactic and semantic effects. Fourth, we single out one account (Milosavljević & Arsenijević 2022) as presenting an analytical solution with the potential to bridge the gap between 'the received view' and 'the syntactic view', one that treats ThVs as sensitive to syntax but not determined by it. Finally, we discuss various methodological improvements to the state-of-the-art on the subject of ThVs.

3.1. ThVs are in *v*

In Section 2.2. we pointed out that a common thread that can be identified in most accounts of ThVs was the claim that they are associated with *v*. Virtually all papers in this Special Collection seem to be in agreement with this position, and in that sense they strengthen this point further from various angles while drawing on data from different languages.

Grestenberger (2022) tackles the issue of the syntactic location and the syntactic/semantic contribution of ThVs in Ancient Greek (AG). She shows that in AG, ThVs are able to induce

root allomorphy or suppletion (**Table 6**). What we see is that the roots take different forms, allomorphic or suppletive (cf. the pattern in row e.), depending on the ThV that follows them.

	Pres.	**Aor.**	**Perf.**	
a.	stéll-**o**-men	steíl-**a**-men	stál-ka-men	‘send’
b.	derk-ó-metha	drák-o-men	dered-dórk-a-men	‘see’
c.	peith-ó-metha	pith-ó-metha	péred-pith-Ø-men	‘trust’
d.	pheúg-o-men	phúg-o-men	(pered-pheug/phug-)	‘flee’
e.	theín-o-men	péred-phn-o-men	pered-phás-Ø-metha	‘slay’
f.	manth-án(-)o-men	máth-o-men	mered-math(-)ḗ-ka-men	‘lean’

Table 6: Ancient Greek ThVs induce root allomorphy/suppletion.

Grestenberger (2022) follows Embick (2010; 2012; 2015) in assuming that morphemes can induce root allomorphy only under strict adjacency. Since ThVs can induce root allomorphy, they must be strictly adjacent to roots. Assuming the hierarchy of functional projections in the verbal domain in **Figure 2**, Grestenberger (2022) concludes that ThVs must be in *v*.

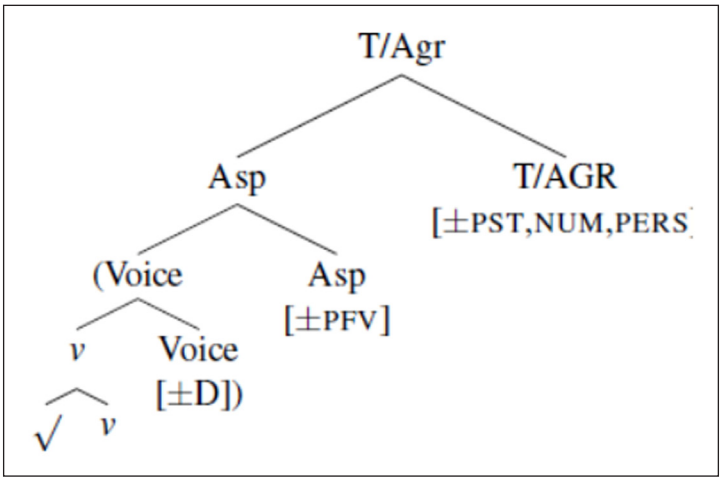


Figure 2: The hierarchy of projections in the verbal domain.

Grestenberger (2022) backs this claim with additional observations related to deverbal adjectival forms (participles). In Ancient Greek, the deverbal adjectival form in *-t-*, which is typically assumed to select roots to derive state-denoting adjectives (cf. Alexiadou et al. 2015), is in complementary distribution with ThVs. Therefore, if an adjectival form deriving from roots and lacking eventive semantics cannot tolerate a ThV, it follows that the ThV instantiates the structural layer in charge of event semantics, which on most accounts is *v*.

Fabregas (2022a) provides an argument to this effect drawing on data from Spanish, but he refers to the relevant projection as the Event layer rather than *v*P. Fabregas uses a different label due to following Ramchand's (2008; 2018) approach and notation for the syntax of the so-called 'first phase', unlike Grestenberger (2022), whose account is stated in DM terms. While fully recognizing the fact that Ramchand's notion of the Event head is not directly translatable into DM's *v*, it should be noted that there is nevertheless a close link between the two notions both in terms of function and in terms of structural location. Namely, the sole purpose of Ramchand's Event head is to introduce the event variable, while in DM, *v* has other functions as well, having to do, for example, with argument structure properties (Folli and Harley 2005). A sketch of Fabregas's (2022a) analysis of ThVs is provided in the following subsection.

3.2. Not all 'ThVs' are created equal; problems of definition

Several of the contributions to the Graz Workshop and the Special Collection address the problem of the (lacking) definition of ThVs, and some of them propose a decomposition of this traditional category based on the conceptual tools of either Nanosyntax or DM. In this subsection, we outline the terminological issues associated with the traditional notion of ThVs as well as the attempts to remedy them using more contemporary formal notions.

Fabregas (2022a) is in agreement with Oltra Massuet (1999 *et seq*.) that the morphemes that are traditionally labeled as 'theme vowels' can appear in different positions in verbal derivations, as presented in (17) with ThVs highlighted in boldface.

