

# Armenian theme vowels: Allomorphy conditioned by output prosody and across words in periphrasis

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## Abstract

Cross-linguistically, it is difficult to tease apart allomorphy from readjustment rules. But regardless, both tend to respect locality and are sensitive to information that is present in the input, not the output. We document a counter-example to these tendencies from Western Armenian. The Western Armenian theme vowel *-i-* changes to the theme vowel *-e-* due to two types of triggers. The first type of trigger is phonological: the change happens when the theme vowel is unstressed in the output. The second type of trigger is morphological: the change happens when the verb is in the past tense. The +PAST morpheme can be either in the verb (adjacent to the theme vowel) or on a separate auxiliary in periphrasis. This amounts to a case of long-distance allomorphy that is conditioned across words, even in suspended affixation. Alternative analyses with ellipsis are not tenable.

## 1 Introduction

Cross-linguistically, the choice of exponent for a morpheme (allomorphy) tends to depend on two types of information: local morphophonological context, and morphophonological information that is present in the input. The issue of locality means that the morphological or phonological trigger must be within a finite bound from the target allomorph (Siegel 1978; Carstairs 1987). The issue of input-based information means that the choice of allomorphy cannot be motivated by the phonological output of allomorphy (Paster 2006; Embick 2010). In this paper, we present a case of allomorphy from Armenian that violates both tendencies.

The main goal of this paper is to document these generalizations. In brief, the Armenian theme vowel *-i-* undergoes an *i-to-e* transformation that is conditioned by output prosody and by the presence of long-distance morphological triggers: the +PAST morpheme. As theoretical tools, we

illustrate the phonological or prosodic triggers with parallelist OT constraints (Prince and Smolensky 2004). The morphological trigger is a type of readjustment rule (Halle and Marantz 1993), such that a morphological rule replaces an entire exponent (the theme *-i-*) with another one exponent (the theme *-e-*) when +PAST is present.

Armenian is an Indo-European language that forms its own sub-branch. There are two standard dialects: Western and Eastern Armenian. Our data comes from Western Armenian. Armenian verbs are divided into three basic regular classes based on the choice of theme vowel: *-e-*, *-i-*, *-a-*. Within their conjugation class, the theme vowels *-e-* and *-a-* are constant throughout the paradigm. They are never replaced with other theme vowels. But the *-i-* theme vowel is replaced by *-e-* (in bold) in many different paradigm cells. We call this change *i-neutralization*.<sup>1</sup>

(1) *Illustrating i-neutralization in Western Armenian*

	‘to scratch’	‘to speak’	‘to read’	
Infinitival	<i>ker-é-l</i>	<i>xos-í-l</i>	<i>gart-á-l</i>	√-TH-INF
Subj. Present 3PL	<i>ker-é-n</i>	<i>xos-í-n</i>	<i>gart-á-n</i>	√-TH-AGR
Causative	<i>ker-e-t̂sən-é-l</i>	<i>xos-<b>e</b>-t̂sən-é-l</i>	<i>gart-a-t̂sən-é-l</i>	√-TH-CAUS-TH-INF

Throughout the language, the above *-i-* to *-e-* change is restricted to only this single *-i-* morpheme. It is thus a highly morpheme-specific process. We can equivalently treat this change as a readjustment rule or as allomorphy. There are two classes of triggers for *i-neutralization*. One is output-based prosody or stress (a phonological trigger). Another is the presence of the +PAST morpheme (a morphological trigger), which can be non-adjacent to the verb.

The phonological trigger is that the *-i-* theme vowel is replaced by *-e-* when the vowel is unstressed. This is clear when infinitivals take nominal inflection. Stress is regularly on the rightmost non-schwa vowel. This stress-based generalization references output prosody. It is cross-linguistically rare but attested for allomorphy to surface output stress, e.g., stress-based stem allomorphy in Rumantsch (Anderson 2011).

(2) *i-neutralization is sensitive to stress*

	‘to scratch’	‘to speak’	‘to read’	
Infinitival	<i>ker-é-l</i>	<i>xos-í-l</i>	<i>gart-á-l</i>	√-TH-INF
Definite-marked	<i>ker-é-l-ə</i>	<i>xos-í-l-ə</i>	<i>gart-á-l-ə</i>	√-TH-INF-DEF
Instrumental-marked	<i>ker-é-l-óv</i>	<i>xos-<b>e</b>-l-óv</i>	<i>gart-a-l-óv</i>	√-TH-INF-INST

The morphological trigger is that *-i-* theme vowel is replaced by *-e-* when the verb is in the past imperfective tense. Note how stress is exceptionally on the theme vowel here. The trigger is the

<sup>1</sup>Data is from the author’s native Western Armenian judgments, corroborated by paradigm tables (Boyacioglu 2010; Boyacioglu and Dolatian 2020). My gratitude to Peter Guekguezian for early discussions. Data is transcribed in IPA, but aspiration is not marked. The segments /χ,β,ɾ,ɑ,ɛ,ɔ/ are transcribed as x,ɣ,r,a,e,o. Glosses follow the Leipzig Glossing Rules, except we use PAST for Past, INST for Instrumental, and CN for Connegative.

[+PAST] morpheme (underlined>, which can either be overt (3a) or covert (3b). The morpheme can likewise be outside the verb and on an auxiliary (3c). This auxiliary can either be adjacent to the verb; they can even be separated from each other via clitics (3d) or coordination (§4.2).

(3) *i-neutralization is sensitive to non-adjacent presence of Past*

a.	<i>gə-xos-é-<u>i</u>-n</i>	IND-√-TH-T-AGR	‘they were speaking’
b.	<i>gə-xos-é-<u>∅</u>-r</i>	IND-√-TH-T-AGR	‘he was speaking’
c.	<i>tʃ-é-<u>i</u>-n xos-è-r</i>	NEG-AUX-T-AGR √-TH-CN	‘they weren’t speaking’
d.	<i>tʃ-é-<u>i</u>-n=al xos-è-r</i>	NEG-AUX-T-AGR=CL √-TH-CN	‘they weren’t even speaking’

The morphologically-conditioned allomorphy is a case of a word-external trigger (cf. Bobaljik and Harley 2017). Neutralization likewise applies under suspended suffixation of the auxiliary. Semantic and prosodic judgments argue against alternative analyses that use ellipsis or movement. Thus regardless of whether we call this *i-to-e* change as a readjustment rule or allomorphy, it is long-distance both over segments and over morphemes.

This paper is organized as follows. We go over the basic conjugation classes in §2 and provide the morphological structure of verbs. Section §3 goes through the phonological conditions of *i-neutralization*. We show that it is triggered by the absence of stress, whether primary or secondary stress. Section §4 goes through the morphological triggers of neutralization. We focus on how the morphological trigger can be non-adjacent to the target thanks to clitics and coordination (suspended affixation). Alternative analyses that utilize ellipsis or word-internal covert triggers are empirically unsupported. We discuss the data in §5 within a general theoretical context of non-locality and output-sensitivity in allomorphy. We conclude in §6

## 2 Theme vowels in Armenian

In citation form, simple regular verbs consist of a root, theme vowel, and an infinitival suffix *-l*. Verbs are assigned to one of 3 conjugation classes based on the choice of theme vowel: *-e-*, *-i-*, *-a-*. We call these classes the E-Class, I-Class, and A-Class. The E-Class is the default class with the most members (Kogian 1949). Stress is generally word-final. We later elaborate on stress assignment.

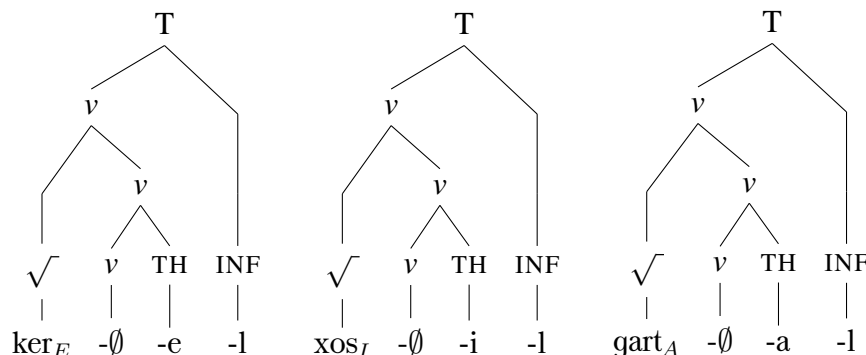
(4) *Infinitivals and their class*

E-Class	I-Class	A-Class	
<i>ker-é-l</i>	<i>xos-í-l</i>	<i>gart-á-l</i>	√-TH-INF
‘to scratch’	‘to speak’	‘to read’	

The choice of theme vowel is root-conditioned with some correlations with transitivity (Dolatian and Guekguezian in prep). Morphosyntactically, we assume that the theme vowel is an adjunct on

a covert little *v* (Oltra-Massuet 1999); see Guekguezian and Dolatian (forthcoming) for evidence. The infinitival suffix occupies T. We show the class features of roots as subscripts *E*, *I*, *A*.

(5) *Structure of simple verbs*



We assume that the choice of theme vowel is conditioned by class diacritics on the root: *E*, *A*, *I*. The following rules handle theme-vowel insertion.

(6) *Selecting theme vowels after a class marker*

$$\begin{aligned} \text{TH} &\rightarrow -e- / \sqrt{\text{E-CLASS}} \curvearrowright v \curvearrowleft - \\ &\quad -i- / \sqrt{\text{I-CLASS}} \curvearrowright v \curvearrowleft - \\ &\quad -a- / \sqrt{\text{A-CLASS}} \curvearrowright v \curvearrowleft - \end{aligned}$$

For the E-Class and A-Class, the quality of the theme vowel stays constant throughout the Armenian paradigm. However for the I-Class, the *-i-* theme vowel is neutralized to *-e-* in diverse morphological contexts. Before analyzing these factors, we first illustrate what some of these contexts are. One such context is causativization. A verb becomes causative by adding the causative suffix *-tsən-* after the root's theme vowel. The causative then takes its own *-e-* theme vowel. Crucially for the E-Class and A-Class, the post-root theme vowel stays *-e-* and *-a-* respectively. But for the I-Class, the the root's *-i-* theme becomes *-e-*. We write the changed theme vowel in **bold**. We call this process *i*-neutralization.

(7) *i*-neutralization in causatives

	E-Class	I-Class verb	A-Class
Base verb	ker-é-l 'to scratch'	xos- <b>i</b> -l 'to speak'	gart-á-l 'to read'
Causative	ker-e-t <b>sən</b> -é-l 'to make s.o. scratch'	xos-e-t <b>sən</b> -é-l 'to make s.o. speak'	gart-a-t <b>sən</b> -é-l 'to make s.o. read'

As we later show, there are two sets of contexts which trigger *i*-neutralization. The first set of contexts trigger *i*-neutralization because of phonological reasons. The second triggers *i*-neutralization

because of morphological reasons.<sup>2</sup> For causativization, we argue that it is part of the first set of phonologically-conditioned contexts for *i*-neutralization. As we argue in the next section, the phonological trigger is that *unstressed -i-* theme vowels neutralize to *-e-*.

### 3 Output prosodic conditions in neutralization

The process of *i*-neutralization applies in diverse morphological contexts, beyond just causatives. Most of these contexts can be explained with a simple generalization that's based on stress (§3.1). We formalize this generalization in §3.2 as a morpheme-specific, phonologically-conditioned, outwardly-sensitive, and output-based process. This process is concerned solely with changing surface exponents and not with changing any morphosyntactic features (§3.3). We go through almost all known cases of *i*-neutralization and show that it is stress-conditioned (§3.4). Morphological exceptions are discussed in §4.

#### 3.1 *i*-neutralization is stress-conditioned

This section shows that for a large set of morphological contexts of *i*-neutralization, a consistent correlation is that the neutralized theme vowel is unstressed. We thus argue that *i*-neutralization is triggered because of a morpheme-specific rule or constraint against unstressed *-i-* theme vowels.

