

# THEME VOWELS

IN V(P) STRUCTURE

## Serbo-Croatian theme vowels carry functional features



Boban Arsenijević  
Stefan Milosavljević  
(University of Graz)  
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# A theme vowel

- typically a vowel (1a), but possibly also other material (1b), standing between the base and the inflection of a word
- it adheres to the base and makes a stem with it
- often described as a morphological item specifying the inflection class (declension, conjugation) the stem takes

(1)	a.	snim-i-ti	b.	skok-nu-ti	[SC]
		record-TH-INF		jump-TH-INF	
		'record'		'jump quickly / a little'	

# Theme vowels: analytic strategies

- Aronoff 1994: verbs are listed with class indices which govern realization rules for the inflection, including theme vowels
- Fabregas 2017: thematic vowels realize the verbal category head  $v$ , just like verbal suffixes do; their vocabulary insertion involves contextual allomorphy (relative to a list of categories, roots and inflections)
- Oltra Massuet 1999, 2020: bundles of subatomic abstract features  $[\pm\alpha, \pm\beta, \pm\gamma]$  in a feature geometry, adjoined to every functional head in the verb's projection; readjustment rules (late insertion)

# Theme vowels: analytic strategies

- Aronoff and Fabregas effectively require lists, either of verb-class pairs (paradigm morphology), or of roots and suffixes per thematic class (Lowenstamm 2014, Simonović 2019: suffixes are roots) for vocabulary insertion rules (DM)
- Oltra Massuet's approach has the capacity to (partially) derive them
- DM approaches: a better ratio between the explanatory power and simplicity, but for theme vowels different empty heads needed for cases where different theme vowels may attach to (seemingly) suffixless bases of the same category

# Simplification

- lists are a cumbersome, non-elegant component of the analyses
- Oltra Massuet makes an attempt to reduce them by a feature geometry combined with underspecification and readjustment rules, but fails to identify the three features involved and hence merely codes the lists in Boolean terms
- real simplification: link her abstract features with properties of the verb, i.e. with some independently attested functional features in its projection

# The big question

- is there a correlation between theme vowels and any grammatical property of the verb?
- the simplest case: each thematic class is characterized by a particular value of some feature
- more complex options (better fitting to Oltra Massuet's view): a finite-state kind of algorithm, where the value of one feature sets a 'register' for the effects of all the higher ones, and the output of each path is a theme vowel

# This talk

- introduces Serbo-Croatian (SC) verbal theme vowels
- not about the syntactic status, only about the feature content of theme vowels
- lays out our hypothesis that all SC theme vowels bear the feature [event], for the semantic type of eventualities, and the most productive theme vowel i:i contrasts the second most productive one a:a in additionally bearing the feature [scale]
- reports quantitative research supporting the hypothesis

# Verbal theme vowels in SC

a:e	gre <u>b</u> ati, gre <u>b</u> em 'scratch'	i:i	ljub <u>i</u> ti, ljub <u>i</u> m 'kiss'
va:je	plju <u>v</u> ati, plju <u>v</u> em 'spit'	a:a	pad <u>a</u> ti, pad <u>a</u> m 'fall'
nu:ne	trun <u>u</u> ti, trun <u>u</u> em 'rot'	e:i	vo <u>l</u> eti, vol <u>i</u> m 'love'
∅:ne	pasti, pad <u>n</u> em 'fall'	a:i	tr <u>č</u> ati, tr <u>č</u> im 'run'
ova:uje	ko <u>v</u> ati, ku <u>v</u> em 'forge'	∅:e	brati, ber <u>e</u> m 'pick'
iva:uje	kazi <u>v</u> ati, kaz <u>v</u> em 'tell'	e:e	sm <u>e</u> ti, sm <u>e</u> m 'dare'
a:je	pis <u>a</u> ti, pi <u>š</u> em 'write'		

