Optimal feet vs. optimal tone placement

Eva Zimmermann
Universität Leipzig

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Main Claim

- opposing phonological preferences in HS can be resolved on a 'first come-first served'-principle: **Optimization of underlying elements has priority over optimization of inserted structure**

- a serial optimization account allows to predict **positionally restricted tone/accent systems** from the order between foot parsing and tone association

- this correctly predicts
  - the **non-local templatic accent system** in Mayo and
  - the **asymmetric distribution of different defaults** in Goizueta Basque

  that are problematic to capture in alternative approaches

Plan

1. HS and PRAS

2. Templatic PRAS in Mayo

3. Different Defaults in Goizueta Basque

4. Discussion

HS and PRAS

Positionally Restricted Accent Systems (PRAS)

(1) *Prosodic contrasts in Goizueta Basque (Hualde et al., 2008, 3)*

		Rising pitch			Falling pitch	
2nd σ	A.	gizón	'man'	C.	purè	'puree'
		emákume	'woman'		eskòla	'school'
1st σ	B.	séme	'son'	D.	bàso	'glass'
		áma	'mother'		lèngusu	'cousin'

- lexical contrast for pitch: Prototypical tone
- positionally restricted, usually only a single V/σ: Prototypical stress
  - A special third pattern with an 'accent' mark? (e.g. for Japanese McCawley (1968); Ross (1985); Haraguchi (1991); Kubozono (1993))

→ 'accent' patterns always reanalyzable as **tonal and/or metrical patterns and their interaction** (Hyman, 2009; Köhnlein, 2019)

PRAS as Interacting Metrical and Tonal Structure: Goizueta Basque

- prominent position on first or second V since iambic left-aligned foot and **tone only on foot head** (e.g. de Lacy, 2002)

(2)

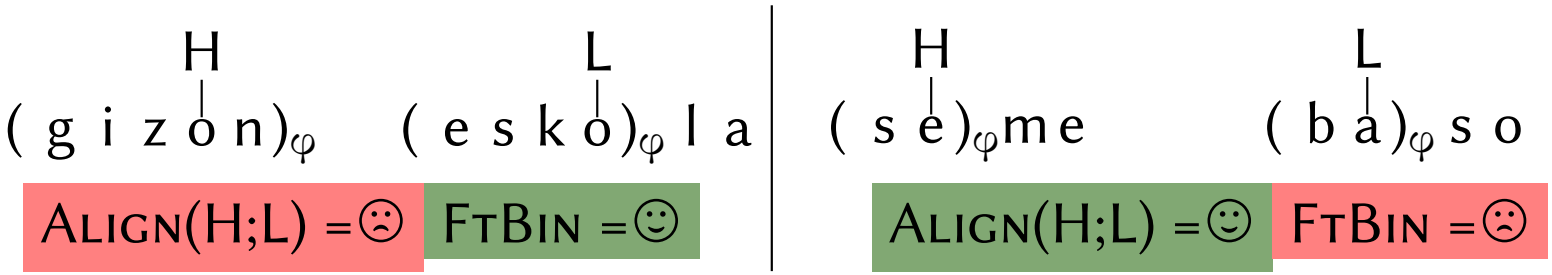
	Binary foot	Unary foot
H-tone	H (g i z o n)$_\varphi$	H (s e)$_\varphi$m e
L-tone	L (e s k o)$_\varphi$ l a	L (b a)$_\varphi$ s o

Different Preferences for Feet and Tones

(3) 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.

(4)



- conflict resolved:
  - Standard Parallel OT: Ranking prefers only one
  - Harmonic Serialism: Different defaults since **underlying structure is optimized first**

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

Templatic PRAS in Mayo

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

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

(5) *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

Serial Account in a Nutshell

Conflict for tones as head of φ

- tones are preferably initial: (h**í**)$_{\varphi}$chupnake
- iambic feet are preferably binary: (hip**ó**n)$_{\varphi}$nake

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 of Mayo

(6)

1. Morpheme Concatenation

h i - p o n n a k e	H h i - c h u p n a k e

2. Floating H-association

h i p o n n a k e	H | h i c h u p n a k e

3. Foot assignment

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

4. Insertion of H on foot head

H | (h i p o n)$_{\varphi}$ n a k e	H | (h i)$_{\varphi}$ c h u p n a k e
φ =☺ – T=☹	φ =☹ – T=☺

Constraints

(7)

a. *FltH

Assign * for each tone not associated to a TBU.

b. HDω (after (Ito and Mester, 2009))

Assign * for every prosodic word that does not dominate a foot.

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. DepH

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

HS optimization: Step 1, No underlying H

(8) *Foot building*

h i - p o n n a k e	*FLTH	HDω	φHD->H	ALIGN(H;L)	FTBIN
a. h i p o n n a k e		*!			
☞ b. (h i p o n)$_{\varphi}$ n a k e			*		
c. H h i p o n n a k e		*!			

