

# Derivational timing of morphemes: Canonicity and rule ordering in the Armenian aorist stem

Hossep Dolatian and Peter Guekguezian

June 28, 2022

## Abstract

Cross-linguistically, morphemes are empirically robust but there are few well-studied cases outside of Romance. We analyze the distribution of present and aorist stems in Western Armenian, an understudied Indo-European language. Canonically, the aorist encodes perfective aspect, but it is meaninglessly used in different paradigm cells for different conjugation classes. For these meaningless cases, the aorist stem acts as a morphomic item. The shape of the aorist stem varies across conjugation classes, including regular classes that use a dedicated aorist suffix vs. irregular classes that use root suppletion. This parallelism across the regular and irregular verbs further establishes that the aorist stem is a legitimate morphological item, and not just a set of homophonous items. We formalize the data in Distributed Morphology, a post-syntactic morphological framework. We use head-insertion or node-sprouting to model how the aorist suffix has canonical perfective semantics, but it is meaninglessly inserted by the morphology in non-perfective contexts. We find that the creation of the aorist stem occurs early in the derivation, and it cyclically interacts with allomorphy and morphophonological alternations. In sum, the morphomic aorist is well-integrated into Armenian morphotactics, and morphomic elements interact with other morphological operations.

## 1 Introduction

Inflectional paradigms tend to display patterns which are both systematic and idiosyncratic. These patterns are often called morphemes or morphomic patterns (Aronoff 1994). Morphemes lack any apparent external grounding in phonology, syntax, or semantics. To quote Trommer (2016; 60), a morpheme is “a systematic morphological syncretism

which does not define a (syntactically or semantically) natural class.” As such, morphemes provide key data for theories of morphology. However, most theoretical work on morphomic patterns focuses on Romance languages and in a non-derivational framework. As an empirical and theoretical contribution, we describe morphomic patterns in Western Armenian verbs. We establish the aorist stem as a morphomic item. As a theoretical contribution, we integrate our analysis of Armenian morphemes within a larger post-syntactic derivational framework to morphology, Distributed Morphology (Halle & Marantz 1993; Arregi & Nevins 2012).<sup>1</sup>

Armenian is an Indo-European language with two standard dialects: Western and Eastern. We focus on the conjugation system of Western Armenian, but the generalizations apply to Eastern as well.<sup>2</sup> In descriptive grammars, Armenian verbs have two stems: a present stem (bold, in 1a) and the aorist stem (underlined, 1b). In regular verbs, the aorist stem involves the use of the aorist suffix  $\overline{ts}$ -. For example, for two of the regular verb classes (E-Class and A-Class), the aorist is used meaningfully in the past perfective paradigm (1b) as an aspect marker. However, the aorist is used meaninglessly or spuriously in other contexts, such as the imperative 2PL (1c). The presence of this spurious aorist is also class-specific (1d): it surfaces in the subject participle of A-Class verbs, but not E-Class verbs, with no semantic or syntactic difference.

(1) Illustrating aorist stems

	E-Class ‘to drink’	A-Class ‘to read’	
a. Infinitive	<b><math>\chi\grave{a}m\text{-}e\text{-}l</math></b>	<b><math>g\grave{a}rt^h\text{-}a\text{-}l</math></b>	$\sqrt{\text{-TH-INF}}$
b. PST PFV 3PL	<u><math>\chi\grave{a}m\text{-}e\text{-}\overline{ts}\text{-}i\text{-}n</math></u>	<u><math>g\grave{a}rt^h\text{-}a\text{-}\overline{ts}\text{-}i\text{-}n</math></u>	$\sqrt{\text{-TH-AOR-PST-3PL}}$
c. IMP 2PL	<u><math>\chi\grave{a}m\text{-}e\text{-}\overline{ts}\text{-}ek^h</math></u>	<u><math>g\grave{a}rt^h\text{-}a\text{-}\overline{ts}\text{-}ek^h</math></u>	$\sqrt{\text{-TH-AOR-2PL}}$
d. SPTCP.	<b><math>\chi\grave{a}m\text{-}o\text{-}\text{Ե}</math></b>	<u><math>g\grave{a}rt^h\text{-}a\text{-}\overline{ts}\text{-}o\text{-}\text{Ե}</math></u>	$\sqrt{\text{(-TH-AOR)-SPTCP}}$

Throughout the paper, we use the  $\sqrt{\quad}$  symbol to gloss roots; this allows us to use a single glossing for multiple word-forms, making our tables more readable.

Classes vary in how the aorist stem is formed (Table 9). The distribution of the aorist stem is likewise meaningless but systematic (Table 19). We analyze the distribution of the aorist stem or spurious aorist. We show that the distribution is indeed morphomic.

<sup>1</sup>For discussion, we thank Mark Aronoff and Borja Herce. Our gratitude to the editor (Olivier Bonami) and the reviewers for bearing with us.

<sup>2</sup>Data is from our native judgments, corroborated with extensive paradigms that can be found in Boyacioglu (2010), and accessible online from Boyacioglu & Dolatian (2020). A general analysis of the conjugation system of Armenian can be found in Dolatian & Guekguezian (2021). Our glossing uses the Leipzig glosses with the following additions: AOR (aorist), CN (connegative), EPTCP (evidential participle), INCH (inchoative), LV (linking vowel), PTCP (participle), T (tense), TH (theme), RPTCP (resultative participle), SPTCP (subject participle), VX (meaningless infix/suffix). Data is in IPA based on the phonology of Lebanon/US-based Western Armenian where affricates are unaspirated. When useful, glosses are placed in text with brackets. Supplementary materials are in <https://osf.io/496d3/>.

However, it still displays morphological regularities with respect to morphological rule ordering and implicational relationships. We establish the following pre-theoretical properties:

(2) Properties of the aorist stem

- a. CORE SEMANTICS: The main function of the aorist stem is to mark past perfectivity.
- b. MEANINGLESS EXTENSION: The aorist stem is also used in diverse paradigm cells without contributing any perfective semantics.
- c. CLASS-SPECIFICITY: Different conjugation classes use the aorist stem in different paradigm cells.
- d. STEM COMPOSITION: The shape of the aorist stem differs by class and can involve combinations of simple concatenation, allomorphy, and zero morphs.
- e. STEM UNITY: Within a conjugation class, the aorist stem has a constant shape across paradigm cells. The aorist stem is a coherent morphological item and it is not reducible to multiple homophonous items.

As an analytical framework, we assume a piece-based realization model like Distributed Morphology (Halle & Marantz 1993). Following Trommer (2016), we illustrate that DM is capable of generating morphomic patterns. We utilize insertion rules to generate a meaningless aorist suffix within specific morphological contexts. These insertion rules have recently been renamed *node sprouting* rules (Choi & Harley 2019). We argue that the spurious aorist is deeply ingrained into the morphotactics of Armenian. The rules for inserting the aorist suffix display locality conditions. The rules can feed, bleed, and be fed by other morphological rules.

The paper is organized as follows. We first descriptively go through the formation of aorist stems (§2) and how they're canonically used to mark the past perfective. We then discuss the arbitrary distribution of the aorist stem across the Armenian paradigm, showing that it varies by class (§3). We summarize the descriptive data as pre-theoretical generalizations in §4. Our analysis is in §5, showing how the creation of aorist stems interacts cyclically with vocabulary insertion and allomorphy. Section §6 discusses our data in a larger theoretical framework. Conclusions are in §7.

## 2 Aorist stems in Armenian

We provide an overview of Armenian verbal morphology. We go over the conjugation classes of regular verbs (§2.1), and the formation of the present stem (§2.2). We discuss the formation of the aorist stem in regular (§2.3) and irregular verbs (§2.4).

## 2.1 Conjugation classes in Armenian

In Western Armenian, verbs can be divided into three large categories: regular simplex verbs, regular complex verbs, and irregular verbs. We first discuss regular verbs.

The citation form of a verb is the infinitive (3). For simplex verbs, the infinitive is formed by a root, theme vowel, and infinitive suffix *-l*. There are three types of simplex verbs based on the choice of theme vowel: E-Class with theme *-e-*, I-Class with *-i-*, and A-Class with *-a-*. The choice of theme vowel is largely root-conditioned with some correlations to transitivity (Guekguezian & Dolatian in press), especially as diathesis in some verbs (Donabédian 1997).

### (3) Simplex verbs in Western Armenian in the infinitive form

E-Class ‘to drink’ χəm-e-l	I-Class ‘to speak’ χos-i-l	A-Class ‘to read’ gart <sup>h</sup> -a-l	√-TH-INF
-------------------------------	-------------------------------	---	----------

As for complex verbs, these consist of a stem and a valency-marking suffix. There are three types of complex verbs: causatives, passives, and inchoatives (4). Causatives include the causative suffix *-tsən-*, passives include the passive suffix *-v-*, and inchoatives include the inchoative suffix *-n-*. The three types of complex verbs take different theme vowels. The causative and passive can be derived from verbs, while the causative and inchoative can be derived from non-verbs such as [k<sup>h</sup>er] ‘fat’.

### (4) Complex verbs in the infinitive form

Causative ‘to make drink’ χəm-t̄sən-e-l √-CAUS-TH-INF	Passive ‘to be spoken’ χos-v-i-l √-PASS-TH-INF	Inchoative ‘to become fat’ k <sup>h</sup> er-n-a-l √-INCH-TH-INF
---	--	--

For causatives and inchoatives, some lexemes include a meaningless vowel /-e-/ or /-a-/ before the valency marker; the presence and type of vowel is lexically arbitrary (Dolatian & Guekguezian 2021). When derived from verbs, this vowel is the root’s theme vowel. When derived from non-verbs, this vowel is a meaningless linking vowel that is also used to form compounds.

### (5) Pre-valency vowel in causatives and inchoatives

	Verb base	Causative	Non-verb base	Inchoative
Using /-e-/	jerk <sup>h</sup> -e-l ‘to sing’	jerk <sup>h</sup> -e-t̄sən-e-l ‘to make sing’	mod ‘near’	mod-e-n-a-l ‘to get near’
Using /-a-/	gart <sup>h</sup> -a-l ‘to read’ √-TH-INF	gart <sup>h</sup> -a-t̄sən-e-l ‘to make read’ √-TH-CAUS-TH-INF	urax ‘happy’ √	urax-a-n-a-l ‘to become happy’ √-LV-INCH-TH-INF

For irregular verbs, there are three basic categories: aorist-less verbs, infixed verbs, and suppletive verbs. We postpone discussing them till later.

This completes the basic overview of conjugation classes in Armenian. The next section discusses stem formation across the classes.

## 2.2 Present stems in Armenian

Traditional Armenian grammars describe that a verb's paradigm consists of two basic elements or stems: the present stem and the aorist stem (Kogian 1949; 82; Fairbanks 1948; 61, 1958; 152; Bardakjian & Thomson 1977; 72; Dum-Tragut 2009; 199).<sup>3</sup> We discuss the formation of these stems. We first discuss the present stem.

The present stem is essentially the elsewhere or default stem (Table 1). It is composed of all the morphological material from the root to the theme vowel, inclusive (in **bold**).<sup>4</sup> This is the form of the stem that is found in the infinitive, where there is no semantic tense. The present stem is also found in various finite forms such the subjunctive present and subjunctive past imperfective.

Table 1: Present stems in the infinitive, subjunctive present, and subjunctive past imperfective

	Infinitive	PRS 3PL	PST IMPF 3PL	
E-Class 'to drink'	<b>χəm-e-l</b>	<b>χəm-e-n</b>	<b>χəm-e-i-n</b>	√-TH(-PST)-3PL
I-Class 'to speak'	<b>χos-i-l</b>	<b>χos-i-n</b>	<b>χos-e-i-n</b>	√-TH(-PST)-3PL
A-Class 'to read'	<b>gart<sup>h</sup>-a-l</b>	<b>gart<sup>h</sup>-a-n</b>	<b>gart<sup>h</sup>-a-i-n</b>	√-TH(-PST)-3PL
Causative 'to make drink'	<b>χəm-t̄sən-e-l</b>	<b>χəm-t̄sən-e-n</b>	<b>χəm-t̄sən-e-i-n</b>	√-CAUS-TH(-PST)-3PL
Passive 'to be spoken'	<b>χos-v-i-l</b>	<b>χos-v-i-n</b>	<b>χos-v-e-i-n</b>	√-PASS-TH(-PST)-3PL
Inchoative 'to get fat'	<b>k<sup>h</sup>er-n-a-l</b>	<b>k<sup>h</sup>er-n-a-n</b>	<b>k<sup>h</sup>er-n-a-i-n</b>	√-INCH-TH(-PST)-3PL

The subjunctive present is formed by adding the appropriate person-agreement marker after the verb's theme vowel. The subjunctive past imperfective also includes the past marker /-i-/ between the theme and agreement. The form of the plural person-agreement markers are the same between past and present tense (such as 3PL in Table 1); they vary for the singulars: 2SG PRS /**χəm-e-s**/ vs. PST IMPF /**χəm-e-i-r**/ of 'to drink' (Karakaş et al.

<sup>3</sup>The present stem is also called the infinitive stem (Dum-Tragut 2009; 199). The aorist stem is also called the preterite (Fairbanks 1958; 152). Other names that we've seldom encountered are imperfective vs. perfective, and present vs. past. The Armenian name for the aorist stem is also just the past perfective stem, and it can be further subcategorized as [t̄sojagan himk<sup>h</sup>] 'stem with the t̄s sound' (as used for regular verbs) vs [ant̄sojagan himk<sup>h</sup>] 'stem without the t̄s sound' (as used for irregulars) (Արրահամյան 1962; 328)

<sup>4</sup>Some grammars treat the present stem as the material that precedes the theme vowel, e.g., just the root for E-Class [**χəm**-e-l] 'to drink' (Kogian 1949; 82). We opt to include the theme vowel for easier contrasts, and because theme vowels are class-specific, root-specific, and are also involved in forming the aorist stem.

2021). Vowel hiatus between the theme and past /-i-/ is repaired by glide epenthesis (not shown): PST IMPF 3PL /χəm-e-i-n/ → [χəm-e-ji-n]. The /-i-/ theme vowel becomes [e] before the past suffix /-i-/ due to an independent morphophonological process (Dolatian accepted).

To clarify the above paradigm cells, the subjunctive forms are used in subjunctive clauses. They signify irrealis actions and are used in a variety of contexts. The indicative version is formed by adding the prefix *g(ə)*-.

- (6) a. jet<sup>h</sup>e χəm-e-n, jet<sup>h</sup>e χəm-e-ji-n  
if **drink-TH-3PL**, if **drink-TH-PST-3PL**  
‘If they drink, if they were to drink.’
- b. gə-χəm-e-n, gə-χəm-e-ji-n gor  
IND-**drink-TH-3PL**, IND-**drink-TH-PST-3PL** PROG  
‘They drink, they were drinking.’

Throughout this paper, we provide finite forms in the 3PL. The same basic morphological template is used for all other persons and numbers (Karakas et al. 2021).

## 2.3 Aorist stems for regular verbs

The above data concerned the present stem. Each verb likewise has what is called the “aorist stem”. This stem is canonically used in the past perfective (“simple past” or “past aorist”). We first discuss the past perfective in this section. The perfective is the most frequent part of paradigm where we use aorist stems, as we discuss later in §4. The other contexts for the aorist stem are described in §3.

We underline the aorist stem throughout this paper (Table 2). For simplex verbs, the aorist stem consists of the root, theme vowel, and the perfective suffix *-ts-*. After this suffix, the past suffix and agreement markers are added. For example, present stem *χəm-e-l* ‘to drink’ vs. aorist stem *χəm-e-ts-i-n* ‘they drank’.

Table 2: Aorist stem for the past perfective of simple E-, I-, and A-Classes

	E-Class ‘to drink’	I-Class ‘to speak’	A-Class ‘to read’	
Infinitive	<u>χəm-e-l</u>	<u>χos-i-l</u>	<u>gart<sup>h</sup>-a-l</u>	√-TH-INF
PST IMPF 3PL	<u>χəm-e-i-n</u>	<u>χos-e-i-n</u>	<u>gart<sup>h</sup>-a-i-n</u>	√-TH-PST-3PL
PST PFV 3PL	<u>χəm-e-ts-i-n</u>	<u>χos-e-ts-a-n</u>	<u>gart<sup>h</sup>-a-ts-i-n</u>	√-TH-AOR-PST-3PL
	‘they drank’	‘they spoke’	‘they read.PST’	

In terms of usage, the past perfective is translatable to the simple past of English. We gloss the aorist suffix or perfective suffix  $-\widehat{ts}$ - as AOR. For the past marker, we see allomorphy. For the E-Class and A-Class, this marker is  $/-i-/$  in both the past imperfective and past perfective. For the I-Class, the past marker is  $/-i-/$  for the imperfective but  $/-a-/$  for the perfective. As we shall see, other conjugation classes also use this  $/-a-/$  past allomorph in the past perfective.<sup>5</sup> The  $/-i-/$  theme vowel changes to  $/-e-/$  before the aorist as an independent morphophonological process (Dolatian accepted).

As a minor terminological issue, the perfective suffix  $/-\widehat{ts}-/$  is often called the *aorist* suffix in the descriptive literature on Armenian. This is because of its diachronic origin as the sigmatic aorist marker of Proto-Indo-European. (Kortlandt 1987, 1995, 2018; Vaux 1995; Kocharov 2018; Martirosyan 2018; Kim 2018). For illustration, we follow this practice of using the term “aorist” for the  $-\widehat{ts}$ - morph, though its semantics are more precisely perfective.

For the regular classes, the aorist stem is formed via simple concatenation of the root, theme, and perfective suffix. That is, for these verbs, the aorist stem is just the present (or default) stem plus the aorist suffix. Outside of the 3SG, the past imperfective and past perfective form morphological minimal pairs for E-Class and A-Class verbs: 3PL PST IMPF  $/\chi\grave{a}m-e-i-n/$  vs. PFV  $/\chi\grave{a}m-e-\widehat{ts}-i-n/$  for ‘to drink’. Both verbs contain the past tense marker  $/-i-/$  (Karakaş et al. 2021). It is the presence of the suffix  $/-\widehat{ts}-/$  that triggers a perfective reading (Donabédian 2016). This is our first generalization of CORE SEMANTICS. The basic function of the aorist stem and of the aorist suffix itself is to mark perfectivity. Corpus evidence from §4 reinforces this argument because the past perfective is the most frequent paradigm cell that uses the aorist stem.

For the complex classes, the formation of the aorist stem is more complicated. For passives, the aorist stem is formed in the same way as for the I-Class (Table 3). The aorist suffix  $/-\widehat{ts}-/$  is added after the passive suffix. The past marker is  $/-a-/$  for the perfective, just as in the I-Class. Note that theme vowels are deleted when immediately before the passive suffix; we don’t show these deleted vowels for now.

Table 3: Aorist stem for the past perfective of passives

Base	$\chi\grave{a}m-e-l$ ‘to drink’	$\chi\acute{o}s-i-l$ ‘to speak’	$\sqrt{-TH-}INF$
Passive INF	$\chi\grave{a}m-v-i-l$ ‘to be drunk’	$\chi\acute{o}s-v-i-l$ ‘to be spoken’	$\sqrt{-PASS-TH-}INF$
PST IMPF 3PL	$\chi\grave{a}m-v-e-i-n$	$\chi\acute{o}s-v-e-i-n$	$\sqrt{-PASS-TH-PST-3PL}$
PST PFV 3PL	$\chi\grave{a}m-v-e-\widehat{ts}-a-n$ ‘they were drunk’	$\chi\acute{o}s-v-e-\widehat{ts}-a-n$ ‘they were spoken’	$\sqrt{-PASS-TH-AOR-PST-3PL}$

<sup>5</sup>The allomorphy of the past tense markers  $/-i,-a-/$  is tangential to this paper, but see Dolatian & Guekguezian (2021) and Karakaş et al. (2021) for analysis.