First off, Armenian has primary stress on the rightmost non-schwa vowel. If the final syllable has a full vowel, then that vowel takes stress (8a). Suffixation triggers stress shift to the rightmost full vowel (8b). If the final syllable is a schwa, then stress shifts to the closest non-schwa vowel (8c). Usually whenever the final syllable has a schwa, the penultimate syllable will have a non-schwa vowel (8d). But in colloquial speech, there are some words which end in two schwas, and thus stress is on the antepenultimate non-schwa vowel (8e).

- |     |    |            |                          |
|-----|----|------------|--------------------------|
| (8) | a. | badaxán    | ‘answer’                 |
|     | b. | badaxan-óv | ‘answer-INST’            |
|     | c. | badaxán-ə  | ‘answer-DEF’             |
|     | d. | méyər      | ‘honey’                  |
|     | e. | méyɾ-ə     | ‘honey-DEF (standard)’   |
|     |    | méyər-ə    | ‘honey-DEF (colloquial)’ |

For verbs, we again see the primary stress rule behaving as expected. But once we look at *i*-neutralization in terms of stress, a strong correlation is that unstressed *-i-* theme vowels surface as

<sup>2</sup>Within Indo-European, it is common to find theme vowel changes that are conditioned either by phonological or morphological factors within the same language, e.g. Spanish (Roca 2010). Note that Eastern Armenian does not have a *-i-* theme vowel, so *i*-neutralization is restricted to Western Armenian.

*-e-*. To illustrate, in infinitivals, final stress is on the theme vowel, and there is no neutralization. But in contrast, for the causative of the I-Class, the theme vowel is neutralized and is *unstressed* because it is not the final vowel. We argue that in these cases, *i*-neutralization is caused by the absence of stress.

(9) *Stress and i-neutralization in aorists and causatives*

	E-Class	I-Class verb	A-Class
Base verb	<i>ker-e-l</i> 'to scratch'	<i>xos-i-l</i> 'to speak'	<i>gart-a-l</i> 'to read'
Causative	<i>ker-e-t̃sən-é-l</i>	<i>xos-e-t̃sən-é-l</i>	<i>gart-a-t̃sən-é-l</i>

This stress-based generalization can be captured with the following morphological rule which changes the unstressed theme vowel *-i-* to *-e-*. Within a serialist formalism, the rule has to apply after a phonological cycle of stress assignment. We illustrate later below.

(10) *i-neutralization rule from stress shift***Unstressed *-i*<sub>TH</sub> neutralization**

$$-i_{\text{TH}} \rightarrow -e_{\text{TH}} / [\_, -\text{STRESS}]$$

The role of stress is visible when schwas are added. In the above examples, the final vowel received stress because of the phonological rule of final stress assignment. But, if the final vowel is a schwa, then there is neither stress shift nor neutralization. For example, infinitivals can be nominalized by adding nominal inflection. These suffixes are determiner suffixes and case markers. The determiner suffixes include the definite and possessive suffixes (11a). These contain a schwa after C-final bases. They don't trigger stress shift or *i*-neutralization: *xos-í-l-ə*. In contrast, the case markers have full vowels, trigger stress shift, and trigger *i*-neutralization: *xos-e-l-óv* (11b).

(11) *i-neutralization in nominalized infinitivals* is based on stress

	E-Class	I-Class	A-Class
Infinitival	<i>ker-é-l</i>	<i>xos-í-l</i>	<i>gart-á-l</i>
a. Definite	<i>ker-é-l-ə</i> 'the act of scratching'	<i>xos-í-l-ə</i> 'the act of speaking'	<i>gart-á-l-ə</i> 'the act of reading'
1SG Possessive	<i>ker-é-l-əs</i>	<i>xos-í-l-əs</i>	<i>gart-á-l-əs</i>
2SG Possessive	<i>ker-é-l-ət</i>	<i>xos-í-l-ət</i>	<i>gart-á-l-ət</i>
b. Instrumental	<i>ker-e-l-óv</i>	<i>xos-e-l-óv</i>	<i>gart-a-l-óv</i>
Ablative	<i>ker-e-l-é</i>	<i>xos-e-l-é</i>	<i>gart-a-l-é</i>
Dative/Genitive	<i>ker-e-l-ú</i>	<i>xos-e-l-ú</i>	<i>gart-a-l-ú</i>

As an alternative analysis that doesn't reference stress, we would need a rule like the following. The rule states that the *-i-* theme vowel is neutralized if it precedes a non-schwa vowel. It would be a mere coincidence that the distinction between schwas and non-schwas is the basis of Armenian stress.

(12) *Alternative rule for i-neutralization based on vowel quality*

**Prevocalic *-i*-<sub>TH</sub> neutralization**

$-i_{\text{TH}} \rightarrow -e_{\text{TH}} / \_ \dots V$

where V is a non-schwa vowel

Regardless if we define *i*-neutralization in terms of stress or vowel quality, the conditions for *i*-neutralization are phonological and output-sensitive. We illustrate a derivation below. First, the theme vowel is spelled-out by the morphology. Later, the phonology places stress on the rightmost full vowel. After this, the *i*-neutralization rule applies.

(13) *Stages for application of phonologically-conditioned i-neutralization*

	‘to speak’	‘the smoking’	‘with smoking’
Input	XOS-TH-INF	XOS-TH-INF-DEF	XOS-TH-INF-INST
Morphology	XOS-i-l	XOS-i-l-ə	XOS-i-l-ov
Phonology: Stress assignment	XOS-í-l	XOS-í-l-ə	XOS-i-l-óv
Morpheme-specific phonology			
(10) Unstressed <i>-i</i> - <sub>TH</sub> neutralization			XOS-e-l-óv

The above vocalic suffixes are inflectional, and they are clearly added after the theme vowel. Thus, *i*-neutralization is an incorrigible case of outwardly-sensitive phonologically-conditioned allomorphy. Within a cyclic framework, it would be unfeasible to argue that that the inflectional suffixes were generated temporally before the theme vowel (cf. Kalin 2020).

As a caveat, although we call *i*-neutralization a rule, the actual process is both morpheme-specific and it targets a single morph. Thus, this rule is descriptively equivalent to a case of phonologically-conditioned suppletive allomorphy (Kiparsky 1996; Kager 2009). For the rest of this paper, we descriptively call it a *process*, but all generalizations would apply if we called it *allomorphy*. In fact, by calling it allomorphy, we can better determine the theoretical consequences of our analysis (§5).

In sum, the above analysis treats *i*-neutralization as a morpheme-specific process that is conditioned by output prosody. The next section unpacks and formalizes this generalization.

### 3.2 *i*-neutralization is morpheme-specific and output-oriented

This generalization is based on making a morpheme-specific rule apply at the end of a phonological derivation. It has three ingredients. First, the rule is morpheme-specific. Second, the rule is conditioned by stress. Third, this rule references stress as the output of phonology after other morphemes are added. We argue that these three sub-generalizations are necessary to account for the data.

First, the use of a late morpheme-specific rule is relatively unconventional (cf. Aronoff 1976), but it is necessary. The rule of *i*-neutralization for theme vowels must be morpheme-specific be-

cause it does not apply to any other unstressed *i* segments in Armenian (14a). Furthermore, Armenian has a process of destressed high vowel reduction whereby destressed high vowels are either deleted or reduced to a schwa (14b) (Dolatian 2020b). This reduction process has no synchronic connection to *i*-neutralization. The unstressed theme vowel is never replaced by a schwa or deleted under stress shift (14c). Within the lexical phonology of Armenian, the rule of high vowel reduction is a stem-level process, and it is more generalized than *i*-neutralization. Furthermore, Armenian has a fossilized rule of destressed *e*-to-*i* reduction which applies in the derivatives of a handful of roots (14d) (Dolatian 2020a:ch2). This rule is fossilized, applies in more morphemes than *i*-neutralization, but it utilizes the reverse transformation: *e*-to-*i* instead of *i*-to-*e*.

(14)	a.	<i>məxítár</i>	‘comforter’	<i>nihár</i>	‘thin’
		* <i>məxítár</i>		* <i>nhar</i>	
	b.	<i>amusín</i>	‘husband’	<i>tív</i>	‘number’
		<i>amusn-utjún</i>	‘marriage’	<i>təv-agán</i>	‘date’
	c.	<i>xos-i-l</i>	‘to speak’		
		<i>xos-e-l-óv</i>	‘with speaking’	* <i>xos-l-óv</i> , * <i>xos-ə-l-óv</i>	
	d.	<i>sér</i>	‘love’	<i>gés</i>	‘half’
		<i>sir-elí</i>	‘dear’	<i>gis-é-l</i>	‘to halve’

Thus, *i*-neutralization must be a grammatical process that is restricted to only the *-i-* theme vowel, and to no other *i* segment in Armenian.

The second generalization is that *i*-neutralization is dependent on stress assignment. In the previous section, we illustrated this generalization in a serial form (13): phonological stress assignment fed *i*-neutralization. The next section provides more cases of this stress-based correlation. For now, we formalize this generalization that the shape of the theme vowel is conditioned by output prosody. This makes the allomorphy be outwardly-sensitive (Anderson 2008).

Within a parallelist framework, we can translate the previous serial derivation from (13) into a single step. The final two stages can be conflated into a single phonology stage that uses parallelist constraints with morpheme-specific indexed-constraints (Pater 2007). We expand below.

To formalize the general stress system of Armenian, we use the constraint \* $\acute{\sigma}$  to block stress on schwas. This constraint outranks the constraint STR-R which places stress on the rightmost vowel (or grid beat; Gordon 2002). As for neutralization, the morpheme-specific constraint \* $i_{\text{TH}}[-\text{str}]$  blocks unstressed *-i-* theme vowels. The subscript TH denotes theme vowels. Crucially, this trigger constraint for *i*-neutralization is a markedness constraint that’s indexed to theme vowels (Flack 2007). The faithfulness constraint ID is shorthand for constraints on feature-changing.<sup>3</sup> Finally, the constraint PRIORITY (Mascaró 2007) specifies that the preferred theme vowel is *-e-*, and is violated for any other type of theme vowel.

<sup>3</sup>More exact instantiations of this faithfulness constraint are possible (cf. Bonet et al. 2007, 2015; Wolf 2008; Bye 2015), but the choice is tangential.



(15) *Constraints for i-neutralization*

- a. \* $\acute{o}$ : Assign a violation if a stressed schwa
- b. STR-R: Assign a violation if stress is not on the rightmost vowel
- c. \* $i_{TH}[-str]$ : Assign a violation if there is an unstressed *i*-theme vowel
- d. ID: Assign a violation if an input segment is changed in the output. We assume that stress loss does not count as a violation.
- e. PRIORITY[ $e_{TH} > i_{TH}, a_{TH}$ ] or PRIORITY: Assign a violation for a theme vowel that's not *-e-*

(16) *Ranking for i-neutralization*

\* $i_{TH}[-str]$ , \* $\acute{o}$  >> STR-R >> ID >> PRIORITY

We see these constraints work below. In a simple infinitival, stress is on the theme vowel so *i*-neutralization does not apply: *xos-í-l* 'to speak' (17b). We assume that the quality of the root-conditioned theme vowel is determined by the morphology, and that it is present in the input. Higher ranking ID blocks changing the theme vowel to *-e-*: \**xos-é-l* (17a).

(17) *No i-neutralization when stressed*

	/xos- $i_{TH}$ -l/	* $i_{TH}[-str]$	* $\acute{o}$	STR-R	ID	PRIORITY
a.	xosel				*!	
b.	$\text{☞}$ xosíl					*
c.	xosal				*!	*

Stress does not shift to schwas. Thus, adding a schwa doesn't trigger stress shift or *i*-neutralization: *xos-í-l-ə* 'the speaking'.

