Tone features and underspecification

Morphological H-tones in Macuiltianguis Zapotec

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Main Claim

- the assumption of **(sub-)tonal features** predicts that the same surface tones may have different (underspecified) phonological representations
- the **asymmetric behaviour of H-tones** in Macuiltianguis Zapotec follows under such an account:
  - more complex [+Upper,+raised] can only associate locally and to a single TBU
  - underspecified [+raised] can associate non-locally and changes the tone of all TBU's associated to one vowel

Structure of the talk

Data: Tones in Macuiltianguis Zapotec

Macuiltianguis Zapotec (=MacZ)

- an Otomanguean language spoken in Oaxaca, Mexico
- data based on Broadwell and Zhang (1999); Broadwell (2000); Foreman (2006), and especially Broadwell et al. (2011)

(1) *State of Oaxaca (Wikimedia, 07/01/16)*

Tone in Macuiltianguis Zapotec (=MacZ)

- three level tones high (=H, á), mid (=M, a), and low (=L, à), and a downstepped H (=ꜜá)
- tone sequences HL and LH on long vowels; **TBU=μ**

(2) *Tone in MacZ (Foreman, 2006, 40)*

íj꞉á	'rock'	ij꞉a	'rain'
bél꞉á	'fish'	bèl꞉à	'snake'
be꞉lia	'cave'	bê꞉lia	'star'
dă꞉	'bean'	dâ꞉	'lard'

Spreading of stem-final H and M

- root-final H and M spread one TBU to the right (3-a+b)
- spreading is blocked by /ʔ/ (3-c)

(3) *Spreading of root-final H/M (Broadwell et al., 2011, 3)*

	Underlying	Surface
a.	be-làːlja-nà-nà	be-làːlja-n**a**-nà
	Com-spill-3SgS-3SgO	'S/he spilled it'
b.	be-làpːá-nà-nà	be-làpːá-n**á**-nà
	Com-clean.up-3SgS-3SgO	'S/he cleaned it up'
c.	be-sìːgáʔ-nà-nà	be-sìːgáʔ-nà-nà
	Com- push-3SgS-3SgO	'S/he pushed it'

Spreading of H from the potential prefix

- the H-toned prefix /gú–/ POTENTIAL causes an **additional H** on the following TBU

(4) *Potential (Broadwell et al., 2011, 4+8)*

	UNDERLYING	SURFACE
a.	gú-di-bìθːà-nà-nà	gú-d**í**-bìθːà-nà-nà
	POT-CAUS-wet-3SGS-3SGO	'S/he will wet it'
b.	gú-sìːgáʔ-nà-nà	gú-s**î**ːgáʔ-nà-nà
	POT- push-3SGS-3SGO	'S/he will push it'
c.	gú-tùːbí-já-nà	gú-t**û**ːbí-já-nà
	POT-roll-1SGS-3SGO	'I will roll it'
d.	gú-làpːá-nà-nà	gú-l**á**pːꜜá-ná-nà
	POT-clean.up-3SGS-3SGO	'S/he will clean it up'

Different tone spreading operations?

- no spread from M-toned prefixes (e.g. COMPL /be–/ or HAB /ru–/)

	UNDERLYING	SURFACE
a.	be-làːlja-nà-nà	be-làːlja-n**a**-nà
	COM-spill-3SGS-3SGO	'S/he spilled it'
b.	be-làpːá-nà-nà	be-làpːá-n**á**-nà
	COM-clean.up-3SGS-3SGO	'S/he cleaned it up'

→ since /gu–/ is the only H-toned prefix in MacZ, the additional H in this context is taken to be **morpheme-specific**
(=bound to the presence of this affix)

H-tone in the 1.Sg formation

- an additional H is realized on the verb base:
  - on a **vowel followed by** /ʔ/,
    be-tsìːg**a**ʔ-jà-nà be-tsìːg**á**ʔ-jà-nà
    Com-get.dirty-1SgS-3SgO ‘I dirtied it’
  - on the **leftmost L-toned** TBU if there is no such vowel,
    be-b**ì**θːà-jà-nà be-b**í**θːà-jà-nà
    Com-wet-1SgS-3SgO ‘I wetted it’
  - and on the **rightmost M-toned** TBU if there is no L-toned TBU.
    be-ʃatt**a**-jà-nà be-ʃatt**á**-já-nà
    Com-iron-1SgS-3SgO ‘I ironed it’

(Different generalization based on a preference for the tone to reach the stressed position in Foreman (2006) or Broadwell and Zhang (1999))

H-tone in the 1.Sg formation

(5) *Abstract Summary*

a. *To glottalized V*

LL.MʔLL.**H**ʔ
LL.HʔLL.**H**ʔ
Mʔ.H**H**ʔ.H

b. *Else to leftmost L*

L.M**H**.M
M.LM.**H**
L.L**H**.L
LL.M**HH**.M
LL.H**HH**.!H

c. *Else to rightmost M*

M.MM.**H**

Two different morphological H-tones?

