

CYCLIC RESIDUES OF AFFIX DELETION IN ARMENIAN PASSIVES

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- Title: *Cyclic residues of affix deletion in Armenian passives*
 - Will look at data from Armenian passives
 - Passive stem is synthetic with a consonantal suffix /-v-/.
 - On the surface, passive verbs look like they're derived from roots
 - But a slew of evidence suggests that passives are derived from active stems via a cyclic rule of theme vowel deletion
- = Cyclic system of:
1. Spell-out active theme vowel → Phonology →
 2. Spell-out passive → Delete active morph → Phonology
! affix deletion with phonological residue

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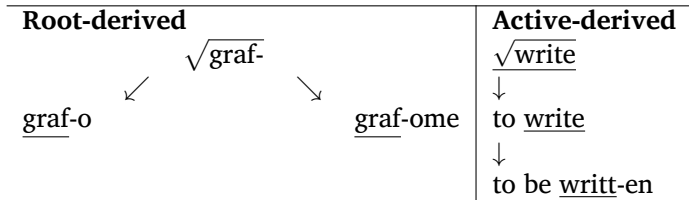
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- Working heuristic: Cyclic containment with the Mirror Principle (Baker, 1985; Bermúdez-Otero, 2011)
- = If a word ABC is morphologically segmentable as $A + B + C$, then:
- ▶ $A \rightarrow AB \rightarrow ABC$
 - ▶ AB is derived from A
- Most of the time, Cyclic Containment works.

- Working heuristic: Cyclic containment with the Mirror Principle (Baker, 1985; Bermúdez-Otero, 2011)
- = If a word ABC is morphologically segmentable as $A + B + C$, then:
- ▶ $A \rightarrow AB \rightarrow ABC$
 - ▶ AB is derived from A
- Most of the time, Cyclic Containment works.
 - But some data require Transderivationalism
 - ▶ Form AB is affected by a related but not intermediate form AC (Breiss, 2021)
 - Argument:
 - ▶ Armenian passive superficially looks like a case of a transderivational relationship: passive AC is affected by active AB
 - ▶ But, derivationally, surface passive $[AC]$ is actually underlyingly $/ABC/$ with a deleted B

DERIVATIONAL PATHS FOR A PASSIVE

- Cross-linguistically, passives have a complicated relationship with their active counterparts (Alexiadou et al., 2018)
- Passive is derived from the active (English) or from the root (Greek).



- Armenian passive is a synthetic passive with suffix *-v-*
- For a simple regular verb, the active verb is *root-TH-INF*
- Common theme vowels are *-e-*, *-i-*, *-a-* (= E-Class, I-Class, A-Class)

Root	<u>t^has</u>	✓	'class'
Active:	<u>t^has</u> -e-l	✓-TH-INF	'to classify'
Passive:	<u>t^has</u> -v-i-l	✓-PASS-TH-INF	'to be classified'

- Passive is *root-PASS-TH-INF*. The theme vowel is always *-i-*

DERIVATION OF PASSIVE

- Based on typology of active-passive connections, there are two possible derivations for the Armenian passive
- Greek-like: derive passive from root
- English-like: derive passive from active

Root-derived	Active-derived
<p style="text-align: center;"><u>t^has</u></p> <p>t^has-e-l ↙ ↘ t^has-v-i-l</p>	<p><u>t^has</u> ‘class’</p> <p>↓</p> <p><u>t^has-e-l</u> ‘to classify’</p> <p>↓</p> <p><u>t^has-v-i-l</u> ‘to be classified’</p>

- Most obvious analysis is that passive is derived from root, but there's evidence for active-based derivation

- Vowel-hiatus is typically repaired across morpheme boundaries
- For root-final /a/, adding a vowel triggers glide epenthesis

	ḍzara	‘servant’	vəga	‘witness’
+ C	ḍzara-n	‘servant-DEF’	vəga-n	‘witness-DEF’
	ḍzara-ner	‘servant-PL’	vəga-ner	‘witness-PL’
+ V	ḍzara[j]-ov	‘servant-INS’	vəga[j]-ov	‘witness-INS’
	ḍzara[j]-ut ^h jun	‘service’	vəga[j]-ut ^h jun	‘testimony’

- Simple transparent phonology

OPAQUE GLIDE PHONOLOGY

- When a /a/-final root is turned to an active verb, get glide epenthesis because of vowel hiatus from theme vowel /-e-/

