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# An apparent case of outwardly-sensitive allomorphy in the Armenian definite

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Cross-linguistically, it is rare to find cases of phonologically-conditioned allomorphy where the trigger morpheme lies external or outside the target morpheme. At first sight, the Armenian definite suffix seems to be such a case. The definite suffix uses various surface forms. The choice of surface form is conditioned by the preceding segment, the following clitic, and/or the following word. However, we argue that this outward sensitivity is epiphenomenal and not actual allomorphy. We derive the surface forms by using an abstract underlying representation that uses floating segments or ghost segments. These segments go through rigid cycles of spell-out and phonological strata. Constraint re-rankings of autosegmental docking, phrasal resyllabification, and cluster avoidance explain a range of dialectal variation. In sum, the Armenian definite suffix is one apparent case of outwardly-sensitive allomorphy that is reducible to latent segments.

# 1 Introduction

It is a significant cross-linguistic tendency that the target of allomorphy is conditioned by structurally lower material. In the case of phonologically-conditioned allomorphy, such a tendency is a near-universal with few convincing exceptions (Anderson 2008) that haven't yet been reanalyzed (Deal & Wolf 2017; Kiparsky 2021). This paper discusses data on the definite suffix across Armenian lects. The distribution of the suffix's surface forms is phonologically-conditioned, but their phonological trigger can vary from being structurally lower, structurally higher, or on a separate word. On the surface, this distribution looks like outwardly-sensitive allomorphy, with multiple underlying allomorphs for the suffix. I however argue that the range of data can be elegantly analyzed with a more abstract analysis that utilizes a single underlying form with latent or floating segments.

The Armenian language is an isolate within the Indo-European language family. It is made up of two standard lects, and multiple non-standard lects that are spread out across the Caucasus and the Middle East. The lects have varying degrees of mutual intelligibility or un-intelligibility. This paper discusses data from the two standard lects (Western Armenian and Eastern Armenian) and one non-standard lect (Iranian Armenian). The focus is on the definite suffix.

Consider **Table 1**. For words in isolation, the suffix shows a relatively simple and inwardly-conditioned distribution of allomorphs. The suffix is *-n* after vowels, and *-ə* after consonants. But between a consonant and a vowel-initial clitic, Western Armenian uses the *-n* surface form. This form is conditioned by the following clitic. However, if the following V-initial segment is an independent lexical word, then the suffix resorts back to the *-ə* form. Eastern and Iranian display further forms of variation. In Eastern, the *-n* form is conditioned both by subsequent clitics and subsequent lexical words, unlike in Western. In Iranian, a separate surface form *-ən* is used between consonants and vowels.

The wide array of surface forms at first suggests that the definite suffix is an outwardly-

| | | **Western** | **Eastern** | **Iranian** |
|---|---|---|---|---|
| Isolation | V_ | *-n* | *-n* | *-n* |
| | C_ | *-ə* | *-ə* | *-ə* |
| Cliticized | C_ = V | *-n* | *-n* | *-ən* |
| Connected speech | C_ #V | *-ə* | *-n* | *-ən* |

**Table 1:** Distribution of the surface forms of the definite suffix.

conditioned suffix, and that its underlying form is chosen post-lexically (Henderson 2012). I argue against this impression. Such a late spell-out analysis would create paradoxes in other areas of the Armenian grammar. Instead, I argue that this entire range of surface forms is all derived from a single underlying form with floating segments: /-(ə)(n)/. This suffix is spelled

out in the lexical level. But the latent segments compete to get anchored or docked in the post-lexical level. The lects vary in the ranking of phonotactic and prosodic constraints. Such rankings control the distribution of surface realizations.

This paper is organized as follows. §2 discusses data on the possessive suffixes in Western Armenian, as spoken in Lebanon. These suffixes occupy the same inflectional slot as the definite suffix, and display a similar distribution of surface forms. I show that these surface forms are inwardly-conditioned and not true allomorphy. The distribution of forms displays cyclic opacity once we add clitics and reach the post-lexical level. Based on this backdrop, §3 discusses the definite suffix in Western Armenian, and how the definite suffix behaves transparently with the post-lexical level and displays outward-sensitivity. I analyze the Western data with floating segments in §4. The analysis is then extended in §5 to capture dialectal variation with Eastern Armenian and Iranian Armenian. §6 discusses the diachronic origin of the definite suffix, and the role of sociolinguistic variation. I conclude in §7.[1]

## 2 Inward-sensitivity and cyclicity of possessive suffixes

Cross-linguistically, phonologically-conditioned allomorphy tends to display three types of conditions: input-sensitivity, internal directionality, and cyclic opacity (Paster 2006; 2009). First, the choice of allomorph depends on the phonological structure of the input base, not of the output structure. Second, allomorphy is sensitive to the phonological structure of morphemes that are spelled-out below (inside) the allomorphs, not above (outside) them. Third, cyclic spell-out can cause the loss of the trigger of allomorphy. All three of of these tendencies are reflected in the Western Armenian possessive suffixes.[2] I go through the data to set up the baseline architecture of the morphology-phonology interface of Armenian.

Western Armenian is the lect of Armenian spoken in various Middle Eastern countries, including Lebanon, Syria, and Turkey. Data is based on my native judgments for Lebanese Western Armenian. Western Armenian has two possessive suffixes: 1SG [-(ə)s] and 2SG [-(ə)tʰ] (**Table 2**). These suffixes surface as the lone consonants [-s, -tʰ] after vowel-final (V-final) bases: *gadu-s* ‘my cat’. They surface with a schwa after consonant-final (C-final) bases: *kʰɯmaɾ-əs* ‘my amount’. It doesn’t matter if the final C is part of simplex vs. complex coda: ɑʃɑgeɾd-əs ‘my student’.[3]

The distribution of the surface forms of the possessives is not true allomorphy. The underlying form of the 1SG possessive is /-s/, and that of the 2SG is /-tʰ/. The schwa is epenthesized to

[1] Data is primarily from my native judgements on Western Armenian, and personal fieldwork on the other lects. Underlying forms are represented by slashes /…/, intermediate representations by double slashes //…//, and surface forms by either brackets […] or nothing.

[2] Technically, the possessives don’t utilize allomorphy because these suffixes use a single underlying form.

[3] I gloss the 1SG [-(ə)s] and 2SG [-(ə)tʰ] morphemes as just ‘=my’ and ‘=your’ for brevity, but the full glossing is 1SG.POSS and 2SG.POSS.

| | …V-s | …V-tʰ | | | …C-əs | …C-ət | |
|---|---|---|---|---|---|---|---|
| | **1SG poss.** | **2SG poss.** | | | **1SG poss.** | **2SG poss.** | |
| gɑ.du | gɑ.du-s | gɑ.du-tʰ | ‘cat’ | kʰu.mɑɾ | kʰu.mɑ.ɾ-əs | kʰu.mɑ.ɾ-ətʰ | ‘amount’ |
| ɑg.ɾɑ | ɑg.ɾɑ-s | ɑg.ɾɑ-tʰ | ‘tooth’ | gɑ.dɑg | gɑ.dɑ.g-əs | gɑ.dɑ.g-ətʰ | ‘joke’ |
| kʰi.ni | kʰi.ni-s | kʰi.ni-tʰ | ‘wine’ | seɾm | seɾ.m-əs | seɾ.m-ətʰ | ‘seed’ |
| kʰɑ.hɑ.nɑ | kʰɑ.hɑ.nɑ-s | kʰɑ.hɑ.nɑ-tʰ | ‘priest’ | ɑ.ʃɑ.geɾd | ɑ.ʃɑ.geɾ.d-əs | ɑ.ʃɑ.geɾ.d-ətʰ | ‘student’ |

**Table 2:** 1SG and 2SG possessive suffixes in Western Armenian.

prevent the suffix from syllabifying as part of a complex coda with the root-final consonant. However, these surface forms do show the three cross-linguistic properties of input-sensitivity, inward-directionality, and cyclic opacity, as we will show.

First, the presence of the schwa after C-final bases is not purely phonological but is morpho-phonological (Ղարագյուլյան 1974: 172; Vaux 1998: 29; Baronian 2017: 7). Complex codas generally show falling sonority. Within roots, the consonants -/s/ and /-tʰ/ can form complex codas: *hars* ‘bride’. It is thus the presence of the possessive morpheme boundary which triggers schwa epenthesis: *d͡zar-əs* instead of **d͡zars* ‘my tree’. The data in **Table 3** illustrates (near)-minimal pairs between root-final [Cs] and [Cʰ] sequences, versus epenthesis in possessive [C-əs] and [C-ətʰ].

| | **1SG poss.** | **2SG poss.** | | | **cf.** | |
|---|---|---|---|---|---|---|
| d͡zɑɾ | d͡zɑ.ɾ-əs | | *d͡zɑɾ-s | ‘tree’ | hɑɾs | ‘bride’ |
| kʰɑɾ | | kʰɑ.ɾ-ətʰ | *kʰɑɾ-tʰ | ‘rock’ | t͡ʃɑɾtʰ | ‘massacre’ |
| pʰɑj | pʰɑ.j-əs | | *pʰɑj-s | ‘verb’ | hujs | ‘hope’ |
| hɑj | | hɑ.j-ətʰ | *hɑj-tʰ | ‘Armenian’ | ɑjtʰ | ‘that’ |
| mom | mo.m-əs | | *mom-s | ‘candle’ | doms | ‘ticket’ |
| pʰɑn | | pʰɑ.n-ətʰ | *pʰɑn-tʰ | ‘thing’ | lintʰ | ‘gum’ |

**Table 3:** Near-minimal pairs for epenthesis in possessives.

Note that complex codas are permitted in suffixes, such as in the present 1PL suffix: *kʰer-e-ŋkʰ* ‘we scratch’, glossed as [√-TH-1PL].

We capture these facts with the following constraint. Complex codas cannot be formed across a morpheme boundary.[4] That is, within a complex coda, the two segments must be part of

[4] A spurious exception is the nominalizer *-kʰ* which follows any consonant or consonant cluster without triggering schwa epenthesis: *lajn* ~ *lajŋ-kʰ* ‘wide ~ width’. However, this consonant can even create non-falling sonority clusters: *aʁotʰ-el* ~ *aʁot-k* ‘to pray ~ prayer’. It is commonly argued that this segment *-kʰ* here is actually an extrasyllabic appendix (Vaux 1998: 83; Dolatian 2021a: §6.1), and does not form complex codas. Thus, it does not violate the constraint in (1a).

the same morpheme. This constraint is undominated and it outranks the anti-epenthesis DEP-ə constraint. We include a low-ranked constraint NOCODA because it will be useful later. This constraint is defined such that it assigns one violation for a syllable with a single coda, and two violations for a syllable with a complex coda.

(1) *Constraints and ranking for possessive 'allomorphy'*
   a. *C-C]$_{\sigma}$: Assign a violation if the members of a complex coda belong to different morphemes.
   b. DEP-ə: Assign a violation if a schwa is epenthesized.
   c. NOCODA: Assign a violation if a consonant is part of a (complex) coda.
   d. *Ranking*: *C-C]$_{\sigma}$ >> DEP-ə >> NOCODA

The above *C-C]$_{\sigma}$ constraint can be formulated in multiple ways, such as in terms of morphological colors (Trommer 2011; 2015), alignment (Bonet & Lloret 2005), or phrasal syllables (Cardinaletti & Repetti 2009). We use the above simple form for illustration. We show a derivation for the V-final and C-final bases. No schwa is needed for V-final bases (2a), while a schwa is needed in C-final bases to resolve the constraint *C-C]$_{\sigma}$ (2b). We set aside the issue of deciding the location of schwa epenthesis.[5]

(2) a. *Deriving the possessive 2SG for V-final base* /gɑdu-s/ 'cat = my (my cat)'

| /gɑdu-s/ | *C-C]$_{\sigma}$ | DEP-ə | NOCODA |
|---|---|---|---|
| a. ☞ gɑ.du**s** | | | * |
| b. gɑ.du.**əs** | | *! | * |

   b. *Deriving the possessive 2SG for C-final base* /k$^{h}$umɑr-s/ 'amount-my (my amount)'

| /k$^{h}$umɑr-s/ | *C-C]$_{\sigma}$ | DEP-ə | NOCODA |
|---|---|---|---|
| a. k$^{h}$u.mɑr**s** | *! | | ** |
| b. ☞ k$^{h}$u.mɑ.r**əs** | | * | * |

In the above data, the schwa was needed because the consonant would otherwise form an illicit complex coda over a morpheme boundary. We see cyclically-induced opacity in epenthesis once we add V-initial clitics (**Table 4**). When added to unsuffixed forms, clitics trigger glide epenthesis after V-final bases: *gadu[j]=e* 'is cat'. After C-final bases, they trigger resyllabification: *k$^{h}$uma.r=e* 'is amount'.[6] I use = to mark clitic boundaries. This data requires the ranking ONSET >> DEP-j.

