Lexical Accent Meets Ghost Vowels
Nxaʔamxcin (Moses Columbia Salish) Accent

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mfm 2023

Introduction

Background on Stratal Phonology

The Non-Arbitrariness of Strata Hypothesis

- The Stem Level and Word Level of Stratal Phonology correspond to different modes of lexical storage (Bermúdez-Otero 2012)
- under the assumption that these types (analytics vs. non-analytic) are the two only types of lexical storage provided by human cognition strata should be uniform across languages

→ **Languages have a maximum of two word-internal strata**

Lexical Accent Systems in Stratal Phonology

- In Lexical Accent systems affixes and roots have unpredictable lexical 'strength' properties determining the overall stress patterns of words

- Classical Example: **Vedic** with four affix types (Halle and Mohanan 1985):
  - Accented dominant
  - Accented recessive
  - Unaccented recessive
  - Unaccented dominant

- **Classical Analysis:**
  - Accentedness is representational
  - Dominance is stratal

- Confirmed by **Vedic**: All dominant affixes inside all recessive affixes

The Nxaʔamxcin Argument against Strata

Czaykowska-Higgins's (1993):

- As Vedic Nxaʔamxcin accent distinguishes 4 different affix types
- **But:** Dominant and recessive affixes are freely interspersed

$\Rightarrow$ A stratal analysis would require
an excessive number of arbitrary ad-hoc strata

The Nxaʔamxcin Argument against Strata

Order of In/trans Suffixes

			-ɬ-			
-xix-	-min-	-nun-	-m-	-tuɬ-	-t-	-cut
-xax	-xit-		-stu-			-wax^{w}
			-n-			
D	R	D	R	D	R	D

(Czaykowska-Higgins 1993:269)

The Nxaʔamxcin Argument against Strata

Stratum 1:	Primary Affixes, Lexical Suffixes	Cyclic
Stratum 2:	=mix (LS), =min (LS), =tn, =xn, =lqst, =lqs	Noncyclic
Stratum 3:	−xix, -xax	Cyclic
Stratum 4:	-min, -xit	Noncyclic
Stratum 5:	-nun	Cyclic
Stratum 6:	-m, -stu, -ł, -n	Noncyclic
Stratum 7:	-tuł	Cyclic
Stratum 8:	-t, obj., subj.	Noncyclic
Stratum 9:	-cut, -wax^{w}	Cyclic
Stratum 10:	-mix	Noncyclic

(Czaykowska-Higgins 1993:269)

Reanalysis Proposed here

- Two word-internal strata:
  - Stem Level (Lexical Suffixes)
  - Word Level (Grammatical Suffixes)
- 'Dominance' at the Word Level is due to representations not to different strata
  - Recessive affixes have defective ('ghost') vowels
  - Word-Level affixes can be [+/-] accented and [+/-] defective
- What is special about Nxaʔamxcin is not its stratification, but its interlinking of accent and vowel deletion

Roadmap of the Talk

- Background on Nxaʔamxcin
- Theoretical Assumptions
- Eliminating additional strata
  at the **Word Level:**
- Reducing ‘Extrametricality’ to Generalized Markedness
  at the **Stem Level:**

Background on Nxaʔamxcin

Nxaʔamxcin (Moses-Columbia Salish)

- Salish language spoken in North-Central Washington state
- Polysynthetic language with inner 'lexical' and outer 'grammatical' affixes (valency, TAM, agreement)
- Conflicting directionality in assignment of accent
- Pervasive deletion of unstressed vowels
- Prefixes are invisible for accent
- Sources: Czaykowska-Higgins (1993), Willett (2003)

Morphological Structure

Prefix	Root	=	Lexical Suffixes	-	Grammatical Suffixes

Morphological Structure

xʷirkstátkʷ	‘reach into water’
xʷir=akst**=atkʷ**	
reach=hand=water	
(p. 209)	
kɬkʷncáksn	‘I grab s.o. by the wrist’
kɬ-kʷan=cin**=akst**-n-t-Ø-n	
LOC-grab=hand-CTR-TR-3O-1SGS	
(p.231)	

Conflicting Directionality

- Stress leftmost accented vowel
- Stress rightmost overt (underlying) vowel
- (Stress leftmost epenthetic vowel)

Conflicting Directionality: Stress rightmost overt vowel

Roots (p.205)		Affixes (p.270)	
hanan**ík**	‘jackrabbit’	pʔiqcncút	‘cook’
ʔara**sík**^{w}	‘turtle’	pʔiq=cin**-cút**	
mac**qʔ^{w}úl**	‘pelican’	cook=mouth-REFL	