	\widehat{dzara}	‘servant’	$v\grave{a}ga$	‘witness’
Active	$\widehat{dzara}[j]-e-l$	‘to serve’	$v\grave{a}ga[j]-e-l$	‘to witness’

OPAQUE GLIDE PHONOLOGY

- When a /a/-final root is turned to an active verb, get glide epenthesis because of vowel hiatus from theme vowel /-e-/

	\widehat{dzara}	‘servant’	$v\acute{a}ga$	‘witness’
Active	$\widehat{dzara}[j]-e-l$	‘to serve’	$v\acute{a}ga[j]-e-l$	‘to witness’

- When turn into a passive verb, unexpectedly get the glide /j/ even though there’s no vowel hiatus

	\widehat{dzara}	‘servant’	$v\acute{a}ga$	‘witness’
Passive	$\widehat{dzara}[j]-v-i-l$	‘to be served’	$v\acute{a}ga[j]-v-i-l$	‘to be witnessed’

- The passive stem is pre-consonantal, but it acts as if it’s pre-vocalic

OPAQUE GLIDE PHONOLOGY

- For the active verb, glide epenthesis is a transparent way to repair vowel hiatus

(1) *Phonotactically-motivated glide epenthesis in actives*

/ḏzara/ + /-e-l/		MAX	ONSET	DEP-j
a.	ḏzara-e-l		*!	
b.	ḏzaraj-e-l			*

OPAQUE GLIDE PHONOLOGY

- For the active verb, glide epenthesis is a transparent way to repair vowel hiatus

(3) *Phonotactically-motivated glide epenthesis in actives*

/ḏzara/ + /-e-l/		MAX	ONSET	DEP-j
a.	ḏzara-e-l		*!	
b.	ḏzaraj-e-l			*

- For the passive, there's no phonological reason to add a glide – *if* we derive passives from roots

(4) *Root-derived: Phonotactically un-motivated glide epenthesis fails*

/ḏzara/ + /-v-i-l/		MAX	ONSET	DEP-j
a.	☹ ḏzara-v-i-l			
b.	ḏzaraj-v-i-l			*!

CYCLIC EPENTHESIS

- Glide epenthesis applies in passives *because* the glide was in the active form
- Pre-consonantal passive stem wants to look like the pre-vocalic active stem
- Capture this by deriving the passive verb [*ḍzaraj-v-i-l*] from the *active stem* in [*ḍzaraj-e-l*]

(5) *Phonotactically-motivated glide epenthesis in actives*

/ḍzara/ + /-e-l/	MAX	ONSET	DEP-j
a. ḍzara-e-l		*!	
b. ✎ ḍzaraj-e-l			*


(6) *Active-derived: Paradigmatically-motivated glide epenthesis*

[ḍzaraj-] + /-v-i-l/	MAX	ONSET	DEP-j
a. ḍzara-v-i-l	*!		
b. ✎ ḍzaraj-v-i-l			

MAKING MORPHOLOGY WORK

- The phonology of glide epenthesis wants to derive passive verbs from active stem

(7)

[$\widehat{d}zaraj-$] + /-v-i-l/	MAX	ONSET	DEP-j
a. $\widehat{d}zara-v-i-l$	*!		
b.  $\widehat{d}zaraj-v-i-l$			

- But the morphology has to provide this *bound* stem [$\widehat{d}zaraj-$]
- How?

MAKING MORPHOLOGY WORK

- The phonology of glide epenthesis wants to derive passive verbs from active stem

(8)

[$\widehat{d}zaraj-$] + /-v-i-l/	MAX	ONSET	DEP-j
a. $\widehat{d}zara-v-i-l$	*!		
b. $\widehat{d}zaraj-v-i-l$			

- But the morphology has to provide this *bound* stem [$\widehat{d}zaraj-$]
- How?
- Remember the possible pathways for the passive?