(17) cant-**a**-r-**i**-**a** *Spanish*
sing-THV-mood-THV-THV
'I would sing'

What is immediately apparent from examples such as (17) is that various ThVs occur in different positions. For instance, the ThV *-a-* is adjacent to the root, but the ThV *-i-* is to the right of not just this ThV but also the mood morpheme *-r-*. If linear proximity to the root is taken as a signal of structural height (as per *the Mirror Principle*, Baker 1985), it follows that *-i-* is 'higher' than *-a-* in (17). These differences in the height of attachment also correlate with certain distributional constraints (or lack thereof). Fabregas (2022a) observes that 'lower' ThVs (*-a-*) are incompatible with light and copular verbs, but no similar restriction applies to higher (*-i-*), as shown in (18).

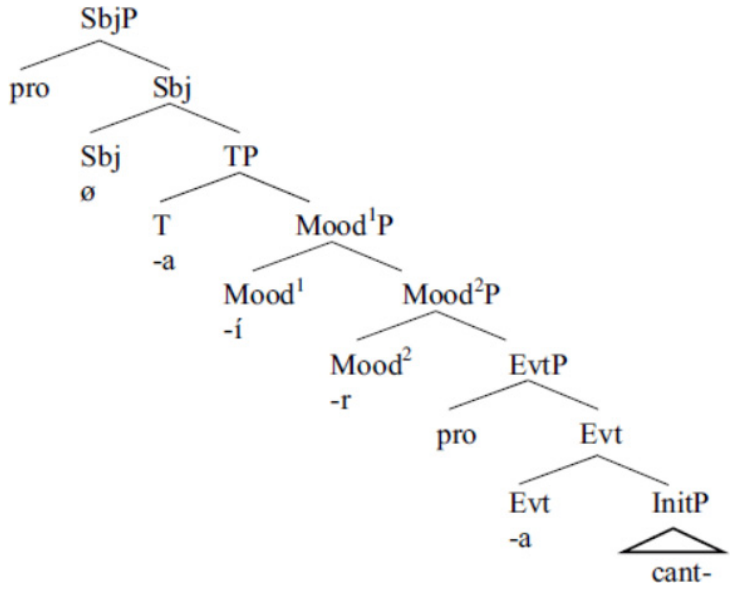
(18) estuv-**i**-ste
be.PFV-THV-2SG
'You were (perfective)'

What sets (18) apart from (17) is that the 'high' ThV *-i-* occurs in the absence of the lower ThV. Therefore, the linear order in (18) looks as though one morphosyntactic segment corresponding

to a particular syntactic head position (following Nanosyntax) has been 'skipped' – the 'lower' ThV is missing.

The difference between (17) and (18) in terms of the presence/absence of the 'lower' ThV is crucial in Fabregas' (2022a) analysis. In contrast to Oltra Massuet (1999 et seq.) which treat all ThVs as a single class of morphemes that can adjoin to different heads in the verbal spine postsyntactically, Fabregas (2022a) assumes that ThVs are not a homogenous class and that they can function as direct exponents of various tense/aspect/mood (TAM) heads, as illustrated in (19), which is the structural representation of (17).

(19)



Based on (19), the 'lower' ThV *-a-* is the exponent of the Event head, while the 'higher' one *-i-* spells out the Mood head (Mood). In addition, the final vowel in (17) is also treated as a ThV which expones the T head.[5] The absence of the 'lowest' ThV with the stative copular verb in (18) is thus significant in light of Fabregas' (2022a) claim that this 'low' ThV is the exponent of the Event head, which introduces the event variable. However, with copular and light verbs, a single vocabulary item (the morphological root itself) is the exponent of the entire 'first phase' together with the Event head, which is a desirable outcome given the fact that such verbs carry no lexical meaning and their only semantic function is to introduce an eventuality. In addition to accounting for the absence of ThVs with light/copular verbs in Spanish, Fabregas (2022a) also provides an appealing conceptual mechanism that ties all the elements that have traditionally been labeled as ThVs together, in the sense that they are all exponents of TAM heads, while

[5] The final vowel *-a-* in *cant-a-r-i-a is* present in the entire present conditional paradigm. In (17), 1st person singular agreement is expressed by a zero suffix as opposed to, for instance, 2nd person singular which is marked by an additional morpheme *-s* (*cant-a-r-i-a-s*).

also explaining their distributional and semantic differences by exploiting an array of functional projections that correspond to the TAM domain.

More data and new analytical insights in support of a fine-grained decomposition of the traditional category of ThVs comes from Matushansky (2024). Matushansky argues that the Russian secondary imperfectivizer (*-iw-*) and semelfactivity marker (*-nu-/-anu-*), which are often classified together with ThVs (cf. Jabłońska 2004; 2007), do not in fact belong in this class. The first argument is that unlike typical ThVs, they are associated with clear semantic contributions (i.e., imperfectivity and semelfactivity). Secondly, there are reasons to believe that these affixes can occur together with regular ThVs. For example, the Russian ThV *-aj-* readily combines with the secondary imperfectivizer *-iw-* (e.g. ob-liz-ɨv-aj-e-tʲ 'licks all over'). Furthermore, the vowels *-i-* and *-a-* that are the segmental parts of the imperfective *-iw-* and semelfactive *-anu-*, respectively, can be plausibly analyzed as ThVs where *-i-* would correspond to the ThV *-i-* while *-a-* would be an allomorph of the ThV *-aj-*. Matushansky (2024) argues that if the secondary imperfectivizer *-iw-* incorporates the ThV *-i-* and readily combines with *-aj-*, it follows that *-i-* and *-aj-* cannot both be verbalizers, which further suggests that ThVs should not be analyzed as a uniform class even once more complex forms such as *-iw-* and *-anu-* are broken down into ThVs and aspectual morphs.