# Some reduction seems possible

a:e	gre <u>b</u> ati, gre <u>b</u> em 'scratch'	a:a	pa <u>d</u> ati, pa <u>d</u> am 'fall'
nu:ne	tru <u>n</u> uti, tru <u>n</u> em 'rot'	∅:e	brati, be <u>r</u> em 'pick'
∅:ne	pa <u>s</u> ti, pa <u>d</u> ne <u>m</u> 'fall'	i:i	ljub <u>i</u> ti, ljub <u>i</u> m 'kiss'
va:je	plju <u>v</u> ati, plju <u>j</u> em 'spit'	e:i	vo <u>l</u> eti, vol <u>i</u> m 'love'
ova:uje	ko <u>v</u> ati, ku <u>j</u> em 'forge'	a:i	tr <u>č</u> ati, tr <u>č</u> im 'run'
iva:uje	ka <u>z</u> ivati, ka <u>z</u> uje <u>m</u> 'tell'	e:e	sm <u>e</u> ti, sm <u>e</u> m 'dare'
a:je	pi <u>s</u> ati, pi <u>š</u> em 'write'		

# Our starting intuition

- focussing on the two by far largest theme classes, *i:i* and *a:a*
- a vague intuition that *i:i* verbs are more directed / scalar / telic / perfective / eventive than *a:a* verbs
- in other words, *a:a* verbs are a more diverse, less constrained class, and *i:i* verbs seem to show a tendency for marked properties of quantity

# Our strong hypothesis

- theme *a:a* carries only the feature [event]  
→ *without further measures, it coincides with unrestricted interpretations (imperfective, atelic)*
- the pair *i:i* carries the features [event] and [scale], where the latter stands for the scalar component argued to be essential in deriving telicity (Hay et al. 1999, Piñón 2008)  
→ *without further measures, it coincides with perfectivity, telicity, single event readings*

# Where to look

- in Slavic languages, the theme vowel is only sensitive to the morphological constituent it directly combines with, its structural sister
- this is typically a root or a verbal suffix, but may as well be another word or even a phrase
- further prefixation and suffixation do not affect the theme (except that it may not survive some operations)
- looking at whole verbs deforms the picture: one root+theme combination counts as as many verbs as it derives

# But bearing in mind:

- the theme is, however, not uniquely determined by its sister: the same base sometimes combines with two, even three themes, yielding verbs with different semantic and grammatical properties
- this speaks against indexing bases for theme vowels, and in favor of either selecting them in grammar, or storing base+theme complexes in the lexicon / Encyclopedia
- it is crucial therefore to look exactly at minimal pairs where different themes are added to the same base

# Significance of minimal pairs

- different themes with a single root reveal correlations with meaning and/or syntax (Svenonius 2004a: 181-185, Milićević 2004, Romanova 2004, Kovačević et al. 2021)

- causative-inchoative alternations

(2) crven-e-ti                      vs.              crven-i-ti              [SC]  
red-TH-INF                                      red-TH-INF  
'redden (inch.)'                                      'redden (caus.)'

- perfective-imperfective alternations

(3) bros-a-t'                      vs.              bros-i-t'              [Russian]  
throw-TH-INF                                      throw-TH-INF  
'throw (Impf.)'                                      'throw (Pf.)'

# Significance of minimal pairs

- Kagan 2016: 33: lexical prefixes combine with the perfective stem (5a:4a), superlexical prefixes with the imperfective stem (5b:4b)

(4) a.	bros-i-t'	b.	bros-a-t'
	toss-TH-INF		toss-TH-INF
	'toss (prf)'		'toss (impf)'
(5) a.	na-bros-i-t'	b.	na-bros-a-t'
	<i>na</i> -toss		<i>na</i> -toss
	'toss on'		'toss a lot of'

# Method

- corpus based study
- database of SC verbs (Arsenijević et al. 2021)
- comparing two themes, *i:i* and *a:a* for:
  - 1) semantic properties in minimal pairs (same base)
  - 2) correlations with non-event-denoting bases
  - 3) correlations with grammatical aspect and its suffixes
  - 4) the capacity to derive nouns