[5] Schwas are epenthesized before the suffix, not after: *k$^{h}$u.ma.rəs*, **k$^{h}$u.mar.sə* 'my amount'. This can be explained with right-to-left syllabification, which is argued to be the norm in Armenian (Dolatian in review).

[6] I gloss the present 3SG copula /=e/ as just '=is' brevity, but the full glossing is COP.PRS.3SG. The copula is inflected for present and past tense, for 3 numbers, and for singular and plural. This creates a paradigm of 12 cells (Dum-Tragut 2009: 215). They all behave the same with respect to syllabification. I only show the present 3SG for space.

| | V-final | | | C-final | | |
|---|---|---|---|---|---|---|
| | /gɑdu/ | /gɑdu = ɑl/ | /gɑdu = e/ | /kʰumɑɾ/ | /kʰumɑɾ = ɑl/ | /kʰumɑɾ = e/ |
| | [gɑ.dú] | [gɑ.dú.jɑl] | [gɑ.dú.je] | [kʰu.máɾ] | [kʰu.má.ɾɑl] | [kʰu.má.ɾe] |
| Gloss: | cat | cat = also | cat = is | amount | amount = also | amount = is |
| Translation | ‘cat | ‘also cat’ | ‘is cat’ | ‘amount | ‘also amount’ | ‘is amount’ |

**Table 4:** Cliticization and resyllabification in Western Armenian.

Stress is on the rightmost non-schwa vowel in the prosodic word (Vaux 1998; Dolatian 2021a). The above morphemes are thus considered clitics because they are unstressed.[7] I do not show stress markings after this section.

When these clitics are added after the possessive suffixes (**Table 5**), the schwa is still maintained for C-final bases even though the suffix is now syllabified as an onset: *kʰu.ma.ɾə.se*, **kʰu.mɑɾ.se* ‘is my amount’.

| UR | SR | Gloss | UR | SR | Gloss |
|---|---|---|---|---|---|
| /gɑdu/ | [gɑ.dú] | ‘cat’ | /kʰumɑɾ/ | [kʰu.máɾ] | ‘amount’ |
| /gɑdu-s/ | [gɑ.dú**s**] | ‘cat-my’ | /kʰumɑɾ-s/ | [kʰu.má.ɾ**əs**] | ‘amount-my’ |
| /gɑdu-s = ɑl/ | [gɑ.dú.**s**ɑl] | ‘cat-my = also’ | /kʰumɑɾ-s = ɑl/ | [kʰu.má.ɾ**ə.s**ɑl]<br>*[kʰu.mɑɾ.**s**ɑl] | ‘amount-my = also’ |
| /gɑdu-s = e/ | [gɑ.dú.**s**e] | ‘cat-my = is’ | /kʰumɑɾ-s = e/ | [kʰu.má.ɾ**ə.s**e]<br>*[kʰu.mɑɾ.**s**e] | ‘amount-my = is’ |
| /gɑdu-tʰ/ | [gɑ.dú**tʰ**] | ‘cat-your’ | /kʰumɑɾ-tʰ/ | [kʰu.má.ɾətʰ] | ‘amount-your’ |
| /gɑdu-tʰ = ɑl/ | [gɑ.dú.**tʰ**ɑl] | ‘cat-your = also’ | /kʰumɑɾ-tʰ = ɑl/ | [kʰu.má.ɾə.**tʰ**ɑl]<br>*[kʰu.mɑɾ.**tʰ**ɑl] | ‘amount-your = also’ |
| /gɑdu-tʰ = e/ | [gɑ.dú.**tʰ**e] | ‘cat-your = is’ | /kʰumɑɾ-tʰ = e/ | [kʰu.má.ɾə.**tʰ**e]<br>*[kʰu.mɑɾ.**tʰ**e] | ‘amount-your = is’ |

**Table 5:** Overapplication of epenthesis before clitics.

Before clitics, the presence of the schwa in C-final bases is phonologically unneeded because the possessive is syllabified with the clitic. Schwa epenthesis thus looks like opaque overapplication. A monostratal non-cyclic derivation cannot derive the cliticized forms of C-final bases. Instead, the above rankings would prevent any epenthesis.[8]

[7] I don’t formalize stress assignment here because it’s tangential.

[8] Աբեղյան (1933: 53ff) reports that in poetry, this epenthetic schwa can sometimes be deleted. I set this variation aside because it is largely restricted to poetic speech; it is not common in natural speech (Ղարագյուլյան 1974: 157). The main such cases of deletion in natural speech are limited to pronouns (Johnson 1954: 40; Hagopian 2005: 17).

(3) *Failure to derive epenthesis in cliticized possessives* 'amount-my = also' *in one single step*:

| /kʰumaɾ-s = e/ | *C-C]$_\sigma$ | DEP-ə | NOCODA |
|---|---|---|---|
| a. ☞ kʰu.maɾ.se | | | * |
| b. ☹ kʰu.ma.ɾə.se | | *! | |

Furthermore, if we instead look into the prosodic structure of these cliticized words, the paradox remains (**Figure 1**). Structurally, clitics form either recursive PWords or are part of a clitic group that is post-lexically formed (Nespor & Vogel 1986; Selkirk 1996; Booij 1996). The clitic takes the preceding consonant as its onset, regardless if that consonant is part of the root or possessive. Thus MWords and PWords are not isomorphic. If we redefined *C-C]$_\sigma$ such that it only applies within the minimal prosodic word, we still have epenthesis unmotivated.

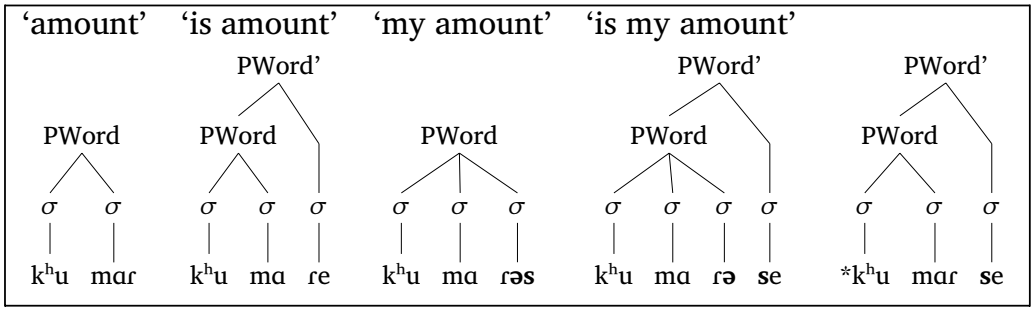


**Figure 1:** Prosodic structure of cliticized and uncliticized words.

Instead, these cliticized forms need a cyclic derivation (Kiparsky 1982; 2000; 2015; Hargus 1993; Booij 1997; Rubach 1985; Bermúdez-Otero 2011; Embick 2010). The base and suffix are syllabified together in one cycle (4a). Schwa epenthesis applies. This cycle can be considered a word-level or lexical cycle. The output of this cycle is then fed to a post-lexical cycle where cliticization applies (4b).[9] The schwa is not deleted because the relevant anti-deletion constraint exists, and there is no high-ranking constraint that would trigger deletion.

(4) *Cyclic derivation for possessives and cliticization*

a. *Lexical level:* /kʰumaɾ-s/ → //kʰu.ma.ɾəs // 'amount-my' (my amount)

| /kʰumaɾ-s/ | *C-C]$_\sigma$ | DEP-ə | NOCODA |
|---|---|---|---|
| a. kʰu.maɾs | *! | | ** |
| b. ☞ kʰu.ma.ɾəs | | * | * |

[9] In the post-lexical level, the morpheme boundary before the possessive is removed via bracket erasure. This renders the *C-C]$_\sigma$ constraint as vacuous and always satisfied.

b. *Post-lexical level:* //kʰu.mɑ.ɾəs = e// → [kʰu.mɑ.ɾə.se] ‘amount-my = is (is my amount)’

| //kʰu.mɑ.ɾəs = e// | *C-C]$_{\sigma}$ | DEP-ə | MAX | NOCODA |
|---|---|---|---|---|
| a. ☞ kʰu.mɑ.ɾə.se | | | | |
| b. kʰu.mɑɾ.se | | | *! | * |

The schwa is thus present in the output because it was epenthesized early in the derivation, when there was no other way to syllabify the suffix. Surface cliticization makes this condition opaque. This opacity reinforces the inward-directionality and input-based nature of determining the surface forms of the possessives. Furthermore, the role of strata is further manifested throughout the rest of Armenian phonology (Dolatian 2020; 2021a; b).

So far, we’ve seen that Armenian provides independent evidence that spell-out applies cyclically, with the need for at least two levels of derivation: lexical and post-lexical. For the possessive suffixes, their surface forms are determined by the their input forms in the lexical level where schwa epenthesis can apply. The output of the lexical level is counter-bled by post-lexical phonology, generating opacity. The next section introduces the unexpected behavior of the definite suffix, which seems to show outward-sensitivity.

## 3 Outwardly-sensitive allomorphy of the Western definite

This section presents data on the Armenian definite. Like the possessives, the definite suffix is part of the word-level morphology. But unlike the possessives, the definite article appears to be a more concrete type of phonologically-conditioned allomorphy that cannot be modeled via a single underlying form (§3.1). Furthermore, the choice of exponents appears outwardly-conditioned because it interacts transparently with post-lexical cliticization (§3.2). This pattern appears to be a case of outwardly-sensitive allomorphy. I show how a cyclic derivation with a simple set of multiple underlying forms cannot capture the apparent outward-sensitivity. Utilizing late spell-out however is unmotivated from the morphology (§3.3).

### 3.1 Inwardly-sensitive allomorphy in isolation

In terms of exponents, the definite suffix is [-n] after V-final bases, and [-ə] after C-final bases.

(5) a. gɑ.du ‘cat’
gɑ.du-n ‘cat-DEF’
‘the cat’

b. kʰu.mɑɾ ‘amount’
kʰu.mɑ.ɾ-ə ‘amount-DEF’
‘the amount’

Unlike the possessives, the two surface forms of the definite do not share any segment in common. There is likewise no phonological rule in Armenian of nasal-schwa alternations. There is likewise

no general phonological rule of deleting nasals in final clusters (Baronian 2017: 3). In fact, root-final underlying /Cn/ clusters can surface either faithfully (**Table 6a**) or with epenthesis (**Table 6b**), depending on the word and consonant (Vaux 1998: 26). But the definite suffix morph [-n] cannot be attached to form a complex coda, nor to trigger epenthesis. Instead, the definite [-ə] is used.[10]

| **a. Allomorphy instead of forming a complex coda** | | | | | | |
|---|---|---|---|---|---|---|
| | **Def -ə** | ***-n** | | **cf.** | | |
| pʰɑj | pʰɑ.j-ə | *pʰɑj-n | 'verb' | /t͡sajn/ | t͡sajn | 'voice' |
| pʰoɾ | pʰo.ɾ-ə | *pʰoɾ-n | 'belly' | /χɑrn/ | χɑrn ~ χɑ.ɾən | 'mixed' |
| pʰɑɾ | pʰɑ.ɾ-ə | *pʰɑɾ-n | 'word' | /tʰɑrn/ | tʰɑrn ~ tʰɑ.ɾən | 'bitter' |
| nəveɾ | nə.ve.ɾ-ə | *nə.veɾ-n | 'present' | /jeʁeɾn/ | je.ʁeɾn | 'crime' |
| **b. Allomorphy instead of schwa epenthesis** | | | | | | |
| | **Def -ə** | ***-ən** | | **cf.** | | |
| pʰem | pʰe.m-ə | *pʰe.m-ən | 'stage' | /himn/ | hi.mən | 'basis' |
| pʰɑg | pʰɑ.g-ə | *pʰɑ.g-ən | 'yard' | /ɑgn/ | ɑ.gən | 'eye (archaic)' |
| hɑd | hɑ.d-ə | *hɑ.d-ən | 'piece' | /vodn/ | vo.dən | 'foot (archaic)' |
| d͡ʒɑʃ | d͡ʒɑ.ʃ-ə | *d͡ʒɑ.ʃ-ən | 'food' | /tʰɑʃn/ | tʰɑ.ʃən | 'gentle' |

**Table 6:** Definite allomorphy vs. syllabifying nasals in roots.

The definite suffix thus appears to be a case of phonologically-conditioned allomorphy. In a simple analysis, the underlying form of the definite suffix would consist of two morphs /-ə,-n/ (Baronian 2017: 3). The choice of exponent can be determined by competition between these two morphs (Nevins 2011; Bonet & Harbour 2012), whether in terms of subcategorization frames (Inkelas 1989; Paster 2006; Bye 2008) or parallelist constraint competition (Drachman et al. 1996; Lapointe 2001; Kager 1996; Mascaró 2007; Bonet et al. 2007; 2015). We illustrate with both.

