Phonology of Armenian passives: From pseudo-cyclic stems to cyclic truncation

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Abstract

It is often assumed that the morphophonological derivation of a word is isomorphic to its surface morphotactics and to its abstract morphosemantic structure. On the surface, passive verbs in Armenian provide a counter-example to this assumption. At first glance, the surface exponents of passive verbs seem to depend on the root. In contrast, the morphophonology of the passive depends on the stem of active verbs, not the root. This complex dependency can be easily handled with Output-Output constraints over bound stems (Steriade 2016). Such an analysis is pseudo-cyclic. However, upon closer examination at the morphosemantic dependencies of passives and actives, I ultimately argue that the pseudo-cyclicity is only apparent. I explicitly argue that the stem of active verbs are cyclically contained within passive verbs. In order to explain why the theme vowel of the active stem is absent in the passive, I utilize affix truncation rules from Aronoff (1976), roughly equivalent to contemporary DM's readjustment rules (Trommer 2012b). Data from allosemy and dialectal variation further reinforce the cyclic dependency of passives over actives.

1 Introduction

When we determine the morphological structure of words, a common heuristic is to map the surface order and appearance of morphs into an analogous morphological structure (Baker 1985). This structure would then cyclically map to ever-growing chunks of phonological structure. In this paper, I present data from passive verbs in Armenian which seems to counter this heuristic. On the surface, passive verbs seem morphologically unrelated to active verbs. But there is extensive morphophonological evidence that passive verbs are computed over the bound stem of active verbs. Such a dependency is pseudo-cyclic. But based on both morphosemantic and dialectal data, I argue against a pseudo-cyclic analysis. I instead argue that passive verbs are cyclically derived from

active stems. This cyclically is partially obfuscated by a morphological process of affix truncation, i.e., a readjustment rule.

I summarize the data below. Armenian is an isolate within Indo-European with two standard lects: Western and Eastern Armenian. This paper focuses on Western Armenian with some discussion of dialectal variation. For regular simple verbs, the active is formed by a root, theme vowel, and infinitival. Regular simple verbs fall into one of 3 classes based on the choice of theme vowel: *-e-, -i-, -a-*. The choice of theme vowel is root-conditioned.[1] The passive is formed by directly placing the passive suffix *-v-* after the root. The passive then takes the *-i-* theme vowel.

(1)

a.	tas	'class'	b.	xos-	'$\sqrt{}$speech'
	ta.s-é-l	'to classify'		xo.s-í-l	'to speak'
	tas-v-í-l	'to be classified'		xos-v-í-l	'to be spoken'

Based on the surface exponents, a simple assumption would be that passives are directly derived from roots: *tas* → *tas-v-i-l*. For this root-derived analysis, the passive verb would cyclically contain only the root, and not the active. In the terminology of Stanton (2014, 2015), the root *tas* would *superficially* look like a local base for both active *tas-e-l* and passive *tas-v-i-l*. The active *tas-e-l* would look like a remote base for the passive *tas-v-i-l*.

This simple assumption is problematic for the full range of passive morphophonology and semantics. Contra surface expectations, we argue that passives like *tas-v-i-l* are not derived from roots like *tas*. Instead, we argue for an *active-derived* analysis, whereby the passives are derived from the stem *tas-(e-)* of active verbs. Evidence for this derivation comes from pre-passive epenthesis and vowel reduction. In brief, the passive triggers epenthesis after CC clusters (2a). Simultaneously, destressed high vowels in roots are reduced before active and passive morphology, to either a schwa (2b) or to nothing (2c).

(2) *Interactions of epenthesis and reduction*

a. Epenthesis		b. Reduction to schwa		c. Reduction to deletion with epenthesis	
jérk	'song'	aɣ.múg	'noise'	d͡za.ɣíg	'flower
jer.k-'e-l	'to sing'	aɣ.mə.g-é-l	'to disquiet'	d͡zaɣ.g-é-l	'to ornament'
jer.kə-v-í-l	'to be sung'	aɣ.məg-v-í-l	'to be disquieted'	d͡zaɣ.gə-v-í-l	'to be ornamented'

For active verbs like *d͡zaɣ.gél* (2c), the use of deletion or epenthesis is predictable given the root *d͡za.ɣíg* based on syllable structure. But for the passive *d͡zaɣ.gə.víl*, the interaction of epenthesis and reduction in passives is not transparent. If the passive were derived from the root, then the application of deletion+epenthesis would be unmotivated. A root-based derivation would prefer no deletion at all: **d͡za.ɣəg.víl*. Instead, I argue that the simplest analysis is that shape of the

[1] Verbs with the *-a-* theme vowel not shown because their passivization is complicated by the use of morphomic stems. We set these aside because they are irrelevant for the morphophonology of passives.

root in the passive is the same as in the active: *d͡zaɣ.g-*. Thus morphophonlogically, passive stems are computed from active bound stems, not from roots. This stem-dependence can be formalized Output-Output constraints between bound stems (McCarthy 2005). Such an analysis would be pseudo-cyclic (Steriade 2008) and it would constitute a split-base effect (Steriade 1999).

However, I later argue that there is morphosemantic evidence that passive stems are cyclically computed from active stems. Within Distributed Morphology (Halle and Marantz 1993), this genuine cyclicity can be captured with a readjustment rule that deletes the active's theme vowel before the passive suffix (cf. truncation rules in Aronoff 1976). Armenian thus presents one the few attested cases of affix deletion with visible phonological effects (contra. Kiparsky 1982). The morphophonological dependence between passive and active stems is further cemented by dialectal variation. I argue that this variation cannot be captured with a root-based analysis.

This paper is organized as follows. I analyze the process of pre-passive epenthesis in §2 as a morpheme-specific process that is idiosyncratically caused by the passive. In §3, I switch gears and discuss vowel reduction in Armenian, with a focus on what constraints pick the output of reduction: schwa vs. deletion. I then examine the reduction data for passives in §4. I argue that the data requires us to derive passives from actives, not from roots. In §5, I discuss how this analysis can be formalized within a pseudo-cyclic framework. But based on data from morphosemantics, I argue that pseudo-cyclicity is not general enough to capture all the data. I opt for a cyclic analysis with affix truncation. The argument for cyclicity and for stem-dependence is reinforced in §6, with more data from dialectal variation and rare morphological processes.[2]

2 Epenthesis in passive verbs

As said, active verbs consist of a root, theme vowel, and an infinitival suffix. The corresponding passive simply involves placing the suffix *-v-* after the root. In Western Armenian, the theme vowel is changed to *-i-*.[3] This section goes through the morphophonological processes that are idiosyncratically triggered by the passive.

(3)	a.	gáb	'knot'	b.	zóh	'sacrifice'
		gab-é-l	'to tie'		zoh-é-l	'to sacrifice'
		gab-v-í-l	'to be tied'		zoh-v-í-l	'to be sacrificed'

When the root of a verb ends in a VC sequence, the passive is transparently formed by adding the suffix *-v-*: *aɣ.víl* 'to be salted' (4a). But for Western Armenian, if the root ends in a CC cluster,

[2]For Western Armenian, We do not mark aspiration on consonants, and we transcribe the segments /ɑ,ɛ,ɔ,ɾ,χ,ʁ,ɾ/ as *a,e,o,r,x,ɣ,ṙ*. Armenian citations are Romanized based on the ISO 9985 transliteration system.

[3]Besides passivization, the passive suffix *-v-* can trigger other valency-reducing operations, such as forming reflexives and anti-causatives (Haig 1982; Dum-Tragut 2009). We set these nuanced semantic distinctions aside because they all behave morphophonologically the same.

then the passive triggers schwa epenthesis immediately before it: *zan.kə.víl* 'to be phoned' (4b) (Fairbanks 1948:81-2, Aǧaŕyan 1971:272).

(4) *Epenthesis in passives in Western Armenian*

a. *Final-VC roots*					
áɣ	'salt'	kóts͡	'closed'	tád	'trial'
a.ɣ-é-l	'to salt'	ko.ts͡-é-l	'to close'	ta.d-é-l	'to judge'
aɣ-v-í-l	'to be salted'	kots͡-v-í-l	'to be closed'	tad-v-í-l	'to be judged'
b. *Final-VCC roots*					
zánk	'bell'	jérk	'song'	bad.rast	'prepared'
zan.k-é-l	'to phone'	jer.k-é-l	'to sing'	bad.ras.t-é-l	'to prepare'
zan.kə-v-í-l	'to be phoned'	jer.kə-v-í-l	'to be sung'	bad.ras.tə-v-í-l	'to be prepared'

The trigger for schwa epenthesis here is not phonologically predictable. The CC sequences above can form complex codas, whether morpheme-medially (5a) or across morpheme boundaries (5b). Armenian is primarily a CVCC language. Complex onsets are generally banned, except for *Cj*. Complex codas generally must have falling sonority, though some falling-sonority clusters are marked or dis-preferred such as *rn*. For lists of possible complex codas, see Fairbanks (1948:20) and Vaux (1998:23).

(5) *Sample of licit complex codas*

a. *Complex codas morpheme-internally*					
i**nk**.na.gán	'personal'	ta**rk**.ma.nél	'to translate'	a**st**.vád͡z	'God'
a**nk**.li.já	'England'	ne**rk**.na.jín	'inner'	a**st**.x-ér	'star-PL'
b. *Complex codas across morpheme boundaries*					
ar.t͡su**nk**-nér	'tear-PL'	ʃə.no**rk**-nér	'grace-PL'	ha.ku**st**-nér	'clothes-PL'
je.ra**nk**-nér	'shade-PL'	əs.pʏ**rk**-nér	'diaspora-PL'	i.ma**st**-nér	'meaning-PL'

Thus, it is the passive suffix itself which is idiosyncratically banned from following a CC sequence. This morpheme-specific behavior can be modeled with the following constraint: *CC-PASS. It crucially outranks DEP. Because of this constraint, no epenthesis is triggered after a VC cluster (6b), but we see do epenthesis after a CC cluster (6c). For illustration, I mark epenthetic schwas with an apostrophe throughout our OT tableaux.