Root-derived	Active-derived
$\widehat{d}zara$	$\widehat{d}zara$ 'servant'
$\widehat{d}zaraj-e-l$ ↙	↓ $\widehat{d}zaraj-e-l$ 'to serve'
$\widehat{d}zaraj-v-i-l$ ↘	↓ $\widehat{d}zaraj-v-i-l$ 'to be served'

- Each pathway coincides with a specific morphological structure (Alexiadou et al., 2015)

PASSIVE STRUCTURE

- Each pathway coincides with a specific morphological structure (Alexiadou et al., 2015)

Active <i>d̄zaraj-e-l</i> 'to serve'	Passive <i>d̄zaraj-v-i-l</i> 'to be served'	Passive <i>d̄zaraj-v-i-l</i> 'to be served'
	(root-derived)	(active-derived)
<p>A morphological tree for the active form. The root node is T, which branches into VOICE and a terminal node. VOICE branches into v and another VOICE node. The v node branches to the root vowel /d̄zara/. The second VOICE node branches into VOICE and TH. The third VOICE node branches into TH and INF. The terminal node branches into TH and INF. The leaf nodes are /d̄zara/, -∅, -e, and -l.</p>	<p>A morphological tree for the root-derived passive form. The root node is T, which branches into PASS and a terminal node. PASS branches into v and another PASS node. The v node branches to the root vowel /d̄zara/. The second PASS node branches into PASS and TH. The third PASS node branches into TH and INF. The terminal node branches into TH and INF. The leaf nodes are /d̄zara/, -v, -i, and -l.</p>	<p>A morphological tree for the active-derived passive form. The root node is T, which branches into PASS(=VOICE) and a terminal node. PASS(=VOICE) branches into VOICE and another PASS(=VOICE) node. The first VOICE node branches into v and another VOICE node. The v node branches to the root vowel /d̄zara/. The second VOICE node branches into VOICE and TH. The third VOICE node branches into TH and INF. The first PASS(=VOICE) node branches into PASS and TH. The second PASS(=VOICE) node branches into TH and INF. The terminal node branches into TH and INF. The leaf nodes are /d̄zara/, -∅, /e/, -v, -i, and -l.</p>

- Root-derived passive has one voice layer, while active-derived has two voice layers
- Passive is derived from active, but deletes the active theme vowel :O

- Passive is derived from active, but deletes the active theme vowel :O

(9) *Theme-vowel deletion (truncation) before the passive suffix*

TH → -∅- / _ ◡ PASS

- Passive is derived from active, but deletes the active theme vowel :O

(10) *Theme-vowel deletion (truncation) before the passive suffix*

TH → -∅- / _-PASS

- Passive verb underlying has the active theme vowel /-e-/.
- This theme vowel triggers glide epenthesis
- But the passive suffix deletes this theme vowel

'to be served'		$\sqrt{\text{serve}} \text{-TH -PASS-TH-INF}$
Input		$\sqrt{\text{serve}} + /-e/ + /-v-i-l/$
Active Cycle	Morphology	$/\widehat{\text{d}}\text{zara}/ + /-e/$
	Phonology	$\widehat{\text{d}}\text{zaraj-e}$
Passive Cycle	Morphology	$\widehat{\text{d}}\text{zaraj-e} + /-v-i-l/$
	Truncation	$\widehat{\text{d}}\text{zaraj-} /-v-i-l/$
	Phonology	$\widehat{\text{d}}\text{zaraj-v-i-l}$

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INTERIM SUMMARY

- Despite surface appearances, passive verbs *seem* to be derived from active stems, not from roots
- But, active stems are phonologically derived from roots + theme vowels
- To capture paradox, the passive has to magically delete the active's theme vowel

<u>ḏzara</u>	'servant'
↓	
<u>ḏzaraj-e-l</u>	'to serve'
↓	
<u>ḏzaraj-∅-v-i-l</u>	'to be served'

- Outside of phonology, there's also semantic and morphological evidence for this derivation!

EXHIBIT A: PRODUCTIVITY

- In Alexiadou et al. (2015)'s typology, productive passivization means that the passive is active-derived
- English active-derived passive is productive, while Greek root-derived passive is not productive
- If Armenian passive is active-derived, then we predict it should be productive
 - ▶ It is!
 - ▶ Virtually any transitive active verb can be passivized

EXHIBIT B: *ABA EFFECTS

- Recall our morphological pathways

Root-derived		Active-derived	
	<u>ḍzara</u>	<u>ḍzara</u>	'servant'
↙		↓	
<u>ḍzaraj-e-l</u>		<u>ḍzaraj-e-l</u>	'to serve'
	↘	↓	
	<u>ḍzaraj-v-i-l</u>	<u>ḍzaraj-v-i-l</u>	'to be served'

- Root-derived: active and passive semantic derivations are independent
 - Active-derived: passive semantics depend on active semantics
- Active-derivation correctly predicts containment effects like *ABA effects