For the causative, the aorist stem is formed by changing the causative suffix from its elsewhere morph /- $\widehat{ts}\text{an-}$ / to an allomorph /- $\widehat{tsu-}$ / (Table 4). The theme vowel /- $\widehat{e-}$ / is absent. The aorist suffix /- $\widehat{ts-}$ / is then added. Tense and agreement then follows.<sup>6</sup>

Table 4: Aorist stem for the past perfective of causatives

Base	$\chi\text{am-e-l}$ 'to drink'	$\text{jer}^{\text{h}}\text{e-l}$ 'to sing'	$\text{g}\text{ar}^{\text{h}}\text{-a-l}$ 'to read'	$\sqrt{-\text{TH-}}\text{INF}$
Causative INF	$\chi\text{am-}\widehat{\text{tsan-e-l}}$ 'to make drink'	$\text{jer}^{\text{h}}\text{-e-}\widehat{\text{tsan-e-l}}$ 'to make sing'	$\text{g}\text{ar}^{\text{h}}\text{-a-}\widehat{\text{tsan-e-l}}$ 'to make read'	$\sqrt{(-\text{TH})-\text{CAUS-TH-}}\text{INF}$
PST IMPF 3PL	$\chi\text{am-}\widehat{\text{tsan-e-i-n}}$	$\text{jer}^{\text{h}}\text{-e-}\widehat{\text{tsan-e-i-n}}$	$\text{g}\text{ar}^{\text{h}}\text{-a-}\widehat{\text{tsan-e-i-n}}$	$\sqrt{(-\text{TH})-\text{CAUS-TH-PST-}}\text{3PL}$
PST PFV 3PL	$\chi\text{am-}\widehat{\text{tsu-}\emptyset\text{-}\widehat{\text{ts-i-n}}}$ 'they made drink'	$\text{jer}^{\text{h}}\text{-e-}\widehat{\text{tsu-}\emptyset\text{-}\widehat{\text{ts-i-n}}}$ 'they made sing'	$\text{g}\text{ar}^{\text{h}}\text{-a-}\widehat{\text{tsu-}\emptyset\text{-}\widehat{\text{ts-i-n}}}$ 'they made read'	$\sqrt{(-\text{TH})-\text{CAUS-TH-AOR-PST-}}\text{3PL}$

As seen above, the presence or type of pre-causative vowel doesn't matter. The aorist stem of all causatives is formed in the above manner.

Note that throughout this paper, we use zero morphs in glossing the aorist stems. This is out of descriptive convenience. The zero morphs show the items that are present in the present stem, but absent in the aorist stem. Whether we use zeros or not does not affect our pre-theoretical generalizations. The later DM analysis uses these zeros for convenience as well.

For the inchoative, the aorist stem is formed in a more complicated manner (Table 5). The aorist stem involves deleting the inchoative suffix /- $\widehat{n-}$ /, deleting the theme vowel /- $\widehat{a-}$ /, and then adding the aorist suffix /- $\widehat{ts-}$ / . The past marker /- $\widehat{a-}$ / and agreement markers are then added. Note the illustrative utility of using zero morphs because of how different the present and aorist stems are.

Table 5: Aorist stem for the past perfective of inchoatives

Base	$\text{k}^{\text{h}}\text{er}$ 'fat'	$\text{mod}$ 'near'	$\text{urax}$ 'happy'	$\sqrt{\quad}$
Inchoative INF	$\text{k}^{\text{h}}\text{er-n-a-l}$ 'to get fat'	$\text{mod-e-n-a-l}$ 'to get near'	$\text{urax-a-n-a-l}$ 'to become happy'	$\sqrt{(-\text{LV})-\text{INCH-TH-}}\text{INF}$
PST IMPF 3PL	$\text{k}^{\text{h}}\text{er-n-a-i-n}$	$\text{mod-e-n-a-i-n}$	$\text{urax-a-n-a-i-n}$	$\sqrt{(-\text{LV})-\text{INCH-TH-PST-}}\text{3PL}$
PST PFV 3PL	$\text{k}^{\text{h}}\text{er-}\emptyset\text{-}\widehat{\text{ts-a-n}}$ 'they got fat'	$\text{mod-e-}\emptyset\text{-}\widehat{\text{ts-a-n}}$ 'they got near'	$\text{urax-a-}\emptyset\text{-}\widehat{\text{ts-a-n}}$ 'they became happy'	$\sqrt{(-\text{LV})-\text{INCH-TH-AOR-PST-}}\text{3PL}$

As seen in Table 5, the presence or quality of the pre-inchoative vowel doesn't affect aorist stem formation. The pre-inchoative vowel stays constant in the aorist, while the inchoative marker /- $\widehat{n-}$ / and the subsequent theme vowel /- $\widehat{a-}$ / are deleted.

<sup>6</sup>In Eastern Armenian, the causative's past allomorph is  $-\widehat{\text{ts}}^{\text{h}}\text{-}$  not  $-\widehat{\text{tsu-}}$ . In the past perfective, the theme vowel and aorist suffix are optional and their use varies by formality:  $\chi\text{am-}\widehat{\text{ts}}^{\text{h}}\text{-}(e\text{-}\widehat{\text{ts}}^{\text{h}})\text{-i-n}$  [ $\sqrt{-\text{CAUS-TH-AOR-PST-}}\text{3PL}$ ] 'they caused to drink' (Hagopian 2005; 358; Dum-Tragut 2009; 208).



This completes the overview of aorist stem formation across the regular conjugation classes. As is clear, different conjugation classes use different morphological operations to form the aorist stem. This is what we call STEM COMPOSITION. Some operations include simple concatenation (E-Class), allomorphy (causatives), or using deletion and covert zero morphs (inchoatives). The next section overviews irregular verbs where we can see such diversity in the formation of the aorist stem.

## 2.4 Aorist stems in irregular verbs

The presence of the suffix /-t̃s-/ for the aorist stems of all regular classes reinforces the generalization that the suffix /-t̃s-/ marks perfectivity. Irregular verbs, however, differ because they often use a zero morph for the perfective morpheme, along with other irregular morphological changes.

For the irregular infixed verbs (Table 6), their present stem includes a meaningless stem-extender /-n-/ or /-t̃j-/ that intervenes between the root and theme vowel (Johnson 1954; 81): *ar-n-e-l* ‘to take’. We gloss these infixes as -VX-. But in the past perfective, the aorist stem is formed by deleting the infix and the theme vowel: *ar-a-n* ‘they took’. There is no overt perfective marker. The past marker is the allomorph /-a-/. We show the aorist stem with We show the aorist stem with zero morphs for illustration.<sup>7</sup>

Table 6: Aorist stem for the past perfective of infixed verbs

Infinitive	<b>ar-n-e-l</b> ‘to take’	<b>has-n-i-l</b> ‘to arrive’	<b>k<sup>h</sup>əd-n-a-l</b> ‘to find’	<b>p<sup>h</sup>ax-t̃j-i-l</b> ‘to flee’	√-VX-TH-INF
PST IMPF 3PL	<b>ar-n-e-i-n</b>	<b>has-n-e-i-n</b>	<b>k<sup>h</sup>əd-n-a-i-n</b>	<b>p<sup>h</sup>ax-t̃j-e-i-n</b>	√-VX-TH-PST-3PL
PST PFV 3PL	<u>ar-∅-∅-∅-a-n</u> ‘they took’	<u>has-∅-∅-∅-a-n</u> ‘they arrived’	<u>k<sup>h</sup>əd-∅-∅-∅-a-n</u> ‘they found’	<u>p<sup>h</sup>ax-∅-∅-∅-a-n</u> ‘they fled’	√-VX-TH-AOR-PST-3PL

Diachronically, this nasal is a reflex of the PIE nasal infix (Greppin 1973; Hamp 1975; Kocharov 2019). The affricate may be another reflex of the PIE nasal (Գալստյան 2004), or more likely a reflex of the PIE inchoative \*-sk- (Kocharov 2014). Thus, the reason why both the infix and aorist suffix are absent in the past perfective is because the presence of the infix itself marked imperfectivity (Kocharov 2014). In other words, diachronically the perfective or aorist stem was the default or unmarked form of these irregular verbs, while the imperfective or present stem with the infix was the marked form. This contrasts with regular verbs, whose present stem is default or unmarked and whose aorist stem is marked.

<sup>7</sup>Coincidentally, Lithuanian has a nasal infix (Ambrazas et al. 2006; 285ff). The nasal surfaces in morphomic present stems in some verbs, but not in the morphomic past stem nor the morphomic infinitive stem (Arkadiev 2012). The Lithuanian nasal infix is likely diachronically related to the Armenian nasal infix. The infix displays morphomic behavior in both languages.

But synchronically, these infixes are unproductive and semantically bleached. To form the aorist stems of these infixed verbs, it doesn't matter whether the infix is /-n-/ or /-tʃ-/ , nor does the quality of the theme vowel matter. The aorist is formed in the above manner by deleting both the infix and the theme vowel, using a covert perfective suffix -∅, and then using the /-a-/ allomorph of the past tense suffix. Note also how the past suffix changes between the imperfective and perfective.

Irregular verbs also include verbs with suppletive aorist stems (Table 7). Their present stem is formed by using one root allomorph and a theme vowel: **ud-e-l** 'to eat'. This stem is used in the infinitive, present, and past imperfective. The aorist stem, by contrast, is formed by using a different root allomorph, with neither a theme vowel nor an overt perfective suffix: *ger-a-n* 'they ate'. The past marker can vary between /-i-/ and /-a-/ depending on the  $\bar{v}$ erb.

Table 7: Aorist stem for the past perfective of suppletive verbs

Infinitive	<b>ud-e-l</b> 'to eat'	<b>dan-i-l</b> 'to send'	<b>əll-a-l</b> 'to be'	√-TH-INF
PRS 3PL	<b>ud-e-n</b>	<b>dan-i-n</b>	<b>əll-a-n</b>	√-TH-3PL
PST IMPF 3PL	<b>ud-e-i-n</b>	<b>dan-e-i-n</b>	<b>əll-a-i-n</b>	√-TH-PST-3PL
PST PFV 3PL	<u>ger-∅-∅-a-n</u> 'they ate'	<u>dar-∅-∅-i-n</u> 'they sent'	<u>jeɛ-∅-∅-a-n</u> 'they were'	√-TH-AOR-PST-3PL

For the above two types of irregular verbs (infixes and suppletive), the aorist stem does not use the aorist suffix /-ts-/ at all. They instead use a zero morph for perfective aspect. While in these forms the perfective morph is phonologically covert, its presence triggers a host of morphophonological irregularities: deletion of the present stem infixes /-n-/ and /-tʃ-/ , deletion of theme vowels, and suppletive root allomorphy.

Another small class of irregular verbs like 'to bring' neither use the aorist suffix /-ts-/ , nor use infixes or suppletion (Table 8). Their aorist stem is formed by simply deleting the theme vowel: *p<sup>h</sup>er-e-l* 'to bring' vs. *p<sup>h</sup>er-i-n* 'they brought'. We call this group the aorist-less verbs. There is no morphological marking of either the present or aorist stem, meaning (im)perfectivity is not marked on these verbs. Of this group, some verbs like 'to sit' can optionally use the aorist suffix.

Table 9: Aorist stems across conjugation classes

	Infinitive	PST PFV 3PL	Operations
E-Class	‘to drink’	$\chi\grave{a}m\text{-}e\text{-}l$	$\chi\grave{a}m\text{-}e\text{-}\widehat{ts}\text{-}i\text{-}n$ $\sqrt{-TH\text{-}AOR\text{-}PST\text{-}3PL}$ Suff
I-Class	‘to speak’	$\chi\grave{o}s\text{-}i\text{-}l$	$\chi\grave{o}s\text{-}e\text{-}\widehat{ts}\text{-}a\text{-}n$ $\sqrt{-TH\text{-}AOR\text{-}PST\text{-}3PL}$ Suff
A-Class	‘to read’	$g\grave{a}r\text{t}^h\text{-}a\text{-}l$	$g\grave{a}r\text{t}^h\text{-}a\text{-}\widehat{ts}\text{-}i\text{-}n$ $\sqrt{-TH\text{-}AOR\text{-}PST\text{-}3PL}$ Suff
Causative	‘to make drink’	$\chi\grave{a}m\text{-}\widehat{ts}\grave{a}n\text{-}e\text{-}l$	$\chi\grave{a}m\text{-}\widehat{tsu}\text{-}\emptyset\text{-}\widehat{ts}\text{-}i\text{-}n$ $\sqrt{-CAUS\text{-}TH\text{-}AOR\text{-}PST\text{-}3PL}$ Allo ThDel Suff
Passive	‘to be spoken’	$\chi\grave{o}s\text{-}v\text{-}i\text{-}l$	$\chi\grave{o}s\text{-}v\text{-}e\text{-}\widehat{ts}\text{-}a\text{-}n$ $\sqrt{-PASS\text{-}TH\text{-}AOR\text{-}PST\text{-}3PL}$ Suff
Inchoative	‘to get fat’	$k^h\grave{e}r\text{-}n\text{-}a\text{-}l$	$k^h\grave{e}r\text{-}\emptyset\text{-}\widehat{ts}\text{-}a\text{-}n$ $\sqrt{-INCH\text{-}TH\text{-}AOR\text{-}PST\text{-}3PL}$ Del ThDel Suff
Infixed	‘to arrive’	$h\grave{a}s\text{-}n\text{-}i\text{-}l$	$h\grave{a}s\text{-}\emptyset\text{-}\emptyset\text{-}a\text{-}n$ $\sqrt{-VX\text{-}TH\text{-}AOR\text{-}PST\text{-}3PL}$ Del ThDel Zero
Suppletive	‘to eat’	$u\grave{d}\text{-}e\text{-}l$	$g\grave{e}r\text{-}\emptyset\text{-}a\text{-}n$ $\sqrt{-TH\text{-}AOR\text{-}PST\text{-}3PL}$ Allo ThDel Zero
Suppletive	‘to be’	$\grave{a}ll\text{-}a\text{-}l$	$j\grave{e}r\text{-}\emptyset\text{-}a\text{-}n$ $\sqrt{-TH\text{-}AOR\text{-}PST\text{-}3PL}$ Allo ThDel Zero
Aorist-less	‘to bring’	$p^h\grave{e}r\text{-}e\text{-}l$	$p^h\grave{e}r\text{-}\emptyset\text{-}i\text{-}n$ $\sqrt{-TH\text{-}AOR\text{-}PST\text{-}3PL}$ ThDel Zero

Table 8: Aorist stem for the past perfective of aorist-less verbs

Infinitive	$p^h\grave{e}r\text{-}e\text{-}l$	$\grave{a}s\text{-}e\text{-}l$	$n\grave{a}st\text{-}i\text{-}l$	$\sqrt{-TH\text{-}INF}$
	‘to bring’	‘to say’	‘to sit’	
PRS 3PL	$p^h\grave{e}r\text{-}e\text{-}n$	$\grave{a}s\text{-}i\text{-}n$	$n\grave{a}st\text{-}i\text{-}n$	$\sqrt{-TH\text{-}3PL}$
PST IMPF 3PL	$p^h\grave{e}r\text{-}e\text{-}i\text{-}n$	$\grave{a}s\text{-}e\text{-}i\text{-}n$	$n\grave{a}st\text{-}e\text{-}i\text{-}n$	$\sqrt{-TH\text{-}PST\text{-}3PL}$
PST PFV 3PL	$p^h\grave{e}r\text{-}\emptyset\text{-}\emptyset\text{-}i\text{-}n$	$\grave{a}s\text{-}\emptyset\text{-}\emptyset\text{-}i\text{-}n$	$n\grave{a}st\text{-}\emptyset\text{-}\emptyset\text{-}a\text{-}n$	$\sqrt{-TH\text{-}AOR\text{-}PST\text{-}3PL}$
			$n\grave{a}st\text{-}e\text{-}\widehat{ts}\text{-}a\text{-}n$	$\sqrt{-TH\text{-}AOR\text{-}PST\text{-}3PL}$
	‘they brought’	‘they said’	‘they sat’	

The disappearance of morphemes in irregular morphology is cross-linguistically common (Calabrese 2015). Within Armenian, irregular verbs which lack the aorist suffix are often called strong verbs (Kim 2018; Plungian 2018).

For these aorist-less verbs, the past imperfective and perfective differ in the absence of the theme vowels, and not in the use of any additional morphs. Some aorist-less verbs can also use different past markers in the imperfective and perfective, like ‘to sit’. For these irregular verbs, we again see that the aorist stem is formed in different ways, whether by deleting morphs or using zeroes. This is again a case of STEM COMPOSITION.

Table 9 shows the aorist stem for each type of verb in the past perfective 3PL. We also summarize the relevant operations for forming the aorist stem from the present stem, specifically adding the overt suffix  $/-\widehat{ts}/$  (Suff), overt allomorphy (Allo), theme vowel deletion (ThDel), deleting other markers like the inchoative (Del), and using a zero perfective marker (Zero). We don’t include changes in theme vowel quality ( $/i/$  to  $/e/$ ), which is an independent morphophonological process common to all verbs, regular or irregular, simple or complex.

In Table 9, we use zero morphs to show what morphs are deleted from the present stem

to the aorist stem. We use zero morphs in this way throughout the paper for illustrative purposes. We do not advance a theoretical argument for zero morphs, and nothing in our argument hinges on using zero morphs.

Irregular verbs show the property of STEM UNITY. On an abstract morphological level, the aorist stem of the different conjugation classes is formed by the same primitive morphemes in the morphosyntactic structure, such as the morpheme AOR. These morphemes are expounded with different morphs on the surface. These morphs can be overt or covert theme vowels, the overt perfective suffix /- $\widehat{ts}$ -/ or covert  $-\emptyset$ , and either overt or deleted morphemes (inchoative, stem-extender). The shape of the aorist stem varies across classes but is consistent within a class. That is, there is no verb that uses one aorist stem in one paradigm cell, but another aorist stem in another cell.

### 3 Morphomic distribution of the aorist stem

Having established the different types of aorists stems, we go over how the aorists stem is used in different paradigm cells for different conjugation classes. Three properties are established based on the data: MEANINGLESS EXTENSION, CLASS-SPECIFICITY, and STEM-UNITY.

#### 3.1 Imperatives and prohibitives

In regards to the property of MEANINGLESS EXTENSION, the aorist stem is canonically and meaningfully used in past perfective verbs where it contributes the semantics of perfective aspect. Corpus evidence from §4 establishes this canonicity. But all classes of verbs likewise use the aorist stem in other paradigm cells without contributing any perfective semantics, or any extra semantics whatsoever.

To illustrate, consider imperatives (Table 10). For the regular simplex verbs, the imperative 2SG is formed by just adding either an overt or covert 2SG marker after the theme vowel, depending on the class of verb:  $\chi\acute{a}m-e-\emptyset$  ‘drink! (SG)’.<sup>8</sup> But for the imperative 2PL, the 2PL marker  $-ek^h$  is added after the aorist stem:  $\chi\acute{a}m-e-\widehat{ts}-ek^h$  ‘drink! (PL)’.

<sup>8</sup>In the imperative 2SG, some Western speakers use a zero morph for the I-Class along with changing the  $-i-$  theme vowel to  $-e-$ :  $\chi\acute{o}s-e-\emptyset$  ‘speak (IMP 2SG)’ (Boyacioglu 2010; 37). This is a more archaic form. In Eastern Armenian, the imperative 2SG marker for the E-Class is  $-ir$  without a theme vowel:  $\chi\acute{a}m-ir$  ‘drink!’. In fact, the imperative suffix is different for most verbs in Eastern Armenian, see paradigms in Dum-Tragut (2009; 271).

Table 10: Imperative formation for regular simplex verbs

	E-Class ‘to drink’	I-Class ‘to speak’	A-Class ‘to read’	
Infinitive	<b>χəm-e-l</b>	<b>χos-i-l</b>	<b>gart<sup>h</sup>-a-l</b>	√-TH-INF
IMP 2SG	<b>χəm-e-∅</b>	<b>χos-i-r</b>	<b>gart<sup>h</sup>-a-∅</b>	√-TH-2SG
IMP 2PL	<b>χəm-e-t̂s-ek<sup>h</sup></b>	<b>χos-e-t̂s-ek<sup>h</sup></b>	<b>gart<sup>h</sup>-a-t̂s-ek<sup>h</sup></b>	√-TH-AOR-2PL

The imperative 2PL uses the aorist stem with the aorist suffix /-t̂s-/ even though the plural form does not have any perfective semantics. There is no perfective viewpoint aspect in either the imperative 2SG or imperative 2PL. There is no sense that number implies perfectivity either, nor that commands imply perfectivity. In fact, there are no semantic differences between 2SG and 2PL imperatives other than the trivial fact that the former is addressed to one listener and the latter to multiple listeners. We are not aware of any claim in the descriptive Armenian literature that 2SG and 2PL imperative differ semantically in perfectivity or any other temporal category.<sup>9</sup>

While the suffix /-t̂s-/ canonically marks perfectivity, it is used meaninglessly in the imperative 2PL. When used in these non-perfective contexts, we call the aorist as the ‘spurious aorist’ because its use is meaningless and morphomic.

