Armenian prosody

A case for prosodic stems

Hossep Dolatian

University of Delaware

May 25, 2017

Table of Contents

The Message - What's prosody?

- Prosodic phonology argues: (Nespor and Vogel, 1986; Selkirk, 2011)
  1. phonological processes apply within phonological domains or constituents (P-constituents)
  2. P-constituents are derived from morpho-syntactic structure

The Message - What are P-constituents?

- The traditional hierarchy has the Prosodic Word (PWord) be the lowest morphologically-derived P-constituent

Adapted from (Selkirk, 2011; Downing, 1999)

Intonational Phrase (ι)

|

Phonological Phrase (φ)

|

———-Prosodic Word (ω or PWord)—-

The Message - Are they enough?

- But the PStem has been argued to be an additional sublexical (below PWord) P-constituent

Adapted from (Selkirk, 2011; Downing, 1999)

Intonational Phrase (ι)

|

Phonological Phrase (φ)

|

———-Prosodic Word (ω or PWord)—-

|

Prosodic Stem (PStem)

The Message - Is PStem needed?

- The PStem's existence is controversial
- Data from Armenian will show that the PStem is
  - → required P-constituent
  - → typological property of agglutinative languages
  - → part of the Prosodic Hierarchy

Background on Armenian

- Armenian is a suffixing agglutinative Indo-European language
  - Standard Western Armenian (SWA)
  - Standard Eastern Armenian (SEA)
- Both dialects have two word-level prosodic processes:
  - primary stress assignment
  - destressed vowel reduction
- An adequate model for their domains and dialectal differences requires the PWord AND PStem

Table of Contents

Stress in SWA & SEA - Position

- SWA and SEA have stress fall on the rightmost full vowel in the morphological word (MWord)

(1) a. k**ó**rd͡z 'work'

Stress in SWA & SEA - Position

- SWA and SEA have stress fall on the rightmost full vowel in the morphological word (MWord)

(2) a. k**ó**rd͡z ‘work’

b. kord͡z-av**ó**r ‘worker’

Stress in SWA & SEA - Position

- SWA and SEA have stress fall on the rightmost full vowel in the morphological word (MWord)

(3)

a.	k**ó**rd͡z	'work'
b.	kord͡z-av**ó**r	'worker'
c.	kord͡z-avor-n**é**r	'workers'

Stress in SWA & SEA - Position

- SWA and SEA have stress fall on the rightmost full vowel in the morphological word (MWord)

(4)

a.	k**ó**rd͡z	'work'
b.	kord͡z-av**ó**r	'worker'
c.	kord͡z-avor-n**é**r	'workers'
d.	kord͡z-avor-n**é**r-ə	'the workers'

Stress in SWA & SEA - Position

- SWA and SEA have stress fall on the rightmost full vowel in the morphological word (MWord)

(5)

a.	k**ó**rd͡z	'work'
b.	kord͡z-av**ó**r	'worker'
c.	kord͡z-avor-n**é**r	'workers'
d.	kord͡z-avor-n**é**r-ə	'the workers'

- Sometimes it coincides with the rightmost syllable (a-c), sometimes doesn't (d)

Stress in SWA & SEA - Morphology

- It doesn't matter if the rightmost full vowel is part of the a) root, b) derivational suffix, or c) inflectional suffix.

(6)

a.	k**ó**rd͡z	'work'
b.	kord͡z-av**ó**r	'worker'
c.	kord͡z-avor-n**é**r	'workers'

Stress in SWA & SEA - Morphology

- It doesn't matter if the rightmost full vowel is part of the a) root, b) derivational suffix, or c) inflectional suffix.

(8)	a.	k**ó**rd͡z	'work'
	b.	kord͡z-av**ó**r	'worker'
	c.	kord͡z-avor-n**é**r	'workers'

- But, stress doesn't fall on an enclitic

(9)	a.	kord͡z-avor-n**é**r en	'(they) are workers '

Primary stress - Prosodic Domain

- Assume PWord is subsection of MWord which is domain of stress (Vogel, 2008; Nespor and Vogel, 1986)
  - MWord = PWord.

(10) /kordz͡-avor-ner$\}_{MW}$ en/
↓↓↓
[kordz͡-avor-nér$\}_{PW}$ en]

Primary stress - Prosodic Domain

- Assume PWord is subsection of MWord which is domain of stress (Vogel, 2008; Nespor and Vogel, 1986)
  - MWord = PWord.

(11) /kord͡z-avor-ner$\}_{MW}$ en/
↓↓↓
[kord͡z-avor-nér$\}_{PW}$ en]

- For simplicity, all examples will be one MWord and one PWord
  - PWord boundaries won't be placed
  - OT constraints & ranking in appendix

Table of Contents

Vowel reduction

- In SWA and SEA, stress is assigned and reassigned cyclically as each suffix is added.
- Evidence is reduction of destressed high vowels to nothing (or sometimes schwa).