# Measured classes

- **bare root verbs:** verbs without prefixes and suffixes, only Root+Theme, e.g. *pis-a-ti* (write-Th-Inf)
- **Root-Th combinations:** unique Root-Th combinations (suffixes excluded), e.g. *pis-a-ti* (write-Th-Inf), *na-pis-a-ti* (on-write-Th-Inf), *u-pis-a-ti* (in-write-Th-Inf), etc. count as one Root-Th combination (different because some Root-Theme combinations do not license bare root verbs)

# Themes in suffixless verbs

Themes	Simplex verbs	Unique (Pref)+Root+Theme
/, e	38	61
/, ne	12	30
<b>a, a</b>	<b>206</b>	<b>303</b>
a, e	4	4
a, i	18	22
a, je	61	96
e, e	3	10
e, i	27	41
<b>i, i</b>	<b>312</b>	<b>590</b>

*i:i* and *a:a* in minimal pairs

# Our prediction

- we predict that *i:i* variants will correlate with bounded quantities (directed, singular, telic, perfective)
- ... and *a:a* variants, as the elsewhere option, with unbounded ones (undirected, plural, atelic, imperfective)

# *i:i* and *a:a* in minimal pairs in SC

- 57 roots occur with both *a:a* and *i:i* themes
- 16 pairs derive verbs with as well as without prefixes
- 12 pairs where neither stem exists without a prefix
- 14 cases where the *i:i* stem does not exist without a prefix
- 15 cases where the *a:a stem* does not exist without a prefix

# Bare root verbs

- the *i:i* verb by default denotes a singular eventuality, typically directed motion or other directed change, perfective in 38% cases (6/16)
- the *a:a* verb is a pluractional description, typically denoting a multidirectional or non-monotonic change, always imperfective (16/16)

(6) a. bac-i-ti	b. bac-a-ti	c. voz-i-ti	d. voz-a-ti
root-TH-INF	root-TH-INF	root-TH-INF	root-TH-INF
'throw (prf)'	'throw (impf)'	'drive (impf, sg)'	'drive (impf, pl)'

# Where both stems only occur prefixed

- the *i:i* verb is always perfective, as in (7a, 8a) (12/12)
- the *a:a* verb is always imperfective, as in (7b, 8b) (12/12)

(7)	a. *(s)-prem-i-ti PREF-root-TH-INF 'prepare (prf)'	b. *(s)-prem-a-ti PREF-root-TH-INF 'prepare (impf)'
(8)	a. *(s)-klop-i-ti PREF-root-TH-INF 'assemble (impf)'	b. *(s)-klap-a-ti PREF-root-TH-INF 'assemble (impf)'

# Where only the *i:i* stem must be prefixed

- the *i:i* variant is always perfective and the prefix is lexical, as in (9a) (14/14)
- the *a:a* counterpart has the respective secondary imperfective interpretation as in (9b), and may only take superlexical prefixes, see (10) (14/14)

(9) a. \*(u)-hvat-i-ti

PREF-root-TH-INF

'catch (prf)'

b. hvat-a-ti

PREF-root-TH-INF

'catch (impf)'

(10) na-hvat-a-ti

PREF-root-TH-INF

'catch a lot / all (prf)'

# Where only the *a:a* stem must be prefixed

- both are imperfective (15/15)
- for each of the prefixed *a:a* verbs (11c), an *i:i* variant carrying the same prefix also exists, as in (11b), and they stand in the relation **secondary imperfective : its perfective base**, as additionally confirmed by the Ablaut in all the *a:a* variants (15/15)
- *i:i* stems derive primary imperfectives with a singular (typically incremental and/or change-of-state) interpretation, as in (11a)

(11)	a.	lom-i-ti	b.	s-lom-i-ti
		root-TH-INF		PREF-root-TH-INF
		'break (impf)'		'break (prf)'
	c.	s-lam-a-ti		
		PREF-root-TH-INF		
		'break (impf)'		