(6) a. *CC-PASS: Assign a violation if the passive suffix *-v-* follows a CC cluster

b. *No epenthesis in VC-passive cluster*

tad-v-i-l	*CC-PASS	DEP
a. ☞ tad.vil		
b. ta.də'.vil		∗!

c. *Epenthesis in CC-passive cluster*

zank-v-i-l			*CC-PASS	DEP
a.		zank.vil	*!	
b.	☞	zankə'.vil		*

Another idiosyncrasy is the location of the schwa. After a CC sequence, the passive triggers schwa epenthesis directly before the passive. This creates a syllable structure of *VC.Cə-CV*. This is in contrast to the language-general behavior of schwa epenthesis. Armenian has productive schwa epenthesis (Vaux 1998:ch3). Within a morpheme, an underlying cluster of 3 consonants is syllabified as *V.CəC.CV*.

(7) /maklt͡s-i-l/ 'to climb' /pedrvar/ 'February' /abstamp/ 'rebel'
ma.kəl.t͡síl pe.dər.vár ' a.bəs.támp

Thus, the location of schwa epenthesis in the passive is morphologically idiosyncratic. For illustration, let us assume that the general location of schwa epenthesis is triggered by a constraint against word-medial open *Cə* syllables.[4] In contrast for the passive, let us assume that the location of its schwa is triggered by a morpheme-specific contiguity constraint: CONT-PASS. For the morpheme that precedes the passive passive, this morpheme's final substring must be is contiguous in the input and output. For simplicity, contiguity is calculated both from input to output, and from output to input (Lamontagne 1996; Prince and Smolensky 2004).

(8) *Constraints for pre-passive schwa*

a. CONT-PASS: Before the passive suffix, assign a violation if:
   - a pair of segments is present in both the input and output, and
   - they are contiguous in the input but not the output, or
   - they are contiguous in the output but not the input

b. *...Cə...: Assign a violation for a word-medial open syllable that has a schwa.

In passives, the contiguity constraint ensures that schwas are preferably inserted at the morpheme boundary, and not inside the root (cf. similar morpheme-internal contiguity effects in other languages Kenstowicz 1994; Alber and Plag 2001; Landman 2002; Gouskova 2003; Silverman 2011). Thus, in order to avoid a contiguity violation, the schwa is added between the root and passive in *zan.kə.vil*, and not inside the root **za.nək.vil*.

[4]Capturing the general behavior of schwa epenthesis is a complex task. We set this aside. Various posited analyses for general schwa epenthesis include intermediate syllabic consonants (Vaux 1998), left-to-right syllabification (Levin 1985), and right-to-left syllabification (Orgun 2000, Dolatian prep).

(9) *Epenthesis at morpheme boundaries for passives*

zank-v-i-l		*CC-PASS	CONT-PASS	DEP	*...Cə...
a.	zank.vil	*!			
b.	za.nə'k.vil		*!	*	
c. ☞	zan.kə'.vil			*	*

The above data and generalizations concern Western Armenian. But there is limited dialectal variation for pre-passive epenthesis. In Western Armenian, the passive triggers epenthesis after any CC cluster, regardless if that cluster can form a complex coda (10a) or not (10b). In contrast for Eastern Armenian, it is often reported that epenthesis applies only after unsyllabifiable clusters (10b) (Ġaragyowlyan 1979:162, Vaux 1998:29,82). Note that the theme vowel for passives in Eastern Armenian is *-e-*, not *-i-*.

(10) *Pre-passive epenthesis across Western and Eastern Armenian*

	Western	Eastern	
a.	var.t͡s-é-l	var.d͡z-é-l	'to hire'
	var.t͡sə-v-í-l	vard͡z-v-é-l	'to be hired'
b.	zar.n-é-l	zarn-é-l	'to hit'
	zar.nə-v-í-l	zar.nə-v-é-l	'to be hit'

In terms of constraint ranking, the main difference for Eastern Armenian is that there is no constraint against pre-passive clusters: *CC-PASS. The presence of a pre-passive schwa in words like *zar.nə.vel* is due to language-general constraints on syllabification, e.g., constraints against word-medial *rn* as a complex coda. The location of the pre-passive schwa is still handled by the morpheme-specific contiguity constraint CONT-PASS.[5]

Thus, for Western Armenian, the passive suffix idiosyncratically triggers the epenthesis of a schwa between a root-final CC cluster and itself. Both the trigger and location of the schwa are morphologically idiosyncratic. So far, we have not seen any complications in determining the input to the passive. The OT tableaux so far have just referenced the concatenation of the root and passive morphology, i.e., a root-derived analysis, without any reference to the active verb. The next section presents evidence for an alternative active-derived analysis.

[5]For Eastern Armenian, there is some variation in epenthesis. When the pre-passive CC cluster can form a complex coda, the norm is that there is no epenthesis (Vaux 1998:82). For example, for the active verb *mar.s-é-l* 'to digest', the passive is *mar.sə-v-í-l* in Western, but *mars-v-í-l* in Eastern. But in Eastern Armenian, variable epenthesis is reported for some words: *marsə-v-é-l* (Abeġyan 1933:45-47, Ġaragyowlyan 1979:162, Margaryan 1997:59,64, Ezekyan 2007:38). Ġaragyowlyan (1974:43,168,181) speculates that there is an excrescent schwa in some of these CC-passive words which some speakers phonologize into a full schwa in colloquial speech. There is likewise variation in whether the surface schwa is inside the root or not. I discuss this in footnote 11.

3 Reduction in Armenian

This section presents evidence against the root-based analysis and for the active-derived analysis. The evidence comes from the morphophonological process of destressed high vowel reduction. Before I discuss how reduction behaves in passives, I first go through the general behavior of reduction.

Armenian has final stress, and suffixation triggers stress shift. There is morphophonological evidence that stress is applied cyclically, per suffix (Khanjian 2009). Specifically, when a stressed high vowel in the root loses stress to a derivational suffix, the high vowel is either reduced to a schwa (11a) or deleted (11b). Notice that deletion that can cause voicing assimilation: *kax.ta.jín* 'colonial'

(11) *Destressed reduction in Western Armenian*

a. *Reduction to schwa*					
sírd	'heart'	han.kíst	'comfortable'	d͡zə.núnt	'cardiac'
sór.d-a.jín	'cardiac'	han.kəs.t-u.tjún	'comfortableness'	d͡zə.nən.t-a.gán	'generative'
b. *Reduction as deletion*					
a.mu.sín	'husband'	dəxúr	'sad'	ka.ɣút	'colony'
a.mus.n-a.gán	'marital'	dəx.r-u.tjún	'sadness'	kax.t-a.jín	'colonial'

Such reduction generally does not occur for other types of vowels (12a), or for high vowels that were unstressed in the base (12b).

(12) *Lack of reduction in other morphophonological contexts*

a. *No reduction in unstressed high vowels*					
mə.xí.tar	'comforter'	ku.már	'amount'	ki.ʃér	'night'
məxi.ta.r-é-l	'to comfort'	ku.ma.r-é-l	'to calculate'	ki.ʃe.r-a.jín	'nocturnal'
b. *No reduction in for non-high vowels*					
dar.pér	'different'	a.róxt͡ʃ	'healthy'	hə.bárd	'proud'
dar.pe.r-é-l	'to differentiate'	a.rox.t͡ʃ-u.tjún	'health'	hə.bar.d-a.gán	'boastful'

For this paper, we set aside what morphophonological factors trigger reduction (Dolatian 2020a,b). For that, we assume an ad-hoc constraint *ĭ,ŭ* against destressed vowels. See Khanjian (2009) on how to formalize that constraint with Comparative Markedness (McCarthy 2003), and Dolatian (2020b) on how to do so with constraint conjunction (Lubowicz 2003). What we focus on is the choice of deletion vs. reduction to schwa.

In general, the destressed high vowel surfaces as a schwa. The schwa is necessary whenever deletion would create an unsyllabifiable consonant cluster, such as a complex onset or a non-falling sonority complex coda. The list below organizes the contexts for reduction-to-schwa based on the syllabic shape of the root before a vowel-initial suffix. For example, the destressed high vowel in

monosyllabic roots of the shape *CĭC* will reduce to a schwa before a vowel-initial suffix: *Cə.C-V*. Some of these examples are compounds that use the linking vowel *-a-* (Dolatian 2021).

(13) *Contexts for reduction to schwa*

Cĭ.C-V					
mís	‘meat’	kídz	‘line’	xúl	‘deaf’
mə.s-e.ɣén	‘meat products’	kə.dz-a.gán	‘linear’	xə.l-u.tjún	‘deafness’
CĭC.C-V					
púrt	‘wool’	víʃt	‘affliction’	lúrtʃ	‘serious’
pər.t-e.ɣén	‘woolen goods’	vəʃ.t-a.gán	‘afflicting (adj)’	lər.tʃ-u.tjún	‘seriousness’
V.CĭC.C-V					
je.ɣúnk	‘nail’	xorúrt	‘advice’	sə.núnt	‘nutrition’
je.ɣən.k-a.vór	‘having nails’	xo.rər.t-a.gán	‘adviser’	sə.nən.t-a.gán	‘nutritious’
VC.CĭC.C-V					
an.túnt	‘abyss’	pam.púʃt	‘cyst’	xər.xíntʃ	‘neigh’
an.tən.t-a.gán	‘hellish’	pam.pəʃ.t-a.jín	‘cystic’	xər.xən.tʃ-é-l	‘to neigh’
VC.Cĭ.C-V					
az.nív	‘sincere’	həd.bíd	‘buffoon’	has.míg	‘jasmine’
az.nə.v-u.tjún	‘sincerity’	həd.bə.d-ánk	‘buffoonery’	has.mə.g-a-kár	‘jade’
VCC.Cĭ.C-V					
arp.ʃír	‘drunken’				
arp.ʃə.r-u.tjún	‘drunkenness’				

For illustration, we assume that the schwa in the above derivatives is the output correspondent of the reduced high vowel (cf. reduced schwas in Dutch: van Oostendorp 2011). In other words, the above schwas are not epenthetic (Xačatryan 1966; Khachaturian 1985; Xačatryan 1988). This is contra previous analyses which argued that the schwas in reduced high vowels are actually epenthetic (Vaux 1998; Khanjian 2009).[6]

However, the schwa is deleted in a restricted set of prosodic contexts. We see deletion if deletion would create a syllabifiable consonant cluster. A typical case is for roots of the shape *V.CĭC* where deletion would create heterosyllabic clusters: *VC.C-V*.[7]

[6]We do not have the space to fully provide the data that contradict the epenthesis account. In brief, there are prosodic contexts where schwa epenthesis predicts the incorrect location of reduced schwas. For example, initial sibilant-stop clusters take prothesis under schwa epenthesis: /sk-a-l/ ‘to feel’ → *əs.kal*. But the reduction of sibilant-vowel-stop clusters leads to medial schwas: *súk* ‘grief’ → *sək-a-l* ‘to grieve’. Other contexts are illustrated in the following sections. Essentially, whenever the reduced schwa surfaces in an open syllable, that schwa is not straightforwardly predicted by schwa epenthesis. Alternatively, we can argue that these schwas are epenthetic, but that a high-ranked contiguity constraint ensures that they are placed within the same location as the vowel. But this is then indistinguishable from an account that doesn’t use epenthesis in the first place.