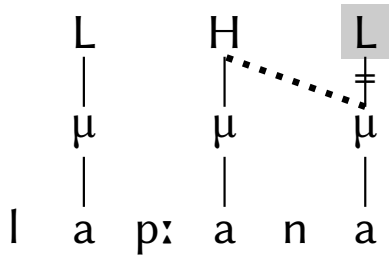
Root	1.Sg	Pot (after /gu–/)
tù:bí	t**ú:**!bí	t**û:**bí
sì:gáʔ	sì:g**á**ʔ	s**î:**gáʔ

The asymmetry

	1Sg	Pot
Locality	on 1. or 2. syllable	always on TBU after /gu-/
Effect for V̀:	Overwriting: V́:	Contour tone: V̂:

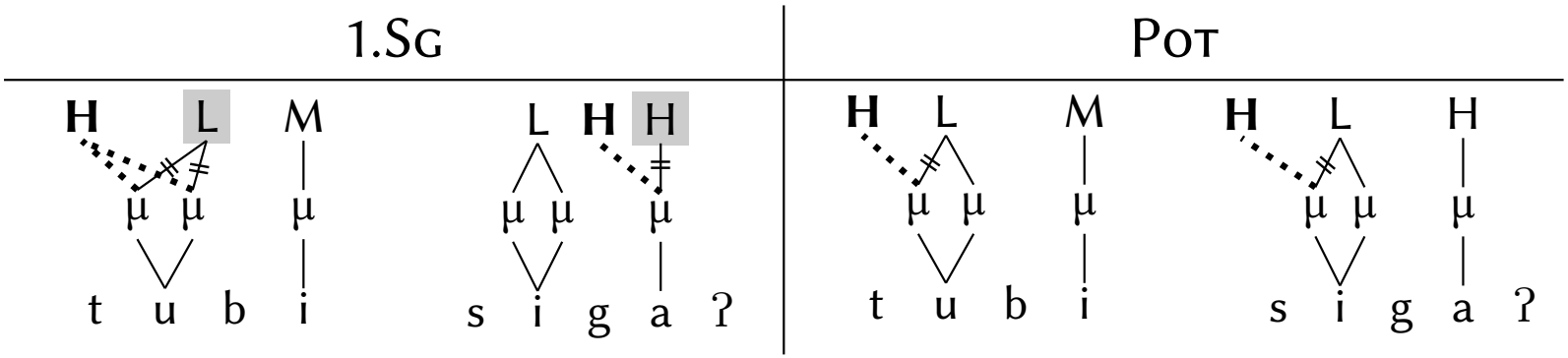
The challenge for an account where tones are primitives

(6) *Phonological H-spread from stem-final TBU*



- POT and 1SG are instances of **morphological H-tones**: (floating) tones present in certain morpho-syntactic configurations

(7) *Two types of morphological tones*



An account for MacZ in terms of (sub)tonal features

Assumption: tonal features (Yip, 1989; Snider, 1990; Hyman, 1992)

- register [±Upper] divides pitch range of voice in half; [±raised] subdivides register (Yip, 1980; Pulleyblank, 1986)
- three tones specified with two tone features **[±Upper] and [±raised]**
- **underspecified** tones (8-b) interpreted with a default [−raised] value

(8) *Tone in MacZ*

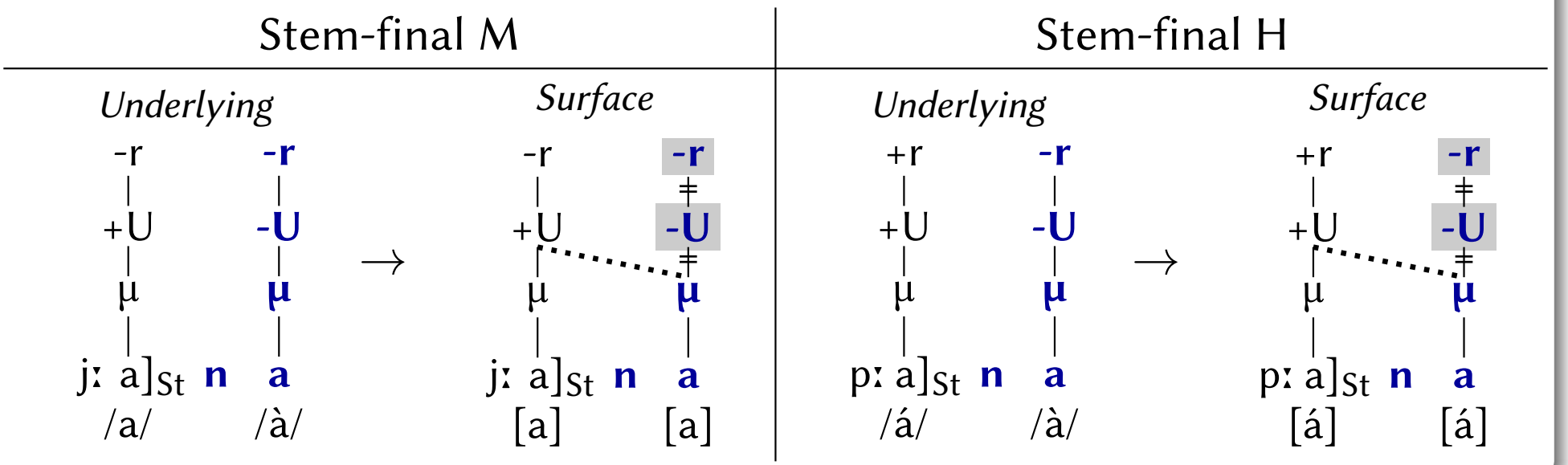
	L	**M**	**H**
a.	-r | -U	-r | +U	+r | +U
b.	-U	+U	

Sub-tonal representation: Prediction I

I. H and M are a natural class

Predicts that H and M spread from stem-final TBU's.