*i:i* vs. *a:a* and  
lexical vs. superlexical  
prefixes

# Our prediction

- Di Sciullo & Slabakova (2005), Svenonius (2004b): two types of prefixes, lexical lower in the structure with a resultative interpretation and correspondence with goal PPs and superlexical higher in the structure with a quantitative interpretation
- we predict that *i:i* will correlate with lexical prefixes due to its scale feature, and *a:a* will be the elsewhere option

# *i:i* with lexical, *a:a* with superlexical prefixes

- 53/57 (93%) *i:i* stems may combine with lexical prefixes
- 21/30 (70%) of *a:a* stems only take clear superlexical prefixes, 9/30 (30%) accept unclear cases, likely to be superlexical too, as in (12)

(12) po-cep-a-ti  
    PREF-root-TH-INF  
    'tear up'

## *i:i* with lexical, *a:a* with superlexical prefixes

- prefixes that can only be lexical combine only with *i:i* stems, as in (13)
- prefixes that can be realized both as lexical and superlexical combine with *i:i* stems in the lexical and with *a:a* stems in the superlexical alteration, as in (14)

(13) a. u-hvat-i-ti  
in-catch-TH-INF  
'catch (in)'

b. \*u-hvat-a-ti  
in-catch-TH-INF

(14) a. na-bac-i-ti  
on-toss-TH-INF  
'toss on'

b. na-bac-a-ti  
on-toss-TH-INF  
'toss a lot'

# Verbalizing properties and individuals

# Enforcing event interpretation

- traditional deadjectival and denominal verbs, except that in DM the status of deadjectival and denominal root verbs is controversial
- all these verbs belong in two classes, those meaning *to become (more) [base]-like*, as in *to straighten* or *to darken*, and those meaning *to act or be in a way associated with [base]*, as in *to shy* or *to wild*.
- full parallel with gradable vs. relational denominal adjectives  $\Rightarrow$  the base generally may contribute the scale (gradable property, incremental dimension) or be an argument/adjunct
- predicts  $i:i$  = incremental,  $a:a$  = relational

# Properties

- (Prefix) + Base denoting a property + Theme (traditional deadjectivals)
- 321 examples: 28 *a:a* stems (15) and 293 *i:i* stems (16)

(15) brz-a-ti  
fast-TH-INF  
'do in a rushing way'

(16) jeftin-i-ti  
cheap-TH-INF  
'become cheap(er)'

- *i:i* verbs mean *to become more* [base]-like
- only about 1/3 of the *a:a* verbs have this meaning

# Individuals

- (Prefix) + Base denoting an individual + Theme (traditional denominals)
- 628 verbs: 160 *a:a* stems (17) and 468 *i:i* stems (18)

(17) kart-a-ti  
card-TH-INF  
'play cards'

(18) mast-i-ti  
grease-TH-INF  
'grease'

- *i:i* verbs mean *to become more* [base]-like
- only about 1/3 of the *a:a* verbs have this meaning

# Grammatical aspect

# Our prediction

- as already elaborated, we predict that due to its [scale] feature, *i:i* will have a tendency for perfectivity, and *a:a* for biaspectual and imperfective interpretations (which Arsenijević 2018 argues to be the same)

# Bare root verbs: perfectives

Th	Sim_total	Sim_Perf	% (/ Sim_total)
/, e	38	2	5%
/, ne	12	12	100%
<b>a, a</b>	<b>206</b>	<b>2</b>	<b>1%</b>
a, e	4	0	0%
a, i	18	0	0%
a, je	61	0	0%
e, e	3	0	0%
e, i	27	0	0%
<b>i, i</b>	<b>312</b>	<b>29</b>	<b>9%</b>

# In perspective

- only the semelfactive */:ne* class has a higher proportion of perfectives
- from another perspective: 29 out of the aggregate of 45 bare root perfectives in SC, i.e. almost 2/3, are i:i verbs

# Suffixes

- SC verbal suffixes are all either imperfective or biaspectual, with the exception of the perfective *-nu*, which has been argued to be a thematic vowel instead (e.g. Svenonius 2004a, Jabłońska 2004)
- verbal suffixes select own themes
- it therefore makes sense to look at the theme selection of verbal suffixes

