Non-adjacency in the phonosyntax of Iranian Armenian

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Abstract

Iranian Armenian has a complex phonosyntactic process: a syntax-sensitive phonological process. The choice of surface form for a suffix depends on the location of another word: the auxiliary. The suffix uses either a short form or a long form based on the pronunciation of floating segments. If the auxiliary is to the left of the suffix, then the suffix uses the short form. But if the auxiliary is to the right of the suffix, even if non-adjacent, then the long form is used. Syntactically, the verb and auxiliary have to be part of the same clause or verb phrase. Accessing such information requires an articulated model of the syntax-phonology interface, such as in traditional Direct Reference models (Kaisse 1985). Such a model must countenance the use of long-distance information. The data resists an analysis where phonology cannot fully access syntactic structures (Nespor & Vogel 1986; Samuels 2011).

1   Introduction

Cross-linguistically, it is common for a phonological process to apply across words in connected speech, i.e., sandhi rules. Some sandhi rules are insensitive to morphological information (prosodic rules: Nespor & Vogel 1986), while others are highly sensitive to the morphological identity of the words involved (such as French liaison: Kaisse 1985). But almost always, the words that are involved in sandhi are linearly adjacent. This paper discusses data from Iranian Armenian, whereby a rule of sandhi is morphologically conditioned but can apply across words over multiple interveners. Such patterns are rarely

attested cross-linguistically, and shed light on various issues in the syntax-phonology interface.

Armenian is an Indo-European language made up of two standard lects, Standard Western Armenian and Standard Eastern Armenian (SEA), and multiple other non-standard varieties. SEA is the official language of the Republic of Armenia. This paper focuses on the Armenian community of Tehran, Iran, and its diaspora. The community is diglossic, using SEA as a formal register and Iranian Armenian (IA) as an informal register.[1]

The phenomenon that we focus on is liquid retention and deletion in the perfective converb suffix *-eɾ* or *-el*. Phonologically, the final liquid of this suffix acts as a floating or latent segment which can delete in different morphosyntactic contexts. Essentially, if the auxiliary 'be' has shifted leftward, then the liquid is deleted.

Table 1: Overview of the data

Underlying form	/gəɾ-**e**<ɾ>	=**e-m** /	/t͡ʃʰ =**e-m**	gəɾ-**e**<ɾ>/
Surface form	[gəɾ-**eɾ**	=**e-m**]	[t͡ʃʰ =**e-m**	gəɾ-**e**]
	write-PERF.CVB	=be-1SG	NEG=be-1SG	write-PERF.CVB
	'I have written'		'I have not written'	

To make this segment surface or 'dock', we find that the ultimate conditioning factor is syntactic and long-distance: the suffix has to precede the auxiliary within the same clause or verb phrase. The suffix and auxiliary can be adjacent or non-adjacent.

To analyze the data, we develop a simple theoretical model based on work on the syntax-phonology interface, specifically from Direct Reference theories of syntax-phonology interactions (Kaisse 1985). This process counts as a phonosyntactic or syntax-sensitive phonological process because of the deep interaction between the phonology and syntax. The novelty of the data and analysis is a) the high level of morpheme-specificity in this phonosyntactic process, and b) the role of long-distance information in triggering this process. This combination of properties creates a cross-linguistically rare process that sheds light on the syntax-phonology interface.

This paper is organized as follows. We go over some basics of Armenian syntax with regards to the auxiliary and inflection (§2). We then discuss the basic data on liquid deletion in §3.1, and then analyze it with latent segments in §3.2. We go through alternative analyses and refute them (§4). Long-distance factors are examined and analyzed in §5. The interim summary places the data within a theoretical context (§6). We then discuss other theoretically-insightful nuances of the language, such as an identical deletion process involving irregular imperfectives (§7.1), its diachronic origins (§7.2), and the effects of code switching between the two varieties (§7.3). Conclusions are in §8.

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[1]Data from this paper is part of documentation efforts with the community (Anonymous). Demographic data on our consultants are found in Anonymous.

2 Background on syntax and inflection

In Iranian Armenian, most verbal inflection is marked via periphrasis. For example, the present indicative is marked by using the form of the verb called the 'imperfective converb'. Tense and agreement are marked on the auxiliary 'be'.

(1) a. jes giɹkʰ-ə **gəɹ-um** =e-m
     I   book-DEF write-IMPF.CVB be-1SG

   'I am writing the book.' (NK)

   Ես գիրքը գրում եմ:

   b. du giɹkʰ-ə **kɒɹtʰ-um** =e-s
      you book-DEF read-IMPF.CVB be-2SG

   'You are reading the book.' (NK)

   Դու գիրքը կարդում ես:

Throughout this paper we underline the relevant converb form. The online version highlights the auxiliary. We mark the nuclear stress of the sentence via boldface, and this information is quite relevant to the syntax of the auxiliary. In the above sentences (1), nuclear stress is on the verb.

In the examples in (1), the auxiliary is phonologically cliticized to the word to its left, i.e., the converb. Evidence is that the auxiliary is syllabified with the converb: [gə.ˈɹu.mem] 'I am writing'. In terms of stress, words generally have final stress. The auxiliary is an unstressed clitic.

In the simple sentences above, the auxiliary is by default after the verb. However, in more complex types of sentences, we find that this auxiliary can move leftwards (Comrie 1984; Kahnemuyipour & Megerdoomian 2011, 2017). Hosts for the mobile clitic include negation.

(2) jes giɹkʰ-ə **t͡ʃʰ=e-m** gəɹ-um
    I   book-DEF NEG=be-1SG write-IMPF.CVB

   'I am not writing the book.' (NK)

   Ես գիրքը չեմ գրում:

Negation is marked by using the prefix *t͡ʃʰ-*. When the verb is periphrastic, the negation prefix is placed directly before the verb, and the auxiliary moves leftwards and attaches to the prefix. The prefix-auxiliary combination acts as its own phonological word, and carries the nuclear stress of the sentence.

Another context for leftward movement involves bare objects. In the above sentences, the object of the verb is definite and resists taking nuclear stress. But if the object lacks any

morphological markers for definiteness or indefiniteness, then the object is considered bare, takes nuclear stress, and takes the auxiliary.

(3) jes **giɹkʰ** =e-m gəɹ-um
  I book =be-1SG write-IMPF.CVB

  'I am writing books.'   (NK)

  Ես գիրք եմ գրում։

Another context is narrow focus. If a word has narrow focus and precedes the verb, then the auxiliary moves and attaches to that focused word.

(4) a. jes **giɹkʰ-ən** =e-m gəɹ-um
    I book-DEF =be-1SG write-IMPF.CVB

    'I am writing **THE BOOK**.'   (NK) elicit

    Ես գիրքն եմ գրում։

  b. **jes** =e-m giɹkʰ-ə gəɹ-um
    I =be-1SG book-DEF write-IMPF.CVB

    '**I** am writing the book.'   (NK)

    Ես եմ գիրքը գրում։

  c. **esoɹ** =e-m giɹkʰ-ə gəɹ-um
    today =be-1SG book-DEF write-IMPF.CVB

    '**TODAY**, I am writing the book.' (NK)

    Էսօր եմ գիրքը գրում։

It is obvious that there are strong correlations between auxiliary movement and nuclear stress. Such correlations have been modeled in the past with various frameworks and analyses (Tamrazian 1994; Megerdoomian 2009; Kahnemuyipour 2009; Kahnemuyipour & Megerdoomian 2011, 2017; Giorgi & Haroutyunian 2016; Hodgson 2019). We do not analyze or provide a larger catalog of contexts for auxiliary movement. For our purposes, we focus on the effects of auxiliary movement on the phonology of converbs.

3 Non-constant form of the perfective converb

Having overviewed the syntax of auxiliaries, this section shows how auxiliary movement interacts with the phonology of the perfective converb suffix. Briefly, the perfective suffix is *-eɹ* or *-el* when the auxiliary is on the right, but *-e* when the auxiliary is on the left within the same clause (§3.1). We analysis the data with floating segments (§3.2).

3.1 Overview of the data

The imperfective converb suffix *-um* is phonologically constant. Its segments never delete or change, regardless of whether the suffix precedes the auxiliary or not. We summarize this constancy below.

Table 2: Constancy of form for the imperfective converb suffix *-um*

	jes	giɹkʰ-ə		**gəɹ-um**	=e-m
	I	book-DEF	write-IMPF.CVB	be-1SG
Base case:	'I am writing the book.'			
Neg:	jes	giɹkʰ-ə	$\widehat{t\int}$**ʰ =e-m**	gəɹ-um
Bare object:	jes	**giɹkʰ =e-m**		gəɹ-um
Narrow Focus:	**jes =e-m**	giɹkʰ-ə		gəɹ-um

In contrast, the perfective converb is formed with the suffix *-el* or *-eɹ*. The liquid deletes when the auxiliary has moved.

