

# Distributing theme vowels across roots, verbalizers, and voice in Western Armenian verbs

Peter Guekguezian and Hossep Dolatian

## 1. Introduction

Armenian is an understudied language forming its own branch within Indo-European. Like in many Indo-European languages, Armenian verbs are divided into separate conjugation classes based on the choice of one of three theme vowels. The choice of theme vowel depends on a mix of transitivity, valency, and root-conditioned arbitrariness (Dolatian & Guekguezian, prep). Focusing on Western Armenian, we catalog the set of factors which condition the choice of theme vowel.

In the infinitival, or citation form, simple regular verbs have a root, theme vowel and infinitival suffix. In §2, we show that structurally, theme vowels are ornamental morphs adjoined to little *v*. However, complications from root classes, causatives, and compounds indicate that theme vowel licensing simultaneously references roots, little *v*, and Voice. In simple verbs, the choice of theme vowel shows some correlations with transitivity in §3. These correlations are grammaticalized in equipollent verbs, whose theme vowel depends entirely on transitivity. But there enough exceptions to the transitivity correlation that root-conditioning also plays a role in the choice of theme vowels. Notably, intransitive verbs have a good chance of appearing with any of the three theme vowels.

For complex verbs in §4, multiple theme vowels can occur. Causatives condition the presence of a second theme vowel in addition to the simple verb's theme. Because these are lexical causatives, they only have one *v* and Voice and, therefore, the second theme vowel is adjoined to Voice, not *v*.

In §5, compounds complicate this picture further. If the left member of a compound is verbal, it can be either a full infinitival with a theme vowel or a verb root with no theme vowel. On the right side of the compound, bound verbal roots commonly appear without a theme vowel. Such compounds are exocentric, categorized as nouns or adjectives, and are analogous to English synthetic compounds or subordinate compounds (Scalise & Bisetto, 2009) due to their strong verbal semantics. The right-hand member has the categorizer *v* head but no theme vowel and thus cannot have further verbal structure, i.e., no verbal inflection nor verbal syntax. But, adding a theme vowel to such a compound allows it to behave as a verb both syntactically and morphologically.

A word in Western Armenian can thus have verbal semantics (little *v*) without a theme vowel, but absence of a theme vowel *blocks* a word from having further verbal structure. Thus, Voice is a necessary ingredient for the appearance of a theme vowel in the word.

## 2. Theme vowels in simple regular verbs

Simple regular verbs form three conjugation classes based on theme vowel: *-e-*, *-i-*, *-a-*; we call these E-Class, I-Class, and A-Class, respectively. The E-Class is the largest and default. The numbers below are from Boyacioglu & Dolatian (2020)'s list of 3,258 Armenian verbs, based on Boyacioglu (2010).

### (1) Conjugation classes of regular verbs

E-Class	1653 (74%)	I-Class	455 (20%)	A-Class	131 (6%)
<i>ker-e-l</i>	'to scratch'	<i>xos-i-l</i>	'to speak'	<i>gart-a-l</i>	'to read'

\* Peter Guekguezian, University of Rochester, peter.guekguezian@rochester.edu. Hossep Dolatian, Stony Brook University, hossep.dolatian@alumni.stonybrook.edu. We thank Karine Megerdumian, Nikita Bezrukov, and fellow participants at WCCFL 2021 for discussion.

In terms of morphological structure, our main question is: what determines both the presence and the identity of the theme vowel? Cross-linguistically, the literature on theme vowels suggests at least the following three options. First, theme vowels could be verbalizers and exponents of little *v* (Julien, 2015; Spyropoulos et al., 2015). Second, theme vowels could be transitivity markers and exponents of Voice (Harley, 2009, 2013). Third, theme vowels could be meaningless, ornamental morphs (Aronoff, 1994; Embick, 1998, 2015; Embick & Noyer, 2007) that are structurally adjoined to little *v* (Oltra-Massuet, 1999a,b). These options can be enriched if we allow Fusion, e.g., that a theme vowel could be a fused exponent of *v* and Voice. There is evidence supporting each of the three basic analyses. Theme vowels correlate with verbal typing and with transitivity, but are also an arbitrary choice of individual roots. We ultimately argue that theme vowels are ornamental, because they cannot be identified solely with either *v* or with Voice. However, both the appearance and choice of theme vowel depends on *v* and on Voice.