- AAA: In typical case, root > active > passive have composition semantics
- ABB: root has one meaning, but active/passive have separate meaning together
- AAB: passive is unique meaning
- ABC: root, active, passive, each have separate meaning

AAA		ABB		AAB or ABC	
t ^h as	'class'	t ^h aʁ	'district'	nəʃan	'sign'
t ^h as-e-l	'to classify'	t ^h aʁ-e-l	'to bury'	nəʃan-e-l	'to mark'
t ^h as-v-i-l	'to be classified'	t ^h aʁ-v-i-l	'to be buried'	nəʃan-v-i-l	'to be betrothed'

- AAA: In typical case, root > active > passive have composition semantics
- ABB: root has one meaning, but active/passive have separate meaning together
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AAA		ABB		AAB or ABC	
t ^h as	'class'	t ^h aʁ	'district'	nəʃan	'sign'
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t ^h as-v-i-l	'to be classified'	t ^h aʁ-v-i-l	'to be buried'	nəʃan-v-i-l	'to be betrothed'

- *ABA: There are no passive verb that are compositional wrt root, but not the active
- e.g., *class, to eat, to be *classified*

EXHIBIT C: OTHER THEME VOWELS

- For a verb like *to serve*, the active theme vowel /-e-/ triggers glide epenthesis, and then deletes

<u>d̄zara</u>	‘servant’
↓	
<u>d̄zaraj-e-l</u>	‘to serve’
↓	
<u>d̄zaraj-∅-v-i-l</u>	‘to be served’

¹This suffix is a morphomic thing (Dolatian & Guekguezian, 2022).

EXHIBIT C: OTHER THEME VOWELS

- For a verb like *to serve*, the active theme vowel /-e-/ triggers glide epenthesis, and then deletes

d̄zara ‘servant’
↓
d̄zaraj-e-l ‘to serve’
↓
d̄zaraj-∅-v-i-l ‘to be served’

- But there’s a conjugation class with the theme vowel /-a-/ (= A-Class).
- For this class, the passive is formed by adding a meaningless suffix called the aorist /-ts̄-/ between the theme and passive.¹

gart^h-a-l ‘to read’
↓
gart^h-a-ts̄^h-v-i-l ‘to be read’

¹This suffix is a morphomic thing (Dolatian & Guekguezian, 2022).

THEME VOWEL RETENTION

- For the theme vowel /-e-/, the passive suffix triggers deletion
- But for the theme vowel /-a-/, the passive suffix triggers a meaningless intervener /-ts-/

<u>d̄zara</u>	‘servant’		
↓			
<u>d̄zaraj-e-l</u>	‘to serve’	<u>gart^h-a-l</u>	‘to read’
↓		↓	
<u>d̄zaraj-∅-v-i-l</u>	‘to be served’	<u>gart^h-a-t̄s-v-i-l</u>	‘to be read’

- This pattern actually happens for other suffixes too like participle suffixes

<u>d̄zara</u>	‘servant’		
↓			
<u>d̄zaraj-e-l</u>	‘to serve’	<u>gart^h-a-l</u>	‘to read’
↓		↓	
<u>d̄zaraj-∅-oṣ</u>	‘server’	<u>gart^h-a-t̄s-oṣ</u>	‘reader’

- Generalization: some suffixes delete the /-e-/ theme vowel, while they force a meaningless item /-ts-/ to be inserted after /-a-/

RULE INTERACTION

- Generalization: some suffixes delete the /-e-/ theme vowel, while they force a meaningless item to be inserted after /-a-/

(11) a. Inserting the aorist for passives of /a/-themed verbs

$$\emptyset \Rightarrow \widehat{-ts-} / \alpha_{TH} \sim _ \sim \text{PASS}$$

b. Deleting theme vowels before passives

$$TH \rightarrow -\emptyset- / _ \sim \text{PASS}$$

- Insertion bleeds deletion for the /a/ theme vowel

	E-Class <i>t^has-e-l</i> 'to classify'					A-Class <i>gart^h-a-l</i> 'to read'					
Input:	t ^h as	-e	-v	-i	-l	gart ^h	-a	-v	-i	-l	
Insertion :						gart ^h	-a	$\widehat{-ts-}$	-v	-i	-l
Deletion :	t ^h as	- \emptyset	-v	-i	-l						
	✓	TH	PASS	TH	INF	✓	TH	AOR	PASS	TH	INF

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- Despite surface appearances, passive verbs are derived from active verbs.
- The passive suffix deletes the preceding active theme vowel
- Evidence came from phonology, semantics, and morphology

ḏzara ‘servant’
↓
ḏzaraj-e-l ‘to serve’
↓
ḏzaraj-∅-v-i-l ‘to be served’

- Let's discuss some problems and alternatives

TRUNCATION IS DESTRUCTIVE

- Morphology provides the active stem / $\widehat{d}zaraj-e/$.
- Passive morphology then deletes this theme vowel.