[7]There are some complications that involve destressed syllables with rhotic onsets. We postpone this till §6.1. Furthermore, in Eastern Armenian, there are some roots like *və.tʃír* ‘verdict’ whose derivatives predictably lack a schwa in standard speech: *vətʃ.r-é-l* ‘to convict’. But in colloquial speech, some of these derivatives can be pro-

(14) *Contexts for reduction via deletion*

V.C̆i.C-V					
a.mís	‘month’	a.múr	‘hard’	za.díg	‘Easter’
am.s-a.gán	‘monthly’	am.r-óts͡	‘fortress’	zad.g-a.gán	‘Paschal’
VC.C̆i.C-V					
ar.tún	‘awake’	jer.kít͡ʃ	‘singer’	təm.púg	‘drum’
art.n-a.gán	‘vigilant’	jerk.t͡ʃ-u.hí	‘female singer’	təmp.k-a-har	‘drummer’

To capture the reduction patterns of destressed high vowels, we use the following set of constraints. Final stress is ensured by STR-R, shorthand for an alignment constraint on metrical beats (Gordon 2002). Destressed high vowels violate the constraint **ĭ,ŭ*. Destressed high vowels are preferably reduced to a schwa instead of deleted. This is captured by ranking MAX over ID[i,u]; the latter constraint is violated whenever a high vowel changes its features. Deletion is blocked whenever it would create an unsyllabifiable complex coda via *BADCC, which is shorthand for a finite list of licit and illicit clusters. Deletion is triggered by the avoidance of word-medial open *Cə* syllables. We assume that the surface schwa is not epenthetic, due to DEP outranking MAX.

(15) a. *Constraints for vowel reduction*
   i. STR-R: Assign a violation if stress is not on the final syllable.
   ii. *ĭ,ŭ: Assign a violation for a a high vowel (= a high vowel that had stress in input but not output)
   iii. *BadCC: Assign a violation for a consonant cluster that cannot be syllabified.
   iv. **...Cə...*: Assign a violation for a word-medial open syllable that has a schwa.
   v. ID[i,u]: Assign a violation if the features of a high vowel changed (= if the vowel reduced to a schwa).

   b. *Constraint ranking for vowel reduction*
   STR-R, *BADCC, *ĭ,ŭ >> *...Cə..., DEP >> MAX >> ID[i,u]

With the above constraints, we can derive the simple cases of reduction to schwa: *mís* ‘meat’ to *mə.se.ɣén* ‘meat goods’, and reduction to deletion: *a.mís* ‘month’ to *am.sa.gán* ‘monthly’. The input is the stressed base and the concatenated suffix. For reduction to schwa, candidates *míseɣen* (a) and *mĭseɣén* (b) lose because of high-ranking constraints for stress shift and against destressed high vowels. Deletion in *mse.ɣén* is blocked because it would create an illicit complex onset **ms*. The winner is reduction to schwa: *mə.se.ɣén* (c). This candidate wins over a surface-identical candidate **mə’.se.ɣén* (e) where the schwa is epenthetic; this is due to DEP outranking ID[i,u].

nounced with a schwa *və.t͡ʃər-é-l*. Such variation is lexeme-specific, and Ġaragyowlyan (1979:39) speculates that it is due to analogy to the base’s high vowel (as do other grammarians: Margaryan 1997:50,97, Ezekyan 2007:38-9, Ġaragyowlyan 1974:176-82, Abeġyan 1933:44-7). Such lexeme-specific variation would require ranking MAX over **...Cə...* Ġaragyowlyan (1974:131-8) speculates that gradient phonotactics may contribute to the appearance of some of these colloquial schwas, such as to avoid fake geminates, affricate clusters, marked sonorant-nasal clusters. In my native Western judgments, such colloquial variation is more common in Eastern Armenian than in Western Armenian.

(16) *Deriving reduction to schwa*

[mís] /-eɣen/		STR-R	*BADCC	*ǐ,ŭ	DEP	*...Cə...	MAX	ID[i,u]
a.	mí.se.ɣen	*!						
b.	mǐ.se.ɣén			*!				
c. ☞	mə.se.ɣén							*
d.	mse.ɣén		*!				*	
e.	mə'.se.ɣén				*!		*	

For reduction to deletion, the main two candidates are the winner *am.sa.gán* (d) and the loser **a.mə.sa.gán* (c). The relative ranking of MAX over ID[i,u] treats schwa-reduction as the default pattern. [8] Deletion is triggered to avoid the word-medial open *Cə* syllable in **a.mə.sa.gán* (c).

(17) *Deriving reduction to deletion*

[a.mís] /-agan/		STR-R	*BADCC	*ǐ,ŭ	DEP	*...Cə...	MAX	ID[i,u]
a.	a.mí.sa.gan	*!						
b.	a.mǐ.sa.gán			*!				
c.	a.mə.sa.gán					*!		*
d. ☞	am.sa.gán						*	
e.	a.mə'.sa.gán				*!	*	*	

The analysis argues that the condition for deletion is to avoid word-medial open *Cə* syllables, and not just a constraint against having schwa **ə* (cf. *STRUC constraints in Gouskova 2003). Evidence for this comes from roots of the shape *V.C₁íC₂C* where *C₁C₂* could form a licit complex coda. For example for *ha.rúst* 'rich', *rs* is a licit complex coda such as in *harsn-ik* 'wedding'. In the derived forms *V.C₁ǐC₂.C-V*, deletion would've create a syllabifiable complex coda: **hars.t-u.tjún*. But instead, we have a schwa: *ha.rəs.t-u.tjún* 'richness' (Ġaragyowlyan 1979:38-9).

(18) *Deletion is blocked if the schwa is in a closed open syllable*

V.CǐC.C-V					
ha.rúst	'rich'	go.rúst	'loss'	am.ba.rí∫t	'impious'
ha.rəs.t-u.tjún	'richness'	go.rəs.t-a.gán	'losable'	am.ba.rə∫.t-u.tjún	'impiety'
*hars.t-u.tjún		*gors.t-a.gán		*am.bar∫.t-u.tjún	'impiety'
cf. ha**rs**.n-ík	'wedding'	cf. t͡∫o**rs**.n-ót͡s	'quaternary'	cf. ga**r∫**.n-éɣ	'nervous'

To illustrate, consider the near-minimal below. The *rs* sequence can form a complex coda in (19a) but not in (19b). The main difference is that in the former, the reduced high vowel would've surfaced in an open syllable if it didn't delete.

[8] This is contra previous work which assumed that deletion is the default, and that the use of a schwa was a last resort (Vaux 1998; Khanjian 2009; Dolatian 2020b).

(19) a. bar.sí̠g ‘Persian’
bars.g-as.tán ‘Persia’
*bar.sə.g-as.tán

b. barísp ‘fortress’
*bars.p-é-l ‘to fortify’
ba.rəs.p-é-l

To capture these facts, we argue that the default output of vowel reduction is just schwa reduction. For derivatives of *bar.sí̠g* (20a), the schwa is deleted due to the constraint **...Cə...* against open word-medial schwa-syllables: *bars.gas.tán* (d) and not **bar.sə.gas.tán*. But for derivatives of *ba.rísp* (20b), deletion is not triggered by **...Cə...* even though deletion would've created an a syllabifiable consonant cluster: *ba.rəs.pél* (d) and not **bars.pél*.

(20) a. *Reduction to deletion for open syllables*

[bar.sí̠g] /-astan/		STR-R	*BADCC	*i̠,ŭ	DEP	*...Cə...	MAX	ID[i,u]
a.	bar.sí.gas.tan	*!						
b.	bar.sí̠.gas.tán			*!				
c.	bar.sə.gas.tán					*!		*
d. ☞	bars.gas.tán						*	
e.	bar.sə'.gas.tán				*!	*!	*	

b. *Reduction to schwa for closed syllables*

[ba.rísp] /-e-l/		STR-R	*BADCC	*i̠,ŭ	DEP	*...Cə...	MAX	ID[i,u]
a.	ba.rís.pel	*!						
b.	ba.rí̠s.pél			*!				
c. ☞	ba.rəs.pél							*
d.	bars.pél						*!	
e.	ba.rə's.pél				*!		*	

Given the above patterns of reduction, the next section looks at reduction in passive verbs. We shall see that the output of reduction behaves opaquely with the output of pre-passive epenthesis. I will argue that the reason is because of cyclic dependence between the passive verbs and active verbs.

4 Reduction in passive verbs

When passivization interacts with vowel reduction, we find paradoxes such as the following. Essentially, when the vowel is reduced to a schwa in the active, it is also reduced in the passive: *aɣ.mə.gél ~ aɣ.məg.ví̠l* (21b). But, when the vowel is deleted in the active, we then see pre-passive epenthesis in the passive: *bad.ʒél ~ bad.ʒə.ví̠l* (21a). As I later illustrate below, the use of both deletion and epenthesis in the passive seems paradoxical because deletion is unlicensed: **ba.dəʒ.ví̠l*.

(21) a. ba.dí͡ʒ ‘punishment’
bad.ʒ-é-l ‘to punish’
bad.ʒə-v-í-l ‘to be punished’
*ba.dəʒ-v-í-l

b. aɣ.múg ‘noise’
aɣ.mə.g-é-l ‘to disquiet’[9]
aɣ.məg-v-í-l‘to be disquieted’

We go through this paradox and argue that it’s due to faithfulness of the passive stem to the active stem *bad.ʒ-*. I first go through cases of schwas being retained across passives and actives (§4.1. These are transparent and not complicated. The paradox is seen for reduction to deletion (§4.2.

4.1 Schwas in active verbs and passive passive verbs

Given a root and active verb, the destressed high vowel will by default reduce to a schwa. The schwa stays in the active if deletion would create an unsyllabifiable cluster. The schwa is likewise kept in the corresponding passive.