Simonović and Mišmaš (2023) also contribute a decompositional analysis of the secondary imperfectivizers *-eva-* and *-ava-* in Slovenian. They propose an analysis according to which *-eva-* is a complex formation consisting of the ThV *-e-* preserved from the perfective base undergoing secondary imperfectivization, which in their analysis is accomplished by the insertion of another ThV, *-a-*. The final sequence /eva/ obtains because the consonant /v/ is added to prevent a hiatus. Part of the evidence for this analysis comes from the fact that the secondary imperfectives in *-eva-* tend to occur with verbs whose perfective forms include a ThV *-e-*. The secondary imperfectives in *-ava-* are decomposed into an independently attested suffix *-av* and the ThV *-a-*, the evidence being that bases with the ThV *-a-* are not overrepresented among the secondary imperfective forms in *-ava-*.

A point of similarity between Matushansky (2024) and Simonović and Mišmaš (2023) that should be highlighted has to do with the idea that the label 'ThV' is reserved for morphemes that do not seem to be associated with any semantic effects, while those that do come with clearly defined meanings are removed from the category of ThVs. Moreover, more complex forms such as the Russian semelfactive *-anu-* or the Slovenian secondary imperfective *-eva-* should not be treated on a par with ThVs both because they have clear semantic contributions as well as because they are not monosegmental morphemes.

The often glossed over difficulty of defining ThVs is also highlighted in Calabrese and Petrosino's (2023) contribution to the Special Collection. These authors point out that the pre-theoretic use of this term has been a general trend both in lexicalist and derivational approaches

to morphology since Aronoff (1994). A closer look at the forms that are often referred to as ThVs across different languages reveals some rather significant discrepancies, which might prevent a uniform treatment of these elements. In particular, Calabrese and Petrosino (2023) are concerned with morphemes that are traditionally labeled as "ThVs" in Latin, Greek, and Sanskrit, and observe that these morphemes are purely ornamental only in Latin, whereas in Sanskrit and Greek they exhibit the properties of verbalizers. A relevant contrast in this regard is that in Latin, ThVs co-occur with typical verbalizers, but in Ancient Greek and Sanskrit they seem to be in complementary distribution with them. Therefore, if co-occurrence with derivational morphemes used to derive verbs is the main criterion in deciding whether ThVs are verbalizers, as suggested by Aronoff (1994), then different conclusions are to be drawn about ThVs in Latin, on the one hand, and Ancient Greek and Sanskrit, on the other.

The terminological issue stressed by Calabrese and Petrosino (2023) also surfaces with regard to the question of the existence of ThVs in French, which differs from the rest of the Romance branch in that not all verbs have segmentable ThVs. As a result, some authors have argued that French has no ThVs and what appear to be ThVs are actually parts of verbal stems (El Fenne 2020). Of course, one should not lose sight of the fact that there are also accounts that treat traditional ThVs in other Romance languages as parts of stems (Bermúdez-Otero 2013).

Pomino and Remberger (2022), however, take the view that ThVs are present in French in the first two conjugation classes, despite being omitted in the paradigms of certain verbs for phonological reasons, and that there is a relatively small and unproductive class of athematic verbs. Pomino and Remberger (2022) provide quantitative evidence to the effect that 90% of French verbs belong in the first conjugation (ThV *-e-*), which is an open and fully productive class. 2.8% of verbs belong in the second conjugation (ThV *-i-*), and this class is only marginally productive. The remainder of the French verbal lexicon is populated by athematic verbs which are highly irregular, unproductive, and constitute a closed class. In that sense, from a purely quantitative standpoint, it would not be justified to claim that French does not have ThVs simply because they cannot be straightforwardly identified as segments in about 7% of the total verbal lexicon of the language. Interestingly, Kastner and Martin's (2021) account of French ThVs draws a conclusion seemingly opposite to that of Pomino and Remberger (2022). However, the apparent incompatibility of these two accounts stems, for the most part, from the terminological issue discussed at some length by Calabrese and Petrosino (2023). Namely, Kastner and Martin (2021) acknowledge the independent morphological reality of what Pomino and Remberger (2022) treat as ThVs marking the first and second conjugation, but they make the argument that these segments are not ThVs. Kastner and Martin's (2021) reasoning is based on the assumption built into what we called 'the received view' of ThVs, which is that they must be purely 'ornamental' conjugation class markers without any semantic import. They provide psycholinguistic evidence that French conjugation class markers (the forms that Pomino and Remberger 2022 treat as

ThVs) are not semantically empty, i.e., they are associated with argument structure properties (more details about their analysis in Section 3.3). Given their empirical data and terminological assumptions, Kastner and Martin (2021) arrive at the conclusion that French has no ThVs.

