The Stratal Structure of Kuria Morphological Tone

Jochen Trommer
jtrommer@uni-leipzig.de

Universität Leipzig
Institut für Linguistik

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Introduction

Agenda

- **Sande & Jenks (2018):** Lexically conditioned phrasal tone is evidence for phases as phonological domains

- **This Talk:** Stratal OT and Autosegmental Phonology account for apparent morphosyntax-phonology mismatches

Traditional Phonological Domains (Kenstowicz 1994)

- **Words:** e.g. Trisyllabic Shortening

  tri-dent/tri-nity, penal/penal-ize, clear/clar-ify,
  but not: *nightingale, stevedore, ivory*

  - applies only inside of words (not to: *ride a bike*)
  - sensitive to word-internal structure

- **Phrases:** e.g. Flapping,

  letter and *let it* (le[r]er, le[r] it)

  - applies (inside and) across words
  - insensitive to word-internal structure

Traditional Word-Internal Domains

- **Stems:** e.g. Albanian Weight-sensitive Stress:
  stress heavy final, otherwise penultimate (Trommer 2013)
  - applies in stems: pa**tók** ‘gander’ **bá**bo ‘midwife’, punə-**tór** ‘worker’
  - not reassigned to inflected words:
    pa**tók**-un/*patok-**ún** ‘gander’ (Acc.) **bá**bo-n/*bab**ó-n** ‘midwife’ (Acc.)

- **Words:** e.g. German Final Devoicing
  - applies at the end of words:
    /ʀe:d/ → [ʀe:**t**] ‘talk!’
  - doesn’t apply at the end of stems:
    /ʀe:d-əst/ → [ʀe:dəst]/*[ʀe:**t**əst] ‘you (sg.) talk’

Domains Based on Syntactic Phases

- Every syntactic phase (vP, CP, DP, Chomsky 2001, 2008)
- every category-defining head (nP, aP, etc.) (Marantz 2001)
- Under postsyntactic morphology (Halle and Marantz 1993) phonological phrases might **cut** across word boundaries

Kuria Remote Future (Marlo et al. 2015:254)

Stem

3 μ's	n-to-re-[saamb-**á**]	'burn'
	n-to-re-[tɛrɛk-**á**]	'brew'
4 μ's	n-to-re-[heet**ó**k-a]	'remember'
	n-to-re-[kara**á**ŋg-a]	'fry'
5 μ's	n-to-re-[koond**ó**kór-a]	'uncover'
6 μ's	n-to-re-[hoot**ó**ótér-a]	'reassure'

Kuria Remote Future – Short Stems (Marlo et al. 2015:254)

Stem

2 μ's	n-to-re-[rom-**ă**]	'bite'
	n-to-re-[βun-**ă**]	'break'
1 μ	n-to-re-[rj-a]	'eat'
	n-to-re-[h-a]	'give'

Kuria Remote Future (Marlo et al. 2015:254)

H on 3rd μ of [Stem + Object-NP]:

2 μ-Stem	n-to-re-[rom-a]	**é**ɣétɔ́ɔ́ke	‘bite a banana’
1 μ-Stem	n-to-re-[rj-a]	eɣ**é**tɔ́ɔ́ke	‘eat a banana’

The Kuria Tone Morphology Dilemma

The left edge of the domain is **word**-internal

but

The right edge of the domain is **phrasal**

Sande and Jenks (2018) on Kuria

Morphological Tone Domain

[ ]

Prefixes Verb Suffixes Object

[[ ]$_{\text{Stem}}$]$_{\text{Word}}$ [ ]$_{\text{DP}}$

Standard Cyclic Domains

Sande and Jenks (2018) on Kuria

Morphological Tone Domain

[ ]

Prefixes Verb Suffixes Object

[[ ]$_{vP}$]$_{CP}$

Phase Domains

Sande and Jenks (2018) on Kuria

"This phenomenon and others like it pose problems for theories such as Stratal-OT (Bermúdez-Otero 2008), which assume word-internal levels necessarily precede phrasal phonology.

But this cross-word process is easily captured in Cophonologies by Phase . . . , which allows word-internal, morphologically-triggered phonological operations to scope over entire phases. . . "

(Sande and Jenks 2018:45-46)

Central Claim here

Apparent Phrase Straddling is stratal

Phrase-straddling Morphological Tone

- is merged at the **Stem Level**
- remains dormant through the **Word Level** (Paschen 2018)
- associates only at the **Phrase Level**

Talk Roadmap

Background
- More on Kuria
- Theoretical Assumptions

Basic Analysis
- Phrase Straddling
- Phrase-final Verbs

Apparent Problems for a Representational Analysis
- The Spreading Problem
- The Stacking Problem