For verbalization (*v*), many roots surface as nouns or adjectives when unaffixed, i.e., without a theme vowel. When affixed with a theme vowel, these roots are verbalized and can take verbal inflection.

(2) *Theme vowels as sole verbalizers*

<i>jerk</i>	‘song’	<i>antsrev</i>	‘rain’	<i>xay</i>	‘game’
<i>jerk-e-l</i>	‘to sing’	<i>antsrev-i-l</i>	‘to rain’	<i>xay-a-l</i>	‘to play’
<i>azad</i>	‘free’	<i>nəman</i>	‘similar’	<i>kots</i>	‘closed’
<i>azad-e-l</i>	‘to free’	<i>nəman-i-l</i>	‘to resemble’	<i>kots-e-l</i>	‘to close’

For transitivity (*Voice*), it is unpredictable whether a specific root-theme combination is transitive or not. This means that the choice of vowel is ultimately arbitrary and not predictable from phonology, morphosyntax, or semantics. Generally, E-class verbs are mostly transitive while I-class & A-Class verbs are mostly intransitive (Daniel & Khurshudian, 2015). But there are many exceptions for each category. We list some transitive and intransitive verbs of each class below.<sup>1</sup>

(3) *Transitive and intransitive members of each class*

	E-Class		I-Class		A-Class	
Transitive	<i>azad-e-l</i>	‘to free’	<i>naj-i-l</i>	‘to look at’	<i>ay-a-l</i>	‘to grind’
	<i>ned-e-l</i>	‘to throw’	<i>sorv-i-l</i>	‘to learn’	<i>havad-a-l</i>	‘to believe’
Intransitive	<i>hamper-e-l</i>	‘to be patient’	<i>barg-i-l</i>	‘to lie down’	<i>bor-a-l</i>	‘to shout’
	<i>pampas-e-l</i>	‘to gossip’	<i>məs-i-l</i>	‘to feel cold’	<i>mən-a-l</i>	‘to remain’

There is a substantial number of ‘exceptional’ transitives in the I-/A-Class, and ‘exceptional’ intransitives in the E-Class. We provide a simple count of each type below from Boyacioglu & Dolatian (2020). The ‘Both’ category is for verbs that can be either transitive or intransitive.

(4) *Distribution of transitive across class*

Class	Transitivity				Total
	Intransitive	Transitive	Both		
E-Class	191 (12%)	1435 (87%)	27 (2%)		1653 (74%)
I-Class	414 (91%)	32 (7%)	9 (2%)		455 (20%)
A-Class	98 (75%)	30 (23%)	3 (2%)		131 (6%)
Total	703 (31%)	1497 (67%)	39 (2%)		2239

There are correlations between *-e-* being transitive, and *-i,a-* being intransitive. But this correlation is unidirectional. That is, if a verb is intransitive, then it is unpredictable to know what class it belongs to. It has a good chance of being E-Class (191, 27%), I-Class (414 59%) or A-Class (98, 14%)

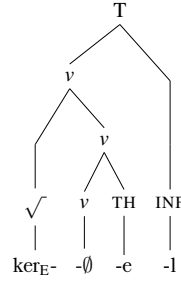
Because of this arbitrariness, we argue that theme vowels are ultimately ornamental (Karakaş et al., in press). They are adjoined to little *v* via some node-insertion process such as node sprouting (Choi & Harley, 2019). They are conditioned by class-features on roots, shown below.<sup>2</sup>

<sup>1</sup> There are sub-regularities in these exceptions. For example, it is possible that transitive I-Class verbs are mental or sensory states, such as the verbs in (3). These verbs are non-dynamic and thus semantically non-canonical transitives. But a more thorough statistical analysis is needed to confirm this.

<sup>2</sup> Alternatively, we can argue that each theme vowel is associated with a different covert exponent of little *v*, and that the combination of roots and little *v* (with themes) is done via licensing (Acquaviva, 2009). Both approaches look like notational equivalents though.

- (5) a. *Selecting theme vowels after a class marker*      b. *Structure of E-class* ker-e-l ‘to scratch’

TH → -e- / [E-CLASS]  $\frown$  v  $\frown$  -  
 -i- / [I-CLASS]  $\frown$  v  $\frown$  -  
 -a- / [A-CLASS]  $\frown$  v  $\frown$  -



For regular simple verbs, there is no evidence that little *v* and Voice are separate heads, so we treat them as bundled (Harley, 2017). For simplicity, we do not assume a markedness-based hierarchy for class features (Oltra-Massuet, 1999b; Trommer, 2008).