In terms of STEM UNITY, verbal paradigms showcase the exceptionless generalization that all verbs, whether simple, complex, or irregular, use the aorist stem for the imperative 2PL (Table 11). It doesn’t matter whether the aorist stem of a verb utilizes overt allomorphy or deletes morphs; the same stem form used meaningfully in past perfectives is used meaninglessly in imperative 2PL forms.<sup>10</sup>

Thus at some abstract morphological level, each verb is associated with its own aorist stem that is used across the Armenian paradigm. The shape of the stem does not matter. Whatever process forms the stem in the past perfective also forms the stem in the imperative 2PL. It thus cannot be the case that the aorist stem used in perfectives and the stem form used in the imperative 2PL are just accidentally homophonous items: these stem forms are identical no matter what verb it is.

A third property is CLASS-SPECIFICITY. The regular simplex verbs don’t use the aorist stem for the imperative 2SG (Table 12). But some other classes do. It is an arbitrary fact whether some conjugation class uses the aorist stem for the imperative 2SG.

<sup>9</sup>For the imperative 2PL, Eastern is more complicated than Western. The A-Class uses the aorist. For the E-Class, some sources say Eastern does use the aorist (Dum-Tragut 2009; 271), but other sources that an aorist-less form is nowadays more typical (the Eastern Armenian National Corpus: Khurshudian et al. 2009).

<sup>10</sup>For the causative, whenever we expect the Western aorist stem  $X-t̂su-t̂s-$  with the aorist suffix, the Eastern form uses the cognate aorist stem  $-t̂s<sup>h</sup>r-$  without an aorist suffix. Contrast the imperative 2PL of the causative ‘to make read’ in Western  $gart<sup>h</sup>-a-t̂su-t̂s-ek<sup>h</sup>$  vs. Eastern  $kart<sup>h</sup>-a-t̂s<sup>h</sup>r-ek<sup>h</sup>$  [√-TH-CAUS-(AOR)-2PL] (Dum-Tragut 2009; 208). The imperative 2SG uses a unique Agr suffix  $-u$ :  $kart<sup>h</sup>-a-t̂s<sup>h</sup>r-u$ .

Table 11: Aorist stems for the imperative 2PL of all other conjugation classes

	Infinitive	Imperative 2PL
Causative ‘to make drink’	$\chi\grave{\alpha}m\text{-}\widehat{ts\grave{a}n}\text{-}e\text{-}l$	$\chi\grave{\alpha}m\text{-}\widehat{tsu}\text{-}\emptyset\text{-}\widehat{ts}\text{-}ek^h$ $\sqrt{-CAUS-TH-AOR-2PL}$
Passive ‘to be spoken’	$\chi\acute{o}s\text{-}v\text{-}i\text{-}l$	$\chi\acute{o}s\text{-}v\text{-}e\text{-}\widehat{ts}\text{-}ek^h$ $\sqrt{-PASS-TH-AOR-2PL}$
Inchoative ‘to get fat’	$k^h\acute{e}r\text{-}n\text{-}\alpha\text{-}l$	$k^h\acute{e}r\text{-}\emptyset\text{-}\emptyset\text{-}\widehat{ts}\text{-}ek^h$ $\sqrt{-INCH-TH-AOR-2PL}$
Infixed ‘to arrive’	<b>has-n-i-l</b>	$has\text{-}\emptyset\text{-}\emptyset\text{-}\emptyset\text{-}ek^h$ $\sqrt{-VX-TH-AOR-2PL}$
Suppletive ‘to eat’	<b>ud-e-l</b>	$ger\text{-}\emptyset\text{-}\emptyset\text{-}ek^h$ $\sqrt{-TH-AOR-2PL}$
Suppletive ‘to be’	<b>əll-α-l</b>	$j\acute{e}v\text{-}\emptyset\text{-}\emptyset\text{-}ek^h$ $\sqrt{-TH-AOR-2PL}$
Aorist-less ‘to bring’	<b>p<sup>h</sup>er-e-l</b>	$p^h\acute{e}r\text{-}\emptyset\text{-}\emptyset\text{-}ek^h$ $\sqrt{-TH-AOR-2PL}$

Table 12: Aorist stems for the imperative 2SG of some but not all the other conjugation classes

	Infinitive	Imperative 2SG
Causative ‘to make drink’	$\chi\grave{\alpha}m\text{-}\widehat{ts\grave{a}n}\text{-}e\text{-}l$	$\chi\grave{\alpha}m\text{-}\widehat{tsu}\text{-}\emptyset\text{-}r$ $\sqrt{-CAUS-TH-2SG}$
Passive ‘to be spoken’	$\chi\acute{o}s\text{-}v\text{-}i\text{-}l$	$\chi\acute{o}s\text{-}v\text{-}i\text{-}r$ $\sqrt{-PASS-TH-2SG}$
Inchoative ‘to get fat’	$k^h\acute{e}r\text{-}n\text{-}\alpha\text{-}l$	$k^h\acute{e}r\text{-}\emptyset\text{-}\emptyset\text{-}\widehat{ts}\text{-}ir$ $\sqrt{-INCH-TH-AOR-2SG}$
Infixed ‘to arrive’	<b>has-n-i-l</b>	$has\text{-}\emptyset\text{-}\emptyset\text{-}\emptyset\text{-}ir$ $\sqrt{-VX-TH-AOR-2SG}$
Suppletive ‘to eat’	<b>ud-e-l</b>	$ger\text{-}\emptyset\text{-}\emptyset\text{-}\emptyset$ $\sqrt{-TH-AOR-2SG}$
Suppletive ‘to be’	<b>əll-α-l</b>	$j\acute{e}v\text{-}\emptyset\text{-}\emptyset\text{-}ir$ $\sqrt{-TH-AOR-2SG}$
Aorist-less ‘to bring’	<b>p<sup>h</sup>er-e-l</b>	$p^h\acute{e}r\text{-}\emptyset\text{-}\emptyset\text{-}\emptyset$ $\sqrt{-TH-AOR-2SG}$
Aorist-less ‘to say’	<b>əs-e-l</b>	$əs\text{-}e\text{-}\emptyset$ $\sqrt{-TH-2SG}$

Some of the the classes in Table 12 use a dedicated 2SG marker /-r, ir/ or zero morph in the imperative 2SG form. Among complex verbs, only the inchoative uses the aorist stem, while the causative and passive do not.<sup>11</sup> For the irregular verbs, most utilize the aorist stem for the imperative 2SG.<sup>12</sup>

The imperative 2SG shows class-specificity because it is ultimately an arbitrary fact whether a conjugation class uses the aorist stem for this paradigm cell. The use of the aorist stem is both unpredictable and meaningless. It is morphomic.

In contrast to the imperative, the prohibitive is formed without the aorist stem (Table 13). The prohibitive is formed by adding the prohibitive particle /mi = / before the finite verb: [mi  $\chi\grave{\alpha}m\text{-}e\text{-}r$ ] ‘don’t drink.SG’. The verb carries either a 2SG marker /-r/ or a 2PL marker

<sup>11</sup>In the imperative 2SG, the causative suffix displays allomorphy to /-tsu-/.

<sup>12</sup>Within each irregular class, some utilize an overt imperative 2SG marker like ‘to arrive’ [has-n-i-l] is inflected as [has-ir]. But some use a bare root, e.g., ‘to take’ [ar-n-e-l] is inflected with a bare root [ar] ‘take!’. We set aside this variation as tangential.

/-k<sup>h</sup>/. This marker is added after the present stem's theme vowel. All the conjugation classes are consistent and do not use the aorist stem. For space, we not show the proclitic /mi =/.<sup>13</sup>

Table 13: No aorist stems for the finite verb form of prohibitives

	Infinitive	PROH 2SG	PROH 2SG	
E-Class	'to drink'	χəm-e-l	χəm-e-ɾ	χəm-e-k <sup>h</sup> ✓/-TH-AGR
I-Class	'to speak'	χos-i-l	χos-i-ɾ	χos-i-k <sup>h</sup> ✓/-TH-AGR
A-Class	'to read'	gɑrt <sup>h</sup> -ɑ-l	gɑrt <sup>h</sup> -ɑ-ɾ	gɑrt <sup>h</sup> -ɑ-k <sup>h</sup> ✓/-TH-AGR
Causative	'to make drink'	χəm-t̃sən-e-l	χəm-t̃sən-e-ɾ	χəm-t̃sən-e-k <sup>h</sup> ✓/-CAUS-TH-AGR
Passive	'to be spoken'	χos-v-i-l	χos-v-i-ɾ	χos-v-i-k <sup>h</sup> ✓/-PASS-TH-AGR
Inchoative	'to get fat'	k <sup>h</sup> er-n-ɑ-l	k <sup>h</sup> er-n-ɑ-ɾ	k <sup>h</sup> er-n-ɑ-k <sup>h</sup> ✓/-INCH-TH-AGR
Infixed	'to arrive'	has-n-i-l	has-n-i-ɾ	has-n-i-k <sup>h</sup> ✓/-VX-TH-AGR
Suppletive	'to eat'	ud-e-l	ud-e-ɾ	ud-e-k <sup>h</sup> ✓/-TH-AGR
Aorist-less	'to bring'	p <sup>h</sup> er-e-l	p <sup>h</sup> er-e-ɾ	p <sup>h</sup> er-e-k <sup>h</sup> ✓/-TH-AGR

Thus, even though both prohibitive and imperative mood are semantically similar, only the imperative 2PL triggers the spurious aorist. There is no evidence nor any claims in the descriptive literature on Armenian that prohibitives and imperatives differ in aspectual semantics.

It is an arbitrary fact that plural number triggers the aorist stem for all verbs in the positive imperative, but for no verbs in the prohibitive (negative imperative). It is also an arbitrary fact that some classes use the aorist for the imperative 2SG, but no verb does it for the prohibitive 2SG. This arbitrariness further reinforces the morphomic nature and distribution of the aorist stem. The appearance of the aorist stem is not due to any semantic, morphosyntactic, or phonological reason, but the aorist stem is a coherent morphological item that can be chosen by other morphemes.

### 3.2 Participles

The previous section examined the distribution of the aorist stem in imperatives and prohibitives. This section looks at participles: connegatives, subject participles, resultative participles, and evidential participles. We again find MEANINGLESS EXTENSION, CLASS-SPECIFICITY, STEM UNITY. Depending on conjugation class, different participles select

<sup>13</sup>Some Western speakers optionally change the *-i-* to *-e-* for the prohibitive 2PL: *mi χos-e-k<sup>h</sup>* (Hagopian 2005; 359). In Eastern Armenian, prohibitive verbs use the same suffixes as imperatives: E-Class *mi k<sup>h</sup>er-ir*, A-Class *mi kart<sup>h</sup>-ɑ* (Hagopian 2005; 359). In Eastern Armenian, the prohibitives use the aorist if the corresponding imperative has the aorist, e.g., in imperative 2PL of the A-Class, but variably for the imperative 2PL of the E-Class.

Table 14: No aorist stems in the connegative across all conjugation classes

		Infinitive	Connegative	
E-Class	‘to drink’	<b>χəm-e-l</b>	<b>χəm-e-ɾ</b>	√-TH-CN
I-Class	‘to speak’	<b>χos-i-l</b>	<b>χos-i-ɾ</b>	√-TH-CN
A-Class	‘to read’	<b>gɑrt<sup>h</sup>-ɑ-l</b>	<b>gɑrt<sup>h</sup>-ɑ-ɾ</b>	√-TH-CN
Causative	‘to make drink’	<b>χəm-t̃sən-e-l</b>	<b>χəm-t̃sən-e-ɾ</b>	√-CAUS-TH-CN
Passive	‘to be spoken’	<b>χos-v-i-l</b>	<b>χos-v-i-ɾ</b>	√-PASS-TH-CN
Inchoative	‘to get fat’	<b>k<sup>h</sup>er-n-ɑ-l</b>	<b>k<sup>h</sup>er-n-ɑ-ɾ</b>	√-INCH-TH-CN
Infixed	‘to arrive’	<b>has-n-i-l</b>	<b>has-n-i-ɾ</b>	√-VX-TH-CN
Suppletive	‘to eat’	<b>ud-e-l</b>	<b>ud-e-ɾ</b>	√-TH-CN
Aorist-less	‘to bring’	<b>p<sup>h</sup>er-e-l</b>	<b>p<sup>h</sup>er-e-ɾ</b>	√-TH-CN

the aorist stem. Whether a class uses the aorist stem in some participle is arbitrary with respect to phonology or morphosyntax, and it is semantically meaningless.<sup>14</sup>

For the connegative, this participle or converb is formed by adding the suffix *-ɾ* after the theme vowel (Table 14). It never uses the aorist stem in any conjugation class.<sup>15</sup> The connegative is also called the negative participle.

The connegative is used for imperfective negative indicative tenses, whether present or past. The non-finite connegative is used alongside a negated auxiliary that carries tense and agreement.

- (7)  $\widehat{t}\widehat{j}$ -e-n      **χəm-e-ɾ**,       $\widehat{t}\widehat{j}$ -e-ji-n      **χəm-e-ɾ**      gοɾ  
 NEG-AUX-3PL **drink-TH-CN**, NEG-AUX-PST-3PL **drink-TH-CN** PROG  
 ‘They don’t drink; they weren’t drinking.’

The subject participle is formed by adding the suffix *-oB* to either the present stem or aorist stem (Table 15). When attached to the present stem, the suffix *-oB* deletes the theme vowel. We gloss the deleted theme vowel because it will be useful later.

<sup>14</sup>Other less common participles include the future participles. These are formed by adding either the suffixes *-ik<sup>h</sup>* or *-u* to the infinitive: [gɑrt<sup>h</sup>-ɑ-l-ik<sup>h</sup>, gɑrt<sup>h</sup>-ɑ-l-u] from [gɑrt<sup>h</sup>-ɑ-l] ‘to read’. We set them aside.

<sup>15</sup>When the connegative is used for negating the past imperfective, the /-i-/ theme vowel changes to /-e-/ due to an independent morphophonological process (Dolatian accepted).



Table 15: Aorist stems in the subject participle for some but not all all conjugation classes

		Infinitive	Subject participle	
E-Class	‘to drink’	$\chi\grave{a}m\text{-}e\text{-}l$	$\chi\grave{a}m\text{-}\emptyset\text{-}o\check{B}$	$\checkmark\text{-TH-SPTCP}$
I-Class	‘to speak’	$\chi os\text{-}i\text{-}l$	$\chi os\text{-}\emptyset\text{-}o\check{B}$	$\checkmark\text{-TH-SPTCP}$
A-Class	‘to read’	$g\grave{a}r\text{t}^h\text{-}a\text{-}l$	$g\grave{a}r\text{t}^h\text{-}a\text{-}\widehat{ts}\text{-}o\check{B}$	$\checkmark\text{-TH-AOR-SPTCP}$
Causative	‘to make drink’	$\chi\grave{a}m\text{-}\widehat{ts}\grave{a}n\text{-}e\text{-}l$	$\chi\grave{a}m\text{-}\widehat{ts}\grave{a}n\text{-}\emptyset\text{-}o\check{B}$	$\checkmark\text{-CAUS-TH-SPTCP}$
Passive	‘to be spoken’	$\chi os\text{-}v\text{-}i\text{-}l$	$\chi os\text{-}v\text{-}\emptyset\text{-}o\check{B}$	$\checkmark\text{-PASS-TH-sptcp}$
Inchoative	‘to get fat’	$k^h\text{e}r\text{-}n\text{-}a\text{-}l$	$k^h\text{e}r\text{-}\emptyset\text{-}\widehat{ts}\text{-}o\check{B}$	$\checkmark\text{-INCH-TH-AOR-SPTCP}$
Infixed	‘to arrive’	$h\text{a}s\text{-}n\text{-}i\text{-}l$	$h\text{a}s\text{-}n\text{-}\emptyset\text{-}o\check{B}$	$\checkmark\text{-VX-TH-SPTCP}$
Suppletive	‘to eat’	$u\text{d}\text{-}e\text{-}l$	$u\text{d}\text{-}\emptyset\text{-}o\check{B}$	$\checkmark\text{-TH-SPTCP}$
Suppletive	‘to be’	$\grave{a}l\text{-}a\text{-}l$	$j\text{e}\check{B}\text{-}\emptyset\text{-}\emptyset\text{-}o\check{B}$	$\checkmark\text{-TH-AOR-SPTCP}$
Aorist-less	‘to bring’	$p^h\text{e}r\text{-}e\text{-}l$	$p^h\text{e}r\text{-}\emptyset\text{-}o\check{B}$	$\checkmark\text{-TH-SPTCP}$

Classes differ in whether the aorist stem is used or not. And among suppletive verbs, some use the aorist stem in the subject participle like [ $j\text{e}\check{B}\text{-}o\check{B}$ ] ‘be-er’, while some do not [ $u\text{d}\text{-}o\check{B}$ ] ‘eater’.

There is no reason to think that subject participles have perfective semantics. Subject participles denote an entity that performs an action continuously or habitually and thus should have *imperfective*, not perfective, semantics. More crucially, there is no aspectual difference in either the semantics or morphosyntax between participles formed with the present stem and those formed with the aorist stem. It is a morphosyntactically arbitrary and semantically meaningless fact that the subject participle uses the aorist stem for the A-Class as in [ $g\grave{a}r\text{t}^h\text{-}a\text{-}\widehat{ts}\text{-}o\check{B}$ ] ‘reader’, while the E-Class does not in [ $\chi\grave{a}m\text{-}o\check{B}$ ] ‘drinker’.

The other major participles are the resultative and the evidential (Table 16). The resultative is marked by the suffix  $-a\widehat{d}\check{z}$  (-RPTCP) and the evidential with  $-er$  (-EPTCP). These two participles always pattern together in terms of the aorist stem. Some conjugation classes use the aorist stem for both participles, like the A-Class, while some classes don’t use the stem for these participles, like the E-Class. As before, the participial suffix deletes the preceding theme vowel.<sup>16</sup>

The resultative and evidential are used in different periphrastic constructions. For example, the resultative is used in the present perfect and past perfect. The evidential is used in the same contexts when the speaker is unsure or is surprised.

<sup>16</sup>The resultative is also called the perfect participle, and the evidential is also called the mediative. In Eastern Armenian, the resultative participle is not used in periphrasis, and there is no evidential participle. Instead, Eastern Armenian has an additional participle called the perfect participle or perfective converb with the suffix  $-el$ . It seems that this participle uses the aorist stem whenever the resultative participle does, similarly to the relationship between the resultative and evidential participles in Western Armenian Dum-Tragut (2009; 213).