HS optimization: Step 2, No underlying H

(9) *Default H*

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

HS optimization: Step 1, Underlying H

(10) *Tone association*

H h i - c h u p n a k e	*FLTH	HDω	φHD->H	ALIGN(H;L)	FTBIN
a. H h i - c h u p 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 n a k e		*			
d. H h i c h u p n a k e		*		*!	

HS optimization: Step 2, Underlying H

(11) *Foot building*

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

Different Defaults in Goizueta Basque

Four prosodic patterns (Hualde et al., 2008)

(12) *Prosodic contrasts in Goizueta Basque (Hualde et al., 2008, 3)*

		Rising pitch			Falling pitch	
2nd σ	A.	giz**ó**n	'man'	C.	pur**è**	'puree'
		al**á**ba	'daughter'		tip**ù**la	'onion'
		em**á**kume	'woman'		esk**ò**la	'school'
1st σ	B.	s**é**me	'son'	D.	b**à**so	'glass'
		úme	'children'		m**ò**ro	'Moor'
		áma	'mother'		l**è**ngusu	'cousin'

Serial Account in a Nutshell

Conflict: Preferred positions for tones (=head of a φ)

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

Underlying contrast: Stems with/without a floating H/L

- floating L's: associated to their preferred position before feet are built
- floating H's: wait until feet are built and associate to head of a binary foot
- no floating tones: default-H's are inserted into the head of a binary foot

→ different defaults for underlying vs. inserted and L- vs. H-tones

Steps in a Serial Account of Goizueta Basque

(13)

Lexical representation

L	H		H
b a s o	g i z o n	p u r a	s e m e

1. Floating L-association

L	H		H
b a s o	g i z o n	p u r a	s e m e

2. Foot assignment

L	H		H
(b a)$_\varphi$ s o	(g i z o n)$_\varphi$	(p u r a)$_\varphi$	(s e)$_\varphi$ m e

3. Floating H-association

L	H		H
(b a)$_\varphi$ s o	(g i z o n)$_\varphi$	(p u r a)$_\varphi$	(s e)$_\varphi$ m e

4. Insertion of default-L on foot head

L	H	L	H
(b a)$_\varphi$ s o	(g i z o n)$_\varphi$	(p u r a)$_\varphi$	(s e)$_\varphi$ m e

HS Account for Goizueta Basque

(14) *Ranking*

*FltL, DepL ≫ Hdω ≫ *FltH, φHd->H, H->φHd ≫ FtBin, Align(H;L), MAL, DAL, DepH

(15) *Predicted outcomes for bi-/trisyllabic stems with 0-1 tone(s)*

1.	σ σ	(σσ)	A: VV́
2.	H σ σ	H (σσ)	A: VV́
3.	L σ σ	L (σ)σ	D: V̀V
4.	H σ σ	H (σ)σ	B: V́V
5.	L σ σ	L (σ)σ	D: V̀V
6.	H σ σ	H (σσ)	A: VV́
7.	L σ σ	L (σσ)	C: VV̀
8.	σ σ σ	H (σσ)	A: VV́
9.	H σ σ σ	H (σσ)σ	A: VV́
10.	L σ σ σ	L (σ)σ σ	D: V̀V
11.	H σ σ σ	H (σ)σ σ	B: V́V
12.	L σ σ σ	L (σ)σ σ	D: V̀V
13.	H σ σ σ	H (σσ)σ	C: VV̀
14.	L σ σ σ	L (σσ)σ	C: VV̀
15.	H σ σ σ	H (σσ)σ	A: VV́
16.	L σ σ σ	L (σσ)σ	C: VV̀

An Alternative in a Parallel OT system?

(16) *Ranking*

HDω, *FLTL, *FLTH, φHD->H, H->φHD, DEPL, ≫ DEPH, MAL, DAL ≫ FTBIN ≫ ALIGN(H;L)

(17) *Predicted outcomes for bi-/trisyllabic stems with 0-1 tone(s)*

1.	H σ σ	(σσ)	A: VV́
2.	H σ σ	H (σσ)	A: VV́
3.	L σ σ	L (σσ)	C: VV̀
4.	H σ σ	H (σ)σ	B: V́V
5.	L σ σ	L (σ)σ	D: V̀V
6.	H σ σ	H (σσ)	A: VV́
7.	L σ σ	L (σσ)	C: VV̀
8.	σ σ σ	H (σσ)	A: VV́
9.	H σ σ σ	H (σσ)σ	A: VV́
10.	L σ σ σ	L (σσ)σ	C: VV̀
11.	H σ σ σ	H (σ)σ σ	B: V́V
12.	L σ σ σ	L (σ)σ σ	D: V̀V
13.	H σ σ σ	H (σσ)σ	C: VV̀
14.	L σ σ σ	L (σσ)σ	C: VV̀
15.	H σ σ σ	H (σσ)σ	A: VV́
16.	L σ σ σ	L (σσ)σ	C: VV̀

Predictions of HS and SPOT and the Distribution of Accent

(18)