(12)

a.	irig**ú**n	'night'
b.	irign-ad**é**n	'nighttime'

Vowel reduction - Phonological factors

- In SWA & SEA, reduction has the same phonological factors
  1. vowel must be de-stressed, not just un-stressed

(13)

a.	irig**ú**n	'night'
b.	irign-ad**é**n	'nighttime'

Vowel reduction - phonological factors

- In SWA & SEA, reduction has the same phonological factors
  1. vowel must be de-stressed, not just un-stressed

(14)

a.		irigún	'night'
b.		irign-adén	'nighttime'
c.	*	irgun-adén	'nighttime'

Vowel reduction - phonological factors

- In SWA & SEA, reduction has the same phonological factors
  1. vowel must be de-stressed, not just un-stressed
  2. vowel must be high /i, u/

(15)

a.	mak**ú**r	'clean'
	makr-utj**ú**n	'cleaning'
b.	azn**í**v	'honesty'
	aznv-utj**ú**n	'honesty'
c.	ur**á**x	'happy'
	ur**a**x-utj**ú**n	'happiness'
	*urx-utj**ú**n	'happiness'

Vowel reduction - phonological factors

- In SWA & SEA, reduction has the same phonological factors
  1. vowel must be de-stressed, not just un-stressed
  2. vowel must be high /i, u/
     - high diphthong /uj/ reduces to /u/

(16)

a.		k**új**n	'color'
b.		k**u**n-av**ó**r	'colorful'
c.	*	kujn-av**ó**r	'colorful'

Vowel reduction - phonological factors

- In SWA & SEA, reduction has the same phonological factors
  1. vowel must be de-stressed, not just un-stressed
  2. vowel must be high /i, u/
     - high diphthong /uj/ reduces to /u/
  3. vowel is reduced to nothing OR to schwa to prevent an onset cluster

(17)	a.	irig**ú**n	'night'
	b.	irign-ad**é**n	'nighttime'
(18)	a.	k**í**r	'letter'
	b.	* kr-**í**t͡ʃ	'pen'
	c.	kər-**í**t͡ʃ	'pen'

Vowel reduction - multiple applications

- Evidence that reduction is cyclic and can apply multiple times

(19) a. l**új**s 'light'

Vowel reduction - multiple applications

- Evidence that reduction is cyclic and can apply multiple times

(20) a. l**új**s 'light'

b. l**u**s-av**ó**r 'illuminous'

Vowel reduction - multiple applications

- Evidence that reduction is cyclic and can apply multiple times

(21)	a.	l**új**s	'light'
	b.	l**u**s-av**ó**r	'illuminous'
	c.	l**u**s-avor-**í**tʃ	'illuminator'

Vowel reduction - multiple applications

- Evidence that reduction is cyclic and can apply multiple times

(22)	a.	l**új**s	'light'
	b.	l**u**s-av**ó**r	'illuminous'
	c.	l**u**s-avor-**í**tʃ	'illuminator'
	d.	l**u**s-avor-**t͡ʃ**-ag**á**n	'Apostolic'

- Some complications in multiple applications – still working on them

Vowel reduction - Formalizing phonological factors

- More minor factors in appendix
- These factors can be generalized using either rules or constraints
- There are previous incomplete OT treatments of Armenian vowel reduction (Khanjian, 2009) that are explained in Appendix

Vowel reduction - Morphology

- All suffixes (derivational & inflectional) trigger stress shift
- But not all trigger vowel reduction.
- Dialects vary on these morphological factors for vowel reduction

Vowel reduction - Derivation

- In SWA and SEA, derivational suffixes systematically trigger stress shift AND vowel reduction

(23)

a.	amus**í**n	'husband'
b.	amusn-ag**á**n	'marital'

Vowel reduction - Inflection

- In SWA and SEA, inflectional suffixes trigger stress shift but..
  - SWA: inflectional suffixes do not trigger vowel reduction (24b,25b)
  - SEA: ...

(24)	a.	amus**í**n	'husband'
	b.	amus**i**n-n**é**r	'husband-PL' (SWA)
(25)	a.	amus**í**n	'husband'
	b.	amus**i**n-**ó**v	'husband-INSTR' (SWA)

Vowel reduction - Inflection

- In SWA and SEA, inflectional suffixes trigger stress shift but..
  - SWA: inflectional suffixes do not trigger vowel reduction (26,27b)
  - SEA: only vowel-initial inflectional suffixes trigger vowel reduction (26,27c)

(26)	a.	amus**í**n	'husband'
	b.	amus**i**n-n**é**r	'husband-PL' (SWA & SEA)
(27)	a.	amus**í**n	'husband'
	b.	amus**i**n-**ó**v	'husband-INSTR' (SWA)
	c.	amusn-**ó**v	'husband-INSTR' (SEA)

Vowel reduction - Prosodic domain?

- The domain for vowel reduction includes derivational suffixes
- But some dialects (SWA) exclude all inflectional suffixes from this domain
- Others (SEA) only include V-initial inflectional suffixes
- Reduction applies if both the newly stressed vowel and the destressed vowel are within the same domain

Vowel reduction - Prosodic domain?