### 3. Equipollent verbs: Voice affects theme

The previous section showed that the link between theme and transitivity is ultimately arbitrarily, despite some correlations. But the correlations have been grammaticalized in a small subset of roots that are equipollent (Haspelmath, 1993; Donabédian, 1997). These roots surface with *-e-* when they are transitive, but *-i-* when they are intransitive. They constitute 90 roots in the (Boyacioglu & Dolatian, 2020) lexicon (= 180 verbs, 8% of total). We list some common equipollent verbs below.

(6) *Equipollent verbs in Western Armenian*

<i>Transitive</i>		<i>Intransitive</i>		<i>Transitive</i>		<i>Intransitive</i>	
<i>jep-e-l</i>	‘to cook X’	<i>jep-i-l</i>	‘to be cooked’	<i>ajr-e-l</i>	‘to burn X’	<i>ajr-i-l</i>	‘to be burned’
<i>mar-e-l</i>	‘to extinguish X’	<i>mar-i-l</i>	‘to be extinguished’	<i>godr-e-l</i>	‘to break X’	<i>godr-i-l</i>	‘to be broken’
<i>gədr-e-l</i>	‘to cut X’	<i>gədr-i-l</i>	‘to be cut’	<i>maʃ-e-l</i>	‘to wear out X’	<i>maʃ-i-l</i>	‘to be worn out’
<i>ʃarʒ-e-l</i>	‘to move X’	<i>ʃarʒ-i-l</i>	‘to be moved’	<i>var-e-l</i>	‘to lead X’	<i>var-i-l</i>	‘to be lead’
<i>var-e-l</i>	‘to light up X’	<i>var-i-l</i>	‘to be lighted’	<i>tap-e-l</i>	‘to shed X’	<i>tap-i-l</i>	‘to be shed’
<i>gankn-e-l</i>	‘to raise X’	<i>gankn-i-l</i>	‘to rise’	<i>ḏzər-e-l</i>	‘to bend X’	<i>ḏzər-i-l</i>	‘to be bent’

For these equipollent verbs, the simplest analysis is that the roots are under-specified for class features, i.e., they have no choice of theme vowel. We argue that default rules referencing *v*/Voice insert the *-e-* theme vowel for transitives and *-i-* for intransitives.

(7) *Default insertion rules for equipollent verbs*

∅ → E-CLASS /  $\sqrt{\text{---}} \frown$  v/Voice[+TRNS]  
 I-CLASS /  $\sqrt{\text{---}} \frown$  v/Voice[-TRNS]

With the above rule, the transitivity features on Voice determine the theme vowel (which we assume Voice is fused with *v*, though nothing hinges on this).<sup>3</sup> But even equipollent verbs have exceptions: different combinations of *-e-*, *-i-*, *-a-* may be used for valency. These include using both *-e-* and *-i-* for intransitives, using both *-i-* and *-a-* for intransitives, or using both *-a-* and *-e-* for transitives. There are likewise some roots that use *-e-* and *-a-* for a voicing contrast, or all three types of themes for a voicing contrast.

(8) *Variations in equipollency*

Intrans. <i>-e-</i> , <i>-i-</i>	<i>kajt-e-l</i>	‘to slip (intr.)’	<i>kajt-i-l</i>	‘to slip (intr.)’
Intrans. <i>-i-</i> , <i>-a-</i>	<i>sarsər-i-l</i>	‘to shudder (intr.)’	<i>sarsər-a-l</i>	‘to shudder (intr.)’
Trans. <i>-a-</i> , <i>-e-</i>	<i>xet-a-l</i>	‘to look at enviously (tr.)’	<i>xet-e-l</i>	‘to look at enviously (tr.)’
Contrast <i>-a-</i> , <i>-e-</i>	<i>ḏzəx-a-l</i>	‘to emit smoke (intr.)’	<i>ḏzəx-e-l</i>	‘to smoke (tr.)’
Contrast all 3	<i>xələrd-a-l</i>	‘to move (intr.)’	<i>xələrd-e-l</i>	‘to move (tr.)’
	<i>xələrd-i-l</i>	‘to be moved (intr.)’		