Summarizing this subsection, the contributions to this Special Collection and the Graz Workshop have revealed the need for a more precise formal definition of the category of ThVs. The current usage of this term runs into at least two major kinds of problems. First, there is a tradition of placing various kinds of morphemes into the category of ThVs within a single language, even though differences between these elements can sometimes be both significant and straightforward. Secondly, inconsistencies in the application of this term within a single language only intensify when it is used crosslinguistically. Thus, for instance, the assumption derived from the Latin data (and maintained for most of Romance) that ThVs are pure morphology creates a problem when attempting to generalize this notion to similar-looking morphemes in other languages that show evidence of semantic correlates. The question thus becomes whether the lack of semantic and syntactic effects might be the defining property of ThVs, which would consequently suggest that similar items in other languages that do show such effects should not be subsumed under this label. Of course, one could refrain from a crosslinguistic generalization based on the criterion of (the lack of) semantic content, but it does not seem as though there are many replacement candidates (other than, perhaps, the purely formal observation that these are morphemes with vocalic exponence used in the derivation of verbs).

3.3. ThVs are in Syntax

This Special Collection puts forth several new empirically-grounded arguments in favor of 'the syntactic view' of ThVs. In addition, there is a general conceptual position uniting these accounts, which is that 'the received view' of ThVs as pure morphology is explanatorily weak. The main objection is that in the absence of clear predictions and constraints, treating ThVs as morphemes that are freely added into the syntactic head positions in a separate morphological module amounts to a stipulative move (Fabregas 2022a; Milosavljević and Arsenijević 2022). Such a move does not advance our understanding of the phenomenon at hand, but it could nevertheless be justified empirically, provided that all other rival conceptual options turn out to be empirically inadequate. These accounts also come with evidence that the syntax-based approaches to ThVs actually capture at least some data sets better than 'the received view'.

In his analysis, Fabregas (2022a; 2022b) examines ThVs in Spanish using the framework of Nanosyntax, which excludes postsyntactic morphological operations and relies exclusively on syntax-based analyses. Fabregas establishes a connection between the following observations. First, the present indicative paradigm in Spanish lacks ThVs only in 1st person forms (as shown in **Table 7**). Second, certain verbs augment their roots with *-g* in 1st person present indicative forms (e.g., *sal-i* 'go out' → *sal**g**-o* 'I go out'). Third, the subjunctive forms of these verbs, which

include the *-g* augment in the 1st person present indicative forms, retain this augment across all persons (e.g., *salg-a* 'I would go out'; *salg-a-s* 'you would go out'; etc.). Lastly, these verbs that involve root augmentation in the 1st person present indicative and all subjunctive forms also lose their ThV (along with the augment) in imperatives (e.g., *sal* 'go out!').

	cant-a 'sing'	***beb-e 'drink'***	***viv-i 'live'***
1sg	cant-**o**	beb-**o**	viv-**o**
2sg	cant-*a*-s	beb-*e*-s	viv-*e*-s
3sg	cant-*a*	beb-*e*	viv-*e*
1pl	cant-*a*-mos	beb-*e*-mos	viv-*i*-mos
2pl	cant-*á*-is	beb-*é*-is	viv-*í*-(i)s
3pl	cant-*a*-n	beb-*e*-n	viv-*e*-n

Table 7: present indicative paradigm in Spanish.

The analysis, cast in terms of Nanosyntax, proceeds as follows: Roots are typically exponents of the 'first phase' positions, including InitP, ProcP, and ResP (Ramchand 2008, 2018). ThVs, on the other hand, generally occupy the Event^0 position. It is important to note that both roots and ThVs, along with other morphemes, have the potential to be exponents of larger domains, as per *the Spanning Hypothesis* (cf. Svenonius 2016). However, the 1st person present indicative morpheme *-o* deviates from this pattern as it occupies a larger span: SbjP > TP > EvtP, thereby occupying the position reserved for the ThV (EvtP). Verbs like *sal-i* ('go out'), which exhibit irregular augmented forms (*salg-*) in 1st person present indicative and subjunctive forms, as well as reduced forms in imperatives (*sal*!), possess two distinct lexical entries. The form *salg* corresponds to InitP > ProcP > ResP, while *sal* corresponds to EvtP > InitP > ProcP > ResP. The augmented form *salg*, representing InitP > ProcP > ResP, is selected in the 1st person present indicative due to the presence of the inflectional morpheme *-o*, which completes the clausal spine (SbjP > TP > EvtP). On the other hand, the alternative form *sal* already contains EvtP, which would conflict with the inflectional morpheme. A similar phenomenon is observed in subjunctives, where *salg-* is chosen for all persons since the subjunctive inflection represents MoodP > TP > AspP > EvtP, thereby replacing the ThV and necessitating the realization of InitP > ProcP > ResP as *salg*. Imperatives lack the TP domain (Isac 2015), which explains why the reduced form *sal* is sufficient to express the complete structure CP > EvtP > InitP > ProcP > ResP.

Fabregas (2022a) emphasizes that the advantage of his approach over the one that removes ThVs from syntax and treats them as purely morphological additions to syntactically-derived structures is that the latter accounts can always accommodate the generalizations that he observes by "stipulat[ing] them as irregular quirks of specific verbs" (Fabregas 2022a: 36). However,

the unrestricted character of such approaches is precisely the reason why alternatives should be sought out, i.e., they are flexible enough to accommodate a lot of different facts without providing deeper insight about them.