(6) *Simple analysis with subcategorization frames* (to be revised in **Figure 2**)

DEF → *-n* / V_
*-ə* / C_

[10] There are some cases of highly lexicalized and morphologically-conditioned allomorphy, where a root surfaces without a final nasal in isolation and in some derivatives, but does surface with a nasal in other derivatives: *amaɾ* ~ *amaɾ**n**-ajin* ~ *amaɾ-anot͡s* 'summer ~ summer (adj) ~ summer-house'. Such allomorphy is diachronically related to the definite (§6.1) via sporadic cases of word-final nasal lenition. But these are all lexicalized or fossilized alternations, without a clear systematic or morphophonological distribution.

For the parallelist analysis, we can use a simple constraint like ONSET which favors [-n] after V-final bases (7b). The constraint *C-C]$_\sigma$ prevents complex codas across morpheme boundaries. For C-final bases, epenthesis is unneeded because the input provides a vocalic morph /-ə/ (7c). For disambiguation, epenthetic schwas are denoted by an apostrophe.

(7) *Parallelist constraint-based competition with simple underlying forms*

a. *Ranking*: ONSET >> NOCODA

b. *V-final base:* [gɑdu-n] 'cat-DEF (the cat)'

| /gɑdu-{ə,n}/ | *C-C]$_\sigma$ | ONSET | DEP-ə | NOCODA |
|---|---|---|---|---|
| a. ☞ gɑ.du**n** | | | | * |
| b. gɑ.du.**ə** | | *! | | |

c. *C-final base:* [k$^h$umɑɾ-ə] 'amount-DEF (the amount)'

| /k$^h$umɑɾ-{ə,n}/} | *C-C]$_\sigma$ | ONSET | DEP-ə | NOCODA |
|---|---|---|---|---|
| a. k$^h$u.mɑɾ**n** | *! | | | ** |
| b. k$^h$u.mɑ.ɾə'**n** | | | *! | * |
| c. ☞ k$^h$u.mɑ.ɾ**ə** | | | | |

Although such an analysis of the underlying forms does work for the above data, it presents problems once we look at cliticization. I turn to this issue next.

## 3.2 Outwardly-sensitive allomorphy in cliticization

The data so far shows that the definite suffix's surface forms are computed by the phonological structure of its base. However, the definite suffix is *also* affected by V-initial clitics. For V-final roots (**Table 7**), the definite suffix stays [-n] in the presence of V-initial clitics: *gadu-n=e* 'is the cat'. There is no issue here.

| **Gloss** | **cat** | **cat-DEF** | **cat-DEF = also** | **cat-DEF = is** |
|---|---|---|---|---|
| | gɑdu | gɑdu-**n** | gɑdu-**n** = ɑl | gɑdu-**n** = e |
| | gɑ.dú | gɑ.dú**n** | gɑ.dú.**n**ɑl | gɑ.dú.**n**e |
| Translation | 'cat' | 'the cat' | 'also the cat' | 'is the cat' |

**Table 7:** No outwardly-conditioned surface forms for the definite after V-final bases.

But for C-final roots (**Table 8**), the definite suffix is [-ə] in isolation, but [-n] before V-initial clitics: *k$^h$umar-n=e* 'is the amount'. The switch in surface forms appears to be outwardly-sensitive allomorphy.

| **Gloss** | **amount** | **amount-DEF** | **amount-DEF = also** | **amount-DEF = is** |
|---|---|---|---|---|
| | kʰumaɾ | kʰumaɾ-**ə** | kʰumaɾ-**n** = ɑl | kʰumaɾ-**n** = e |
| | kʰu.maɾ | kʰu.mɑ.ɾ**ə** | kʰu.maɾ.**n**ɑl<br>*kʰu.mɑ.ɾə.jɑl | kʰu.maɾ.**n**e<br>*kʰu.mɑ.ɾ**ə**.je |
| Translation | 'amount' | 'the amount' | 'also the amount' | 'is the amount' |

**Table 8:** Outwardly-conditioned surface forms of the definite between a C-final base and V-initial clitic.

For C-final roots, we incorrectly predict that the definite suffix should stay [-ə] before clitics, and that vowel hiatus is repaired by glide epenthesis: **kʰumaɾ-ə[j] = e* 'is the amount'. Such an opaque choice of surface form is however not what we find (8a). Contrast this behavior with that of possessives, whose form is stable before clitics, thus generating opacity: *kʰumaɾ-əs = e* 'is my amount' (8b).

(8)

| a. | | | b. | | |
|---|---|---|---|---|---|
| | kʰumaɾ-**ə** | 'amount-DEF' | | kʰu.mɑ.ɾ-**əs** | 'amount-my' |
| | *kʰumaɾ-**əj** = ɑl | 'amount-DEF = also' | | kʰu.mɑ.ɾ-**əs** = ɑl | 'amount-my = also' |
| | kʰumaɾ-**n** = ɑl | | | *kʰu.mɑ.ɾ-**s** = ɑl | |
| | *kʰumaɾ-**əj** = e | 'amount-DEF = is' | | kʰu.mɑ.ɾ-**əs** = e | 'amount-my = is' |
| | kʰumaɾ-**n** = e | | | *kʰu.mɑ.ɾ-**s** = e | |

For the possessives, the schwa is added after C-final roots in order to syllabify the suffix, even though the cliticization later makes the trigger for the schwa opaque: ***kʰu.mɑ.ɾəs*** 'my amount' vs. ***kʰu.mɑ.ɾə.se*** 'is my amount'. But for the definite, it appears that allomorphy is determined late in the derivation because the form of the suffix changes in cliticization: ***kʰu.mɑ.ɾə*** 'the amount vs. ***kʰu.maɾ.ne*** 'also the amount'. We illustrate below for the definite form. The suffix is spelled-out as /-ə/ in the lexical level. It is too late to change allomorphs in the post-lexical level. The incorrect output is produced.

(9) *Failed derivation for cliticized definites after C-final bases*

a. *Lexical level*:
/kʰumaɾ-{ə,n}/ → //kʰumaɾ-ə// 'amount-DEF (the amount)'

| /kʰumaɾ-{ə,n}/ | *C-C]$_\sigma$ | ONSET | DEP-j | NOCODA |
|---|---|---|---|---|
| a. kʰu.mɑɾ**n** | *! | | | ** |
| b. ☞ kʰu.mɑ.ɾ**ə** | | | | |

b. *Post-lexical level*:
//kʰumaɾ-ə = e// → *kʰumaɾ-əj = e 'amount-DEF = is (is the amount)'

| //kʰu.mɑ.ɾə = e// | *C-C]$_\sigma$ | ONSET | DEP-j | NOCODA |
|---|---|---|---|---|
| a. kʰu.mɑ.ɾ**ə**.e | | *! | | |
| b. ☹ kʰu.mɑ.ɾ**ə**.je | | | * | |

Thus on the surface, the definite suffix appears to display outwardly-sensitive allomorphy, as illustrated by the following hypothetical subcategorization frames.

(10) *Outwardly-sensitive allomorphy with subcategorization frames* (to be revised in **Figure 2**)
DEF → *-n* / V_
*-n* / _=V
*-ə* / elsewhere

Contra the data from possessives, the cliticized definites cannot be correctly generated if we use a) the simple underlying forms /-ə, n/, and b) if spell-out is cyclic. With these underlying forms and these cyclic levels, the definite suffix will be exposed as [-ə] and then incorrectly trigger glide epenthesis. Instead with these underlying forms, we need to postpone the spell-out of the definite until the post-lexical level (cf. late-insertion based analyses in Chung 2003; Hannahs & Tallerman 2006; Henderson 2012; Royer 2021). It cannot be the case that Armenian simply lacks a lexical vs. post-lexical distinction; otherwise we wouldn't be able to handle the simpler case of possessives (§2).

(11) *Hypothetical late spell-out of the definite in the post-lexical stratum*:
/kʰumɑɾ-{ə,n}=e/ → [kʰumɑɾ-n=e] 'amount-DEF=is'

| /kʰumɑɾ-{ə,n}=e/ | *C-C]$_\sigma$ | ONSET | DEP-j | NOCODA |
|---|---|---|---|---|
| a. kʰu.mɑ.ɾə.e | | *! | | |
| b. kʰu.mɑ.ɾə.je | | | *! | |
| c. ☞ kʰu.mɑɾ.ne | | | | * |

## 3.3 Paradox of late spell-out

The previous section showed that, if we use analyze the definite suffix with two underlying forms, then the definite suffix must idiosyncratically undergo very late spell-out. It must be spelled out within the same cycle as clitics. This section argues that such late spell-out is diacritically unique to the definite.

Cross-linguistically, it is rare to find such cases of phonologically-conditioned allomorphy that is outwardly-sensitive (Anderson 2008; Svenonius 2012; McCarvel 2016; Herce 2020; Rolle & Bickmore 2021). Some argue it can't exist (Paster 2006; 2009). Theoretical accounts for such rare patterns are diverse, ranging from selective late spell-out (Hannahs & Tallerman 2006) to making suffixes more morphologically lower than roots (Kalin 2020). In classical OT, one can use simultaneous spell-out of morphemes in order to handle outwardly-sensitive allomorphy (Kager 1996), among other methods (Wolf 2008; 2013). However, the problem becomes how we can allow simultaneous spell-out for morphemes like the definite which show

apparent outwardly-sensitive allomorphy, while having to prevent simultaneous spell-out for other morphemes like the possessives.

Ideally, if the definite suffix has late spell-out, then we should find morphosyntactic differences between the definite and the possessive suffixes. But we don't. It is not the case that the definite suffix is actually a clitic while the possessives are suffixes. Within Armenian morphotactics, the definite and possessives are both morphologically word-level suffixes that occupy the exact same inflection slot (Fairbanks 1948; Sigler 1997). They cannot co-occur.

To showcase how the definite and possessives occupy the same slot, consider the entire paradigm of possessive marking in **Table 9**. The possessive suffixes are used for 1SG and 2SG possessors. For all other types of possessors, the definite suffix is used. For the 1SG and 2SG possessors, the possessive suffix is mandatory while a possessive pronoun is optional. For all other persons and numbers, both the definite suffix and a possessive pronoun are mandatory.

| | | | |
|---|---|---|---|
| 1SG | (im) | kʰumaɾ-əs | 'my amount' |
| 2SG | (kʰu) | kʰumaɾ-ətʰ | 'your.SG amount' |
| | pronoun | noun-POSS | |
| 3SG | iɾ | kʰumaɾ-ə | 'his amount' |
| 1PL | meɾ | kʰumaɾ-ə | 'our amount' |
| 2PL | t͡seɾ | kʰumaɾ-ə | 'your.PL amount' |
| 3PL | iɾent͡s | kʰumaɾ-ə | 'their amount' |
| | pronoun | noun-DEF | |

**Table 9:** Paradigm of possessive marking.

Thus morphologically, there is no reason why the definite has this late spell-out diacritic while the possessive suffixes don't. Although the analysis works, the use of late spell-out for the definite is utterly idiosyncratic without any correlations with the rest of Armenian morphology or semantics.

The need for late spell-out however arises from the combination of our two premises: a) that the underlying form of the definite is /-ə, n/, and b) that spell-out is cyclic. Abandoning the second premise is problematic because the possessive data relies on it. Furthermore, there is abundant cross-linguistic evidence for the distinction between lexical vs. post-lexical phonology (Kaisse & McMahon 2011; Scheer 2011a). The next section abandons the first premise.[11]

[11] Curiously, Armenian lects display much more apparent cases of outwardly-sensitive phonologically-conditioned allomorphy, e.g., in the plural possessive (Wolf 2013; Arregi et al. 2013; Bezrukov 2016) and in theme vowel neutralization (Dolatian accepted). These other cases though don't generally reference the post-lexical stratum.

## 4 Reducing outward-sensitivity to latent segments

The definite suffix seems to display outwardly-sensitive allomorphy. However, this section argues that such allomorphy is epiphenomenal. It emerges from the abstract underlying structure of the definite suffix as a sequence of floating segments (also called ghosts or latent segments). With this abstraction, we can cover the data without blurring the line between lexical and post-lexical phonology.