Table 16: Aorist stems in the resultative and evidential participles for some but not all conjugation classes

	Infinitive	Resultative PTCP	Evidential PTCP	
E-Class ‘to drink’	<b>χəm-e-l</b>	<b>χəm-<u>θ</u>-ad̄z</b>	<b>χəm-<u>θ</u>-er</b>	√-TH-PTCP
I-Class ‘to speak’	<b>χos-i-l</b>	<b>χos-<u>θ</u>-ad̄z</b>	<b>χos-<u>θ</u>-er</b>	√-TH-PTCP
A-Class ‘to read’	<b>gart<sup>h</sup>-a-l</b>	<b>gart<sup>h</sup>-a-<u>ts</u>-ad̄z</b>	<b>gart<sup>h</sup>-a-<u>ts</u>-er</b>	√-TH-AOR-PTCP
Causative ‘to make drink’	<b>χəm-<u>tsən</u>-e-l</b>	<b>χəm-<u>tsu</u>-<u>θ</u>-<u>ts</u>-ad̄z</b>	<b>χəm-<u>tsu</u>-<u>θ</u>-<u>ts</u>-er</b>	√-CAUS-TH-AOR-ptcp
Passive ‘to be spoken’	<b>χos-v-i-l</b>	<b>χos-v-<u>θ</u>-ad̄z</b>	<b>χos-v-<u>θ</u>-er</b>	√-PASS-TH-PTCP
Inchoative ‘to get fat’	<b>k<sup>h</sup>er-n-a-l</b>	<b>k<sup>h</sup>er-<u>θ</u>-<u>θ</u>-<u>ts</u>-ad̄z</b>	<b>k<sup>h</sup>er-<u>θ</u>-<u>θ</u>-<u>ts</u>-er</b>	√-INCH-TH-AOR-PTCP
Infixed ‘to arrive’	<b>has-n-i-l</b>	<b>has-<u>θ</u>-<u>θ</u>-<u>θ</u>-ad̄z</b>	<b>has-<u>θ</u>-<u>θ</u>-<u>θ</u>-er</b>	√-VX-TH-AOR-PTCP
Suppletive ‘to eat’	<b>ud-e-l</b>	<b>ger-<u>θ</u>-<u>θ</u>-ad̄z</b>	<b>ger-<u>θ</u>-<u>θ</u>-er</b>	√-TH-AOR-PTCP
Suppletive ‘to be’	<b>əll-a-l</b>	<b>jev-<u>θ</u>-<u>θ</u>-ad̄z</b>	<b>jev-<u>θ</u>-<u>θ</u>-er</b>	√-TH-AOR-PTCP
Aorist-less ‘to bring’	<b>p<sup>h</sup>er-e-l</b>	<b>p<sup>h</sup>er-<u>θ</u>-ad̄z</b>	<b>p<sup>h</sup>er-<u>θ</u>-er</b>	√-TH-PTCP

- (8) a. **χəm-θ-ad̄z** e-n, **χəm-θ-er** e-n  
**drink-TH-RPTCP** AUX-3PL, **drink-TH-EPTCP** AUX-3PL  
‘They have drunk. Apparently they have drunk.’
- b. **gart-a-ts-ad̄z** e-n, **gart-a-ts-er** e-n  
**read-TH-AOR-RPTCP** AUX-3PL, **read-TH-AOR-RPTCP** AUX-3PL  
‘They have read. Apparently they have read.’

Both the resultative and evidential are semantically types of perfects and include non-imperfective viewpoint aspects (Iatridou et al. 2001). So, at first glance it is not too surprising why these participles might take the aorist for A-Class verbs (though note that *perfect* and *perfective* aspects are distinct (Iatridou et al. 2001)). But there is no semantic sense in which the resultative and evidential participles have perfective meaning for an A-Class participle like [gart<sup>h</sup>-a-ts-ad̄z] ‘read’, but not for the E-Class [χəm-ad̄z] ‘drunk’. Again, we find no evidence and no claims in the Armenian descriptive literature for any semantic contrast between A-Class participles and their E-Class counterparts. Therefore, even if perfective aspect were present in the morphosyntax of resultative and evidential participles, arbitrariness would be required, since some verb classes use the present (i.e., non-perfective) stem.

The fact that different classes use the aorist stem for different participles further reinforces CLASS-SPECIFICITY. The fact that the aorist stem is used in participles without adding perfective semantics also reinforces MEANINGLESS EXTENSION. And again, the fact that the shape of the aorist stem is consistent within a class reinforces STEM UNITY. All these aorists stems are the same object, not homophonous objects. All these factors reinforce the morphomic status of the aorist stem.

Table 17: Aorist stems in deriving deverbal causatives for some but not all all conjugation classes

		Infinitive	Causativized INF	
E-Class	‘to sing’	<b>jer</b> <sup>h</sup> - <b>e</b> -l	<b>jer</b> <sup>h</sup> - <b>e</b> - <u>tsən</u> -e-l	√-TH-CAUS-TH-INF
I-Class	‘to speak’	<b>χos</b> -i-l	<b>χos</b> - <b>e</b> - <u>tsən</u> -e-l	√-TH-CAUS-TH-INF
A-Class	‘to read’	<b>gar</b> <sup>h</sup> - <b>a</b> -l	<b>gar</b> <sup>h</sup> - <b>a</b> - <u>tsən</u> -e-l	√-TH-CAUS-TH-INF
Passive	‘to get ready’	<b>badrastə</b> -v-i-l	<b>badrastə</b> -v- <b>e</b> - <u>tsən</u> -e-l	√-PASS-TH-CAUS-TH-INF
Inchoative	‘to receive’	<b>əst</b> -a-n-a-l	əst-a- <u>θ-θ</u> - <u>tsən</u> -e-l	√-LV-INCH-TH-CAUS-TH-INF
Infixe	‘to arrive’	<b>has</b> -n-i-l	<u>has</u> - <u>θ-θ</u> - <u>tsən</u> -e-l	√-VX-TH-AOR-CAUS-TH-INF
Infixe	‘to flee’	<b>p<sup>h</sup>αχ</b> -tʃ-i-l	<u>p<sup>h</sup>αχ</u> - <u>θ-θ</u> - <u>tsən</u> -e-l	√-VX-TH-AOR-CAUS-TH-INF
			<b>p<sup>h</sup>αχ</b> -tʃ- <b>e</b> - <u>tsən</u> -e-l	√-VX-TH-CAUS-TH-INF
Suppletive	‘to eat’	<b>ud</b> -e-l	<u>ger</u> - <u>θ-θ</u> - <u>tsən</u> -e-l	√-TH-AOR-CAUS-TH-INF

### 3.3 Deriving causatives and passives from verbs

In addition to inflectional morphology, Armenian has productive valency-changing operations such as causativization and passivization. Causatives with /-tsən-/ and passives with /-v-/ form their own conjugation classes, with their own rules for creating aorist stems in their inflectional paradigms (§2). However, when a causative/passive verb is derived from a base verb, the derived verb itself can be built from the aorist stem of the base verb. Classes vary in whether they use the aorist stem in creating these derived verbs.<sup>17</sup>

For causativization, the regular simplex classes form the causative by adding the causative suffix -tsən- after the base verb’s present stem. The theme vowel is absent in some verbs (5). When causativizing complex verbs, the passive is causativized by again adding the -tsən- to the present stem.<sup>18</sup> The inchoative is passivized in a more complicated way: the inchoative suffix is simply deleted before the causative (Table 17). Among irregular verbs, some infixed verbs use the aorist stem to form the causative, while some optionally do. The few suppletive verbs which can be causativized do so with the aorist stem.<sup>19</sup>

Thus it seems that causativization generally can trigger the use of the aorist stem in some but not all types of irregular verbs. More consistent behavior is found in passivization.

<sup>17</sup>For causativization and passivization, inchoatives generally resist these operations. The most unambiguous cases involve inchoative verbs which are actually transitive: *əst-a-n-a-l* ‘to receive’. Here, the inchoative morpheme is bleached of its inchoative meaning while it maintains its morphological behavior.

<sup>18</sup>The /-i-/ theme vowel changes to /-e-/ before the causative suffix. A causative verb cannot be re-causativized.

<sup>19</sup>The infixed verb ‘to descend’ [itʃ-n-e-l] is causativized without the infix but with the theme vowel, so it doesn’t truly use the aorist stem: [itʃ-e-tsən-e-l] ‘to lower’. The suppletive verb ‘to eat’ *ud-e-l* is causativized with the aorist stem *ger-tsən-e-l* ‘to feed’. Some dictionaries also list forms with the present stem *ud-e-tsən-e-l* [√-TH-CAUS-TH-INF]. We speculate that the present-stem version is more common in Eastern Armenian than in Western.

For passivization, the simplex E-Class and I-Class are passivized by just adding the suffix *-v-* after the present stem (Table 18). The passive suffix deletes the preceding theme vowel. Because it will be useful later, we show the deleted theme vowel. The A-Class and inchoative instead use the aorist stem. The causative is passivized without the aorist stem, but uses a special allomorph */-ts̄-/* before the passive */-v-/*.<sup>20</sup> As for irregular verbs, some verbs use the aorist stem, some do not, and some vary.<sup>21</sup>

Table 18: Aorist stems in derived deverbal passives for some but not all conjugation classes

		Infinitive	Passivized INF
E-Class	‘to drink’	<b>χəm-e-l</b>	<b>χəm-<u>∅</u>-v-i-l</b> ✓/-TH-PASS-TH-INF
I-Class	‘to speak’	<b>χos-i-l</b>	<b>χos-<u>∅</u>-v-i-l</b> ✓/-TH-PASS-TH-INF
A-Class	‘to read’	<b>gart<sup>h</sup>-a-l</b>	<b>gart<sup>h</sup>-a-<u>ts̄</u>-v-i-l</b> ✓/-TH-AOR-PASS-TH-INF
Causative	‘to make drink’	<b>χəm-<u>∅</u>-<u>ts̄</u>ən-e-l</b>	<b>χəm-<u>∅</u>-<u>ts̄</u>ə-<u>∅</u>-v-i-l</b> ✓/-TH-CAUS-TH-PASS-TH-INF
Inchoative	‘to receive’	<b>əst-a-n-a-l</b>	<b>əst-a-<u>∅</u>-<u>∅</u>-<u>ts̄</u>-v-i-l</b> ✓/-LV-INCH-TH-AOR-PASS-TH-INF
Infixed	‘to touch’	<b>t<sup>h</sup>əp<sup>h</sup>-tʃ-i-l</b>	<b>t<sup>h</sup>əp<sup>h</sup>-<u>∅</u>-tʃə-<u>∅</u>-v-i-l</b> ✓/-VX-TH-PASS-TH-INF
	‘to wear’	<b>hak<sup>h</sup>-n-i-l</b>	<b>hak<sup>h</sup>-nə-<u>∅</u>-v-i-l</b> ✓/-VX-TH-PASS-TH-INF
			<b>hak<sup>h</sup>-<u>∅</u>-<u>∅</u>-v-i-l</b> ✓/-VX-TH-AOR-PASS-TH-INF
Suppletive	‘to eat’	<b>ud-e-l</b>	<b>ud-<u>∅</u>-v-i-l</b> ✓/-TH-PASS-TH-INF
Suppletive	‘to send’	<b>dan-i-l</b>	<b>dar-<u>∅</u>-<u>∅</u>-v-i-l</b> ✓/-TH-AOR-PASS-TH-INF

Among the regular classes, only the A-Class and inchoative use the aorist stem in passive formation. The irregular classes are more haphazard in whether they use the aorist stem in passivization.

Passives provide evidence that the aorist suffix */-ts̄-/* and the aorist stem function in two ways: either meaningfully as a perfective marker, or meaninglessly as a spurious morphomic element. For the passive of the A-Class (9), the spurious aorist */-ts̄-/* is used before the passive suffix, i.e., the passive is formed from the aorist stem of the A-Class. There is no sense that A-class-derived passives inherently encode any past or perfective semantics. This passive verb can then undergo further inflection to mark different tenses, whether present or past. In order to actually encode the past perfective, we need to add the meaningful aorist */-ts̄-/*.

#### (9) Presence of both meaningful and meaningless aorists in the same word

<sup>20</sup>It is a diachronic accident that the causative suffix allomorphs */-ts̄ən-*, *-ts̄u-*, *-ts̄-* and aorist suffix */-ts̄-/* share the segment */ts̄/*. The causative is historically derived from compounding the stem with the verb ‘to show’ *X-a-ts̄uts̄an-e-l* [X-LV-show-TH-INF] (Kortlandt 1999). The causative morpheme is not synchronically related to the aorist. But in the sequence */-a-ts̄-v-/*, the */ts̄/* is formally ambiguous between being the causative marker of a passivized causative vs. the aorist of a passivized A-Class.

<sup>21</sup>The passive triggers schwa epenthesis after a CC cluster as in the passive of ‘to touch’.

A-Class	$\text{gart}^{\text{h}}\text{-a-l}$	$\sqrt{\text{-TH-INF}}$	‘to read’
Passivized	$\text{gart}^{\text{h}}\text{-a-ts-v-i-l}$	$\sqrt{\text{-TH-AOR-PASS-TH-INF}}$	‘to be read’
SUBJ PRS 3PL	$\text{gart}^{\text{h}}\text{-a-ts-v-i-n}$	$\sqrt{\text{-TH-AOR-PASS-TH-3PL}}$	‘(If) they are read’
SBJV PST IMPF 3PL	$\text{gart}^{\text{h}}\text{-a-ts-v-e-i-n}$	$\sqrt{\text{-TH-AOR-PASS-TH-PST-3PL}}$	‘(If) they were being read’
PST PFV 3PL	$\text{gart}^{\text{h}}\text{-a-ts-v-e-ts-a-n}$	$\sqrt{\text{-TH-AOR-PASS-TH-AOR-PST-3PL}}$	‘they were read’

## 4 Interim summary: Properties of the aorist stem

The previous section discussed aorist stem formation in regular and irregular verbs, and looked at the distribution of the aorist stem across different paradigm cells for different conjugation classes. This section summarizes all that distributional information. The end-result is that this distribution is systematic and morphomic.

Table 19 lists the paradigm slots where we find the aorist stem in regular simplex, regular complex, and irregular verbs. We provide a type frequency for classes, based on a verb lists from Boyacioglu & Dolatian (2020) (n = 3213) and from the Universal Dependencies (UD) treebank of Western Armenian (Yavrumyan 2019) (n = 1724),<sup>22</sup> available in the supplementary materials.<sup>23</sup> We distinguish the aorist stem when used as a meaningful aorist in the past perfective, vs. the meaningless or spurious aorist when used elsewhere. Parentheses mark variation.

The irregulars have a low type frequency (BD: n = 70, 2.18%; UD: n = 63, 3.65%), thus reinforcing their irregularity. Note that the causative and inchoatives are under-represented in these sources; nouns and adjectives can productively get causativized/inchoativized.

We also calculated the token frequency of different verb forms and stems from the UD corpus<sup>24</sup> The treebank included 10,745 tokens of inflected verbs. Of this set, we report the token number of instances of different inflected forms and derived forms that ‘could’ use the aorist stem (row 2). Row 3 reports the number of verb tokens that did use the aorist stem. The overwhelming majority of attested aorist stems were found in the past perfective (64.30%), followed by the resultative participle (23.15%), and then few tokens in other paradigm cells forms (each under 4%).

<sup>22</sup>[https://github.com/UniversalDependencies/UD\\_Western\\_Armenian-ArmTDP](https://github.com/UniversalDependencies/UD_Western_Armenian-ArmTDP)

<sup>23</sup>For the class count, we combine E-Class, I-Class, and Passives because they pattern the same. For BD, the verb list originally had 3257 lemmas, while UD had 1762 lemmas; we excluded 44 lemmas from BD and 38 lemmas from UD because these lemmas (and their inflected forms) were either obsolete, defective, were Eastern Armenian, or displayed variation in the choice of class depending on the paradigm cell.

<sup>24</sup>Passive and causative tokens are doubly counted, e.g., resultative passives would count to both the Passive and Resultative columns. We exclude an additional 1119 tokens that used either obsolete, defective, heteroclitic, or Eastern conjugations.

Table 19: Distribution of aorist stems across regular and irregular verbs

	Regular verb (simplex or complex)				Irregular verbs		
	E/I-Class	Causative	A-Class	Inchoative	Aorist-less	Infixed	Suppletive
BD	73.95% (n = 2376)	10.55% (n = 339)	4.11% (n = 132)	9.21% (n = 296)	0.72% (n = 23)	0.96% (n = 31)	0.5% (n = 16)
UD	75.93% (n = 1309)	7.95% (n = 137)	3.36% (n = 58)	9.11% (n = 157)	1.16% (n = 20)	1.57% (n = 27)	0.93% (n = 16)
Infinitive Present PST IPFV Prohibitive Connegative							
<b>Aorist stems Meaningful:</b>							
PST PFV	✓	✓	✓	✓	✓	✓	✓
<b>Spurious:</b>							
IMP 2PL	✓	✓	✓	✓	✓	✓	✓
RPTCP		✓	✓	✓		✓	✓
EPTCP		✓	✓	✓		✓	✓
SPTCP			✓	✓			(✓)
Passivized			✓	✓		(✓)	(✓)
IMP 2SG				✓	(✓)	✓	✓
Causativized						(✓)	(✓)

Table 20: Token frequency of aorist stems across different inflected and derived forms

Paradigm cell	PST PFV	IMP 2PL	RPTCP	EPTCP	SPTCP	PASS	IMP 2SG	CAUS	Total
Number of tokens	1736	37	2072	206	273	1517	67	440	6348
Uses aorist?	1736	37	625	98	58	73	35	38	2700
% from # of aorists	64.30%	1.37%	23.15%	3.63%	2.15%	2.70%	1.30%	1.41%	

Many generalizations can be derived from the above tables, each of which reinforce our pre-theoretical generalizations on the aorist stem from (2), which we go through below.

First, the overwhelming majority of aorist stems in the UD corpus is found in the past perfective. If we assume that child-directed speech uses similar frequencies, then the Armenian child is primed to treat the aorist suffix as a perfective marker by default. This reinforces the CORE SEMANTICS or the core function of the aorist stem to mark the simple past. This is the intuition behind why the conventional name for this stem is the ‘aorist’ or ‘perfective’ stem (Plungian 2018; cf. similar uses of ‘perfective’ stems in areally-related languages in Daniel 2018).<sup>25</sup>

<sup>25</sup>As an anecdotal example for this point, before we did this study, we the authors naively thought that the aorist suffix *-ts-* was just a non-morphomic marker for perfectivity. Later while doing this study, we realized that this affix was used elsewhere in the paradigms as a meaningless element, such as in imperatives.

The second generalization is MEANINGLESS EXTENSION. When we look beyond the past perfective, the use of the aorist stem (as the spurious or meaningless aorist) does not correlate with any clear semantic parameters. There is no clear semantic similarity between imperatives, whether singular or plural, resultative/evidential (perfect) participles, subject (habitual) participles, and passivization/causativization. Nor is there a clear link from most of these forms to the perfective semantics. This reinforces the role of the spurious aorist as morphomic and as agnostic to semantic motivation.

The third generalization is CLASS-SPECIFICITY. The distribution of the aorist stem varies by verb class. This chaotic distribution however does display implicational relations. As a morpheme, the aorist stem is expected to have an arbitrary distribution of contexts. On the one hand, this is true. The contexts which trigger the spurious aorist do not show any semantic correlations or connections with perfectivity. But on the other hand, there is a degree of language-internal predictability between pairs of arbitrary contexts that trigger the spurious aorist. In fact, these contexts show implicational relations or dependencies (Bonami & Boyé 2002; Blevins 2006).<sup>26</sup> That is, they display an \*ABA restriction (Bobaljik 2012). For example, all regular verbs use the aorist stem in the imperative 2PL. If a regular verb uses the aorist in subject participles, then it must also use it in evidential participles (A-Class verbs). This implication does not hold in the reverse, because causatives have the spurious aorist in the evidential but not the subject participle.

This third generalization reinforces the stability of the spurious aorist as a grammatical process that is likely psychologically real. Coincidentally, the concept of implicational dependencies has been invoked in other guises in previous work on morphemes, such as the concept of subset-superset relations across paradigms (Herce 2019; §3.2.2). Typological evidence from Herce (2020b; 207-210) suggests that such implicational dependencies are cross-linguistically attested in morphomic distributions.

The fourth generalization, STEM COMPOSITION, can be seen by comparing the regular verbs with the irregular verbs. For the past perfective, whereas regular verbs use the meaningful aorist suffix /-ts-/, irregular verbs apply irregular morphology such as suppletive root allomorphy or a covert perfective suffix /-∅-/. This reinforces the idea of STEM COMPOSITION in that different classes utilize different operations to form their aorist stems. Similarly, setting aside causativization, if some context can trigger the spurious aorist in regular verbs, then that context can also trigger irregular morphology in irregular verbs. For example, the imperative 2PL triggers allomorphy in suppletive roots, and it triggers the spurious aorist in regular verbs.

---

This anecdote suggests that speakers may psycholinguistically process the aorist suffix/stem differently for different paradigm cells.

<sup>26</sup>In more formal terms, such implicational dependencies are analogous to monotonicity (Graf 2019; Moradi 2019, 2020, 2021). Given some domain elements  $x, y$  and a function  $f$ ,  $f$  is monotonic if  $x < y$ , then  $f(x) < f(y)$ . More informally, because evidential participles are above ('less' than) subject participles in our base hierarchy, then if a verb's subject participle uses an aorist stem, then so must its evidential, but not vice versa.