When the perfective converb suffix precedes the auxiliary, some speakers produce this suffix as *-el*, some as *-eɹ*, and some as either. The choice of liquid varies by speaker and generation. Our primary consultant NK could use both forms, but she more often does *-eɹ*.

(5) jes giɹkʰ-ə **gəɹ-el/eɹ** =e-m
     I book-DEF write-PERF.CVB =be-1SG

'I have written the book.'   (NK)
Ես գիրքը գրել/գրեր եմ:

When the auxiliary is attached to the suffix, the auxiliary is syllabified with the suffix: [gə.ɹe.lem] or [gə.ɹe.ɹem].

When the auxiliary shifts leftwards, the perfective converb suffix loses its liquid. We find deletion in configurations involving negation (6a), bare objects (6b), or narrow focus (6c-6d), among others.

(6) a. jes giɹkʰ-ə $\widehat{t\int}$**ʰ =e-m** gəɹ-e
         I book-DEF NEG=be-1SG write-PERF.CVB

'I have not written the book.'   (NK)
Ես գիրքը չեմ գրե:

     b. jes **giɹkʰ =e-m** gəɹ-e
         I book =be-1SG write-PERF.CVB

'I have written books.' (NK)

Ես գիրք եմ գրել:

c. **jes** =e-m giɹkʰ-ə gəɹ-e
I be-1SG book-DEF write-PERF.CVB

'**I** have written the book.' (NK)

Ես եմ գիրքը գրել:

d. **esoɹ** =e-m giɹkʰ-ə gəɹ-e
today be-1SG book-DEF write-PERF.CVB

'**TODAY**, I have written the book.' (NK)

Էսօր եմ գիրքը գրել:

To summarize the data, whenever the auxiliary has shifted leftwards, the final liquid of the perfective converb suffix is deleted. The table below summarizes the data so far, so that the link with linearity and deletion is clearer.

Table 3: Inconstancy of form for the perfective converb suffix *-eɹ*

	jes	giɹkʰ-ə	**gəɹ-eɹ**	=e-m
	I	book-DEF	write-PERF.CVB	be-1SG
Base case:	'I am writing the book.'			
Neg:	jes	giɹkʰ-ə	$\widehat{t\int^h}$ =e-m	gəɹ-e
Bare object:	jes	**giɹkʰ** =e-m		gəɹ-e
Narrow Focus:	**jes** =e-m	giɹkʰ-ə		gəɹ-e

3.2 Formalizing final liquid deletion

Based on the above data, the following questions arise: 1) What liquids can delete? 2) What blocks the deletion? And 3) what is the relationship between the liquid and the blocker?

For the first question, final liquid deletion is restricted to the perfective suffix. No other final liquids delete in the language. Final liquids in roots and other suffixes surface without deletion. To illustrate, the phrases in (7) consist of a rhotic-final word that has the auxiliary clitic. When the auxiliary moves for subject focus, only the perfective suffix loses its liquid.

(7) a. nəɹɒŋkʰ **təχuɹ** =e-n, **nəɹɒŋkʰ** =e-n təχuɹ
they sad =be-3PL, they =be-3PL sad

'They are sad. **THEY** are sad.' (NK)

Նրանք տխուր են: Նրանք են տխուր:

b. nəɖɒŋkʰ **kʰɒɻ-eɻ** <mark>=e-n</mark> ,   nəɖɒŋkʰ <mark>=e-n</mark>   kʰɒɻ-eɻ
    they   rock-PL =be-3PL, they   =be-3PL rock-PL

    'They are rocks. **THEY** are rocks.'   (NK)

    Նրանք քարեր են: Նրանք են քարեր:

c. nəɖɒŋkʰ **gəɻ-eɻ**   <mark>=e-n</mark> ,   nəɖɒŋkʰ <mark>=e-n</mark>   gəɻ-e
    they   write-PERF.CVB =be-3PL, they   =be-3PL write-PERF.CVB

    'They have written. **THEY** have written.'   (NK)

    Նրանք գրեր են: Նրանք են գրէ:

The converb suffix *-el/eɻ* is thus special in that it deletes, i.e., liquid deletion is specific to this morpheme. We represent this specialness in terms of floating segments, also called ghost segments or latent segments (Zoll 1996, 2001; Akinlabi 2011; Zimmermann 2019; Lindsey 2019). Representationally, this suffix is underlyingly /-e<l>/ or /-e<ɻ>/ with a floating liquid. Underlyingly, the final consonant is not connected with its own consonant slot, cf. with a suffix like imperfective *-um* where the final consonant is connected.

Figure 1: Representing floating segments in the perfective converb suffix vs. non-floating imperfective