# Suffixes taking the *a:a* theme

- the biaspectual loan-verb adaptation suffix *-ir*: 23% (399/1710 *a:a* verbs in our base)

(19) *domin-ir-a-ti* 'dominate'

- the secondary imperfective suffix *-av*: 15% (254/1710)

(20) *pre-trč-av-a-ti* < *pre-trč-a-ti* 'run over'  
      PREF-run-SUFF-TH-INF    PREF-run-TH-INF

- most other secondary imperfectivizing suffixes: *-j* (*i:i+a:a?*), *-k*, *-v*, *-ev*: 21% (362/1710)

(21) *vrat+j+a-ti* < *vrat-i-ti* 'return'  
      return-j-TH-INF    return-TH-INF

# *a:a* as an (apparent) imperfectivizer

- imperfective members of aspectual pairs distinguished by the theme vowel (including those with the Ablaut): 17% (291/1710), 31% of roots taking *a:a* (94/303)

(22) *a:a* vs. */:ne*

pad-a-ti	:	pad-0-ti (= pasti)
fall-TH-INF		fall-TH-INF
'fall (impf)'		'fall (prf)'

(23) *a:a* vs. *nu:ne*

cim-a-ti	:	cim-nu-ti
lug-TH-INF		lug-TH-INF
'lug (impf)'		'lug (prf)'

# *i:i* as an (apparent) imperfectivizer

•the only cases where *i:i* 'imperfectivizes' are with the 3 roots: *ved/vod*, *ved/voz* and *ne/nos*, in opposition with the */:e* theme, and with the Ablaut, as in (24-25)

- |      |   |  |
|------|---|--|
| (24) | a. do-ved-/-sti<br>PREF-lead-TH-INF<br>'lead to (perf)' | b. do-vod-i-ti<br>PREF-lead-TH-INF<br>'lead to (imperf)'   |
| (25) | a. do-ne-/-ti<br>PREF-bring-TH-INF<br>'carry to (perf)' | b. do-nos-i-ti<br>PREF-bring-TH-INF<br>'carry to (imperf)' |

•2% of all *i:i* verbs (35/1606), 0.5% of roots taking *i:i* (3/590)

# Triple competition, predicted effects

- these roots build verbs with three themes - next to /:e and *i:i*, they also take the *a:a* theme
- /:e versions occur only prefixed and only in perfectives
- *i:i* variants are directed-motion imperfectives, may be prefixed or not
- *a:a* yields undirected-motion imperfectives unable to take (lexical) prefixes

(26) a. \*(do)-ves-/-ti    b. (do)-vod-i-ti    c. (\*do)-vod-a-ti  
to-lead-TH-INF    to-lead-TH-INF    to-lead-TH-INF  
'lead to (prf)'    'lead (to) (dir!)'    'lead (ipf, undir)'

- is the root the context for theme insertion or the theme for root allomorphy?

# Deverbal nouns

# Our prediction

- Svenonius 2004a: deverbal root event-nouns tend to correlate with resultativity
  - Svenonius 2004b: only verbs with lexical prefixes derive deverbal root event-nouns
  - Arsenijević 2020: imperfective verbs productively and systematically derive event nouns in *-nje*, perfective verbs take various suffixes
- all the rest equal, *i:i* verbs, being more perfective, telic and resultative than their *a:a* minimal pairs, will be more likely to derive deverbal nouns

# Deverbal event-nouns

- **-ak**

do-laz-i-ti  
PREF-root-TH-INF  
'arrive'

do-laz-ak  
PREF-root-AK  
'arrival'

od-rez-a-ti  
PREF-root-TH-INF  
'slice off'

od-rez-ak ()  
PREF-root-AK  
'slice'

- **-aj**

pro-maš-i-ti  
PREF-root-TH-INF  
'mishit'

pro-maš-aj  
PREF-ROOT-AJ  
'miss'

od-kuc-a-ti  
PREF-root-TH-INF  
'type down'

od-kuc-aj  
PREF-ROOT-AJ  
'beat'