	A: VV́	B: V́V	C: VV̀	D: V̀V
SPOT	6	2	6	2
HS	6	2	4	4

- by far the most common type is A whereas class B only 'contains a relatively small number of bisyllabic stems' (Hualde et al., 2008, 4)

→ if one wants to correlate the status of being exceptional/rare to the number of different contrasts being neutralized to that form, HS allows a more fine-grained asymmetrical distribution

HS vs. SPOT

Possible positional defaults in HS

- the position of epenthetic tones, floating H- and floating L-tones can be different

Possible positional defaults in SPOT

- the position of epenthetic tones, floating H- and floating L-tones is identical

- shown in (19) with a factorial typology done with OTHelp (Staubs et al., 2010)
- all possible different default patterns (=tone needs to assign newly) for HS and SPOT where a tone results on syllable 1 or 2

Positional Defaults for Newly Associated Tones: OTHelp

(19) *HS (8 out of 282)*

No Tone		Floating Tone				Reassociation into φ	
σ σ	σ σ σ	σ σ fH	σ σ fL	σ σ σ fH	σ σ σ fL	σ σ σ H3	σ σ σ L3
H2	H2	H2	L2	H2	L2	H2	L2
H2	H2	H2	L1	H2	L1	H2	L2
H2	H2	H1	L2	H1	L2	H2	L2
H2	H2	H1	L1	H1	L1	H2	L2
L2	H2	H2	L2	H2	L2	H2	L2
L2	H2	H2	L1	H2	L1	H2	L2
L2	H2	H1	L2	H1	L2	H2	L2
L2	H2	H1	L1	H1	L1	H2	L2

(20) *SPOT (6 out of 394)*

H2	H2	H2	L2	H2	L2	H2	L2
L2	H2	H2	L2	H2	L2	H2	L2
H1	H1	H1	L1	H1	L1	H2	L2
L1	H1	H1	L1	H1	L1	H2	L2
H1	H1	H1	L1	H1	L1	H1	L1
L1	H1	H1	L1	H1	L1	H1	L1

Summary: PRAS in Goizueta Basque

- a HS account predicts that all imaginable underlying tonal/metrical contrasts are neutralized to one of the four attested accent patterns
- in contrast to a non-serial account, it allows to predict **different defaults** for epenthetic, floating L-, and floating H-tones
- these different defaults allow to capture the **distribution into frequent and exceptional** classes

Discussion

Summary and Discussion

- if conflicting preferences for two suprasegmental elements is resolved by serial optimization, underlying elements can be optimized earlier than inserted ones

- this predicts **templatic non-local accent** in Mayo
  - in spirit similar to the Lexical Phonology account in Hagberg (2006) but based on a single ranking of independently motivated phonological constraints

- and **co-existence of different defaults** in Goizueta Basque

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Appendix: Additional undominated constraints in Mayo

(21) 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.

Appendix: Step 3, no underlying H: Convergence

(22)

H (h i p o n)$_{\varphi}$ n a k e	*FLTH	HDω	φHD->H	ALIGN(H;L)	FTBIN	DEPH
☞ a. H (h i p o n)$_{\varphi}$ 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			*!		*	

Appendix: Step 3, underlying floating H: Convergence

(23)

H (h i)$_{\varphi}$ c h u p n a k e	*FLTH	HDω	φHD->H	ALIGN(H;L)	FTBIN	DEPH
☞ a. H (h i)$_{\varphi}$ c h u p n a k e					*	
b. H (h i p o n)$_{\varphi}$ n a k e			*!			
c. H h i c h u p n a k e		*!				

Appendix: Mee (New Guinea, Hyman and Kobepa (2013); Worbs (2016))

- two tone patterns A+B for words of all shapes
- tonal morphology: A changes into B

(24)

	μμ	μ.μ	μμ.μ	μμ.μμ	μ.μ.μ	
A.	bóù	údò	gáàbò	múùmàì	áyàmù	**HL(L…)**
	‘wind’	‘heavy’	‘quiet’	‘to finish’	‘chicken’	
B.	bóú	údó	gáátì	búúmàì	ágíyà	**HH(L…)**
	‘to skin’	‘testicle’	‘ten’	‘to swim’	‘net bag’	

Appendix: HS Account of Mee

- An underlying tone associates to the initial TBU and spreads
  (=all syllables want to have a tone but maximally binary spread is possible)

- Without a tone, a left-aligned binary foot is built first; a H tone is inserted into the foot head but cannot spread since it is illicit on the foot non-head

→ Morphologically determined change from A to B:
A **floating tone**

Appendix: Steps in a Serial Account of Mee

(25)

1. Morpheme Concatenation	
H a y a m u	a g i y a
2. Floating H-association	
H a y a m u	a g i y a
3. H-Spread	
H a y a m u	a g i y a
4. Foot assignment	
H (a)$_{\varphi}$ y a m u	(a g i)$_{\varphi}$ y a
5. Insertion of H on foot head	
H (a)$_{\varphi}$ y a m u	H (a g i)$_{\varphi}$ y a

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 (26-a), gemination for accented ones (26-b)

(26) *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)