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        Perfective          Imperfective
        /e<ɻ>/               /-um/
         V                    V    C
         |                    |    |
        -e     ɻ             -u    m
```

Such analyses have been used in the past to model segment-zero alternations that are morphophonologically conditioned, such as French liaison (Tranel 1995, 1996; Côté 2011) and the definite suffix in Armenian (Dolatian 2022a). For example in French, the word 'petit' is pronounced as [pəti] before consonants, but as [pətit] before vowels. The final segment *t* is considered a floating segment which variably surfaces. Such floating segments are often represented with parentheses or brackets: /pəti<t>/.

For the second question, the liquid surfaces essentially whenever the auxiliary is to the right of the suffix. The auxiliary is always vowel-initial, whether with an initial /e/, /i/, or /ɒ/. A partial paradigm of auxiliary forms is in Table 4. Full paradigms can be found in Anonymous.

Table 4: Variation in type of auxiliary vowel after the imperfective converb

[eɹ=e]:	jeɹkʰ-eɹ =e-m	sing-PERF.CVB =be-1SG	'I have sung'	երգեր եմ
[eɹ=i]:	jeɹkʰ-eɹ =∅-i-m	sing-PERF.CVB =be-PST-1SG	'I had sung'	երգեր իմ
[eɹ=ɒ]:	jeɹkʰ-eɹ =ɒ	sing-PERF.CVB =be.PRS.3SG	'he has sung'	երգեր ա

The deletion or retention of the perfective liquid applies regardless of the person-number value of the auxiliary. Table 5 illustrates with a partial paradigm for the present perfect. In the positive, the converb precedes the auxiliary, and the liquid surfaces. If an unstressed definite object is added, the converb's liquid and the auxiliary stay the same. If the object is bare and takes stress, then the auxiliary shifts and causes the liquid to delete. For space, we gloss -PERF.CVB as -P, and -DEF as -D, and we do not segment the auxiliary.

Table 5: Liquid deletion across all person-number combinations of the perfective converb for the present perfect of [jeɹkʰ-e-l] 'to sing' (NK)

	sing-P	=be	song-D	sing-P	=be	song	=be	sing-P
1SG	**jeɹkʰ-eɹ**	**=em**	jeɹkʰ-ə	**jeɹkʰ-eɹ**	**=em**	**jeɹkʰ**	**=em**	jeɹkʰ-e
	'I have sung.'					'I have sung songs.'		
	երգեր եմ:			Երգը երգեր եմ:		Երգ եմ երգէ:		
2SG	**jeɹkʰ-eɹ**	**=es**	jeɹkʰ-ə	**jeɹkʰ-eɹ**	**=es**	**jeɹkʰ**	**=es**	jeɹkʰ-e
	երգեր ես:			Երգը երգեր ես:		Երգ ես երգէ:		
3SG	**jeɹkʰ-eɹ**	**=ɒ**	jeɹkʰ-ə	**jeɹkʰ-eɹ**	**=ɒ**	**jeɹkʰ**	**=ɒ**	jeɹkʰ-e
	երգեր ա:			Երգը երգեր ա:		Երգ ա երգէ:		
1PL	**jeɹkʰ-eɹ**	**=eŋkʰ**	jeɹkʰ-ə	**jeɹkʰ-eɹ**	**=eŋkʰ**	**jeɹkʰ**	**=eŋkʰ**	jeɹkʰ-e
	երգեր ենք:			Երգը երգեր ենք:		Երգ ենք երգէ:		
2PL	**jeɹkʰ-eɹ**	**=ekʰ**	jeɹkʰ-ə	**jeɹkʰ-eɹ**	**=ekʰ**	**jeɹkʰ**	**=ekʰ**	jeɹkʰ-e
	երգեր էք:			Երգը երգեր էք:		Երգ էք երգէ:		
3PL	**jeɹkʰ-eɹ**	**=en**	jeɹkʰ-ə	**jeɹkʰ-eɹ**	**=en**	**jeɹkʰ**	**=en**	jeɹkʰ-e
	երգեր են:			Երգը երգեր են:		Երգ են երգէ:		

As we discuss later in §4, only the auxiliary can license the liquid of the perfective converb. The converb suffix is morphologically unique because it can delete its liquid, and the auxiliary is morphologically unique because it blocks deletion. Liquid deletion and liquid retention are thus not the effect of simple phonological rule but of a highly grammaticalized morpheme-specific process that involves both morphology and phonology. We can summarize this behavior with the following rule that anchors or causes floating consonants to surface when they precede the auxiliary.

Rule 1. Liquid retention: Morpheme-specific rule of anchoring (surfacing) floating segments before the auxiliary (to be revised)

Simplified formulation
<C> → C / _ AUX
More complex formulation
C   C C
| | |
X X → X X / _ AUX

We illustrate the application of this rule below.

Figure 2: Derivation for anchoring the perfective liquid in simple sentences

	'I have written'		'I have not written'		
Input	gər-e<ɻ>	=e-m	t͡ʃʰ	gər-e<ɻ>	=e-m
	write-PERF.CVB	=be-1SG	NEG	write-PERF.CVB	=be-1SG
Syntax Auxiliary movement			t͡ʃʰ =e-m	gər-e<ɻ>	
Morphophonology Anchoring the liquid	gər-eɻ	=e-m	t͡ʃʰ =e-m	gər-e	

The above is our initial definition of this rule. In the following sections, we refine this rule in order to incorporate long-distance triggers. Such triggers involve a long-distance syntactic relationship between the verbs and the auxiliary.

4 Disentangling syntactic and prosodic factors

The present analysis is restrictive. It allows liquid retention if and only if the suffix precedes the auxiliary within the same clause. One can hypothesize various alternative analyses, each of which we refute as follows.

- Deletion can apply in sentence-medial position, thus it is not triggered by sentence-final pauses (§4.1).
- Deletion can apply even if focus on a subsequent word, thus it is not triggered by the simple presence of narrow-focus (§4.2).
- Deletion can ignore subsequent vowels, whether from full lexical words or clitics. Only the auxiliary can license the liquid (§4.2).

4.1 Deletion is insensitive to sentence position

Given the present data, one could hypothesize that liquid deletion is a prosodic process triggered by a following sentence-final pause, not the movement of the auxiliary. This

account turns out not to work.

For example, in the following ditransitive constructions, the verb is between two noun phrases in a focus-neutral declarative sentence (8a). In the corresponding interrogative sentence, the auxiliary moves leftward and encliticizes to the wh-word. The verb can be sentence-final (8b) or sentence-medial (8c). In both cases, the verb lacks a final liquid.

(8) a. es   giɺkʰ-ə   **təv-eɺ**   =e-m   d͡ʒon-i-n
         this book-DEF give-PERF.CVB =be-1SG John-DAT-DEF
         'I have given this book to John.'   (NK)
         Ես գիրքը տուեր եմ Ջոնին։

     b. es   giɺkʰ-ə   **um-i-n**   =e-s   təv-e
         this book-DEF who-DAT-DEF be-2SG give-PERF.CVB
         'Who have you given this book to?'   (NK)
         Ես գիրքը ումին ես տուե։

     c. **um-i-n**   =e-s   təv-e   es   giɺkʰ-ə
         who-DAT-DEF =be-2SG give-PERF.CVB this book-DEF
         'Who have you given this book to?'   (NK)
         Ումին ես տուե ես գիրքը։

The only factor that causes liquid deletion here is thus auxiliary movement.

4.2   Deletion is sensitive to only linear effects of focus

In all previous cases, adding focus to the word caused both auxiliary movement and liquid deletion. One could thus hypothesize that it is focus itself which causes liquid deletion, and not auxiliary movement. This is false. The evidence comes from post-verbal foci.

When a word is focused, the most typical situation is to place the focused word before the verb (9). In this case, the auxiliary encliticizes to the focused word. The direct object is optional and can be added at the end of the sentence. The uncliticized verb then surfaces without the final liquid, regardless of whether it is sentence-medial or sentence-final (9).

(9) jes **d͡ʒon-i-n**   =e-m   təv-e   (es   giɺkʰ-ə)
     I   John-DAT-DEF =be-1SG give-PERF.CVB this book-DEF
     'I have given this book to JOHN.'   (NK, KM)
     Ես Ջոնին եմ տուե (Ես գիրքը)։

An alternative construction places the focused answer after the verb (10). In this case, the auxiliary does not shift leftwards and it remains cliticized to the verb. The verb then surfaces with a liquid.

(10) es giɹkʰ-ə   təv-eɹ   =e-m   d͡ʒon-i-n
      this book-DEF give-PERF.CVB =be-1SG John-DAT-DEF
      'I have given this book to JOHN.'   (NK)
      Ես գիրքը տուեր եմ Ջոնին:

Thus, focus itself doesn't matter for liquid deletion. What matters is whether the auxiliary has moved leftward or not.

4.3   Deletion ignores vowels in other morphemes

The core aspect of liquid retention is that only the auxiliary vowel can license it. No other vowel-initial morpheme or word can license the liquid or block liquid deletion. We go through cases where the suffix precedes a vowel-initial word or vowel-initial clitic, but we still see liquid deletion.

For example, in the sentence below, a ditransitive verb is preceded by the auxiliary and then a vowel-initial direct object (11a). If the indirect object is focused (11b), the auxiliary moves leftward and the suffix liquid is deleted. Similarly if the sentence is negated (11c), the auxiliary shifts and the liquid is deleted. The vowel of the subsequent word does not block deletion.