<sup>3</sup> For illustration, we treat transitivity as a binary feature. But we can equivalently treat it as privative, i.e., the presence of Voice makes a verb transitive, while the absence of Voice makes it intransitive.

For these exceptional equipollent verbs, the root must provide theme vowel information for the different transitivity settings (if any). We can model this either by insertion rules that reference the root as well as *v* and Voice, or by the root's theme vowel preference being sensitive to the *v*/Voice heads that it combines with.

#### 4. Causatives: Two themes but one Voice

Armenian has two productive ways for causative formation, one of which is morphological.<sup>4</sup> A simple verb can be causativized by adding the causative suffix *-tsən-* after the root's theme vowel. The causative then takes its own *-e-* theme vowel.

##### (9) Causative formation from regular verbs

	E-Class <i>ker-e-l</i> 'to scratch'	I-Class <i>xos-i-l</i> 'to speak'	A-Class <i>gart-a-l</i> 'to read'	√-TH-INF
Causative:	<i>ker-e-tsən-e-l</i> 'to make scratch'	<i>xos-e-tsən-e-l</i> 'to make speak'	<i>gart-a-tsən-e-l</i> 'to make read'	√-TH-CAUS-TH-INF

The I-Class changes its *-i-* theme to *-e-* in causative formation; we set this issue aside, since it is not specific to causatives. The base of causativization is often, but not always, an intransitive verb (Daniel & Khurshudian, 2015:487). There are some causative verbs which are not derived from an existing word (Daniel & Khurshudian, 2015:491-2). Certain semantic classes of verbs are more likely to undergo causativization than others (Megerdooonian, 2005:16).

What matters is that we see two theme vowels in causatives, one on the root and one on the causative suffix. These leads to the following questions: 1) Why does the causative select its own *-e-* theme vowel? 2) Why does the root keep its own theme vowel? And, 3) what is the morphological structure of causatives? We answer these below.

##### 4.1. Theme vowels in causatives

For the first question, the answer comes from diachrony (Bardakjian & Thomson 1977:244; Margaryan 1997:124; Kortlandt 1999). The modern causative construction √-TH-*tsən-e-l* is derived from a compound construction in Classical Armenian: *X-a-ts<sup>h</sup>ut<sup>h</sup>an-e-l*. The second member of the compound is a verb with the *-e-* theme vowel in Classical Armenian: *ts<sup>h</sup>ut<sup>h</sup>an-e-l* 'to show'. Diachronically, this construction became grammaticalized into the modern causative formation, such that the second member reduced from a full-fledged verb into a theme-selecting suffix *tsən-e-*. Synchronically, the causative suffix retains this theme vowel as its own.

The second question ties into the first. The diachronic origins of the causative construction led to roots keeping their theme vowels. In general, when the causative suffix is added onto a simple verb, that verb preserves its original theme vowel, with three exceptions. The first exception is that *-i-* theme vowels change to *-e-*. The second exception is denominal or deadjectival causatives. When the causative suffix is added onto a non-verbal base, the pre-CAUS vowel is usually *-a-*, sometimes *-e-*.

##### (10) Causatives derived from adjectives and nouns

	Base	Causative
Adjective	<i>hivant</i> 'sick' <i>aroxtj</i> 'healthy'	<i>hivant-a-tsən-e-l</i> 'to make sick' <i>aroxtj-a-tsən-e-l</i> 'to heal'
Noun	<i>badger</i> 'picture' <i>vertj</i> 'end'	<i>badger-a-tsən-e-l</i> 'to portray' <i>vertj-a-tsən-e-l</i> 'to finish'

In this case, we argue that the pre-CAUS vowel is actually the linking vowel *-a-*, a meaningless morph used to form compounds: *tas-a-kirk* 'lesson-book' (Donabédian, 2004; Dolatian, 2021). Diachronically, the causative is descended from a compound construction, so this analysis has some grounding.

<sup>4</sup> There is a syntactic way to form analytical causatives, using the word *d-a-l* 'to give' (cf. Eastern Armenian Megerdooonian, 2005).