(9)

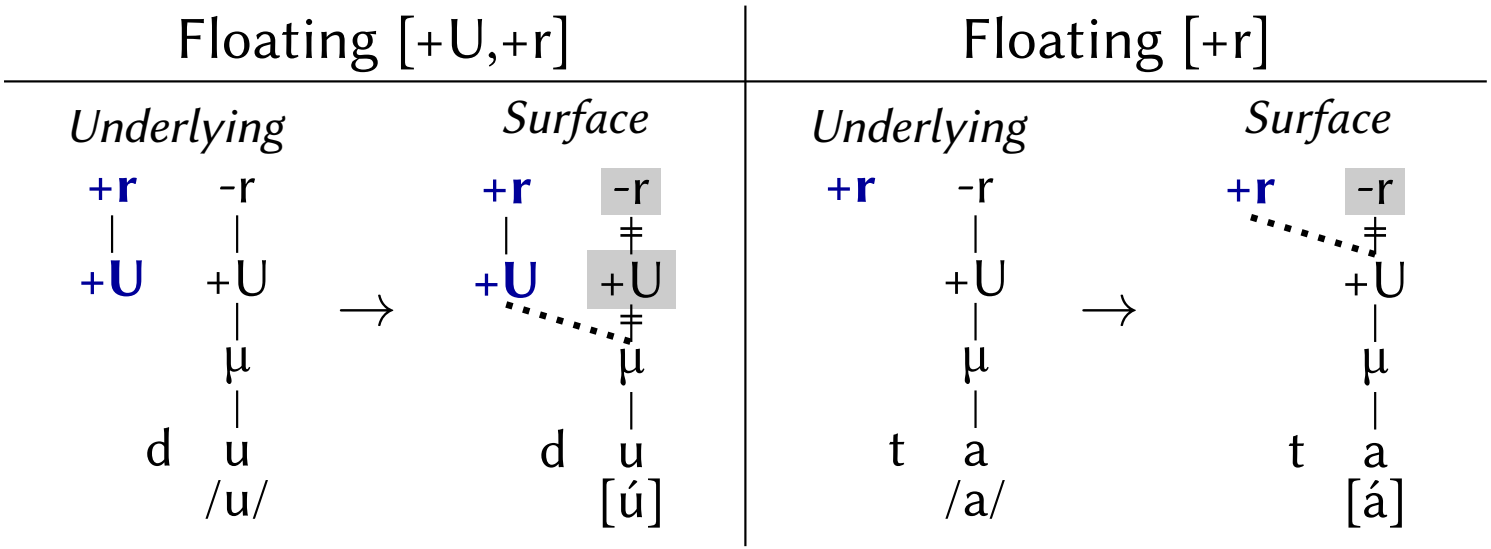


Sub-tonal representation: Prediction II

II. Different H-tones

Addition of floating [+r] and [+U,+r] has in principle the **same surface effect**: realization of a H-tone instead of the underlying tone (=overwriting).

(10)



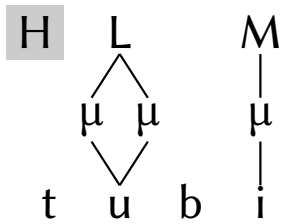
Theoretical background: Coloured Containment-based OT

(van Oostendorp, 2006; Trommer, 2011; Zimmermann, 2014; Trommer and Zimmermann, 2014)

(11) *Containment (Prince and Smolensky, 1993/2004)*
Every element of the phonological input representation is contained in the output.

1. **No deletion**: unrealized elements are not integrated under the highest prosodic node (=Stray Erasure, McCarthy, 1979; Steriade, 1982; Itô, 1988)
   - ➙ for tone: unassociated high has no effect on adjacent tones (in the languages under discussion); unassociated low may cause downstep

(12) *Marking conventions: phonetically unrealized elements*

Phonological structure	Phonetic interpretation
	[tù:bi]

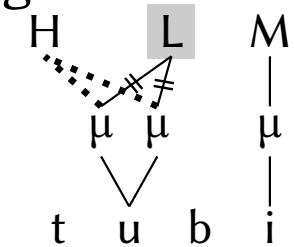
Theoretical background: Coloured Containment-based OT

2. **No deletion of association lines**: they can only be marked as 'phonetically invisible' (=not interpreted)

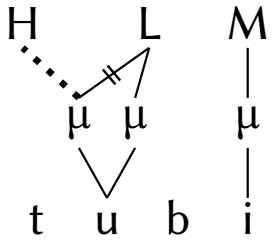
(13) *Marking conventions: different types of association lines*

Morphological association lines		Epenthetic association lines	
phonetically visible:	phonetically invisible:	phonetically visible:	phonetically invisible:
a.	b.	c.	d.

(14) *Marking conventions: phonetically unrealized elements II*

a. 

[tú:bi]

b. 

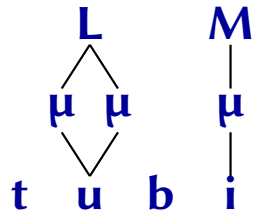
[tû:bi]

➙ Constraints: sensitive to only the phonetically visible or all structure
(='constraint cloning' Trommer, 2011; Trommer and Zimmermann, 2014)

Theoretical background: Coloured Containment-based OT

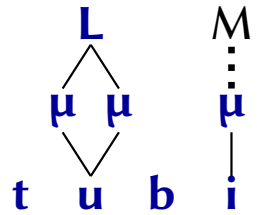
3. All morphemes have a **'colour'** (=affiliation); epenthetic elements are colourless

(15) *Marking conventions: morphological colours*

a. 

[tù:bi]

→ two underlying tones

b. 

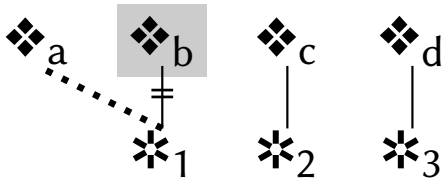
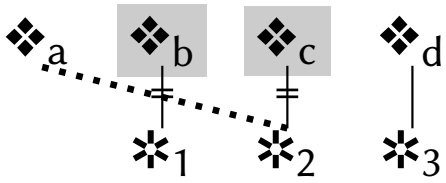
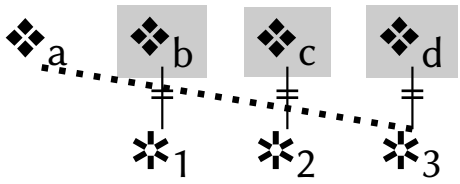
[tù:bi]