Conflicting Directionality: Stress leftmost accent

kʷútɬnmn — ‘I’m borrowing it’
kʷútɬn-min-t-Ø-n
borrow-REL-CTR-TR-3O-1SGS

kʔʷuʔtɬmíxtn — ‘I used up s.t. belonging to s.o. else’
kʷwʔtɬ**-min**-xit-Ø-n
use-REL-REDIR-3O-1SGS

(p.272/251)

Deletion of Unstressed Vowels

- Obligatory Deletion of Post-Stress vowels
- Optional Deletion of Pre-Stress vowels

Obligatory Deletion of Post-Stress vowels

kʷútɬnmn — ‘I’m borrowing it’
kʷútɬn-min-t-Ø-n
borrow-REL-CTR-TR-3O-1SGS

ħúykstmnc — ‘s.o. is bothering me’
ħuy=akst-min-t-sa-s
bother=hand-REL-TR-1SGO-3S

(p.251/252)

Optional Deletion of Pre-Stress vowels

kʔʷaʔaksncút	‘bite one’s own hand’
kʔʷʔ=akst-n**-cút**	
bite=hand-CTR-REFL	
xʷirkstátkʷ	‘reach into water’
xʷir=akst**-atkʷ**	
reach=hand=water	

(p.245-46)

Take on Vowel Deletion here

- Post-Stress Vowel Deletion is a categorial **Word-Level** process
- Pre-Stress Vowel Deletion is a variable **Phrase-Level** process

Theoretical Assumptions

Theoretical Assumptions

- **Stratal OT:** Stem-Level, Word-Level, and Phrase-Level Evaluations feed each other serially. Different levels have potentially different optimality-theoretic constraint rankings

- **Colored Containment:** (van Oostendorp 2006)
  Underlying material (i.e. nodes and association lines)
  is never literally deleted, but retained in the output,
  and marked as phonetically invisible.

- **Generalized Markedness:** (cf. Doubling in Correspondence Theory, McCarthy & Prince 1995)
  All markedness constraints are assumed to exist in two versions,
  one referring only to phonetically visible material,
  and one to all material in a given structure.

Representation/Notation of Association (Zimmermann & Trommer 2011)

Morphological association		Epenthetic association
phonetically visible:	phonetically invisible:	phonetically visible:
		

Generalized Markedness

Every markedness constraint exists in 2 incarnations:

The **general clone** refers to all structure in I

The **phonetic clone** refers only to structure in P

(cf. Doubling in Correspondence Theory, McCarthy & Prince 1995)

Generalized Markedness Constraints

Input: = a.	*CLASH	*CLASH
a. **xar lwas**	*	*
b. **xar** lwas		*
c. xar **lwas**		*

*CLASH Assign $*$ to every phonetic pair of adjacent accented syllables

*CLASH Assign $*$ to every pair of adjacent accented syllables

Ghost (unstable) Vowels

Unpredictable vowel which are contrastively prone to deletion

Ghost vowels in Yawelmani (Zoll 1996:182+183)

		C___		V___	
/-ni/	IND.OBJ	talap-ni	‘bow’	xataː-ni	‘food’
/-mi/	PRECATIVE	amic-mi	‘approach’	pana-m	‘arrive’

See also

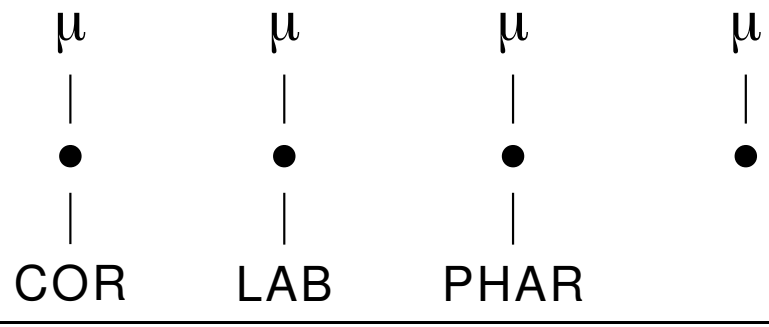
- Rubach (2013) on Slavic yers
- Dolatian (2022) on Armenian
- Zimmermann (2019) on Catalan and Mohawk

Representation of Ghost Vowels

- Ghost vowels are ‘defective’ in lacking parts of underlying phonological representation
- Less underlying structure confers
  less protection by faithfulness constraints
- For concreteness, I assume that defective ghost/defective segments lack an underlying root node
  (Zoll 1993, Kim and Pulleyblank 2009)