The third exception comes from syncope. Some causatives lack a pre-CAUS vowel because of a diachronic process of syncope which idiosyncratically deleted some instances of medial unstressed vowels. The syncopated versions are more common in Western Armenian, while the non-syncopated versions are more common in Eastern Armenian (Dolatian, 2020:38).<sup>5</sup>

(11) *Syncope of pre-causative theme vowel*

Base		Causative		
<i>xay-a-l</i>	‘to play’	<i>xay-a-tsən-e-l</i>	<i>xay-tsən-e-l</i>	‘to make to play’
<i>vax</i>	‘fear’	<i>vax-e-tsən-e-l</i>	<i>vax-tsən-e-l</i>	‘to scare someone’

#### 4.2. Structure of causatives

Synchronically, the data leads us to the third question of the verb’s morphological structure. Hypothetically, the presence of two overt theme vowels in causatives could be connected to the existence of two separate events, each with their own layer of little *v*/Voice. But this is problematic because Megerdooian (2005) provides evidence that causatives are semantically a single event (monoclausal), i.e., that they are lexical or synthetic causatives. Megerdooian (2005, 2009) bases her argument on Eastern Armenian. We find that her evidence and data match those of Western Armenian. For example, the simple I-Class verb *sorv-i-l* ‘to study’ is transitive. When causativized, it becomes a ditransitive verb *sorv-e-tsən-e-l* that means ‘to teach’. The indirect object receives dative marking, but it has no agency.

- (12) *tun ankleren gə-sorv-i-s*  
you.NOM English INDC-study-TH-PRES2SG  
‘You study English.’

- (13) *jes kezi ankleren gə-sorv-e-tsən-e-m*  
I.NOM you.DAT English INDC-study-TH-CAUS-TH-PRES1SG  
‘I teach you English.’

If an adverb like ‘happily’ is added anywhere in the sentence, it modifies the action of the agent (subject) of the sentence, not of the indirect object. In brief, the causee is not associated with its own event of learning. It is merely one of the arguments of a monoclausal lexical or synthetic causative. The verb has only one (covert) Voice head.

- (14) *jes (uraxoren) kezi (uraxoren) ankleren (uraxoren) gə-sorv-e-tsən-e-m*  
I (happily) you.DAT (happily) English (happily) INDC-study-TH-CAUS-TH-PRES1SG  
‘I happily teach you English.’

Structurally, we argue that these verb-derived causatives consist of only one layer of little *v*/Voice. The first layer includes the root, a covert *v*, and the adjunct theme vowel. The second layer consists of the causative suffix *-tsən-* as the exponent of a special Voice head (or CAUS), with its theme vowel *-e-* adjoined. Furthermore, there is semantic and syntactic evidence that these causative verbs consist of only a single Voice head over the entire verb. Therefore, the second theme vowel must be be adjoined to Voice, while the first theme vowel must be adjoined to little *v*. We show below the structure of a verb-derived and a noun-derived causative. The latter has an inner little *n* and the pre-CAUS vowel is a meaningless linking vowel, another empty morph.<sup>6</sup> The denominal causative must have an intermediate covert little *v* layer, potentially containing the meaning of an inchoative (Megerdooian, 2005).

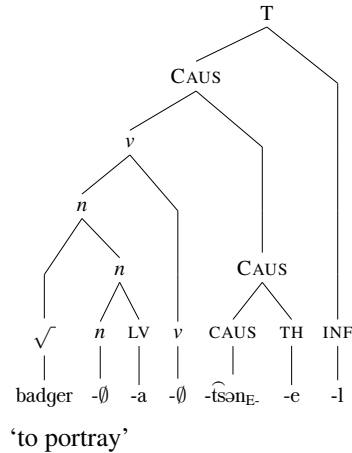
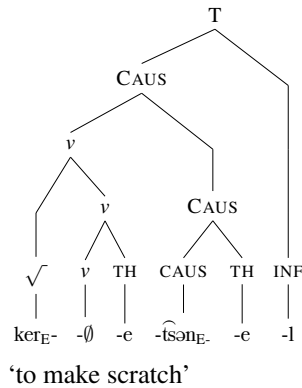
<sup>5</sup> Impressionistically, most syncopated causatives are derived from non-verbs. This tendency might be due to the fact that the pre-causative vowel for these verbs is the linking vowel *-a-, -e-* and not a theme vowel. In Armenian compounds, the meaningless linking vowel is a common target of diachronic syncope (Ėloyan, 1972). Instead, theme vowels carry the functional load of exponing the verbalizer in simple verbs

<sup>6</sup> For space we cannot discuss passives. For a simple regular verb like *ker-e-l* ‘to scratch’. The passive is formed by deleting the root’s theme vowel, adding the passive suffix *-v-*, and then adding a theme vowel *-i-*: *ker-v-i-l* ‘to be scratched’. There is semantic and phonological evidence that passives, like causatives, have only one layer of little *v* and Voice, and that the passive suffix embeds *v*. Briefly, passive phonology and semantics is compositionally computed over active verbs.