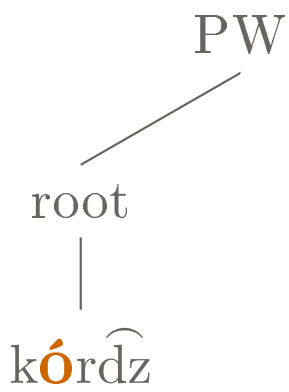
- Prosodic phonology argues: (Nespor and Vogel, 1986; Selkirk, 2011)
  1. phonological processes apply within phonological domains or constituents (P-constituents)
  2. Especially when these P-constituents is influenced by morpho-syntactic structure
- How can we model vowel reduction's domain?

Vowel reduction - Prosodic domain?

- SWA has the most extreme restrictions: no Inf
- Using its data, will the two commonly used domains work out?
  1. PWord
  2. Recursive PWord

Vowel reduction in PWord?

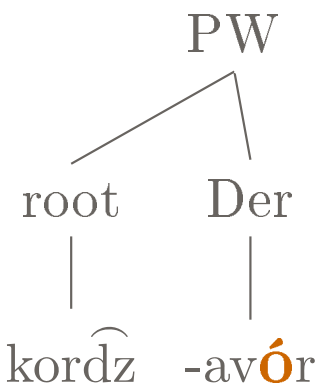
- One hypothetical model can be the PWord but for SWA...:
  For stress
  PWord includes root



'work'

Vowel reduction in PWord?

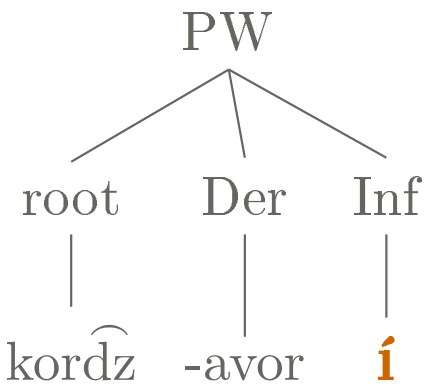
- One hypothetical model can be the PWord but for SWA...:
  For stress
  PWord includes root, Der,



'worker'

Vowel reduction in PWord?

- One hypothetical model can be the PWord but for SWA...:
  For stress
  PWord includes root, Der, & Inf

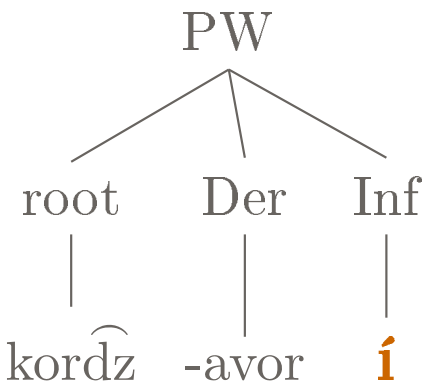


'worker-GEN'

Vowel reduction in PWord?

- One hypothetical model can be the PWord but for SWA...:

For stress	**For reduction?**
PWord includes root, Der, & Inf	Is PWord the same?

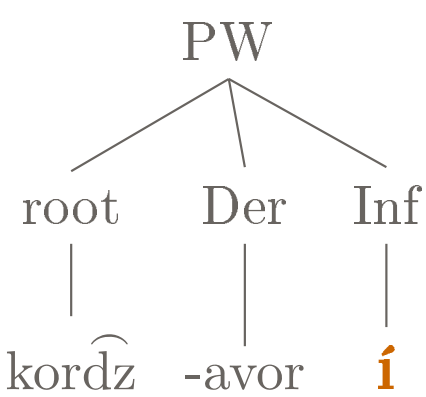


'worker-GEN'

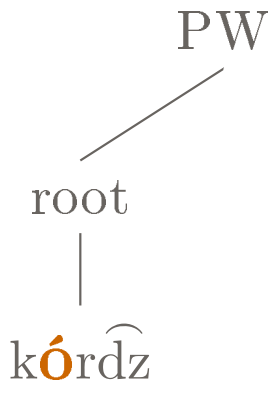
Vowel reduction in PWord?

- One hypothetical model can be the PWord but for SWA...:

For stress	**For reduction?**
PWord includes root, Der, & Inf	PWord includes root,



‘worker-GEN’



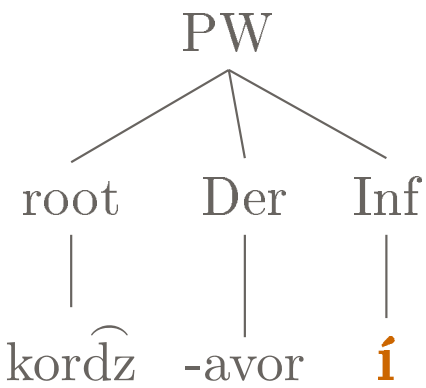
‘work’

Vowel reduction in PWord?

- One hypothetical model can be the PWord but for SWA...:

For stress

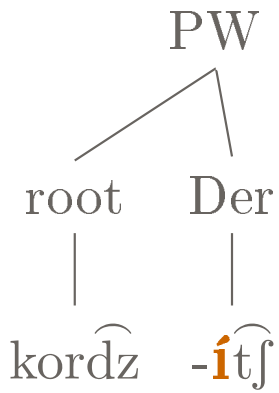
PWord includes root, Der, & Inf



'worker-GEN'

For reduction?