(22) *Reduction to schwa in actives and passives*

C̆i.C-V					
zúd	‘pure’	ní͡ʃ	‘sign’	d͡zúx	‘smoke’
zə.d-é-l	‘to filter’	nə.ʃ-é-l	‘to mention’	d͡zə.x-é-l	‘to smoke’
zəd-v-íl	‘to be filtered’	nəʃ-v-íl	‘to be mentioned’	d͡zəx-v-í-l	‘to be smoked’
VC.C̆i.C-V					
aɣ.múg	‘noise’	gəs.mí͡t	‘pinch’		
aɣ.mə.g-é-l	‘to disquiet’	gəs.mə.t-é-l	‘to pinch’		
aɣ.məg-v-í-l	‘to be disquited’	gəs.mət-v-í-l	‘to be pinched’		

As expected, if the root ends in a complex coda, then the passive triggers pre-passive epenthesis.

(23) *Reduction to schwa in passives, with pre-passive epenthesis*

C̆iC.C-V					
kírg	‘bosom’	zúsp	‘restrained’	d͡ʒí͡ʃt	‘correct’
kər.g-é-l	‘to embrace’	zəs.p-é-l	‘to restrain’	d͡ʒəʃ.t-é-l	‘to correct’
kər.gə-v-íl	‘to be embraced’	zəs.pə-v-íl	‘to be restrained’	d͡ʒəʃ.tə-v-í-l	‘to be corrected’
V.C̆iC.C-V					
gamúrt͡ʃ	‘bridge’	pə.ʒí͡ʃk	‘doctor’	so.sínts	‘paste’
ga.mər.t͡ʃ-é-l	‘to bridge’	pə.ʒəʃ.k-é-l	‘to heal’	so.sən.t͡s-é-l	‘to paste’
ga.mər.t͡ʃə-v-íl	‘to be bridged’	pə.ʒəʃ.kə-v-í-l	‘to be healed’	so.sən.t͡sə-v-í-l	‘to be pasted’

[9]The verb *aɣ.mə.gél* is most often used as an intransitive verb ‘to make noise’, with the transitive usage of ’to disturb’ or ‘to disquiet’ (especially via making noise somewhere). The passive form is derived from the transitive extension.

As before, if the reduced vowel would have been in a closed syllable in the active verb, then reduction is blocked even if deletion would create a syllabifiable consonant cluster. And as expected, the passive keeps the root's schwa. It likewise triggers pre-passive epenthesis because of the consonant cluster.

(24) *Reduction to schwa in passives with closed syllables*

V.CĭC.C-V			
ba.rísp	'fortress'	xa.rísx	'anchor'
ba.rəs.p-é-l	'to fortify'	xa.rəs.x-é-l	'to cast (anchor)'
ba.rəs.pə-v-í-l	'to be fortified'	xa.rəs.xə-v-í-l	'to be cast'

For the active, keeping the schwa is predictable from our previous constraint set. For the passive, keeping the schwa is likewise straightforward given the previous constraints. To preview the analysis, the tableaux below entertain two possible sources for the passive: one via the root as a base, and one via the active stem as a base.

For roots without final clusters, it does not matter whether we derive the passive directly from the root, or if we derive it from the stem of the active. The winner is *aɣ.məg.víl* (25a) without any epenthesis or deletion. Deletion would create an unsyllabifiable cluster: **aɣmg.víl* (b). Deleting the vowel and then inserting a schwa in the same location violates DEP: **aɣ.mə'g.víl* (c). Deleting the vowel and inserting a vowel somewhere else ensues violations of contiguity: **a.ɣə'mg.víl* (d,e), with a violation for every pair of segments that have mismatching contiguity across the input and output. For space, we omit the stress constraint that trigger stress shift and that blocks the losing candidate **aɣmúg-v-i-l*. And, we omit the constraint **ĭ,ŭ* for blocking the losing candidate **aɣmŭg-v-i-l* that has an unreduced vowel.

(25) *Deriving* [aɣ.məg.víl] *from the root* [aɣ.múg]

[aɣ.múg] /-v-i-l/		*BADCC	*CC-PASS	CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
a. ☞	aɣ.məg.víl							*
b.	aɣmg.víl	*!	*!	*!			*	
c.	aɣ.mə'g.víl				*!		*	
d.	a.ɣə'mg.víl		*!	*!*	*		*	
e.	a.ɣə'm.gə'.víl			*!*	**	*	*	

Similarly, if we derive the passive from the active stem *aɣ.məg-*, then we get the same winner *aɣ.məg.vil*. The difference is that the winner does not violate any faithfulness constraints because the stem's vowel is already a schwa.

(26) *Deriving* [aɣ.məg.víl] *from the stem* aɣ.mə.g- *of the active verb* [aɣ.məg-é-l]

[aɣ.məg-] /-v-i-l/	*BADCC	*CC-PASS	CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
a. ☞ aɣ.məg.víl							
b. aɣmg.víl	⋆!	⋆!	⋆!			⋆	
c. aɣ.mə'g.víl				⋆!		⋆	
d. a.ɣə'mg.víl		⋆!	⋆!⋆	⋆		⋆	
e. a.ɣə'm.gə'.víl			⋆!⋆	⋆⋆	⋆	⋆	

Similarly, when the root ends in a complex coda, we see the schwa retained in the passive, and an additional schwa before the passive suffix: *ga.mər.t͡ʃə.vil*. Again, both the root-derived and active-derived analyses correctly predict the same output. They only differ in that the winner in the active-derived analyses does not violate ID[i,u] because the stem's vowel was already a schwa in the input.

(27) *Deriving* [ka.mərt͡ʃə.víl] *from the root* [ka.múrt͡ʃ]

[ga.múrt͡ʃ] /-v-i-l/	*BADCC	*CC-PASS	CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
b. ga.mərt͡ʃ.víl		⋆!					⋆
c. ☞ ga.mər.t͡ʃə'.víl				⋆	⋆		
d. gamrt͡ʃ.vil	⋆!	⋆!	⋆!⋆			⋆	

(28) *Deriving* [ka.mərt͡ʃə-v-í-l] *from the stem* ka.mərt͡ʃ- *of the active verb* [ka.mər.t͡ʃél]

[ga.mərt͡ʃ-] /-v-i-l/	*BADCC	*CC-PASS	CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
a. ga.mərt͡ʃ.víl		⋆!					
b. ☞ ga.mər.t͡ʃə'.víl				⋆	⋆		
c. gamrt͡ʃ.vil	⋆!	⋆!	⋆!⋆			⋆	

Based on the data so far, we have not seen any evidence that would favor the active-derived analysis over the root-derived analysis. That evidence is in the next section.

4.2 Deletion in active and passive

The previous section looked at active-passive pairs where the vowel is reduced to a schwa. In contrast in the verbs below, the root's high vowel is deleted in the active verb. In the corresponding passive verb, the high vowel is still absent. Instead, there is pre-passive epenthesis (Ġaragyowlyan 1979:41-2).[10]

[10]The pronunciation of *gərgnel* 'to repeat' is from Standard and Beiruti Western Armenian. Margaryan (1997:97) reports that for some Eastern Armenian speakers often insert an additional schwa in *gərgənel* because they parse

(29) *Passives with deletion and epenthesis*

VC.Cĭ.C-V			
tar.pín	'blacksmith, forger'	gər.gín	'double, again'
tarp.n-é-l	'to forge'	gərg.n-é-l	'to repeat'
tarp.nə-v-í-l	'to be forged'	gərg.nə-v-í-l	'to be repeated'

For deriving the active verbs, it is useful to contrast two types of roots and their derivatives. For the roots in (30a), the high vowel is flanked by a consonants C_1,C_2 which can form a falling-sonority complex coda in other words. To illustrate, we place subscript *F* on the first consonant. In contrast, for the roots in (30b), the high vowel is flanked by consonants which cannot form a complex coda in other words. These consonants have rising or flat sonority. To illustrate, we place subscript *R* on the first consonant.

(30) *Passives with deletion, categorized by sonority*

a. $V.C_F\check{i}.C$-V					
d͡za.ɣíg	'flower'	hu.ruť	'charm'	o.ʒíd	'dowry'
d͡zaɣ.g-é-l	'to ornament'	hur.t-é-l	'to enchant'	oʒ.t-é-l	'to endow'
d͡zaɣ.gə-v-í-l	'to be ornamented'	hur.tə-v-í-l	'to be enchanted'	oʒ.tə-v-í-l	'to be endowed'
b. $V.C_R\check{i}.C$-V					
megín	'explicit'	paʒín	'section'	ga.bíg	'monkey'
meg.n-é-l	'to interpret'	paʒ.n-é-l	'to divide'	gab.g-é-l	'to mimic'
meg.nə-v-í-l	'to be interpreted'	paʒ.nə-v-í-l	'to be divided'	gab.gə-v-í-l	'to be mimicked'

In the active, both types of consonant sequences are hetero-syllabic. Thus, both types of active verbs surface without a schwa: *d͡za.ɣíg* to *d͡zaɣ.gél*. For the active verbs, deriving the schwa-less forms is straightforward. These forms are derivable using either the root-derived or active-derived analyses, as done in the previous section. However, for the passive verbs, the analyses diverge.

For the active verbs above, their passive forms all utilize pre-passive epenthesis: *d͡zaɣ.gə.víl*, not **d͡za.ɣəg.víl*. For the root-derived analysis, it is paradoxical why there is deletion and then subsequently pre-passive epenthesis. For the root *d͡za.ɣíg* in (30a), deletion would cause the passive to follow a CC cluster: **d͡zaɣg.víl*. Thus, the incorrect expected outcome for the root-derived analysis would be to not delete at all: **d͡za.ɣəg.víl*. Similarly for the roots in (30b) such as *me.gín*, the passive cannot utilize deletion because the resulting consonant cluster cannot be syllabifiable as a complex coda: **məgn.víl*. Thus we would incorrectly expect reduction to schwa instead of deletion+epenthesis: **me.gən.víl*.

The paradox is illustrated in the tableaux below. With the root-based analysis, the incorrect winner utilizes reduction to schwa for both types of verbs. Given the root *d͡za.ɣíg*, the incorrect winner is **d͡za.ɣəg.víl* (34.a). The desired winner *d͡zaɣ.gə.víl* (c) fails because the deletion+epenthesis is

this word as pseudo-reduplicative (Zuraw 2002). However, some Eastern speakers pronounce this word as *gərg.nel* (Sowk'iasyan 2004:27-8,61).

unmotivated and more costly than just reducing the vowel to a schwa. Reducing and metathesizing root vowel also accrues additional violations of contiguity constraints: **d͡zaɣ.gə.vil* (d). For the root *me.gín*, the same incorrect winner is also incorrectly derived for the same reason.

