Serial Computation of Accent in Mayo

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Main Claim

- the competition between opposing phonological preferences in a serial account can follow a 'first come-first serve'-principle: **Optimization of underlying elements has priority over optimization inserted default structure**

- a serial optimization account allows to predict **non-local templatic accent systems** as in Mayo from the order between between foot parsing and tone association

Mayo

Mayo (Uto-Aztecan; Hagberg (1989, 1990, 2006); Hyman (2009); Spahr (2016))

- one vowel in every word is realized with a higher pitch

(1) *Mayo accent (Hagberg, 2006, 73)*

Accented		Unaccented	
ch**ú**pnake	'will harvest' TRNS	ponn**á**ke	'will play' TRNS
h**í**chupnake	'will harvest' INTR	hip**ó**nnake	'will play' INTR
h**í**hichupnake	'will always harvest'	hih**í**ponnake	'will always play' INTR
ch**í**knake	'will sweep' TRNS	wis**é**ka	'sawing' TRNS
h**í**chiknake	'will sweep' INTR	hiw**í**seka	'sawing' INTR
h**í**hichiknake	'will always sweep' INTR	hih**í**wiseka	'always sawing'

→ a **non-local templatic** accent system: The stem determines the stress pattern for the whole word and is not necessarily stressed itself

- another example for such a pattern is Tagalog (Hagberg, 2006)

Stress/tone/(pitch) accent/…?

- the dilemma:
  - lexical contrast for high pitch: Prototypical tone?
  - exactly one high-pitched V which is positionally restricted to the initial two V's: Prototypical stress?
- possible solution: a special third pattern with an 'accent' mark
  (e.g. for Japanese McCawley (1968); Ross (1985); Haraguchi (1991); Kubozono (1993))
- another solution: 'accent' patterns always reanalyzable as tonal and/or metrical patterns (Hyman, 2009; Köhnlein, to appear)
  - ➙ Mayo is another examples where **foot structure and tone assignment interact**

Feet and Tone in Mayo

The head of a foot = A high tone

(2)

Unaccented	Accented
H (h i c h u p)$_{\varphi}$ n a k e	H (h i)$_{\varphi}$ p o n n a k e

- another example for well-established interaction between metrical structure and tone (e.g. de Lacy, 2002)

Harmonic Serialism Account

Serial Account in a Nutshell

Conflict: Preferred positions for a H-tone (=head of a φ)

- the initial V: (hí)$_{\varphi}$ponnake
- inside an unmarked and hence bisyllabic left- aligned φ: (hichúp)$_{\varphi}$nake

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Underlying contrast: Stems with/without a floating H-tone

- underlying floating H-tones are associated to their preferred position before feet are built
- without a H-tone, the unmarked foot is created before a default H is inserted

Steps in a Serial Account for Mayo

(3)

Stem without floating H	Stem with floating H
1. Morpheme Concatenation	
h i - c h u p n a k e	H h i - p o n n a k e
2. Floating H-association	
h i c h u p n a k e	H h i p o n n a k e
3. Foot assignment	
(h i c h u p)$_{\varphi}$ n a k e	H (h i)$_{\varphi}$ p o n n a k e
4. Insertion of H on foot head	
H (h i c h u p)$_{\varphi}$ n a k e	H (h i)$_{\varphi}$ p o n n a k e

Harmonic Serialism (McCarthy, 2008*a*,*b*, 2010; Elfner, 2009, 2016; Moore-Cantwell, 2011; McCarthy et al., 2012; Torres-Tamarit, 2012; Pruitt, 2012; Pater, 2012)

- GEN is restricted by **gradualness** and there is a **GEN-EVAL-Loop** that continues as long as a new step is **harmonically improving**
- possible one-step operations in the domain of feet and tone:
  (McCarthy et al., 2012; Breteler, 2018)
  1. Link a tone to a TBU
  2. Insert a tone and link it to a TBU
  3. Build a foot
  4. Delink a tone from a TBU

Constraints

(4)

a. ALIGN(H;L)
Assign * for every TBU that intervenes between the left word edge and the leftmost TBU a tone H is associated to.

b. FTBIN
Assign * for each φ that is not binary on the σ level.

c. φHD->H (=LICENSE(MIN-R, H) (Breteler, 2018, 20))
For each MinFt, assign * if its rightmost syllable is not associated to a H tone.

d. *FLTH
Assign * for each tone not associated to a TBU.

e. HDω (after (Ito and Mester, 2009))
Assign * for every prosodic word that does not dominate a foot.

f. DEPH
Assign * for every tone in the output without an input correspondent.