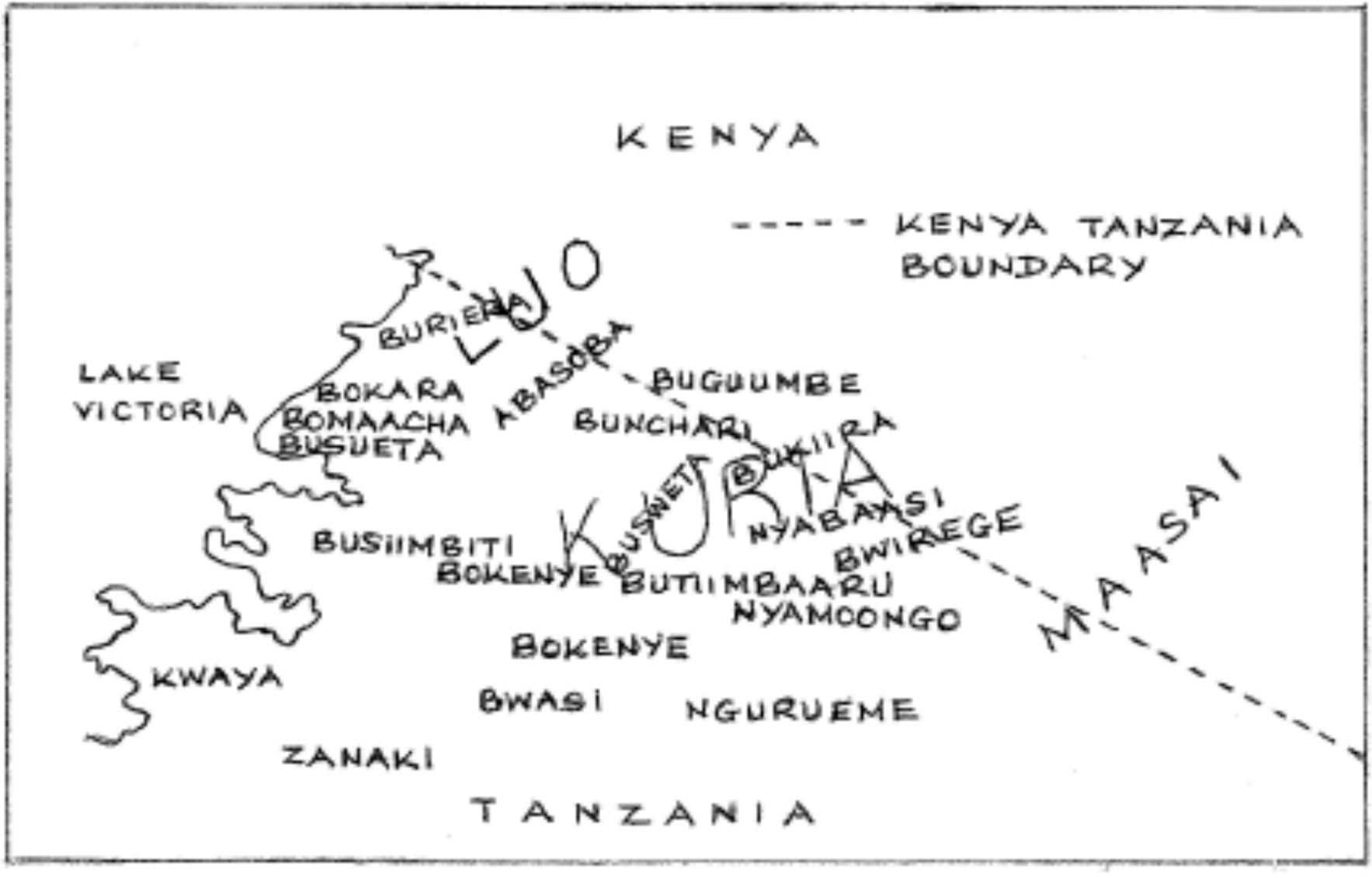
V1

V3

More on Kuria

- Eastern Bantu **Lacustrine** language (Guthrie code E43)
- spoken by $\approx$ 500,000 speakers
  in SW Kenya and NW Tanzania
- Major descriptive sources: Mwita (2008), Marlo et al. (2015)

More on Kuria



Kuria Basic Verb Tone Grammar

- No lexical verb tone
- Tone Morphology may put a High tone
  on the 1st/2nd/3rd/4th mora of the stem
- Morphological H-tones are preceded by Low-tone moras
- H-tone spreading spreads the morphological H
  (and other H-tones) up to the next H or the phrase boundary

Kuria Positional High-Tone (Marlo et al. 2015:252)

Past	μ 1	n-to-o-[h**ó**ótóótér-a] FOC-1PL-TNS-reassure-FV 'we have reassured'
Progressive Past	μ 2	n-to-oka-[ho**ó**tóóté-éj-a] FOC-1PL-TNS-reassure-PFV-FV 'we have been reassuring'
Remote Future	μ 3	n-to-re-[hoot**ó**ótér-a] FOC-1PL-TNS-reassure-FV 'we will reassure'
Inceptive	μ 4	n-to-ra-[hooto**ó**tér-a] FOC-1PL-TNS-reassure-FV 'we are about to reassure'

Theoretical Assumptions

- **Autosegmental Representation** of Tone
  (Goldsmith 1976, Clements 1984, Yip 2002)