(31) a. *Failed derivation of passive* [d͡zaɣ.gə.víl] *from the root* [d͡za.ɣíg]

[d͡za.ɣíg] /-v-i-l/		*BADCC	*CC-PASS	CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
a. ☞	d͡za.ɣəg.víl							*
b.	d͡zaɣg.víl		*!	*!			*	
c. ☹	d͡zaɣ.gə'.víl			*!	*	*	*	
d.	d͡zaɣ.gə.víl			*!*		*		*

b. *Failed derivation of passive* [mag.nə.víl] *from the root* [ma.gín]

[me.gín] /-v-i-l/		*BADCC	*CC-PASS	CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
a. ☞	me.gən.víl							*
b.	megn.víl	*!	*!	*!			*	
c. ☹	meg.nə'.víl			*!	*	*	*	
d.	mag.nə.víl			*!*		*		*

In contrast, both types of passive verbs can be correctly derived in the active-derived analysis. Here, the input to the derivation is a not a root with a high vowel like *d͡za.ɣíg*. Instead, the input is a bound stem without a vowel *d͡zaɣ.g-*. The correct candidate *d͡zaɣ.gə.víl* wins (32a.c). Given this stem *d͡zaɣ.g-*, there is no high vowel anymore. Thus, any schwas would necessarily be epenthetic. Inserting a schwa inside the root would lose because it would violate contiguity: **d͡za.ɣəg.víl* (32a.a). Instead, a schwa is added at the morpheme boundary. The passive verb *meg.nə.víl* is analogously derived.

(32) a. *Successfully deriving* [d͡zaɣ.ɣə.víl] *from the stem* [d͡zaɣ.ɣ-] *of the active* [d͡zaɣ.gél]

[d͡zaɣ.g-] /-v-i-l/		*BADCC	*CC-PASS	CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
a.	d͡za.ɣə'g.víl			*!	*			
b.	d͡zaɣg.víl		*!					
c. ☞	d͡zaɣ.gə'.víl				*	*		

b. *Successfully deriving* [mag.ə.víl] *from the stem* [mag.n-] *of the active* [mag.nél]

[meg.n-] /-v-i-l/		*BADCC	*CC-PASS	CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
a.	me.gə'n.víl			*!	*			
b.	megn.víl	*!	*!					
c. ☞	meg.nə'.víl				*	*		

Thus, based on the behavior of vowel reduction in passive verbs, I argue that passive verbs are morphophonologically derived from the stem of active verbs. If passives were derived from roots, then we would get the wrong patterns of vowel reduction. The next section places this analysis within the larger theoretical contexts of Output-Output constraints and pseudo-cyclicity. I further argue that this passive-active dependence is actually a cyclic process. I analyze the cyclicity as obfuscated by a morphological operation of theme-vowel deletion.[11]

5 Discussion: From pseudo-cycles to real cycles

The analysis so far argued that the phonological form of passive verbs is calculated from active verbs. To capture this dependency, we can use many different theoretical tools. This section explicitly states how the above analysis can be couched with conventional Output-Output constraints over bound stems. I then present data on passive semantics and morphology. The data suggests that the passive-active dependence is not simply a case of paradigmatic uniformity or pseudo-cyclicity. Instead, the data is part of the morphosyntactic dependency of passives over actives. To capture both the morphosyntactic and morphophonological dependencies, I argue for a complex morphosyntactic structure where passive stems cyclically contain active stems. The absence of the active's theme vowel is explained through affix truncation rules.

5.1 Pseudo-cyclicity: Stem-based output constraints

The analysis so far presented tableaux which simplified the dependency between the passive and active. Such dependency was modeled by determining the *input* of the derivation. That is, the input to a passive *d͡zaɣ.gə-v-í-l* 'to be ornamented' was the stem *d͡zaɣ.g-* of the active verb *d͡zaɣ.g-é-l* 'to ornament'. This is repeated below.

[11] Colloquial Eastern Armenian shows variation in the location of the passive schwa for some words. From the root *patíʒ* 'punishment', the standard active is *pat.ʒ-é-l* 'to punish', and the standard passive is *pat.ʒə-v-é-l* 'to be punished'. But Ġaragyowlyan (1974:101) reports that some speakers place the vowel inside the root in colloquial speech: *pa.təʒ-v-é-l.* She explicitly argues that this is not due to analogy to the root's high vowel (Ġaragyowlyan 1974:163). She instead argues that this is due to analogy to the active verb *pat.ʒ-é-l* which can variably surface as *pa.təʒ-é-l* in colloquial speech. She argues it's that so speakers maintain the same syllable division between passives and actives (Ġaragyowlyan 1974:41-2). Thus, this colloquial data on variation is further evidence that passives are derived from actives. Such variation would require lexeme-specific re-ranking of MAX for deriving the active verbs. However, there are some passives which colloquially have a root-internal schwa: standard *mat.nə-v-é-l* vs. colloquial *ma.tən-v-ḗ-l* 'to be betrayed'. These are not derived from a root with a high vowel. She speculates that such colloquial cases are simply arbitrary (Ġaragyowlyan 1974:180). This variation may be due to lexeme-specific variation in the relative ranking of of CONT-PASS.

(33) *Successfully deriving* [d͡zaɣ.ɣə.víl] *from the stem* [d͡zaɣ.ɣ-] *of the active* [d͡zaɣ.gél]

[d͡zaɣ.g-] /-v-i-l/	*BADCC	*CC-PASS	CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
a. d͡za.ɣə'g.víl			*!	*			
b. d͡zaɣg.víl		*!					
c. ☞ d͡zaɣ.gə'.víl				*	*		

An equivalent alternative is to treat the input as just the root *d͡za.ɣíg* 'flower'. The root is the local base B^L for the passive. But, the relative faithfulness constraints CONT-PASS would be specialized to maintain identity of the passive stem to the active stem as a remote base B^R, i.e. BD-CONT-PASS. With this constraint, the root's vowel cannot appear inside the stem because it would violate BD-CONT-PASS: **d͡za.ɣəg.víl* (34a). The schwa is essentially treated as epenthetic with respect to the passive stem. Instead, the winner is *d͡zaɣ.gə.víl* (d) where the root's vowel is metathesized to outside the stem. This is surface-identical to making this schwa be epenthetic (c).

(34) *Successful derivation of passive* [d͡zaɣ.gə.víl] *from the root* [d͡za.ɣíg] *via identity to the active stem* [d͡zaɣ.g-]

B_L: [d͡za.ɣíg] /-v-i-l/ B^R: [d͡zaɣ.g-]	*BADCC	*CC-PASS	BD-CONT-PASS	DEP	*...Cə...	MAX	ID[i,u]
a. d͡za.ɣəg.víl			*!				*
b. d͡zaɣg.víl		*!				*	
c. d͡zaɣ.gə'.víl				*!	*!	*	
d. ☞ d͡zaɣ.gə.víl					*		*

Cross-linguistically, the use of Output-Output constraints have been motivated for two different types of morphological relationships: cyclic and pseudo-cyclic (cf. entries in Downing et al. 2005). If a suffixed form *A+B* is morphologically derived from an un-suffixed form *A*, then the phonological derivation is said to be cyclic. The cyclic derivation of the morphophonology of *A+B* would match the cyclic containment of *A* under *A+B* for the morphosyntax and for the morphosemantics. Such dependencies can be modeled either with serialist rules (Chomsky et al. 1956; Chomsky and Halle 1968; Kiparsky 1982), recursive Output-Output constraints (Benua 1997), or by a parallelist stratal derivation (Booij 1997; Kiparsky 2000, 2015; Rubach 2003, 2008; Bermúdez-Otero 2011, 2018b). On the surface, the Armenian data does not look like this.

In contrast, if the phonology of the suffixed form *A+B* is computed from a morphologically related form *A+C*, then the the computation is pseudo-cyclic (Steriade 2008). On the surface, it is not the case that *A+C* cyclically contains *A+B*, whether in the morphology of its surface exponents or in the semantic dependencies between *A+B* and *A+C*. Such cases of non-cyclic dependencies can be subsumed under Paradigm Uniformity (Kenstowicz 1996), Lexical Conservatism (Steriade 1999), Optimal Paradigms (McCarthy 2005; Downing 2005), or simple Output-Output constraints that select bound stems like *A-* within some inflectional or derivational paradigm (Steriade 2008, 2016;

Steriade and Yanovich 2015). The above Armenian analysis that was presented thus far falls into this camp of pseudo-cyclic analyses. For the Armenian passive, identity is maintained between bound *stems*: *d͡zaɣ.g-*.[12]

Such pseudo-cyclic analyses though are very controversial (Bobaljik 2008). Some can be reanalyzed with more abstract underlying representations (Bermúdez-Otero 2018a). For Armenian, I argue that the seemingly pseudo-cyclic dependence between the passive and active is *not* semantically motivated. In contrast, there is semantic evidence that the active stem is cyclically contained within the passive. The next section presents this evidence.

5.2 Morphosemantic dependencies between actives and passives

The pseudo-cyclic analysis assumes that the passive and active stems are tied together because of their morphophonological dependency. Although this dependency exists, the pseudo-cyclic analysis does not acknowledge the fact that there are also morphosemantic dependencies between the active and the passive. I present two such dependencies.

The first dependency comes from the fact that for every passive verb, there is a corresponding active verb. But there are pairs of active-passive verbs where the corresponding root is not a free-standing word. Diachronically, the roots in some of these examples might have existed as a free-standing words. But synchronically, those words are obsolete and unknown to most speakers, including myself.

(35) *Active-passive verbs without a free-standing root*

ar.n-é-l	'to take'	a.d-é-l	'to hate'	ɣər.g-é-l	'to send'
ar.nə-v-ɨ́-l	'to be taken'	ad-v-ɨ́-l	'to be hated'	ɣər.gə-v-ɨ́-l	'to be sent'
bad.m-é-l	'to narrate'	mə.gər.d-é-l	'to baptize'	pər.g-é-l	'to save'
bad.mə-v-ɨ́-l	'to narrated'	mə.gər.də-v-ɨ́-l	'to be baptized'	pər.gə-v-ɨ́-l	'to be saved'

The second dependency comes from allosemy (Marantz 2013). The passive verb's meaning is dependent on the meaning of the active, but the meaning of these verbs can differ from that of the root. This means that the semantics of the passive are locally computed from the active, not from the root. The semantic dependence of the passive over the active is cross-linguistically attested, and is often formalized by deriving passives from actives, even if covertly (Bruening 2013).[13]

[12]The need to reference morphologically bound items is a common critique against transderivational OT (cf. Orgun 1996; Orgun and Dolbey 2007). However, it is simple to resolve by providing the appropriate definition of BD-CONT-PASS.