The basic data set is repeated below for the definite suffix. We provide the paradigm for the 1SG possessive for contrast.

| | | | | |
|---|---|---|---|---|
| (12) | a. | gɑdu-**n** | 'cat-DEF' | 'the cat' |
| | | kʰumɑɾ-**ə** | 'amount-DEF' | 'the amount' |
| | | kʰumɑɾ-**n** = e | 'amount-DEF = is' | 'is the amount' |
| | b. | gɑdu-**s** | 'cat-my' | 'my cat' |
| | | kʰumɑɾ-**əs** | 'amount-my' | 'my amount' |
| | | kʰumɑɾ-**əs** = e | 'amount-my = is' | 'is the amount' |

To analyze the apparent outward-sensitivity of the definite, I analyze its underlying form as a sequence of floating segments: /-(ə)(n)/ where parentheses mark floating segments. There is a wide cross-linguistic literature on the existence of floating segments and floating features (Archangeli 1991; Tranel 1995; 1996; Zoll 1996; 2001; Wolf 2007; Akinlabi 2011; Côté 2011; Scheer 2011b; Zimmermann 2019). They have been used to model a diverse range of theoretically-controversial phenomena (Scheer 2016; Barillot et al. 2018; Faust et al. 2018; Perry & Vaux 2018; Ulfsbjorninn 2019; Newell 2021; Lahrouchi & Ulfsbjorninn 2022). They have likewise been utilized to model apparent outward-sensitive allomorphy (Zimmermann 2019; Lindsey 2019; Ulfsbjorninn 2020).

In its underlying form, a segment is considered floating if it does not consist of a melody that is associated to the skeletal tier. By lacking a complete association, a floating segment can vary in the position, shape, and context of its surface appearance. In terms of its internal structure, a floating segment can have a melodic feature but lack a skeletal slot (a melodic ghost), or it can have a skeletal slot but lack a melodic feature (a skeletal ghost) (Lindsey 2019). In terms of default behavior, a ghost can be specified to generally surface in the language, but be deleted in order to resolve a phonotactic constraint, i.e, a martyr ghost (Lindsey 2019) or a disappearing ghost (Zimmermann 2019). Conversely, a ghost can be specified to generally delete, but be allowed to surface to resolve a phonotactic constraint: a hero ghost or appearing ghost.

For Armenian, I analyze the surface morphs [-ə], [-n] as deriving from a single abstract underlying form /-(ə)(n)/.[12] Intuitively, the definite has an underlying consonant like the possessives. This consonant however is weaker because it is floating. The surface schwa is furthermore not epenthetic, but phonologized as a floating segment in the suffix. Both the schwa and the nasal are melodic ghosts: they have melodic features but no underlying skeletal slot. I later show that the ghosts are hero ghosts or appearing ghosts.

**Figure 2** shows the realization rules or Vocabulary Insertion rules for the definite suffix. It is spelled out as two latent segments /-(ə)(n)/ which are not underlyingly associated to a skeletal slot (C or V). In contrast, the 1SG and 2SG possessive suffixes are spelled out as fixed consonants with an underlyingly associated C slot.[13]

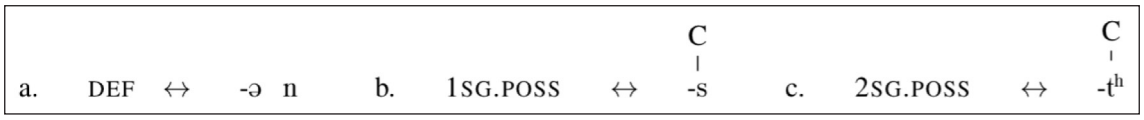


**Figure 2:** Realization rules for the definite and possessives.

With this floating analysis, I argue that docking is postponed to the post-lexical level. That is, in the lexical level without clitics, floating segments don't need to associate to a timing slot. They can survive or pass from the lexical level to the post-lexical level without deleting. This argument is not cross-linguistically problematic. There are many attested cases where a floating segment displays deletion or docking based on its post-lexical environment (Côté 2011; Ulfsbjorninn 2020; 2021). Coincidentally, floating features that dock late have been called *dormant features* (Paschen 2018).

For illustration, I show a simple derivation table below in a rule-based format. In the lexical level, the suffix is spelled-out as a sequence of floating segments /-(ə)(n)/ (**Table 10**). These ghosts are not incorporated into any syllable structure; they are invisible for syllabification. Thus for a form like *gadu-(ə)(n)*, there is no hiatus or onset violation for the schwa because it's not part of a syllable.

Autosegmental docking is postponed to the post-lexical level. For words in isolation, the schwa docks after C-final bases: *kʰumar-ə*, while the nasal docks in V-final bases: *gadu-n*. Before

[12] This morpheme thus consists of two ghosts instead of one. The use of two ghosts within a single a morpheme is less common than using one ghost, but it is attested (Wolf 2007; Trommer 2012; McPherson 2017).

[13] Other representational choices for the skeletal slot are possible: X-units, moras, root nodes, among others. The choice is tangential.

| | | **‘cat-DEF’** | **‘amount-DEF’** | **‘amount = DEF = is’** |
|---|---|---|---|---|
| Input: | | /gadu-(ə)(**n**)/ | /kʰumaɾ-(ə)(**n**)/ | /kʰumaɾ-(ə)(**n**) = e/ |
| Lexical cycle | Spell-out | gadu-(ə)(**n**) | kʰumaɾ-(ə)(**n**) | kʰumaɾ-(ə)(**n**) |
| | Epenthesis | | | |
| Post-lexical cycle | Spell-out | | | kʰumaɾ-(ə)(**n**) = e |
| | Docking | gadu-**n** | kʰumaɾ-**ə** | kʰumaɾ-**n** = e |
| Output | | [ga.du**n**] | [kʰu.ma.ɾ**ə**] | [kʰu.maɾ.**n**e] |

**Table 10:** Late docking in the post-lexical level for the definite.

a clitic, only the nasal is docked, while the schwa is deleted: *kʰumaɾ-n = e*. In contrast for the possessives (**Table 11**), floating segments are not involved at all. The only process we have is epenthesis at the lexical level.[14]

| | | **‘cat-my’** | **‘amount-my’** | **‘amount-my = is’** |
|---|---|---|---|---|
| Input: | | /gadu-**s**/ | /kʰumaɾ-**s**/ | /kʰumaɾ-**s** = e/ |
| Lexical cycle | Spell-out | gadu-**s** | kʰumaɾ-**s** | kʰumaɾ-**s** |
| | Epenthesis | | kʰumaɾ-**əs** | kʰumaɾ-**əs** |
| Post-lexical cycle | Spell-out | | | kʰumaɾ-**əs** = e |
| | Docking | | | |
| Output | | [ga.du**s**] | [kʰu.ma.ɾ**əs**] | [kʰu.ma.ɾ**ə**.se] |

**Table 11:** Early epenthesis in the lexical level for the possessives.

I now decompose the above derivation with a simple stratal OT analysis. I utilize a lexical level and post-lexical level. We need to introduce the following core constraints on docking, adapted from Lindsey (2019). The constraint RealizeMorpheme requires that at least one of the floating segments survives in the output (Kurisu 2001).[15] The constraint Dep(skel) is

[14] A reviewer wonders if the epenthetic schwa of the possessives can be treated as an underlying floating schwa: /-(ə)s/. This analysis wouldn’t work because we would expect that the possessive’s floating schwa can delete before clitics **kʰumaɾ-s = e*, just as the floating schwa of the definite /-(ə)(n)/ does: **kʰumaɾ-n = e*.

[15] Instead of RealizeMorpheme, a reviewer suggests making the UR of the definite be /-X(ə)(n)/, where X is an unassociated timing slot or root node. This X requires that at least one of the floaters docks in the output. Another alternative is to use the UR /-X(n)/, similar to Trommer (2021). Here, the X provides a slot for the nasal after V-final words. After C-final words, the nasal is deleted; to make the X surface, a schwa is epenthesized. I do not know of evidence for or against these alternatives. This paper’s analysis can be rewritten with either of these URs, as long as we add additional constraints to handle this X slot. The core generalizations of the paper’s analysis stay the same.

violated when we insert a skeletal or timing slot for a segment, such as for a floating segment or for an epenthetic segment. The constraint MAX(MEL) is violated when we delete the melody of a (floating) segment. The constraint PARSE is violated by the presence of floating segments. The postponement of docking is done by a careful ranking of the above constraints across the two strata.

(13) *Constraints for docking floating segments*

a. REALIZEMORPHEME or REALIZE: Assign a violation if an morpheme does not have a surface exponent.
b. DEP(SKEL): Assign a violation if a skeletal unit is added for a segment.
c. MAX(MEL): Assign a violation if the melody of a segment is deleted.
d. PARSE: Assign a violation if there is a floating segment in the output.

(14) *Rankings for floating segments*

a. *Lexical ranking*:
REALIZEMORPHEME, DEP(SKEL), MAX(MEL) > > PARSE
b. *Post-lexical ranking*:
REALIZEMORPHEME, PARSE > > DEP(SKEL) > > MAX(MEL)
c. *Ranking for the interaction of floating segments and syllabification across strata*
ONSET, DEP-ə > > DEP(SKEL) > > NOCODA, MAX(MEL)

First consider a V-base word in isolation. The definite suffix is added in the lexical word-level: //gɑdu-(ə)(n)// (15a). The floating segments are not docked yet. They survive in the output as floating segments. This is ensured by the ranking of our constraints. REALIZEMORPHEME blocks the deletion of both segments. The constraints MAX(MEL) and DEP(SKEL) outrank PARSE. This ensures that we never delete nor dock the floating segments.

(15) *Deriving the definite suffix for V-final base* [gɑdu-n] 'cat-DEF (the cat)'

a. *Lexical level*:
/gɑdu-(ə)(n)/ → //gɑdu-(ə)(n)//

| /gɑ.du-(**ə**)(**n**)/ | | REALIZE | DEP(SKEL) | MAX(MEL) | PARSE |
|---|---|---|---|---|---|
| a. ☞ | gɑ.du-(**ə**)(**n**) | | | | ** |
| b. | gɑ.du.**ən** | | *!* | | |
| c. | gɑ.du.**ə** | | *! | *! | |
| d. | gɑ.du**n** | | *! | *! | |
| e. | gɑdu | *! | | | *!* |

b. *Post-lexical level*:
//gɑ.du-(ə)(n)// → [gɑdu-n]

| //gɑ.du-(ə)(**n**)// | | REALIZE | PARSE | ONSET | DEP(SKEL) | NOCODA | MAX(MEL) |
|---|---|---|---|---|---|---|---|
| a. | gɑ.du-(ə)(**n**) | | *!* | | | | |
| b. | gɑ.du.**ən** | | | *! | ** | * | |
| c. | gɑ.du.**ə** | | | *! | * | | * |
| d. ☞ | gɑ.du**n** | | | | * | * | * |
| e. | gɑ.du | *! | | | | | ** |

In the post-lexical level (15b), the nasal is docked while the schwa is deleted: [gɑdu-n]. the constraints are reranked such that PARSE outranks MAX(MEL) and DEP(SKEL). This ensures that the output lacks any floating segments. High-ranked REALIZEMORPHEME ensures that at least one floater is docked. As for the choice of what segment to dock, we have the choice of outputting (docking) either the schwa [-ə], the nasal [-n], or both [-ən]. For the competition between the schwa and the nasal, the nasal wins because of ONSET. To prevent both forms from surfacing, ONSET must outrank DEP(SKEL). The constraint MAX(MEL) is low-ranked in the post-lexical stratum, and is inactive.

For C-final bases, the lexical level adds the floating segments which are not docked yet: //kʰumɑɾ-(ə)(n)// (16a). In the post-lexical level (16b), we again have the choice of docking either the schwa [-ə], the nasal [-n], or both [-ən]. The nasal (candidate d) is blocked to minimize NOCODA violations.[16] We thus need to choose between [-ə] vs. [-ən]. The latter loses (candidate b) because DEP(SKEL) outranks NOCODA and MAX(MEL). There is likewise no point in docking the nasal and then epenthesizing a schwa (candidate f). Epenthesizing a schwa violates DEP-ə and also DEP(SKEL); and this candidate is harmonically bounded by candidate (c) with the docked schwa.[17]

(16) *Deriving the definite suffix for C-final base* [kʰumɑɾ-ə] 'amount-DEF (the amount)'
a. *Lexical level*:
/kʰumɑɾ-(ə)(n)/ → //kʰu.mɑɾ-(ə)(n)//

| /kʰumɑɾ-(ə)(**n**)/ | | REALIZE | DEP(SKEL) | MAX(MEL) | PARSE |
|---|---|---|---|---|---|
| a. ☞ | kʰu.mɑɾ-(ə)(n) | | | | ** |
| b. | kʰu.mɑ.ɾ**ən** | | *!* | | |
| c. | kʰu.mɑ.ɾ**ə** | | *! | *! | |
| d. | kʰu.mɑɾ**n** | | *! | *! | |
| e. | kʰu.mɑɾ | *! | | *!* | |

[16] As a reviewer points out, because of bracket erasure, the pre-definite morpheme boundary should be invisible to the post-lexical stratum, thus making *C-C]$_\sigma$ vacuously satisfied. We keep boundaries in the tableaux for illustration.