PWord includes root, Der,



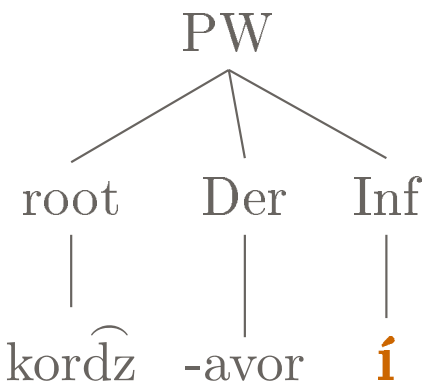
'agent'

Vowel reduction in PWord?

- One hypothetical model can be the PWord but for SWA...:

For stress

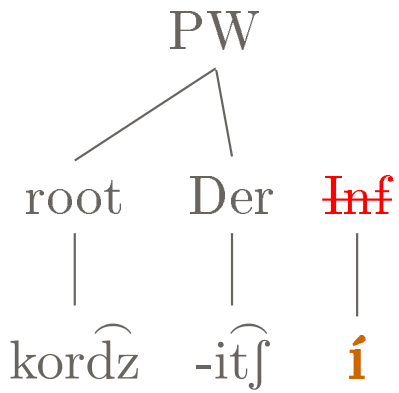
PWord includes root, Der, & Inf



'worker-GEN'

For reduction?

PWord includes root, Der, but **NOT** Inf



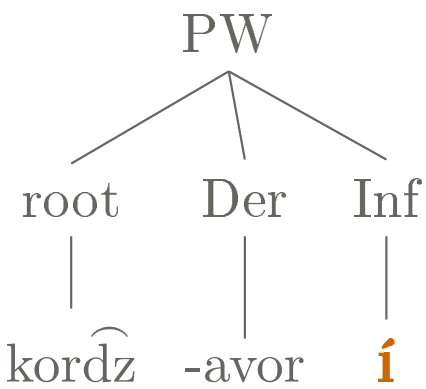
'agent-GEN'

Vowel reduction in PWord?

- One hypothetical model can be the PWord but for SWA...:

For stress

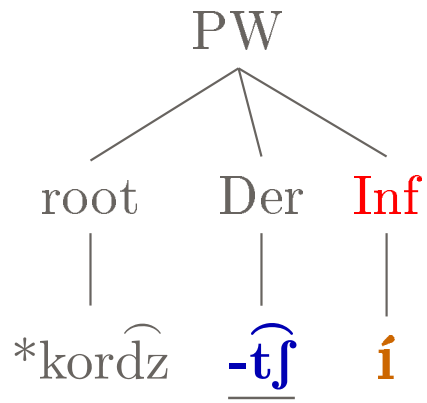
PWord includes root, Der, & Inf



'worker-GEN'

For reduction?

PWord includes root, Der, but **NOT** Inf – otherwise...



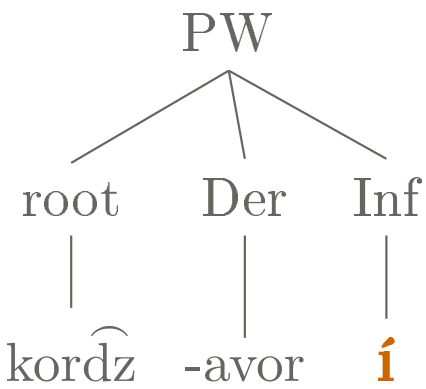
'agent-GEN'

Vowel reduction in PWord?

- One hypothetical model can be the PWord but for SWA...:

For stress

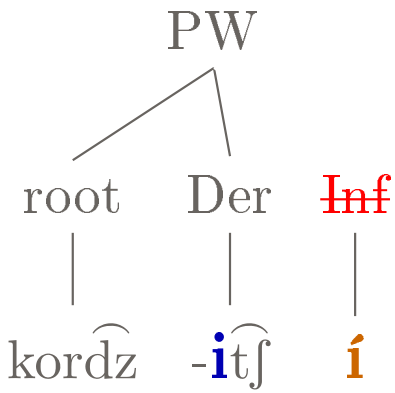
PWord includes root, Der, & Inf



'worker-GEN'

For reduction?

PWord includes root, Der, but **NOT** Inf

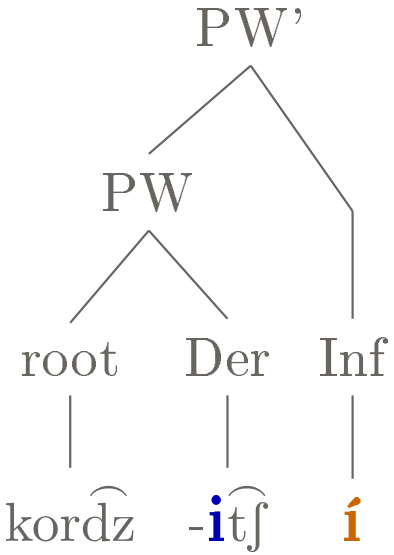


'agent-GEN'

→ Contradiction: PWord can't be domain for both stress & reduction

Vowel reduction in Recursive PWord?