(18) *No i-neutralization when stressed before a schwa*

	/xos- $i_{TH}$ -l-ə/	* $i_{TH}[-str]$	* $\acute{o}$	STR-R	ID	PRIORITY
a.	xosiló	*!	*			
b.	xosélə			*	*!	
c.	$\text{☞}$ xosílə			*		*
d.	xosálə			*	*!	*

But when a non-schwa suffix is added, we see stress-shift and *i*-neutralization: *xos-e-l-óv* 'with speaking' (19b). Stress must shift because of high-ranking STR-R: \**xos-í-l-ov* (a). The high vowel cannot stay *-i-* because it is unstressed: \**xos-i-l-óv* (c). The vowel is neutralized to *-e-* instead of *-a-* because of PRIORITY: \**xos-a-l-óv* (d).

(19) *i*-neutralization when unstressed

	/xos-i <sub>TH</sub> -l-ov/	*i <sub>TH</sub> [-str]	*ó	STR-R	ID	PRIORITY
a.	xosílov			*!		
b.	xoselóv				*	
c.	xosilóv	*!				*
d.	xosalóv				*	*!

In contrast, we see no such neutralization for other theme vowels like *gart-a-l-óv* ‘with reading’.

## (20) No neutralization for other theme vowels

	/gart-a <sub>TH</sub> -l-ov/	*i <sub>TH</sub> [-str]	*ó	STR-R	ID	PRIORITY
a.	gartálov			*!		
b.	gartelóv				*!	
c.	gartilóv	*!			*	*
d.	gartalóv					*

The third generalization is that by referencing stress, *i*-neutralization must reference the output of the phonology after other suffixes are added. This amounts to treating *i*-neutralization as a case of outwardly-sensitive and phonologically-conditioned allomorphy. Such a generalization is theoretically controversial (Paster 2006), but empirically valid (Anderson 2011). This is further elaborated and defended in section §3.4, where we go through more cases of phonologically-conditioned *i*-neutralization. But first, we briefly refute an alternative analysis based on morphological features.<sup>4</sup>

### 3.3 *i*-neutralization does not affect morphology

So far, we have seen that stress shift triggers the change in theme vowels. On the surface, one could argue that the cause of *i*-neutralization is changing the class features of the root. That is, one could argue that whenever an *-i-* theme vowel is neutralized to *-e-*, the verb root has lost its I-Class feature and is now an E-Class root. But this analysis is untenable. Evidence comes from the past perfective.

<sup>4</sup>As an alternative to morpheme-specific processes, we can postpone theme-vowel selection to after the phonology has applied, i.e., morphology and phonology apply in parallel (McCarthy and Prince 1993). But this has conceptual and empirical problems (Paster 2006; Yu 2007; Embick 2010; Kalin 2020). Another alternative is to treat the underlying form of the *-i-* theme vowel as the set of allomorphs {-i-, -e-} (cf. Bermúdez-Otero 2013). The *-e-* vowel is picked because of a low-ranking constraint against unstressed high vowels. A separate PRIORITY constraint is needed to ensure that *-i-* is prioritized over *-e-* so that *-i-* surfaces when it is stressed (cf. Mascaró 2007). But regardless of what theoretical implementation we use, all the above formalizations still treat *i*-neutralization as a case of phonologically-conditioned outwardly-sensitive allomorphy. The choice of a morphological exponent is conditioned by the prosody of the output.

In the past perfective, the perfective suffix  $\widehat{ts}$ - is added after the theme vowel. The suffix is followed by a sequence of T+Agr suffixes. Crucially, there are two processes that occur in the past perfective. First, *i*-neutralization predictably applies because of stress shift. Second, the I-Class triggers a special set of T-Agr suffixes, distinct from the suffixes used for the E-Class and A-Class. The main difference is that the T morpheme is *-a* for the I-Class, but *-i* for the E/A-Class

(21) *Past perfective of simple verbs*

	E-Class	I-Class	A-Class	Template
INF	<i>ker-e-l</i> 'to scratch'	<i>xos-i-l</i> 'to speak'	<i>gart-a-l</i> 'to read'	$\sqrt{-TH- INF}$
1SG	<i>ker-e-ts-í</i> 'I scratched'	<i>xos-e-ts-á</i> 'I spoke'	<i>gart-a-ts-í</i> 'I read'	$\sqrt{-TH- ASP- T- AGR}$
1SG	<i>ker-e-ts-í-r</i>	<i>xos-e-ts-á-r</i>	<i>gart-a-ts-í-r</i>	
1SG	<i>ker-é-ts</i>	<i>xos-e-ts-á-v</i>	<i>gart-á-ts</i>	
1SG	<i>ker-e-ts-í-nk</i>	<i>xos-e-ts-á-nk</i>	<i>gart-a-ts-í-nk</i>	
1SG	<i>ker-e-ts-í-k</i>	<i>xos-e-ts-á-k</i>	<i>gart-a-ts-í-k</i>	
1SG	<i>ker-e-ts-í-n</i>	<i>xos-e-ts-á-n</i>	<i>gart-a-ts-í-n</i>	

For the T-Agr suffixes on the I-Class, the choice of suffixes is morphologically-conditioned allomorphy. These are conditioned by the I-Class feature of the root. Thus, I-Class roots in this context trigger allomorphy but also take an *-e-* class theme vowel. Even though the theme vowel is *-e-*, the root must still have its I-Class feature. Otherwise, the roots would not have been able to trigger T-Agr allomorphy. We do not provide rules for this allomorphy nor discuss it in depth. For that, see Dolatian and Guekguezian (prep) and Karakaş et al. (in press).

More explicitly, if *i*-neutralization deleted the class-features of the root, it would not be able to trigger the the correct T-Agr allomorphy. In bottom-up spell-out (Bobaljik 2000), the theme vowel must be inserted before the perfective. Once the perfective morpheme is inserted, it would form the context for *i*-neutralization and delete class features. These deleted features would be missing by the time the T-Agr is spelled out, preventing the choice of T-Agr allomorphy. Thus this alternative analysis is incorrect.

In sum, *i*-neutralization is not a matter of changing morphosyntactic features on roots. It is a process that directly affects the theme vowel exponent, without affecting the class membership of the root. Having set this concern aside, we now go through more contexts for phonologically-conditioned *i*-neutralization. We see that the overarching generalization is stress-based.

### 3.4 Stress and *i*-neutralization in other contexts

The analysis above treats *i*-neutralization as stress-conditioned. This section provides more evidence for the role of stress based on other morphological constructions which trigger *i*-neutralization.

Like any other free-standing word, infinitivals can take derivational suffixes or form compounds. Compounds are formed by concatenating stems with the linking vowel *-a-*. Both derivation and compounding trigger stress shift. The theme vowels *-e-*, *-a-* stay intact, while the *-i-* vowel is neutralized to *-e-*: *nəst-e-l-ík*.

(22) *i*-neutralization in words derived from infinitivals

	<i>Derivatives</i>		<i>Compounds</i>	
E-Class verbs	<i>kəm-é-l</i>	‘to drink’	<i>kordz-é-l + gérb</i>	‘to work + manner’
	<i>kəm-e-l-ík</i>	‘beverage’	<i>kordz-e-l-a-gérb</i>	‘tactic’
I-Class verbs	<i>nəst-í-l</i>	‘to sit’	<i>abr-í-l + tsév</i>	‘to live + manner’
	<i>nəst-e-l-ík</i>	‘sittable’	<i>abr-e-l-a-tsév</i>	‘lifestyle’
A-Class verbs	<i>xənt-á-l</i>	‘to laugh’	<i>əsk-á-l + bés</i>	‘to feel + manner’
	<i>xənt-a-l-ík</i>	‘funny’	<i>əsk-a-l-a-bés</i>	‘sensibly’

Imperatives likewise show the dependence of *i*-neutralization on stress-shift. The theme vowel is stressed in the imperative 2SG, but not in the imperative 2PL.<sup>5</sup> We find neutralization in only the latter.

(23) *i*-neutralization in imperative 2PL but not 2SG

	E-Class	I-Class	A-Class
Infinitival	<i>ker-é-l</i>	<i>xos-í-l</i>	<i>gart-á-l</i>
Imp 2SG	<i>ker-é</i>	<i>xos-í-r</i>	<i>gart-á</i>
Imp 2PL	<i>ker-e-ts-ék</i> ‘to scratch’	<i>xos-e-ts-ék</i> ‘to speak’	<i>gart-a-ts-ék</i> ‘to read’

Neutralization does not distinguish between primary stress and secondary stress. In the prohibitive 2SG and 2PL, primary stress is on a proclitic, while secondary stress is on the theme vowel. There is no neutralization.

(24) No *i*-neutralization in prohibitives due to secondary stress

	E-Class	I-Class	A-Class
Infinitival	<i>ker-é-l</i>	<i>xos-í-l</i>	<i>gart-á-l</i>
Proh 2SG	<i>mí ker-è-r</i>	<i>mí xos-ì-r</i>	<i>mí gart-á-r</i>
Proh 2PL	<i>mí ker-è-k</i> ‘to scratch’	<i>mí xos-ì-k</i> ‘to speak’	<i>mí gart-à-k</i> ‘to read’

<sup>5</sup>In some more archaic dialects, the imperative 2SG of the I-Class is marked by the suffix *-e*: *xos-é* ‘speak!’. We can treat this *-e* either as idiosyncratic *i*-neutralization or as a separate imperative morpheme; note the contrast for these archaic lects between *xos-í* ‘he speaks’ vs. *xos-é* ‘speak!’. The imperative 2PL utilizes a meaningless perfective suffix *-ts-* between the theme vowel and T/Agr suffix. This meaningless affix is part of a morphomic distribution of the traditional aorist stem (Kogian 1949; Fairbanks 1948).

Similarly, in the subjunctive present, stress is final on the theme vowel in the positive. The negative is formed by adding the negative prefix  $\widehat{tj}(\text{ə})-$  with schwa epenthesis before consonants. Stress is idiosyncratically on the first syllable, while the theme vowel takes secondary stress. There is no neutralization. We only show the I-Class below.

(25) *No i-neutralization in negative subjunctive present due to secondary stress*

	Positive	Negative	Positive	Negative
Infinitival	<i>abr-í-l</i> 'to live'		<i>xos-í-l</i> 'to speak'	
Pres 1SG	<i>abr-í-m</i>	$\widehat{tj}\text{-}\acute{a}br\text{-}\grave{i}\text{-}m$	<i>xos-í-m</i>	$\widehat{tj}\acute{\text{ə}}\text{-}xos\text{-}\grave{i}\text{-}m$
Pres 2SG	<i>abr-í-s</i>	$\widehat{tj}\text{-}\acute{a}br\text{-}\grave{i}\text{-}s$	<i>xos-í-s</i>	$\widehat{tj}\acute{\text{ə}}\text{-}xos\text{-}\grave{i}\text{-}s$
Pres 3SG	<i>abr-í</i>	$\widehat{tj}\text{-}\acute{a}br\text{-}\grave{i}$	<i>xos-í</i>	$\widehat{tj}\acute{\text{ə}}\text{-}xos\text{-}\grave{i}$
Pres 1PL	<i>abr-í-nk</i>	$\widehat{tj}\text{-}\acute{a}br\text{-}\grave{i}\text{-}nk$	<i>xos-í-nk</i>	$\widehat{tj}\acute{\text{ə}}\text{-}xos\text{-}\grave{i}\text{-}nk$
Pres 2PL	<i>abr-í-k</i>	$\widehat{tj}\text{-}\acute{a}br\text{-}\grave{i}\text{-}k$	<i>xos-í-k</i>	$\widehat{tj}\acute{\text{ə}}\text{-}xos\text{-}\grave{i}\text{-}k$
Pres 3PL	<i>abr-í-n</i>	$\widehat{tj}\text{-}\acute{a}br\text{-}\grave{i}\text{-}n$	<i>xos-í-n</i>	$\widehat{tj}\acute{\text{ə}}\text{-}xos\text{-}\grave{i}\text{-}n$

Instead of secondary stress, we can instead argue that the above periphrastic constructions are evidence that the trigger for *i*-neutralization is the presence of a following non-schwa vowel. Both analyses are again descriptively equivalent with equivalent theoretical ramifications.