(11) a. d͡ʒon-i-n   **təv-eɹ**   =e-m   ɒtʰor-ə
          [d͡ʒo.nin   tə.ve.   ɹe.   mɒ.tʰo.rə]
          John-DAT-DEF give-PERF.CVB =be-1SG chair-DEF
          'I have given the chair to John.'   (NK)
          Ջոնին տուեր եմ աթոռը:
      b. **d͡ʒon-i-n**   =e-m   təv-e   ɒtʰor-ə
          [d͡ʒo.ni.   nem   tə.ve.   (ʲ)ɒ.tʰo.rə]
          John-DAT-DEF =be-1SG give-PERF.CVB chair-DEF
          'I have given the chair to **JOHN**.'   (NK, KM)
          Ջոնին եմ տուե աթոռը:
      c. d͡ʒon-i-n   **t͡ʃʰ =e-m**   təv-e   ɒtʰor-ə
          [d͡ʒo.nin.   t͡ʃʰem   tə.ve.   (ʲ)ɒ.tʰo.rə]
          John-DAT-DEF NEG =be-1SG give-PERF.CVB chair-DEF
          'I have not given the chair to John.'   (NK)
          Ջոնին չեմ տուե աթոռը:

In the above sentences, we also provide a syllabified representation. In (11a), the vowel /ɒ/ of the direct object [ɒtʰor-ə] 'the chair' is syllabified with the preceding segment [m] the auxiliary /=e-m/. Thus, this vowel can resyllabify with preceding segments. But in

the focused form (11b), the vowel is not resyllabified with the suffix's liquid. The liquid is instead deleted. A transient glide [j] is weakly noticeable between the suffix and the word 'chair'. Thus, although the vowel of 'chair' is phonologically able to syllabify with the auxiliary, it's not able to license the suffix's liquid.

The same pattern is found when the suffix precedes other vowel-initial words. Only an un-shifted auxiliary allows the liquid to surface. If the auxiliary has shifted, then the liquid is deleted.

(12) a. **d͡ʒon-i-n** =e-m tǝv-e eʃ-ǝ
John-DAT-DEF =be-1SG give-PERF.CVB donkey-DEF
'I have given the donkey to **JOHN**.' (NK)
Ջոնին եմ տուե էշը:

b. d͡ʒon-i-n **t͡ʃʰ=e-m** tǝv-e eʃ-ǝ
John-DAT-DEF NEG=be-1SG give-PERF.CVB donkey-DEF
'I have not given the donkey to John.' (NK)
Ջոնին չեմ տուե էշը:

c. **ɒtʰor-ǝn** =e-m tǝv-e ɒnɒj-i-n
chair-DEF =be-1SG give-PERF.CVB Ana-DAT-DEF
'I have given the **CHAIR** to Ana.' (NK)
Աթոռն եմ տուե Անային:

d. ɒtʰor-ǝ **t͡ʃʰ=e-m** tǝv-e ɒnɒj-i-n
chair-DEF NEG=be-1SG give-PERF.CVB Ana-DAT-DEF
'I have not given the chair to Ana.' (NK)
Աթոռը չեմ տուե Անային:

e. **d͡zɒjn** =e-m lǝs-e esoɾ
sound =be-1SG hear-PERF.CVB today
'I have heard a **SOUND** today.' (NK)
Ձայն եմ լսե էսօր:

We find similar behavior before the clitic =*el* 'also'. This morpheme is a vowel-initial unstressed clitic that can syllabify with a preceding consonant (13a). After vowel-final words, it triggers glide epenthesis (13c).

(13) a. t͡ʃɒˈkɒt=el 'forehead=also' 'also forehead' (NK)
[t͡ʃɒ.ˈkɒ.tel]

b. uˈɾɒχ=el 'happy=also' 'also happy' (NK)
[u.ˈɾɒ.χel]

c. kɒˈtu=el 'act=also' 'also cat' (NK)
[kɒ.ˈtu.jel]

When this clitic is combined with a negated verb, the clitic can be placed after either the auxiliary (14a) or after the verb (14b). In both cases, the liquid is deleted because the auxiliary shifted leftward. The clitic is vowel-initial and in the same prosodic word as the suffix; but the clitic cannot license the liquid. Vowel hiatus is repaired by epenthesizing a glide or glottal stop.

(14)   Liquid deletion ignores clitics in negation

    a. $\widehat{t\int^h}$ **= e-m**   = el   keɹ-e
        [$\widehat{t\int^h}$e.   mel. $\overline{ke.ɹe}$]
        NEG = be-1SG = also eat-PERF.CVB

        'Also, I have not eaten.'   (NK, KM)
        Չեմ էլ կերե:

    b. $\widehat{t\int^h}$ **= e-m**   keɹ-e(*ɹ)   = el
        [$\widehat{t\int^h}$em. $\overline{ke.ɹe}$.   (j/ʔ)el]
        NEG = be-1SG eat-PERF.CVB = also

        'I have not eaten anymore.'   (NK, KM)
        Չեմ կերե էլ:

In sum, liquid retention is sensitive to the vowel of only the auxiliary morpheme. This reinforces our rule in Rule 1: only the auxiliary can license the liquid.

5   Long-distance conditions on liquid retention

So far, we've seen cases where the liquid is dropped when the auxiliary shifts leftward. Based on these data, one could hypothesize that the liquid surfaces when the auxiliary is *immediately* to the right. We find evidence against this hypothesis. Data comes from intervening clitics and coordination (§5.1). We analyze the data as a type of suspended affixation (§5.2) (Kabak 2007; Kornfilt 2012; Erschler 2018; Fenger 2020; Dolatian 2022b). Alternative analyses with ellipsis do not work well (§5.3).

5.1   Cliticization and coordination

Cliticization lets us see long-distance syntactic factors in liquid anchoring. The liquid surfaces if there is an auxiliary to the right within the verb phrase. Other clitics are ignored. For example, the clitic [= el] can appear between the verb and auxiliary (15a), or after the auxiliary (15b). The clitic does not prevent the liquid from surfacing. This is because the auxiliary is to the right of the liquid.

(15)   Liquid deletion ignores intervening clitics (without negation)

a. keɹ-eɹ =el =e-m
   eat-PERF.CVB =also =be-1SG

   'I have also eaten.' (NK)

   Կերեր էլ եմ:

b. keɹ-eɹ =e-m =el
   eat-PERF.CVB =be-1SG =also

   'I have eaten already!'[2] (NK)

   Կերեր եմ էլ:

Unfortunately, there are few unambiguous clitics in the language. We have not been able to find consonant-initial clitics.

Coordination provides clearer long-distance conditions that block liquid deletion. In simple cases of coordination, two verbs can be coordinated each with their own auxiliary. In a sentence such as (16a), the liquids of both verbs surface because each is before an auxiliary.

(16) Coordination and liquid deletion

	Verb1	Aux	Conj	Verb2	Aux
a.	χəm-eɹ	=e-m	kɒm	**keɹ-eɹ**	=e-m
	drink-PERF.CVB	=be-1SG	or	eat-PERF.CVB	=be-1SG

'I have drunk or have eaten.' (NK)

Խմեր եմ կամ կերեր եմ:

	Verb1	Aux	Conj	Verb2	Aux
b.	χəm-eɹ		kɒm	**keɹ-eɹ**	=e-m
	drink-PERF.CVB		or	eat-PERF.CVB	=be-1SG

'I have drunk or eaten.' (NK)

Խմեր կամ կերեր եմ:

But this sentence can be paraphrased with a simpler type of coordination which we call reduced coordination (16b). In reduced coordination, only one auxiliary is used. The auxiliary follows the second verb, and it licenses the liquids of both verbs. Note how this auxiliary licenses the liquid of the first verb (Verb1) even though they are not adjacent.

The generalization so far is that, in reduced coordination, the single auxiliary can license the liquids of both verbs without being adjacent to both of them. We repeat the relevant sentence below (17a). If this auxiliary shifted leftwards, then the auxiliary is to the left of both verbs (17b). Both verbs then lose their liquid. Movement is found in negation (17b) and narrow focus (17c-d).

(17) Reduced coordination and auxiliary movement with consonant-initial conjunction

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[2]NK found the Aux-Clitic sequence rather odd but acceptable, while KM felt it too odd.

	X(=Aux)	Verb1	Conj	Verb2	(Aux)
a.		χəm-eɹ	kɒm	**keɹ-eɹ**	**=e-m**
		drink-PERF.CVB	or	eat-PERF.CVB	=be-1SG

'I have drunk or eaten.'   (NK)

 Խմեր կամ կերեր եմ:

b.	t͡ʃʰ **=e-m**	χəm-e	kɒm	keɹ-e	
	NEG=be-1SG	drink-PERF.CVB	or	eat-PERF.CVB	

'I have not drunk or eaten.'   (NK)

Չեմ խմե կամ կերէ:

c.	**jes =e-m**	χəm-e	kɒm	keɹ-e	
	I=be-1SG	drink-PERF.CVB	or	eat-PERF.CVB	

'**I** have drunk or eaten.'   (NK)

Ես եմ խմե կամ կերէ:

d	**esoɹ =e-m**	χəm-e	kɒm	keɹ-e	
	today=be-1SG	drink-PERF.CVB	or	eat-PERF.CVB	

'**TODAY**, I have drunk or eaten.'   (NK)

Էսօր եմ խմե կամ կերէ:

In the positive form, some speakers prefer repeating the conjunction on both verbs (18a). The single auxiliary licenses the liquids on both verbs. Also when negating reduced coordination, an alternative construction is to delete the conjunction entirely (18b). Again this doesn't matter and we see liquid deletion.

(18)   a.   kɒm χəm-el   kɒm keɹ-el   **=e-m**
            or   drink-PERF.CVB or   drink-PERF.CVB be-1SG

'I have drunk or driven.'   (KM)

Կամ խմել կամ կերել եմ:

  b.   t͡ʃʰ **=e-m**   keɹ-e   χəm-e
       NEG=be-1SG   eat-PERF.CVB   drink-PERF.CVB

'I have not eaten or drunk.'   (KM)

Չեմ կերէ խմէ:

In the above cases, the conjunction is a consonant-initial word [kɒm] 'or'. The same patterns are found when the conjunction is vowel-initial [u] 'and'.

(19)   Reduced coordination and auxiliary movement with vowel-initial conjunction

	X(=Aux)	Verb1	Conj	Verb2	(Aux)
a.		χəm-eɻ	u	**keɻ-eɻ**	**=e-m**
		drink-PERF.CVB	and	eat-PERF.CVB	=be-1SG

'I have drunk and eaten.'   (NK)