→ insertion of an epenthetic M

Locality of association under containment

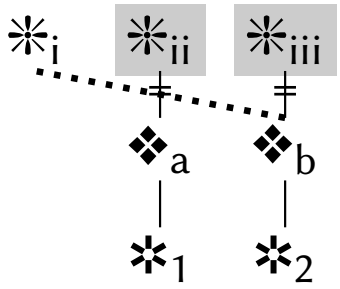
- phonetically visible association lines can not cross (Goldsmith, 1976)
- a **phonetically invisible association line might be 'crossed'**, under violation of *Cross
- 'crossed' elements remain invisible under violation of Max and Have

(16)

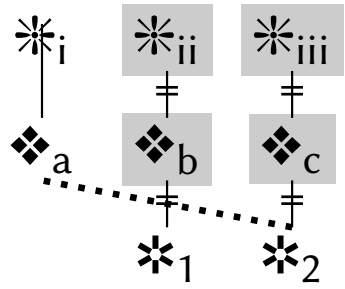
	*Cross	Have-❖	Max-❖	
☞ a. 			*	*'local'*
b. 	*!	*	**	*'non-local'*
c. 	*!*	**	***	

Non-local association: general predictions

(17) *Non-local overwriting: 'Simple' structure*



(18) *Non-local overwriting: 'Complex' structure*

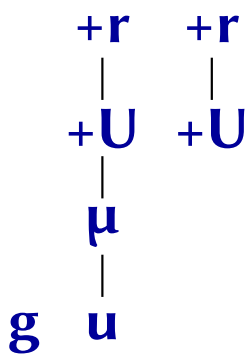


- non-local association of a more complex superset-structure implies non-realization of a **superset** of structure
  ➙ 'smaller' things can more easily reach a non-local position
- the 'crossed' elements are **neutralized to default** structure or take the value of the 'crossing' element (=spreading)

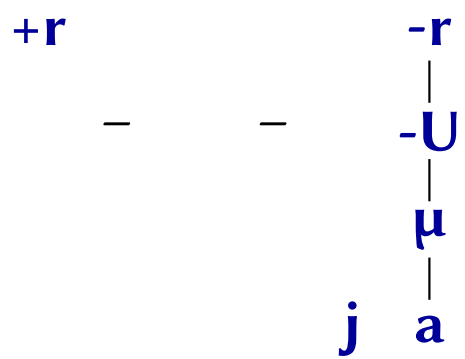
Assumption: Representation of floating High tones

(19) *Two different morphological (floating) H-tones*

Pot ↔



1.Sg ↔



➙ a circumfix; the suffixed segmental portion is not relevant in the following

Overwriting in containment: Constraints

(20) a. R-TO-U
Assign a violation mark for every [±r] that is not associated to a [±U].

b. $\underline{*^{R}U^{R}}$
Assign a violation mark for every [±U] that is phonetically visibly associated to more than one feature [±r].

c. MAX[R]
Assign a violation mark for every phonetically invisible [±r].