# Deverbal event-nouns

- **-ba**

služ-i-ti

root-TH-INF

'serve'

u-d-a-ti

PREF-root-TH-INF

'marry'

služ-ba

root-BA

'service'

u-d-a-t-ba

PREF-root-Th-Inf-BA

'marriage'

- **-nja**

traž-i-ti

root-TH-INF

'look for'

s-prd-a-ti

PREF-root-TH-INF

'make fun of'

traž-nja

PREF-root-NJA

'demand'

s-prd-nja

PREF-root-NJA

'mockery'

# Deverbal event-nouns suffixes in S-C

- -ka

- greš-i-ti ('to make mistakes')      greš-ka ('demand')

- root-TH-INF

- root-KA

- pro-ziv-a-ti ('to call out')

- pro-ziv-ka ('roll-call')

- PREF-root-TH-INF

- PREF-root-KA

# Root-Theme combinations

(recall: Root-Th include prefixed and unprefixed unique root-theme combinations)

Th	Root-Th	ak/aj/ba/nja/ka	% (/Root-Th)
/, e	61	12	19.67%
/, ne	30	4	13.33%
<b>a, a</b>	<b>303</b>	<b>17</b>	<b>5.61%</b>
a, e	4	0	0%
a, i	22	2	9.09%
a, je	96	10	10.42%
e, e	10	0	0%
e, i	41	6	14.63%
<b>i, i</b>	<b>590</b>	<b>104</b>	<b>17.63%</b>

# Zooming into suffixes

Th	Root-Th	AK	%	AJ	%	KA	%	NJA	%	BA	%
/, e	61	10	16%	1	2%	1	2%	1	2%	1	2%
/, ne	30	3	10%	1	3%	0	0%	0	0%	0	0%
<b>a, a</b>	<b>303</b>	<b>9</b>	<b>3%</b>	<b>6</b>	<b>2%</b>	<b>3</b>	<b>1%</b>	<b>2</b>	<b>1%</b>	<b>1</b>	<b>0%</b>
a, e	4	0	0%	0	0%	0	0%	0	0%	0	0%
a, i	22	1	5%	1	5%	0	0%	0	0%	0	0%
a, je	96	2	2%	7	7%	3	3%	0	0%	0	0%
e, e	10	0	0%	0	0%	0	0%	0	0%	0	0%
e, i	41	0	0%	1	2%	0	0%	5	12%	0	0%
<b>i, i</b>	<b>590</b>	<b>30</b>	<b>5%</b>	<b>32</b>	<b>5%</b>	<b>11</b>	<b>2%</b>	<b>24</b>	<b>4%</b>	<b>32</b>	<b>5%</b>

# Bare root verbs

(recall: bare root verbs are without prefixes, as prefixed verbs might have an additional nominalization structure)

- only *-ba* and *-nja* appear in at least 20 examples

Themes	Bare_root_v's	BA-nouns	NJA-nouns
/, e	38	1 (3%)	0
/, ne	12	0	0
<b>a, a</b>	<b>206</b>	<b>0</b>	<b>3 (1%)</b>
a, e	4	0	0
a, i	18	0	0
a, je	61	0	1 (2%)
e, e	3	0	0
e, i	27	0	5 (19%)
<b>i, i</b>	<b>312</b>	<b>24 (8%)</b>	<b>19 (6%)</b>

# Conclusion

- in isolation from factors such as varying prefixes or secondary imperfectivization, quantitative data show a clear contrast between *i:i* and *a:a* verbs
- as predicted by our hypothesis that in addition to the shared reference to eventualities, *i:i* verbs carry a [scale] feature, this class displays a strong tendency for singular, directed, telic and perfective interpretations
- exceptions are few and may plausibly be a result of lexicalization
- however, the variation in the instantiation of contrast, i.e. as number, directedness, lexical or grammatical aspect needs a more detailed investigation, and a well developed theory of quantity properties of the VP, which is our task for the future

**THANK YOU!**

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