(15) *Structure of causatives*

Verb-derived causative from *ker-e-l* ‘to scratch’

Noun-derived causative from *badger* ‘picture’



## 5. Compounds: Zero or one theme

The last data set comes from compounding, and it is the most complicated. A compound in Armenian is formed by combining two words with the linking vowel *-a-*. For endocentric compounds, the head is the second member (Dolatian, 2020, 2021). The first member can be either a non-verbal or a verbal entity. For the latter case, this verbal entity can be a full infinitival form (*V<sub>inf</sub>*) or a bound root (*V<sub>root</sub>*). Even when the first member is a bound root, we argue it has a little *v* categorizer because the meaning of the compound involves a verbal action.

(16) *Compounds where first member is a verb or not*

N-a-N		<i>V<sub>inf</sub></i> -a-N		<i>V<sub>root</sub></i> -a-N	
don + <i>d̂zar</i>	‘holiday’ + ‘tree’	var-e-l + <i>pajd</i>	‘to kindle’ + ‘wood’	aʃxad-i-l + <i>seyan</i>	‘to work’ + ‘desk’
don-a-d̂zar	‘Christmas-tree’	ver-e-l-a-pajd	‘firewood’	aʃxad-a-seyan	‘workdesk’
			(wood for kindling)		(desk for working)

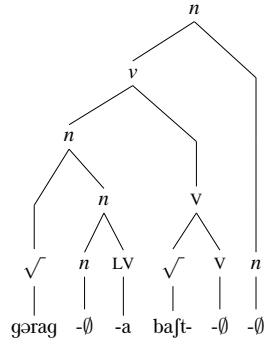
The above paradigm shows that the first member can be either a full verb (with little *v*, theme, and infinitival) or just a bound root. As for the second member, it again can be a non-verbal item as in the above examples. But the second member can also be a bound verbal root, as shown below. The non-head can act as a direct object argument, a subject argument (rarely), or even an adverb modifier.

(17) *Compounds where second member is a verb root*

Obj-a- <i>V<sub>root</sub></i>		Subj-a- <i>V<sub>root</sub></i>		Adv-a- <i>V<sub>root</sub></i>	
gərag + <i>baft-e-l</i>	‘fire’ + ‘to worship’	kaʃl + <i>haladz-e-l</i>	‘wolf’ + ‘to persecute’	arak + <i>farʒ-i-l</i>	‘fast’ + ‘to move’
gərag-a-baft	‘fire-worshipper’	kaʃl-a-haladz	‘chased by wolves’	arak-a-farʒ	‘fast-moving’

The above compounds are exocentric compounds, similar to English synthetic compounds like ‘fire-worshipper’, such that the second member has verbal semantics. But unlike English, the second members here lack any suffixes or even theme vowels. For the basic cases of *X+V<sub>root</sub>* compounds, we assume they have the simple structure below, whereby the verb root and its argument/adjunct are under the scope of a covert *a* or *n* head. The structure renders these compounds as exocentric (Steddy, 2019; Dolatian, 2021).

- (18) *Structure of a noun+V<sub>root</sub> compound: gərag-a-baft* ‘fire-worshipper’



The second members above must have a (covert) little *v* that licences the verbal semantics of the compound. But this structure is not enough either to license a theme vowel. The compound can't take verb inflection or syntactically act as a verb. To illustrate, in the following compounds, the second member is a theme-less root. We can create a verb from these compounds by adding a theme vowel.<sup>7</sup>

- (19) *Compounds where second member can be a full verb or not*

X + V	ned + har-e-l 'arrow' + 'to churn'	sahman + pag-e-l 'border' + 'to enclose'	dey + pox-e-l 'place' + 'to change'
X-a-√	ned-a-har 'archer'	sahmann-a-pag 'confined'	dey-a-pox 'displaced'
X-a-√-TH-INF	ned-a-har-e-l 'to throw arrows'	sahmann-a-pag-e-l 'to confine'	dey-a-pox-e-l 'to displace'