The fourth generalization ties irregular morphology with implicational relations. For regular verbs, the contexts of the spurious aorist form a clear monotonic order. But for irregular verbs, it seems that they pick and choose which contexts can trigger these irregular processes. This makes it difficult to set up a clear, monotonic, and consistent implicational hierarchy for both regular and irregular verbs. It is possible that the above contexts form a partial order (cf. tense-based partial orders in Moradi 2020). Alternatively, the lack of clear implicational dependencies can be evidence that irregular morphology is chaotic enough that speakers don't create clear implicational generalizations over irregular morphology, thus further cementing the status of these paradigms as irregular.<sup>27</sup>

In sum, for a given irregular verb and paradigm cell, a consistent and near-perfect generalization is that these irregularities in this paradigm cell are correlated with the use of the aorist suffix /-tʰs-/ in regular verbs. In simpler terms, irregular verbs use an aorist stem in the same way that regular verbs do. Throughout their conjugation, irregular verbs display either a present stem or an aorist stem. When an aorist-less, infixed, or suppletive irregular verb has a paradigm cell that requires a spurious aorist, the verb uses an aorist stem that is identical between that cell and the perfective. Given the verb, the aorist is formed the same way wherever it shows up in the paradigm, no matter how it is formed.

This connection across the aorist stems of the different conjugation classes reinforces the fifth generalization, STEM UNITY, meaning that the aorist stem is a morphologically active object within the Armenian lexicon. The use of aorist stems across paradigm cells is not due to accidental homophony but direct morphological operations. The next section formalizes the creation and distribution of aorist stems.

## 5 Decomposing the aorist stem in Distributed Morphology

The previous sections detailed the formation and distribution of the aorist stem across Western Armenian. All core generalizations were established. This section formalizes these generalizations within a lexical realizational model of morphology, Distributed Morphology (Halle & Marantz 1993; Embick & Noyer 2007).

We use DM because of three reasons. First, morphemes are often argued to be undesirable to model in DM (Embick & Halle 2005). Following Trommer (2016), we show that a piece-based morphology like DM is capable of modeling morphomic processes, as are many other non-piece based theories (Aronoff 1994; Stump 2001; Blevins 2006). Second, aorist stems are formed in quite disparate ways depending on class. DM provides a repertoire

<sup>27</sup>We thank Borja Herce for discussing this alternative explanation with us. A similar interpretation is that, because regular verbs display monotonicity, then a constructive approach is efficient for organizing regular verbs. In contrast, because irregular verbs are chaotic and seem to need cell-by-cell information, then an abstractive approach is more efficient for them (O'Neill 2014).



of morphological operations that we use to factorize the way stems are made. Third, the Armenian data provides arguments for how a model like DM can incorporate stem formation within an articulated derivational framework. This analysis of Armenian aorist stems can then shed more light on how the derivation itself should work in DM, including the process of node sprouting (Choi & Harley 2019).<sup>28</sup>

## 5.1 Core semantics: aorists as perfective marker

The first generalization in the Armenian aorist stem is CORE SEMANTICS. The aorist stem is used to create the past perfective for all classes, and it contrasts with the past imperfective, which uses the present stem instead.

Consider the simplex E-Class and A-Class verbs in their past imperfective and perfective forms. In both the past imperfective and perfective, the past marker /-i-/ is added. In the past perfective, we find an additional element which is the perfective suffix /- $\widehat{\text{ts}}$ -/.

### (10) CORE SEMANTICS: Using the aorist stem to form past perfective

	E-Class ‘to drink’	A-Class ‘to read’	
Infinitive	$\chi\text{ə}m\text{-e-l}$	$g\text{a}r^h\text{-a-l}$	$\sqrt{-\text{TH-Inf}}$
PST IMPF 3PL	$\chi\text{ə}m\text{-e-i-n}$	$g\text{a}r^h\text{-a-i-n}$	$\sqrt{-\text{TH-PST-3PL}}$
PST PFV 3PL	$\chi\text{ə}m\text{-e-}\widehat{\text{ts}}\text{-i-n}$	$g\text{a}r^h\text{-a-}\widehat{\text{ts}}\text{-i-n}$	$\sqrt{-\text{TH-AOR-PST-3PL}}$

Based on the above minimal pairs, the suffix /- $\widehat{\text{ts}}$ -/ functions as an aspect marker of perfectivity (Donabédian 2016). Briefly, the event is complete by the time of reference, which can be modeled as event time either preceding reference time (Hornstein 1990) or being contained within reference time (Smith 1997). Armenian follows the typologically common pattern of perfective aspect only occurring with the past tense (e.g. Dahl 1985). Without the suffix /- $\widehat{\text{ts}}$ /, the past verb is interpreted as imperfective.

We capture this with the following realization rule or Vocabulary Insertion (VI). We use double-sided arrows  $\leftrightarrow$  for VI rules. Morphs are presented in slashes / /.

### (11) Vocabulary Insertion rule for aorist suffix

ASP[AOR]  $\leftrightarrow$  /- $\widehat{\text{ts}}$ -/

<sup>28</sup>For readers who don’t practice DM, we encourage them to see how their own preferred morphological model would differ from DM in formalizing the individual aspects of our analysis. We don’t think our model is empirically superior to another.

## 5.2 Meaningless extension: Node insertion for spurious aorist

For past perfective verbs, the suffix  $-\widehat{ts}$ - is meaningful. It contributes perfective semantics to the verb. In a post-syntactic framework, the aorist head ASP[AOR] is added in the narrow syntax for perfective verbs.

However, the aorist stem and the aorist suffix are also meaninglessly found in other paradigm cells *without* contributing any semantic function. One such context is the imperative 2PL which triggers the aorist stem for all verbs. The aorist is used even though the imperative 2PL does not have any perfective semantics.

- (12) MEANINGLESS EXTENSION: Using the aorist stem in the imperative 2PL without adding perfective semantics

	E-Class ‘to drink’	A-Class ‘to read’	
Infinitive	$\chi\text{əm-e-l}$	$\text{gart}^{\text{h}}\text{-a-l}$	$\sqrt{-\text{TH-}}\text{INF}$
IMP 2SG	$\chi\text{əm-e-}\emptyset$	$\text{gart}^{\text{h}}\text{-a-}\emptyset$	$\sqrt{-\text{TH-}}\text{2SG}$
IMP 2PL	$\chi\text{əm-e-}\widehat{ts}\text{-ek}^{\text{h}}$	$\text{gart}^{\text{h}}\text{-a-}\widehat{ts}\text{-ek}^{\text{h}}$	$\sqrt{-\text{TH-}}\text{AOR-2PL}$

The use of a meaningless aorist suffix (a spurious aorist) is a type of morphomic process. Within a Y-model or a post-syntactic approach to morphology like DM, we can capture MEANINGLESS EXTENSION via a head insertion rule (Trommer 2016), which we call a node-sprouting rule (following Choi & Harley 2019). This rule inserts the meaningless and purely formal aspect suffix before the imperative 2PL suffix. Insertion rules use a two-layered right-arrow  $\Rightarrow$ .

- (13) **Node-sprouting:** *Spurious aorist insertion in 2PL imperative*  
 $\emptyset \Rightarrow \text{ASP[AOR]} / \_ \neg \text{MOOD}[+\text{IMP}]/\text{AGR}[+2, +\text{PL}]$

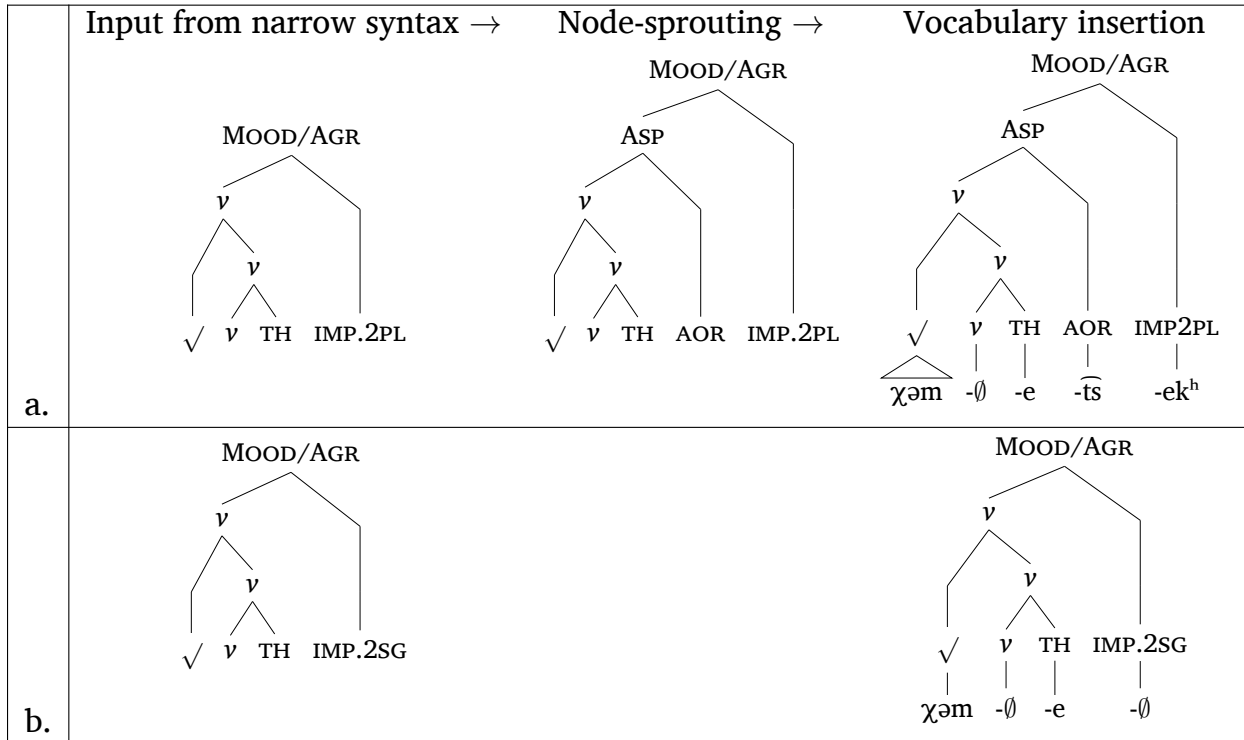
In a post-syntactic, Minimalist framework to morphology like DM, this rule would apply in the Morphological component after the narrow syntax has shipped the morphosyntactic structure to the PF branch. Since there is no (perfective) Asp head in the narrow syntax, no associated aspectual semantics can be present at LF. This rule would thus affect the surface morphological structure of the verb, but not the semantics. Informally, this insertion rule creates the aorist stem but it applies too late to create perfective semantics.<sup>29</sup>

This rule acts as a node-sprouting rule because it creates an extra terminal node (Choi & Harley 2019); see Figure 1. The inserted node can be called a meaningless dissociated morpheme (Embick 1998, 2015). This inserted aorist then undergoes VI (11) to surface as  $-\widehat{ts}$ -. We illustrate below the application of this rule for a 2PL imperative, and the lack

<sup>29</sup>Following Trommer (2016)’s terminology, these insertion rules treat the aorist feature AOR as a semi-parasitic feature. The feature is semi-parasitic because it is meaninglessly added in the Morphology for the imperative 2PL, while it is meaningfully added in the Syntax for the past perfective.

of application in the 2SG imperative. For illustration, we treat VI in this context as a single non-cyclic step. We revise this later in the paper. We treat theme vowels TH as adjoined to little *v* (Oltra-Massuet 1999; Dolatian & Guekguezian 2021).

Figure 1: Spurious aorist in imperative 2PL, but not imperative 2SG of [ $\chi\acute{\alpha}m\text{-}e\text{-}l$ ] ‘to drink’



The above discussion illustrated how the spurious aorist is inserted in the imperative 2PL. In the next sections we look at a larger set of constructions where the spurious suffix is added for some but not all conjugation classes. In other words, the spurious aorist is sensitive to conjugation class features, which are purely morphological (Dolatian & Guekguezian 2021; Guekguezian & Dolatian in press; Karakaş et al. 2021). This necessitates the use of multiple insertion rules.

### 5.3 Class-specific: Node insertion is fed by vocabulary insertion

The property of CLASS-SPECIFICITY is that the same morphosyntactic context can use the aorist stem in some classes but not others. This is demonstrated in participles and passives.

- (14) CLASS-SPECIFICITY: participles and passives are formed from the aorist stem of some classes but not others

	E-Class ‘to drink’	A-Class ‘to read’
Infinitive	$\chi\acute{\alpha}m\text{-}e\text{-}l$ $\sqrt{-\text{TH-}INF}$	$g\acute{a}rt^h\text{-}a\text{-}l$ $\sqrt{-\text{TH-}INF}$
Subject PTCP	$\chi\acute{\alpha}m\text{-}\emptyset\text{-}o\text{v}$ $\sqrt{-\text{TH-}PTCP}$	$g\acute{a}rt^h\text{-}a\text{-}\widehat{ts}\text{-}o\text{v}$ $\sqrt{-\text{TH-}AOR\text{-}PTCP}$
Passive	$\chi\acute{\alpha}m\text{-}\emptyset\text{-}v\text{-}i\text{-}l$ $\sqrt{-\text{TH-}PASS\text{-}TH-}INF$	$g\acute{a}rt^h\text{-}a\text{-}\widehat{ts}\text{-}v\text{-}i\text{-}l$ $\sqrt{-\text{TH-}AOR\text{-}PASS\text{-}TH-}INF$

The E-Class uses the present stem to form subject participles and passives, while the A-Class uses the aorist stem with a spurious aorist suffix  $\widehat{ts}$ -. In an E-Class verb, the participle and passive suffixes delete the theme vowel of the root.

We assume that conjugation classes are represented as features on roots; see Dolatian & Guekguezian (2021) for arguments. To capture this class-specificity in DM, node insertion rules must be sensitive to the class features of the root. Rule (15) inserts a spurious aorist between the theme vowel of an A-Class root and the participle/passive suffixes.

(15) **Node-sprouting:** *Spurious aorist insertion in participles and passives of A-Class*

$$\emptyset \Rightarrow \text{ASP[AOR]} \quad / \quad \sqrt{\text{A-Class}} \text{ } \curvearrowright \text{v} \text{ } \curvearrowright \text{TH} \text{ } \curvearrowright \text{ } \text{PTCP}$$

$$\quad \quad \quad \quad \quad \quad \quad / \quad \sqrt{\text{A-Class}} \text{ } \curvearrowright \text{v} \text{ } \curvearrowright \text{TH} \text{ } \curvearrowright \text{ } \text{PASS}$$

For the E-Class verbs, participles and passives are formed from the present stem and delete the theme vowel. We assume that there is a readjustment rule which deletes theme vowels before the participle and passive suffixes (16).<sup>30</sup> We represent morph deletion rules with a simple right-arrow  $\rightarrow$ , to distinguish them from node-sprouting ( $\Rightarrow$ ) and vocabulary insertion ( $\leftrightarrow$ ).

(16) **Deletion:** *Theme-vowel deletion before participles*

$$\text{TH} \rightarrow \text{ } / \text{-}\emptyset\text{/} \quad / \quad \text{ } \curvearrowright \text{PTCP}$$

The more specific aorist insertion rule bleeds the theme deletion rule for A-Class verbs, while E-Class verbs get theme deletion as the default. We illustrate in Table 21 a derivation for the subject participles of an E-Class and A-Class verb. We include a covert little  $v$  node which hosts the theme vowel.

<sup>30</sup>There is morphophonological evidence that the deleted theme vowels are expounded and overt at an earlier phonological cycle, syllabifying with the root, and then getting deleted before certain suffixes (Dolatian in review). The theme deletion rule likewise cannot be a purely phonological rule. Although it is tempting to argue that a theme vowel is deleted to repair vowel hiatus  $*\chi\acute{\alpha}m\text{-}e\text{-}o\text{v}$ , the general hiatus repair rule in Armenian is glide epenthesis:  $mark^h\text{-}are\text{-}ov \rightarrow mark^h\text{-}arej\text{-}ov$  ‘prophet-INS’. Although deletion is possible when the first vowel is  $i$  before a derivational suffix (Dolatian 2020, 2021), deletion is not a common repair rule for  $e$  or  $a$  (Vaux 1998). In fact, epenthesis is used to resolve vowel hiatus between theme vowels and Agr suffixes. In the past imperfective  $\chi\acute{\alpha}m\text{-}e\text{-}i\text{-}n$  ‘(If) they were to drink’ (§2.2), the surface form is pronounced with a glide [ $\chi\acute{\alpha}m\text{-}e\text{-}ji\text{-}n$ .]

Table 21: Cyclic derivation of spurious aorist insertion in subject participles

	E-Class ‘drinker’				A-Class ‘reader’			
Narrow syntax input:	$\sqrt{\text{drink}}$	$\nu$	TH	SPTCP	$\sqrt{\text{read}}$	$\nu$	TH	SPTCP
Vocabulary insertion:	$\chi\text{əm}_E$	$\nu$	TH	SPTCP	$\text{gart}^h_A$	$\nu$	TH	SPTCP
Node-sprouting (15):					$\text{gart}^h_A$	$\nu$	TH	AOR SPTCP
Vocabulary insertion:	$\chi\text{əm}_E$	$-\emptyset$	-e	SPTCP	$\text{gart}^h_A$	$-\emptyset$	$\alpha$	AOR SPTCP
Deletion (16):	$\chi\text{əm}_E$	$-\emptyset$	$-\emptyset$	SPTCP				
Vocabulary insertion:	$\chi\text{əm}_E$	$-\emptyset$	$-\emptyset$	-O $\mathcal{B}$	$\text{gart}^h_A$	$-\emptyset$	$\alpha$	$-\overline{\text{ts}}$ SPTCP
					$\text{gart}^h_A$	$-\emptyset$	$\alpha$	$-\overline{\text{ts}}$ -O $\mathcal{B}$

Because the spurious aorist is class-conditioned for the A-Class verb, we need to assume either of the following strategies for how to make node-sprouting access class diacritics. Either 1) vocabulary insertion and node-sprouting are cyclic such that roots (and their class diacritics) are exponed first which feeds node-sprouting, or 2) root class diacritics are accessible from the narrow syntactic input via root indexes. We assume the first cyclic approach simply because this is a more common assumption in DM. We treat spell-out as cyclic, bottom-out, starting from the root (Bobaljik 2000). Because theme vowels are adjuncts, we assume that they’re spelled out at the same time as little  $\nu$ .

In the narrow syntax, roots are just indexes (Harley 2014). In the above cyclic derivation, root VI applies first and generates class diacritics. Node-sprouting applies as early as possible whenever its conditions are met, i.e., whenever the right class features and morphological contexts are present. The application of node-sprouting bleeds theme vowel deletion.

We treat theme deletion as the deletion of morphs or exponents, via readjustment (Trommer 2012; 330), thus they must apply after the target exponent is first exponed. We emphasize that the above deletion rule targets morphs, and does not delete the actual morpheme in the morphological tree (cf. unlike obliteration rules in Arregi & Nevins 2012).

## 5.4 Stem composition: Allomorphy and deletion in stems

The previous section illustrated how the formation of the aorist interacts with other morphophonological rules. We similarly find other morphological rules interact to create the aorist stem. We focus on two processes in this section: allomorphy of suffixes, and the use of covert morphs. Throughout we find that aorist stem formation interacts cyclically with vocabulary insertion.

## 5.4.1 Node insertion is fed by and feeds vocabulary insertion

Causative verbs use the causative suffix  $\widehat{-ts\grave{a}n-}$  and theme vowel  $-e-$  in the present stem. In the aorist stem, the causative suffix is a different allomorph  $\widehat{-tsu}$  without a theme vowel. This allomorph is found before the meaningful aorist in the past perfective, and the spurious aorist as in the imperative 2PL or resultative participle.