Խմեր ու կերեր եմ:

b.	**t͡ʃʰ =e-m**	χəm-e	u	keɻ-e
	NEG=be-1SG	drink-PERF.CVB	and	eat-PERF.CVB

'I have not drunk and eaten.'   (NK)

Չեմ խմե ու կերէ:

c.	**jes =e-m**	χəm-e	u	keɻ-e
	I=be-1SG	drink-PERF.CVB	and	eat-PERF.CVB

'**I** have drunk and eaten.'   (NK)

Ես եմ խմէ ու կերէ:

d.	**esoɻ =e-m**	χəm-e	u	keɻ-e
	today=be-1SG	drink-PERF.CVB	and	eat-PERF.CVB

'**TODAY**, I have drunk and eaten.'   (NK)

Էսօր եմ խմէ ու կերէ:

Note that the word 'and' can be expressed with one of two morphemes: the conjunction [u] or the conjunction [jev]. Informally, the conjunction [u] is used when the two conjuncts have a close semantic connection to each other. The conjunction [jev] is used regardless of such closeness. For example, to conjoin two verbs that each have an object, using the conjunction [jev] feels more natural than using the conjunction [u].

(20) d͡ʒuɻ-ə   χəm-eɻ   **=e-m**   jev keɻɒkuɻ-ə keɻ-eɻ   **=e-m**
       water-DEF drink-PERF.CVB =be-1SG and food-DEF   eat-PERF.CVB =be-1SG

'I have drunk the water, and have eaten the food.'   (NK)

Ջուրը խմեր եմ եւ կերակուրը կերեր եմ:

The conjunction [jev] can be used in reduced coordination, but is not preferred. In reduced coordination, we find the same behavior. The liquids surface in the positive. If the auxiliary has shifted, then the liquids are deleted.

(21) Reduced coordination and auxiliary movement with consonant-initial conjunction [jev] 'and'

	X(=Aux)	Verb1	Conj	Verb2	(Aux)
a.		χəm-eɹ	jev	**keɹ-eɹ**	**=e-m**
		drink-PERF.CVB	and	eat-PERF.CVB	=be-1SG

'I have drunk and eaten.' (NK)

Խմեր եւ կերեր եմ։

b.	**t͡ʃʰ=e-m**	χəm-e	jev	keɹ-e	
	NEG=be-1SG	drink-PERF.CVB	and	eat-PERF.CVB	

'I have not drunk and eaten.' (NK)

Չեմ խմե եւ կերէ։

c.	**jes =e-m**	χəm-e	jev	keɹ-e	
	I=be-1SG	drink-PERF.CVB	and	eat-PERF.CVB	

'**I** have drunk and eaten.' (NK)

Ես եմ խմե եւ կերէ։

d.	**esoɹ =e-m**	χəm-e	jev	keɹ-e	
	today=be-1SG	drink-PERF.CVB	and	eat-PERF.CVB	

'**TODAY**, I have drunk and eaten.' (NK)

Էսօր եմ խմե եւ կերէ։

In sum, we argue that coordination shows that liquid anchoring is conditioned by a non-adjacent but subsequent auxiliary.

We have found some speaker variation in cases where the suffix is after the auxiliary but before a clitic. Whereas NK and KM drop the liquid (14b), Garoun Engström (GE) reports that she can maintain the liquid: [t͡ʃʰ-e-m keɹ-el =el]. GE likewise reports that in cases of reduced coordination like V+*kɒm*+V+Aux (16), she also maintains the liquid. Thus for some speakers, the rule is that that the liquid is licensed either long-distance by the auxiliary, or locally by an adjacent clitic. At this point, we don't have enough data to construct a large-scale variationist study on the phonosyntax of this process across multiple speakers, but it is a worthwhile future endeavor.

5.2   Incorporating long-distance triggers

The cliticization and coordination data shows that the liquid surfaces if there's an auxiliary *somewhere* later in the sentence, not necessarily adjacent to the liquid. For our consonant anchoring rule, we revise the rule by letting the auxiliary simply follow the verb within some syntactic domain.

Rule 2. Liquid retention: Morpheme-specific rule of anchoring (surfacing) floating segments before the auxiliary (final)

Simplified formulation
<C> $\rightarrow$ C / [_ ... AUX]

More complex formulation
C   C   C
| | |
X   X $\rightarrow$ X   X / [_ ... AUX]

We illustrate this rule below. For space, we use the gloss -P for -PERF.CVB, =be for =be-1SG.

Figure 3: Derivation for anchoring the perfective liquid in coordination sentences

	'I have drunk or eaten'				'I have not drunk or eaten'				
Input	χəm-e<ɹ>	kɒm	keɹ-e<ɹ>	**=e-m**	t͡ʃʰ	χəm-e<ɹ>	kɒm	keɹ-e<ɹ>	**=e-m**
	eat-P	or	drink-P	is	NEG	eat-P	or	drink-P	is
Syntax					t͡ʃʰ **=e-m**	χəm-e<ɹ>	kɒm	keɹ-e<ɹ>	
Anchoring	χəm-eɹ	kɒm	keɹ-eɹ	**=e-m**	t͡ʃʰ **=e-m**	χəm-e	kɒm	keɹ-e	

The generalization was observed in coordination sentences with two verbs. It can also be found in sentences with three verbs. Note that the sentences below were uttered by KM, who prefers using the [-el] form of the suffix instead of [-eɹ].

(22) Reduced coordination for three verbs

	Verb1	(Aux)	Verb2	(Aux)	Verb3	(Aux)

a. ek-el   **=e-m**   tes-el   **=e-m**   **hɒχtʰ-el**   **=e-m**
come-P   =be   see-P   =be   conquer-P   =be
'I have come, have seen, have conquered.'   (KM)
Եկել եմ, տեսել եմ, յաղթել եմ:

b. ek-el   tes-el   **hɒχtʰ-el**   **=e-m**
come-P   see-P   conquer-P   =be
'I have come, seen, seen, conquered.'   (KM)
Եկել, տեսել, յաղթել եմ:

Note that we specifically said that the verb and auxiliary must be within the same syntactic domain. We are not sure what to label this domain. The most likely option is a verb phrase (VP).[3] The verb and auxiliary have to be part of a domain together, and we cannot restate the rule in terms of simple non-linear precedence.

Evidence comes from un-reduced coordination with negation. In the sentence below, each verb takes its own auxiliary (23a). In (23b), the first auxiliary Aux1 shifts leftward for negation, while the second auxiliary Aux2 stays in place. Thus the first liquid in Verb1 is

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[3]Other options include a vP phase (Chomsky 2001) or the use of c-command (Kaisse 1985).

deleted, while the second liquid in Verb2 surfaces. The liquid of Verb1 cannot be licensed by Aux2 even though Verb1 precedes Aux2. The reason is that Verb1 and Aux2 belong to separate verb phrases. For space, we simplify the glosses with -P for -PERF.CVB, =be for =be-1SG.

(23)   Un-reduced coordination and negation

(Neg=Aux1)	Verb1	(Aux1)	Conj	Verb2	Aux2
a.	χəm-eɹ	=e-m	kɒm	keɹ-eɹ	=e-m
	drink-P	=be	or	eat-P	=be

'I have drunk or have eaten.'   (NK)

Խմեր եմ կամ կերեր եմ:

b.	t͡ʃʰ=e-m	χəm-e		kɒm	keɹ-eɹ	=e-m
	NEG=be	drink-P		or	eat-P	=be

'I have not drunk, or I have eaten.'   (NK)

Չեմ խմե, կամ կերեր եմ:

To summarize, the rule for anchoring the perfective liquid is quite complicated. The suffix ends in floating segment: /-e<l>/ or /-e<ɹ>/. This liquid by default deletes. It surfaces when there's an auxiliary to the right of the suffix within the verb phrase. The liquid and auxiliary don't need to be adjacent.

5.3   Alternative analysis with ellipsis

As an alternative to using long-distance rules, we could instead argue that reduced coordination sentences with one auxiliary are actually made up of two auxiliaries in an underlying form. The first auxiliary licenses the first liquid. Ellipsis then deletes the first auxiliary.

(24)   Ellipsis account for reduced coordination and liquid deletion

a.	Verb1	Aux	Conj	Verb2	Aux
	χəm-eɹ	=e-m	kɒm	keɹ-eɹ	=e-m
	drink-PERF.CVB	=be-1SG	or	eat-PERF.CVB	=be-1SG

'I have drunk or have eaten.'   (NK)

b.	Verb1	~~Aux~~	Conj	Verb2	Aux
	χəm-eɹ	~~=e-m~~	kɒm	keɹ-eɹ	=e-m
	drink-PERF.CVB	=be-1SG	or	eat-PERF.CVB	=be-1SG

'I have drunk or eaten.'   (NK)

The problem with this analysis is that it's circular. If reduced coordination does utilize ellipsis, then that suggests that reduced coordination is syntactically derived from unreduced coordination, and that reduced coordination has the same underlying syntax as

unreduced coordination. Ideally, we would have independent evidence for this syntactic derivation or identity, such as from the semantics or prosody. However, we do not.[4]

In terms of semantics, the sentence with two auxiliaries is not completely synonymous with the sentence with one auxiliary. When the sentence has two auxiliaries, the sentence can license an 'exclusive-or' reading: I have either drunk or have eaten. In contrast when there's only one auxiliary, the meaning is more so that the two verbs are the same event. The different English translations capture the subtle difference between the two sentences.

As for the prosody, when there are two auxiliaries, there is a stronger pause before the conjunction [kɒm] than when only one auxiliary is used. Again, we find that this prosodic distinction is likewise visible in the English translation.

Furthermore, the cross-linguistic norm is for ellipsis to precede morphophonological rules and allomorphy (Banerjee 2020; Sailor 2022).[5] Thus if we accept the ellipsis account, then we have to allow our theory to either a) have morphophonological rules be triggered by invisible (yet adjacent) material, or b) have morphophonological rules precede the application of ellipsis. Such positions are controversial.