Fabregas's (2022a) study provides an example of an analysis that places ThVs in syntax, yet Fabregas refrains from equipping ThVs with special semantics. In his analysis, ThVs typically spell out the Event head, which always has the same semantic contribution (i.e., introducing the event variable), thus different ThVs are not predicted to be associated with differentiated semantic contributions. In the remainder of this section, we will outline three contributions to the volume which do make this additional step. Namely, they associate ThV differences with distinct semantics in each case that is related to argument structure properties.

The contribution by Kouneli (2022) extends the investigation of ThVs beyond Indo-European languages by incorporating data from Kipsigis, a Nilotic language spoken in Kenya. By employing a DM analysis grounded in the 'flavors of *v*' framework of Folli and Harley (2005), she presents evidence for a strong correlation between ThVs and argument structure. In Kipsigis, ThVs manifest as prefixes located to the left of the verbal root. The language exhibits two conjugation classes, Class 1 and Class 2 verbs, which display variations in several linguistic features. Firstly, the length of the subject agreement prefix differs between the two classes, with Class 2 verbs having a long vowel and Class 1 verbs a short vowel. Additionally, the imperative morpheme is realized as *e-* for Class 1 verbs and *i-* for Class 2 verbs. Furthermore, there are tonal distinctions in the stem of Kipsigis verbs. Kouneli (2022) identifies the presence or absence of a moraic prefix as the crucial factor distinguishing the two classes. The moraic prefix corresponds to the spell-out of *v* and is found in Class 2 verbs but is absent in Class 1 verbs. Notably, Kouneli highlights the existence of verbs that exhibit alternations between Class 1 and Class 2, essentially constituting "minimal pairs" that solely differ in their ThVs (20).

(20) a. Kà-∅-bet ŋô:ktà. Class 1
PST.CURR-3-get.lost dog.NOM
'The dog got lost.'

b. Kà-∅-**i**-be:t kíbê:t ŋó:ktá. Class 2
PST.CURR-3-CL2-get.lost kibeet.NOM dog
'Kibeet lost the dog.'

We observe in (20) that a change in the ThV places a verb into a different conjugation class. Interestingly, however, this shift in the conjugation class is accompanied by a clear semantic correlate, i.e., by migrating into Class 2 an intransitive verb becomes a causative transitive.

Kouneli (2022) relies on Toweet's (1979) observation that this alternation is productive in Kipsigis, with approximately 60% of verbs participating in it. Among the remaining 40%, most verbs belong to Class 1, which is considered the unmarked class. Only 60 Class II verbs do not

undergo the alternation, comprising 40 transitives and 20 intransitives. In this sense, conjugation class membership is strongly correlated with argument structure. Kouneli thus identifies the moraic prefix as the realization of *v*CAUSE that can attach to roots in the case of non-alternating Class 2 verbs, as well as to *v*Ps in the case of alternating verbs.

Kovačević et al. (accepted) similarly provide evidence for a link between ThVs and argument structure properties. Their empirical focus is on "minimal pairs" of verbs differing only in the choice of the ThV (i.e., *-i-* in one member in a pair and *-ova-* in the other) in SC. Preliminarily, they observe that in such minimal pairs the *-i-* verb tends to be transitive while the *-ova-* verb intransitive, as illustrated in (21). However, they also note that there are some exceptions (22). In (22b), the example with the ThV *-ova-* is clearly transitive whereas the verb in (22a) is used intransitively despite containing the ThV -i-. Now, the intransitively used *-i-* verb in (22a) is combined with the morpheme *se*, suggesting that the intransitive use we are observing in (22a) is actually an anticausative form derived from an underlying transitive verb. However, it is hard to find examples of this verb used transitively and without *se*. Regardless of whether transitive uses of the verb *kamen-i-ti* 'turn-into-stone' are grammatical, contrary to the tendency illustrated in (21), the important point is that transitive uses of the *-ova-* verb in this pair *kamen-ova-ti* 'stone' are uncontroversially available, again contradicting a tentative generalization behind (22).[6]

(21) a. Sveti Sava je mir-**i**-o zavađenu braću.
Saint Sava AUX peace-i-INF feuding brothers
'Saint Sava was reconciling the feuding brothers.'

b. Pacijent je nedeljama mir-**ova**-o.
patient AUX weeks peace-ova-PST
'The patient was recovering in bed for weeks.'

(22) a. On je zastajkivao pred svakom stvarčicom i kamenio se.[8]
he AUX stopped before every little.thing and stone–i-PST SE
'He stopped in front of every little thing and turned into stone.'

b. Rulja je kamen-**ova**-la osuđenika.
crowd AUX stone-ova-PST convict
'The crowd stoned the convict.'

Despite the exceptions of the kind illustrated in (22), Kovačević et al. (accepted) point out that in such minimal pairs there is an overwhelmingly higher than chance probability that the *-i-* verb will be transitive while the *-ova-* verb will be intransitive. They carried out a quantitative corpus-based study to confirm and measure out the strength of the observed tendency, identifying 66 'minimal pairs' of verbs which differ only in the ThV (*-i-* vs *-ova-*). A sample of 50 corpus tokens was drawn for each member of each pair and tokens were coded for transitivity. Those verbs from

[6] The example is drawn from a literary piece (author: Janko Veselinović, short story: *Večnost* 'Eternity').

the initial set of 66 pairs (132 verbs) which did not reach the threshold of 50 tokens in the corpus under investigation (Ljubešić and Klubička 2014) were excluded from the comparison. The results confirmed the initial hypothesis, with the verbs involving the ThV *-i-*, indeed, being significantly more likely to be used transitively than the *-ova-* verbs (**Figure 3** from Kovačević et al. accepted).