We argue that the correlation between the presence of the theme vowel and of verbal morphology/syntax can be captured by making the theme vowel depend on Voice in addition to the root and *v*. In the compounds above where the second member lacks a theme vowel, there is no Voice, no external argument, and no possibility to add Asp, T or Agr above the structure. In the compounds where the second member has a theme vowel, it has Voice and thus external arguments, and Asp, T and Agr can embed the structure. In addition to equipollent verbs and causatives, this shows that Voice – though crucially, not *only* Voice – is needed to determine the theme vowel's appearance.

## 6. Conclusion

This paper documented the morphosyntactic conditions on theme vowels in Western Armenian. These conditions include the presence of verbal semantics (little *v*), correlations with transitivity and the presence of argument structure (Voice), and pure arbitrariness (roots). Transitivity of different verbs showed that Voice determined the theme vowel in some instances and roots did so in others. (Lexical) causatives showed that theme vowels can be adjoined both to *v* and to Voice. Compounds showed that verbal semantics (little *v*) are possible without theme vowels, but that verbal argument and syntactic structure (Voice) require theme vowels.

## References

- Ackema, Peter & Ad Neeleman (2004). *Beyond morphology: Interface conditions on word formation*. No. 6 in Oxford Studies in Theoretical Linguistics, Oxford University Press, Oxford.
- Acquaviva, Paolo (2009). Roots and lexicality in distributed morphology. Galani, Alexandra, Daniel Redinger & Norman Yeo (eds.), *York-Essex Morphology Meeting 5: Special Issue of York Working Papers in Linguistics*, University of York, York, p. 1–21.

<sup>7</sup> For the X+V<sub>inf</sub> verbal compounds, the structural position of the theme vowel is unclear (cf. Ackema & Neeleman, 2004). Either the compound consists of two units, such that the second member includes the theme vowel and infinitival: [X]-a-[√-TH-INF], analogous to analyses of English synthetic compounds as [*truck*] [*drive-er*]. Or, the theme vowel has scope over both members: [X-a-√]-TH-INF, analogous to English [*truck drive*]-er. We speculate that the second structure is more accurate, but we leave it to future work.