- **Stratal OT:** Cyclic optimality-theoretic evaluation
  at Stem Level, Word Level, and Phrase Level
  (Kiparsky 2000, Bermúdez-Otero 2018)

- **Colored Containment Theory:**
  - No stratum-internal deletion of phonological primitives
    (but association lines might be marked as phonetically invisible)
  - Deletion of invisible association lines between strata
    Tones and other nodes are maintained
  - Morphemes have distinct 'colors'
    between strata all elements of an evaluation assume a single color

Basic Analysis

Stratal OT-Analysis of Phrase Straddling

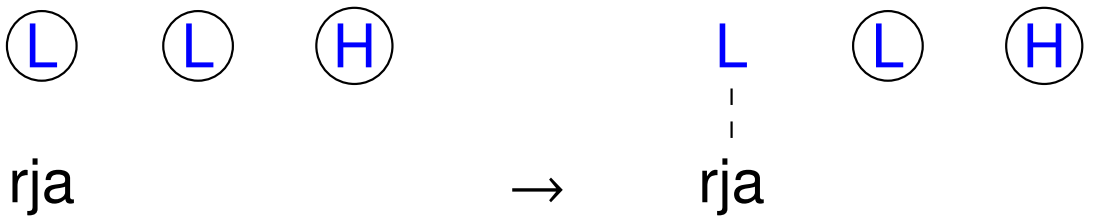
- Morphological tone remains dormant (floating)

Phrase Level:

- Surviving floating tones associate to object NP

Stratal-OT Analysis of Phrase Straddling

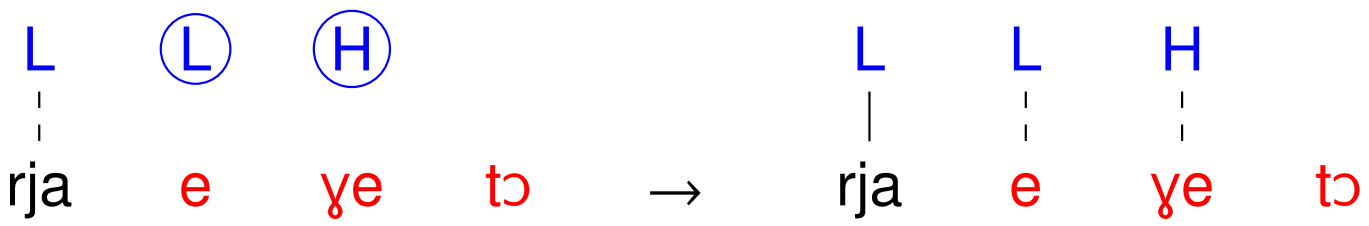
Stem Level:



Word Level:

—-

Phrase Level:



Stem Level Derivation

- Tone affixes associate to tonally unspecified verb stems
- Association is 1:1 left-to-right
- Surplus tones remain floating at the right edge

Constraints Tríggering Initial Left-to-Right Mapping

$\tau \triangleright \mu$	Assign $*$ to every tone which is not associated to a μ
$\textcircled{\tau}\ldots]$	Assign $*$ to every floating tone which precedes non-floating tones
$\textcircled{\mu}\ldots]$	Assign $*$ to every unassociated mora which precedes associated moras
$^{*}\underline{\text{C(ontour)}}$	Assign $*$ to every μ which is phonetically associated to two different tones
$^{*}_{\text{L}}\underline{\mu}_{\text{L}}$	Assign $*$ to every μ which is phonetically associated to two L-tones

Initial Left-to-Right Mapping (Stem Level)

Input: e.	τ ▷ μ	*(τ)...]	*(μ)...]	*Contour	*$\underline{\mu}_{L}$
☞ a. L L H / te re me ka					
b. L L H / te re me ka					*!
c. L L H / te re me ka				*!	
d. L L H / te re me ka			*!		
e. (L) (L) (H) / te re me ka	*!**				

Phrase Straddling – Stem Level

Input: d.	*(τ)...]	*C	$\overset{*}{\underset{L}{\mu}}_{L}$	τ ▷ μ
☞ a. L (L) (H) rja				**
b. (L) (L) H rja	*!*			**
c. L L H rja		*!	*	
d. (L) (L) (H) rja				***!