Representation of Ghost Vowels in Nxaʔamxcin

Full Vowels:



Ghost Vowels:

COR	LAB	PHAR	
i	u	a	ə

Eliminating additional strata at the Word-Level

Three Types of Word-Level Suffixes

- **Strong Suffixes:** Full vowel with foot-level accent x
  (never deleted, D/D$*$)
- **Accented Suffixes:** Defective vowel with foot-level accent x
  (preferentially accented/realized, R$*$)
- Weak Suffixes: Defective vowel without accent
  (prone to deletion, R)

(there are no word-level affixes with full unaccented vowels)

Constraints

$\underline{1}*$	Every PW has exactly one phonetic accent
$\underline{\text{RM}}(\text{V}\ *)$	Stress the rightmost phonetic vowel
$\text{LM}(\text{x}\ *)$	Stress the leftmost underlying accent
$\textsc{Max}\ \text{V}$	Don't delete full underlying vowels
$\textsc{Max}\ \text{v}$	Don't delete defective underlying vowels

Notational Conventions in OT-Tableaux

		Examples
Underlying Accent:	Grave accent on vowel (or: ‘x’)	mìn
Full Vowel-Affix	Boldface	**-cùt**
Surface Stress	Acute accent on vowel/blue (or: ‘$*$’)	**-cút**

Weak + Weak

(Czaykowska-Higgins 1993:271)

cəkstwás	‘he throws it’
ck-stu-**wa**-s	
hit-CAUS-TO-3SG	

Weak + Weak: Rightmost wins (Czaykowska-Higgins 1993:271)

Unaccented Stem + Weak Suffix + **Weak Suffix**

Input: = a.	1*	RM(V *)	MAX V	LM(x *)	MAX v
a. cək-stu-wa-s		*!**			
b. cək-**stú**-w-s					*!
c. **cák**-st-w-s					*!*
d. **cák**-stu-wa-s		*!*			
☞ e. cək-stu-**wá-s**					

Accented + Weak: Leftmost wins

(Czaykowska-Higgins 1993:252)

qʔiyxítus	‘he writes to him’
qʔy-**xit**-wa-s	
write-REDIR-TO-3SG	

Accented + Accented: Leftmost wins (Czaykowska-Higgins 1993:138)

kʔʷuʔɬmíxtn
kʔ-ɬ-**min**-xit-Ø-n
use-REF-REDIR-3O-1SGS

‘I used up s.t. belonging to s.o. else’

Accented Suffix: Leftmost wins

Unaccented Stem + **Accented Suffix** + Weak Suffix

Input: = a.	1∗	RM(V ∗)	MAX V	LM(x ∗)	MAX v
a. qəj-xìt-wa-s	*!			*	
b. qəj-**xít**-wa-s		*!			
c. qəj-xit-**wá-s**				*!	
d. **qə́j**-xt-w-s				*!	**
e. **qə́j**-xit-wa-s		*!*		**	*
☞ f. qəj-**xít**-w-s					*

Unaccented Stem + **Accented Suffix** + Accented Suffix

Input: = a.	1∗	RM(V ∗)	MAX V	LM(x ∗)	MAX v
a. kwəl-mìn-xìt-n	*!			*	
b. kwəl-mn-**xít**-n				*!	
c. kwəl-**mín**-xit-n		*!			
d. **kwə́l**-mìn-xìt-n		*!*		**	*
☞ e. kwəl-**mín**-xt-n					*

Strong wins over {Weak, Accented} Suffix

Strong+Weak (Willett 2003:138)

wak^{w}tú**ɬ**cx^{w} ‘you hid it from me’
wak^{w}**-tuɬt**-sa-x^{w}
hide-APPL-1SGO-2SGS

Strong+Accented (Czaykowska-Higgins 1993:271)

k^{w}anxíxmn ‘I took it away from s.o.’
k^{w}an**-xix**-min-t-Ø-n
grab-REDIR-REL-TR-3O-1SGS

Strong wins over {Weak, Accented} Suffix

Accented Stem + **Strong Suffix** + Weak Suffix

Input: = a.	1∗	RM(V ∗)	MAX V	LM(x ∗)	MAX v
a. wàk-**tùlt**-sa	*!				
b. **wák**-**tult**-s		*!			*
c. **wák**-**tlt**-s			*!		*
d. wak-tult-**sá**				**!	
☞ e. wak-**túlt**-s				*	*