[13]The schwa in *madən* 'finger' is epenthetic.

(36) *Active-passive verbs whose meaning doesn't match the root*

táɣ	'district'	néɣ	'narrow'	néd	'arrow'
taɣ-é-l	'to bury'	neɣ-é-l	'to upset'	ned-é-l	'to throw'
taɣ-v-ɨ́-l	'to be buried'	neɣ-v-ɨ́-l	'to be upset'	ned-v-ɨ́-l	'to be thrown'
má.dən	'finger (archaic)'	ga.núx	'early'	vo.róʃ	'distinct'
mad.n-é-l	'to betray'	gan.x-é-l	'to anticipate'	vo.ro.ʃ-é-l	'to decide'
mad.nə-v-ɨ́-l	'to be betrayed'	gan.xə-v-ɨ́-l	'to be anticipated'	vo.roʃ-v-ɨ́-l	'to be decided'

To capture the above morphosemantic facts, we would need to replicate our morphologically-idiosyncratic Base-Derivative constraints across the phonology, morphology, and semantics of passive verbs. This misses the generalizations that passives are computed from actives in essentially all their grammatical aspects *except* for the absence of post-root theme vowel. The next section presents an analysis that captures all these dependencies.

5.3 Cyclic containment with truncation

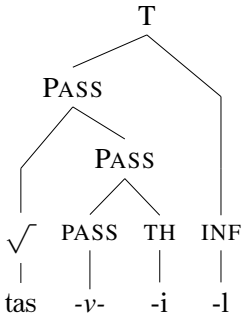
The data so far has shown that passives depend on actives in their phonology and semantics. To capture both aspects, the most direct approach is to cyclically derive passives from actives. But in order to do so, we would need to explain the absence of the post-root theme vowel. I shall do with affix truncation. This section uses the following running examples, one with vs. without reduction.

(37)	a.	tás	'class'	b.	d͡za.ɣɨ́g	'flower'
		tas-é-l	'to classify'		d͡zaɣ.g-é-l	'to ornament'
		tas-v-ɨ́-l	'to be classified'		d͡zaɣ.gə-v-ɨ́-l	'to be ornamented'

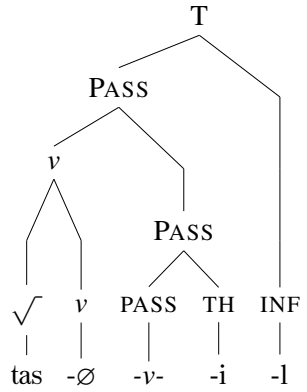
Throughout this paper, we entertained two opposing analyses for passives: root-derived vs. active-derived. Within a Distributed Morphology framework (Halle and Marantz 1993; Embick and Noyer 2007), these two analyses would correspond to two possible morphosyntactic structures for passive verbs. One structure is the root-derived structure where the passive suffix is linearly adjacent to the root (or to the root's category) without any intervening little *v*. The other is the active-derived structure where the passive is linearly adjacent to a covert little *v* which denotes the active verb. I argue for the second structure (cf. Bruening 2013). Both analyses would treat the passive as a flavor of little *v*, which we call PASS. We assume that the theme vowel is an adjunct on little *v* which turns roots into verbs (Oltra-Massuet 1999).

(38) *Analytical options for a passive* [tas.víl] 'to be classified'

a. *Root-derived passives from root* [d͡za.ɣíg]



b. *Active-derived passives from active stem* [tas-] *of* [tas-é-l]



The latter structure would explain the morphosemantic dependence of passives over actives. Furthermore, the latter structure corresponds to the morphophonological derivation that we have seen thus far: passive stems are computed over active stems. But on the surface, it is unexpected that the passive is derived from the active. The active verb has a theme vowel after the root: *tas-é-l* 'to classify'. In contrast, the passive lacks that theme vowel: *tas-v-í-l* not **tas-e-v-í-l* 'to be classified'. Cross-linguistically, it is often assumed that the overt presence of morphemes indicates their position in the morphological structure (Baker 1985). In morpheme-based theories, it is likewise assumed that morphological operations are additive or incremental, not substractive (Bermúdez-Otero 2012; Trommer and Zimmermann 2014).

However, the above assumptions on the mirror principle and additivity are controversial (Stump 2001). In early work on morphological theory, Aronoff (1976) proposed that morphological operations can truncate or delete entire morphs. His case studies came from English where a word like *nomin-ee* is derived from *nomin-ate* via truncating the suffix. In contemporary terms, truncation is a readjustment rule triggered by the *-ee* suffix which deletes the *-ate* suffix (Trommer 2012b).

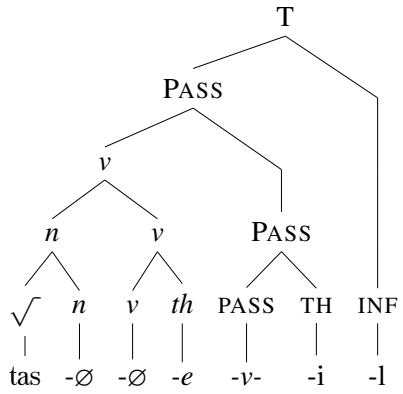
(39) *Deriving* nominee *from* nominate *via affix truncation*

Input:		[[[*nomin*] [*-ate*]] *-ee*]
Cycle 1	Spell-out	*nomin-ate*
Cycle 2:	Spell-out	*nomin-ate-ee*
	Truncation	*nomin-~~ate~~-ee*

We can likewise use truncation in order to model the mismatch between the surface morphotactics of the passive on the one hand and between the morphophonology and morphosemantics of the passive on the other. For a passive verb like *tas-v-i-l* 'to be classified', the underlying structure is *tas-e-v-i-l*. Crucially, this underlying structure keeps the theme vowel of the active verb *tas-e-l* 'to classify'. This theme vowel would be present as an adjunct on the first little *v* node. Its surface

exponent is later deleted or truncated in the passive's cycle. For later illustration, let us assume that the root *tas* 'class' has a covert little *n*

(40) *Deriving passive* [tas-v-í-l] *with truncation form the active stem* [tas-e-]



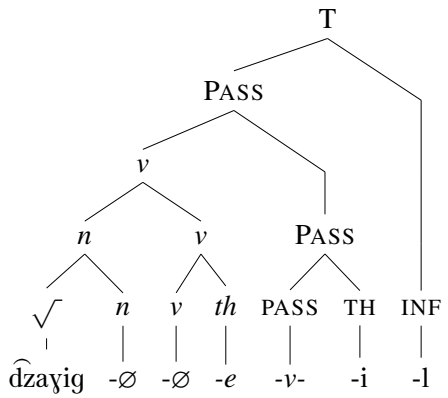
Input:

Cycle 1	Spell-out root and little *n*	*tas-∅*
Cycle 2:	Spell-out active verb (little *v)*	*tas-∅-e*
Cycle 3:	Spell-out passive verb	*tas-∅-e-v-i-l*
	Truncation	*tas-∅- -v-i-l*
Output		[tas.vĭl]

Despite their utility, the use of truncation rules was not widely accepted. As a morphological operation, affix truncation is dubious because it is a consequence of specific theoretical assumptions instead of an independently motivated process (Aronoff 1994). Furthermore, truncation rules were often criticized because the attested cases for truncation did not involve any phonological evidence (Kiparsky 1982, 1996; Booij 1987; Anderson 1992:187ff). Cases like English could thus be equally-well modeled by arguing that *-ee* attaches directly to roots. However, there are attested cases of affix truncation which have morphosemantic dependencies and visible phonological effects (Polish: Szpyra 1989; Bethin 1990; Russian: Darden 1988; Hippisley 1998). I argue that Armenian passives are one of these cases. In fact, affix truncation is essentially a serialist form of deriving Paradigm Uniformity over bound stems (e.g. in Hebrew Bat-El 2002, 2005).

Given a root with a reduced high vowel *d͡zaɣíg* 'flower', if the vowel is deleted in the active then it stays deleted in the passive: *d͡zaɣ.gél* ~ *d͡zaɣ.gə.vil.* We illustrate how truncation would feed the phonology in the serial derivation below. All the (morpho)phonological steps can be subsumed under the OT constraints from the previous sections.

(41) *Deriving passive* [d͡zaɣ.gə-v-ɨ́-l] *with truncation form the active stem* [d͡zaɣ.g-e-]



Input:

Cycle 1	Spell-out root and little *n*	*d͡zaɣig-∅*
	Phonology: Stress	*d͡zaɣíg*
	Phonology: Reduction	
Cycle 2:	Spell-out active verb (little *v)*	*d͡za.ɣí.g-e*
	Phonology: Stress	*d͡za.ɣɨ́.g-é*
	Phonology: Reduction	*d͡zaɣ.g-é*
Cycle 3:	Spell-out passive verb	*d͡zaɣ.g-é-v-i-l*
	Morphology: Truncation	*d͡zaɣ.g- -v-i-l*
	Morphophonology: Pre-passive epenthesis	*d͡zaɣ.gə-v-i-l*
	Phonology: Stress	*d͡zaɣ.gə-v-ɨ́-l*
Output		[d͡ʒaɣ.gə.vɨ́l]

Assume that Cycle 1 over the root applies stress: *d͡zaɣíg.*[14] In Cycle 2, we add the active theme vowel, apply stress shift, and then reduce the root's vowel: *d͡zaɣ.g-e.* In Cycle 3, the passive morphology is added (alongside T). The passive truncates the active's theme vowel: *d͡zaɣ.g- -v-i-l.* The absence of the root's vowel will then cause the passive to follow a consonant cluster. Because the passive was derived from the active, the root's high vowel cannot surface as a schwa in order to resolve this CC-PASS cluster: **d͡za.ɣəg.vil.* Instead, the passive then triggers pre-passive epenthesis: *d͡zaɣ.gə.vil.* If instead, the passive were derived directly from the root, then there would have been no need to delete the root's high vowel, and the wrong output would've been generated.