Cross-linguistically, there is semantic and prosodic evidence that reduced coordination is not always derived from un-reduced coordination via deletion (Takano 2004; Artstein 2005; Yoon 2017; Zuraw 2015), including Standard Western Armenian (Dolatian 2022b). Our analysis of the Iranian Armenian data is consistent with this literature.

To summarize, the present analysis uses long-distance rules to to handle liquid retention in reduced coordination. If we used ellipsis, the end result is that we replace one theoretically bizarre analysis (long-distance conditions) with another theoretically bizarre analysis (pre-ellipsis phonology). The ellipsis alternative also lacks any non-circular evidence from the semantics or prosody. In contrast, the long-distance analysis can seamlessly integrate with the semantics and prosody.

6 Interim summary: theoretical rarity of the Armenian data

Cross-linguistically, the Iranian Armenian data is quite surprising and rare. The data constitutes a case of a syntax-sensitive morphophonological phenomenon that has the

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[4]Furthermore, if ellipsis is a relatively late process, then we would expect it to target lexical words more easily than a cliticized function word (the auxiliary) because only non-clitics can form prosodic words (Booij 1985; Chaves 2008).

[5]There is some work arguing that elided material can trigger allomorphy if the elided material (the auxiliary) is structurally higher than the allomorph (the suffix) (Erschler 2018; Banerjee 2021:16). Adopting this approach however requires that we treat the *eɫ-e* alternation as allomorphy instead of a single underlying form /-e<ɹ>/.

following properties:

1. It applies across words.
2. It is sensitive to the phonological form of the target of deletion: the perfective suffix has a floating segment.
3. It is sensitive to the morphological identity of the blocker of deletion (the auxiliary).
4. It references the long-distance syntactic relationship between the liquid and auxiliary.

In theoretical terms, the data can be categorized in terms of a post-lexical rule that is syntactically conditioned. Such cases are rarer than purely prosodic rules, but still attested (Selkirk 1986). Cross-linguistically, the norm is for post-lexical rules to be insensitive to syntax (Kiparsky 1982a,b, 1985; Cowper & Rice 1987; Kaisse & McMahon 2011; Bermúdez-Otero 2011). But there are other cases of syntax-sensitive post-lexical rules, such as the P1 rules (Kaisse 1985, 1990), post-syntactic chaining rules (Pak 2008), pre-compilation rules (Hayes 1990), and feature-chain-based interactions (Elordieta 1997).

Syntactic structural relationships (c-command) and hierarchy are likewise heavily involved in tone sandhi (Chen 1990; Duanmu 1997, 1999) and grammatical tone processes (McPherson & Heath 2016; Rolle 2018). The Armenian data references the syntactic relationship between the verbal suffix and the auxiliary. Such information requires an elaborate model of the syntax-phonology interface as in Direct Reference models (Kaisse 1985). More restrictive models would limit how much syntactic information that the phonology can get (cf: modular theories in Scheer 2011). Some common restrictions are using only syntactcically-derived prosodic constituents (Nespor & Vogel 1986), or referencing only stratal cycles and phases (Newell 2008; Newell & Piggott 2014; Bermúdez-Otero 2012). The Armenian data however resists such simpler accounts.

However, to our knowledge, most attested cases of syntax-sensitive phonology involve adjacency between the target and trigger/blocker. For example, such locality or adjacency constraints are common in Romance sandhi (Sampson 2016). French liaison is sensitive to pauses and hesitations, and is generally limited to cases where the liaison segment and the following vowel are adjacent (Kaisse 1985; Cŏté 2011).[6] Similarly in Italian, syntactic gemination, phonosyntactic doubling, and /u/-propagation are famous syntax-sensitive phonological processes, but they likewise involve locality or adjacency (Kaisse 1985; Nespor & Vogel 1986; Rizzi & Savoia 1993; Elordieta 2008; Passino 2013; Manzini & Savoia 2016; D'Alessandro & Scheer 2015; Ledgeway 2018). Local conditioning is likewise found across case studies of syntax-sensitive allomorphy in Germanic (Ackema & Neeleman 2003, 2004; Weisser 2019).

The Iranian Armenian data is thus cross-linguistically rare in allowing long-distance conditioning. To our knowledge, the closest attested case of long-distance syntax-sensitive phonology is long-distance and discontinuous vowel harmony in Wolof (Sy 2005) and

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[6]Some long-distance cases of French liaison are attested, with evidence for and against treating such cases as errors (Côté 2008).

Guébie (Dąbkowski & Sande 2021).[7] For Wolof, vowel harmony applies across words, specifically between a head and its complement. This makes vowel harmony a type of syntax-sensitive phonology. Harmony can ignore certain intervening words between the source and target vowels. This invisibility of intervening words is what makes Wolof be a case of long-distance syntax-sensitive phonology.

(25)   Long-distance ATR agreement in Wolof, taken from Sy (2005:95:ex1)

a. **[-ATR]**   **[-ATR]**   **[-ATR]**   b. **[+ATR]**   **[+ATR]** **[+ATR]**
   xaj b- u   weex   **b- ale**   **béy** w- u   réy   **w- ëlé**
   dog CL-REL be.white CL-DEM.DIST   goat CL-REL be.big   CL-DEM.DIST
   'that white dog'   'that big goat'

Note that there are also other Armenian lects in Iran which alternate in the form of the perfective converb suffix based on whether the auxiliary is to the right vs. the left of the verb.[8]For Tehrani Iranian Armenian, this difference manifests in the presence/absence of the final liquid: V-*el/eɫ* vs. V-*e*. But in Iran, there are other Armenian lects where the difference is manifested in using a completely different allomorph for the alternating converb suffix. For example in Salmast (Vaux 2022:§3.2.1), the pre-auxiliary form of the imperfective converb is V-*s*, while the post-auxiliary form is V-*li*. It is an open question whether the generalizations for Tehrani Armenian extend to these other Armenian varieties.

7   Other issues in the phonosyntax of Iranian Armenian

The previous section examined the synchronic behavior of the perfective converb suffix -*el/eɫ* and how this suffix loses its liquid when the auxiliary has shifted. This section describes other relevant and theoretically-interesting aspects of liquid retention.

Section §7.1 goes through a near-identical process from the irregular imperfective suffix -*is*. The perfective -*eɫ* and imperfective -*is* show the exact same patterns of consonant deletion, thus reinforcing our theoretical analysis.

Section §7.2 discusses the diachronic origins of this behavior from Standard and Colloquial Eastern Armenian. Colloquial Eastern Armenian and Iranian Armenian seem to have different locality restrictions on liquid deletion. The locality differences suggest a certain diachronic pathway.

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[7]We thank Kie Zuraw for bringing the Wolof case to our attention. Another potential case is iterative or pervasive propagination in the Verbicaro dialect of Italian (Silvestri 2022:7).

[8]Interestingly, the alternations is also attested in Armenian lects that developed outside of Iran, such as the Karin or Erzurum dialect which developed in modern-day Turkey (Bezrukov 2022:120).

Finally, we go over how this process becomes more complicated when Iranian Armenian speakers code switch between Standard Eastern and Iranian Armenian (§7.3). The code switching data suggests that sociolinguistic limits on how the grammar uses liquid retention.

7.1 Similar alternations in the irregular imperfective converb

All of the preceding data focused on the perfective converb suffix. This suffix shows an inconstant form, with or without a final liquid: [-el/ɹ] or [-e]. Whether a liquid surfaces or not depends on the syntactic relationship between the liquid and the auxiliary. We find exactly the same behavior in another suffix: the irregular imperfective [-i(s)].