[17] DEP-ə must outrank NOCODA, otherwise the language would not have any codas.

b. *Post-lexical level*:
//kʰumaɾ-(ə)(n)// → [kʰumaɾ-ə]

| kʰu.maɾ-(ə)(**n**) | | REALIZE | PARSE | ONSET | DEP-Ə | DEP(SKEL) | NOCODA | MAX(MEL) |
|---|---|---|---|---|---|---|---|---|
| a. | kʰu.maɾ-(ə)(**n**) | | *!* | | | | | |
| b. | kʰu.ma.ɾə**n** | | | | | **! | * | |
| c. ☞ | kʰu.ma.ɾə | | | | | * | | * |
| d. | kʰu.maɾ**n** | | | | | * | *!* | * |
| e. | kʰu.maɾ | *! | | | | | | ** |
| f. | kʰu.ma.ɾə'**n** | | | | *! | ** | * | * |

For the post-lexical stratum, I have found no evidence of MAX(MEL) outranking any other constraint. I treat this constraint as low-ranked and inactive. I do not show it in later tableaux. Because DEP(SKEL) outranks MAX(MEL), the floating segments in the definite suffix are hero ghosts (Lindsey 2019) or appearing ghosts (Zimmermann 2019). The ghosts are deleted by default. At least one surfaces to satisfy REALIZEMORPHEME, and the choice of segment is based on minimizing the violations of ONSET and NOCODA.

The above is for words in isolation. In cliticization, we start to see the apparent outwardly-sensitive allomorphy thanks to late docking. For a V-final base, the lexical level will add the floating suffix without any docking: //gɑdu-(ə)(n)//. In the post-lexical level, the clitic is added. The floating nasal is docked to provide an onset to the clitic: [gɑdu-n=e]. The schwa is deleted because it would create ONSET violations. We show just the post-lexical derivation.

(17) *Deriving the definite suffix for V-final bases before clitics*: [gɑdu-n=e] 'cat-DEF=is'

a. *Lexical level*:
/gɑdu-(ə)(n)/ → //gɑdu-(ə)(n)// 'cat-DEF (the cat)'

b. *Post-lexical level*:
//gɑdu-(ə)(n)=e// → [gɑdu-n=e] 'cat-DEF=is (is the cat)'

| //gɑdu-(ə)(**n**)=e// | | REALIZE | PARSE | ONSET | DEP(SKEL) | NOCODA |
|---|---|---|---|---|---|---|
| a. | gɑ.du-(**ə**)(**n**)=e | | *!* | *! | | |
| b. | gɑ.du.**ə**.**n**e | | | *! | ** | |
| c. | gɑ.du.**ə**.e | | | *!* | * | |
| d. ☞ | gɑ.du.**n**e | | | | * | |
| e. | gɑ.du.e | *! | | *! | | |

For a C-final word, again the lexical level outputs an identical input with the floating segments intact: //kʰumaɾ-(ə)(n)//. In the post-lexical level, the nasal is docked to provide an onset to the clitic: [kʰumaɾ-n=e]. The schwa is not docked (candidate b,c) because DEP(SKEL) outranks NOCODA.

(18) *Deriving the definite suffix for C-final bases before clitics*:
[kʰumaɾ-n=e] 'amount=DEF=is'

a. *Lexical level*:
/kʰumaɾ/ → //kʰumaɾ-(ə)(n)// 'amount-DEF (the amount)'

b. *Post-lexical level*:
//kʰumaɾ-(ə)(n)=e// → [kʰumaɾ-n=e] 'amount-DEF=is (is the amount)'

| //kʰu.maɾ-(**ə**)(**n**)=e// | REALIZE | PARSE | ONSET | DEP(SKEL) | NOCODA |
|---|---|---|---|---|---|
| a. kʰu.maɾ-(**ə**)(**n**)=e | | *!* | *! | | * |
| b. kʰu.maɹ.**ɾə.n**e | | | | **! | |
| c. kʰu.maɹ.**ɾə**.e | | | *! | * | |
| d. ☞ kʰu.maɾ.**n**e | | | | * | * |
| e. kʰu.maɹ.ɾe | *! | | | | |

As we see, the above floating analysis reduces the outwardly-sensitive allomorphy of the definite suffix into an epiphenomenal result. The outward-sensitivity allomorphy is epiphenomenal because it is an indirect consequence of lexical abstraction and syllabification. There has been a growing body of which work has argued that apparent outwardly-sensitive allomorphy (Hannahs & Tallerman 2006; Kikuchi 2006; Bonet et al. 2007; Deal & Wolf 2017; Brinkerhoff 2019) can be reduced to the interaction of floating segments (Scheer 2016; Lindsey 2019; Ulfsbjorninn 2020; Kiparsky 2021). The fact that the Armenian data can seamlessly integrate with this body of work is a further conceptual argument for this analysis.

In sum, above analysis can capture the bizarre behavior of the definite suffix in Western Armenian. It captures the apparent outwardly-sensitive allomorphy without violating our lexical-postlexical division, and without needing to postpone the spell-out of word-level morphology. The cost is the need for more abstract representations that utilize floating segments, and the need to make docking be a post-lexical process. These assumptions are not cross-linguistically problematic. The next section explores dialectal variation in post-lexical docking.

## 5 Dialectal variation in resyllabification and allomorphs

The data and analysis so far concern the allomorphy of the definite in isolation and in cliticization. We analyzed the outward-sensitivity by utilizing floating segments. In this section, we show how definite allomorphy shows dialectal variation in phrasal resyllabification between Western and

Eastern Armenian (§5.1), and in the ability to dock multiple segments in Iranian (§5.2). The variation shows that the domain of docking is truly post-lexical.

## 5.1 Phrase-level allomorphy in Western vs. Eastern Armenian

Eastern Armenian is a standard dialect of Armenian, as spoken in Yerevan, the capital Republic of Armenia (Dum-Tragut 2009). It is primarily spoken in the Republic of Armenia, Russia, and Georgia. It is the formal register of Armenian in Iran. Data is primarily taken from my fieldwork with members of the Eastern Armenian diaspora in California. I first go over the basic distribution of the definite suffix in Eastern (§5.1.1). I formalize this distribution based on phrasal resyllabification (§5.1.2), which has independent evidence in the language (§5.1.3).

### 5.1.1 Distribution of the definite's surface forms

Western and Eastern Armenian have some differences in their phonology and morphology, but they have large similarities. For example, the possessive suffixes display the same pattern of schwa epenthesis in isolation and in cliticization (**Table 12**).[18]

| | **V-final 'cat'** | | **C-final 'amount'** | | |
|---|---|---|---|---|---|
| | **Western** | **Eastern** | **Western** | **Eastern** | |
| Base | gadu | katu | kʰumaɾ | gumaɾ | |
| Suffixed | gadu-**s** | katu-**s** | kʰumaɾ-**əs** | gumaɾ-**əs** | 'X-my' |
| Cliticized | gadu-**s** = ɑl | katu-**s** = el | kʰumaɾ-**əs** = ɑl | gumaɾ-**əs** = el | 'X-my = also' |
| | gadu-**s** = e | katu-**s** = e | kʰumaɾ-**əs** = e | gumaɾ-**əs** = e | 'X-my = is' |

**Table 12:** Western and Eastern behave the same with the possessives in isolation and cliticization.

The definite suffix likewise behaves the same in both lects in isolation and in cliticization (**Table 13**).

| | **V-final 'cat'** | | **C-final 'amount'** | | |
|---|---|---|---|---|---|
| | **Western** | **Eastern** | **Western** | **Eastern** | |
| Base | gadu | katu | kʰumaɾ | gumaɾ | |
| Suffixed | gadu-**n** | katu-**n** | kʰumaɾ-**ə** | gumaɾ-**ə** | 'X-my' |
| Cliticized | gadu-**n** = ɑl | katu-**n** = el | kʰumaɾ-**n** = ɑl | gumaɾ-**n** = el | 'X-my = also' |
| | gadu-**n** = e | katu-**n** = e | kʰumaɾ-**n** = e | gumaɾ-**n** = e | 'X-my = is' |

**Table 13:** Western and Eastern behave the same with the definite in isolation and cliticization.

[18] The 2SG possessive suffix is /-t/ in Eastern and Iranian, contra the Western /-tʰ/.

Differences emerge in connected speech before other words. The definite essentially ignores the following word in Western Armenian, but it is sensitive to following V-initial words in Eastern Armenian. For V-final words, the definite suffix surfaces as [-n] in both lects, both before V-initial and C-initial words (19-i,ii). But for C-final words, the dialects differ. In Western Armenian, the definite suffix surfaces as [-ə] before V-initial words: *kʰumaɾ-ə aɾi* (19a-iv). In contrast in Eastern Armenian, the suffix is [-n] before V-initial words: *gumaɾ-n ara* (19b-iv) (Խաչատրյան 1988: 58).

(19) *Outwardly-sensitive allomorphy in connected speech*

a. Western Armenian

i. gɑdu-**n** desɑ
cat-DEF saw.PST1SG
'I saw the cat.'

ii. gɑdu-**n** ɑɾi
cat-DEF took.PST1SG
'I took the cat.'

iii. kʰumɑɾ-**ə** desɑ
amount-DEF saw.PST1SG
'I saw the amount.'

iv. kʰumɑɾ-**ə** ɑɾi
amount-DEF took.PST1SG
'I took the amount.'

b. Eastern Armenian

i. kɑtu-**n** tesɑ
cat-DEF saw.PST1SG
'I saw the cat.'

ii. kɑtu-**n** ɑrɑ
cat-DEF bought.PST1SG
'I bought the cat.'

iii. gumɑɾ-**ə** tesɑ
amount-DEF saw.PST1SG
'I saw the amount.'

iv. gumɑɾ-**n** ɑrɑ
amount-DEF bought.PST1SG
'I bought the amount.'

On the surface, the above data indicate that definite allomorphy is outwardly-sensitive in both lects. But this outward sensitivity is restricted to V-initial clitics in Western Armenian, while it also applies before V-initial words in Eastern Armenian.[19] I analyze this variation in terms of phrasal resyllabification, which I argue is allowed only in Eastern Armenian.[20] That is, the definite suffix surfaces as [-n] in Eastern Armenian in order to provide an onset for the subsequent V-initial word (Ղարագյուլյան 1974: 156). Phrasal resyllabification is reported to occur in Eastern Armenian even for morphemes besides the definite (Առաքելյան 1955: 54).

[19] Early grammars of early Western Armenian report that the definite suffix was able to optionally show outward-sensitivity to the following V-initial word (Քիրէճճեան 1864: 91; Տօնէլեան 1899: 73; Kogian 1949: 29; Տասնապետեան 1990: 121–2). But some state that this was restricted to literary or poetic speech, not in natural speech. In any case, these generalizations no longer apply to modern Western.

[20] Alternatively, we could argue that there is an additional stratum or cophonology that sits between the lexical level and the post-lexical level (Rubach 2016), wherein cliticization can apply. For Western Armenian, docking is inactive in the lexical level, but is turned on in the clitic level. In Eastern Armenian, docking would be inactive in the lexical and clitic level, but then turned on in the post-lexical level. Evidence for this approach would depend on finding evidence for/against phrasal resyllabification in Western Armenian.

To illustrate this dialectal difference, the Eastern examples in **Table 14** were elicited from my informants. I provide the Western form alongside them. In each of these examples, the first word ends in the the definite suffix. The suffix is between a C-final base, and a V-initial word. The suffix surfaces as [n] in Eastern, but as [ə] in Western.

| | | | | | | |
|---|---|---|---|---|---|---|
| Eastern: | pənɑk-**n** | ɑrt͡sɑtʰ = e | gevorkʰ-**n** | ɑrjut͡s-n = e | kɑpik-**n** | urɑχ = e |
| Western: | bənɑg-**ə** | ɑrd͡zɑtʰ = e | kʰevorkʰ-**ə** | ɑruj**d͡z**-n = e | gɑbig-**ə** | urɑχ = e |
| Gloss: | plate-DEF | silver = is | Gevork-DEF | lion-DEF = is | monkey-DEF | happy = is |
| Translation: | 'The plate is silver.' | | 'Gevork is the lion.' | | 'The monkey is happy.' | |

**Table 14:** Allomorphy conditioned by the following word in Eastern but not Western.

More evidence for the role of phrasal resyllabification comes from variable cliticization and focal pauses. For cliticization, Western Armenian uses the focus-operator ɑl 'also' and the copula *e* 'is', along with its inflected forms *em* 'am', and so on. These morphemes are invariably cliticized to their base, trigger resyllabification, and cause the definite to surface as [n]. But there are some morphemes which are variably clitics. For example, the conjunction *u* 'and' can either cliticize (20a) or not (20b). When cliticized, it is syllabified with the base and causes the definite to surface as [n] (20c) (Khanjian 2013: 26). When the conjunction is not cliticized, the definite suffix does not display any outwardly-sensitive surface forms (20d).