In sum, the passive is cyclically derived from active verbs via a process of morpheme deletion. Within a parallelist analysis, this can be captured with simple Output-Output constraints over bound stems. Within a serialist framework, capturing this cyclicity requires a truncation rule which idiosyncratically deletes previously exponed morphs: the active theme vowel *-e-*. By using morphological truncation, we can capture both the morphosemantic and morphophonological dependencies of passives over actives. In this way, the potential pseudo-cyclicity of Armenian

[14]To do so, we can either assume that roots can undergo their own cycle before affixation (cf. Inkelas 1989, 1993), or that the root has a covert little *n* categorizer. For now, both analyses would work. I assume the latter for illustration.

passives is reducible to cyclicity.[15]

6 Additional morphophonological evidence for cyclicity

The previous sections presented the main data and analysis. The end-result is that passives are cyclically computed over actives via truncation of theme vowels. In this section, I go over more data from passives and other derived verbs in order to provide more evidence of morphophonological dependencies. These dependencies further require the need to compute passives from actives.

6.1 Rhotic metathesis

So far, we have seen that whenever a destressed high vowel reduced to a schwa, the schwa was in the same location as the original high vowel (42). But in a restricted set of phonological contexts that involve rhotic onsets, the schwa is in a different position (42b). I first show that these mismatches are due to a process of rhotic-schwa metathesis: *rə→ər* (§6.1.1). I then show that his metathesis process is likewise active in passive verbs, but variably so (§6.1.2). The variation can only be captured if we derive passive stems from active stems.

(42)

a.	az.nív	‘sincere’	b.	badríg	‘patrician’
	az.nə.v-u.tjún	‘sincerity’		*badrəg-u.tjun	‘order of patricians’
	*a.zən.v-u.tjún			badərg-u.tjún	

6.1.1 Rhotic metathesis in Armenian

First, consider prosodic contexts where the high vowel has a rhotic onset and is deleted. The vowel deletes as long as it is in an open syllable and as long as its deletion would create a syllabifiable consonant cluster.

[15]For a passive verb like *d͡zaɣ.gə-v-í-l* ‘to be ornamented’, Vaux (1998:105) adopts an abstract analysis for the passive data by positing that the surface *-v-* is underlyingly a vowel *-u-*. In an intermediate representation //d͡za.ɣi̯.g-u-í-l//, the root is syllabified with the *-u-* and will lose its high vowel: //d͡zaɣ.g-u-i-l//. The *-u-* then changes into *-v-* because of vowel hiatus: //d͡zaɣg-v-i-l//. For Western Armenian, the passive would arbitrarily trigger epenthesis: [d͡zaɣ.gə.víl]. This analysis works because Vaux’s abstract vowel does the job of my analysis’s truncated theme vowel. However, there is no overt evidence of the passive *-v-* ever surfacing as *-u-*. Although Armenian has a *u→v* rule in vowel hiatus, this rule is not the language-general repair rule for vowel hiatus (Dolatian 2020b). I speculate though that Vaux’s analysis may be a viable account for the diachronic origins of the modern passive *-v-* from a Classical theme vowel *-u-* (J̌ahowkyan 2010; Mowradyan 2018).

(43) *Reduction as deletion in deletable contexts around rhotics*

V.r̆i.C-V					
ka.rún	‘spring’	po.to.rí̠g	‘storm’	d͡ʒəʃ.ma.rí̠d	‘true’
kar.n-anál	‘to become spring’	po.tor.g-á-l	‘to bluster’	d͡ʒəʃ.mar.d-u.tjún	‘truth’
a.rí̠t	‘occasion’	mə.de.rím	‘intimate’	mar.ka.rí̠d	‘pearl’
ar.t-é-l	‘to occasion’	mə.der.m-u.tjún	‘intimacy’	mar.kar.d-a.vór	‘pearly’

As for contexts where a schwa is necessary, we find two types of positions for the schwa. First, if the destressed high vowel is in a closed syllable, then there is no metathesis. The schwa stays in the original position of the high vowel.

(44) *Reduction to schwa in closed syllables with rhotics*

r̆iC.C-V					
rúnk	‘nostril’	rúmp	‘bomb’	rí̠ʃt	‘stingy’
rən.k-a-jí̠n	‘nasal’	rəm.p-ág	‘bombshell’	rəʃ.t-u.tjún	‘stinginess’
V.r̆iC.C-V					
an.de.rúnt͡ʃ	‘forlorn’	zə.rí̠nt͡ʃ	‘bray (n)’	mə.rúnt͡ʃ	‘noise, uproar’
an.de.rənt͡ʃ-u.tjún	‘forlorn-ness’	zə.rən.t͡ʃ-á-l	‘to bray’	mə.rən.t͡ʃ-é-l	‘to roar’
VC.r̆iC.C-V					
bad.rí̠nt͡ʃ	‘lemon-balm’	zəm.rúxt	‘emerald (n)’		
bad.rən.t͡ʃ-a-t͡ʃúr	‘balm extract’	zəm.rəx.t-e.ɣén	‘emerald goods’		

However, if the vowel would have been in a word-medial open syllable, then we find metathesis (Ġaragyowlyan 1979:42).[16]

(45) *Vowel reduction and vowel metathesis in word-medial open syllables*

VC.r̆i.C-V → V.Cər.C-V					
dəz.rúg	‘leech’	gəd.rí̠d͡ʒ	‘valiant’	d͡zəɣ.rí̠d	‘cricket’
də.zər.g-a-t͡sév	‘leech-shaped’	gə.dər.d͡ʒ-u.tjún	‘valiance’	d͡zə.ɣər.d-á-l	‘to chirp’
*dəz.rə.g-a-t͡sév		*gəd.rə.d͡ʒ-u.tjún		*d͡zəɣ.rə.d-á-l	
VCC.r̆i.C-V → VC.Cər.C-V					
gənt.rúg	‘frankincense’	d͡ʒəʃk.rí̠d	‘precise’	əst.rúg	‘slave’
gən.tər.g-a.jí̠n	‘frankincense (adj)’	d͡ʒəʃ.kər.d-u.tjún	‘precision’	əs.tər.g-u.tjún	‘slavery’
*gənt.rə.g-a.jí̠n		*d͡ʒəʃk.rə.d-u.tjún		*əst.rə.g-u.tjún	

However, rhotic metathesis is restricted to *word-medial* open syllables. Armenian allows *rə* syl-

[16] It is reported that metathesis is also found for open *lə* syllables (Vaux 1998:30). But these cases are too vanishingly rare to make concrete generalizations. Also, for *d͡ʒəʃk.rí̠d* ‘precise’, some speakers pronounce the base as *d͡ʒəʃ.kə.rí̠d* with an additional schwa. For speakers with this base, the destressed high vowel is deleted in the derivative *d͡ʒəʃ.kər.d-utjún.* For those with the base *d͡ʒəʃk.rí̠d*, the high vowel reduces to a schwa in the wrong position.

lables at the edges of a word. Word-initial *rə* syllables are mostly formed via vowel reduction,[17] while final *rə* syllables are formed with the definite suffix *-ə*.

(46)

a.	#*rə*		b.	*rə*#	
	rús	'Russian (person)'		kár-ə	'rock-DEF
	rə́.s-a-xós	'Russian-speaking'		banír-ə	'cheese-DEF

In sum, the reduced schwa is metathesized with a rhotic if the rhotic-schwa sequence forms a word-medial open syllable. This is straightforwardly captured with the following constraint set:

(47) *Constraints and ranking for rhotic metathesis*

a. **...rə...*: Assign a violation for a word-medial open syllable of the shape *rə*.

b. CONT: Assign a violation for any pair of segments that are present in the input and output, but have mismatching contiguity.

c. *BADCC >> **...rə...* >> CONT, DEP >> **...Cə...*

Contiguity outranks **...Cə...* Thus, metathesis is not used to metathesize any open *Cə* syllables: *aɣ.múg* 'noise' to *aɣ.mə.gél* 'to disquiet' (48b.b). But **...rə...* outranks contiguity. Thus word-medial rhotic-schwa syllables are replaced with *ər* (48a.c,d): *bad.ríg* 'patriarch' → *ba.dər.gu.tjún* (c) or *ba.də'r.gu.tjún* (d) 'order of patriarchs. The choice of either metathesis (c) vs deletion+epenthesis (d) depends on the relative ranking of CONT, DEP. The choice is ultimately tangential.

(48) a. *Rhotic metathesis in rhotic-schwa syllables*

[bad.ríg] /-utjun/		*BADCC	*ĭ,ŭ	*...rə...	CONT	DEP	*...Cə...	MAX	ID[i,u]
a.	bad.rĭ.gu.tjún		*!						
b.	bad.rə.gu.tjún			*!			*		*
c. ☞	ba.dər.gu.tjún				* * *				*
d. ☞	ba.də'r.gu.tjún				**	*		*	

b. *Lack of metathesis elsewhere – example from (21b)*

[aɣ.múg] /-e-l/		*BADCC	*ĭ,ŭ	*...rə...	CONT	DEP	*...Cə...	MAX	ID[i,u]
a.	aɣ.mŭ.gél		*!						
b. ☞	aɣ.mə.gél						*		*
c.	a.ɣəm.gél				* * *				*
d.	a.ɣə'm.gél				**	*		*	

The above data concerns how rhotic metathesis behaves across most derivatives in Western Armenian. The generalizations likewise apply to Eastern Armenian. However, we start to see effects

[17] Word-initial rhotics are rare. They also tend to resist reduction: *rus-erén* 'Russian language', but some cases of reduction are attested.

of contiguity and dialectal variations once we look at rhotic metathesis in passive verbs. This is discussed next.

6.1.2 Variation in rhotic metathesis in passives

This section looks at rhotic metathesis in passives. Generally, rhotic metathesis in passives is reported as the norm in Eastern Armenian (EA) (Ġaragyowlyan 1974:163), while the lack of metathesis is reported as the norm for Western Armenian (WA) (Ġaragyowlyan 1979:41). However, in order to capture this dialectal variation, I argue that we need to derive passives from actives, not from roots.

For the active verbs in (49), the verb is not derived from a root with a high vowel.[18] When passivized, the verbs on the top rows take metathesis in both dialects: *ba.dər.vil.* However, most passives show variation in whether they allow metathesis. The choice of metathesis depends on dialect: WA *av.rə.vil* vs. EA *a.vər.vel.*[19]

(49) *Rhotic metathesis passives with bound roots*

	rə-PASS → *ər*-PASS			
	bad.r-é-l	'to tear up'	gəd.r-é-l	'to cut'
	ba.dər-v-í-l	'to be torn up'	gə.dər-v-í-l	'to be cut'
	rə-PASS → *ər*-PASS ~ *rə*-PASS			
	pənd.r-é-l	'to look for'	d͡zaɣ.r-é-l	'to mock'
WA	pənd.rə-v-í-l	'to be looked for'	d͡zaɣ.rə-v-í-l	'to be mocked'
EA	pʰən.tər-v-é-l		t͡sa.ɣər-v-é-l	

More systematic variation is found in passives whose derivation involves vowel reduction. For Eastern Armenian, the norm is to trigger metathesis; while for Western, the norm is to block metathesis.