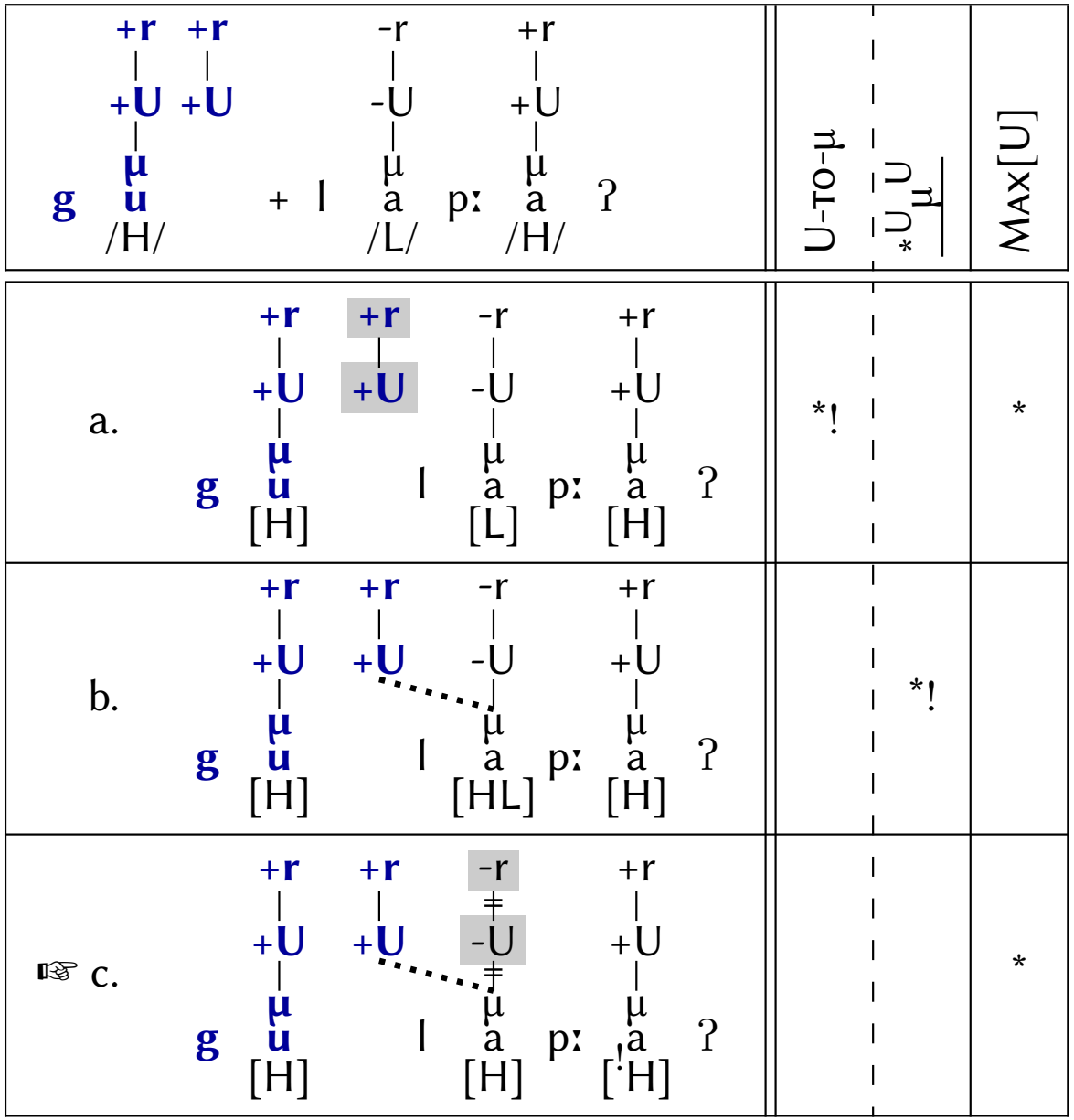
Overwriting: 1Sg-H

(21)

		r-to-U	*^{R}U^{R}	Max[r]
+r	+ ʃ u /M/ ʔ n i /H/ (-r, +U, μ; +r, +U, μ)			
a.	+r; ʃ u [M] ʔ n i [H]	*!		*
b.	+r; ʃ u [HM] ʔ n i [H]		*!	
☞ c.	+r; -r; ʃ u [H] ʔ n i [H]			*

Overwriting: Pot-H

(22)



Asymmetry 1: Locality

- 1Sg **[+r]** realized non-locally (on first or second syllable of stem)
- Pot **[+U,+r]** realized only locally (on the first TBU following /gu–/)

Preferred realization site for a high tone

- the preference for being realized on a vowel followed by /ʔ/is taken to be standard case of **consonant-tone interaction**
  (Lee, 2008; Tang, 2008, cf. also the blocking of H/M-spread across /ʔ/)

(23) *–CG/H
Assign a violation mark for every phonetically visible vowel that is associated to [+r] but not followed by a [+cg]-sound.

(the additional preferences triggering non-local H-realization (cf. slide 10) follow from faithfulness preserving M-tones and a preference for M-tones on the initial TBU)

Additional constraints

(24) a. HAVE[U]
Assign a violation mark for every phonetically visible μ that is not associated to a [±U] in a phonetically visible way.

b. HAVE[R]
Assign a violation mark for every phonetically visible [±U] that is not associated to a [±r] in a phonetically visible way.

c. *CROSS
Assign a violation mark for every instance of crossing association lines.
(=for every pair of features A_1 followed by A_2 on tier n if A_1 is associated to B_2 and A_2 to B_1 if B_1 precedes B_2 on tier n-1)

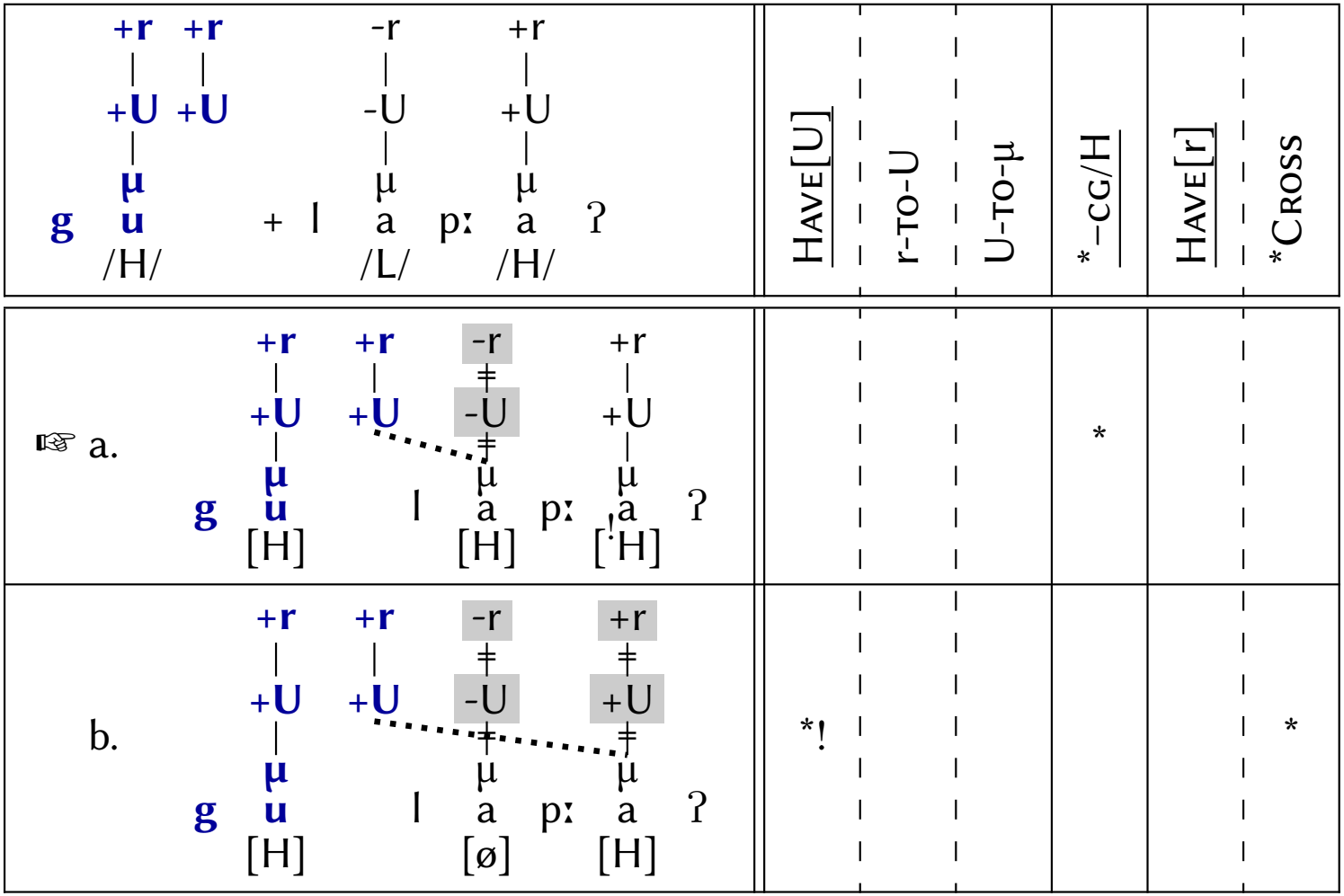
Non-local realization possible for the 1.Sg-H