- Another hypothetical model can be Recursive PWords (PW') (Ito and Mester, 2009):



Maximal PW or **PW'**:

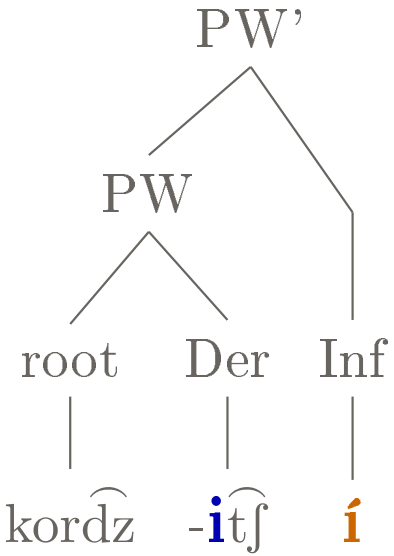
- root+Der+Inf
- Domain of stress assignment

Minimal PW or PW:

- root+Der
- Domain of vowel reduction

Vowel reduction in Recursive PWord?

- Another hypothetical model can be Recursive PWords (PW') (Ito and Mester, 2009):



Maximal PW or **PW'**:

- root+Der+Inf
- Domain of stress assignment

Minimal PW or PW:

- root+Der
- Domain of vowel reduction

→ Conceptually un-insightful: These P-constituents are supposed to be the same (= act the same phonologically) but it's only in name

PStems - Background

- Model proposed here is the Prosodic Stem (PStem) (Downing, 1999, 2006; Downing and Kadenge, 2015)
- What is the PStem?
  - a sublexical prosodic constituent
    (= P-constituent smaller than PWord)
  - mapped from the Derivational Stem (DStem)
    (= MWord without inflection)
  - Used to model prosody in some agglutinative languages

PStems - Example in Bantu

- For example in KiHehe (Bantu, Downing (1998b)), the PStem corresponds to the DStem (root+derivational suffix)
- Total reduplication targets the PStem + its output is PStem
- Spoiler: C-initial DStems act differently from V-initial DStems

PStems - Example in Bantu

- **DStem** is bold, *reduplicant* in italics, PStems are underlined
- C-initial DStem: RED=PStem=DStem
- V-initial DStem: ...

(28) C-initial DStem

a.	ku+**haata**	'to ferment'
b.	ku-*haata*~**haata**	'to start fermenting'
c.	* *ku-haata*~ku-**haata**	'to start fermenting'

PStems - Example in Bantu

- **DStem** is bold, *reduplicant* in italics, PStems are underlined
- C-initial DStem: RED=PStem=DStem
- V-initial DStem: RED=PStem BUT PStem is bigger than DStem
- PStem misaligned (included prefixes) to respect syllable edges

(30) C-initial DStem

a.	ku+**haata**	'to ferment'
b.	ku-*haata*~**haata**	'to start fermenting'
c.	* *ku-haata*~ku-**haata**	'to start fermenting'

(31) V-initial DStem

a.	kw+**iita**	'to pour'
b.	* kw-*iita*~**iita**	'to pour a little'
c.	*kw-iita*~kw-**iita**	'to pour a little'

PStems - Extending to Armenian

- A similar explanation can be provided for Armenian
- Constituents:
  - **Morphological**: **Derivational Stem (DStem)**
    It includes root+derivational suffixes
  - **Prosodic**: **Prosodic Stem (PStem)**
    It is mapped from the DStem
- Reduction applies when a destressed vowel **within** the PStem lost stress to another vowel **within** the PStem

PStems - PStem variation

- Alignment Constraints:
  - **ALIGN-(PS,R,DS,R)** or **ALIGN-PS-DS**=
    PStem aligns with DStem
  - **ALIGN-(PS,R,σ,R)**or **ALIGN-PS-σ**=
    PStem aligns with end of syllable
- How to capture dialect variation in PStem size?

SWA? ALIGN-PS-DS » ALIGN-PS-σ :
Better to align with DStem than with syllable boundaries

SEA? ALIGN-PS-σ » ALIGN-PS-DS:
Better to align with syllable boundaries than with DStem

- Extra constraints in appendix...

PStems - Alignment with Der

- In SWA & SEA, derivation triggers reduction.
- The constraints for reduction are not placed
- The symbols },> are used to mark Dstems & PStems
- /amusín+agan}/ → [amusn-agán>] 'husband-DER'

SWA

amusín+agan}			ALIGN-PS-DS	ALIGN-PS-σ
a.		amusi.>nagán	*!	
b.	☞	amusnagán>		

SEA

amusín+agan}			ALIGN-PS-σ	ALIGN-PS-DS
a.		amusi.>nagán		*!
b.	☞	amusnagán>		

PStems - Alignment with C-initial inf.