For regular verbs and most irregular verbs, the imperfective converb is formed by adding the suffix *-um* onto the verb root or stem. In contrast, there are two irregular verbs 'to give' and 'to come' which form their imperfective converb by adding the suffix *-is* to the infinitive.[9]

Table 6: Formation of regular and irregular imperfective converbs

	Regular 'to sing'		Irregular 'to give' 'to come'		
Infinitive	jeɹkʰ-e-l երգել	√-TH-INF	t-ɒ-l տալ	g-ɒ-l գալ	√-TH-INF
Impf. converb	jeɹkʰ-um երգում	√-IMPF.CVB	t-ɒ-l-is տալիս	g-ɒ-l-is գալիս	√-TH-INF-IMPF.CVB

In §2, we saw that the regular suffix *-um* has a constant form and never alternates. In contrast, the irregular suffix *-is* as *-is* when before the auxiliary, and as *-i* when the auxiliary has shifted leftwards.

(26) a. jes giɹkʰ-ə   **t-ɒ-l-is**   =**e-m**
          I   book-DEF give-TH-INF-IMPF.CVB =be-1SG
          'I am giving the book.'   (NK)
          Ես գիրքը տալիս եմ։

      b. jes giɹkʰ-ə   **t͡ʃʰ**=**e-m**   t-ɒ-l-i
          I   book-DEF NEG=be-1SG give-TH-INF-IMPF.CVB
          'I am not giving the book.'   (NK)
          Ես գիրքը չեմ տալի։

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[9]Standard Eastern Armenian utilizes the same irregular imperfective forms for the verbs 'to come' [g-ɑ-l], 'to give' [t-ɑ-l], and 'to cry' [l-ɑ-l]. But in Iranian Armenian, the verb [l-ɑ-l] 'to cry' is replaced by regular [lɒt͡sʰ-e-l] 'to cry' which forms the imperfective converb with *-um*: [lɒt͡sʰ-um].

      c.   jes **gi̱kʰ** =e-m   t-ɒ-l-i
             I   book =be-1SG give-TH-INF-IMPF.CVB

             'I am giving books.'   (NK)
             Ես գիրք եմ տալի։

      d.   **jes** =e-m gi̱kʰ-ə   t-ɒ-l-i
             I   be-1SG book-DEF give-TH-INF-IMPF.CVB

             '**I** am giving the book.'   (NK)
             Ես եմ գիրքը տալի։

The imperfective [-is]∼[-i] alternation happens in the same contexts for the perfective [-el/ɭ]∼[-e] alternation. We adopt the same analysis for this suffix. Underlyingly, the suffix contains a floating segment: /-i<s>/. The segment /s/ is anchored before the auxiliary, due to the same rule from Rule 2 for the perfective converb suffix /-e<ɭ>/.

We likewise see the same long-distance conditions in reduced coordination. The suffix surfaces as [-is] when the auxiliary is to the right within the phrase, even if not adjacent to the suffix. The suffix surfaces as [-s] when the auxiliary shifts leftwards.

(27)   a.   t-ɒ-l-is   =e-m   kɒm t͡sɒχ-um   =e-m
             give-TH-INF-IMPF.CVB =be-1SG or   sell-IMPF.CVB =be-1SG

             'I am giving or am selling.'   (NK)
             Տալիս եմ կամ ծախում եմ։

       b.   t-ɒ-l-is   kɒm t͡sɒχ-um   =e-m
             give-TH-INF-IMPF.CVB or   sell-IMPF.CVB =be-1SG

             'I am giving or selling.'   (NK)
             Տալիս կամ ծախում եմ։

Our analysis for the perfective converb *-eɭ* seamlessly extends to the imperfective *-is*. The data is further evidence for the role of long-distance syntactic conditions in morphophonological alternations.

7.2   Origin of non-local deletion from local deletion

The data so far focused on the synchronic behavior of Iranian Armenian. This section discusses the diachronic source of such behavior. We find subtle locality differences between Iranian Armenian and other lects.

In Standard Eastern Armenian (SEA), the perfective converb suffix is *-el*, and the irregular imperfective converb suffix is *-is*. Whereas these suffixes alternate in Iranian Armenian, they do not in Standard Eastern. The forms of the suffixes remain constant regardless of whether the auxiliary has shifted leftwards.

(28)   Constant forms in Standard Eastern Armenian

    a. **gəɾ-el**   **=e-m**,   **t-ɑ-l-is**   **=e-m**

       write-PERF.CVB =be-1SG, give-TH-INF-IMPF.CVB =be-1SG

       'I have written, I am giving.'

       Գրել եմ, տալիս եմ:

    b. $\widehat{\text{tʃ}^\text{h}}$ **=e-m**   gəɾ-el, $\widehat{\text{tʃ}^\text{h}}$ **=e-m**   t-ɑ-l-is

       NEG =be-1SG write-PERF.CVB, NEG =be-1SG give-TH-INF-IMPF.CVB

       'I have not written, I am not giving.'

       Չեմ գրել, չեմ տալիս:

The Iranian Armenian suffix [-el/-eɹ] developed from the the same historical source as the Standard Eastern suffix. It is reported that across Armenian lects, the perfective suffix's liquid can differ in being a lateral liquid /l/ or a rhotic (Գրիգորյան 2018).

However in Colloquial Eastern Armenian (CEA) as spoken in Yerevan, it is reported that speakers can optionally drop the liquid /l/ and the fricative /s/ when the auxiliary has shifted (Դարագյուլյան 1981:101; Dum-Tragut 2009:213,223; Դամոյան et al. 2014:37).

(29)   Optional deletion in Colloquial Eastern Armenian

    a. **gəɾ-el**   **=e-m**,   **t-ɑ-l-is**   **=e-m**

       write-PERF.CVB =be-1SG, give-TH-INF-IMPF.CVB =be-1SG

       'I have written, I am giving.'

       Գրել եմ, տալիս եմ:

    b. $\widehat{\text{tʃ}^\text{h}}$ **=e-m**   gəɾ-e(l), $\widehat{\text{tʃ}^\text{h}}$ **=e-m**   t-ɑ-l-i(s)

       NEG =be-1SG write-PERF.CVB, NEG =be-1SG give-TH-INF-IMPF.CVB

       'I have not written, I am not giving.'

       Չեմ գրել, չեմ տալիս:

The deletion of the final liquid is reported to be largely restricted to the perfective converb suffix [-el] in Colloquial Eastern Armenian. This colloquial process is likewise attested in the Colloquial Eastern Armenian as spoken by immigrant communities in Los Angeles (Karapetian 2014:72).

Diachronically, there is an obvious path of historical development for the perfective suffix in Iranian Armenian. 1) In some stage of the dialect, there was no deletion at all [-el] (like modern SEA). 2) Later on, the dialect developed optional deletion [-e(l)] (like modern CEA). 3) And finally, the deletion become obligatory [-e] (as in modern IA).

We synchronically capture this variation with the following underlying forms for each dialectal version of the perfective converb suffix. The liquid is constant in Standard Eastern, and floating in Colloquial Eastern and Iranian Armenian. In order to capture the optionality of liquid deletion in Colloquial Eastern Armenian, we argue that such optionality is actually code switching between the standard form and the colloquial form.

Figure 4: Underlying forms for the perfective converb suffix across lects and registers

PERF.CVB	→	-el	(Standard Eastern Armenian)
		-e\<l\>	(Colloquial Eastern Armenian)
		-e\<l\> or -e\<ɹ\>	(Iranian Armenian)

Data on this colloquial process is sparse, but we suspect that Colloquial Eastern and Iranian Armenian differ in the role of adjacency between the verb and auxiliary. Briefly, in Iranian Armenian, non-adjacent auxiliaries cause the liquid to surface, while non-adjacent auxiliaries can cause the liquid to delete. We illustrate below.

Consider the sentences in (30), in both Colloquial Eastern and Iranian Armenian. In (30a), the sentence has un-reduced coordination with two verbs and two auxiliaries. The verb's liquid surfaces in both dialects. But in reduced coordination (30b) with just one auxiliary, Verb1 keeps its liquid in Iranian Armenian but can optionally delete in Colloquial Eastern Armenian. No deletion is found in Standard Eastern. We use -P, =be instead of -PERF.CVB, =be-1SG

(30)   Effect of verb-auxiliary adjacency in Colloquial Eastern and Iranian Armenian

a.   Un-reduced coordination with two auxiliaries

	Verb1	Aux	Conj	Verb2	Aux		
i.	χəm-el	=e-m	kam	keɾ-el	=e-m	(SEA)	(MA, VP)
ii.	χəm-el	=e-m	kam	keɾ-el	=e-m	(CEA)	(MA, VP)

Խմել եմ կամ կերել եմ:

	Verb1	Aux	Conj	Verb2	Aux		
iii.	χəm-eɹ	=e-m	kɒm	keɹ-eɹ	=e-m	(IA)	(NK)
	drink-P	=be	or	eat-P	=be		

'I have drunk or have eaten.'

Խմեր եմ կամ կերեր եմ:

b.   Reduced coordination with one auxiliary

	Verb1	Conj	Verb2	Aux		
i.	χəm-el	kam	keɾ-el	=e-m	(SEA)	(MA, VP)
ii.	χəm-e(l)	kam	keɾ-el	=e-m	(CEA)	(MA, VP)

Խմել կամ կերել եմ:

	Verb1	Conj	Verb2	Aux		
iii.	χəm-eɹ	kɒm	keɹ-eɹ	=e-m	(IA)	(NK)
	drink-P	or	eat-P	=be		

'I have drunk or eaten.'

Խմեր կամ կերեր եմ:

When reduced coordination is negated, Standard Eastern keeps the liquid in Verb1, while Iranian Armenian deletes the liquids in both Verb1 and Verb2. For Colloquial Eastern

Armenian, either both liquids surface or both delete. Other permutations are not possible (liquid + no liquid, no liquid + liquid).