- (17) STEM COMPOSITION: The aorist suffix triggers allomorphy of other morphemes in the aorist stem of causatives

Present stem:	Infinitive	$\chi\grave{a}m\widehat{-ts\grave{a}n-e-l}$	$\sqrt{-CAUS-TH-INF}$
Meaningful aorist:	PST PFV 3PL	$\chi\grave{a}m\widehat{-tsu-\emptyset-\widehat{ts-i-n}}$	$\sqrt{-CAUS-TH-AOR-PST-3PL}$
Spurious aorist:	IMP 2PL	$\chi\grave{a}m\widehat{-tsu-\emptyset-\widehat{ts-ek}^h}$	$\sqrt{-CAUS-TH-AOR-2PL}$
	RPTCP	$\chi\grave{a}m\widehat{-tsu-\emptyset-\widehat{ts-}\grave{a}d\grave{z}}$	$\sqrt{-CAUS-TH-AOR-RPTCP}$

We analyze the data by treating  $\widehat{-tsu-}$  as the pre-aorist allomorph of the causative (18a-i).<sup>31</sup> The theme vowel has a covert exponent between the causative and aorist (18a-ii). The causative suffix triggers node-sprouting of the aorist before the non-subject participles (18b).

- (18) a. **Allomorphy: Vocabulary Insertion rules for causatives**
- i. CAUS  $\leftrightarrow$   $\widehat{-tsu-}/$  /  $\_ \widehat{-TH-ASP[AOR]}$   
 $\widehat{-ts\grave{a}n-}/$  / elsewhere
  - ii. TH  $\leftrightarrow$   $\widehat{-\emptyset-}/$  / CAUS  $\_ \widehat{-ASP[AOR]}$
- b. **Node-sprouting: Spurious aorist insertion in causative participles**
- $\emptyset \Rightarrow$  ASP[AOR] / CAUS  $\_ \widehat{-TH-PTCP[-SPTCP]}$

Interestingly, causative verbs show that the spurious aorist  $\widehat{-ts-}/$  and the meaningful aorist  $\widehat{-ts-}/$  are the same morph, not two separate homophonous morphs. The causative allomorph  $\widehat{-tsu-}$  is triggered by both types of aorist suffixes: by the meaningful aorist in the past perfective, and by the spurious aorist in the imperative 2PL. The derivation in Table 22 illustrates this. For space, we gloss the root  $\sqrt{\text{drink}}$  as just  $\sqrt{\text{}}$ , and we skip the first two cycles for exponing the root and theme.

For the imperative, node-sprouting applies early in the derivation because its context is present. Eventually, vocabulary insertion will reach the causative. The causative surfaces as its past allomorph  $\widehat{-tsu-}$  in the context of the aorist, whether meaningful or spurious.

In sum, the meaningful and spurious aorists both trigger causative allomorphy. Thus the spurious aorist must be inserted early in the morphological structure in order to condition allomorphy.

<sup>31</sup>The allomorph is also used in the imperative 2SG even though there is no spurious aorist (§3.1). This seems to be just arbitrary morphological conditioning.

Table 22: Cyclic derivation of spurious aorist insertion in causatives

	‘they made drink’						‘make drink! (2PL)’				
Input:	√ <i>v</i>	CAUS	TH	AOR	PST	3PL	√ <i>v</i>	CAUS	TH	IMP.2PL	
Sprouting (13):	√ <i>v</i>	CAUS	TH	AOR	IMP.2PL		√ <i>v</i>	CAUS	TH	AOR	IMP.2PL
VI:	χə̃m-∅	CAUS	TH	AOR	PST	3PL	χə̃m-∅	CAUS	TH	AOR	IMP.2PL
Allomorphy (18a)	χə̃m-∅	<u>-tsu</u>	-∅	AOR	PST	3PL	χə̃m-∅	<u>-tsu</u>	-∅	AOR	IMP.2PL
	χə̃m-∅	<u>-tsu</u>	-∅	<u>-ts</u>	PST	3PL	χə̃m-∅	<u>-tsu</u>	-∅	<u>-ts</u>	IMP.2PL
	χə̃m-∅	<u>-tsu</u>	-∅	<u>-ts</u>	-i	3PL	χə̃m-∅	<u>-tsu</u>	-∅	<u>-ts</u>	-ek <sup>h</sup>
	χə̃m-∅	<u>-tsu</u>	-∅	<u>-ts</u>	-i	-n					

### 5.4.2 Node insertion and opaque conditions

The previous section looked at the aorist of the causative wherein the causative suffix switches allomorphs. We find similar behavior in inchoatives but with a crucial difference. The inchoative suffix switches from its overt morph *-n-* in the present stem to a covert morph *-∅-* in the aorist stem. Because the use of the aorist stem is class-specific, we find an opaque interaction between a) the inchoative triggering the aorist, and b) the aorist deleting the inchoative marker.

In the present stem, inchoative verbs are derived from nouns and adjectives by adding the inchoative marker *-n-*. This nasal takes its own theme vowel *-a*. The nasal can be preceded by either a meaningless */-e/*, */-a-/*, or nothing. The aorist stem however displays quite complicated changes. The nasal and theme vowel are deleted, while the past marker is *-a*. This same aorist stem is used both with the meaningful aorist in the past perfective and the meaningless aorist in the imperative 2PL or resultative participle.

#### (19) STEM COMPOSITION: Zero morphs in the aorist stem of inchoatives

	Base ‘fat’	k <sup>h</sup> er	√
Present stem	Inchoative INF	k <sup>h</sup> er-n-a-l	√-INCH-TH-INF
Meaningful aorist	PST PFV 3PL	k <sup>h</sup> er-∅-∅- <u>-ts</u> -a-n	√-INCH-TH-AOR-PST-3PL
Spurious aorist	IMP 2PL	k <sup>h</sup> er-∅-∅- <u>-ts</u> -ek <sup>h</sup>	√-INCH-TH-AOR-2PL
	RPTCP	k <sup>h</sup> er-∅-∅- <u>-ts</u> -aḏz	√-INCH-TH-AOR-RPTCP

We assume a covert adjectivizer between the root and inchoative (Dolatian & Guekguezian 2021; Guekguezian & Dolatian in press). We treat the inchoative as a flavor of little *v*: INCH. In the past perfective, the aorist suffix causes the preceding inchoative and theme vowel to be covert. The meaning of the covert inchoative is still present in the past perfective; it is the covert inchoative which causes the word to be interpreted as a verb. It is likewise the covert inchoative which triggers the past suffix allomorph */-a-/*.

We analyze these facts as allomorphy conditioned by the aorist, though morph deletion is also a possible alternative. We also use a node-sprouting rule to insert the spurious aorist

between an inchoative and participle marker.

- (20) a. **Allomorphy:** *Allomorphy of the inchoative conditioned by the aorist*  
 INCH ↔ /-∅/ /  $\_ \frown$  TH  $\frown$  ASP[AOR]  
           / -n- / / elsewhere  
 TH ↔ /-∅- / / INCH  $\frown$   $\_ \frown$  ASP[AOR]
- b. **Node-sprouting:** *Spurious aorist insertion in participles of inchoatives*  
 $\emptyset \Rightarrow$  ASP[AOR] / INCH  $\frown$  TH  $\frown$   $\_ \frown$  PTCP

We show a derivation in Table 23 for the inchoative resultative participle. Node-sprouting applies as early as possible because the context is met: the inchoative marker and theme vowel are underlyingly adjacent to the participle marker. Vocabulary insertion then applies root-outwards, eventually reaching the inchoative and its theme vowel. The spurious aorist triggers a covert zero for the inchoative and its theme. The aorist is then spelled-out and vocabulary insertion continues.

Table 23: Cyclic derivation of spurious aorist insertion and deletion in inchoatives

	'become fat (resultative participle)'					
Narrow syntax input:	$\sqrt{\text{fat}}$	<i>a</i>	INCH	TH		RPTCP
Node-sprouting (20b):	$\sqrt{\text{fat}}$	<i>a</i>	INCH	TH	AOR	RPTCP
Vocabulary insertion:	<i>k<sup>h</sup>er</i>	<i>a</i>	INCH	TH	AOR	RPTCP
	<i>k<sup>h</sup>er</i>	-∅	INCH	TH	AOR	RPTCP
	<i>k<sup>h</sup>er</i>	-∅	INCH	TH	AOR	RPTCP
Allomorphy (20a)	<i>k<sup>h</sup>er</i>	-∅	-∅	-∅	AOR	RPTCP
	<i>k<sup>h</sup>er</i>	-∅	-∅	-∅	$\overline{\text{-ts}}$	RPTCP
	<i>k<sup>h</sup>er</i>	-∅	-∅	-∅	$\overline{\text{-ts}}$	$\overline{\text{-adz}}$

In the above derivation, there is a degree of rule-ordering opacity. When forming the aorist stem, the inchoative triggers the spurious aorist which then makes the inchoative trigger become covert. In terms of surface exponents, the opacity resembles self-destructive feeding (Baković 2011).<sup>32</sup>

## 5.5 Effects of covert aorists in irregular verbs

The previous section formalized the formation of aorist stems in regular verbs. This section goes through irregular verbs. We argue that the same abstract morpheme AOR triggers aorist formation in both regulars and irregulars. This aorist suffix is covert in irreg-

<sup>32</sup>But in terms of underlying morphological features (which trigger the feeding), the covert allomorphy is arguably non-self-destructive (Eric Baković, p.c).



ulars but it triggers a host of other morphological processes such as allomorphy or affix deletion.

### 5.5.1 Spurious aorist can be covert

In regular verbs, the aorist stem includes the aorist suffix  $/\widehat{-ts}/$ . In irregulars however, the aorist stem generally avoids using this suffix. We first look at aorist-less verbs. The word ‘to bring’ never uses the suffix  $/\widehat{-ts}/$ , while the verb ‘to sit’ optionally does.

(21) STEM COMPOSITION: covert aorists in aorist-less verbs

Present stem:	Infinitive	‘to bring’	‘to sit’	
	PST IMPF 3PL	$p^her-e-l$	$n\acute{a}st-i-l$	$\sqrt{-TH-}INF$
	PST PFV 3PL	$p^her-e-i-n$	$n\acute{a}st-e-i-n$	$\sqrt{-TH-}PST-3PL$
Meaningful aorist	PST PFV 3PL	$p^her-\emptyset-i-n$	$n\acute{a}st-(e-\widehat{ts})-a-n$	$\sqrt{-TH-AOR-}PST-3PL$
Spurious aorist	IMP 2PL	$p^her-\emptyset-ek^h$	$n\acute{a}st-(e-\widehat{ts})-ek^h$	$\sqrt{-TH-AOR-}2PL$

Although the aorist morpheme is not shown on the surface, there are two pieces of evidence that the aorist is present in an intermediate representation. First for the meaningful aorist, the past perfective’s semantics requires an abstract ASP in the morphological structure, in order to distinguish the past perfective  $p^her-i-n$  [ $\sqrt{-}PST-3PL$ ] ‘they brought’ from the past imperfective  $p^her-e-[j]i-n$  [ $\sqrt{-}TH-PST-3PL$ ] ‘(If) they were to bring’.<sup>33</sup>

Second, in contexts where we expect the spurious aorist, the theme vowel is likewise absent: imperative 2PL  $p^her-ek^h$  instead of  $*p^her-e-\widehat{ts}-ek^h$ . It is not the case that theme vowel is phonologically deleted for simple vowel hiatus repair. The regular repair for vowel hiatus is glide epenthesis as in the past imperfective  $p^her-e-[j]i-n$ . The fact that this  $e-i$  sequence is repaired with hiatus in the past imperfective, but via deletion in the past perfective  $p^her-i-n$  cannot be explained phonologically.

We argue that what happens is the following. All past perfectives have a meaningful ASP[AOR] node that is generated in the narrow syntax. The imperative 2PL lacks such a node in the narrow syntax, but it triggers node-sprouting for a spurious aorist, just like in a regular verb. The irregular root then triggers covert exponents or covert allomorphs for theme vowel and the aorist. This allomorphy applies for both the meaningful and spurious aorist. We call this allomorphic pattern *Aorist drop*.

(22) *Allomorphy: Aorist drop in some words*

<sup>33</sup>In the past perfective 3SG, the irregular verb *per-e-l* shows idiosyncratic use of the T-Agr allomorphs  $/-a-v/$ :  $p^her-a-v$  [ $\sqrt{-}PST-3SG$ ] ‘he brought’. The choice of this exponent requires referencing both the root and the covert aorist morpheme. If the aorist morpheme was absent, we would incorrectly expect the verb to take the same past markers as in the past imperfective 3SG:  $p^her-e-\emptyset-r$  [ $\sqrt{-}TH-PST-3SG$ ] ‘he was bringing’. It is the covert presence of the perfective aorist which licenses the right T and Agr morphs.

$$\begin{aligned} \text{ASP[AOR]} &\leftrightarrow /-\emptyset-/ / \sqrt{\sim v \sim \text{TH} \sim} \quad (\text{where root is irregular } \sqrt{\text{bring}}, \dots) \\ \text{TH} &\leftrightarrow /-\emptyset-/ / \sqrt{\sim v \sim} \sim \text{ASP[AOR]} \quad (\text{where root is irregular } \sqrt{\text{bring}}, \dots) \end{aligned}$$

We illustrate the allomorphy in Table 24. with the past perfective 3PL and the imperative 2PL

Table 24: Spurious aorist insertion and aorist dropping in irregular [p<sup>h</sup>er-e-l] ‘to bring’

Input:	‘they brought’						‘bring! (PL)’				
	$\sqrt{\text{bring}}$	v	TH	AOR	PST	3PL	$\sqrt{\text{bring}}$	v	TH	AOR	IMP.2PL
Sprouting (13):							$\sqrt{\text{bring}}$	v	TH		IMP.2PL
VI:	p <sup>h</sup> er	v	TH	AOR	PST	3PL	p <sup>h</sup> er	v	TH	AOR	IMP.2PL
	p <sup>h</sup> er	-∅	-∅	AOR	PST	3PL	p <sup>h</sup> er	-∅	-∅	AOR	IMP.2PL
Aorist drop (22)	p <sup>h</sup> er	-∅	-∅	-∅	PST	3PL	p <sup>h</sup> er	-∅	-∅	-∅	IMP.2PL
	p <sup>h</sup> er	-∅	-∅	-∅	-i	3PL	p <sup>h</sup> er	-∅	-∅	-∅	-ek <sup>h</sup>
	p <sup>h</sup> er	-∅	-∅	-∅	-i	-n					

The takeaway from this section is that these irregular verbs on the surface either never or optionally take an aorist suffix. However, their paradigms behave as if the aorist was inserted and then made covert, along with the root’s theme vowel. More evidence for this insertion and covert allomorphy comes from the next section on infixed verbs.

### 5.5.2 Covert spurious aorist triggers exponent deletion

Another class of irregulars is infixed verbs. These verbs have a meaningless /-n-/ or /-t̪-/ affix intervene between the root and theme vowel. This affix and theme vowel are deleted in the aorist stem, whether in the meaningful aorist or spurious aorist contexts. These verbs take a covert aorist suffix /-∅-/.

(23) STEM COMPOSITION: affix deletion in aorist stem of infixed verbs

		‘to arrive’	
Present stem:	Infinitive	<b>has-n-i-l</b>	$\sqrt{-\text{VX-TH-INF}}$
	PST IMPF 3PL	<b>has-n-e-i-n</b>	$\sqrt{-\text{VX-TH-PST-3PL}}$
Meaningful aorist	PST PFV 3PL	<u>has-∅-∅-∅-α-n</u>	$\sqrt{-\text{VX-TH-AOR-PST-3PL}}$
Spurious aorist	IMP 2PL	<u>has-∅-∅-∅-ek<sup>h</sup></u>	$\sqrt{-\text{VX-TH-AOR-2PL}}$

We analyze the meaningless affix as an empty morph that’s adjoined to little v, much like a theme vowel. As with aorist drop, we analyze these facts in the following way. The meaningful aorist is underlyingly present in the past perfective. The spurious aorist is added in the same contexts as other verbs, such as the imperative 2PL. These irregular roots trigger the insertion of a meaningless stem-extender infix (24a). The infix is made

covert in the presence of the aorist (24b). We call this allomorphy rule *Infix drop*. The exponents of the theme-vowel and aorist are also made covert whenever the aorist is present in these verbs (24c).

- (24) **Allomorphy: Infix drop in aorist contexts for irregular infixed verbs**
- a.  $\emptyset \Rightarrow \text{VX} / \sqrt{\sim v \sim}$  (where root is infixed  $\sqrt{\text{arrive, ...}}$ )
- b.  $\text{VX} \Leftrightarrow /-\emptyset-/ / \sim \sim \text{TH} \sim \text{ASP}[\text{AOR}]$   
 $/-\bar{t}\bar{j}\bar{-}/ / \sqrt{\sim v \sim}$  (some roots)  
 $/-n-/ / \text{elsewhere}$
- c.  $\text{TH} \Leftrightarrow /-\emptyset-/ / \sqrt{\sim v \sim \text{VX} \sim \sim \text{ASP}[\text{AOR}]}$  (where root is infixed)  
 $\text{ASP}[\text{AOR}] \Leftrightarrow /-\emptyset-/ / \sqrt{\sim v \sim \text{VX} \sim \text{TH} \sim}$  (where root is infixed)

Although the aorist does not have a surface exponent, its morphological features are still present (Table 25). The features of the perfective aorist morpheme must still be present somewhere in the tree in order to license the right past allomorph  $/-a-/$ . We illustrate a derivation below. For space, we gloss the root  $\sqrt{\text{arrive}}$  as just  $\sqrt{\phantom{x}}$ .

Table 25: Spurious aorist insertion and infix dropping in irregular [has-n-i-l] ‘to arrive’

Input:	Past perfective 3PL ‘they arrived’							Imperative 2PL ‘arrive!’					
	$\sqrt{\phantom{x}}$	v	VX	TH	AOR	PST	3PL	$\sqrt{\phantom{x}}$	v	VX	TH	AOR	IMP.2PL
Sprouting (13):	$\sqrt{\phantom{x}}$	v	VX	TH	AOR	PST	3PL	$\sqrt{\phantom{x}}$	v	VX	TH	AOR	IMP.2PL
VI:	has	v	VX	TH	AOR	PST	3PL	has	v	VX	TH	AOR	IMP.2PL
Infix drop (24)	has	$-\emptyset$	$-\emptyset$	$-\emptyset$	AOR	PST	3PL	has	$-\emptyset$	$-\emptyset$	$-\emptyset$	AOR	IMP.2PL
	has	$-\emptyset$	$-\emptyset$	$-\emptyset$	$-\emptyset$	PST	3PL	has	$-\emptyset$	$-\emptyset$	$-\emptyset$	$-\emptyset$	IMP.2PL
	has	$-\emptyset$	$-\emptyset$	$-\emptyset$	$-\emptyset$	-a	3PL	has	$-\emptyset$	$-\emptyset$	$-\emptyset$	$-\emptyset$	-ek <sup>h</sup>
	has	$-\emptyset$	$-\emptyset$	$-\emptyset$	$-\emptyset$	-a	-n						

Thus, these infixed verbs drop their infix when forming the aorist stem. We argue that it is the covert presence of the aorist suffix which triggers the covert infix.

### 5.5.3 Covert spurious aorist feeds root suppletion

The last class of irregular verbs is suppletive verbs. These verbs use one root allomorph (the elsewhere allomorph) in the present stem, and another allomorph (the marked allomorph) in the aorist stem. No theme vowels or aorist suffixes are present in the aorist stem.