- In SWA & SEA, C-initial inflectional suffixes don't trigger reduction.
- /amusín}+ner/ → [amusin>-nér] 'husband-PL'

SWA

amusín}+ner		ALIGN-PS-DS	ALIGN-PS-σ
a.	☞ amusin.>nér		
b.	amusənnér>	*!	

SEA

amusín}+ner		ALIGN-PS-σ	ALIGN-PS-DS
a.	☞ amusin.>nér		
b.	amusənnér>		*!

PStems - Misalignment with V-initial inf.

- V-initial inflectional suffixes trigger reduction in only SEA.
- /amusín}+i/ → [amusin>-óv] (SWA) vs.
  [amusn-óv>] (SEA) 'husband-INSTR'

SWA

amusín}+ov			ALIGN-PS-DS	ALIGN-PS-σ
a.	☞	amusi.n>óv		*
b.		amusnóv>	*!	

SEA

amusín}+ov			ALIGN-PS-σ	ALIGN-PS-DS
a.		amusi.n>óv	*!	
b.	☞	amusnóv>		*

Table of Contents

Morphology-Phonology Interface - two camps

- Cross-linguistically, the phonology-morphology interface is rife with examples of interaction between both modules (Inkelas, 1989, 2014)
- Many theoretical models have been proposed to handle the interface:

Morphology-Phonology Interface - two camps

- Cross-linguistically, the phonology-morphology interface is rife with examples of interaction between both modules (Inkelas, 1989, 2014)
- Many theoretical models have been proposed to handle the interface:

1. Lexical phonology (Kiparsky, 1982) and Stratal OT (Kiparsky 2000, Bermúdez-Otero prep)
2. Prosodic phonology (Nespor and Vogel, 1986) and its variations or expansions (Inkelas, 1989, 1993; Selkirk, 1996, 2011; McCarthy and Prince, 1993a,b, 1995; Downing, 2006)
3. among others ...

Constituency across the camps

- Both theories argue that phonology applies within domains influenced by morphology
  1. **Lexical Phonology**: Phonology applies within morphological constituents (M-constituents)
  2. **Prosodic Phonology**: Phonology apples within phonological constituents (P-constituents) derived from M-constituents

Constituency across the camps

- Both theories argue that phonology applies within domains influenced by morphology
  1. **Lexical Phonology**: Phonology applies within morphological constituents (M-constituents)
  2. **Prosodic Phonology**: Phonology apples within phonological constituents (P-constituents) derived from M-constituents
- Best evidence for (2) is when the P-constituent isn't identical to its M-constituent because of prosodic well-formedness
  - e.g. compound prosody (Vogel, 2010), English stress domains (Inkelas, 1989), Bantu reduplication (Downing, 1999), and now Armenian stress

Constituency within one camp

- In prosodic phonology, there's controversy over what the possible P-constituents are:
  1. Recursion? (Selkirk, 2011; Vogel, 2012)
  2. Sublexical P-constituents? (Inkelas, 1989; Downing, 1999)
  3. And a lot more... (Hall, 1999; Hildebrandt, 2015; Trommer, 2011; Vogel, 2009; Schiering et al., 2010)...

Constituency within one camp

- In prosodic phonology, there's controversy over what the possible P-constituents are:
  1. Recursion? (Selkirk, 2011; Vogel, 2012)
  2. Sublexical P-constituents? (Inkelas, 1989; Downing, 1999)
  3. And a lot more... (Hall, 1999; Hildebrandt, 2015; Trommer, 2011; Vogel, 2009; Schiering et al., 2010)...
- For (2), Armenian provides evidence for the PStem.

Adding PStem to the hierarchy

- Armenian shows that the PStem is useful, and provides evidence for its typological properties (Downing, 2016)

Adding PStem to the hierarchy

- Armenian shows that the PStem is useful, and provides evidence for its typological properties (Downing, 2016)
  1. Agglutination:
     - PStem has been argued for agglutinative languages where complex morphological structure interacts with prosodic processes (Downing and Kadenge, 2015)
     - Salishan, Athapaskan, Bantu, Bengali, Japanese, ...(as cited in Downing (2016))

Adding PStem to the hierarchy

- Armenian shows that the PStem is useful, and provides evidence for its typological properties (Downing, 2016)
  1. Agglutination:
  2. Derivation vs. Inflection:
     - PStem echoes difference between derivational vs. inflectional morphology (Trommer, 2011)
     - This distinction isn't just descriptive shorthand for syntactic features, but is morpho-phonologically significant

Adding PStem to the hierarchy

- Armenian shows that the PStem is useful, and provides evidence for its typological properties (Downing, 2016)
  1. Agglutination:
  2. Derivation vs. Inflection:
  3. Misalignment and variation:
     - Dialectal or within-language-family variation shows how misalignment can happen because of phonological well-formedness (Downing, 1998b)
     - PStem is independent from its syntactic origin
     - PStem is an indirect reference to syntactic structure

Table of Contents

Conclusion

- Armenian has two productive word-level prosodic processes: **primary stress assignment** & **destressed vowel reduction**
- An adequate model requires using the PWord and PStem
- This gives support to the PStem's typology and utility within the Prosodic Hierarchy
- Future work will require looking at more dialects, more prosody (vowel harmony), and bigger structures (compounds, multiple applications)...

