

Theme-vowel minimal pairs show argument structure alternations

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1. Introduction

Broader question: What are theme vowels?

From totally ornamental/conjugation class markers to exponents of different flavours of *v* (for an overview, see Oltra-Massuet 2020).

Aim: Pitting the two extremes against each other.

We compare argument structure properties of minimal pairs of prefixless verbs containing *-i-* and *-ova-* theme vowels in Serbo-Croatian (SC).

Method: quantitative / corpus analysis

Minimal pairs extracted from a corpus, annotated for argument-structure properties & analysed statistically.

Findings: almost perfect dichotomy

-i- derives causative transitives; unaccusatives & anticausatives.

-ova- derives unergatives (and a limited set of typically lexicalized transitives).

2. Background

The basic issue in the literature on theme vowels concerns their syntactic/semantic contribution (or lack thereof).

One can identify **two opposing perspectives** on this matter:

1. The **‘received view’**/pure morphology: Theme vowels have **no syntactic/semantic contribution**; they are simply markers of conjugation class membership (Aronoff 1994).
2. The **‘syntactic view’**: theme vowels **interact with vP/VP structure**.

2.1. The ‘received view’

Drawing on the data from Latin, Aronoff (1994) presents three main arguments in support of the position that theme vowels are phonological markers of conjugation class membership:

1. Assuming that theme vowels derive verbs **would mean that there are only a handful of Latin verbs that are underived or ‘pure verbs’**.

2. Different theme vowels lead to **no clear semantic distinctions**.
3. Theme vowels are associated with meaningful derivational verbal suffixes and analyzing theme vowels as verbalizers **would entail that these suffixes are actually complex consisting of a meaningful component and a pure verbalizer**.

(1)

Suffix	Theme vowel	Meaning	verb	gloss
-ur-	-ī-	desiderative	esurire	‘be hungry’
-it-	-ā-	iterative	visitare	‘see often’
-sc-	-ē-	inceptive	calescere	‘get warm’
-ess-	-e-	intensive	capessere	‘seize’

(Aronoff 1994: 46)

From the Distributed Morphology (DM) point of view, Aronoff’s (1994) first objection is actually totally predicted → theme vowels as verbalizers can attach to bare roots.

The remaining two objections boil down to the problem that theme vowels seem to have no syntactic/semantic contribution of their own.

This issue would disappear if there were evidence that theme vowels are associated with syntactic/semantic information.

2.2. ‘The syntactic view’

Oltra Massuet (1999) considers the view that theme vowels are exponents of the verbalizing *v*.

Following Harley (1995), Fábregas (2017) assumes that theme vowels are exponents of ‘light verbs’/*v*.

Contra Aronoff’s (1994) objection that theme vowels attach to already existing verbalizing suffixes, Fábregas (2017) proposes a treatment of these suffixes as bound roots (Lowenstamm 2014) with the theme vowel being the exponent of the actual categorizing/verbalizing head.

Assuming that theme vowels are light verbs immediately explains why lexemes that carry light verb semantics (BE, DO, etc.) are often exceptional in that they do not include a theme vowel (Fábregas 2017).

If theme vowels are exponents of *v*, then, given the ‘flavors of *v*’ approach (Folli & Harley 2005), it is expected that different theme vowels would manifest different types of *v* heads associated with argument structure differences.

In Slavic, different theme vowels sometimes discriminate between causative transitives and unaccusatives (Marvin 2002, Arsenijević 2020)

The view that theme vowels carry argument structure information is present in a lot of the Nanosyntactic work on Slavic verbs as well (Medová & Wiland 2019; Jabłonska 2007, 2004)

A common issue in this line of work is that correlations between argument structure properties and theme vowel differences seem to occur only sporadically and when looked across the entire set of verbs they do not appear so strong.

However, the weakness of this correlation might be due to certain confounding factors that can alter argument structure properties. For instance, prefixes are able to alter argument structure in Slavic (2)

- (2) a. Vanja pisał. *Russian*
 Vanja wrote.IMP
 Vanja was writing.
 b. Vanja pisał pis’mo.
 Vanja wrote.IMP a/the letter
 Vanja was writing a/the letter.
 c. *Vanja napisal.
 Vanja wrote down.PERF
 Vanja wrote down.
 d. Vanja napisal pis’mo
 Vanja wrote down.PERF a/the letter.
 Vanja wrote down a/the letter. (from Basilico 2008: 1717-1718)

In SC, for instance, a prefix can turn an unaccusative verb into a transitive one (3).