(25)

		HAVE[U]	r-TO-U	U-TO-μ	*–CG/H	HAVE[r]	*CROSS
+r	+: -r, -U; -r, +U; μ μ μ; ts iː g a ʔ; /LL/ /M/						
a.	+r, -r, -U, +U; μ μ μ; ts iː g a ʔ; [<MM>] [H]				*!		
☞ b.	+r, -r, -r, -U, +U; μ μ μ; ts iː g a ʔ; [LL] [H]					*	*

Non-local realization impossible for the Pot-H

(26)



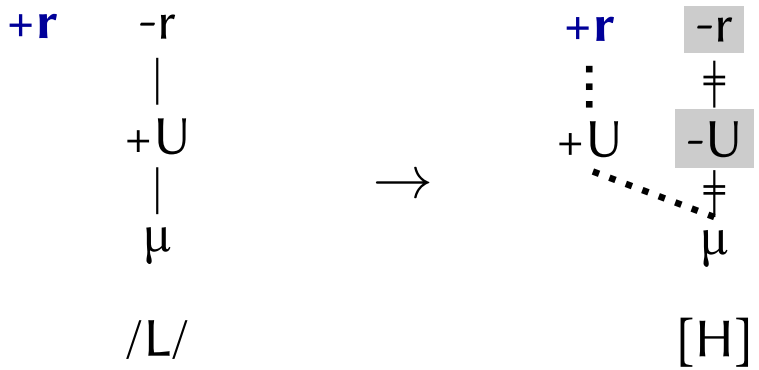
Asymmetry 2: Effect for V:

- 1Sg **[+r]** overwrites V̀: to V́:
- Pot **[+U,+r]** creates rising contour V̂:

Avant propos: [+r] 'overwrites' an L-tone

- since there are no [–U,+r] tones in MacZ, realization of [+r] implies insertion of an epenthetic [+U]

(27) *[+r] realized on an underlying L-toned TBU*



Additional constraints

(28) a. *CONT$_V$

Assign a violation mark for every phonetically visible V associated to two different tones in a phonetically visible way.

b. DEPAL(U–μ)

Assign a violation mark for every colourless association line between a morphologically coloured [±U] and a morphologically coloured μ.

(Trommer and Zimmermann, 2014)

Vː-Asymmetry: Contour creation for the Pot-H

(29)

	r-to-U	U-to-μ	DepAL(U–μ)	*Cont$_{\underline{V}}$	Dep[U]	Max[U]	Max[r]
+r +r -r +r | | | | +U +U -U +U | | ⟨ ⟩ | μ μ μ | | | **g u** + s i g a ʔ /H/ /L/ /H/							
☞ a. +r +r -r +r | | | | +U +U -U +U | ⋰ ⟨ ⟩ | μ μ μ | | | **g u** s i g a ʔ [H] [HL] [H]			*	*			
b. +r +r -r +r | | ǂ | +U +U -U +U | ⋰ ⟨ ⟩ | μ μ μ | | | **g u** s i g a ʔ [H] [HH] [H]			**!			*	*

V:-Asymmetry: Complete overwriting for the 1.Sg-H

(30)

	r-to-U	U-to-μ	DepAL(U–μ)	*Cont$_V$	Dep[U]	Max[U]	Max[r]
+r -r -r / -U +U / μ μ μ / + g a s i / /L/ /M/							
a. +r -r -r / +U -U +U / μ μ μ / g a s i / [HL] [M]				*!	*		
☞ b. +r -r -r / ≠ / +U -U +U / μ μ μ / g a s i / [H] [M]					*	*	*

Summary: Analysis for MacZ

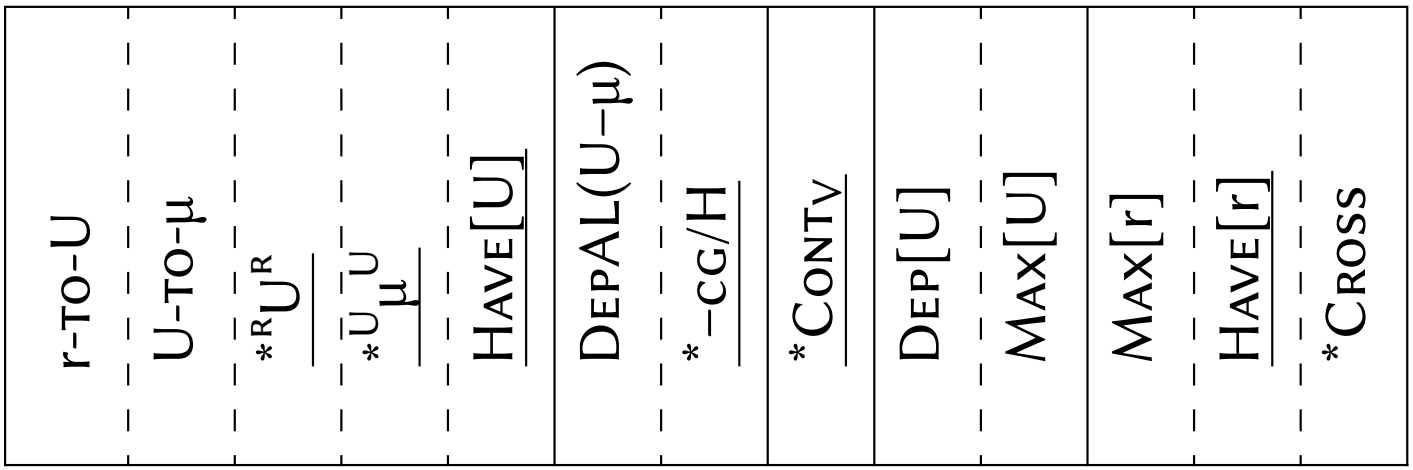
Asymmetry of 1.Sg-H and Pot-H follows from their **different specification**:

- less complex **[+r]** can associate 'across' other [±r] specifications to reach a preferred TBU;
  the more complex **[+U,+r]** cannot since (the 'crossed') μ's would remain without an overt specification for [±U]

- overwriting of an underlying L-tone implies insertion of an epenthetic [+U] for **[+r]** – additional association lines to avoid a contour tone are less costly than they are for associating **[+U,+r]**

Summary: The ranking for MacZ

(31)



(tested with the help of OTHelp (Staubs et al., 2010))

Further implications

Locality asymmetry of tone-demanding suffixes in Bora

(Seifart, 2005; Thiesen and Weber, 2012; Roe, 2014)

- Witotoan language, spoken in Northern Peru
- two tone levels H and L; H is assumed to be the default
- some suffixes impose L: on the **final or penult TBU** of their base

(32) *Suffixes imposing L on final or penult base σ*

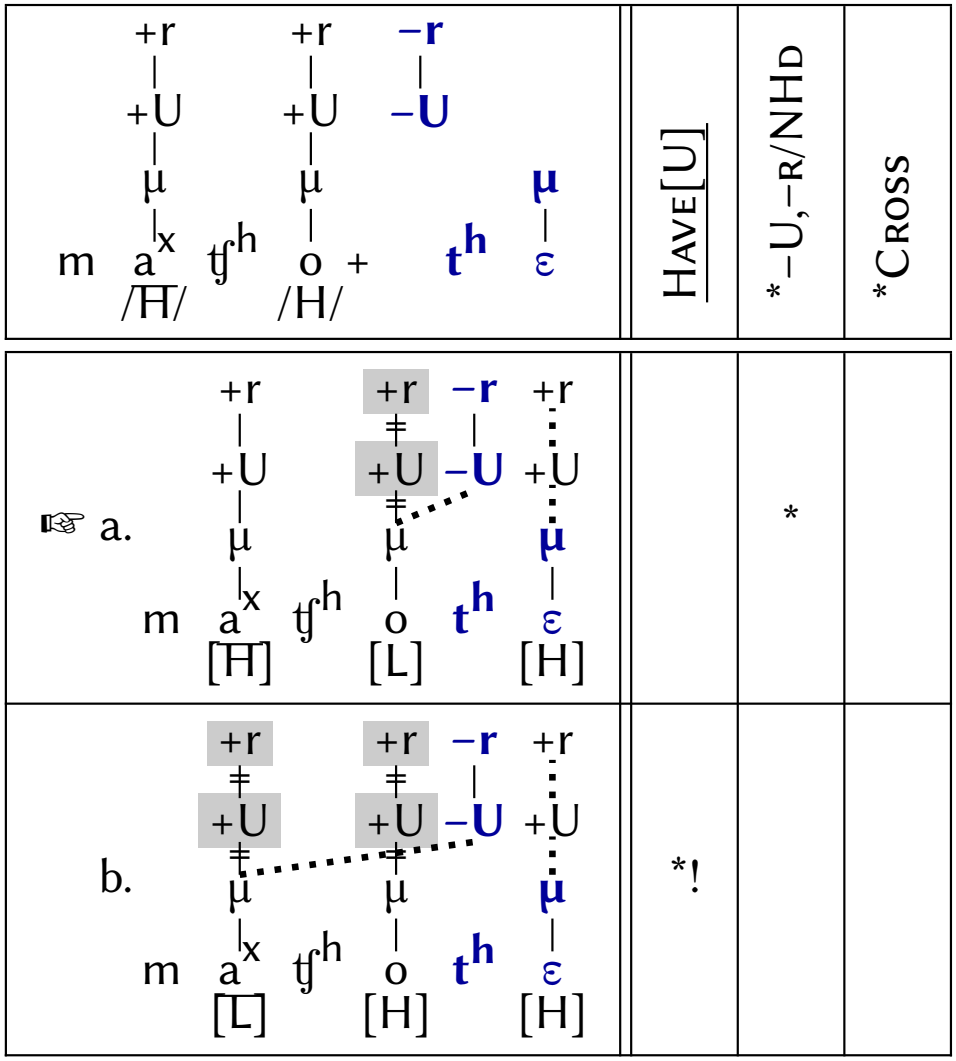
a.	o ma^{x}ʧ^{h}o-$^{\mathbf{L}}$t^{h}ɛ-ʔi I eat-go.do	ó má^{x}ʧ^{h}**ò**-t^{h}é-ʔì 'I go to eat'	(Thiesen and Weber, 2012, 77)
b.	aːnɯ-kpa-$^{\mathbf{L}}$ma cassava.shoot-slab-Soc	áːnɯ́-kp**à**-mà 'with a cassava.shoot for planting'	(Roe, 2014, 92)
c.	ma^{x}ʧ^{h}o-$^{\mathbf{Lø}}$mɛ eat-An.Pl	mà^{x}ʧ^{h}ó-mɛ̀ 'they ate'	(Thiesen and Weber, 2012, 77)
d.	imipa^{x}ʧ^{h}o-$^{\mathbf{Lø}}$mɛ fix-An.Pl	ímípà^{x}ʧ^{h}ó-mɛ̀ 'they fix'	(Thiesen and Weber, 2012, 77)