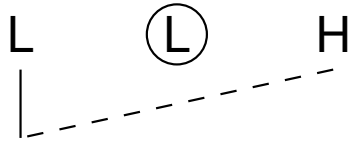
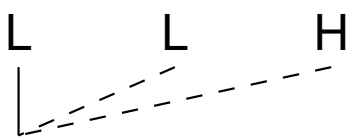
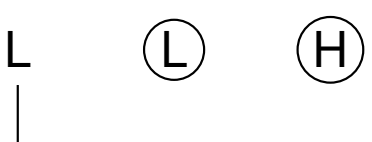
Derivation at Word Level

- Stem and Stem-Level tone affix have acquired the same color
- High-ranked ALTERNATION blocks association of tautomorphemic tones and moras

ALT(ERNATION) Assign $*$ to every association line between two nodes of the same morphological color

(van Oostendorp 2007)

Phrase Straddling – Word Level

Input: c.	ALT	*C	$^{*}_{L}\mu_{L}$	τ ▷ μ	*(τ)...]
 a. rja	*!	*		*	*
 b. rja	*!		*		
 ☞ c. rja				**	

Derivation at Phrase Level

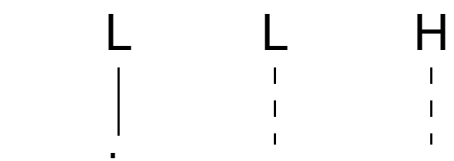
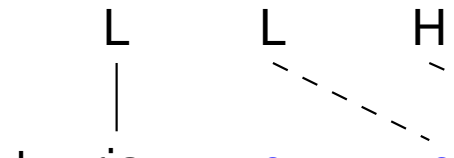
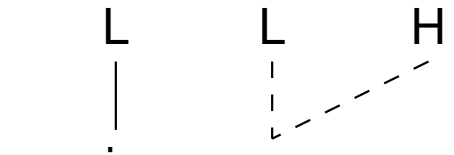
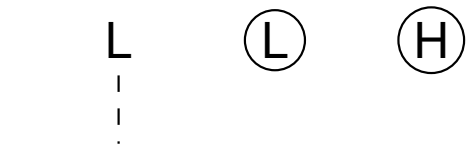
Floating stem tones associate to tonally underspecified object phrase

Additional Phrase Level Constraints

*C. . .] Assign $*$ to every μ which is phonetically associated to two different tones and precedes other moras

MAX | Assign $*$ to every morphological association line which is not phonetic

Phrase Straddling **Phrase Level**

Input: d.	CT	$^{*}_{L}\underline{\mu}_{L}$	$\tau_{\omega} \triangleright \mu$	ALT	$\tau \triangleright \mu$	$^{*}\mu_{2\tau}$	MAX |
☞ a. 							
b. 	*!						
c. 						*!	
d. 					*!*		

Phrase-final Verbs

Phrase-final Verbs

3 Possibilities:

- **1:1 Mapping:**
  Number(τ's) ≤ Number(μ's)
- **Contour Pattern:**
  Number(τ's) = Number(μ's)+1
  Surplus H forms a rising Contour on the last mora
- **Lost-H Pattern:**
  Number(τ's) > Number(μ's)+1
  Surplus H is not realized

Kuria Remote Future – 1:1 Mapping (Marlo et al. 2015:254)

Stem

3 μ's	n-to-re-[saamb-**á**]	'burn'
	n-to-re-[tɛrɛk-**á**]	'brew'
4 μ's	n-to-re-[heet**ó**k-a]	'remember'
	n-to-re-[kara**á**ŋg-a]	'fry'
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Kuria Remote Future – Short Stems (Marlo et al. 2015:254)

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	n-to-re-[βun-**ă**]	'break'	
1 μ	n-to-re-[rj-a]	'eat'	**Lost-H Pattern**
	n-to-re-[h-a]	'give'	

Contour Pattern – Stem Level

Input: d.	*(τ)...]	*C	$^{*}_{L}\mu_{L}$	τ ▷ μ
☞ a. L L (H) / ro ma				*
b. L L H / ro ma		*!		
c. L (L) H / ro ma	*!			
d. (L) (L) (H) / ro ma				**!*

Contour Pattern – Word Level

Input: c.	ALT	*C	$\overset{*}{\text{L}}\underline{\mu}_{\text{L}}$	τ ▷ μ	*(τ)...]
a. L L H | | ro ma	*!	*			
b. L (L) H | ⋮ ro ma	*!				*
☞ c. L L (H) | | ro ma				*	

Contour Pattern **Phrase** **Level**

Input: c.	*C. . .]	*τ. . .]	$\overset{*}{\underset{L}{\mu}}_{L}$	MAX |	τ ▷ μ
☞ a. L L H | | ⋱ ro ma					
b. L (L) H | ⋮ ⋱ ro ma		*!		*	
c. L L (H) | | ro ma					*!

Lost-H Pattern – Stem Level

Input: d.	*(τ)...]	*C	$\overset{*}{\underset{L}{}}\mu_{\underline{L}}$	τ ▷ μ
☞ a. L (L) (H) rja				**
b. (L) (L) H rja	*!*			**
c. L L H rja		*!	*	
d. (L) (L) (H) rja				***!