- (3) a. Ivan je lud-e-o. *SC*
 Ivan AUX mad-e-masc.sg
 ‘Ivan was going mad.’
 b. Marija je iz-lud-e-la Ivan.
 Marija AUX prf-mad-e-fem.sg Ivan
 ‘Marija made Ivan crazy.’

The theme vowel *-e-* that we see with an unaccusative verb in (3a), suddenly appears in a transitive environment (3b). However, that could be due to the prefix and the theme vowel could still carry the same semantic/syntactic contribution that it did in (3a).

3. Method/procedure

Recall: we focus on two theme-vowel classes, out of 13.

Table 1. Theme vowels across verbs in SC (Arsenijević 2020; Arsenijević et al. 2021)

Ø, e	brati, berem 'pick'	305	i, i	ljubiti, ljubim 'kiss'	1606
a, e	grebati, grebem 'scratch'	9	a, a	padati, padam 'fall'	1710
e, e	smeti, smem 'dare'	42	e, i	voleti, volim 'love'	184
nu, ne	trunuti, trunem 'rot'	259	a, i	trčati, trčim 'run'	61
Ø, ne	pasti, padnem 'fall'	128	a, je	pisati, pišem 'write'	434
ova, uje	kovati, kujem 'forge'	251	va, je	pljuvati, pljujem 'spit'	21
iva, uje	kazivati, kazujem 'narrate'	329	TOTAL		5339

If all verbs belonging to these classes are considered, it seems like anything goes.

Table 2. Theme vowels across verbs belonging to different argument-structure types

i, i causative transitive	mir-i-ti (koga) peace- i -Inf (someone) 'to reconcile someone'
i, i non-causative transitive	mol-i-ti (koga) beg- i -Inf (someone) 'to beg someone (for something)'
i, i unaccusative	cur-i-ti leak- i -Inf 'to leak'
i, i unergative:	pilj-i-ti stare- i -Inf 'to stare'
ova causative transitive	legaliz-ova-ti (nešto) legalize- ova -Inf (something) 'to legalize (something)'
ova non-causative transitive	bojkot-ova-ti (nešto) boycott- ova -Inf (something) 'to boycott (something)'
ova unaccusative	napred-ova-ti forward- ova -Inf 'to make progress'
ova unergative	let-ova-ti summer- ova -Inf 'to spend the summer'

BUT:

In SC there are verbs that constitute minimal pairs where the only difference is the theme vowel, as in (4).

(4)

- (a) mir - **i** - ti
peace-**i**-inf
'reconcile / appease'
- (b) mir - **ova** - ti
peace-**ova**-inf
'rest (e.g. in order to recover from an illness)'

Minimal pairs allow for a natural experiment testing the hypothesis that different theme vowels correlate with different argument structure properties

The relevance of minimal pairs of roots with different theme vowels has been discussed in the literature (Svenonius 2004: 181-185; Milićević 2004, Romanova 2004, Gribanova 2013: 131-133, Kagan 2016: 33). However, no quantitative and exhaustive analyses so far. (See also Arsenijević & Milosavljević 2021 (this workshop)).

Prediction: there will be a statistically significant difference in argument structure properties associated with the two theme vowels under investigation

Corpus study Srwac (Ljubešić & Klubička 2014)

+ Additional examples (attested on the web)

Sample

64 pairs, 128 verbs in total

Coding for:

- Obligatory accusative case-marked object
- Possible accusative case-marked object
- Deriving a verbal passive
- Deriving any passive forms

For three out of four coded properties, no clear tendency in the big sample (data from Arsenijević et al. 2021)

Table 3. Summary of the results from Arsenijević et al. (2021)

	Acc_obligatory	Acc_possible	Verbal_passive	Any_n/t_form
i, i	64% (200/312)	70% (217/312)	62% (192/312)	71% (223/312)
ova, uje	66% (124/189)	69% (131/189)	60% (113/189)	87% (164/189)

Chi square test for relationship between:

- theme vowel
- argument structure

4. Findings

Table 4. Summary of the results for *i/ova*-pairs

	Acc_obligatory	Acc_possible	Verbal_passive	Any_n/t_form
i, i	63% (40/64)	86% (55/64)	69% (44/64)	84% (54/64)
ova, uje	5% (3/64)	11% (7/64)	8% (5/64)	98% (63/64)

All the differences are statistically significant (χ^2 : $p < 0.01$)

-i- verbs more likely to require obligatory accusative case-marked objects.