[18] Some of these active verbs are diachronically derived from the syncope of a word-medial low vowel, such as *badár* 'piece' to *bad-é-l* 'to tear up' via *badar-é-l.* The non-syncopated form is rare or obsolete in Western Armenian, but sometimes is found in Eastern Armenian.

[19] For illustration, the following roots and active verbs are transcribed based on the Western variant. The EA passives are transcribed based on EA pronunciation. Judgments are gathered from myself, Wiktionary, Sak'apetoyean (2011)'s pronunciation dictionary, and various grammars in the bibliography. Although metathesis in passives is generally blocked in standard WA, some lexemes can optionally take metathesis in colloquial WA. Active *av.r-é-l* 'to ruin' is passivized as *a.vər.v-é-l* 'to be ruined' in EA, *av.rə.v-í-l* in standard WA, and *a.vər.v-í-l* in colloquial WA. Colloquial data is difficult to systematically gather, but any such colloquial exceptions would require simple lexeme-specific rerankings of constraints.

(50) *Rhotic metathesis in passives with vowel reduction*

	ma.kúr	‘clean’	xən.tír	‘problem’	gə.ʃír	‘balance’
	mak.r-é-l	‘to clean’	xənt.r-é-l	‘to ask’	gəʃ.r-é-l	‘to weigh’
WA	mak.rə-v-í-l	‘to be cleaned’	xənt.rə-v-í-l	‘to be asked’	gəʃ.rə-v-í-l	‘to be weighed’
EA	ma.k^{h}ər-v-é-l		xən.t^{h}ər-v-é-l		kə.ʃər-v-é-l	

The above dialectal variation can be captured with a simple constraint reranking. In Western Armenian, the norm is for CONT-PASS to outrank *...rə.... This will block rhotic metathesis in Western Armenian passives: *mak.rə.víl*. Epenthesizing a schwa would violate the contiguity of the stem. In contrast, in Eastern Armenian, we have the reverse ranking. This will trigger epenthesis to resolve the *rə* syllable, at the expense of violating contiguity: *ma.k^{h}ər.vél*.

(51) *No rhotic metathesis for passives in Western Armenian*
CONT-PASS >> *...rə...

[mak.r-] /-v-i-l/	*BADCC	*CC-PASS	CONT-PASS	*...rə...	CONT	DEP	*...Cə...
a. makr.víl	⋆!	⋆!					
b. ☞ mak.rə’.víl				⋆		⋆	⋆
c. ma.kə’r.víl			⋆!		⋆	⋆	

(52) *Rhotic metathesis for passives in Eastern Armenian*
*...rə... >> CONT-PASS

[mak^{h}.r-] /-v-e-l/	*BADCC	*CC-PASS	*...rə...	CONT-PASS	CONT	DEP	*...Cə...
a. mak^{h}r.vél	⋆!	⋆!					
b. mak^{h}.rə’.vél			⋆!			⋆	⋆
c. ☞ ma.k^{h}ə’r.vél				⋆	⋆	⋆	

The above dialectal variation is easily captured by using active-derived passives. But if we instead derived passives from roots, then we wouldn’t be able to capture the dialectal variation at all. Specifically, the Western system of no metathesis would be un-formalizable. We illustrate below.

If the passive were derived directly from a root *ma.kúr*, then the least costly derivation is to directly reduce the high vowel into a schwa. Doing so would not need any metathesis at all: **ma.kər.víl* (53.a). This incorrect winner does not violate any of the output constraints, contiguity constraints, or faithfulness constraints that are violated by the desired winner *mak.rə’.víl*. In the tableau below, the many contiguity constraints and other constraints cannot be reranked in order to generate the winner. The only way to do so would be to promote ID[i,u] over MAX, but this would contradict the rest of reduction phonology (§3).

(53) *Failed root-derived analysis can't block rhotic metathesis in WA rhotics*

[ma.kúr] /-v-i-l/		*CC-PASS	CONT-PASS	*...rə...	CONT	DEP	*...Cə...	MAX	ID[i,u]
a. ☞	ma.kər.vil								*
b.	makr.víl	*!						*	
c. ☹	mak.rə'.víl			*!		*!	*	*	
d.	ma.kə'r.víl		*!		*!	*!		*	

In effect, given our independently motivated constraints and rankings, the root-based analysis predicts that the WA system is un-optimizing. This is because the only reason why WA blocks metathesis in passives is in order to maintain identical contiguity between the passive stem and the active stem, not between the passive stem and the root.

In sum, rhotic metathesis provides further morphophonological evidence that passives stems are derived from active stems. I list below all the required rankings for reduction, pre-passive epenthesis, rhotic metathesis, and their interactions. These rankings capture the general behavior of these processes in Armenian, not lexeme-specific variation and exceptions.

(54) *Required rankings*

a. *For pre-passive epenthesis*: *CC-PASS, CONT-PASS >> DEP, *...Cə...
   - In Eastern Armenian, the constraint *CC-PASS does not exist or is at least row-ranked

b. *For reduction*: STR-R, *BADCC, *i̯,u̯ >> DEP, *...Cə... >> MAX >> ID[i,u]

c. *For rhotic metathesis*: *BADCC >> *...*rə*... >> CONT, DEP >> *...*Cə*...
   - If assume the schwa is metathesized: DEP >> CONT
   - If assume the schwa is epenthetic: CONT >> DEP

d. *Dialectal variation for rhotic metathesis in passives*:
   - Western: CONT-PASS >> *...*rə*...
   - Eastern: *...*rə*... >> CONT-PASS

6.2 Intensive verbs

Passivization is a productive process in Armenian. It can apply to virtually any transitive verb, given the right lexical semantics (cf. Haig 1980; Dum-Tragut 2009; Daniel and Khurshudian 2015). In this section, I go through a significantly less product process of intensive formation. I show that this process likewise shows cyclic dependence on active verbs.

A relatively infrequent suffix in Armenian is the iterative or intensive *-d-* (= *-t-* in Eastern Armenian) in (55a). Like the passive suffix *-v-*, the intensive *-d-* triggers a pre-affixal schwa when it follows a consonant cluster: *səl.kə-d-á-l* (Vaux 1998:30). Destressed high vowels exceptionally 'delete' before it, much like they do they before the passive *-v-*: *gər.və-d-í-l* (55c).

(55) a. səl.k-é-l ‘to stroll’
səl.kə-d-á-l ‘id.’

b. gər.d͡ʒ-é-l ‘to gnash’
gər.d͡ʒə-d-é-l ‘id.’

c. gərív ‘fight’
gər.v-í-l ‘to fight’

The iterative *-d-* is highly lexicalized and appears in few words.[20] Just like for the passive, the appearance and location of the pre-intensive schwa is also idiosyncratic. For example, the *rd͡ʒ* cluster can form a word-medial complex coda: *gard͡ʒ-n-a-l* ‘to become short’. I argue that the same set of morpheme-specific constraints from the passive are also needed for the intensive. Furthermore, just like in passives, the epenthesis seemingly overapplies after roots with deleted high vowels: *gər.və’.díl* instead of **gə.rəv.díl* ‘to fight’. Thus, I argue that the form of these intensive verbs is derived from the stem of simple active verbs..[21]

A much rarer iterative affix is *-k-* or *-g-* (voicing variation is dialectal). It’s rare enough that traditional and modern reference grammars don’t list it. It’s largely restricted to non-standard dialectal words. Data is from Vaux (1998:66,126) and Wiktionary. The transcriptions below are in the Eastern variant because some don’t have equivalents in Western Armenian. Some of these verbs only exist as intensive verbs, without a corresponding active verb.

(56) a. hər.məʃ.-t-é-l ‘to jostle’
hər.məʃ-tə-k-é-l ‘id.’

b. bə.rəʃ-tə-k-é-l ‘to waft’

c. gə.rəʃ.tə-k-é-l ‘to burp’

Again, the pre-affixal schwa before *-k-* is predictable if we treat it as cyclically derived from the stem of active verbs. Though as a caveat, these two affixes are unproductive or non-existent in the standard dialects. More data on these affixes could be collected via dialectal fieldwork or by examining dialectal dictionaries.

7 Conclusion

This paper presented data on passive verbs in Armenian. I showed that the passive suffix idiosyncratically trigger a process of epenthesis directly before it. This process of epenthesis opaquely interact with cyclic vowel reduction. To resolve this paradox, I argued that the passive verb is computed from the stem of active verbs, not from roots. On the surface, this passive-active dependence looks like a case of pseudo-cyclicity because the exponents of the active stem are not all part of the passive stem (Steriade 2008).

[20] The iterative has many suppletive allomorphs and they are all lexicalized. Lists can be found in Dum-Tragut (2009:171) and Avetisyan (2007:135). Most are either unproductive or too ‘big’ to trigger epenthesis or opaque vowel reduction, i.e. they are vowel-initial *-od* or contain a closed syllable *-gərd-*.

[21] The Eastern Armenian intensive *bəz.kə-t-é-l* ‘to tear up’ is derived from *bə.zíg* ‘strip’. It is pronounced without a pre-affixal schwa in Western Armenian *pə.zəg-d-é-l*. Ġaragyowlyan (1979:43) argues that this is an arbitrary dialectal difference. I agree with Vaux (1998:126) and assume that the absence of a pre-affixal schwa before the affix *-d-* in certain words is caused by morphological reanalysis of the affix, i.e. that is no longer parsed as a separate morpheme by speakers in certain words: *pə.zəg.tdé-l*.

Later in the paper, I argued however that passives are in fact cyclically derived from actives. Evidence comes from their morphosemantics, alongside their morphophonology. In order to explain the difference in surface exponents between passives and actives, I argued for an affix truncation rule (Aronoff 1976) which is equivalent a DM readjustment rule (Trommer 2012b). The use of cyclicity was further reinforced by data from dialectal variation and less common morphology.

In summary, the takeaway from this paper is that Armenian presents a cse of apparently pseudocyclic dependence of passive stems over active stems. But when viewed within a large morphological system, there is evidence that passives are actually cyclically derived from passives. Any surface mismatches are due to affix truncation.

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