Lost H Pattern – Word Level

Input: c.	ALT	*C	$^{*}_{\text{L}}\underline{\mu}_{\text{L}}$	τ ▷ μ	*(τ)...]
L (L) H a. rja	*!	*		*	*
L L H b. rja	*!		*		
L (L) (H) ☞ c. rja				**	

Lost H Pattern – Phrase Level (Marlo et al. 2015:254)

Input: d.	*(τ)τ	*μ_{2L}	$\tau_{\omega} \rhd \mu$	ALT	$\tau \rhd \mu$	*$\mu_{2\tau}$	MAX |
a. rja (L (L) H)	*!				**		
b. rja (L L H)		*!					
☞ c. rja (L (L) (H))					**		

Apparent Problems for a Representational Analysis

Apparent Problems for a Representational Analysis

- **The Spreading Problem:**
  Morphological Low-tones should block independent tonal spreading processes

- **The Stacking Problem:**
  Stacking of tonal affixes should push positional H-tones further to the right

originally raised by Marlo et al. (2015)

adopted by Sande and Jenks (2018), Lionnet and Rolle (2019)

The Spreading Problem

"If the melodic H reached its position by LLH and LLLH melodies, a number of formal problems would follow since spreading would have to ignore the Ls: the Ls would neither block spreading nor play any role in limiting the rightward extent of the H-toned prefix, as we would expect if L were phonologically active (see Hyman 2001). This would require deleting each L (or removing association lines one by one from a single, multiply linked L) as part of the iterative spreading process. The spreading rule therefore would perform multiple operations that could not be stated as separate ordered rules. This is formally problematic, as multiple operations are generally thought to not to be possible in a single phonological rule" (Marlo et al. 2015:261-262)

The Spreading Problem (Marlo et al. 2015:261)

a. **Remote Future Negative**

te-βá-ré-[βérekéˊ-rá] hai	'call'	**High on 3rd μ**
te-βá-ré-[kóondókó-rá] hai	'uncover'	

b. **Infinitive Negative**

o-ɣo-tɔ́-kó-[βéréker-á]	'call'	**High on 4th μ**
o-ɣo-tɔ́-kó-[kóóndokór-a]	'uncover'	

+ Spreading of Underlying H

Solving the Spreading Problem in OT

- Associated Low-tones can be delinked without trace if not protected by high-ranked faithfulness constraints
- Since MAX | is ranked low, a high-ranked Plateauing constraint (*H . . . H) reined in by higher-ranked OCP-H accounts for spreading
- Containment and $\tau \triangleright \mu$ ensure survival of **specific** (underlyingly floating) Low-tones in **specific** contexts.
- Low-tones are **not** representationally absent but partially disadvantaged by constraint rankings

Plateauing Constraint (Phrase Level)

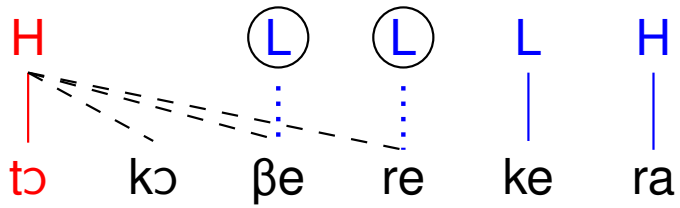
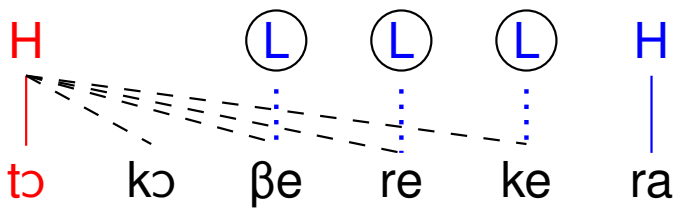
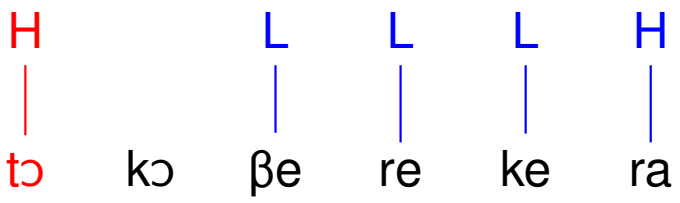
*H . . . H

Assign $*$ to every mora which intervenes

between two H-tones

in the same prosodic word

Spreading (Phrase Level)

Input: c.	OCP-H	*H . . . H	*(τ). . .]	MAX |
☞ a. 		*	**	**
b. 	*!		***	***
c. 		***!		

One or two Types of Spreading?

Marlo et al. – **One H-Spreading Processes**:

"prefixes spread right by what appears to be the same process that spreads the melodic H: the prefix Hs spread iteratively to the right as long as there is a toneless mora following the target." (Marlo et al. 2015:261)

Mwita (2008) adapted here – **Two H-Spreading Processes**:

- Lexical and phrasal edge-spreading triggered by $\mu \rightarrow \tau$
  (only to toneless TBUs)
- Phrase-level plateauing triggered by *H . . . H
  (also across L-tones, but restricted by the OCP)

No general H-Spreading from Prefixes (Mwita 2008:134-135)

(67) a. /a - tá - h - a/ sm - t - give - fv	→	atá[ha]	"let him give"
b. /a - tá - ɾom - a/ sm - t - bite - fv	→	atá[ɾomà]	"let him bite"
c. /a - tá - saNβ - a/ sm - t - burn - fv	→	atá[saambà]	attehim burn"
d. /a - tá - βereker - a/ sm - t - call - fv	→	atá[βerekerà]	"let him call"
e. /a - tá - haɣaaʧ - a/ sm - t - build - fv	→	atá[haɣaaʧà]	"let him build"