(12) Deleting theme vowels before passives

TH \rightarrow $-\emptyset-$ / $_{-}\widehat{\quad}$ PASS

Input		$\sqrt{\text{serve}} + /-e/ + /-v-i-l/$
Active Cycle	Morphology	$\widehat{d}zara/ + /-e/$
	Phonology	$\widehat{d}zaraj-e$
Passive Cycle	Morphology	$\widehat{d}zaraj-e + /-v-i-l/$
	Truncation	$\widehat{d}zaraj- /-v-i-l/$
	Phonology	$\widehat{d}zaraj-v-i-l$

- This rule of deletion is a truncation rule (Aronoff, 1976), or a type of morph-deleting readjustment rule (Trommer, 2012)

NON-DESTRUCTIVE ALTERNATIVE

- If your theory of morphology doesn't allow affix deletion or morph deletion, you can always think of similar cheats
- = passive is made up of a defective vowel node X and a suffix -v: -Xv
- When added to an active stem, the defective X triggers phonetic non-interpretation of the theme vowel

Input		$\sqrt{\text{serve}} + /-e/ + /-Xv-i-l/$
Active Cycle	Morphology	$/\widehat{d}zara/ + /-e/$
	Phonology	$\widehat{d}zaraj-e$
Passive Cycle	Morphology	$\widehat{d}zaraj-e + /-Xv-i-l/$
	Docking	$\widehat{d}zaraj-(\emptyset) /-v-i-l/$
	Phonology	$\widehat{d}zaraj-(\emptyset)-v-i-l$

- But ultimately the same story

OUTPUT-OUTPUT?

- Primary paradox is that phonological rules like glide epenthesis overapply in passives.

‘servant’ ‘to serve’ ‘to be served’
ḍzara ḍzara[j]-e-l ḍzara[j]-v-i-l

- We can’t derive passive glides if we derive passives from roots.

(13) *Root-derived: Phonotactically un-motivated glide epenthesis fails*

/ḍzara/ + /-v-i-l/	MAX	ONSET	DEP-j
a. ☹ ḍzara-v-i-l			
b. ḍzaraj-v-i-l			*!

- Instead, I argued we derive passives from actives.

(14) *Active-derived: Paradigmatically-motivated glide epenthesis*

[ḍzaraj-] + /-v-i-l/	MAX	ONSET	DEP-j
a. ḍzara-v-i-l	*!		
b. ☺ ḍzaraj-v-i-l			

OUTPUT-OUTPUT?

- But, with a root-derived analysis, we could derive glide epenthesis if we use Output-Output constraints

(15) *Root-derived: Input is root but phonology has output-output constraints*

B ^L : [d̄zara] /-v-i-l/	OO-MAX	ONSET	DEP-j
B ^R : [d̄zaraj-e-l]			
a. d̄zara-v-i-l	*!		
b. ↵ d̄zaraj-v-i-l			*

- Analysis works but...
 - ▶ Under-generates: can't predict the other active-passive dependencies from semantics (productivity, *ABA) or morphology (variably appearing themes)
 - ▶ Over-generates: OO allows us to have cases where the passive phonology shows *some* influence from the root, but we never do
 - ▶ Same story: OO wants passive to look like active stem (= active verb without theme vowel)

DIACHRONIC ORIGIN

- Theme vowel deletion looks like a crazy rule
- Synchronic craziness is diachronic residue!
- The modern passive consonant /-v-/ used to be a vowel /-u-/

DIACHRONIC ORIGIN

- Theme vowel deletion looks like a crazy rule
- Synchronic craziness is diachronic residue!
- The modern passive consonant /-v-/ used to be a vowel /-u-/
/e-/ and /i-/ would alternative for voice

‘to classify’ das-e-l √-TH-INF

‘to be classified’ das-i-l √-TH-INF

- Over time, a theme vowel /-u-/ was redundantly added before the /-i-/.
The /-u-/ became /-v-/ because of vowel hiatus. Then /-v-/ got
grammaticalized as passive.