(20) *Variable cliticization of* [u] *and definite allomorphy in Western Armenian*

a. ɑχ.t͡ʃi.g = u də.ʁɑ
girl = and boy

b. ɑχ.t͡ʃig u də.ʁɑ
girl and boy
'Girls and boys.'

c. ɑχ.t͡ʃig-**n** = u də.ʁɑ-**n**
girl-DEF = and boy-DEF

d. ɑχ.t͡ʃi.g-**ə** u də.ʁɑ-**n**
girl-DEF and boy-DEF
'The girl and the boy.'

The above data shows that in order for the definite to show outward-sensitivity in Western Armenian, the outward morpheme must be prosodically incorporated into the PWord of the base word.[21]

[21] Besides the conjunction, early grammars of early Western Armenian report that the functional morphemes *isk* 'as for', *aŋkʰam* 'even', *i ver* 'up to', and *i var* 'down' could cliticize onto the definite suffix and trigger the [n] allomorph

The second piece of evidence comes from focus and pauses in Eastern Armenian. For a C-final word, if the definite suffix precedes a pause, then the suffix surfaces as [-ə] (21b). The subsequent word surfaces without an onset. This happens clearly when the subsequent word has narrow focus and prosodic prominence (Խաչատրյան 1988: 58; Dum-Tragut 2009: 105). Narrow focus creates longer pauses around the focused word in Eastern Armenian (Skopeteas 2021). The prefocal pause prevents the outward-sensitivity and resyllabification of the definite suffix.[22]

(21) *Effects of focus and pauses in Eastern Armenian allomorphy*

a. gu.mɑɾ-**n** ɑ.rɑ
amount-DEF bought.PST1SG
'I bought the amount.'

b. gu.mɑ.ɾ-**ə** ɑ.rɑ
amount-DEF bought.PST1SG
'I BOUGHT the amount.'

On the surface, the Eastern Armenian data look like phrasal allomorphy, meaning allomorphy that is conditioned across words (Condoravdi 1990; Hayes 1990; Peperkamp 1997: ch5.5; Henderson 2012; McPherson 2019; Royer 2021). However, I argue that such apparent phrasal allomorphy is epiphenomenal. The surface forms of the definite suffix in Eastern Armenian are determined from the same single underlying form /-(ə)(n)/. The apparent allomorphy is caused by the interaction of these latent segments with phrasal resyllabification and prosodic alignment. The next section formalizes this intuition.

### 5.1.2 Formalizing the distribution with phrasal resyllabification

The previous section displayed the wide array of surface forms of the definite suffix in Eastern Armenian. I capture this distribution with an alignment constraint on phrasal resyllabification. The constraint ALIGN requires that prosodic words are aligned with the first segment of their corresponding morphological words. This constraint is violated by phrasal resyllabification. This constraint outranks ONSET in Western Armenian, thus blocking resyllabification. In contrast in Eastern Armenian, ONSET outranks ALIGN, thus triggering resyllabification. The constraint ALIGN-FOC is high-ranked and blocks the resyllabification of a focused word.

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(Տօնէլեան 1899: 91; Տօնէլեան 1902: 128; Gulian 1902: 6; Տասնապետեան 1990: 121). These morphemes no longer cliticize onto words, and thus don't trigger the outward-sensitivity anymore.

[22] Focal pauses can likewise occur after the focused word (Skopeteas 2021: 33ff). Such pauses also block definite allomorphy: *aram-ə asat͡sʰ* 'Aram said' (Մկրտչյան 2015: 39).

(22) *Constraints for phrasal resyllabification and its effects on the definite suffix*

a. ALIGN: Assign a violation if the left-edge of a prosodic word is not aligned with the left-edge of its morphological word.

b. ALIGN-FOC: Assign a violation if the left-edge of a focused prosodic word is not aligned with the left-edge of its morphological word.

(23) *Constraint rankings across Western and Eastern in the post-lexical level*

a. *Western*: ALIGN-FOC, ALIGN > > ONSET

b. *Eastern*: ALIGN-FOC > > ONSET > > ALIGN

In the tableaux below, I use {} to mark MWords in the input. PWords are separated via spacing in the candidates.

For C-final words in connected speech, the ALIGN constraint outranks ONSET in Western Armenian. This means that the definite suffix surfaces as [-ə] and not as [-n] before V-initial words (candidate d). If the suffix surfaced as [-n], it cannot resyllabify with the following word because of high-ranking ALIGN (f). But if it stayed inside the PWord of the base, then it would not be syllabified with the base because of NOCODA (candidate e). Docking both the schwa and nasal (b,c) is harmonically bounded by the other candidates.

(24) *Western Armenian: Blocking nasal between C-final and V-initial word* ((19)a-iv)

| //{kʰu.mɑɾ-(ə)(**n**)} {ɑ.ɾi}// | | PARSE | ALIGN-FOC | ALIGN | ONSET | DEP(SKEL) | NOCODA |
|---|---|---|---|---|---|---|---|
| a. | kʰu.mɑɾ-(ə)(**n**) ɑ.ɾi | *!* | | | * | | * |
| b. | kʰu.mɑ.ɾ**ən** ɑ.ɾi | | | | * | **! | * |
| c. | kʰu.mɑ.ɾ**ə** **n**ɑ.ɾi | | | *! | | ** | |
| d. ☞ | kʰu.mɑ.ɾ**ə** ɑ.ɾi | | | | * | * | |
| e. | kʰu.mɑɾ**n** ɑ.ɾi | | | | * | * | *!* |
| f. | kʰu.mɑɾ **n**ɑ.ɾi | | | *! | | * | * |

In contrast for Eastern Armenian, the definite suffix surfaces as [-n] before V-initial words (candidate f). The suffix is not [-ə], because high-ranking ONSET is violated by the following word (d). When the suffix surfaces as [-n], it has to resyllabify with the following word to provide an onset for it. The nasal cannot stay inside the base PWord (e). The suffix does not surface as [-ən] with both segments docking (b,c). Although the schwa would resolve a NOCODA violation for the root's final C, the constraint DEP(SKEL) outranks NOCODA.

(25) *Eastern Armenian: Deriving nasal between C-final word and non-focused V-initial word* ((19)b-iv)

| //{gu.mar-(ə)(**n**)} {a.ra}// | | PARSE | ALIGN-FOC | ONSET | ALIGN | DEP(SKEL) | NOCODA |
|---|---|---|---|---|---|---|---|
| a. | gu.mar-(ə)(**n**) a.ra | *!* | | * | | | * |
| b. | gu.ma.ɾə**n** a.ra | | | *! | | ** | * |
| c. | gu.ma.ɾə **n**a.ra | | | | * | **! | |
| d. | gu.ma.ɾə a.ra | | | *! | | * | |
| e. | gu.marn a.ra | | | *! | | * | ** |
| f. ☞ | gu.mar **n**a.ra | | | | * | * | * |

However if the following word is focused, then it cannot resyllabify with the definite suffix (candidate f). This is due to the high-ranking constraint on maintaining the alignment of focus material. The definite suffix must surface as the schwa inside the base's PWord (d).

(26) *Eastern Armenian: Blocking nasal between C-final word and focused V-initial word* (21b)

| //{gu.mar-(ə)(**n**)} {a.ra}// | | PARSE | ALIGN-FOC | ONSET | ALIGN | DEP(SKEL) | NOCODA |
|---|---|---|---|---|---|---|---|
| a. | gu.mar-(ə)(**n**) a.ra | *!* | | * | | | * |
| b. | gu.ma.ɾə**n** a.ra | | | * | | **! | * |
| c. | gu.ma.ɾə **n**a.ra | | *! | | * | ** | |
| d. ☞ | gu.ma.ɾə a.ra | | | * | | * | |
| e. | gu.marn a.ra | | | * | | * | *!* |
| f. | gu.mar **n**a.ra | | *! | | * | * | * |

Little is known about the prosodic structure of sentences with narrow focus in Armenian. Thus, I do not know if a focused word is necessarily parsed into a separate prosodic phrase (Féry 2013), or if focus requires movement to some special syntactic slot (Samek-Lodovici 2005). I remain agnostic. I use the constraint ALIGN-FOC (Truckenbrodt 1999) which somehow has access to knowing whether some word is focused or not, such as by having a [+focus] feature.

The above resyllabification effects are visible for C-final bases. But they are superfluous for V-final bases. For V-final words before V-initial words, the definite suffix surfaces as [-n] in both dialects but it surfaces inside different prosodic words. The nasal is resyllabified as an onset for the subsequent word in Eastern Armenian (27a), thus causing the nasal to dock. While in Western Armenian, the nasal is docked inside base word (27b). The different outcomes come

from the different constraint rankings for ALIGN and ONSET. The schwa is not surfaced because it would create ONSET violations.

(27) *Superfluously deriving the nasal between V-final word and V-initial word*

a. *Eastern Armenian with phrasal resyllabification* (19b-ii)

| //{kɑ.tu-(ə)(**n**)} {ɑ.rɑ}// | | PARSE | ONSET | ALIGN | DEP(SKEL) | NOCODA |
|---|---|---|---|---|---|---|
| a. | kɑ.tu-(ə)(**n**) ɑ.rɑ | *!* | * | | | |
| b. | kɑ.tu.**ən** ɑ.rɑ | | *!* | | ** | * |
| c. | kɑ.tu.**ə** **n**ɑ.rɑ | | *! | * | ** | |
| d. | kɑ.tu.**ə** ɑ.rɑ | | *!* | | * | |
| e. | kɑ.tu**n** ɑ.rɑ | | *! | | * | * |
| f. ☞ | kɑ.tu **n**ɑ.rɑ | | | * | * | |

b. *Western Armenian without phrasal resyllabification* (19a-ii)

| //gɑ.du-(ə)(**n**) ɑ.ɾi// | | PARSE | ALIGN | ONSET | DEP(SKEL) | NOCODA |
|---|---|---|---|---|---|---|
| a. | gɑ.du-(ə)(**n**) ɑ.ɾi | *!* | | * | | |
| b. | gɑ.du.**ən** ɑ.ɾi | | | **! | ** | * |
| c. | gɑ.du.**ə** **n**ɑ.ɾi | | *! | * | ** | |
| d. | gɑ.du.**ə** ɑ.ɾi | | | **! | * | |
| e. ☞ | gɑ.du**n** ɑ.ɾi | | | * | * | * |
| f. | gɑ.du **n**ɑ.ɾi | | *! | | * | |

In this way, phrasal resyllabification can model how the definite suffix shows outward-sensitivity to lexical words in Eastern Armenian, but not Western Armenian.

### 5.1.3 Phrasal resyllabification elsewhere in the language

The above distinction between Western and Eastern Armenian relied on phrasal resyllabification. This section presents additional data on phrasal resyllabification.