(Hortatory Imperative 1)

The Stacking Problem (Marlo et al. 2015:263)

a. **3pl** + **Inceptive**

βa-ra-[k**á**raaŋg-**á**] ‘fry’

βa-ra-[**í**ɣɔɔmb-**á**] ‘desire’

βa-ra-[β**é**réker-**á**] ‘call’

b. **3pl** + **Immediate Past**

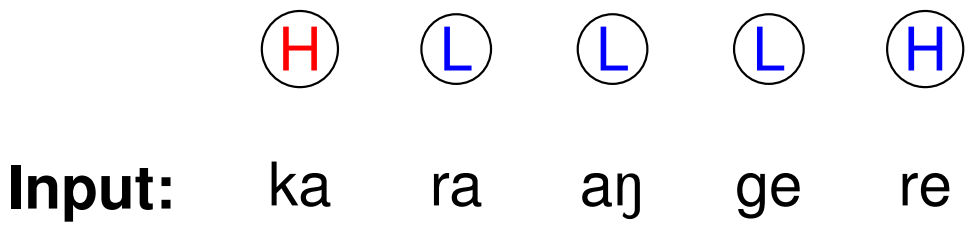
βa-a-[k**á**raaŋg-**é**re] ‘fry’

βa-a-[β**é**réke-**é**je] ‘call’

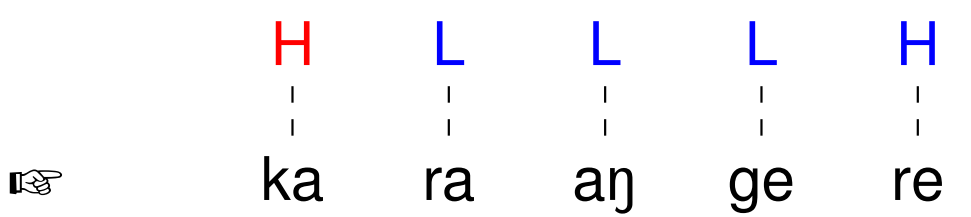
High on 1st μ

High on 4th μ

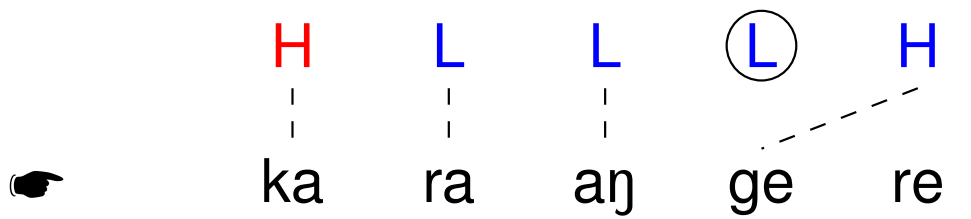
The Stacking Problem



If tone melodies are concatenated



a morphological H should push the H of a LLLH melody to the 5th mora



not to the fourth mora (where it actually surfaces)

Solving the Stacking Problem

- 4th-position H (LLLH) is attached at the **Stem Level**
- 1st position Agr-H is attached at the **Word Level**, when LLLH is already in place
- As in H-Spreading, underlyingly associated Low-tones are deassociated without traces

1 ⊕ 4 Pattern – **Word** Level

Input: e.	*(τ)...]	*CONT	MAX τ	$^{*}_{L}\mu_{L}$	τ ▷ μ
☞ a. L L H (L) L L H / βa ra βe re ke ra			*		
b. L L (H) L L L H / βa ra βe re ke ra			*		*!
c. L L H (L) L L H / βa ra βe re ke ra	*!				*
d. L L H L L L H / βa ra βe re ke ra		*!			
e. L (L) (H) L L L H / βa ra βe re ke ra	*!*				**

1 ⊕ 4 Pattern – **Phrase** Level

Input: b.	*C. . .]	*(τ). . .]	$^{*}_{L}\mu_{L}$	MAX |	τ ▷ μ
a. L L (H) L L L H / βa ra βe re ke ra		*		*!	
b. L L H L L L H / βa ra βe re ke ra	*!				
☞ c. L L H (L) L L H / βa ra βe re ke ra		*			*