Table of Contents

harts-**ú**m>	‘Question?’
harts-**u**m>-n**é**r	‘Questions?’
*harts-**ə**m-n**é**r>	‘Quest**ə**ons?’

Compounds

- Compounds have stress appear only once on the rightmost full vowel of the compound (32)
- Note that -a- is a linking vowel in compounds.

(32) a. aʃxár + kərutjún ‘world + writing’
b. aʃxar-a-kərutjún ‘geography’

Compounds - Prosodic Domain

- Assume PWord is subsection of MWord which is domain of stress (Vogel, 2008; Nespor and Vogel, 1986)
  - MWord = PWord.
- Even compounds form one PWord
  - Against cross-linguistic tendency for compound words to be two PWords like English *blácк-bìrd* (Vogel, 2010)
- Note that compounds are part of DStem and PStem

Compounds - Reduction

- Note that compounds are part of DStem and PStem because they can trigger reduction

(33)

a.	xúmp + kír	'group + letter'
b.	xəmp-a-kír	'editor'

Primary stress - Formalization

- Primary stress pattern requires following OT constraints & ranking
- /aʃxar-ə/ 'world-DEF' → [aʃxár-ə]

aʃxar-ə		*ó	Align-STR-R	Align-STR-L
a. ☞	aʃxár-ə		*	**
b.	áʃxar-ə		**!	
c.	aʃxar-ó	*!		**

- The above ALIGN constraints are shorthand for the constraints needed to model final-stress patterns in (Gordon, 2002)

Phonology - Enclitics

- Stress can't go beyond the MWord and fall on an enclitic

(34) a. kórd͡z 'work'

b. kórd͡z e '(it) is work'

Phonology - Enclitics

- The PWord domain mapping can be modeled with the following undominated ALIGN constraint (McCarthy and Prince, 1993a)
- Example: /kordz͡}$_{MW}$ e/ 'work 3SG.COP' → [kórdz͡}$_{PW}$ e]

kordz͡}$_{MW}$ e			Align(PW,R,MW,R)
a.	☞	kórtdz}$_{PW}$ e	
b.		kórdz͡ é}$_{PW}$	*

Vowel reduction - chain shift

- In SWA & SEA, reduction has the same phonotactic contexts
  1. the vowel must be destressed
  2. the vowel must be high
     - high diphthong /uj/ reduces to /u/ (chain shift)

(35)

a.		kújn	'color'
b.		kun-avór	'colorful'
c.	*	kujn-avór	'colorful'

Vowel reduction - interconsonantal

- In SWA & SEA, reduction has the same phonotactic contexts
  1. vowel must be de-stressed, not just un-stressed
  2. the vowel must be high /i, u/
  3. the vowel must be flanked by consonants
     - Needs an onset (Downing, 1998a)
     - Doesn't apply in vowel hiatus

(36) a. **ú**ʒ 'strength'

b. **u**ʒ-**é**ɣ 'strong'

c. * ʒ-**é**ɣ 'strong'

(37) a. hasgənal**í** 'understandable'

b. hasgənal**i**-or**é**n 'understandably'

c. * hasgənal-or**é**n 'understandably'

Vowel reduction - opacity

- In SWA & SEA, reduction has the same phonotactic contexts
  1. the vowel must be destressed
  2. the vowel must be high
     - high diphthong /uj/ reduces to /u/
  3. the vowel must be flanked by consonants
     - A later process of glide-insertion in vowel hiatus will counterbleed reduction

(38)

a.		hasgənalí	‘understandable’
b.		hasgənali-[j]-orén	‘understandably’
c.	*	hasgənalə-[j]-orén	‘understandably’

Vowel reduction - Formalizing phonotactics

- The process can be generalized using either rules or constraints
- Because of conspiracy (schwa vs deletion), I follow Khanjian (2009)'s OT treatment of the phonotactic factors for vowel reduction
  - though it isn't complete

Vowel reduction - Formalizing phonotactics

- Constraints used:
  1. C//V to ban complex onsets.
  2. $*_N V_{[-stress]}$ to handle destressing
  3. *ə to disprefer schwas
  4. MAX[+HIGH] removes high vowels
- Though his analysis doesn't capture the flanking requirement
- Example: d͡zúr 'bent' → d͡zər-íl 'to bend over'

d͡zúr+il		C//V	$*_N V_{[-stress]}$	*ə	MAX[+HIGH]
a.	d͡zur-íl		*!		
b. ☞	d͡zər-íl			*	*
c.	d͡zr-íl	*!			*

Morphology - More on inflection

- Nominal inflection slots:

  Noun + Number + (Plural Poss) + Case + Def/Poss

- Some inflectional suffixes do not contain full vowels and thus do not participate in stress
  - Def & Poss: ʃúk 'shadow' → ʃúk-ə 'shadow-DEF'
- All case suffixes are full vowel-initial
  - SWA: ʃúk 'shadow' → ʃuk-ə́ 'shadow-GEN'
  - SEA: ʃúk 'shadow' → ʃək-ə́ 'shadow-GEN'