Furthermore, it is not the case that the mere presence of these morphological constructions causes neutralization. In contrast, the theme vowel must be unstressed in order to then undergo neutralization. For example, in (22), we showed that when an infinitival undergoes compounding, it will lose stress and undergo neutralization. However, it is not the mere presence of compounding which triggers neutralization. When a compound is a noun or adjective, it can get verbalized by adding a theme vowel: *her-a-t̂saj̄n-é-l*. In general, compound verbs follow the E-Class. When these verbs are passivized, they become I-Class verbs and take the *-i-* theme vowel: *her-a-t̂saj̄nə-v-í-l*. The theme vowel is not neutralized to *-e-* despite the presence of compounding.<sup>6</sup> Neutralization is blocked because the theme vowel is stressed.

<sup>6</sup>The additional schwa in the passive forms is due to a morpheme-specific rule of pre-passive epenthesis (Vaux 1998; Dolatian prep). The behavior of compounds is complicated by exocentricity and feature percolation. Consider the I-Class root *xos-* (a). There are many exocentric compounds where the second stem is the root of a verb (c). When these exocentric compounds are verbalized, they take the *-e-* theme vowel (d). The second stem does not percolate its class features, and is unable to select the *-i-* theme vowel (e). This is unsurprising because exocentric compounds tend to block the prevention of morphological features (Stump 1995, 2001). See Dolatian (2021) for data on how exocentric compounds behave differently in irregular inflection and other bracketing paradoxes.

- (1) a. *xos-í-l* 'to speak'  
 b. *heru + xos-* 'far +  $\sqrt{\text{speak}}$ '  
 c. *her-a-xós* 'telephone'  
 d. *her-a-xos-é-l* 'to telephone'  
 e. \**her-a-xos-í-l*

(26) *Blocking i-neutralization in verbalized compounds*

N + N	<i>heru + tsájn</i>	‘far + voice’	<i>tas + gark</i>	‘class + order’
N-a-N	<i>her-a-tsájn</i>	‘telephone’	<i>tas-a-gárk</i>	‘class, category’
N-a-N-TH-INF	<i>her-a-tsájn-é-l</i>	‘to telephone’	<i>tas-a-gark-é-l</i>	‘to classify’
N-a-N-PASS-TH-INF	<i>her-a-tsájnə-v-í-l</i>	‘to be telephoned’	<i>tas-a-garkə-v-í-l</i>	‘to be classified’
	<i>*her-a-tsájnə-v-é-l</i>		<i>*tas-a-garkə-v-é-l</i>	

Thus, we have 6 constructions which trigger neutralization: causatives, past perfectives, derivation, compounding, imperative 2PL, and case-marking. The common factor across all these constructions is that they trigger stress shift away from the theme vowel. In all these constructions, the vowel lacks either primary or secondary stress. Thus, the morpheme-specific process of neutralization must apply after the phonology places final stress. If we were to analyze these factors in terms of the morphology, then there wouldn’t be a clear and simple trigger for neutralization. We would have to argue that all derivational suffixes and compounding constructions would have some arbitrary morphological feature that triggered neutralization (cf. similar problems in Harley and Tubino Blanco 2013).

In fact, the Armenian data is partially analogous to the case of stress-conditioned stem allomorphy in Swiss Rumantsch (Anderson 2008) and stress-conditioned diphthongization in Spanish (Bermúdez-Otero 2006, 2013). The main differences are that the stress-conditioned allomorphy in Armenian is simpler in its scope and its complications. The allomorphy is restricted to a single morph (the theme vowel) and not to an open class of roots. The Armenian case likewise doesn’t present any reflexes of cyclicity, opacity, or stratal paradoxes. But regardless, as elaborated in Anderson (2011), stress-conditioned allomorphy like Rumantsch and Armenian are counter-examples to two cross-linguistic tendencies in allomorphy (Paster 2009). First, the allomorphy (*i*-neutralization) is conditioned by an output-based property (stress), and not a property that can be elegantly captured by just analysing the input. Second, the allomorphy is based on the phonological properties of morphemes that are derivationally ‘outward’ or added later, e.g., nominal inflection. Stress-conditioned *i*-neutralization is thus one of the few attested cases of outwardly-sensitive and phonologically-conditioned allomorphy (Hannahs and Tallerman 2006; Svenonius 2012; Bermúdez-Otero 2016; McCarvel 2016; Deal and Wolf 2017; Brinkerhoff 2019; Herce 2020).

In sum, for the constructions above, the simplest generalization is that *i*-neutralization applies whenever the theme vowel is unstressed. However, there are still some corners of the grammar which resist the above stress-based generalization. We discuss those next.

## 4 Word-external conditions in neutralization

In the previous section, we went through a large set of contexts which trigger *i*-neutralization. We argued that the trigger for neutralization was a morpheme-specific phonological rule that targeted the unstressed *-i-* theme vowel. In this section and the following, we go through two contexts where

*i*-neutralization applies without any stress shift: past imperfectives and negated past imperfectives. We argue that the trigger for neutralization in these contexts is not phonological or morpheme-specific phonology. Instead, the trigger is morphological. The trigger is the past morpheme which can be either after the theme vowel or on an (non-)adjacent auxiliary.

#### 4.1 Local neutralization in past imperfectives

Before we get to these morphologically-conditioned neutralization contexts, we first consider a context where there is predictably no neutralization. For example, verbs can be inflected for present tense.<sup>7</sup> Here, the theme vowel takes predictable final stress, and is not neutralized. The post-theme elements are replaced with the appropriate Tense (T) and Agreement (Agr) morphemes. T and Agr are fused in the present.

(27) *Present tense for simple verbs*

	E-Class	I-Class	A-Class	Template
INF	<i>ker-é-l</i> 'to scratch'	<i>xos-í-l</i> 'to speak'	<i>gart-á-l</i> 'to read'	√-TH-ÍNF
1SG	<i>ker-é-m</i> 'I scratch'	<i>xos-í-m</i> 'I speak'	<i>gart-á-m</i> 'I read'	√-TH-T/AGR
2SG	<i>ker-é-s</i>	<i>xos-í-s</i>	<i>gart-á-s</i>	
3SG	<i>ker-é-</i>	<i>xos-í-</i>	<i>gart-á-</i>	
1PL	<i>ker-é-nk</i>	<i>xos-í-nk</i>	<i>gart-á-nk</i>	
2PL	<i>ker-é-k</i>	<i>xos-í-k</i>	<i>gart-á-k</i>	
3PL	<i>ker-é-n</i>	<i>xos-í-n</i>	<i>gart-á-n</i>	

In contrast in the past imperfective, we find *i*-neutralization, but stress stays on the theme vowel. To clarify its structure, we compare it with the past perfective. The main difference between them is that the past perfective contains an overt ASP suffix *-t̃s-* after the root, while the past imperfective has no overt ASP. The verb ends in separate T and Agr morphs. We only show the E-Class and I-Class. The I-Class shows *i*-neutralization in both. We underline the past suffix in the past imperfective.

<sup>7</sup>These verbs are interpreted as present subjunctive. To make them indicative, the prefix *g(ə)-* is added. See Bezrukov and Dolatian (2020) on the morphotactics of the indicative prefix across Western dialects.

## (28) Past imperfectives and perfectives of simple verbs

Infinitival	E-Class		I-Class	
	<i>ker-é-l</i>		<i>xos-í-l</i>	
	Past impf.	Past perf.	Past impf.	Past perf.
1SG	<i>ker-é-i</i>	<i>ker-e-ts-í</i>	<i>xos-é-i</i>	<i>xos-e-ts-á</i>
2SG	<i>ker-é-i-r</i>	<i>ker-e-ts-í-r</i>	<i>xos-é-i-r</i>	<i>xos-e-ts-á-r</i>
3SG	<i>ker-é-r</i>	<i>ker-é-ts</i>	<i>xos-é-∅-r</i>	<i>xos-e-ts-á-v</i>
1PL	<i>ker-é-i-nk</i>	<i>ker-e-ts-í-nk</i>	<i>xos-é-i-nk</i>	<i>xos-e-ts-á-nk</i>
2PL	<i>ker-é-i-k</i>	<i>ker-e-ts-í-k</i>	<i>xos-é-i-k</i>	<i>xos-e-ts-á-k</i>
3PL	<i>ker-é-i-n</i>	<i>ker-e-ts-í-n</i>	<i>xos-é-i-n</i>	<i>xos-e-ts-á-n</i>
	√-TH-T-AGR	√-TH-ASP-T-AGR	√-TH-T-AGR	√-TH-ASP-T-AGR

Setting aside the 3SG, for both past tenses, the theme vowel is followed by a full-vowel. Thus we incorrectly expect final stress in both contexts. In the past perfective, stress is predictably on the final vowel because it is the rightmost vowel. Here, *i*-neutralization is predictable because the theme vowel is unstressed: *xos-e-ts-á* ‘I spoke’.<sup>8</sup> But in the past imperfective, stress is idiosyncratically placed on the theme vowel, yet we still find *i*-neutralization: *xos-é-i* ‘(If) I were speaking’.<sup>9</sup>

Based on the above paradigm, one could think of two hypothetical phonological reasons as to why *i*-neutralization applies: vowel hiatus or dissimilation. We argue against both of these. First, we cannot argue that *i*-neutralization is triggered by vowel hiatus. Underlyingly in the past imperfective, the theme vowel precedes the past marker *-i* for most T-Agr combinations. But, this vowel hiatus is repaired by glide *j*-epenthesis (not shown): *xos-é-[j]-i-r* ‘(If) I were speaking’.

Second, we cannot argue that neutralization is caused by the dissimilation of the theme vowel *-i* before *i*-initial T/Agr suffixes (*\*xos-í-i*). This is because in the past imperfective 3SG, the T node is covert while the Agr node is *-r*. There is thus no post-theme vowel but we still see neutralization: *xos-é-r*. Furthermore, elsewhere in Armenian, there is no evidence of underlying /i+i/ sequences getting repaired via dissimilation, only by glide epenthesis: /kini-i/ → *kini-ji* ‘wine-GEN’.

It is possible that, diachronically, morpheme-specific dissimilation was the trigger and that neutralization spread via analogy throughout the past imperfective paradigm (cf. with Optimal Paradigms, McCarthy 2005). But synchronically, imperfectives *idiosyncratically* trigger neutralization without any phonological motivation. Instead, *i*-neutralization in the past imperfective requires the following morphological rule.

<sup>8</sup>In the past perfective, the T+Agr for the 3SG can be zero or a separate suffixes, depending on class. We set this aside because it’s tangential. And for the I-Class, the I-Class roots trigger special T-Agr allomorphs in the past perfective. See Karakaş et al. (in press) for an analysis.

<sup>9</sup>As with present tense verbs (7), past imperfectives are subjunctive; they become indicative with the prefix *g(ə)-*. The perfective and imperfective have largely the same T-Agr exponents. They mainly differ in the 3SG. In the past imperfective 3SG, the T+Agr slots fuse into a portmanteau *-r*. In the Lebanese sub-dialect of Standard Western Armenian, the imperfective suffixes don’t trigger stress shift. But in Eastern Armenian, these suffixes do trigger stress shift (Margaryan 1997:77). The Eastern dialect however doesn’t have the *-i*-theme vowel at all.