Reconstructed: das-u-i-l √-TH-TH-INF

Vowel hiatus repair: das-v-i-l √-TH-TH-INF

Grammaticalized: das-v-i-l √-PASS-TH-INF

DIACHRONIC ORIGIN

- Classical passive stems used to always precede vowels /-i-/;
Post-Classical with /-u-i/
- Phonological rules would apply because the passive stem was pre-vocalic
- But now, their modern forms precede a consonant-initial sequence [-v-i-]. Yet we still treat these stems as pre-vocalic, via reanalysis with cyclic truncation
- We could recapitulate this diachronic story with abstract UR of passive [-v-] as /-u-/

Input	√-PASS-TH-INF	'to be served' /ḏzara-u-i-l/
Root Cycle 1		ḏzara
Passive Cycle 2	Suffixation Glide epenthesis	ḏzara + /-u/ ḏzaraj-u
Theme Cycle 3	Suffixation Frication	ḏzaraj-u + /-i-l/ ḏzaraj-v-i-l

DIACHRONY IN SYNCHRONY

- We could recapitulate this diachronic story with abstract UR of passive [-v-] as /-u-/

Input	√-PASS-TH-INF	‘to be served’ /d̄zara-u-i-l/
Root Cycle 1	Stress	d̄zara
Passive Cycle 2	Suffixation	d̄zara + /-u/
	Glide epenthesis	d̄zaraj-u
Theme Cycle 3	Suffixation	d̄zaraj-u + /-i-l/
	Frication	d̄zaraj-v-i-l

- But...
 - ▶ Under-generates: doesn't predict semantics or morphology effects
 - ▶ Absolute neutralization: why should the child posit a different underlying segment?
 - ▶ Too abstract: truncation & OO are at least motivated by surface-true morphological generalizations (= passive stem depends on active stem)

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CONCLUSION

- We looked at passive verbs in Armenian
- On the surface, would think that a synthetic passive verb is derived from the root, and not from a separate synthetic active verb

Root-derived		Active-derived	
	<u>d̄zara</u>	<u>d̄zara</u>	'servant'
<u>d̄zaraj-e-l</u>	↙ ↘	↓	'to serve'
	<u>d̄zaraj-v-i-l</u>	↓	'to be served'

- But a wealth of evidence argues for an abstract derivation from actives to passives
- There's even more phonological evidence in the appendix :D
- Essentially, have a cyclic dependency from a bound active stem into a bound passive stem

- Armenian data provides multiple levels of generalization and argument:
 1. On the **surface**: the phonology of Armenian passive stems is computed from active stems
 2. **Truncation**: To encode this dependency in a cyclic framework, we need morphological rules that can delete morphs or heads during a cyclic derivation (Trommer, 2012)
 - = Spell-out → Phonology → Spell-out → Delete → Phonology
 3. **Cyclicity**: Cyclicity can apply in deriving between bound stems (Bobaljik, 1997), not just between free-standing forms (contra traditional OO)
 4. **Abstraction**: Surface morphotactics can contradict underlying morphological structure. We need some level of abstraction
 5. **Cross-modulars**: Abstract structures (= deleted theme vowels) and Cyclic Containment are more convincing when have multiple modules to corroborate (phonology, semantics, morphology)

- We focused on a single case study in depth. This case-study had the following ingredients:
 - ▶ Synthetic voice morphology
 - ▶ Cyclic phonology
- The result was an analysis that required affix deletion or truncation in order to make everything work.
- Possible future work (for someone who's not me)
 - ▶ Do any other cases of synthetic passives show multi-modular dependencies in active-passive phonology + semantics?
 - ▶ Do other alleged cases of truncation (English: Aronoff 1976; Russian: Darden 1988, Polish: Szpyra 1989) show cross-modular evidence?