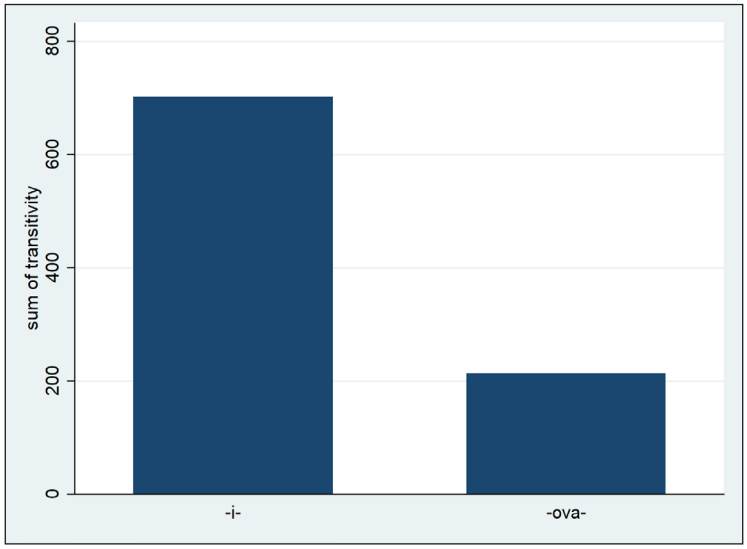


Figure 3: the frequency of transitive uses of -i- and -ova- verbs in the sample.

A closer examination of the exceptions reveals that the difference in the transitivity ratios of the two groups of verbs could be even more pronounced. This is because quantificational or cognate/hyponymous objects account for the majority of transitive uses of *-ova-* verbs suggesting that these verbs are unergatives, thus being able to license only these types of objects. The unergative status of *-ova-* verbs is also confirmed by other tests. The minority of *-i-* verbs that are intransitive are, on the other hand, shown to be unaccusative. In that sense, the real split between *-i-* and *-ova-* verbs is not one of (in)transitivity but rather one of the presence/absence of the internal argument, whereby *-i-* verbs have an internal argument and are thus either transitive or unaccusative, while *-ova-* verbs are unergative. Now, even this statement is not exceptionless (recall 22b), but the number of exceptions is very small.

The analysis of the data that Kovačević et al. (accepted) put forth also relies on Folli and Harley's (2005) 'flavors of *v*' approach. The assumption is that the ThV *-ova-* instantiates *v*[DO], thus building unergative structures. The ThV *-i-*, on the other hand, instantiates *v*[BECOME], creating unaccusatives, or *v*[CAUSE] + *v*[BECOME] deriving causative transitives. The authors also note that *-ova-* is probably best analyzed as a composite element consisting of the ThV *-a-* spelling out *v*[DO] combined with a nominalizer/augment *-ov-*.

Incidentally, Kastner and Martin (2021) present experimental findings that offer empirical support for the association between different ThVs/conjugation class markers in French and argument structure properties. Their study utilizes a modified version of the classic "wug" experiment, where participants were tasked with selecting between two distinct verbs derived from a newly created adjective. These verbs differed solely in their ThVs: one featured the ThV *-i-* (representing the first conjugation), while the other included the ThV *-e-* (representing the second conjugation). The crucial factor manipulated as the independent variable was context, which favored either a change-of-state interpretation or an activity interpretation of the target verb. Building on a preliminary examination of existing "minimal pairs", Kastner and Martin hypothesized that participants would exhibit a preference for *-i-* verbs in change-of-state contexts and *-e-* verbs in activity contexts. The results of the experiment confirmed this prediction. The experimental evidence thereby suggests a clear relationship between the choice of ThV/conjugation class marker and the underlying argument structure properties in French, demonstrating the influence of context in guiding verb selection in accordance with the appropriate semantic interpretation.

A feature that reappears in the theme-vowels-in-syntax accounts is that the links between ThVs and syntactic/semantic properties rest on tendencies (even if sometimes very strong), not systematic rules. The formal analyses of these tendencies (e.g., of the ThVs → 'flavors of *v*' type) must acknowledge the (often numerous) exceptions and assume that the exceptional cases are simply listed/lexicalized. We should note that the existence of listed/lexicalized forms escaping established rules does not need to be seen as a fatal flaw of these analyses, given that ThVs are argued to be in *v* and thus strictly local to the root, which is the domain in which lexicalization and idiosyncratic semantic and phonological properties are expected to arise (Marantz 1997, 2001). This position seems compatible with a typological observation that languages in general fall into one of the following classes: (i) languages that do not have ThVs at all, where the *v* position is null or exponed by the root itself (e.g., English); (ii) languages where ThVs are present, but not with all verbs (e.g., French); (iii) languages that show clearly segmentable ThVs on (virtually) all verbs (e.g., the rest of Romance and Slavic), with varying degrees of systematicity of their semantic contributions; and (iv) languages in which different flavors of *v* (Folli and Harley 2005) are systematically differentiated in morphology, though usually not by means of ThVs, and associated with completely compositional semantics (e.g., causative morphemes in Chichewa).