Accented Stem + **Strong Suffix** + Accented Suffix

Input: = a.	1∗	RM(V ∗)	MAX V	LM(x ∗)	MAX v
a. kwàn-**xìx**-mìn	*!				
b. **kwán**-**x**-mn			*!		
c. kwàn-**xíx**-min		*!		*	
d. kwan-**xix**-**mín**				**!	*
☞ e. kwan-**xíx**-mn				*	*

Stem-Level Accent

Rightmost Accent also wins at the Stem Level

katpʔiqcín ‘burn lips’
kat-pʔiq**=cín**
LOC-cook=mouth

naqsqnwíl ‘load’
naqs=qin**=wil**
one=top=container

(p.205,206)

Two Accentual Types of Roots at the Stem Level

- **Strong:** accented in isolation or with a single weak suffix loses against strong suffixes
- **Weak:** only accented in isolation
- (Vowelless Roots: may only be stressed if word doesn't contain underlying vowels)
- **Same for Suffixes:** Strong/Accented vs. Weak/Unaccented

‘Extrametricality’ at the Stem Level

- Strong roots win over single weak suffix

  Root$_{S}$ Affix$_{W}$

- Strong roots lose to final weak suffix
  if there are several weak suffixes:

  Root$_{S}$ Affix$_{W}$ **Affix**$_{W}$

Strong roots win over single weak suffix

x^{w}írkstm	‘reach out’
x^{w}ir=akst-m	
reach=hand-MID	
yapk^{w}ánksn	‘I grab s.o. by the hand’
yap-**k^{w}an**=akst-n-t-Ø-n	
LOC-grab=hand-CTR-TR-3O-1SGS	

(p.229/230)

Strong roots lose to final weak suffix if there are several weak suffixes:

x^{w}irkstátk^{w}	‘reach into water’
x^{w}ir=akst**=atk^{w}**	
reach=hand=water	
kɬk^{w}ncáksn	‘I grab s.o. by the wrist’
kɬ-k^{w}an=cin**=akst**-n-t-Ø-n	
LOC-grab=hand-CTR-TR-3O-1SGS	

(p.231)

Gist of the Analysis

- Strong roots/affixes are accented
  Weak roots/affixes are unaccented

- Stress is rightmost whenever possible

- **Root**$*$ + Affix because accenting the affix
  leads to a generalized *CLASH violation (*Root$\circledast$ + Affix$*$)

- with multiple affixes, the *CLASH violation is avoided:
  (👍 Root$\circledast$ + Affix + Affix$*$)
  → Emergence of Rightmostness

- with accented suffix, the *CLASH violation cannot be avoided anyway:
  (Root$\circledast$ + Affix$*$ ≈ Root$*$ + Affix$\circledast$)
  → Emergence of Rightmostness

‘Extrametricality’ at the Stem Level

Unaccented Root + Unaccented Suffix:

Input: = a.	1∗	*CLASH	MAX V	RM(V ∗)	FTH ∗
a. piq cin				*!*	
b. **piq** cin				*	*
☞ c. **piq** cin					*

Accented Root + Unaccented Suffix:

Input: = a.	1∗	*CLASH	MAX V	RM(V ∗)	FTH ∗
☞ a. **xir** akst				*	
b. xir **akst**		*!			**

‘Extrametricality’ at the Stem Level

Accented Root + Unaccented Suffix:

Input: = a.	1∗	*CLASH	MAX V	RM(V ∗)	FTH ∗
☞ a. **xir** akst				*	
b. xir **akst**		*!		*	*

Accented Root + Unaccented Suffix + Unaccented Suffix:

Input: = a.	1∗	*CLASH	MAX V	RM(V ∗)	FTH ∗
a. **kwa** cin akst				*!*	
b. kwa cin akst		*!		*	**
☞ c. kwa cin akst					**

Accented Stem-Level Suffix

Input: = a.	1∗	*CLASH	MAX V	RM(V ∗)	FTH ∗
a. **xar lwas**	*!	*			
b. **xar** (lwas)		*		*!	*
☞ c. (xar) **lwas**		*			*

Discussion

Discussion

- Nxaʔamxcin doesn't require more than 2 word-internal strata and is fully compatible with the Affix Ordering Hypothesis
- Evidence **for** the Affix Ordering Hypothesis
  - Lexical suffixes show a different inventory of accentual types
  - "Extrametricality" is limited to lexical suffixes
  - "Strong" Word-Level suffixes never undergo vowel deletion
- Generalized Containment obviates the unique type of Extrametricality in Czaykowska-Higgins (1993)
- In contrast to alternative analyses, the stratal/ghost vowel approach **predicts** that 4 representational classes correlate with stress-based vowel deletion

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