Unfortunately to my knowledge, there is no independent articulatory or acoustic data available on phrasal resyllabification in any Armenian lect. For the most part, data on resyllabification is limited to perception and to the definite suffix's surface forms. For example, in the examples in **Table 15**, some of my Eastern Armenian informants felt that they were resyllabifying the base-final consonant. For Western Armenian, myself and other speakers did not perceive any resyllabification.

| | Eastern Armenian | | Western Armenian | |
|---|---|---|---|---|
| | kɑpik | ɑrɑ | gɑbig | ɑɾi |
| | [kɑ.pi | kɑ.rɑ] | [gɑ.big. | ɑ.ɾi] |
| Gloss: | monkey | bought.PST1SG | monkey | took.PST1SG |
| Translation: | ‘I bought a monkey.’ | | ‘I took a monkey.’ | |
| | kɑtu-s | ɑrɑ | gɑdu-s | ɑɾi |
| | [kɑ.tu | sɑ.rɑ] | [gɑ.dus. | ɑ.ɾi] |
| Gloss: | cat=my | bought.PST1SG | cat=my | took.PST1SG |
| Translation: | ‘I bought my cat.’ | | ‘I took my cat.’ | |

**Table 15:** Perceiving resyllabification outside of the definite suffix.

Sibilants provide a systematic and independent piece of evidence for phrasal resyllabification in Eastern Armenian. For words in isolation (**Table 16**), word-initial sibilant-stop clusters obligatorily undergo schwa prothesis in Western Armenian: [əs.pɑ.sel] ‘to receive’. In Eastern Armenian, schwa prothesis is optional: [(ə)spɑ.sel]. For Eastern Armenian, the schwa-less forms are more common than the prothetic forms (Vaux 1998: 24ff; Dum-Tragut 2009: 31).

| | ‘to wait’ | ‘sponge’ | ‘to receive’ | ‘low’ | ‘beginning’ | ‘to feel’ |
|---|---|---|---|---|---|---|
| Eastern | [spɑ.sel] | [spuŋg] | [stɑ.nɑl] | [stoɾ] | [skizb] | [zgɑl] |
| Western | [əs.pɑ.sel] | [əs.puŋkʰ] | [əs.tɑ.nɑl] | [əs.toɾ] | [əs.kisp] | [əs.kɑl] |

**Table 16:** Schwa prothesis in Western vs. Eastern Armenian.

Alongside this variable prothesis, the initial sibilant can resyllabify with the preceding word in connected speech (Աբեղյան 1933: 62ff; Հովհաննիսյան 2012: 103ff). For example, Vaux (1998: 113) reports that the initial sibilant can resyllabify as a coda to a preceding dorsal or sonorant. **Table 17** shows data and syllabification patterns from Vaux.

Based on the data, Vaux (1998: 84) argues that the word-initial sibilant is prosodically an appendix that is attached to the prosodic phrase when phrase-initial. Phrase-medially, it resyllabifies to the previous word’s rime if phonotactically possible. Such systematic and perceptible sibilant resyllabification is not reported in Western Armenian.

| **Gloss:** | **you.DEF** | **are.1PL** | **waiting** |
|---|---|---|---|
| Underlying form: | /kʰez | enkʰ | spɑsum/ |
| Surface: | [ke. | zeŋkʰs. | pɑ.sum] |
| Translation: | ‘We are waiting for you’ | | |

**Table 17:** Sibilant resyllabification in Eastern Armenian from Vaux (1998: 113).

We see a transparent interaction between sibilant resyllabification and the definite suffix in Eastern Armenian (Dum-Tragut 2009: 32ff). In the sentences in **Table 18**, the definite suffix is underlyingly between a C-final base and a sibilant-initial word. If schwa prothesis does apply before the sibilant, then the definite suffix surfaces as [n] and is syllabified with a prothetic schwa. I represent epenthetic segments with the apostrophe. In contrast, if there is no prothesis, then the sibilant is resyllabified with the previous word. The definite suffix surfaces as [ə] to host both the preceding consonant and the sibilant.

| **Gloss:** | **amount-DEF** | **received.PST1SG** |
|---|---|---|
| Underlying form: | /gumaɾ-(**ə**)(**n**) | staʦ͡ = a/ |
| With prothesis: | [gu.maɾ. | **n**ə’s.ta.ʦ͡ʰa] |
| Without prothesis: | [gu.ma.ɾəs. | ta.ʦ͡ʰa] |
| Translation: | ‘I received the amount.’ | |

**Table 18:** Eastern Armenian: Phrasal resyllabification and variable prothesis before sibilants.

I do not formalize the interaction between sibilant resyllabification and definite allomorphy. Because the data is so limited, it is unclear to me what phonotactic conditions or constraints cause variation in resyllabification. What is clear for our purposes is that sibilants provide independent evidence for resyllabification. And their resyllabification patterns transparently interact with definite allomorphy.

In sum, we see how phrasal resyllabification feeds definite allomorphy in Eastern Armenian, thanks to ALIGN outranking ONSET. No such effects are found in Western because of the reverse ranking ONSET >> ALIGN. Thus all this dialectal variation is reducible to variation in the ranking of alignment constraints.

## 5.2 Double-docking in Iranian Armenian

The previous section provided data from Eastern and Western on inter-word conditions on the surface forms of the definite suffix. Such variation in outwardly-sensitive surface forms was formalized with floating segments. However, the preceding data itself did not provide evidence for an analysis based on floating segments over an analysis based on late spell-out or simultaneous spell-out. Such evidence comes from Iranian Armenian.

Iranian Armenian is the spoken vernacular of the Armenians of Tehran, Iran. It is an offshoot of Eastern Armenian. In Iran, the Iranian lect is spoken as an informal register, while Eastern is spoken as a formal register within literary or official contexts. Iranian Armenian is also called Persian Armenian or Tehrani Armenian. It is also spoken by Armenians of the Iranian diaspora, especially in Los Angeles. Data is taken from joint fieldwork with members of the diaspora in the US (Dolatian et al. prep).

Like Eastern and Western Armenian, Iranian Armenian displays the same patterns of schwa epenthesis for possessive suffixes in isolation and cliticization (**Table 19**). In all three lects, a schwa is epenthesized after C-final bases, and the schwa stays constant even before clitics.

| | **V-final base 'cat'** | | | **C-final base 'amount'** | | | |
|---|---|---|---|---|---|---|---|
| | **West.** | **East.** | **Iran.** | **West.** | **East.** | **Iran.** | |
| Base | gadu | katu | kɒtu | kʰumar | gumar | gumɒɻ | |
| Suffixed | gadu-**s** | katu-**s** | kɒtu-**s** | kʰumar-**əs** | gumar-**əs** | gumɒɻ-**əs** | 'X-my' |
| Cliticized | gadu-**s**=al | katu-**s**=el | kɒtu-**s**=el | kʰumar-**əs**=al | gumar-**əs**=el | gumɒɻ-**əs**=el | 'X-my=also' |
| | gadu-**s**=e | katu-**s**=e | kɒtu-**s**=ɒ | kʰumar-**əs**=e | gumar-**əs**=e | gumɒɻ-**əs**=ɒ | 'X-my=is' |

**Table 19:** Possessives and epenthesis in Western, Eastern, and Iranian Armenian.

Like the two other lects, Iranian Armenian uses the definite allomorphs [-ə, -n] for words in isolation, with [-ə] after C-final words, and [-n] after V-final words. Differences emerge however in connected speech and cliticization (**Table 20**). For V-final words, the definite suffix surfaces as [-n] before V-initial clitics. But for C-final words, the suffix surfaces as [-ən] before V-initial clitics. This is in contrast to Western and Eastern which both use only [-n].

| | **V-final base** | | | **C-final base** | | | |
|---|---|---|---|---|---|---|---|
| | **West.** | **East.** | **Iran.** | **West.** | **East.** | **Iran.** | |
| Base | gadu | katu | kɒtu | kʰumar | gumar | gumɒɻ | |
| Suffixed | gadu-**n** | katu-**n** | kɒtu-**n** | kʰumar-**ə** | gumar-**ə** | gumɒɻ-**ə** | 'X-DEF' |
| Cliticized | gadu-**n**=al | katu-**n**=el | kɒtu-**n**=el | kʰumar-**n**=al | gumar-**n**=el | gumɒɻ-**ən**=el | 'X-DEF=also' |
| | gadu-**n**=e | katu-**n**=e | kɒtu-**n**=ɒ | kʰumar-**n**=e | gumar-**n**=e | gumɒɻ-**ən**=ɒ | 'X-DEF=is' |
| | 'cat' | | | 'amount' | | | |

**Table 20:** Definite allomorphy in Western, Eastern, and Iranian Armenian.

Unlike the other lects, Iranian uses a novel surface form [-ən] between a C-final base and a V-initial clitic. Like Eastern, Iranian has the definite suffix be sensitive to the following word (**Table 21**). Again, we find that the definite suffix is [-ən] between a C-final word and V-initial word. In contrast, Eastern Armenian uses only [-n], while Western has the definite be blind to connected speech and surface as [-ə].

| | | |
|---|---|---|
| Iranian: | mɒɻtʰ-**ən** | ɒɻtʰnɒt͡sʰɒv |
| Eastern: | mɑɾtʰ-**n** | ɑɾtʰnɑt͡sʰɑv |
| Western: | mɑɾtʰ-**ə** | ɑɾtʰənt͡sɑv |
| Gloss: | man-DEF | woke.up.PST3SG |
| Translation: | ‘The man woke up.’ | |

**Table 21:** Different definite allomorphs in connected speech across the three lects.

In sum, the three lects display a sum total of three surface forms of the definite: [-n-, -ə-, -ən-]. These three forms are spread across different morphophonological and syntactic contexts, summarized in **Table 22**. I use # to mark word boundaries. I use the period to indicate the syllable affiliation of the suffix.

| | **Western** | **Eastern** | **Iranian** |
|---|---|---|---|
| V_ | *n.* | | |
| V_ =V | *.n* | | |
| V_ #V | *n.* | *.n* | |
| C_ | *-ə* | | |
| C_ =V | *.n* | | *ə.n* |
| C_ #V | *ə.* | *.n* | *ə.n* |

**Table 22:** Distribution of the definite allomorphs across the three lects.

When seen in terms of floating segments, the Iranian pattern involves making *both* floating segments of the definite suffix surface when between a C-final word and a V-initial clitic/word. That is, whereas Eastern and Western permit docking only one segment, Iranian requires docking both of them. I formalize the Iranian data with a constraint re-ranking of NoCoda and Dep(skel).

(28) *Constraint rankings to block vs. derive docking both segments*

a. *Docking only one floating segment in Western and Eastern*
Dep(skel) >> NoCoda

b. *Docking both floating segments in Iranian*
NoCoda >> Dep(skel)

The effects of this re-ranking is visible only for C-final bases before V-initial clitics and words. Only these contexts can create a coda before the definite. I illustrate this re-ranking with cliticized forms.

Consider C-final bases before V-initial clitics in Eastern Armenian: /gumɑr-(ə)(n)=e/. As before, I skip the lexical stratum because its output does not involve docking. The work is done in the post-lexical stratum. Because of high-ranking REALIZEMORPHEME and PARSE, at least one of the two floating segments must dock in the output. In Western and Eastern Armenian, DEP(SKEL) outranks NOCODA. Cliticized C-final bases thus surface with the suffix morph [-n] instead of [-ən] (candidate d). Both surface forms would provide an onset to the following vowel. The [-ən] form would also resolve the NOCODA violation by resyllabifying the base's final C. However, this comes at the cost of docking both segments (candidate b).

(29) *Deriving the morph* [n] *in Eastern in* C_=V *contexts*

a. *Lexical level*:
/gumɑr-(ə)(n)/ → //gumɑr-(ə)(n)// 'amount-DEF (the amount)'

b. *Post-lexical level*:
//gumɑr-(**ə**)(**n**)=e// → [gumɑr-n=e] 'amount-DEF=is (is the amount)'

| //gu.mɑr-(ə)(n)=e// | | REALIZE | PARSE | ONSET | DEP(SKEL) | NOCODA |
|---|---|---|---|---|---|---|
| a. | gu.mɑr-(**ə**)(**n**)=e | | *!* | * | | * |
| b. | gu.mɑ.ɾə.**n**e | | | | **! | |
| c. | gu.mɑ.ɾə.e | | | *! | * | |
| d. ☞ | gu.mɑr.**n**e | | | | * | * |
| e. | gu.mɑ.ɾe | *! | | | | |

In contrast for Iranian, NOCODA outranks DEP(SKEL). The surface form uses the morph [-ən] where both segments have docked (candidate b). This provides an onset for the following word and resolves the NOCODA violation of the preceding consonant.

(30) *Deriving the morph* [ən] *in Iranian in* C_=V *contexts*

a. *Lexical level*:
/gumɒɻ-(ə)(n)/ → //gumɒɻ-(ə)(n)// 'amount-DEF (the amount)'

b. *Post-lexical level*:
//gumɒɻ-(ə)(n)=ɒ// → [gumɒɻ-ən=ɒ] 'amount-DEF=is (is the amount)'

| //gu.mɒɻ-(**ə**)(**n**)=ɒ// | | REALIZE | PARSE | ONSET | NOCODA | DEP(SKEL) |
|---|---|---|---|---|---|---|
| a. | gu.mɒɻ-(**ə**)(**n**)=ɒ | | *!* | * | * | |
| b. ☞ | gu.mɒ.ɻə.**n**ɒ | | | | | ** |
| c. | gu.mɒ.ɻə.ɒ | | | *! | | * |
| d. | gu.mɒɻ.**n**ɒ | | | | *! | * |
| e. | gu.mɒ.ɻɒ | *! | | | | |

When the base is V-final, the ranking of NoCoda over Dep(skel) does not cause any special behaviors of the definite in Iranian. The definite surfaces as [-n], just as in the other two lects (candidate d). This is because the base doesn't have a final consonant in the first place, so the choice of allomorph won't create a coda.