3.4. ThVs sensitive to syntax

Milosavljević and Arsenijević (2022) offer a kind of middle-ground solution to the problem of the relationship between ThVs and syntactic/semantic effects by proposing a markedness-based account in which the selection of ThVs is influenced (but not determined) by morphosyntactic properties. Similar to Kovačević et al. (accepted), they compare "minimal pairs" of SC verbs

contrasting only in the ThV. Milosavljević and Arsenijević focus on the two most productive ThVs <i,i> and <a,a> and locate 34 pairs of verbs with these ThVs, observing one of the following three types of semantic contrasts in those pairs[7]. Under Type 1 contrast, the <i,i> member of the minimal pair is associated with the bounded perfective semantics while the <a,a> member is unbounded and imperfective (23). Type 2 contrast involves an <i,i> verb, which is imperfective and scalar, while the <a,a> verb is imperfective, pluractional or non-scalar (see the difference between 24b and 24c). In such cases, pure perfectivity is expressed by means of another ThV, namely <Ø,e>, as illustrated in (24a). Finally, there is the Type 3 contrast, where the <i,i> verb is imperfective with directionality semantics, while the <a,a> verb is imperfective, but its denotation is non-directional (25).

(23) a. s-prem-i-ti /spre:miti/
WITH-prepare-THV-INF
'prepare' (perf)

b. s-prem-a-ti /spre:mati/
WITH-prepare-THV-INF
'prepare' (imperf)

(24) a. *(do-)nes-**Ø**-ti /done:ti/ <Ø,e>
TO-carry-THV-INF
'bring' (perf)'

b. (do-)nos-**i**-ti /donositi/ <i,i>
TO-carry-THV-INF
'bring / carry' (imperf)

c. (*do-)nos-**a**-ti /dono:sati/ <a,a>
TO-carry-THV-INF
'carry around' (imperf)

(25) a. Jad-**i**-ti /ja:diti/
misery-THV-INF
'grieve (someone)'

b. jad-**a**-ti /jadati/
misery-THV-INF
'lament' (repeated actions)

[7] In contrast to Kovačević et al. (accepted), Milosavljević and Arsenijević (2022) use a more elaborate notation for SC ThVs which is meant to reflect the fact that some SC ThVs do not remain the same throughout the verbal paradigm. For instance, the verb *drž-a-ti* ('hold.inf') has the ThV *-a-* in its infinitival form but in the present tense it has the ThV *-i-* (*drž-i-š* 'hold.2.sg.pres'), thus under the notation employed by Milosavljević and Arsenijević (2022) the ThV class that this verb belongs to would be notated as <a,i>.

One way to capture this pattern would be by assuming that <i,i> maps onto a feature [SCALE], while <a,a> is associated with the absence of this feature. Such an analysis would be too strong, according to Milosavljević and Arsenijević (2022), as it would predict that all scalar verbs should appear with the ThV <i,i>, and <a,a> should be found only with non-scalar verbs. However, this is not the case outside the context of minimal pairs, therefore such a rule would face numerous exceptions. Instead, Milosavljević and Arsenijević (2022) opt for an analysis in terms of markedness. They assume that ThVs are not directly associated with morphosyntactic features. The latter are instead inserted, postsyntactically, into head positions generated in syntax (i.e., they are not morphologically-inserted adjuncts to the syntactically created heads). ThVs are arranged into a markedness hierarchy, which allows for a matching procedure to take place between syntactic head positions and different ThVs as instantiations of those positions. The matching procedure takes place via a comparison of markedness rankings of ThVs and feature combinations contained in a particular head position. Crucially, the markedness mapping is inverted, meaning that a more marked morphosyntactic feature set gets mapped onto a less marked ThV. In this way, *v* heads that are marked for boundedness, scalarity, or directedness are mapped onto the ThV <i,i>, which is the most unmarked ThV class in the language with the majority of the verbal lexicon falling into this class. Less marked feature sets (e.g., unbounded, non-scalar, or non-directional) are mapped onto a more marked ThV class <a,a>.

3.5. Methodological contributions

As pointed out by Oltra Massuet (under review), the discussion surrounding ThVs revolves around the absence of a one-to-one mapping between these forms and semantic or syntactic effects, “As shown in Fábregas (2021) for Spanish, the choice of the ThV is fully arbitrary and does not correlate with any semantic or syntactic behavior, i.e., conjugations do not have any effects on aspect […], transitivity […], or argument structure properties […], and one can find any ThV exponent with every type of predicate, as illustrated for Catalan.” However, Panagiotidis et al. (2017) acknowledge that while the “pure morphology” view argues for a lack of a correlation, subregularities and correlations with transitivity can still be observed under competition.

To establish correlations between ThVs and argument structure properties, the contributions to the Graz Workshop and *Glossa*’s Special Collection employ a reductionist approach. By eliminating confounding factors and focusing on ‘minimal pairs’ that only differ in ThVs, the authors are able to establish strong correlations, albeit imperfect ones. Several studies, such as those by Milosavljević and Arsenijević, Kouneli, Kastner and Martin, and Kovačević et al. utilize quantitative and experimental methods to generate data and quantify the strengths of observed tendencies. However, a challenge arises when trying to incorporate these probabilistic rules into existing formal models. The solution proposed by some authors is to express the identified tendencies as morphosyntactic rules, treating exceptions as listed items. Alternatively, a markedness-based account as proposed by Milosavljević and Arsenijević constrains the choice

of ThVs with morphosyntactic features but does not determine it entirely. This approach allows for additional factors to be considered, potentially explaining the unaccounted data.