- (25) STEM COMPOSITION: Root allomorphy in aorist stem of suppletive verbs

Present stem:	Infinitive	‘to eat’ <b>ud-e-l</b>	‘to be’ <b>əll-a-l</b>	$\sqrt{-\text{TH-}}\text{INF}$
	PST IMPF 3PL	<b>ud-e-i-n</b>	<b>əll-a-i-n</b>	$\sqrt{-\text{TH-PST-}}\text{3PL}$
Meaningful aorist	PST PFV 3PL	<u>ger-<math>\emptyset</math>-<math>\emptyset</math>-a-n</u>	<u>jeɤ-<math>\emptyset</math>-<math>\emptyset</math>-a-n</u>	$\sqrt{-\text{TH-AOR-PST-}}\text{3PL}$
Spurious aorist	IMP 2PL	<u>ger-<math>\emptyset</math>-<math>\emptyset</math>-ek<sup>h</sup></u>	<u>jeɤ-<math>\emptyset</math>-<math>\emptyset</math>-ek<sup>h</sup></u>	$\sqrt{-\text{VX-TH-AOR-}}\text{2PL}$

There are two analytical options for treating the marked root allomorphs *ger-*, *jeɤ-*. The first option is to treat them as the realization of the root before the covert aorist suffix (26a). Their presence is stipulated to trigger aorist dropping like some irregular verbs (26b). The second option is to treat this allomorph as the fused realization of the root, theme vowel, and aorist suffix. Both options would capture the relevant facts, and it is unclear if one is empirically superior to the other based on just the Western Armenian data. But for consistency with previous irregular verbs, we take the former non-fusional approach.<sup>34</sup>

(26) **Allomorphy: Root suppletion and covert aorists**

- a.  $\sqrt{\text{eat}}$   $\leftrightarrow$  *ger-* /  $\_ \sim \nu \sim \text{TH} \sim \text{ASP}[\text{AOR}]$   
*ud-* / elsewhere
- $\sqrt{\text{be}}$   $\leftrightarrow$  *jeɤ-* /  $\_ \sim \nu \sim \text{TH} \sim \text{ASP}[\text{AOR}]$   
*əll-* / elsewhere
- b. TH  $\leftrightarrow$  /- $\emptyset$ -/ /  $\sqrt{\_ \sim \nu \sim \_ \sim \text{ASP}[\text{AOR}]}$  (for suppletive  $\sqrt{\text{eat}}\dots$ )  
 ASP[AOR]  $\leftrightarrow$  /- $\emptyset$ -/ /  $\sqrt{\_ \sim \nu \sim \text{TH} \sim \_}$  (for suppletive  $\sqrt{\text{eat}}\dots$ )

We show a derivation in Table 26 for the verb ‘to eat’ in the past perfective and imperative 2PL. These contexts use the marked allomorph, triggered by either the meaningful or spurious aorist. Node-sprouting must thus apply before the root is exponed.

Table 26: Spurious aorist insertion and root allomorphy in [ud-e-l] ‘to eat’

Input: Sprouting (13): VI (26):	Past perfective 3PL ‘they ate’						Imperative 2PL ‘eat!’				
	$\sqrt{\text{eat}}$	$\nu$	TH	AOR	PST	3PL	$\sqrt{\text{eat}}$	$\nu$	TH	AOR	IMP.2PL
	$\sqrt{\text{eat}}$	$\nu$	TH	AOR	PST	3PL	$\sqrt{\text{eat}}$	$\nu$	TH	AOR	IMP.2PL
	<i>ger</i>	$\nu$	TH	AOR	PST	3PL	<i>ger</i>	$\nu$	TH	AOR	IMP.2PL
	<i>ger</i>	- $\emptyset$	- $\emptyset$	AOR	PST	3PL	<i>ger</i>	- $\emptyset$	- $\emptyset$	AOR	IMP.2PL
	<i>ger</i>	- $\emptyset$	- $\emptyset$	- $\emptyset$	PST	3PL	<i>ger</i>	- $\emptyset$	- $\emptyset$	- $\emptyset$	IMP.2PL
	<i>ger</i>	- $\emptyset$	- $\emptyset$	- $\emptyset$	-a	3PL	<i>ger</i>	- $\emptyset$	- $\emptyset$	- $\emptyset$	-ek <sup>h</sup>
	<i>ger</i>	- $\emptyset$	- $\emptyset$	- $\emptyset$	-a	-n					

<sup>34</sup>There is some cross-dialectal evidence for the deletion approach. In Western Armenian, the suppletive verb *d-a-l* [ $\sqrt{-\text{TH-}}\text{INF}$ ] ‘to give’ has a suppletive root in the past perfective along with theme and aorist deletion: *dəv-i-n* [ $\sqrt{-\text{PST-}}\text{3PL}$ ] ‘they gave’. In Eastern Armenian, we find suppletion but no deletion: *təv-e-ts<sup>h</sup>-i-n<sup>h</sup>* [ $\sqrt{-\text{TH-AOR-PST-}}\text{3PL}$ ] ‘they gave’. Here we see that root allomorphy triggers deletion in Western, but not in Eastern.

To summarize, the use of root suppletion in the aorist stem of suppletive verbs largely parallels the use of suffixation in the aorist stem of regular verbs. An economic analysis is to posit that a spurious aorist is inserted in these contexts, such as in the imperative 2PL. The aorist then feeds root allomorphy. The aorist is then deleted.

## 6 Status and derivation of morphomic nodes

This paper studies the distribution of the aorist marker in verbs. We present three higher-level arguments. The first is that the distribution of the aorist is morphomic in Armenian. The second concerns the derivational timing of generating morphomic units within a post-syntactic framework like DM. The third is that the aorist stems of regular verbs and irregular verbs are all morphologically the same item on an abstract morphological level. We discuss these arguments.

### 6.1 Spurious aorist is morphomic

Our first argument is that the Armenian paradigm displays a morphomic distribution of the aorist (past perfective) marker. This marker is used meaningfully in the past perfective, but idiosyncratically in other slots such as participles, imperatives, and valency-changing contexts. In these constructions, the aorist suffix is added even though it is semantically inactive, i.e., doesn't add past tense or perfective aspect. Such a distribution is morphological, and ignores any semantic or phonological motivations. This section reinforces our finding in light of debates in morphological theory.

In traditional grammars, the unmotivated use of the aorist suffix is used to motivate *stems*. Descriptive grammars label these spurious uses of the aorist as *aorist stems* to contrast them with the absence of spurious aorists in *present stems*. In a theoretical context, the use of the aorist in these contexts is morphomic (Aronoff 1994). Here, the affix is acting as a meaningless dummy morph that doesn't affect the verb's meaning.

Since their coinage in Aronoff (1994), morphomes have been a controversial phenomenon in morphological theory (Luís & Bermúdez-Otero 2016). On the hand, some argue that morphomes don't synchronically exist at all (Embick & Halle 2005). Some show that putative morphomic distributions can be reduced to systematic non-arbitrary patterns, whether from phonology (Steriade 2016) or semantics (Koontz-Garboden 2016). This is feasible on a per-language basis. For example, many Iranian languages use a present stem and a past stem (Haig 2008). In some Iranian languages, the distribution of the stems can be semantically explained (Kalin & Atlamaz 2018; Atlamaz 2019). Crucially, this reduction is not possible in all Iranian languages (Kaye 2013).

But on the other hand, the above controversy does not mean that *all* purported cases

of morphemes can be reduced to semantics or phonology. There is ample diachronic evidence for the sustainability and extension of morphemes (Maiden 2016; Enger 2019; Feist & Palancar 2021). A morpheme can gain and lose productivity during the history of a language (Nevins et al. 2015). Morphemes are cross-linguistically widespread (Herce 2020b,a), can be subject to interactions amongst each other (Herce 2019), be sensitive to conjugation class (Arkadiev 2012). They can form an integral part of a language's morphotactics (Bonami & Boyé 2002; Round 2016), morphological predictability (Blevins 2006; Maiden 2021), and stratal phonology (Bermúdez-Otero 2013).

Regardless of theoretical preconceptions, most morphological theories are capable of creating morphomic patterns (Bermúdez-Otero & Luís 2016), including the use of class features and head insertion in Distributed Morphology (Trommer 2016). The concept of the morpheme can also be taken over by DM approaches to the semantic bleaching of affixes, i.e. allosemy (Marantz 2013).

For Armenian, we treat the spurious aorist as morphomic for two reasons. One is that the general meaning of the aorist affix is past tense or perfectivity (Donabédian 2016; Giorgi & Haroutyunian 2011; Plungian 2018). Neither meanings are found in cases of the spurious aorist, making it semantically vacuous. Second, the spurious aorist is conditioned by disparate constructions across some but not all conjugation classes. For example, all regular classes use the spurious aorist in the imperative 2PL but none do in the prohibitive. Among participles, the A-Class uses the spurious aorist in all participles, the causative uses it in the resultative and evidential participles, while the E-Class never does. Furthermore, the Armenian aorist is diachronically stable (Donabédian 2016; 8), and there is ample work on the origin and development of the aorist stem in Classical Armenian (Martirosyan 2018; Kim 2018; Kortlandt 1987, 1995, 2018; Vaux 1995; Kocharov 2018).<sup>35</sup>

In sum, our first argument is that the spurious aorist is a morphomic item. The next section discusses how to incorporate the generation of this morphomic node into a larger derivational framework.

## 6.2 Derivational nature and timing of the spurious aorist

Our second argument builds on the first. Within a derivational model of morphology like DM, if the spurious aorist is morphomic, then it must be added after the narrow syntax through some mechanism in the Morphology component. The spurious aorist is then expected to interact with other morphological processes. We have so far proposed multiple rules which affect or are affected by the spurious aorist. In this section, we synthesize those rules and they exhibit a clear rule ordering between node-sprouting and

<sup>35</sup>It is an open question if the aorist stem was morphomic in Classical Armenian, and what were the necessary changes from Classical to Modern forms. It is also an open question if aorist or perfective stems in other areally-related Caucasian and Indo-European languages are also morphomic (Daniel 2018; Ganenkov 2020; Belyaev 2020; 607).

other morphological processes (Choi & Harley 2019; Georgieva et al. 2021).

To formalize the distribution of the aorist marker, we argued that the the aorist marker  $\widehat{-ts}$  is used meaningfully in the past perfective. The narrow syntax generates an aorist marker as the Aspect head in this context. For other contexts like the imperative 2PL, the aorist is added in the Morphology component as a form of node-sprouting. The table below lists some of the needed node-sprouting rules, such as for the imperative 2PL, A-Class participles, and inchoative participles. More such class-specific rules would be needed to essentially ‘list’ out all the contexts of the aorist stem across all classes and paradigm cells.

(27) *Sample of insertion rules for the spurious aorist in regular verbs*

Imperative 2PL	$\emptyset \Rightarrow \text{ASP[AOR]} / \_ \widehat{\text{MOOD}}[+ \text{IMP}]/\text{AGR}[+ 2, + \text{PL}]$
A-Class participle	$\emptyset \Rightarrow \text{ASP[AOR]} / \sqrt{\text{A-Class}} \widehat{\text{V}} \widehat{\text{TH}} \widehat{\text{PTCP}}$
Inchoative participle	$\emptyset \Rightarrow \text{ASP[AOR]} / \text{INCH} \widehat{\text{TH}} \widehat{\text{PTCP}}$
Causative non-subject participles	$\emptyset \Rightarrow \text{ASP[AOR]} / \text{CAUS} \widehat{\text{TH}} \widehat{\text{PTCP}}[-\text{SPTCP}]$
Passive of A-Class	$\emptyset \Rightarrow \text{ASP[AOR]} / \sqrt{\text{A-Class}} \widehat{\text{V}} \widehat{\text{TH}} \widehat{\text{PASS}}$

In terms of locality, the above insertion rules reference a rather large window of morphological triggers. For example, for the participles of A-Class verbs, node-sprouting uses a window of 4 morphemes plus the inserted aorist: the root, little  $\nu$ , TH, and PTCP. In terms of locality, these resemble spans (Merchant 2015). The intervening theme vowels do not however affect node-sprouting because the main trigger on the left are either the root or valency-suffixes, and the main triggers on the right are a single suffix. One could argue that theme vowels are just ignored by node-sprouting because they are structurally adjuncts (Bobaljik 2012; Gribanova 2015).

As an interesting correlation, the triggers on the left (categorized roots, valency suffixes) are arguably phase heads (Marvin 2002; Newell 2008; Embick 2015). Phases thus delimit the left-context for node-sprouting. For example, consider the passivized A-Class verb in (28) in the imperative 2PL. This is a verb with a valency suffix on top of the categorized root, creating two phase heads. This verb has two instances of the spurious aorist  $\widehat{-ts}$ /: one triggered by the passive next to the A-class verb, and one triggered by the imperative 2PL.

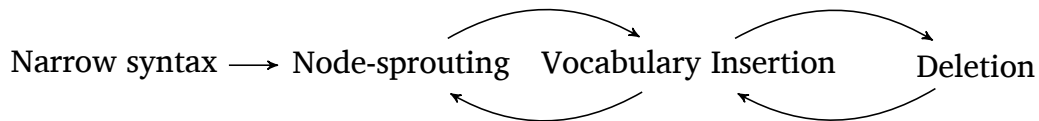
- (28)  $\text{gart}^h \text{-a} \widehat{-ts} \text{-v} \text{-e} \widehat{-ts} \text{-ek}^h$   
 read -TH -AOR -PASS -TH -AOR -IMP2PL  
 ‘Be read!’ (Context: Shouting at books that no one reads)

Phases do play a role in other areas of Armenian morphology because they determine conjugation classes (Dolatian & Guekguezian 2021), so it is not surprising that phases could also play a role in generating morphomic nodes. Phase heads can act as barriers for irregular morphological rules (Marantz 2013; Embick 2015). We suggest that phase

heads may play a role in delimiting the possibility of triggering aorist morphemes, but this is a place for further research.

In terms of derivational timing (Figure 2), we argue that node-sprouting applies as early as possible, can apply cyclically with vocabulary insertion, can feed allomorphy, and it can bleed theme vowel deletion rules (readjustment rules).

Figure 2: Derivational pipeline for node-sprouting



Focusing just on node-sprouting and its triggers, the rules in (27) include rules that reference the class of the root, such as for A-Class participles (§5.3). Node-sprouting in this context thus must follow vocabulary insertion of the root in a cyclic system so that class features can license node-sprouting. In the other contexts, node-sprouting can apply as the first step in the derivation because the contexts are present in the input from the narrow syntax, e.g., imperative 2PL (§5.2).

Alongside these insertion rules, there are a set of suffixes which trigger the deletion of adjacent theme vowels. For example, the subject participle suffix *-oB* and passive suffix *-v-* trigger the deletion of theme vowels in E-Class verbs: [χəm-e-l] ‘to drink’ vs. [χem-oB] ‘drinker’ and [χəm-v-i-l] ‘to be drunk’. These theme-deletion rules are summarized below.

(29) *Deleting theme vowels before certain suffixes*

Participle suffixes	TH → /-∅-/ / $\_ \curvearrowright$ PTCP
Passive suffixes	TH → /-∅-/ / $\_ \curvearrowright$ PASS

The above deletion rules target spelled-out exponents or morphs, not morphemes, as a type of readjustment rule (Trommer 2012). Crucially, the aorist insertion rules **bleed** the theme-deletion rules. For example in the A-Class, the root and participle morphemes trigger the insertion of the spurious aorist (§5.3). The aorist in turn intervenes between the theme vowel and participle suffix, thus blocking deletion: [gart<sup>h</sup>-a-t̃s-oB] instead of \*gart<sup>h</sup>-oB ‘reader’. No such insertion or blocking is found in the E-Class.

Besides bleeding rules, the insertion rules likewise feed other rules (§5.4). The inchoative and causative trigger the insertion of the spurious affix in different contexts. Both the meaningful and spurious aorist then trigger a special allomorph of the causative (see node-sprouting feeding root allomorphy in Korean: Choi & Harley 2019; 1347). The meaningful and spurious aorists also cause a covert allomorph for the inchoative.



## (30) Rules that are fed by the aorist

Past allomorph of causative	CAUS ↔ /-tsu-/	/ _ ^TH ^ASP[AOR]
	CAUS ↔ /-tsən-/	/ elsewhere
Covert allomorphy the inchoative:	INCH ↔ /-∅-/	/ _ ^TH ^ASP[AOR]
	INCH ↔ /-n-/	/ elsewhere

For the causative and inchoative, we argue that the inserted aorist conditions allomorphy on morphemes that are lower than it. In the case of the causative, this is the presence of some participles: CAUS-TH-RPTCP  $\Rightarrow$  CAUS-TH-AOR-RPTCP. The causative then undergoes allomorphy conditioned by the aorist. This shows that node-sprouting within some location X can temporarily precede vocabulary insertion for locations X-1. Thus, node-sprouting applies as early as possible whenever its context is met.

As for the inchoative, the feeding rules resemble self-destructive feeding rules (Baković 2011) in that the inchoative morpheme triggers the aorist, which then triggers a covert inchoative morph. Inchoatives show that covert morphs are not just deleted morphemes (deleted features). If the inchoative morpheme were deleted, then it would be unable to license the right past T allomorph.

The take-away from this section is thus twofold. One is that the spurious aorist is a morphomic item that is inserted via node-sprouting. Two is that node-sprouting applies early in the Morphology component, and it can cyclically interact with vocabulary insertion.

### 6.3 Stem uniformity and uniform morphological representations

The previous two arguments can be made by looking at only regular verbs. For regular verbs, the meaningful or spurious aorists are overt and they trigger processes such as allomorphy and theme vowel deletion. Our third argument is that the behavior of irregular verbs matches that of regular verbs. Because of this matching, we argue that the aorist stem is an abstract morphological item that is uniform across conjugation classes despite surface variation in its morphs.

On the surface, irregular verbs do not use a meaningful or spurious aorist. Instead, they exhibit irregular morphological processes in slots where we could expect a spurious aorist. These processes include deleting the aorist marker (aorist drop), deleting meaningless infixes (infix drop), and root allomorphy. We argued that these slots display a covert aorist which triggers irregular morphology.

To capture this connection, we argued that these irregular verbs trigger node-sprouting of the aorist. The aorist then triggers irregular morphology, and then ‘surfaces’ as a covert allomorph. We illustrate this connection in Table 27. We show the imperative 2PL of a simple E-Class verb that uses a spurious aorist. We also show the imperative 2PL of a suppletive verb *ud-e-l* ‘to eat’. The spurious aorist is inserted before the imperative 2PL

marker. It surfaces as  $\widehat{-ts}$  for regular verbs. But for the suppletive verb, the aorist triggers allomorphy of the root as *ger-* and then becomes covert.

Table 27: Spurious aorist insertion for imperative 2PL of regular and irregular verbs

	E-Class ‘drink!’					Suppletive ‘eat!’				
Input:	$\sqrt{\text{drink}}$	$\nu$	TH		IMP.2PL	$\sqrt{\text{eat}}$	$\nu$	TH		IMP.2PL
Sprouting (13):	$\sqrt{\text{drink}}$	$\nu$	TH	AOR	IMP.2PL	$\sqrt{\text{eat}}$	$\nu$	TH	AOR	IMP.2PL
VI (26):	$\chi\text{əm}$	$\nu$	TH	AOR	IMP.2PL	<i>ger</i>	$\nu$	TH	AOR	IMP.2PL
	$\chi\text{əm}$	$-\emptyset$	-e	AOR	IMP.2PL	<i>ger</i>	$-\emptyset$	$-\emptyset$	AOR	IMP.2PL
	$\chi\text{əm}$	$-\emptyset$	-e	$\widehat{-ts}$	IMP.2PL	<i>ger</i>	$-\emptyset$	$-\emptyset$	$-\emptyset$	IMP.2PL
	$\chi\text{əm}$	$-\emptyset$	-e	$\widehat{-ts}$	$-\text{ek}^h$	<i>ger</i>	$-\emptyset$	$-\emptyset$	$-\emptyset$	$-\text{ek}^h$

For a given irregular verb and paradigm cell, a consistent and near-perfect generalization is that presence of irregularities is correlated with the use of the spurious aorist in regular verbs. This correlation is intuitively what has guided Armenian philologists and grammarians to use the concept of ‘aorist stems’. We argue that this dependence on the spurious aorist is the *primary* generalization behind irregular verbs. By analyzing these irregularities in terms of the spurious aorist, we arrive at a consistent, coherent, and economical analysis of Armenian morphology (cf. similar generalizations in Round 2016).

## 7 Conclusion

This paper catalogued the systematic but arbitrary distribution of the aorist suffix across verbal paradigms in Western Armenian. In its canonical function, the aorist suffix is a marker of past perfectivity. But, it is used in many paradigm cells where no such perfective semantics are created. Instead, the use of the aorist in these positions is morphomic, meaningless, and arbitrary.

But beneath the arbitrariness, the morphomic and spurious aorist obeys systematic generalizations on its use. We analyze the spurious aorist as generated via a node-sprouting rule. This applies in the Morphology component after the narrow syntax. The entire window or context for insertion forms a span that is delimited by phases. Insertion applies as early as possible once its context is met. Insertion can happen at the beginning of the morphological derivation, or cyclically after vocabulary insertion of roots.