(31) *Deriving the morph* [n] *in Iranian in* V_ = V *contexts*

a. *Lexical level*:
/kɒtu-(ə)(n)/ → //kɒtu-(ə)(n)// 'cat-DEF (the cat)'

b. *Post-lexical level*:
//kɒtu-(ə)(n)// → [kɒtu-n = ɒ] 'cat-DEF = is (is the cat)'

| kɒ.tu-(**ə**)(**n**) = ɒ | | Realize | Parse | Onset | NoCoda | Dep(skel) |
|---|---|---|---|---|---|---|
| a. | kɒ.tu-(**ə**)(**n**) = ɒ | | *!* | * | | |
| b. | kɒ.tu.**ə.n**ɒ | | | *! | | ** |
| c. | kɒ.tu.**ə**.ɒ | | | *!* | | * |
| d. ☞ | kɒ.tu.**n**ɒ | | | | | * |
| e. | kɒ.tu.ɒ | *! | | | | |

The Iranian data provides clear evidence that the definite suffix has some type of abstract structure that somehow merits the use of both the segments [ə] and [n] in certain cliticized forms. If we used a simple analysis without ghosts, then we would have to postulate that the Iranian underlying form of the suffix now consists of three separate morphs /-ə,-n,-ən/, which are coincidentally all similar to each other.

This completes my discussion of dialectal variation in the definite allomorphy. In sum, dialect specific rankings or settings for phrasal resyllabification and coda avoidance create a wide but organized array of allomorphic patterns. These patterns are outwardly-sensitive, but they can be unified by using a single underlying form /(ə)(n)/. The surface forms are derived via postponing autosegmental docking to the post-lexical level.

# 6 Diachronic and variational factors of the allomorphy

The previous sections provided a large chunk of the morphophonological patterns of the definite suffix. We analyzed its surface forms via floating segments. This section briefly goes through some diachronic and colloquial data, in order to shed further light on how these floating segments behave across Armenian.

## 6.1 Diachronic origins of the definite

The earliest attested variety of Armenian is Classical Armenian (around the fifth century). The modern possessives and definite suffix are reflexes of Classical deictic or demonstrative suffixes

(Olsen 2017: 1088). In traditional pronunciation (Godel 1975: 19; Thomson 1989: 120), the proximal and medial suffixes were respectively *-s,-d* after V-final bases, and *-əs,-əd* after C-final bases (**Table 23**). This is essentially the same as in modern Western Armenian descendants: the 1SG possessive [-(ə)s] and 2SG possessive [-(ə)t$^{h}$], with schwas epenthesized to resolve the consonant cluster.

| | **V-final base** | | **C-final base** | |
|---|---|---|---|---|
| Proximal | i tanē-s | ‘from the house’ | tun-əs | ‘the house’ |
| Medial | k’ari-d | ‘to the stone’ | k’ar-əd | ‘the stone’ |
| Distal | hogi-n | ‘the spirit’ | hogwov-ən | ‘with the spirit’ |

**Table 23:** Demonstrative morphemes in Classical Armenian from Godel (1975: 20).

As for the Modern definite, it is a reflex of the Classical distal suffix. This suffix is *-n* after V-final bases. But for C-final bases, the Classical form had schwa epenthesis as *-ən*, unlike the modern reflex which is just the morph [-ə].

Diachronically for the definite, the set of Classical morphs [-n,-ən] changed to [-ə,-n]. For C-final bases, the final nasal of Classical [-ən] became diachronically reduced or lenited to the extent that it fully deleted in its modern descendants (Khachaturian 1985; Մկրտչյան 2015). For our analysis, this sporadic lenition means that the underlying forms of the definite changed from Classical /-n/ to modern /-(ə)(n)/. The nasal was demoted to a floating segment, while the epenthetic schwa was lexicalized as part of the underlying form.[23]

Similar diachronic changes also appear elsewhere in Armenian. In Western Armenian, the indefinite suffix is *-mə* after both V-final and C-final bases (**Table 24**). But before V-initial clitics, it uses a separate morph *-mən*. No such morph is used before V-initial words.[24]

| | **V-final ‘cat’** | | **C-final ‘amount’** | |
|---|---|---|---|---|
| Base: | gadu | k$^{h}$umar | | |
| Suffixed | gadu-**mə** | k$^{h}$umar-**mə** | ‘X-INDF‘ | ‘a X’ |
| Cliticized | gadu-**mən** = al | k$^{h}$umar-**mən** = al | ‘X-INDF = also’ | ‘also a X’ |
| | gadu-**mən** = e | k$^{h}$umar-**mən** = e | ‘X-INDF = is’ | ‘is a X’ |
| Connected speech | gadu-**mə** ari | k$^{h}$umar-**mə** ari | ‘X-INDF took’ | ‘I took a X’ |

**Table 24:** Indefinite allomorphy in Western Armenian.

[23] Based on the above diachronic origins, Vaux (1998: 112) suggests that the underlying form of the modern definite is /-n/. After C-final bases, the nasal triggers epenthesis but then deletes: /-n/→//-ən//→[-ə]. This analysis however recapitulates the diachronic changes. Cross-linguistically, there are phonologically-conditioned cases of schwa-nasal alternations (Noelliste 2017: 113ff). But in Armenian, such an alternation is limited to just this single morpheme. Such extreme morpheme-specificity renders this analysis indistinguishable from allomorphy (Kiparsky 1996; Haugen 2016).

[24] The indefinite morpheme is a proclitic *mi* in Eastern and proclitic *me* in Iranian. They don’t show any phonologically-conditioned allomorphy.

The distribution of the indefinite is similar to the definite, because both show outward-sensitivity to V-initial clitics.[25] Its underlying form is thus /-mə(n)/, and its floating nasal (n) is docked to provide an onset to the following clitic. This floating segment is a hero ghost or appearing ghost, in that it only surfaces to repair vowel hiatus between the suffix and the clitic (Lindsey 2019; Zimmermann 2019). Diachronically, this indefinite is a reflex of the Classical word *mi* 'one' (Ա ճ ա ռ յ ա ն 1971: vol. 3, 316ff). The nasal must have developed as a floating segment, via analogy to the definite suffix.

## 6.2 Role of social variation

The above data and constraints capture the basic patterns of definite allomorphy in the three Armenian lects that we described. However, there are some cases where we find that one of the lects unexpectedly behaves as the other, depending on sociophonetic variables such as register and speed. We discuss these below.

In Iranian Armenian, the surface morphs of the definite are [-ə,-n,-ən]. This third morph [-ən] is not found in the standard literary speech of Western and Eastern Armenian. For C-final bases before clitics, the usual form of the definite is [-n]. However, in casual and emphatic registers, speakers can optionally use [-ən] (Kogian 1949: 6; Johnson 1954: 40). I demonstrate an example below from my own Western judgments.

(32) *Effect of emphatic speech in Western Armenian*

a. iŋk$^{h}$ -n =e
him -DEF =is
'It is him.'

b. iŋk$^{h}$ -n/ən =e
him -DEF =is
'It is HIM.'

In casual speech, the definite suffix surfaces as [-n] between the C-final base and clitic. But if one is trying to be very emphatic or place contrastive focus on the noun, then it is not uncommon to instead use the surface morph [-ən]. In my judgments, the use of [-ən] is more common when the base has a complex coda. Capturing the above variation requires variable re-rankings of focus-specific versions, such as DEP(SKEL)-FOCUS or NOCODA-FOCUS. Unfortunately, corpus resources are too limited to determine the rate at which such a re-ranking happens. This precludes my ability to determine the prosodic structure of such occurrences.[26]

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[25] As said in §5.1.1, the conjunction /u/ 'and' in Western can variably cliticize after the the definite suffix, thus variably triggering outwardly-sensitivity. But this clitic can never cliticize to the indefinite. The indefinite always surfaces as [-mə] before this conjunction: [gɑdu-mə u ʃun-mə] 'cat-INDF and dog-INDF (a cat and a dog)'. Early grammars report that the indefinite can variably fuse with the following clitic: *mən=al* ~ *m=al* 'INDF=also (also a …)' (Տ ո ւ Է լ ե ա ն 1899: 78). Such fusion generally does not occur in modern Western.

[26] One possibility is that the focused word prefers that its minimal prosodic word ends in a vowel *((iŋk$^{h}$-ə)n=e)* instead of a (complex) coda *((iŋk$^{h}$)-n=e)*.

Another aspect of variation comes from Eastern Armenian. In formal literary Eastern Armenian, the rule is that the definite suffix *must* surface as [n] before a V-initial word, unless the subsequent word is focused or if there's a pause. These rules are indicated in prescriptive and teaching grammars. My informants from Yerevan, Armenia have told me that they were explicitly taught in school to always expone the definite suffix as [-n] before V-initial words unless there is a pause. However, in colloquial Eastern speech, we do find variation in how to expone to definite before V-initial words. I illustrate below.

(33) *Speaker and formality-based variation in Eastern Armenian*

a. gevorkʰ-**n** ɑtɑm-**n** uni

b. gevorkʰ-**ə** ɑtɑm-**n** uni

Gevork-DEF tooth-DEF has.PRS1SG

'Gevork has the tooth.'

In the above sentences, there are two definite suffixes and both precede a V-initial word. Sentence (a) was uttered by a young female informant who was educated in literary Eastern Armenian in Armenia. She produced two nasals, thus showing phrasal resyllabification throughout the sentence. Sentence (b) instead was uttered by a young male informant who was educated in the US, not Armenia, and was thus never taught formal literary Eastern Armenian. He preferred to make the first definite be exponed as a schwa while the second as a nasal. He commented that using two nasals is 'supposed to be the rule'. He felt that using two nasals made the sentence feel more formal, while using only one nasal made the sentence feel more colloquial.

The above data suggests that, although phrasal resyllabification and outward-sensitivity are the default processes for the definite suffix in Eastern Armenian, there are other factors which can variably block the application of phrasal resyllabification and autosegmental docking (Խաչատրյան 1988: 58). In my preliminary work, it seems the choice is conditioned by a combination of prosodic factors, including speech rate, phrasal pauses, topicalization, the type of (complex) coda in the pre-suffix syllable, and the word size of the definite word and subsequent word. Sociolinguistic factors (education and formality) likewise play a large role. More work and data is required to discover the exact factors and rates of outwardly-sensitivity in casual speech. Such variation would ultimately be formalizable as a variable weighting or variable ranking of ALIGN and ONSET.

On a last note, this paper looked at definite allomorphy in only three Armenian lects: Western, Eastern, and Iranian. But there are other Armenian lects which show different alternations in definite allomorphy after C-final bases. For example, in the Van and Svedia dialects, the definite suffix surfaces as *-n* after vowels. But after consonants, the suffix is a zero suffix in Van (Մկրտչյան 2015: 39); in Svedia, the suffix is covert and it triggers vocalic alternations in the base, such as vowel lengthening or diphthongizations (Vaux 1998: ch8.3). The data suggests

that the definite suffix has been reduced to an underlying /-(n)/ in Van,[27] and to an underlying /-(μ)(n)/ in Svedia with a floating mora. But of course, more data is needed to document the full extent of such allomorphic patterns of the definite suffix across the Armenian family.

## 7 Conclusion

This paper discussed data on the definite suffix of Armenian, across three lects: Western Armenian, Eastern Armenian, and Iranian Armenian. Across these lects, we found that the definite suffix displayed a wide array of possible surface forms. The distribution of these forms was phonologically-conditioned, based on the preceding and following segment. The triggers for the shape of the definite could were distributed across the preceding word, the following clitic, or the following word.

On the surface, the above distribution looks like outwardly-sensitive allomorphy. However, we analyzed this entire range of data by using an abstract underlying that used floating segments. With this abstraction, we can derive the dialectal variation of the suffix. Furthermore, by using floating segments, we can maintain the cyclic nature of Armenian phonology, with strong divisions between lexical and post-lexical strata. By using cyclic spell-out, we are in fact forced into using ghost segments. The alternative would have been to abandon cyclicity and use non-cyclic spell-out. Furthermore, because docking is post-lexical, this requires that the post-lexical stratum has access to morphological information like RealizeMorpheme; otherwise, floating segments wouldn't need to dock.

It is an open question if all cross-linguistic cases of outwardly-sensitive allomorphy can be reduced to floating segments. But at least for the Armenian definite suffix, such a reduction is viable and systematic.

[27] For Van, Dep-ə must dominate RealizeMorpheme. This will block the combination of nasal docking and schwa epenthesis **C-ə'n*.

## Abbreviations

COP = copula, DEF = definite, INDF = indefinite, POSS = possessive, PRS = present, PST = past, SG = 1 singular, PL = plural, TH = theme vowel

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## Competing interests

The author has no competing interests to declare.

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