3.6. What about 'the received view'?

Some of the contributions to the present Special Collection can be seen as posing challenges for 'the received view' in so far as it rests on the assumption that ThV selection has no relationship to syntactic and semantic properties of verbs. As was outlined in the previous subsection, various contributions to the Special Collection have provided evidence of strong links between ThVs and argument structure and/or aspect, but crucially no study has delivered a categorical generalization of this kind. In that sense, if what it takes to challenge the assumption underlying 'the received view' is evidence of a one-to-one mapping between a given syntactic or semantic property and the choice of a ThV, then it can be said that this approach remains largely unaffected by the empirical contributions to this Special Collection. There is, in principle, no obstacle to applying the mechanics of 'the received view' in order to capture the data presented in these studies without incorporating the observed subregularities. On the other hand, if one is also concerned with capturing imperfect correlations in addition to categorical rules and refraining from specialized analytical tools such as postulating purely morphological operations (which could very well turn out to be necessary for empirical domains other than the one under discussion here), the 'syntactic view' could put forth important advantages. These considerations, however, remain at the level of conceptual preferences, at least for the time being.

4. Concluding remarks

One of the recurring themes in the contributions to this Special Collection, which resonates well with what has previously been argued in the literature, is that ThVs are located in *v*, but, at the same time, they can reappear in higher functional projections. This conclusion follows from various different observations about ThVs. First, the way they interact with the root for the purposes of allomorphy signals that the root and the ThV must be within the same locality domain, which further implies that the theme vowel cannot be merged after the categorizing head *v* has already been introduced. Second, we should stress that the diverging perspectives on the function of ThVs are, nonetheless, in agreement with each other when it comes to the structural location these morphological items occupy. Those authors who believe the ThVs are just markers of conjugation class membership analyze them as being adjoined to *v*, where their purpose is strictly morphological (i.e., to determine the class of verbs that the particular lexical item belongs to). On the other hand, those authors who associate ThVs with specific semantic or syntactic contributions typically see those contributions in terms of a signal of the lexico-semantic class membership which is usually associated with either argument structure or aspect (again, the purview of *v*, as argued, for instance, by Folli and Harley 2005).

Taken together, the contributions to this Special Collection, as well as, more broadly, the Graz Workshop that gave rise to it also offer a step forward or at least a fresh perspective when it comes to the debate about the function of ThVs. The majority, though, emphatically, not at all, of the articles that tackle this question argue against what we call 'the received view' of ThVs, or the idea that theme vowels are purely morphological conjugation class markers. The arguments against 'the received view' put forth by the authors in the Special Collection are both conceptual and empirical. Conceptually, 'the received view' is seen by some authors as carrying little explanatory weight, as it merely restates the description of the observed facts within a given formal framework (Fabregas 2022a; Milosavljević and Arsenijević 2022). Empirically, it is suggested that ThVs do, in fact, have syntactic or semantic import. Significantly, the evidence behind such claims in all cases is based on quantitative data that yield strong correlations, but the authors admit substantial numbers of exceptions to the tendencies they are trying to establish.

The claims made on the basis of strong tendencies, which, nonetheless, face significant numbers of exceptions, cannot immediately be accepted as evidence against 'the received view', at least if the traditional criteria for adjudicating syntactic, semantic and morphological evidence are applied. It does seem to us, however, that these contributions bring forth important methodological innovations and raise rather pertinent questions about the status of non-categorical or probabilistic observations in linguistics. When it comes to the methodological innovations stemming from the articles in this Special Collection, we saw a number of works that have relied on what we have called morphological 'minimal pairs' (i.e., pairs of verbs differing only in their ThVs) to isolate syntactic and semantic correlates of ThV differences in these pairs through the application of quantitative (corpus or experimental) methods. It seems to us that these approaches can be used quite fruitfully to establish correlations between linguistic phenomena while simultaneously producing a measure of the number and ratio of exceptions to correctly predict observations. Such facts, however, do not have a clear and uncontroversial status in linguistic theory, and it is our hope that one of the questions this Special Collection will inspire researchers to tackle will be precisely about the nature of such facts and the significance that a theory of language faculty should attach to them. More research is also needed to establish whether the observed correlations between ThVs and argument structure properties extend beyond the languages included in these studies and what other factors (if any) may affect the choice between different ThVs in a given language.

Abbreviations

AOR = aorist, ACC = accusative, AUX = auxiliary, CL2 = class 2, CURR = current, GEN = genitive, DSD = desiderative, F = feminine, FUT = future, IMPF = imperfective, IND = indicative, INF = infinitive, INS = instrumental, LOC = locative, M = masculine, NOM = nominative, PERF = perfect, PFV = perfective, PL = plural, PRES = present, PST = past, PTCP = participle, SC = Serbo-Croatian, SG = singular, SUBJ = subjunctive, THV = theme vowel.

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Competing interests

The authors have no competing interests to declare.

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