(29) *i-neutralization for past* (To be revised)

**Neutralization in Past**

$-i_{-TH} \rightarrow -e_{-TH} / \_ +PAST$

The rule specifies that the *-i-* theme vowel is neutralized to *-e-* when there is a +PAST marker. In the past imperfective, this marker is covert in 3SG, but an overt *-i* vowel elsewhere. The past morpheme will correctly cause neutralization in past imperfectives, where there is no stress shift.<sup>10</sup>

The rule says that the theme vowel *-i-* is replaced by *-e-* in the past. This rule can apply in the Morphology component either a) after theme-vowels are selected, or b) in parallel with theme-vowel selection. We are ultimately agnostic about the choice of timing; for illustration, we assume neutralization applies after theme-selection.

(30) *Stages for application of morphologically-conditioned i-neutralization*

	‘to speak’	‘We were speaking’
Input	xos-TH-INF	xos-TH-T-1PL
Morphology	xos-i-l	xos-i-i-nk
(29) Neutralization in Past		xos-e-i-nk
(Morpho-)Phonology		
Stress assignment	xos-í-l	xos-é-i-nk
Glide epenthesis		xos-é-ji-nk
Output	xos-í-l	xos-é-ji-nk

The above rule requires that the theme vowel and past suffix are adjacent. But in the next section, we revise this rule to incorporate long-distance triggers in past constructions.

## 4.2 Non-local neutralization in periphrasis

The previous section showed that past imperfectives trigger neutralization, such that the target theme vowel and the trigger past suffix are adjacent. In this section, we discuss long-distance neutralization in the negated past imperfective. Here, the trigger past morpheme is on a separate auxiliary within a periphrastic construction. We still have neutralization apply. Linear adjacency is not crucial.

In the indicative mood, present and past imperfective verbs are negated in a complicated manner. We illustrate first with the negated present indicative. The verb uses a participle form, the *connegative*, that does not bear any T/Agr markers. The T/AGR slot is replaced by a connegative suffix *-r*. Negation, tense, and agreement are marked periphrastically by adding a negated auxiliary before

<sup>10</sup>The rule will likewise vacuously apply in past perfectives, where we find both stress shift and neutralization: *xos-e-ts-á-nk* ‘we spoke’. The +PAST node is *-a* in the past perfective for the I-Class.

the verb:  $\widehat{tj}\text{-}\acute{e}\text{-}m\text{ ker-}\grave{e}\text{-}r$  ‘I do not scratch’. The auxiliary carries all T/Agr marking.<sup>11</sup>

(31) *Negated present indicative of simple verbs*

	E-Class		I-Class		A-Class	
INF		<i>ker-é-l</i>		<i>xos-í-l</i>		<i>gart-á-l</i>
1SG	$\widehat{tj}\text{-}\acute{e}\text{-}m$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}m$	<i>xos-ì-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}m$	<i>gart-à-r</i>
2SG	$\widehat{tj}\text{-}\acute{e}\text{-}s$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}s$	<i>xos-ì-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}s$	<i>gart-à-r</i>
3SG	$\widehat{tj}\text{-}i$	<i>ker-è-r</i>	$\widehat{tj}\text{-}i$	<i>xos-ì-r</i>	$\widehat{tj}\text{-}i$	<i>gart-à-r</i>
1PL	$\widehat{tj}\text{-}\acute{e}\text{-}nk$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}nk$	<i>xos-ì-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}nk$	<i>gart-à-r</i>
2PL	$\widehat{tj}\text{-}\acute{e}\text{-}k$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}k$	<i>xos-ì-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}k$	<i>gart-à-r</i>
3PL	$\widehat{tj}\text{-}\acute{e}\text{-}n$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}n$	<i>xos-ì-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}n$	<i>gart-à-r</i>
Template:	NEG-AUX-T/AGR		$\sqrt{\text{-TH-CN}}$			

In both the positive and negative present, we find no neutralization: *xos-i-m* ‘I speak’ vs.  $\widehat{tj}\text{-}\acute{e}\text{-}m\text{ xos-}\grave{e}\text{-}r$  ‘I don’t speak’. Prosodically in the negative form, the auxiliary and the connegative participle form a prosodically coherent constituent. The auxiliary has primary stress while the verbal participle has secondary stress. As with prohibitives, secondary stress blocks phonologically-conditioned *i*-neutralization:  $*\widehat{tj}\text{-}\acute{e}\text{-}m\text{ xos-}\grave{e}\text{-}r$  ‘I do not speak’. We can treat the two items as separate prosodic words that combine to form a single larger constituent, whether as a recursive prosodic word (Selkirk 1996; Ito and Mester 2009), a clitic group (Nespor and Vogel 1986; Kabak and Vogel 2001), a composite group (Vogel 2009, 2016), or some PWord group (Vigário 2010).

For the negated present tense, the verb takes the connegative suffix *-r* without any *i*-neutralization. But in the negated past imperfective, the verb takes the suffix *-r* and undergoes *i*-neutralization:  $\widehat{tj}\text{-}\acute{e}\text{-}i\text{ xos-}\grave{e}\text{-}r$  ‘I wasn’t speaking’. The trigger for neutralization is thus the past T morpheme on the auxiliary, not phonology. The segmental environment of the *-i-* theme vowel is the same between the negated present (31) and negated imperfective (32). The underlined past morpheme is linearly before the root and theme vowel.

(32) *Long-distance neutralization in the negated past imperfective of simple verbs*

	E-Class		I-Class		A-Class	
INF		<i>ker-é-l</i>		<i>xos-í-l</i>		<i>gart-á-l</i>
NEG PRES 1SG	$\widehat{tj}\text{-}\acute{e}\text{-}i$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}\underline{i}$	<i>xos-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}i$	<i>gart-à-r</i>
NEG PRES 2SG	$\widehat{tj}\text{-}\acute{e}\text{-}i\text{-}r$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}\underline{i}\text{-}r$	<i>xos-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}i\text{-}r$	<i>gart-à-r</i>
NEG PRES 3SG	$\widehat{tj}\text{-}\acute{e}\text{-}\emptyset\text{-}r$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}\underline{\emptyset}\text{-}r$	<i>xos-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}\emptyset\text{-}r$	<i>gart-à-r</i>
NEG PRES 1PL	$\widehat{tj}\text{-}\acute{e}\text{-}i\text{-}nk$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}\underline{i}\text{-}nk$	<i>xos-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}i\text{-}nk$	<i>gart-à-r</i>
NEG PRES 2PL	$\widehat{tj}\text{-}\acute{e}\text{-}i\text{-}k$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}\underline{i}\text{-}k$	<i>xos-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}i\text{-}k$	<i>gart-à-r</i>
NEG PRES 3PL	$\widehat{tj}\text{-}\acute{e}\text{-}i\text{-}n$	<i>ker-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}\underline{i}\text{-}n$	<i>xos-è-r</i>	$\widehat{tj}\text{-}\acute{e}\text{-}i\text{-}n$	<i>gart-à-r</i>
Template:	NEG-AUX- <u>T</u> -AGR		$\sqrt{\text{-TH-CN}}$			

<sup>11</sup>For 3SG, the negated auxiliary uses a portmanteau:  $\widehat{tj}\text{-}i$ . Before a vowel-initial verb, this 3SG negated auxiliary is reduced to a prefix: *abr-í-l* ‘to live’ [ $\sqrt{\text{-TH-INF}}$ ] vs.  $\widehat{tj}\text{-}\grave{a}br\text{-}\acute{e}\text{-}r$  ‘he does not live’ [NEG- $\sqrt{\text{-TH-CN}}$ ].

Just as in the case of stress-conditioned neutralization, the above case of morphologically-conditioned neutralization is outwardly-sensitive. It is conditioned by the presence of the T morpheme on a separate prosodic word and morphological word: the auxiliary. We thus have a case of allomorphy occurring due to a trigger (T) that is not confined within the same morphological word of the target (the theme vowel). Such cases of word-external or inter-word allomorphy are cross-linguistically rare, but attested (Toosarvandani 2016; Bobaljik and Harley 2017; Harley et al. 2017; Duncan 2019; Weisser 2019). Furthermore, morphophonological dependencies between verbs and their auxiliaries are likewise attested (Elordieta 1997).<sup>12</sup>

In the above paradigm, the theme vowel and the trigger T morpheme are linearly separated by only one morpheme, the root. However, passives (33a) and passivized causatives (33b) show that there is no principled limit on how many morphemes or segments can linearly separate the T morpheme and the theme vowel. Passive verbs are I-Class, and they are formed by adding the suffix *-v-* after the root. Passive verbs undergo *i*-neutralization in the same contexts as simple I-Class verbs.<sup>13</sup>

(33) *Long-distance neutralization in the negated imperfective of passives*

a.	Active verb:	<i>xos-í-l</i>	‘to speak’
		√-TH-INF	
	Passivized	<i>xos-v-i-l</i>	‘to be spoken’
		√-PASS-TH-INF	
	Neg Impf 3PL	<i>tʃ-é-i-n xos-v-è-r</i>	‘they were not spoken’
		NEG-AUX-T-AGR √-PASS-TH-CN	
b.	Active verb:	<i>jer-á-l</i>	‘to boil (intransitive)’
		√-TH-INF	
	Causativized:	<i>jer-á-t̂sən-e-l</i>	‘to boil (transitive)’
		√-TH-CAUS-TH-INF	
	Passivized	<i>jer-a-t̂s-v-i-l</i>	‘to be boiled’
		√-TH-CAUS-PASS-TH-INF	
	Neg Impf 3PL	<i>tʃ-é-i-n jer-a-t̂s-v-è-r</i>	‘they were not boiled’
		NEG-AUX-T-AGR √-CAUS-PASS-TH-CN	

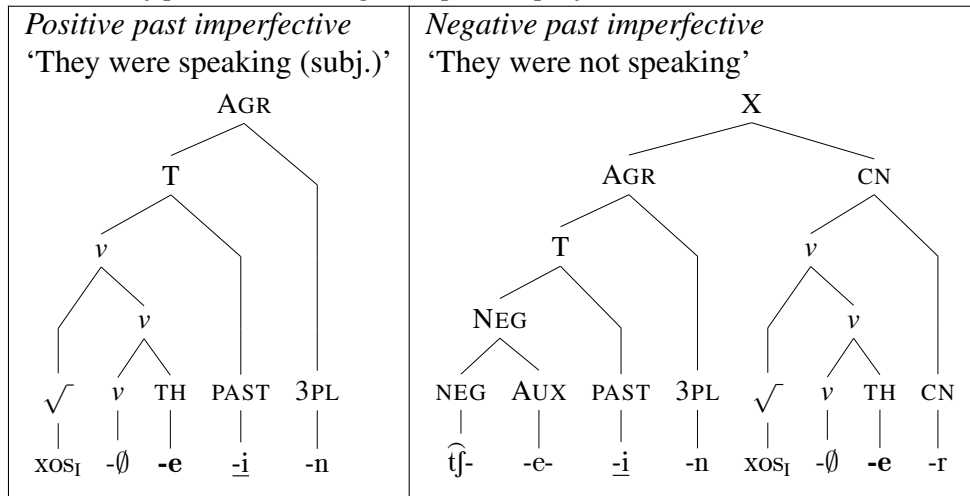
Thus, the trigger for neutralization is the past affix, whether inside the verb or on a separate auxiliary. Linearly, the past morpheme can either follow the theme vowel (in positive past imper-

<sup>12</sup>A reviewer suggests if it’s possible that there is a covert affix or feature present on the connegative for past imperfectives, such that it triggers neutralization in the case of the negated past imperfective, but not the negated present. Similar reanalysis have been suggested for other cases of inter-word allomorphy (Thornton 2019). But the problem with this analysis is that there is no non-circular or independent evidence for this covert affix. For the E-Class and A-Class, the connegative is identical in both tenses: *ker-e-r* ‘scratch-TH-CN’ and *gart-a-r* ‘scratch-TH-CN’. Between the two tenses, the connegative differs only for the I-Class because of *i*-neutralization: *xos-i-r* (present) and *xos-e-r* (past) for ‘speak-TH-CN’.