- Aronoff, Mark (1994). *Morphology by itself: Stems and inflectional classes*. No. 22 in Linguistic Inquiry Monographs, MIT press, London/Cambridge.
- Bardakjian, Kevork B & Robert W Thomson (1977). *A Textbook of Modern Western Armenian*. Caravan Books, Delmar: NY.
- Boyacioglu, Nisan (2010). *Hay-Pay: Les Verbs de l'arménien occidental*. L'Asiatheque, Paris.
- Boyacioglu, Nisan & Hossep Dolatian (2020). Armenian Verbs: Paradigms and verb lists of Western Armenian conjugation classes. <https://doi.org/10.5281/zenodo.4397423>.
- Choi, Jaehoon & Heidi Harley (2019). Locality domains and morphological rules. *Natural Language & Linguistic Theory* 37:4, 1319–1365.
- Daniel, Michael & Victoria Khurshudian (2015). Valency classes in Eastern Armenian. Malchukov, Andrej & Bernard Comrie (eds.), *Valency Classes in the World's Languages*, De Gruyter Mouton, Berlin & Boston, 483–540.
- Dolatian, Hossep (2020). *Computational locality of cyclic phonology in Armenian*. Ph.D. thesis, Stony Brook University.
- Dolatian, Hossep (2021). The role of heads and cyclicity in bracketing paradoxes in Armenian compounds. *Morphology* 31:1, p. 1–43.
- Dolatian, Hossep & Peter Ara Guekguezian (prep). Relativized locality: Phases and tiers in long-distance allomorphy in Armenian. Unpublished manuscript.
- Donabédian, Anaïd (1997). Neutralisation de la diathèse des participes en -ac de l'arménien moderne occidental. *Studi italiana di linguistica teorica ed applicata* 26:2, 327–339.
- Donabédian, Anaïd (2004). Arménien. Arnaud, Pierre J.L. (ed.), *Le nom composé: Données sur seize langues*, Presses Universitaires de Lyon, Lyon, 3–20.
- Ēloyan, Seda Armenaki (1972). Hodakapov ew anhodakap bardowt'yownnerë žamanakakic' hayerenowm [The compound words with and without copulative particles in modern Armenian]. *Lraber Hasarakakan Gitowt'yownneri* 7, 77–85.
- Embick, David (1998). Voice systems and the syntax/morphology interface. Harley, Heidi (ed.), *MITWPL 32: Papers from the UPenn/MIT Roundtable on Argument Structure and Aspect*, MITWPL, Department of Linguistics and Philosophy, MIT, Cambridge, MA, p. 41–72.
- Embick, David (2015). *The morpheme: A theoretical introduction*, vol. 31. Walter de Gruyter, Boston and Berlin.
- Embick, David & Rolf Noyer (2007). Distributed morphology and the syntax/morphology interface. Ramchand, Gillian & Charles Reiss (eds.), *The Oxford handbook of linguistic interfaces*, Oxford University Press, Oxford, vol. 289, p. 289–324.
- Harley, Heidi (2009). The morphology of nominalizations and the syntax of vP. Giannakidou, Anastasia & Monika Rathert (eds.), *Quantification, definiteness and nominalization*, Oxford University Press, Oxford, 320–342.
- Harley, Heidi (2013). External arguments and the mirror principle: On the distinctness of voice and v. *Lingua* 125, 34–57.
- Harley, Heidi (2017). The “bundling” hypothesis and the disparate functions of little v. D'Alessandro, Roberta, Irene Franco & Ángel Gallego (eds.), *The verbal domain*, Oxford University Press, Oxford, 3–28.
- Haspelmath, Martin (1993). More on the typology of inchoative/causative verb alternations. Comrie, Bernard & Maria Polinsky (eds.), *Causatives and transitivity*, John Benjamins, Amsterdam, vol. 23, 87–121.
- Julien, Marit (2015). Theme vowels in North Sámi: Spanning and maximal expression. *Lingua* 164, 1–24.
- Karakaş, Ayla, Hossep Dolatian & Peter Ara Guekguezian (in press). Agglutination underlies superficial fusion in Western Armenian verbal inflection. *Proceedings of the Sixth Workshop on Turkic and Languages in Contact with Turkic (TU+6)*.
- Kortlandt, Frederik (1999). The Armenian causative. *Annual of Armenian linguistics* 20, 47–49.
- Margaryan, Alek'sandr Simoni (1997). *Žamanakakic' hayoc' lezow: Hnčyownabanowt'yown [Contemporary Armenian language: Phonology]*. Yerevani Petakan Hamalsarani Hratarakčowt'yown, Yerevan.
- Megerdooian, Karine (2005). Transitivity alternation verbs and causative constructions in Eastern Armenian. *Annual of Armenian linguistics* 24, 13–33.
- Megerdooian, Karine (2009). *Beyond words and phrases: A unified theory of predicate composition*. VDM, Verlag Dr. Müller.
- Oltra-Massuet, Isabel (1999a). On the constituent structure of Catalan verbs. Arregi, Karlos, Vivian Lin, Cornelia Krause & Benjamin Bruening (eds.), *MIT Working Papers in Linguistics*, Department of Linguistics, Massachusetts Institute of Technology, Cambridge, MA, vol. 33, 279–322.
- Oltra-Massuet, Isabel (1999b). *On the notion of theme vowel: A new approach to Catalan verbal morphology*. Master's thesis, Massachusetts Institute of Technology.
- Scalise, Sergio & Antonietta Bisetto (2009). The classification of compounds. Lieber, Rochelle & Pavol Štekauer (eds.), *The Oxford handbook of compounding*, Oxford University Press, Oxford, p. 34–53.
- Spyropoulos, Vassilios, Anthi Revithiadou & Phoevos Panagiotidis (2015). Verbalizers leave marks: evidence from Greek. *Morphology* 25:3, 299–325.
- Steddy, Sam (2019). Compounds, composability, and morphological idiosyncrasy. *The Linguistic Review* 36:3, 453–483.
- Trommer, Jochen (2008). A feature-geometric approach to Amharic verb classes. Bachrach, Asaf & Andrew Nevins (eds.), *Inflectional identity*, Oxford University Press, Oxford.