The aorist is fully integrated into the morphotactics of Armenian. It can feed and bleed other morphological rules that affect the shape of other morphs in the word, such as suffix allomorphy or morph deletion. To showcase this integration, we see that the morphomicity of the aorist likewise pop up in irregular paradigms. In these paradigms, there

is no actual aorist suffix that is used. In its place, a host of other irregular processes are triggered such as root suppletion. We analyze these facts as using covert aorist nodes.

## References

- Ambrazas, Vytautas, Emma Geniušienė, Aleksas Girdenis, Nijolė Sližienė, Dalija Tekorienė, Adelė Valeckienė & Elena Valiulytė. 2006. Lithuanian grammar. Baltos lankos.
- Arkadiev, Peter M. 2012. Stems in Lithuanian verbal inflection (with remarks on derivation). Word Structure 5(1). 7–27. <http://dx.doi.org/10.3366/word.2012.0017>.
- Aronoff, Mark. 1994. Morphology by itself: Stems and inflectional classes (Linguistic Inquiry Monographs 22). London/Cambridge: MIT press.
- Arregi, Karlos & Andrew Nevins. 2012. Morphotactics: Basque auxiliaries and the structure of spellout, vol. 86. Dordrecht: Springer. <http://dx.doi.org/10.1007/978-94-007-3889-8>.
- Atlamaz, Ümit. 2019. Agreement, case, and nominal licensing: Rutgers University dissertation.
- Baković, Eric. 2011. Opacity and ordering. In John Goldsmith, Jason Riggle & Alan C. L. Yu (eds.), The handbook of phonological theory, vol. 2, 40–67. Oxford: Blackwell 2nd edn. <http://dx.doi.org/10.1002/9781444343069.ch2>.
- Bardakjian, Kevork B. & Robert W Thomson. 1977. A textbook of modern Western Armenian. Delmar: NY: Caravan Books.
- Belyaev, Oleg. 2020. Indo-European languages of the Caucasus. In Maria Polinsky (ed.), The oxford handbook of languages of the caucasus, Oxford: Oxford University Press. <http://dx.doi.org/10.1093/oxfordhb/9780190690694.013.6>.
- Bermúdez-Otero, Ricardo. 2013. The Spanish lexicon stores stems with theme vowels, not roots with inflectional class features. Probus 25(1). 3–103. <http://dx.doi.org/10.1515/probus-2013-0009>.
- Bermúdez-Otero, Ricardo & Ana R Luís. 2016. A view of the morpheme debate. In Luís & Bermúdez-Otero (2016) 309–40. <http://dx.doi.org/10.1093/acprof:oso/9780198702108.003.0012>.
- Blevins, James P. 2006. Word-based morphology. Journal of Linguistics 42(3). 531–573. <http://dx.doi.org/10.1017/S0022226706004191>.
- Bobaljik, Jonathan David. 2000. The ins and outs of contextual allomorphy. In Kleanthes K. Grohmann & Caro Struijke (eds.), University of Maryland Working papers in Linguistics, vol. 10, 35–71. College Park: University of Maryland.

- Bobaljik, Jonathan David. 2012. Universals in comparative morphology: Suppletion, superlatives, and the structure of words (Current Studies in Linguistics 50). Cambridge, MA: MIT Press. <http://dx.doi.org/10.7551/mitpress/9069.001.0001>.
- Bonami, Olivier & Gilles Boyé. 2002. Suppletion and dependency in inflectional morphology. In Frank van Eynde, Lars Hellan, & Dorothee Beermann (eds.), The Proceedings of the HPSG'01 conference, 51–70. Stanford: CSLI Publications.
- Boyacioglu, Nisan. 2010. Hay-Pay: Les verbes de l'arménien occidental. Paris: L'Asiatheque.
- Boyacioglu, Nisan & Hossep Dolatian. 2020. Armenian verbs: Paradigms and verb lists of Western Armenian conjugation classes (v.1.0.0). Zenodo. <http://dx.doi.org/10.5281/zenodo.4397423>.
- Calabrese, Andrea. 2015. Irregular morphology and athematic verbs in Italo-Romance. Isogloss. Open Journal of Romance Linguistics 69–102. <http://dx.doi.org/10.5565/rev/isogloss.17>.
- Choi, Jaehoon & Heidi Harley. 2019. Locality domains and morphological rules. Natural Language & Linguistic Theory 37(4). 1319–1365. <http://dx.doi.org/10.1007/s11049-018-09438-3>.
- Dahl, Östen. 1985. Tense and aspect systems. Oxford: Basil Blackwell.
- Daniel, Michael. 2018. Aspectual stems in three East Caucasian languages. In Diana Forker & Timur Maisak (eds.), The semantics of verbal categories in Nakh-Daghestanian languages, 247–266. Leiden/Boston: Brill. [http://dx.doi.org/10.1163/9789004361805\\_010](http://dx.doi.org/10.1163/9789004361805_010).
- Dolatian, Hossep. 2020. Computational locality of cyclic phonology in Armenian: Stony Brook University dissertation.
- Dolatian, Hossep. 2021. Cyclicity and prosodic misalignment in Armenian stems: Interaction of morphological and prosodic cophonologies. Natural Language and Linguistic Theory 39. 843–886. <http://dx.doi.org/10.1007/s11049-020-09487-7>.
- Dolatian, Hossep. accepted. Output-conditioned and non-local allomorphy in Armenian theme vowels. The Linguistic Review .
- Dolatian, Hossep. in review. Cyclic dependencies in bound stem formation in Armenian passives. Unpublished manuscript.
- Dolatian, Hossep & Peter Ara Guekguezian. 2021. Relativized locality: Phases and tiers in long-distance allomorphy in Armenian. Linguistic Inquiry [http://dx.doi.org/10.1162/ling\\_a\\_00456](http://dx.doi.org/10.1162/ling_a_00456).

- Donabédian, Anaïd. 1997. Neutralisation de la diathèse des participes en *-ac* de l'arménien moderne occidental. Studi italiani di linguistica teorica ed applicata 26(2). 327–339.
- Donabédian, Anaïd. 2016. The aorist in Modern Armenian: Core value and contextual meanings. In Zlatka Guentchéva (ed.), Aspectuality and temporality: Descriptive and theoretical issues, vol. 172, 375. John Benjamins Publishing Company. <http://dx.doi.org/10.1075/slcs.172.12don>.
- Dum-Tragut, Jasmine. 2009. Armenian: Modern Eastern Armenian (London Oriental and African Language Library 14). Amsterdam/Philadelphia: John Benjamins Publishing Company. <http://dx.doi.org/10.1075/loall.14>.
- Embick, David. 1998. Voice systems and the syntax/morphology interface. In Heidi Harley (ed.), MITWPL 32: Papers from the UPenn/MIT Roundtable on Argument Structure and Aspect, 41–72. Cambridge, MA: MITWPL, Department of Linguistics and Philosophy, MIT.
- Embick, David. 2015. The morpheme: A theoretical introduction, vol. 31. Boston and Berlin: Walter de Gruyter. <http://dx.doi.org/10.1515/9781501502569>.
- Embick, David & Morris Halle. 2005. On the status of stems in morphological theory. In Twan Geerts, Ivo van Ginneken & Haike Jacobs (eds.), Romance languages and linguistic theory 2003 (Current Issues in Linguistic Theory 270), 37–62. Amsterdam: John Benjamins. <http://dx.doi.org/10.1075/cilt.270.03emb>.
- Embick, David & Rolf Noyer. 2007. Distributed morphology and the syntax/morphology interface. In Gillian Ramchand & Charles Reiss (eds.), The oxford handbook of linguistic interfaces, vol. 289, 289–324. Oxford: Oxford University Press. <http://dx.doi.org/10.1093/oxfordhb/9780199247455.013.0010>.
- Enger, Hans-Olav. 2019. In defence of morphomic analyses. Acta Linguistica Hafniensia 51(1). 31–59. <http://dx.doi.org/10.1080/03740463.2019.1594577>.
- Fairbanks, Gordon H. 1948. Phonology and morphology of modern spoken West Armenian. Madison, WI: University of Wisconsin-Madison dissertation.
- Fairbanks, Gordon H. 1958. Spoken West Armenian 16. New York: American Council of Learned Societies.
- Feist, Timothy & Enrique L Palancar. 2021. Paradigmatic restructuring and the diachrony of stem alternations in Chichimec. Language 97(1). 1–41. <http://dx.doi.org/10.1353/lan.2021.0000>.
- Ganenkov, Dmitry. 2020. Missing elsewhere: Domain extension in contextual allomorphy. Linguistic Inquiry 51. 785–798. <http://dx.doi.org/10.1162/linga00358>.

- Georgieva, Ekaterina, Martin Salzmann & Philipp Weisser. 2021. Negative verb clusters in Mari and Udmurt and why they require postsyntactic top-down word-formation. Natural Language & Linguistic Theory 457–503. <http://dx.doi.org/10.1007/s11049-020-09484-w>.
- Giorgi, Alessandra & Sona Haroutyunian. 2011. Remarks on temporal anchoring: The case of Armenian aorist. University of Venice Working papers in Linguistics 21. 89–110.
- Golovko, Evgeny V. (ed.). 2018. Acta linguistica petropolitana. Transactions of the institute for linguistic studies. part 1: The Armenian and Proto-indo-european preterite: Forms and functions, vol. 14 1. St. Petersburg: Russian Academy of Sciences.
- Graf, Thomas. 2019. Monotonicity as an effective theory of morphosyntactic variation. Journal of Language Modelling 7(2). 3–47. <http://dx.doi.org/10.15398/jlm.v7i2.211>.
- Greppin, John AC. 1973. The origin of Armenian nasal suffix verbs. Zeitschrift für vergleichende Sprachforschung 87(2. H). 190–198.
- Gribanova, Vera. 2015. Exponence and morphosyntactically triggered phonological processes in the Russian verbal complex. Journal of Linguistics 51(3). 519–561. <http://dx.doi.org/10.1017/S0022226714000553>.
- Guekguezian, Peter Ara & Hossep 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).
- Hagopian, Gayané. 2005. Armenian for everyone: Western and Eastern Armenian in parallel lessons. Ann Arbor, MI: Caravan Books.
- Haig, Geoffrey LJ. 2008. Alignment change in Iranian languages: A construction grammar approach, vol. 37. Berlin: Mouton de Gruyter. <http://dx.doi.org/10.1515/9783110198614>.
- Halle, Morris & Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In Kenneth Hale & Samuel J. Keyser (eds.), The view from Building 20: Studies in linguistics in honor of Sylvain Bromberger, 111–176. Cambridge, MA: MIT Press.
- Hamp, Eric P. 1975. On the nasal presents of Armenian. Zeitschrift für vergleichende Sprachforschung 89(1. H). 100–109.
- Harley, Heidi. 2014. On the identity of roots. Theoretical linguistics 40(3/4). 225–276. <http://dx.doi.org/10.1515/tl-2014-0010>.
- Herce, Borja. 2019. Morpheme interactions. Morphology 29(1). 109–132. <http://dx.doi.org/10.1007/s11525-018-09337-8>.
- Herce, Borja. 2020a. On morphemes and morphemes: Exploring the distinction. Word Structure 13(1). 45–68. <http://dx.doi.org/10.3366/word.2020.0159>.

- Herce, Borja. 2020b. A typological approach to the morpheme: University of Surrey dissertation.
- Hornstein, Norbert. 1990. As time goes by: Tense and universal grammar. Cambridge, MA: MIT Press.
- Iatridou, Sabine, Elena Anagnostopoulou & Roumyana Izvorski. 2001. Observations about the form and meaning of the perfect. In Michael Kenstowicz (ed.), Ken Hale: A life in language, 189–238. Cambridge, MA: MIT Press. <http://dx.doi.org/10.1515/9783110902358.153>.
- Johnson, Emma Wintler. 1954. Studies in East Armenian grammar. Berkeley, CA: University of California, Berkeley dissertation.
- Kalin, Laura & Ümit Atlamaz. 2018. Reanalyzing Indo-Iranian “stems”: A case study of Adıyaman Kurmanji. In Deniz Özyıldız Faruk Akkuş, İsa Kerem Bayırlı (ed.), Proceedings of tu + 1: Turkish, Turkic and the languages of Turkey, 85–98.
- Karakaş, Ayla, Hossep Dolatian & Peter Ara Guekguezian. 2021. Effects of zero morphology on syncretism and allomorphy in Western Armenian verbs. In Proceedings of the Sixth Workshop on Turkic and Languages in Contact with Turkic (TU+6), vol. 6, <http://dx.doi.org/10.3765/ptu.v6i1.5056>.
- Kaye, Steven. 2013. Morphomic stems in the Northern Talyshi verb: Diachrony and synchrony. In Silvio Cruschina, Martin Maiden & John Charles Smith (eds.), The boundaries of pure morphology: Diachronic and synchronic perspectives, 181–208. Oxford: Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780199678860.003.0010>.
- Khurshudian, Victoria G., Misha A. Daniel, Dmitri V. Levonian, Vladimir A. Plungian, Alex E. Polyakov & Sergey A. Rubakov. 2009. Eastern Armenian National Corpus. In Computational Linguistics and Intellectual Technologies (papers from the Annual International Conference “Dialogue 2009”, vol. 8 15, 509–518. Moscow: RGGU.
- Kim, Ronald I. 2018. The prehistory of the Classical Armenian weak aorist. In Golovko (2018) 86–136. <http://dx.doi.org/10.30842/alp2306573714104>.
- Kocharov, Petr. 2019. Old Armenian nasal verbs. archaisms and innovations: Leiden University dissertation.
- Kocharov, Petr A. 2014. Derivational semantics of Classical Armenian č”-stems. Acta Linguistica Petropolitana. Transactions of the Institute for Linguistic Studies 10(1). 202–226.
- Kocharov, Petr A. 2018. A note on the origin of the Old Armenian mediopassive endings. In Golovko (2018) 137–148. <http://dx.doi.org/10.30842/alp2306573714105>.

- Kogian, Sahak L. 1949. Armenian grammar (West dialect). Vienna: Mechitharist Press.
- Koontz-Garboden, Andrew. 2016. Thoughts on diagnosing morphomicity: A case study from Ulwa. In Luís & Bermúdez-Otero (2016) 89–111. <http://dx.doi.org/10.1093/acprof:oso/9780198702108.003.0005>.
- Kortlandt, F. 1995. The sigmatic forms of the Armenian verb. Annual of Armenian linguistics 16. 13–17.
- Kortlandt, Frederik. 1987. Sigmatic or root aorist. Annual of Armenian Linguistics 8. 49–52.
- Kortlandt, Frederik. 1999. The Armenian causative. Annual of Armenian linguistics 20. 47–49.
- Kortlandt, Frederik. 2018. The development of the sigmatic aorist in Armenian. In Golovko (2018) 149–152.
- Luís, Ana R & Ricardo Bermúdez-Otero. 2016. The morphome debate. Oxford: Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780198702108.001.0001>.
- Maiden, Martin. 2016. Some lessons from history: Morphemes in diachrony. In Luís & Bermúdez-Otero (2016) 33–63. <http://dx.doi.org/10.1093/acprof:oso/9780198702108.003.0003>.
- Maiden, Martin. 2021. The morphome. Annual Review of Linguistics 7. 89–108. <http://dx.doi.org/10.1146/annurev-linguistics-040220-042614>.
- Marantz, Alec. 2013. Locality domains for contextual allomorphy across the interfaces. In Ora Matushansky & Alec Marantz (eds.), Distributed morphology today, 95–115. Cambridge & London: MIT Press. <http://dx.doi.org/10.7551/mitpress/9780262019675.003.0006>.
- Martirosyan, Hrach. 2018. The development of the Classical Armenian aorist in modern dialects. In Golovko (2018) 153–162.
- Marvin, Tatjana. 2002. Topics in the stress and syntax of words: Massachusetts Institute of Technology dissertation.
- Merchant, Jason. 2015. How much context is enough? Two cases of span-conditioned stem allomorphy. Linguistic Inquiry 46(2). 273–303. <http://dx.doi.org/10.1162/LINGa00182>.
- Moradi, Sedigheh. 2019. \*ABA generalizes to monotonicity. In M. Baird & J. Pesetsky (eds.), Proceedings of NELS 49, vol. 2, GSLA University of Massachusetts, Amherst. <http://dx.doi.org/10.1007/978-3-662-62843-08>.



- Moradi, Sedigheh. 2020. Morphosyntactic patterns follow monotonic mappings. In Dun Deng, Fenrong Liu, Mingming Liu & Dag Westerstål (eds.), Monotonicity in logic and language, 147–165. Berlin, Heidelberg: Springer Berlin Heidelberg. [http://dx.doi.org/10.1007/978-3-662-62843-0\\_8](http://dx.doi.org/10.1007/978-3-662-62843-0_8).
- Moradi, Sedigheh. 2021. Monotonicity in morphosyntax: Stony Brook University dissertation.
- Nevins, Andrew, Cilene Rodrigues & Kevin Tang. 2015. The rise and fall of the L-shaped morpheme: Diachronic and experimental studies. Probus 27(1). 101–155. <http://dx.doi.org/10.1515/probus-2015-0002>.
- Newell, Heather. 2008. Aspects of the morphology and phonology of phases. Montreal, QC: McGill University dissertation.
- Oltra-Massuet, Isabel. 1999. On the constituent structure of Catalan verbs. In Karlos Arregi, Vivian Lin, Cornelia Krause & Benjamin Bruening (eds.), MIT Working papers in Linguistics, vol. 33, 279–322. Cambridge, MA: Department of Linguistics, Massachusetts Institute of Technology.
- O'Neill, Paul. 2014. The morpheme in constructive and abstractive models of morphology. Morphology 24(1). 25–70. <http://dx.doi.org/10.1007/s11525-014-9232-1>.
- Plungian, Vladimir. 2018. Notes on Eastern Armenian verbal paradigms: “temporal mobility” and perfective stems. In Daniël Van Olmen, Tanja Mortelmans & Frank Brisard (eds.), Aspects of linguistic variation: Studies in honor of Johan van der Auwera, 233–245. Berlin: De Gruyter Mouton. <http://dx.doi.org/10.1515/9783110607963-009>.
- Round, Erich R. 2016. Kayardild inflectional morphotactics is morphomic. In Luís & Bermúdez-Otero (2016) 228–247. <http://dx.doi.org/10.1093/acprof:oso/9780198702108.003.0009>.
- Smith, Carlota S. 1997. The aspectual system of Mandarin Chinese. In The parameter of aspect, 343–390. Springer. <http://dx.doi.org/10.1007/978-94-011-5606-611>.
- Steriade, Donca. 2016. The morpheme vs. similarity-based syncretism: Latin t-stem derivatives. In Luís & Bermúdez-Otero (2016) 112–172. <http://dx.doi.org/10.1093/acprof:oso/9780198702108.003.0006>.
- Stump, Gregory. 2001. Inflectional morphology: A theory of paradigm structure (Cambridge Studies in Linguistics 93). Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511486333>.
- Trommer, Jochen. 2012. Ø-exponence. In The morphology and phonology of exponence (Oxford Studies in Theoretical Linguistics 41), 326–354. Oxford: Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780199573721.003.0010>.

- Trommer, Jochen. 2016. A postsyntactic morpheme cookbook. In David Siddiqi & Heidi Harley (eds.), Morphological metatheory, vol. 229, 59–93. *Linguistik Aktuell/Linguistics Today*. <http://dx.doi.org/10.1075/la.229.03tro>.
- Vaux, Bert. 1995. A problem in diachronic Armenian verbal morphology. In Jos Weitenberg (ed.), New approaches to medieval Armenian language and literature, 135–148. Amsterdam: Rodopi.
- Vaux, Bert. 1998. The phonology of Armenian. Oxford: Clarendon Press.
- Yavrumyan, Marat M. 2019. Universal dependencies for Armenian. Present at the International Conference on Digital Armenian, INALCO, Paris, October 3-5.
- Աբրահամյան, Աշոտ. 1962. Բայը ժամանակակից հայերենում [The verb in Modern Armenian]. Երեւան: Հայկական ՍՍՌ ԳԱ Հրատարակչություն.
- Գալստյան, Լ. Ն. 2004. Գրաբարի սուկածանցավոր բայերի համապատասխանությունները արևմտահայերենում [Correspondences of derivative verbs of Classical Armenian in Western Armenian]. Լրաբեր Հասարակական Գիտությունների 2. 178–185.