<sup>13</sup>Causatives are formed by adding the affix *-t̂sən-* after theme vowels; when passivized the causative affix takes the form *-t̂s-*.

fectives) or precede it (in negated past imperfectives). Structurally, these two environments are unified in terms of the presence of +PAST. We assume the periphrastic form is a single constituent called X; its label is tangential.<sup>14</sup>

(34) *Structure of positive and negative past imperfectives*



We argue that the past affix triggers neutralization because both are present within the verbal complex X. Linear order does not matter.

(35) *i-neutralization for past (Final)*

**Neutralization in Past**

$$-i_{-TH} \rightarrow -e_{-TH} / [ \dots \_ \dots +PAST ]_X \text{ or } [+PAST \dots \_ \dots ]_X$$

Further evidence for long-distance comes from the insertion of interveners. The auxiliary and the connegative participle can be separated by other words, indicating that each is a separate morphosyntactic word (cf. similar effects in Turkish and Japanese in Fenger 2020). We consider two types of constructions: cliticization and coordination. Crucially, *i*-neutralization applies even in suspended affixation.

For cliticization, Armenian has a focus-operator clitic =*al* ‘also’ or ‘even’ (36c). It can be added between the auxiliary and the connegative. Another clitic is the colloquial question particle =*mə* (36d). It can also intervene between the auxiliary and the connegative. In all these cases, the past auxiliary triggers *i*-neutralization on the connegative, even though the two are not adjacent.<sup>15</sup>

<sup>14</sup>We omit the indicative prefix *gə-* for the positive past imperfective: *gə-xos-é-i-n* ‘They were speaking’. Without the prefix, the verb is interpreted as subjunctive. We are agnostic over how this periphrastic construction is generated, but some possible venues are post-syntactic operations such as Lowering (Georgieva et al. 2021). It’s possible that X is T, and that Agr is adjoined to T; this would cause the past T to c-command or scope over the theme vowel, while still being on a separate morphological word.

<sup>15</sup>The progressive clitic =*gor* is restricted to colloquial speech (Donabédian 2001). The gloss is abbreviated with I (indicative), N (negation), A (auxiliary), PR (progressive) PS (past), 3 (3pl), CN (connegative).

- (36) a.  $g\theta$ -xos- $\acute{e}$ - $\underline{i}$ -n =gor  
I-speak-TH-PS-3 =PR.  
'They were speaking.'
- b.  $\widehat{tj}$ - $\acute{e}$ - $\underline{i}$ -n xos- $\grave{e}$ -r =gor.  
N-A-PS-3 speak-TH-CN =PR.  
'They were not speaking.'
- c.  $\widehat{tj}$ - $\acute{e}$ - $\underline{i}$ -n =al xos- $\grave{e}$ -r =gor.  
N-A-PS-3 =even speak-TH-CN =PR.  
'They were not even speaking.'
- d.  $\widehat{tj}$ - $\acute{e}$ - $\underline{i}$ -n =m $\theta$  xos- $\grave{e}$ -r =gor.  
N-A-PS-3 =Q speak-TH-CN =PR.  
'Were they not speaking?'
- e.  $\widehat{tj}$ - $\acute{e}$ - $\underline{i}$ -n =al =m $\theta$  xos- $\grave{e}$ -r =gor.  
N-A-PS-3 =even =Q speak-TH-CN =PR.  
'Were they not even speaking?'

We likewise find long-distance neutralization in coordination contexts that trigger suspended 'affixation'. To illustrate this, consider the A-Class verb *gart-a-l* 'to read' and the I-Class verb *xos-i-l* 'to speak' (37a). When coordinated with the conjunction *gam* 'or', both verbs have their own T-Agr marking in the positive past imperfective (37b). The I-Class verb likewise shows *i*-neutralization. The verbs use the indicative prefix *g $\theta$* - to mark mood in the positive. When negated, the negated auxiliary takes all T-Agr marking (37c). It appears before the first verb. The second verb still undergoes *i*-neutralization, and the past trigger is substantially far from the target theme vowel.<sup>16</sup>

- (37) a. *gart-á-l*, *xos-í-l*  
read-TH-INF speak-TH-INF  
'To read, to spread'
- b. *jerp vor urax e-i-n*, *g $\theta$ -gart-á-i-n* *gam g $\theta$ -xos- $\acute{e}$ -i-n* *mer h $\acute{a}$ d- $\theta$*   
when that happy A-PS-3 I-read-TH-PS-3 or I-spread-TH-PS-3 our with-DEF  
'When they were happy, they would read (with us) or speak with us'
- c. *jerp vor neyvadz e-i-n*, *hetj  $\widehat{tj}$ - $\acute{e}$ -i-n* *gart-à-r* *gam xos- $\grave{e}$ -r* *mer*  
when that upset A-PS-3, NPI N-A-PS-3 read-TH-CN or speak-TH-CN our  
*hed- $\theta$*   
with-DEF

<sup>16</sup>The word *hetj* is an NPI that can be mean 'never' or 'at all' (Khanjian 2013). The Turkish-influenced NPI is restricted to colloquial speech. In standard speech, such a sentence without this colloquial element would sound awkward. Furthermore, the negated auxiliary must be repeated for the conjunction *jev* 'and'. These effects are likely due to interaction between the semantics of negation and conjunction. Our gratitude to Sabine Laszakovits, Nazila Shafiei, and Mai Ha Vu for help with elicitations, to Nikita Bezrukov, Samuel Chakmakjian, Hrayr Khanjian, and Tabita Toparlak for judgments, and to Nicholas Rolle for discussion.

‘When they were upset, they would never read nor speak with us.’

For illustration, we repeat the second clause of (37c) with additional notation.

(38) *Suspended affixation and i-neutralization*

NPI	Aux	V1	Coor	V2	PP
hetʃ	tʃ-é-i-n	gart-à-r	gam	xos-è-r	mer hed-ə
NPI	N-A- <u>PS</u> -3	read-TH-CN	or	speak-TH-CN	our with-DEF
‘... they would never read nor speak with us.’					

For the above coordination case, there are two possible analyses for *i*-neutralization. One is that the T-marking on the auxiliary  $tʃ-é-i-n$  triggers the neutralization on  $xos-è-r$ , even though they are not adjacent. That is the analysis that we entertain.

An alternative analysis is that the coordination involves ellipsis. That is, the input underlyingly has two identical auxiliaries, each adjacent to a verb. The second auxiliary would trigger neutralization, and then undergo a later rule of ellipsis.

(39) *Ellipsis-based analysis*

	NPI	Aux	V1	Coor	(Aux)	V2	PP
...,	hetʃ	tʃ-é-i-n	gart-à-r	gam	tʃ-é-i-n	xos-è-r	mer hed-ə
...,	NPI	N-A- <u>PS</u> -3	read-TH-CN	or	N-A- <u>PS</u> -3	speak-TH-CN	our with-DEF
Intended: ‘..., they would never read nor speak with us.’							
Actual meaning: ‘..., they would never read or they wouldn’t speak with us.’							

Because the negated auxiliary forms its own morphological word and prosodic word, an ellipsis-based analysis does at first seem plausible.<sup>17</sup> Cross-linguistically, there isn’t a consensus on whether suspended affixation is actually ellipsis (Despić 2017; Guseva and Weisser 2018; Erschler 2018), prosodic-word deletion (Booij 1985), base-generation, (Orgun 1996, 1999; Kabak 2007; Broadwell 2008; Gong 2021), or some type of raising process (Kornfilt 2012). So if we assumed that the above suspended affixation is truly ellipsis, then this alternative would have ramifications for the derivational ordering of ellipsis and morphological operations (Saab and Lipták 2016; Banerjee 2020, 2021). In fact, some argue that suspended affixation (as ellipsis) precedes readjustment rules (Guseva and Weisser 2018; Erschler 2018), while others provide data that perhaps morphophonological rules can block suspended affixation (Turkish: Kornfilt 2012:185; Hungarian: Kenesei 2007:282).

But this ellipsis-based analysis is not tenable. The sentences with one (38) vs. two auxiliaries (39) are neither semantically nor prosodically identical.<sup>18</sup> First, the use of two auxiliaries (39) can

<sup>17</sup>Our gratitude to Neil Banerjee and Tom Meadows for discussion.

<sup>18</sup>Syntactic-semantic differences between verbal complexes with vs. without suspended affixation are also found in other languages like Japanese (Takano 2004) and Korean (Yoon 2017). In Germanic languages like English, coordination reduction like ‘*ortho and periodontists*’ likewise display semantic differences from unreduced coordination (Artstein 2005).

create a sense of an exclusive-or reading. To illustrate, consider the disambiguation sentence in (40). This sentence can felicitously follow the sentence with the two auxiliaries (39) but not the sentence with only one auxiliary (38).

- (40)  $\widehat{\text{pait}}\widehat{\text{t}}\widehat{\text{f}}\text{-e-m}$                        $\text{kid-e-r}$                        $\text{te}$                        $\text{vormeg-}\widehat{\text{ə}}$                        $\widehat{\text{t}}\widehat{\text{f}}\text{-}\widehat{\text{ər-i-n}}$   
 but NEG-AUX-PRES 1SG know-TH-CN that which-DEF NEG-do-PAST-3PL  
 ‘But I don’t know which of the two actions they didn’t do.’

Second, if the second auxiliary is present (39), then it is harder to make the subsequent postpositional phrase *mer hed-ə* ‘with us’ modify the first verb. It is likewise hard to make the preceding NPI *hetf* modify the second verb. Third, there is a stronger prosodic boundary after the coordination *gam* if the second auxiliary is present.

Thus, coordination and cliticization can create linear interveners between the auxiliary and the connegative. To our knowledge, we have not been able to find other possible interveners. In our judgments, it’s ungrammatical to separate the two with a pronoun, noun, or adverb. To remove the confound of *i*-neutralization, we use an E-Class verb *ker-e-l* ‘to scratch’.

- (41) a.  $\widehat{\text{t}}\widehat{\text{f}}\text{-}\widehat{\text{é-i-n}}$                        $\text{ker-}\widehat{\text{è-r}}$                       =gor.  
           N-A-PS-3                      scratch-TH-CN =PR.  
           ‘They were not scratching.’  
 b.  $*\widehat{\text{t}}\widehat{\text{f}}\text{-}\widehat{\text{é-i-n}}$                        $\text{indzi}$                        $\text{ker-}\widehat{\text{è-r}}$                       =gor.  
           N-A-PS-3                      me.DAT                      scratch-TH-CN =PR.  
           Intended: ‘They were not scratching me.’  
 c.  $*\widehat{\text{t}}\widehat{\text{f}}\text{-}\widehat{\text{é-i-n}}$                        $\text{verk}$                        $\text{ker-}\widehat{\text{è-r}}$                       =gor.  
           N-A-PS-3                      wound                      scratch-TH-CN =PR.  
           Intended: ‘They were not scratching wounds.’  
 d.  $*\widehat{\text{t}}\widehat{\text{f}}\text{-}\widehat{\text{é-i-n}}$                        $\text{arak}$                        $\text{ker-}\widehat{\text{è-r}}$                       =gor.  
           N-A-PS-3                      fast                      scratch-TH-CN =PR.  
           Intended: ‘They were not scratching fast.’

To sum up, neutralization has two classes of triggers: phonological and morphological. The phonological triggers involve a morpheme-specific phonological rule which changes unstressed theme vowel *-i-* to *-e-*. This rule applies after stress is assigned. In contrast, the morphological trigger is the presence of the past suffix which replaces the *-i-* theme vowel *-e-*. This past suffix can be either adjacent to the theme vowel on the verb, or it can be on a non-adjacent auxiliary within the verbal complex.

## 5 Distance and directionality

This section summarizes the data and analysis within a larger theoretical context. The Armenian presents various counter-examples to common cross-linguistic tendencies in allomorphy. We present these tendencies below.