(5)

(a) Petar je mir-i-o *(braću).

Petar AUX peace-i-PAST brothers.ACC

‘Petar reconciled his brothers’

(b) Petar je mir-ova-o (*braću).

Petar AUX peace-ova-PAST brothers.ACC

‘Petar rested’

-i- verbs more likely to allow an optional accusative case-marked object.

(6)

(a) Petar je sud-i-o (utakmicu).

Petar AUX judge-i-PAST match.ACC

‘Petar refereed (the match)’

(b) Petar je sud-ova-o (*parnične postupke).

Petar AUX peace-ova-PAST litigation procedures.ACC

‘Petar worked as a judge’

-ova- verbs more likely to derive impersonal passives, a characteristic of unergatives, but not of unaccusatives (Aljović 2000).

(7)

- (a) *Tamo je puno (štet-i-en-o →) štećeno.
There AUX a lot damage-i-PASS.PTC-Neuter
Intended: ‘There was a lot of damaging there’
- (b) Tamo je puno štet-ova-n-o.
There AUX a lot damage-ova-PASS.PTC-Neuter
‘One has suffered a lot of damage there.’

The reason why a portion of *i*-verbs cannot derive passive participles lies in the fact that when these verbs are intransitive, they are unaccusative (8) and denote a change of state.

(8)

- (a) Izgledaš kao da si prvo **stario** pa **mladio**.
look.2sg like Comp Aux first got_old.Impf. then got_young.Impf.
‘You look like you first were getting old and then getting young.’
- (b) Prolazi jesen i (već) postepeno **zimi**.
pass.3sg autumnand already gradually become_wintery.3sg
‘Autumn is passing away, and the weather is gradually becoming wintery.’
- (c) Dok sam ja postepeno **gazdio**, on je **siromašio**.
while Aux I gradually became_boss.Impf. he Aux became_poor.Impf.
‘While I was gradually becoming a boss, he was turning poor.’

5. Discussion

The findings of this investigation speak strongly in favor of **theme vowels being associated with argument structure properties**.

An approach that would treat theme vowels as purely ornamental conjugation class markers has no mechanisms to account for the correlations we have established.

Such correlations are, in fact, **completely expected on the view that sees theme vowels as exponents/carriers of syntactic information**.

The data we have presented lend themselves to a DM-based analysis within the ‘flavors of v’ framework. We will present one possible implementation.

5.1. *i* is [BECOME], *ova* is [DO]

To recap, we have observed that the theme vowel **-i-** can be found in transitive and unaccusative environments while **-ova-** correlates with unergatives.

The derivations with **-i-** involve an internal argument undergoing a change of state, where the final state is defined by the property-denoting element in the base.

-ova- derivations show a looser semantic relationship with the base with an obligatory volitional component. Namely, control and volitionality are known to favor unergative behavior (Ramchand 2013: 290).

We implement these generalizations by assuming:

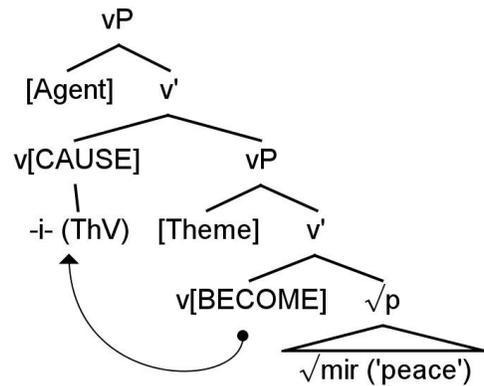
1. **-i-** is an exponent of either v [BECOME] or v [BECOME]+ v [CAUSE]
2. **-ova-** is an exponent of the unergative $v \rightarrow v$ [DO]

Thus, we propose the structures in (10) capturing the contrast between the transitive verb with the theme vowel **-i-** and the unergative version with **-ova-** given in (4) and repeated here as (9).