*Abstracting away from H-Spreading

Independent Evidence for Stratal H-Affixation

In vowel-initial stems undergoing V-deletion at the Word Level

a stem-initial mora is suppressed

Stem-Level LLLH occurs now on the **third** mora

but Word-Level-H appears on the **first** mora

Independent Evidence for Stratal H-Affixation

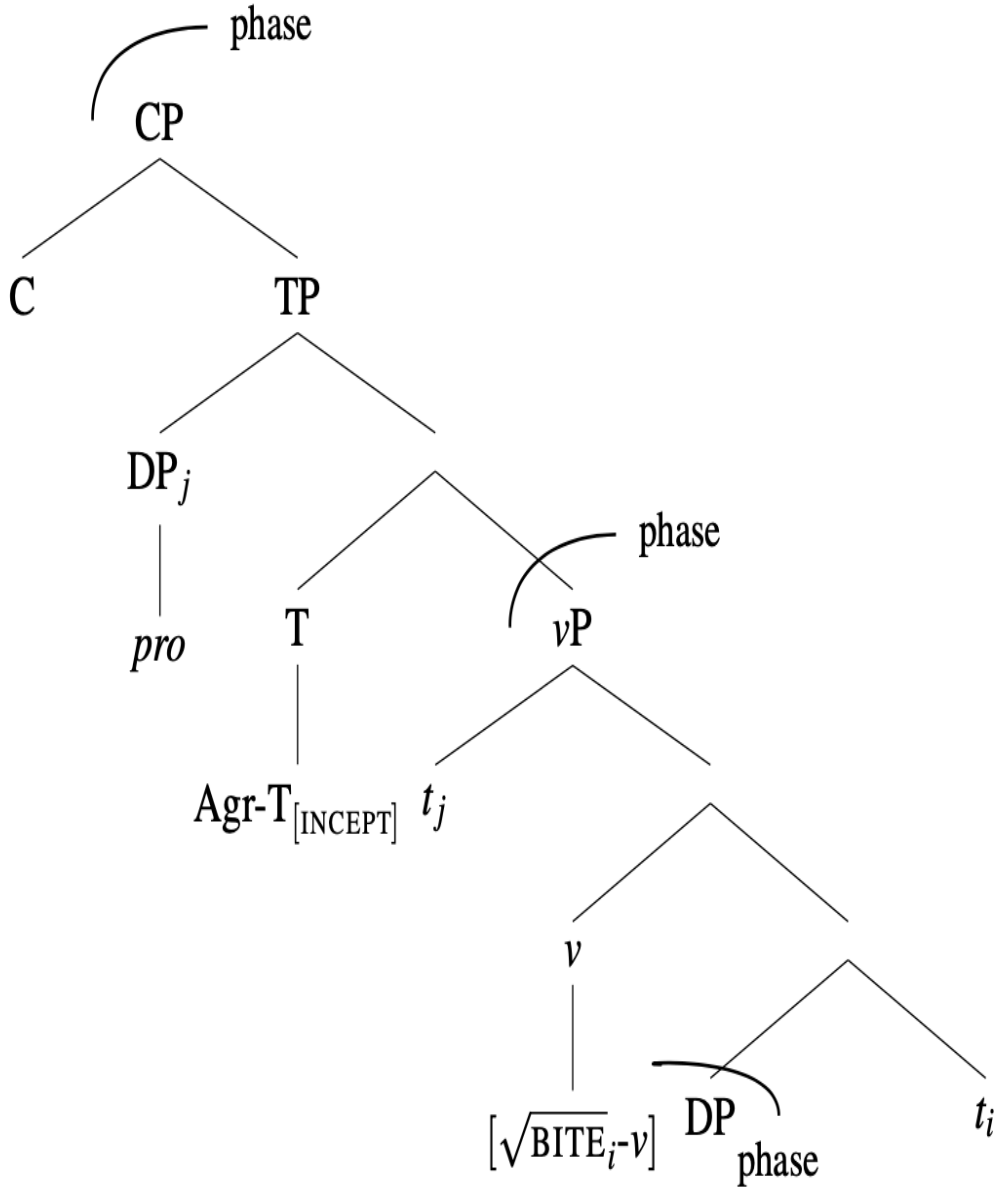
3pl + **Immediate Past**

a.	βa-a-[k**á**raaŋg-**é**re]	‘fry’	**C-Initial Root**
	βa-a-[β**é**reke-**é**je]	‘call’	
a.	βa-j-[ɣ**ó**ómb-**é**re] /βa-a-iɣoomb-ere/	‘desire’	**V-Initial Root**
	βa-j-[n**é**ke-**é**je] /βa-a-ineke-eje/	‘lay out’	

Real Problems for Sande and Jenks (2018) (I)

- Sande & Jenks assume only one cycle of evaluation for verb tone (the CP phase)
- This fails to capture the necessary interleaving of $1 \oplus 4$ tone patterns (Benz 2019)

Kuria Phase Structure in Sande and Jenks (2018)



Real Problems for Sande and Jenks (2018) (II)

The difference between Contour and Lost-H Pattern is derived by :

- **This paper:**
  Representations –
  intervening L-tones vs. non-intervening L-tones.

- **Marlo et al. (2015)**:
  Opaque rule interaction
  (Phrase-final V-lengthening → H-association → V-shortening)

- **Sande and Jenks (2018)**: ??