For phonologically-conditioned allomorphy, two cross-linguistic tendencies are the following (Paster 2006, 2009). First, the target of allomorphy is usually conditioned by the phonological structure of inward triggers, not outward targets. Second, the relevant phonological structure of the trigger is present in the input, not necessarily the output. Both tendencies are displayed in the Turkish third person possessive suffix (data from Paster 2009:26, for more see Inkelas 2014:270ff).

- (42) a. *bedel-i*            ‘its price’  
       b. *deri-si*            ‘its skin’  
       c. *bebek*             ‘baby’  
       *bebe-i*             ‘its baby’  
       \**bebek-i*, \**bebek-si*

In general, the Turkish suffix surfaces as *-i* after C-final bases (42a), and as *-si* elsewhere (42b). However, after a *k* final base, the *-i* form is used (42c). But a later process of velar weakening removes the final *k*. If the allomorphy were output-based, then the *-si* form should’ve been used.

Both of these tendencies are violated by phonologically-conditioned *i*-neutralization in Armenian. The theme vowel *-i-* is replaced by *-e-* if it is unstressed. This stress information is determined by examining the entire output string and by seeing if there is a subsequent non-schwa vowel.<sup>19</sup>

- (43) a. *xos-í-l*             $\sqrt{\text{-TH-INF}}$             ‘to speak’  
       b. *xos-í-l-ə*         $\sqrt{\text{-TH-INF-DEF}}$         ‘the act of speaking’  
       c. *xos-e-l-óv*         $\sqrt{\text{-TH-INF-INST}}$         ‘with the act of speaking’

For morphologically-conditioned allomorphy, there are likewise two cross-linguistic tendencies that are violated by morphologically-conditioned *i*-neutralization. First, the trigger and target of morphologically-conditioned allomorphy tend to be adjacent to each other, whether linear or structurally (Siegel 1974, 1978; Allen 1979), though not always (Bobaljik 2000). Second, allomorphy tends to be limited to inside the morphosyntactic word, and is blocked by word-boundaries or by maximal projections (Embick 2010; Bobaljik 2012). This means that periphrasis generally blocks any allomorphy. Both of these tendencies are manifested in comparative formation in Georgian (data taken from Bobaljik 2012:70).

<sup>19</sup>Curiously, Armenian lects display much more cases of outwardly-sensitive phonologically-conditioned allomorphy, e.g., in the plural possessive (Wolf 2013; Arregi et al. 2013; Bezrukov 2016), mobile affixation (Bezrukov and Dolatian 2020), and the allomorphy of the definite article (Dum-Tragut 2009). It’s unclear to me why this is so.



- (44) a. **k'arg**-i                'good'  
       b. u-**k'et**-es-i        'better'  
       c. upro **k'arg**-i        'better'

In Georgian, the root (in bold) for good surfaces as *k'arg* in the positive form. The root can form either a synthetic or periphrastic comparative. In the synthetic form, the comparative suffix *-es* triggers root suppletion to *k'et*. In the periphrastic form, no suppletion is found and the root surfaces as *k'arg*.

Again, these two tendencies are violated by morphologically-conditioned *i*-neutralization. The theme vowel *-i-* faithfully surfaces as *-i-* when it has either primary stress in the indicative present (45a), or secondary stress in the corresponding negative (45b). But in the past imperfective, the underlined +PAST morpheme triggers *i*-neutralization to *-e-*. In the positive (45c), the target (theme vowel) and trigger (past) are adjacent. But in the negative, the two are non-adjacent (45b). They are in two different morphosyntactic words within a periphrastic construction.

- (45) a. gə-xos-í-n                                'they speak'  
       IND-√-TH-PRES3PL  
       b. tʃ-é-n xos-ì-r                                'they don't speak'  
       NEG-AUX-PRES3PL √-TH-CNEG  
       c. gə-xos-é-i-n                                'they were speaking'  
       IND-√-TH-PAST-3PL  
       d. tʃ-é-i-n xos-è-r                                'they weren't speak'  
       NEG-AUX-PAST-3PL √-TH-CNEG

For the negative past imperfective, the trigger of *i*-neutralization is on a separate auxiliary within the periphrastic construction. The auxiliary and the verb can be separated by other elements such as clitics and coordination. This amounts to having long-distance allomorphy across word boundaries. Thus *i*-neutralization applies regardless of the number of intervening segments or morphemes (cf. contra local readjustment rules Embick and Shwayder 2018).

Cross-linguistically, it is rare to find periphrasis-conditioned allomorphy like in Armenian. The closest example that came to our attention is suppletion within serial verb constructions in Yoruba (Stahlke 1970:80ff, Carstens 2002:12, Nicholas Rolle, p.c.). But regardless of its rarity, such long-distance allomorphy across word-boundaries is attested.

## 6 Conclusion

This paper documents a morpheme-specific alternation that contradicts cross-linguistic tendencies in locality and input-sensitivity. The theme vowel *-i-* in Armenian alternates with the vowel *-e-*

across the verbal paradigm. The change from *-i-* to *-e-* is equivalently due to either allomorphy or morpheme-specific readjustment rules. What matters is that this change has two classes of triggers: phonological and morphological.

The phonological trigger is that the theme vowel is unstressed. This amounts to a case of outwardly-sensitive, phonologically-conditioned, and output-based allomorphy. The morphological trigger is the presence of the Past morpheme, anywhere within the verbal complex. The trigger can be adjacent to the theme vowel, or found on a separate auxiliary. The auxiliary can be adjacent or non-adjacent to the verb. This amounts to a cross-linguistically rare case of allomorphy or readjustment that is conditioned across words. In sum, *i*-neutralization is output-sensitive and long-distantly triggered.

## References

- Allen, M. R. (1979). *Morphological investigations*. Ph. D. thesis, University of Connecticut, Storrs, CT.
- Anderson, S. R. (2008). Phonologically conditioned allomorphy in the morphology of Surmiran (Rumantsch). *Word Structure* 1(2), 109–134.
- Anderson, S. R. (2011). Stress-conditioned allomorphy in Surmiran (Rumantsch). In M. Maiden, J. C. Smith, M. Goldbach, and M.-O. Hinzelin (Eds.), *Morphological autonomy: Perspectives from Romance inflectional morphology*, pp. 13–35. New York & Oxford: Oxford University Press.
- Aronoff, M. (1976). *Word formation in generative grammar*. Number 1 in Linguistic Inquiry Monographs. Cambridge, MA: The MIT Press.
- Arregi, K., N. Myler, and B. Vaux (2013). Number marking in Western Armenian: A non-argument for outwardly-sensitive phonologically conditioned allomorphy. In *87<sup>th</sup> Linguistic Society of America Annual Meeting, Boston*. Available online at [https://works.bepress.com/bert\\_vaux/4/](https://works.bepress.com/bert_vaux/4/). Accessed 1 July 2019.
- Artstein, R. (2005). Coordination of parts of words. *Lingua* 115(4), 359–393.
- Banerjee, N. (2020). Ellipsis as obliteration: Evidence from Bengali negative allomorphy. *Proceedings of the Linguistic Society of America* 5(1), 133–143.
- Banerjee, N. (2021). Two ways to form a portmanteau: Evidence from ellipsis. *Proceedings of the Linguistic Society of America* 6(1), 39–52.
- Bermúdez-Otero, R. (2006). Morphological structure and phonological domains in Spanish denominal derivation. In F. Martínez-Gil and S. Colina (Eds.), *Optimality-theoretic studies in Spanish phonology*, pp. 278–311. John Benjamins Amsterdam.

- Bermúdez-Otero, R. (2013). The Spanish lexicon stores stems with theme vowels, not roots with inflectional class features. *Probus* 25(1), 3–103.
- Bermúdez-Otero, R. (2016). We do not need structuralist morphemes, but we do need constituent structure. In D. Siddiqi and H. Harley (Eds.), *Morphological Metatheory*, Volume 229, pp. 385–428. *Linguistik Aktuell/Linguistics Today*.
- Bezrukov, N. (2016). Number marking mismatches in Modern Armenian: A Distributed Morphology approach. Master's thesis, University of Chicago.
- Bezrukov, N. and H. Dolatian (2020). Mobile affixes across Western Armenian: Conflicts across modules. In *University of Pennsylvania Working Papers in Linguistics*, Volume 26.
- Bobaljik, J. D. (2000). The ins and outs of contextual allomorphy. In K. K. Grohmann and C. Struijke (Eds.), *University of Maryland working papers in linguistics*, Volume 10, pp. 35–71. College Park: University of Maryland.
- Bobaljik, J. D. (2012). *Universals in comparative morphology: Suppletion, superlatives, and the structure of words*. Number 50 in *Current Studies in Linguistics*. Cambridge, MA: MIT Press.
- Bobaljik, J. D. and H. Harley (2017). Suppletion is local: Evidence from Hiaki. In H. Newell, M. Noonan, and G. Piggott (Eds.), *The structure of words at the interfaces*, Volume 68, pp. 141–152. Oxford: Oxford University Press.
- Bonet, E. and J. Lloret, Maria-Rosa and Mascaró (Eds.) (2015). *Understanding allomorphy: Perspectives from optimality theory*. *Advances in Optimality Theory*. Equinox Publishing Limited.
- Bonet, E., M.-R. Lloret, and J. Mascaró (2007). Allomorph selection and lexical preferences: Two case studies. *Lingua* 117(6), 903–927.
- Bonet, E., M.-R. Lloret, and J. Mascaró (2015). The prenominal allomorphy syndrome. See Bonet and Lloret (2015), pp. 5–44.
- Booij, G. (1985). Coordination reduction in complex words: A case for prosodic phonology. In H. van der Hulst and N. Smith (Eds.), *Advances in Nonlinear Phonology*, pp. 143–160. Dordrecht: Foris.
- Boyacioglu, N. (2010). *Hay-Pay: Les Verbs de l'arménien occidental*. Paris: L'Asiatheque.
- Boyacioglu, N. and H. Dolatian (2020, December). Armenian Verbs: Paradigms and verb lists of Western Armenian conjugation classes. <https://doi.org/10.5281/zenodo.4397423>.
- Brinkerhoff, M. L. (2019). On subcategorization and priority: Evidence from Welsh allomorphy. Master's thesis, University of North Carolina at Chapel Hill.
- Broadwell, G. A. (2008). Turkish suspended affixation is lexical sharing. In M. Butt and T. Holloway King (Eds.), *Proceedings of the LFG08 Conference*, pp. 198–213.

- Bye, P. (2015). The nature of allomorphy and exceptionality: Evidence from Burushaski plurals. See Bonet and Lloret (2015), pp. 107–176.
- Carstairs, A. (1987). *Allomorphy in inflexion*. London: Croom Helm.
- Carstens, V. (2002). Antisymmetry and word order in serial constructions. *Language* 78(1), 3–50.
- Deal, A. R. and M. Wolf (2017). Outwards-sensitive phonologically-conditioned allomorphy in Nez Perce. See Gribanova and Shih (2017), pp. 29–60.
- Despić, M. (2017). Suspended morphology in Serbian: Clitics vs. affixes. *Glossa: a journal of general linguistics* 2(1).
- Dolatian, H. (2020a). *Computational locality of cyclic phonology in Armenian*. Ph. D. thesis, Stony Brook University.
- Dolatian, H. (2020b). Cyclicity and prosodic misalignment in Armenian stems: Interaction of morphological and prosodic cophonologies. *Natural Language and Linguistic Theory*.
- Dolatian, H. (2021). The role of heads and cyclicity in bracketing paradoxes in Armenian compounds. *Morphology* 31(1), 1–43.
- Dolatian, H. (prep). Phonology of Armenian passives: From pseudo-cyclic stems to cyclic truncation. Unpublished manuscript.
- Dolatian, H. and P. A. Guekguezian (prep). Relativized locality: Phases and tiers in long-distance allomorphy in Armenian. Unpublished manuscript.
- Donabédian, A. (2001). Tabou linguistique en arménien occidental: ‘gor’ progressif est-il ‘turd’? In A. Donabédian (Ed.), *Langues de diaspora, languages en contact. Faits de langue* 18, pp. 201–210. Paris: Ophrys.
- Dum-Tragut, J. (2009). *Armenian: Modern Eastern Armenian*. Number 14 in London Oriental and African Language Library. Amsterdam/Philadelphia: John Benjamins Publishing Company.
- Duncan, P. T. (2019). Unaccusative structures and verbal suppletion in Me’phaa from Iliatenco. In Z. Xu, R. Stockwell, M. O’Leary, and Z. L. Zhou (Eds.), *Proceedings of the 36<sup>th</sup> West Coast Conference on Formal Linguistics*, Somerville, MA, pp. 143–148. Cascadilla Press.
- Elordieta, G. (1997). *Morphosyntactic feature chains and phonological domains*. Ph. D. thesis, University of Southern California.
- Embick, D. (2010). *Localism versus globalism in morphology and phonology*, Volume 60 of *Linguistic Inquiry Monographs*. Cambridge, MA: MIT Press.
- Embick, D. and K. Shwayder (2018). Deriving morphophonological (mis)applications. In R. Petrosino, P. Cerrone, and H. van der Hulst (Eds.), *From Sounds to Structures: Beyond the Veil of Maya*, Volume 135, pp. 193–248. Berlin: Walter de Gruyter.