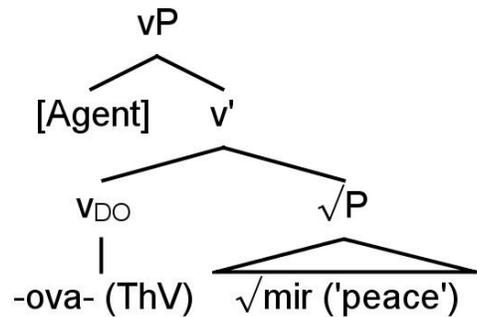
(9)

- (a) Petar je mir-i-o *(braću).
Petar AUX peace-i-PAST brothers.ACC
‘Petar reconciled his brothers’
- (b) Petar je mir-ova-o (*braću).
Petar AUX peace-ova-PAST brothers.ACC
‘Petar rested’

(10) a.



b.

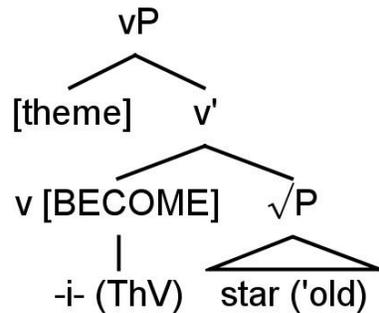


In (10a) representing transitive structures with the theme vowel *-i-*, the root/base merges with **v [BECOME]** introducing the theme argument. The **causative v** is, then, merged on top of this structure creating a transitive structure with **an agent in its Spec position**.

-ova- verbs are represented in (10b), which is a typical unergative structure with an agentive **v[DO]** merging with the root/base and introducing the external argument.

The alternative unaccusative structure for the theme vowel *-i-* with the verb *stariti* (old-*i-* inf 'age') is presented in (11).

(11)



The representation in (11) shows the unaccusative structure with *-i-*, which is also possible. This structure involves the same *v*[BECOME] responsible for the theme argument merged with the root/base. Of course, this is a smaller structure than the one in (10a) since it lacks the causative *v* and the external argument.

The exact details of these implementations could vary. The projection introducing the agent is often labeled VoiceP (Harley 2013). Also, we follow Embick (2004), among others, in assuming the existence of the [BECOME] version of *v*; however, he labels this head [fient].

5.2. Loose ends

Terminological issues aside, there is a deeper question of the status of the base/root.

5.2.1. Category of the base

Huge majority of the bases show up as independent nouns.

Denominal (or at least word-selecting) patterns?

Buljan (2016) lists both patterns as denominal.

General issue: No generalisable tests for distinguishing denominal from deradical structures.

Indications that *ova* is denominal and *i* is not:

- Zec (2019) claims that *ov* is a nominal theme (cf. *mir-ov-i* ‘peaces’, *sud-ov-i* ‘courts’).
- *ova* is productive in loan verb integration, *i* is not (*lajkovati*, **lajkiti*)
 - Moravcsik (1975): only denominal patterns participate in verb integration.
- *ova* preserves nominal prosody, *i* allows only two prosodic patterns allowed in all verbs.
 - Strictly verbal prosody: H on the theme vowel and base-final H.

(12)	Exceptional preservation of nominal stress in ova-verbs		
	Noun	Verb	Gloss
	'ínteres	'ínteresovati	'to interes'
	'profésor	'profésorovati	'to be a professor'

No attested verbs with the prosodic pattern like * *'ínteresiti* or * *'profésoriti*.

5.2.2. Scales, telicity and [BECOME]

Arsenijević & Milosavljević (2021, this workshop) propose that *i*, *i* in SC carries the features [v] and [scale], the latter being essential in deriving telicity. This approach is in accordance with our findings on the argument-structure properties of *i*-verbs, as both unaccusatives and causative transitives are plausibly analyzed as carrying the feature [scale] [cf. the BECOME component].