Typological Problem for Cophonology Approach

Attributing H on the 4th mora to phonological constraints

predicts languages with L L L H **across the board**

Hidden Agenda of Marlo et al. (2015)

Asymmetries High vs. Low in Alternations

should be adduced to representational asymmetry High vs. Ø

But:

- Crosslinguistically, H/L asymmetries are **gradient**
- In OT, Richness of the Base bans banning L-tones
- Asymmetries are predicted to follow from constraint rankings

Crosslinguistically, H/L asymmetries are gradient

Babanki (Hyman 1979):	Both H and L spread, but H spreads more Evidence for L from Downstep formation
Tiv (Pulleyblank 1986):	Only H spreads, but massive evidence for L from Downstep formation and rule blocking
Kinande (Jones 2014):	Only H spreads, but marginal evidence for L from rule blocking
Kuria:	Only H spreads, but marginal evidence for L from affixation

Summary

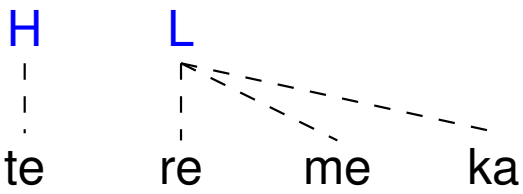
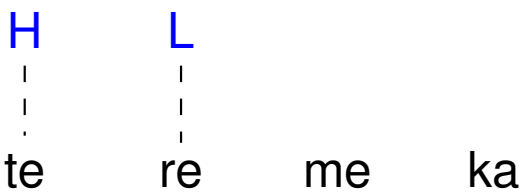
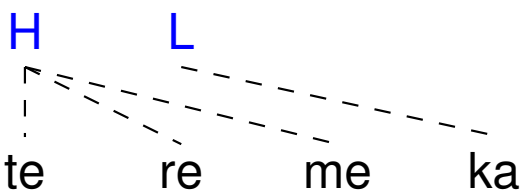
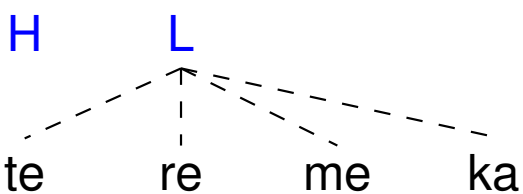
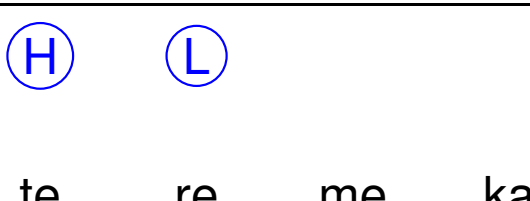
- Standard Autosegmental Representations and Stratal OT are sufficient to capture Phrase Straddling in Kuria
- Kuria **doesn't** provide evidence for
  - Cophonologies by Phase (Sande and Jenks 2018),
  - Phantom Structure (Lionnet 2014)
  - Morpheme-specific rules employing mora-counting (Marlo et al. 2015)
- Kuria actually poses empirical **problems for a phase-based account**

V1

V1 with H-Spreading (Stem Level)

Input: d.	$\overset{*}{\tau}\mu_{\tau}$	$^{*}(\tau)\tau$	$\overset{*}{\mu}\tau_{\mu}\ \tau$	$\tau \triangleright \mu$	$^{*}\acute{\mu}]$	$\mu \triangleright \tau$
☞ a. H — te re me ka						*
b. H — te re me ka					*!	
c. H — te re me ka						**!*
d. (H) — te re me ka				*!		****

V1 without H-Spreading (Stem Level)

Input: e.	$*_{\tau}\mu_{\tau}$	$*\textcircled{\tau}\tau$	$*_{\mu}\tau_{\mu}\,\tau$	$\tau \rhd \mu$	$*\acute{\mu}]$	$\mu \rhd \tau$
☞ a. 						
b. 						*!*
c. 			*!			
d. 		*!		*		
e. 				**!		****

V3

Contour Pattern – Stem Level

Input: e.	$^{*}_{\tau}\mu_{\tau}$	$^{*}(\tau)\tau$	$^{*}_{\mu}\tau_{\mu}\ \tau$	$\tau \rhd \mu$	$^{*}\acute{\mu}]$	$\mu \rhd \tau$
☞ a. L L (H) / ro ma				*		
b. L L H / ro ma	*!				*	
c. L (L) H / ro ma		*!				
d. (L) (L) (H) / ro ma				***		**

Lost-H Pattern – Stem Level

Input: e.	$^{*}_{\tau}\mu_{\tau}$	$^{*}(\tau)\tau$	$^{*}_{\mu}\tau_{\mu}\ \tau$	$\tau \triangleright \mu$	$^{*}\acute{\mu}]$	$\mu \triangleright \tau$
L (L) (H) ☞ a. rja				**		
(L) (L) H b. rja		*!*		**	*	
L L H c. rja	*!*				*	
(L) (L) (H) d. rja				***		*

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Overview

Background
- More on Kuria
- Theoretical Assumptions

Basic Analysis
- Phrase Straddling
- Phrase-final Verbs

Apparent Problems for a Representational Analysis
- The Spreading Problem
- The Stacking Problem

V1

V3