- Erschler, D. (2018). Suspended affixation as morpheme ellipsis: Evidence from Ossetic alternative questions. *Glossa* 3(1).
- Fairbanks, G. H. (1948). *Phonology and morphology of modern spoken West Armenian*. Ph. D. thesis, University of Wisconsin-Madison, Madison, WI.
- Fenger, P. (2020). *Words within Words: The Internal Syntax of Verbs*. Ph. D. thesis, University of Connecticut.
- Flack, K. (2007). Templatic morphology and indexed markedness constraints. *Linguistic Inquiry* 38(4), 749–758.
- Georgieva, E., M. Salzmann, and P. Weisser (2021). Negative verb clusters in mari and udmurt and why they require postsyntactic top-down word-formation. *Natural Language & Linguistic Theory*, 457–503.
- Gong, Z. M. (2021). Postsyntactic lowering and linear relations in dagur noun phrases. *Glossa: a journal of general linguistics* 6(1).
- Gordon, M. (2002). A factorial typology of quantity-insensitive stress. *Natural Language & Linguistic Theory* 20(3), 491–552.
- Gribanova, V. and S. S. Shih (Eds.) (2017). *The morphosyntax-phonology connection: Locality and directionality at the interface*. Oxford University Press.
- Grijzenhout, J. and B. Kabak (Eds.) (2009). *Phonological domains: Universals and deviations*. Number 16 in Interface explorations. Berlin: Mouton de Gruyter.
- Guekguezian, P. A. and H. Dolatian (in press). Distributing theme vowels across roots, verbalizers, and voice in western armenian verbs. Proceedings of the 39<sup>th</sup> meeting of the West Coast Conference on Formal Linguistics (WCCFL).
- Guseva, E. and P. Weisser (2018). Postsyntactic reordering in the Mari nominal domain: Evidence from suspended affixation. *Natural Language & Linguistic Theory* 36(4), 1089–1127.
- Halle, M. and A. Marantz (1993). Distributed morphology and the pieces of inflection. In K. Hale and S. J. Keyser (Eds.), *The view from Building 20: Studies in linguistics in honor of Sylvain Bromberger*, pp. 111–176. Cambridge, MA: MIT Press.
- Hannahs, S. J. and M. Tallerman (2006). At the interface: selection of the Welsh definite article. *Linguistics* 44(4), 781–816.
- Harley, H., M. Tubino, and J. D. Haugen (2017). Locality conditions on suppletive verbs in Hiaki. See Gribanova and Shih (2017), pp. 91–111.
- Harley, H. and M. Tubino Blanco (2013). Cycles, vocabulary items, and stem forms in Hiaki. In O. Matushansky and A. Marantz (Eds.), *Distributed Morphology Today*, pp. 117–134. MIT Press.

- Herce, B. (2020). Stem alternations in Kiranti and their implications for the morphology–phonology interface. *Journal of Linguistics*, 321–363.
- Inkelas, S. (2014). *The interplay of morphology and phonology*. Oxford: Oxford University Press.
- Ito, J. and A. Mester (2009). The extended prosodic word. See Grijzenhout and Kabak (2009), pp. 135–194.
- Kabak, B. (2007). Turkish suspended affixation. *Linguistics* 45(2), 311–347.
- Kabak, B. and I. Vogel (2001). The phonological word and stress assignment in Turkish. *Phonology* 18(3), 315–360.
- Kager, R. (2009). Lexical irregularity and the typology of contrast. In K. Hanson and S. Inkelas (Eds.), *The Nature of the Word: Studies in Honor of Paul Kiparsky*, Current Studies in Linguistics, pp. 397–432. Cambridge, MA: The MIT Press.
- Kalin, L. (2020). Morphology before phonology: A case study of Turoyo (Neo-Aramaic). *Morphology* 30(3), 135–184.
- Karakaş, A., H. Dolatian, and P. A. 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).
- Kenesei, I. (2007). Semiwords and affixoids: The territory between word and affix. *Acta Linguistica Hungarica* 54(3), 263–293.
- Khanjian, H. (2013). *(Negative) concord and head directionality in Western Armenian*. Ph. D. thesis, Massachusetts Institute of Technology.
- Kiparsky, P. (1996). Allomorphy or morphophonology? In R. Singh and R. Desrochers (Eds.), *Trubetzkoy's Orphan: Montréal Roundtable "Morphonology: Contemporary responses,"* pp. 13–31. Amsterdam: John Benjamins.
- Kogian, S. L. (1949). *Armenian grammar (West dialect)*. Vienna: Mechitharist Press.
- Kornfilt, J. (2012). Revisiting “suspended affixation” and other coordinate mysteries. *Functional Heads: The Cartography of Syntactic Structures* 7, 181–196.
- Margaryan, A. S. (1997). *Žamanakacic' hayoc' lezow: Hnčyownabanowt'yown [Contemporary Armenian language: Phonology]*. Yerevan: Yerevani Petakan Hamalsarani Hrtarakčowt'yown.
- Mascaró, J. (2007). External allomorphy and lexical representation. *Linguistic Inquiry* 38(4), 715–735.
- McCarthy, J. J. (2005). Optimal paradigms. In L. J. Downing, T. A. Hall, and R. Raffelsiefen (Eds.), *Paradigms in phonological theory*, pp. 171–210. Oxford: Oxford University Press.

- McCarthy, J. J. and A. Prince (1993). Prosodic morphology I: Constraint interaction and satisfaction. Unpublished manuscript.
- McCarvel, M. K. (2016). *Harmonic serialism with lexical selection: Evidence from Jèrriais allomorphy*. Ph. D. thesis, The University of Utah.
- Nespor, M. and I. Vogel (1986). *Prosodic phonology*. Dordrecht: Foris.
- Oltra-Massuet, I. (1999). On the notion of theme vowel: A new approach to Catalan verbal morphology. Master's thesis, Massachusetts Institute of Technology.
- Orgun, C. O. (1996). *Sign-based morphology and phonology with special attention to Optimality Theory*. Ph. D. thesis, University of California, Berkeley, Berkeley, CA.
- Orgun, C. O. (1999). Sign-based morphology: a declarative theory of phonology-morphology interleaving. In B. Hermans and M. van Oostendorp (Eds.), *The Derivational Residue in Phonological Optimality Theory*, Volume 28, pp. 247–267. Amsterdam/Philadelphia: John Benjamins Publishing.
- Paster, M. (2006). *Phonological conditions on affixation*. Ph. D. thesis, University of California, Berkeley, Berkeley, CA.
- Paster, M. (2009). Explaining phonological conditions on affixation: Evidence from suppletive allomorphy and affix ordering. *Word structure* 2(1), 18–37.
- Pater, J. (2007). The locus of exceptionality: Morpheme-specific phonology as constraint indexation. In L. Bateman, M. O'Keefe, E. Reilly, and A. Werle (Eds.), *University of Massachusetts Occasional Papers in Linguistics 32: Papers in Optimality Theory III*, pp. 187–207. Amherst, MA: Graduate Linguistics Student Association, University of Massachusetts.
- Prince, A. and P. Smolensky (2004). *Optimality Theory: Constraint Interaction in Generative Grammar*. Oxford: Blackwell Publishing.
- Roca, I. (2010). Theme vowel allomorphy in Spanish verb inflection: An autosegmental optimality account. *Lingua* 120(2), 408–434.
- Saab, A. and A. Lipták (2016). Movement and deletion after syntax: Licensing by inflection reconsidered. *Studia Linguistica* 70(1), 66–108.
- Selkirk, E. (1996). The prosodic structure of function words. In J. L. Morgan and K. Demuth (Eds.), *Signal to syntax: Bootstrapping from speech to grammar in early acquisition*, Volume 187, pp. 214. Mahwah, NJ: Lawrence Erlbaum Associates.
- Siegel, D. (1978). The adjacency constraint and the theory of morphology. In M. Stein (Ed.), *Proceedings of the Eighth Annual Meeting of the North Eastern Linguistics Society*, Amherst, pp. 189–1–97. University of Massachusetts.

- Siegel, D. C. (1974). *Topics in English morphology*. Ph. D. thesis, Massachusetts Institute of Technology.
- Stahlke, H. (1970). Serial verbs. *Studies in African linguistics* 1(1), 60–99.
- Stump, G. (1995). The uniformity of head marking in inflectional morphology. In G. Booij and J. van Marle (Eds.), *Yearbook of Morphology 1994*, pp. 245–296. Dordrecht: Kluwer.
- Stump, G. (2001). *Inflectional morphology: A theory of paradigm structure*. Number 93 in Cambridge Studies in Linguistics. Cambridge: Cambridge University Press.
- Svenonius, P. (2012). Look both ways: Outward-looking allomorphy in Icelandic participles. unpublished manuscript.
- Takano, Y. (2004). Coordination of verbs and two types of verbal inflection. *Linguistic Inquiry* 35(1), 168–178.
- Thornton, A. (2019). Agreeing in number: Verbal plural suppletion and reduplication. *The Linguistic Review* 36(3), 531–552.
- Toosarvandani, M. (2016). Vocabulary insertion and locality: Verb suppletion in Northern Paiute. In C. Hammerly and B. Prickett (Eds.), *Proceedings of the Forty-Sixth Annual Meeting of the North East Linguistic Society*, pp. 247–257.
- Vaux, B. (1998). *The phonology of Armenian*. Oxford: Clarendon Press.
- Vigário, M. (2010). Prosodic structure between the prosodic word and the phonological phrase: Recursive nodes or an independent domain? *The Linguistic Review* 27(4), 485–530.
- Vogel, I. (2009). The status of the clitic group. See Grijzenhout and Kabak (2009), pp. 15–46.
- Vogel, I. (2016). Life after the strict layer hypothesis: Prosodic structure geometry. In Y. Zhang, Hongming Qian (Ed.), *Prosodic Studies: Challenges and Prospects*. London: Routledge.
- Weisser, P. (2019). Telling allomorphy from agreement. *Glossa: a journal of general linguistics* 4(1).
- Wolf, M. (2008). *Optimal interleaving: Serial phonology-morphology interaction in a constraint-based model*. Ph. D. thesis, University of Massachusetts, Amherst, Amherst, MA.
- Wolf, M. (2013). Candidate chains, unfaithful spell-out, and outwards-looking phonologically-conditioned allomorphy. *Morphology* 23(2), 145–178.
- Yoon, J. (2017). Lexical integrity and suspended affixation in two types of denominal predicates in Korean. *Glossa: a journal of general linguistics* 2(1).
- Yu, A. C. (2007). *A Natural History of Infixation*. Number 15 in Oxford Studies in Theoretical Linguistics. Oxford: Oxford University Press.