Moreover, it is known that when a verb can be used either as unaccusative or unergative depending on the telicity of the structure it is embedded in, unaccusativity tends to correlate with telicity, while unergativity tends to correlate with atelicity (cf. Ramchand 2013: 290).

Finally, “verbs which have an argument that undergoes a gradual change (without attainment of a definite result) often display unaccusative behavior in the languages where the diagnostics are clear” (Ramchand 2013: 294).

5.2.3. Deviant examples

We will now look at some examples which (at first sight) do not display differences w.r.t the coded properties (taking accusative objects, forming passive forms).

1. When both *i*- and *ova*-verbs appear as transitives (13), the *i*-variant is causative, roughly ‘to make something become base-like’ (13a), while the *ova*-verb shows a loose relationship to the base meaning (e.g. related to the instrument in (13b)). This can be accounted for if the *i*-class is more tightly related to the root, while nP intervenes between the root and *-ova*. (See e.g. Bazalgette 2015 for the importance of nP in attributing idiomatic/encyclopedic meaning.)

(13)	a.	kamen-i-ti (nešto)	b.	kamen-ova-ti (nekog)
		stone- i -Inf		stone- ova -Inf
		‘to turn something into stone’		‘to stone (somebody)’

2. The volitional component, which, as we have seen, favors unergative behavior, is present in all of the *ova*-counterparts within the pairs under examination. This also includes cases in which the

i-variant is not equipped with the [BECOME] component, as illustrated with the root *lik* ‘face, figure’ (14): while the *i*-verb is stative (14a), the *ova*-version denotes a volitional and controlled activity loosely related to the root/base meaning (14b).

- (14) a. lič-i-ti b. lik-ova-ti
 face-**i**-Inf face-**ova**-Inf
 ‘to resemble’ ‘to exult’

3. There are also pairs that seem to not display any obvious syntactic and semantic difference between *i*- and *ova*-verbs (15). However, even in such cases, speakers that have both variants tend to connect the *-ova* version more loosely with the base *facebook*, i.e. as performing any kind of activity related to it. The *i*-variant, on the other hand, is more restrictive, typically to the ‘(irresistibly) spending time on the social network Facebook’.

- (15) a. fejsbuč-i-ti b. fejsbuk-ova-ti
 facebook-**i**-Inf face-**ova**-Inf
 ‘to facebook’ ‘to facebook’

Consider, for instance, the compatibility with prefixes: the *i*-variant is more prone to combine with *pro-* (through) denoting a path / route (16a), while *pro-* with *ova*-verbs is mainly used with quantification-like meanings, as in (16b). Once again, this is in accordance with the *i*-verbs merging directly with the root (and with their scalar nature), as well as with the *ova*-class being ‘mediated’ by an nP.

- (16) a. Da ne bi profejsbučio život, Andrija je odlučio
 Comp Neg Aux **pro**-facebook-**i**-Past life A. Aux decided
 da postane suprug i otac.
 Comp become.3sg husband and father
 ‘In order not to spend the life facebooking, Andrija has decided to become a husband and a father.’
 b. Posle škole obično malo profejsbukujem.
 after school usually bit **pro**-facebook-**ova/uje**.1sg
 ‘After school, I usually spend some time facebooking.’

In future research, we plan to conduct experiments to check whether such differences are real in a larger population.

6. Conclusion

The aim of the paper was to test the hypothesis that theme vowels are associated with argument structure properties.

The hypothesis was tested on a set of ‘minimal pairs’ of verbs consisting of the same root/base and two different theme vowels (*-i-/-ova-*) in SC.

Quantitative analysis shows that *i*-verbs are far more likely to require an accusative case-marked internal argument (either obligatory or optional) as well as to form verbal passives, while *-ova-* verbs were more likely to be able to form any kind of *-n/-t* passive participles.

We interpreted these findings as suggesting that *-i-* is an exponent of a structure with an internal argument (transitive or unaccusative), while *-ova-* derives unergative verbs.

The analysis captures the overwhelming majority of cases, with a highly restricted number of exceptions that we have discussed.

Any account of theme vowels that treats them as purely ornamental features has no way of capturing these strong tendencies.

The research method we employed can be applied to other cases where two theme vowels form minimal pairs.

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