Additional undominated constraints

(5) a. RhT:I (Kager, 1999)
Assign * for every foot with initial prominence.

b. Align(φ,L;ω,L)
Assign * for every σ that intervenes between the leftmost σ in a φ and the left word edge.

c. MaxH
Assign * for every tone in the input without an output correspondent.

Step 1, no underlying H: Foot building

(6)

h i - c h u p n a k e	*FltH	Hdω	φHd->H	Align(H;L)	FtBin	DepH
a. h i c h u p n a k e		*!				
☞ b. (h i c h u p)$_{\varphi}$ n a k e			*			
c. (h i)$_{\varphi}$ c h u p n a k e			*		*!	

Step 2, no underlying H: Assignment of default H

(7)

(h i c h u p)$_{\varphi}$ n a k e	*FltH	HDω	φHD->H	Align(H;L)	FtBin	DepH
a. (h i c h u p)$_{\varphi}$ n a k e			*!			
☞ b. H | (h i c h u p)$_{\varphi}$ n a k e				*		*
c. H | (h i c h u p)$_{\varphi}$ n a k e			*!			*

Step 3, no underlying H: Convergence

(8)

H (h i c h u p)$_{\varphi}$ n a k e	*FltH	HDω	φHD->H	Align(H;L)	FtBin	DepH
☞ a. H (h i c h u p)$_{\varphi}$ n a k e				*		
b. H (h i c h u p)$_{\varphi}$ n a k e	*!		*			
c. H (h i)$_{\varphi}$ c h u p n a k e			*!		*	

Step 1, underlying floating H: Tone association

(9)

H h i - p o n n a k e	*FLTH	HDω	φHD->H	ALIGN(H;L)	FTBIN	DEPH
a. H h i p o n n a k e	*!	*				
b. H (h i p o n)φ n a k e	*!		*			
☞ c. H | h i p o n n a k e		*				
d. H | h i p o n n a k e		*		*!		

Step 2, underlying floating H: Foot building

(10)

	*FltH	Hdω	φHd->H	Align(H;L)	FtBin	DepH
h i (H) p o n n a k e						
a. h i (H) p o n n a k e		*!				
☞ b. (h i)$_{\varphi}$ p o n n a k e (H)					*	
c. (h i p o n)$_{\varphi}$ n a k e (H)			*!			

Step 3, underlying floating H: Convergence

(11)

H (h i)$_{\varphi}$ p o n n a k e	*FltH	Hdω	φHd->H	Align(H;L)	FtBin	DepH
☞ a. H (h i)$_{\varphi}$ p o n n a k e					*	
b. H (h i p o n)$_{\varphi}$ n a k e			*!			
c. H h i p o n n a k e		*!				

Summary: The 'First come-first serve'-Account

- competition between an ideally positioned H and an ideal bisyllabic foot is resolved by the **order of operations, determined by a representational contrast**: An underlying floating H-tone is optimized first whereas a default-H is inserted only after foot-parsing
- non-serial alternative: Constraints are sensitive to the status as being underlying/morphologically coloured or epenthetic/colourless
  $\textsc{Align}(H;L)_{\textsc{Morph}} \gg \textsc{FtBin} \gg \textsc{Align}(H;L)_{\textsc{Epenthetic}}$

Further Predictions and Discussion

Further Prediction: Default Accent in Mayo

- Spanish loans are (with very few exceptions) stressed on the second vowel

(12) *Spanish Loanwords in Mayo (Hagberg, 2006, 79)*

Spanish	Mayo	
váca(s)	wakás	'cow'
cábra	kabára	'sheep'
domíngo	lomínko	'Sunday'
diós	lióh	'God'

An Independent Argument for the Assumed Foot Structure

- bimoraic reduplication: asymmetry for accented/unaccented stems if the first syllable is open