Locality asymmetry for tone-demanding suffixes in Bora

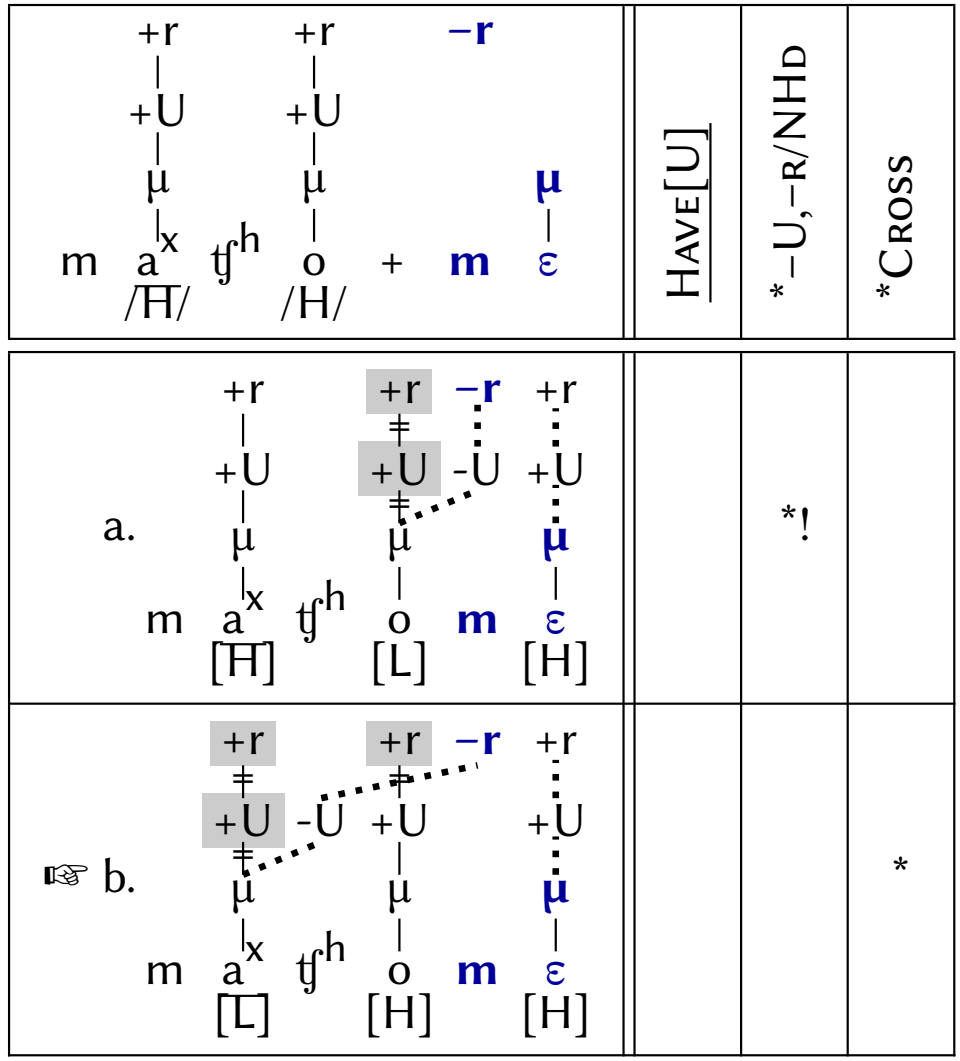
- there is a preference for L-tones to be realized on the penultimate TBU of the base – due to ALIGN(L;L) or a preference for stressed position: *–U,–R/NHD (de Lacy, 2002)
- **some** floating L's ([–U,–r]) **can reach this preferred position** and others ([–r]) not

Locality asymmetry of tone-demanding suffixes in Bora

(33) *Local association: /-$^{L}t^{h}\varepsilon$/*



(34) *Non-local association: /-$^{L\emptyset}m\varepsilon$/*



Summary

Summary

- the asymmetric behaviour of different morphological H-tones in MacZ follows under the assumption of **tonal features** and underspecification
- **non-local association** of (non-complex) floating tone features under the pressure of higher-ranked markedness constraints is possible in a containment-based system
- extends the argument that phonetically identical tones may have **different phonological specification** in a tone feature account
  - two different M's in Bimoba (Snider, 1998): downstepped H vs. underlying M
  - two different L's in Mundurukú (Picanço, 2005)
  - **two different H-tones in MacZ**

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A1: More examples for the 1.SG formation

(35) *1.Singular (Broadwell et al., 2011, 6+7)*

	UNDERLYING	SURFACE
a.	be-tsìːg**a**ʔ-jà-nà COM-get.dirty-1SGS-3SGO	be-tsìːg**á**ʔ-jà-nà 'I dirtied it'
	be-ʃ**u**ʔní-jà-nà COM-wrinkle-1SGS-3SGO	be-ʃ**ú**ʔní-já-nà 'I wrinkled it'
b.	be-b**ì**θːà-jà-nà COM-wet-1SGS-3SGO	be-b**í**θːà-jà-nà 'I wetted it'
	be-di-g**àː**si-jà-nà COM-CAUS-be.scared-1SGS-3SGO	be-di-g**áː**si-ja-nà 'I scared it'
	be-detʃ**ːù**-jà-nà COM-fold-1SGS-3SGO	be-detʃ**ːú**-já-nà 'I folded it'
	be-t**ùː**bí-jà-nà COM-roll-1SGS-3SGO	be-t**úː**ꜜbí-já-nà 'I rolled it'
c.	be-ʃatː**a**-jà-nà COM-iron-1SGS-3SGO	be-ʃatː**á**-já-nà 'I ironed it'
	be-neːs**i**-jà-nà COM-submerge-1SGS-3SGO	be-neːs**í**-já-nà 'I submerged it'