Morphology - More on inflection

- Nominal inflection slots:

  Noun + Number + (Plural Poss) + Case + Def/Poss

- Singular is not marked while Plural has two phonologically-conditioned suppletive allomorphs, one V-initial (-er) one C-initial (-ner):
  - -er after monosyllabic bases:
    - SWA: ʃúk 'shadow' →ʃuk-er 'shadow-PL'
    - SEA: ʃúk 'shadow' →ʃək-er 'shadow-PL'
  - -ner after polysyllabic bases: moruk-ner 'beard-PL'
    - SWA & SEA: morúk 'beard' →moruk-nér 'beard-PL'

Morphology - More on inflection

- Nominal inflection slots:

  Noun + Number + (Plural Poss) + Case + Def/Poss

- Colloquial dialects include an extra inflectional slot for plural possessive suffixes and this is C-initial
  - WA & EA: gadu-s 'cat-1SGPoss' or 'my cat'
  - WA (Beiruti) : gadu-ni-s 'cat-PlPoss-1SGPoss' or 'our cat'
  - EA (Karchevan): gadu-na-s 'cat-PlPoss-1SGPoss' or 'our cat'

PStems - Misalignment is only 'exfixation'

- With V-initial inflectional, PStem is never smaller than DStem in either dialect
  - = PStem boundary > never shifts to the left

SEA

amusín}+ov			ALIGN-PS-σ	ALIGN-PS-DS
a.		amusi.n>óv	*	
b.	☞	amusnóv>		*
c.	☹	amusi.>nóv		*

PStems - Misalignment is only 'exfixation'

- Easy fix to that:
  - **MAX DS-PS**=
    Every element of the DStem has a correspondent in the PStem (when you factor out reduction).
  - **DEP DS-PS**=
    Every element of the PStem has a correspondent in the DStem.
- Ranking:
  - SWA & SEA: MAX DS-PS » DEP DS-PS
    - PStem is never smaller than DStem
    = PStem boundary > never shifts to the left

SEA

amusín}+ov			ALIGN PS-σ	ALIGN PS-DS	MAX DS-PS	DEP DS-PS
a.		amusi.n>óv	*			
b.	☞	amusnóv>		*		*

Future work & questions

1. Reduction in other hammock dialects

Future work & questions

1. Reduction in other hammock dialects
   - Besides SWA and SEA, Armenian encompasses a large number of dialects across Asia Minor, the Middle East, and the Near East such that they also have the hammock stress pattern (Vaux, 1998).
   - How do these dialects (extinct or still extant) treat vowel reduction?

Future work & questions

1. Reduction in other hammock dialects
2. Stress and reduction in penult dialects

Future work & questions

1. Reduction in other hammock dialects
2. Stress and reduction in penult dialects
   - Some Armenian dialects have developed fixed penultimate stress pattern instead of final stress, e.g. Kharabagh Armenian.
   - How does this affect reduction?

Future work & questions

1. Reduction in other hammock dialects
2. Stress and reduction in penult dialects
3. Vowel harmony

Future work & questions

1. Reduction in other hammock dialects
2. Stress and reduction in penult dialects
3. Vowel harmony
   - Some dialects developed vowel harmony patterns such that some dialects target the root while others the word (Vaux, 1998).
   - How well does the domain of vowel harmony line up with PWord, PStem, or even PRoot?

Future work & questions

1. Reduction in other hammock dialects
2. Stress and reduction in penult dialects
3. Vowel harmony
4. Recursive vs Restructured PStems

Future work & questions

1. Reduction in other hammock dialects
2. Stress and reduction in penult dialects
3. Vowel harmony
4. Recursive vs Restructured PStems
   - Larger morphological words show multiple applications of vowel reduction all within the DStem/PStem:

     /**lujs**-avor-**it**ʃ-agan-utjun/ → [**lus**-avor-**t**ʃ-agan-utjún]
     'Apostolicism '
   - Does this require recursion extended to the PStem (Selkirk, 2011) or the existence of prosodic structures in abstract derivation (Hall, 1999)?

References

Bermúdez-Otero, R. Stratal Optimality Theory. Oxford Studies in Theoretical Linguistics. Oxford University Press.

Downing, L. (2016). The prosodic hierarchy in Chichewa: How many levels? Studies in Prosodic Grammar 1, 5–33.

Downing, L. J. (1998a). On the prosodic misalignment of onsetless syllables. Natural Language & Linguistic Theory 16(1), 1–52.

Downing, L. J. (1998b). Prosodic misalignment and reduplication. In Yearbook of Morphology 1997, pp. 83–120. Springer.

Downing, L. J. (1999). Prosodic stem≠ prosodic word in bantu. Studies on the phonological word 174, 73.

Downing, L. J. (2006). Canonical forms in prosodic morphology. Number 12. Oxford University Press.

Downing, L. J. and M. Kadenge (2015). Prosodic stems in zezuru shona. Southern African Linguistics and Applied Language Studies 33(3), 291–305.

Gordon, M. (2002). A factorial typology of quantity-insensitive stress. Natural Language & Linguistic Theory 20(3), 491–552.