(13) *Mayo reduplication (p.135+137)*

a. *Unaccented stems: C_1VC_2*

noká	nok∼nóka	'speak'	*non∼nóka
bwaná	bwan∼bwána	'cry'	*bwab∼bwána

b. *Accented stems: C_1VC_1*

nóka	nón∼noka	'know language'	*nók∼noka
tíwe	tít∼tiwe	'be ashamed'	*tíw∼tiwe

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➙ the base for reduplication is a φ (Hagberg, 2006)

- unaccented: $(\text{noká})_\varphi$
- accented: $(\text{nó})_\varphi\text{ka}$

Richness of the Base?

Only tone-less morphemes or stems with floating H's?

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Option 1

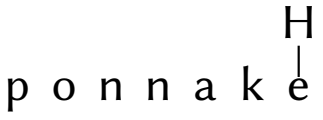
Pre-optimization prior to concatenation excluding all possible morpheme types (Trommer, 2011).

Option 2

All possible representations result in attested forms.

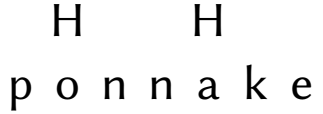
RotB: All possible representations result in attested stem behaviour

(14) *Underlyingly associated H's?*



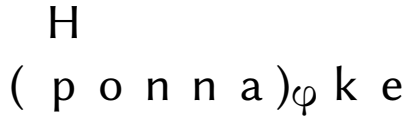
Unmarked foot is assigned first: Behave as unaccented stems.

(15) *More than one H?*



Are neutralized to a single H due to the OCP.

(16) *Underlying φ structure?*



Is always overwritten: DepAL(ω-φ) ≫ Maxφ.

(17) *Affixes with H?*

Are never associated: $\text{DepAL}(\text{H-}\mu)_{\text{Affix}} \gg {}^{*}\text{FltH}$.

Summary

Summary and Discussion

- Mayo templatic accent results from a conflicting preferences for two suprasegmental elements resolved by **serial optimization** (underlying: earlier optimization vs. default: later optimization)
  - in spirit similar to the Lexical Phonology account in Hagberg (2006) but based on a single ranking of independently motivated phonological constraints

- general prediction: Realization of featural affixation/**floating elements can take precedence over phonological defaults**
  - e.g. Southern Sierra Miwok where (one) morphological vowel lengthening affects the initial vowel that is then stressed and predictable iambic vowel lengthening affects the second vowel in the absence of underlying/morphological vowel length (Broadbent, 1964; Brown, 2003; Zimmermann, 2015)

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Appendix: Account in Hagberg (2006)

- accented words have a floating stress autosegment
- linking rule links * L to R at every cycle and delinking rule delinks it at the end of every cycle
- foot building is also cyclic (=reduplication at every cycle possible)
- the delinking rule is turned off at the end of the lexical cycles: * is hence linked to leftmost stress-bearing unit for every word containing an accented stem
- postlexical stress insertion and linking inside foot R to L (=accounts for default stress on second syllable)

→ based on coexisting L-R and R-L linking rules in a single language

→ based on principles like the 'Degenerate Foot Principle' demanding that the presence of a 'lexical accent linked to any element that is being incorporated into a foot forces that foot to become degenerate' (p.19) that seem problematic from a cross-language perspective

Appendix: Further Data on Minimality-Induced Lengthening

- words are minimally bimoraic and final syllable is extrametrical phrase-finally: potential feeding of lengthening
- VL for unaccented stems (18-a), gemination for accented ones (18-b)

(18) *Phrase-final extrametricality and lengthening (Hagberg, 2006, 156+168)*

	Phrase-final	elsewhere	
a.	bwiík-a	bwik-á	'sing'-PRS
	noók-a	nok-á	'speak'-PRS
b.	chúpp-na	chúp-na	'harvest'-PRS
	mákk-a	mák-a	'give'-PRS

→ preference for VL except if gemination allows to avoid shifting of H
  - for long V's, H is always on second μ; VL for accented stems would hence result in shifting H from one μ to the other
  - for unaccented stems, the H has to shift anyway (since it can't remain on final syllable)