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MORE PHONOLOGICAL DATA

- Main story: passive is derived from active stem
- Evidence came from phonology, morphology, and semantics
- There's even more evidence from the phonology
- Basic gist:
 - ▶ Passive stem is pre-consonantal on the surface
 $\sqrt{-v-i-l}$
 - ▶ But derivationally, it acts as if it's pre-vocalic because of deleted theme vowel
 $\sqrt{/\cancel{v}-i-l}$

- When the passive suffix is after a C, nothing special happens
- But when passive is after CC, we get arbitrary schwa epenthesis

C-PASS		CC[ə]-PASS	
t ^h as	‘class’	nerg	‘paint’
t ^h as-e-l	‘to classify’	nerg-e-l	‘to paint’
t ^h as-v-i-l	‘to be classified’	nergə-v-i-l	‘to be painted’

- Assume got a morpheme-specific rule for this

(16) Pre-passive epenthesis

$\emptyset \rightarrow \text{ə} / \text{CC_PASS}$

VOWEL REDUCTION

- Independently, there's a rule of destressed high vowel reduction
- Stress is final, and we reduce destressed high vowel to schwa by default
- If syllable is open [Cə] and if deletion doesn't create bad clusters, then delete the schwa

ga.múrtʃ̄	'bridge'		d̄za.ʋíg	'flower'
ga.məɾ.tʃ̄-él	'to bridge'		d̄zaʋ.g-él	'to ornament'

- Basic rule:

(17)

$$\begin{array}{l} /i/ \rightarrow \text{ə} \\ /ə/ \rightarrow \emptyset \quad / \text{C_CV} \end{array}$$

- Note how deletion happens if before a vocalic suffix

VOWEL REDUCTION IN PASSIVES

- For passives, the high vowel is a schwa iff the active used a schwa
- If the active had zero, then the passive has zero

ga.múrtʃ	‘bridge’		d̄za.ɸíg	‘flower’
ga.mər.tʃ-él	‘to bridge’		d̄zak.g-él	‘to ornament’
ga.mər.tʃə-víl	‘to be bridged’		d̄zak.gə-víl	‘to be ornamented’

- For verbs with a schwa in passive + active, a root-derived analysis works.

Input		$\sqrt{\text{bridge}} /-e-l/$	$\sqrt{\text{bridge}} /-v-i-l/$
Morphology		gamurtʃ + /-e-l/	gamurtʃ + /-v-i-l/
Phonology	/ĩ/ → [ə]	gamərtʃ-él	gamərtʃ-víl
	/ə/ → ∅		
	CC_v → CCəv		gamərtʃə-víl
Output		gamərtʃ-él	gamərtʃə-víl

VOWEL REDUCTION IN PASSIVES

- For passives, the high vowel is a schwa iff the active used a schwa
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ga.múrtʃ	‘bridge’	ḍza.ɸíg	‘flower’
ga.mər.tʃ-él	‘to bridge’	ḍzaɸ.g-él	‘to ornament’
ga.mər.tʃə-víl	‘to be bridged’	ḍzaɸ.gə-víl	‘to be ornamented’

- But for actives with zero, if we derive passive from root, then we don’t expect the pre-passive schwa in ‘to be ornamented’

Input		√orn. /-e-l/	√orn. /-v-i-l/
Morphology		ḍzaɸig + /-e-l/	ḍzaɸig + /-v-i-l/
Phonology	/ĩ/ → [ə]	ḍzaɸəg-él	ḍzaɸəg-víl
	/ə/ → ∅	ḍzaɸg-él	
	CC_v → CCəv		
Output		ḍzaɸg-el	*ḍzaɸəg-vil

VOWEL REDUCTION BECAUSE OF ACTIVES

- Basic gist: vowel reduction treats the pre-consonantal passive stem as being pre-vocalic, because the active stem is pre-vocalic
- Vowel reduction works if we derive passives from actives, again

Input			$\sqrt{\text{orn.}} + /-e-l/$	$\sqrt{\text{orn.}} /-e/ + /-v-i-l/$
Active cycle	Morphology		$\widehat{d}zaxig + /-e-l/$	$\widehat{d}zaxig + /-e/$
	Phonology	$/i/ \rightarrow [ə]$ $/ə/ \rightarrow \emptyset$	$\widehat{d}zaxəg-él$ $\widehat{d}zaxg-él$	$\widehat{d}zaxəg-é$ $\widehat{d}zaxg-é$
Passive cycle	Morphology			$\widehat{d}zaxg-é + /-v-i-l/$
	Truncation			$\widehat{d}zaxg- + /-v-i-l/$
	Phonology	$CC_v \rightarrow CCəv$		$\widehat{d}zaxgə- /-v-i-l/$
Output			$\widehat{d}zaxg-el$	$\widehat{d}zaxgə-vil$

- Vowel reduction applies from root to active, not from root to passive nor from active to passive.
- Passive stems wants to be identical to reduced active stem.