(31)   Reduced coordination with negation and consonant-initial conjunction

	Neg-Aux	Verb1	Conj	Verb2		
i.	$\widehat{\text{t}\int^h}$ **=e-m**	χəm-el	kɑm	keɾ-el	(SEA)	(MA, VP)
ii.	$\widehat{\text{t}\int^h}$ **=e-m**	χəm-el	kɑm	keɾ-el	(CEA)	(MA, VP)
	$\widehat{\text{t}\int^h}$ **=e-m**	χəm-e	kɑm	keɾ-e		(MA, VP)
	*$\widehat{\text{t}\int^h}$ **=e-m**	χəm-e	kɑm	keɾ-el		(*MA, *VP)
	*$\widehat{\text{t}\int^h}$ **=e-m**	χəm-el	kɑm	keɾ-e		(*MA, *VP)

Չեմ խմել կամ կերել:

iii.	$\widehat{\text{t}\int^h}$ **=e-m**	χəm-e	kɒm	keɻ-e	(IA)	(NK)
	NEG=be	drink-P	or	eat-P		

'I have not drunk or eaten.'

Չեմ խմե կամ կերէ:

The generalization so far is the following. In both Standard Eastern and Colloquial Eastern Armenian, the auxiliary licenses the floating liquid of the perfective converb. In Iranian Armenian, the suffix and auxiliary don't need to be adjacent, but they need to be adjacent in Colloquial Eastern Armenian. We can formalize this variation with the following rules, adapted from Rule 2.

Rule 3. Liquid retention: Dialect variation for the morpheme-specific rule of anchoring (surfacing) floating segments before the auxiliary

IA Non-adjacent conditioning $<$C$> \rightarrow$ C / [_ ... AUX]	CEA Adjacent conditioning $<$C$> \rightarrow$ C / [_ AUX]

The above rule however is too simplified for Colloquial Eastern Armenian, because we have found some variation across speakers. In reduced coordination with a vowel-initial conjunction, some Standard Eastern speakers told us that they can delete the liquid on Verb1 (VP), while some say they couldn't (MA). This data suggests that some speakers can allow other adjacent vowel-initial words to license the perfective liquid.

(32)   Effect of other vowel-initial words in Colloquial Eastern Armenian and in Iranian Armenian

    a.   Un-reduced coordination with two auxiliaries

	Verb1	Aux	Conj	Verb2	Aux		
i.	χəm-el	=e-m	u	keɾ-el	=e-m	(SEA)	
ii.	χəm-el	=e-m	u	keɾ-el	=e-m	(CEA)	

Խմել եմ ու կերել եմ:

	Verb1	Aux	Conj	Verb2	Aux		
iii.	χəm-eɭ	=e-m	u	keɻ-eɭ	=e-m	(IA)	(NK)
	drink-P	=be	and	eat-P	=be		

'I have drunk and have eaten.'

Խմեր եմ ու կերեր եմ:

b. Reduced coordination with one auxiliary

	Verb1		Conj	Verb2	Aux		
i.	χəm-el		u	keɾ-el	=e-m	(SEA)	(MA, VP)
ii.	χəm-el		u	keɾ-el	=e-m	(CEA)	(VP, MA)
	χəm-e		u	keɾ-el	=e-m	(CEA)	(VP, *MA)

Խմել կամ կերել եմ:

	Verb1		Conj	Verb2	Aux		
iii.	χəm-eɭ		u	keɻ-eɭ	=e-m	(IA)	(NK)
	drink-P		and	eat-P	=be		

'I have drunk and eaten.'

Խմեր ու կերեր եմ:

The variation can cause ineffability when reduced coordination involves negation and a vowel-initial conjunction. In the sentences below, the auxiliary has to shift because of negation, and Verb1 precedes a vowel. Our consultants VP and MA are fine with deleting neither liquid. VP is fine with deleting both liquids, but MA is not. Neither speaker is fine with deleting only one liquid.

(33) Reduced coordination with negation and vowel-initial conjunction

	Neg-Aux	Verb1	Conj	Verb2		
i.	t͡ʃʰ=e-m	χəm-el	u	keɾ-el	(SEA)	(VP, MA)
ii.	t͡ʃʰ=e-m	χəm-el	u	keɾ-el	(CEA)	(VP, MA)
	t͡ʃʰ=e-m	χəm-e	u	keɾ-e		(VP, *MA)
	*t͡ʃʰ=e-m	χəm-e	u	keɾ-el		(*VP, *MA)
	*t͡ʃʰ=e-m	χəm-el	u	keɾ-e		(*VP, *MA)

Չեմ խմել ու կերել:

	Neg-Aux	Verb1	Conj	Verb2		
iii.	t͡ʃʰ=e-m	χəm-e	u	keɻ-e	(IA)	(NK)
	NEG=be	drink-P	and	eat-P		

'I have not drunk and eaten.'

Չեմ խմե ու կերե:

As is clear, the data from Colloquial Eastern Armenian is quite complicated and our analysis is incomplete. But crucially, the overarching generalization is that whereas IA allows non-local conditioning between the suffix and the auxiliary, CEA seems to require local conditioning.

7.3 Variation of deletion in code switching

In the previous sections, we saw that the perfective converb suffix has a constant form [-el] in Standard Eastern Armenian. In contrast in Iranian Armenian, the final liquid of this suffix [-el/-eɹ] deletes if the auxiliary has shifted leftwards. In this section, we document the effects of code switching between Standard Eastern and Iranian Armenian.

In the previous sections, nearly all the data on the Iranian Armenian perfective suffix came from our consultant NK. NK was born and raised in California, and she considers her home languages to be Iranian Armenian and English. She did not go to an Armenian school, and did not acquire Standard Eastern Armenian. Thus, we consider her a mono-lectal Armenian speaker who knows only one register of Armenian: Iranian Armenian.

In contrast, Armenians raised in Tehran are typically bi-dialectal because they acquire Iranian Armenian at home, and Standard Eastern Armenian at school. Our consultant KM is considered a bi-dialectal speaker and can switch between registers. In her speech, we've noticed that when she code switches between registers, she variably deletes the perfective liquid. Deletion depends on formality.

(34) Effects of code switching for Iranian Armenian speakers who know Standard Eastern Armenian

   a. Positive form: use a liquid
      i. gəɹ-eɹ   =e-m   (Mono-lectal NK)
      ii. gəɹ-el   =e-m   (Bi-lectal KM)
          write-P   =be
          'I have written.'
          Գրել/գրեր եմ։

   b. Negative form: variably use a liquid
      i. t͡ʃʰ =e-m   gəɹ-e   (Mono-lectal NK)
      ii. t͡ʃʰ =e-m   gəɹ-el   (Bi-lectal KM – formal)
          t͡ʃʰ =e-m   gəɹ-e   (Bi-lectal KM – informal)
          NEG =be   write-P
          'I have not written.'
          Չեմ գրե/գրել։

Note how NK prefers the suffix form [-eɹ] while KM prefers [-el]. We capture this variation in terms of code switching between lexical items. When bi-dialectal speakers like KM code switch, they switch between using the perfective suffix [-el] with a consonant liquid /-el/ vs. a floating liquid /-e<l>/.

Complications arise in coordination contexts. To illustrate, consider the sentences below. In the positive form, both verbs have their liquid surface because the auxiliary is present. In the negated form, our mono-lectal speaker NK must delete both liquids on both verbs.

In contrast, our bi-dialectal speaker KM can either delete both liquids or produce both liquids. Neither NK nor KM allow other permutations like liquid + no liquid, or no liquid + liquid.

(35)   Effect of code switching in bi-dialectal speakers

    a.   Reduced coordination with one auxiliary: use a liquid

	Verb1	Conj	Verb2	Aux	
i.	χəm-eɻ	kɒm	keɻ-eɻ	=e-m	(Mono-lectal NK)
ii.	χəm-el	kɒm	keɻ-el	=e-m	(Bi-lectal NK)
	drink-P	or	eat-P	=be	

        'I have drunk or eaten.'

        Խմել/խմեր կամ կերել/կերեր եմ:

    b.   Reduced coordination with negation : use a liquid

	Neg-Aux	Verb1	Conj	Verb2	
i.	t͡ʃʰ=e-m	χəm-e	kɒm	keɻ-e	(Mono-lectal NK)
ii.	t͡ʃʰ=e-m	χəm-el	kɒm	keɻ-el	(Bi-lectal NK – formal)
	t͡ʃʰ=e-m	χəm-e	kɒm	keɻ-e	(Bi-lectal NK – informal)
	drink-P	or	eat-P	=be	

        'I have not drunk or eaten.'

        Չեմ խմել/խմե կամ կերել/կերէ:

As with simple sentences, the coordination data suggest that code switching involves switching between lexical items: informal /-e<l>/ vs. formal /-el/. Interestingly, the same form must be used in both conjuncts. This suggests that bi-dialectal speakers can't code switch between conjuncts.

8   Conclusion

Cross-linguistically, phonological rules that apply across rules tend to obey phonological locality. Similarly, phonologically defective segments (ghost segments) tend to also show locality restrictions. We have documented an exception from Iranian Armenian which violates both locality restrictions.

Various suffixes show an alternation between a consonant-final form vs. a vowel-final form: *-eɻ* vs. *-e*, and *-is* vs. *-i*. The choice of form is conditioned by the location of the auxiliary within the sentence. If the auxiliary is to the left of the suffix, then the suffix uses the short form. However knowing such linearity information requires access to the syntactic structure of the sentence. We argue that the data needs an articulated syntax-morphology-phonology interface such as in (Kaisse 1985; Elordieta 1997; Pak 2008).

In sum, Iranian Armenian presents a rare case of a floating segment being licensed via syntactically-conditioned relationships. This relationship cannot be reduced to phonology or morphology. It is instead an interplay of all modules.

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