

# Anonymous Tone Linking in Olusamia

Jochen Trommer  
University of Leipzig

<http://www.uni-leipzig.de/~jtrommer>  
[jtrommer@uni-leipzig.de](mailto:jtrommer@uni-leipzig.de)

Typology of Tone & Intonation 2

September 7, 2006

# Anonymous Tone Linking

a. H

b. u

c.  $\begin{array}{c} H \\ | \\ \mu \\ | \\ u \end{array}$ d.  $\begin{array}{c} \mu \\ | \\ u \end{array}$ e.  $\mu$ f.  $\begin{array}{c} H \\ | \\ \mu \end{array}$

# Anonymous Tone Linking

a. H

b. u

c. H  
|  
 $\mu$   
|  
u

$\mu$   
|  
d. u

e.  $\mu$

**H**  
|  
f.  $\mu$

# Anonymous Tone Linking

a. H

b. u

c. H  
|  
 $\mu$   
|  
u

$\mu$   
|  
d. u

e.  $\mu$

**H**  
|  
f.  $\mu$

# Anonymous Tone Linking

a. H

b. u

c. H  
|  
 $\mu$   
|  
u

$\mu$   
|  
d. u

e.  $\mu$

**H**  
|  
f.  $\mu$

# Anonymous Tone Linking

a. H

b. u

c. H  
|  
*μ*  
|  
u

*μ*  
|  
d. u

e. *μ*

**H**  
|  
f. *μ*

# Anonymous Tone Linking

a. H

b. u

c. H  
|  
 $\mu$   
|  
u

$\mu$   
|  
d. u

e.  $\mu$

**H**  
|  
f.  $\mu$

# Distinctive Tone Linking (Somali)

	<b>Nominative</b>	<b>Vocative</b>	<b>Genitive</b>	<b>Absolutive</b>
'males'	rag	–	rág	rág
'billy-goat'	orgi	órgi	orgí	órgi
'mothers'	hooyooyin	hóoyooyin	hooyooyín	hooyoóyin
'family'	xaas	–	xaás	xáas
	<b>No H</b>	<b>Initial</b> $\mu$	<b>Final</b> $\mu$	<b>Penultimate</b> $\mu$

(Hyman, 1981; Banti, 1988; Yip, 2002)



# Basic Claim

Distinctive Tone Linking follows from Anonymous Tone Linking

# Olusamia (Chagas, 1976; Poletto, 1998)

- Bantu language of the Luhya group (E.34 according to Guthrie, 1967)
- spoken on the northern coast of lake Victoria (Kenya, Uganda)
- H/L tone system with no distinctive root tones for verbs

# Olusamia (Chagas, 1976; Poletto, 1998)

- Bantu language of the Luhya group  
(E.34 according to Guthrie, 1967)
- spoken on the northern coast of lake Victoria  
(Kenya, Uganda)
- H/L tone system  
with no distinctive root tones for verbs

# Olusamia (Chagas, 1976; Poletto, 1998)

- Bantu language of the Luhya group  
(E.34 according to Guthrie, 1967)
- spoken on the northern coast of lake Victoria  
(Kenya, Uganda)
- H/L tone system  
with no distinctive root tones for verbs

# Outline

- 1 Distinctive Tone Linking in Olusamia
- 2 Poletto's (1998) Analysis
- 3 An Anonymous Tone Linking Analysis

# Outline

- 1 Distinctive Tone Linking in Olusamia
- 2 Poletto's (1998) Analysis
- 3 An Anonymous Tone Linking Analysis

# Outline

- 1 Distinctive Tone Linking in Olusamia
- 2 Poletto's (1998) Analysis
- 3 An Anonymous Tone Linking Analysis

# Negative Recent Past

xu[bá]lire 'we did not count today'  $(\acute{\mu})_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$

xu[lí]lire 'we did not eat today'  $(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}$

xu[bwé]ene 'we did not see today'  $(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}$

xu[dé]exere 'we did not cook today'  $(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$

**Pattern:**  $\acute{\mu} \mu^+$



# Negative Recent Past

xu[bá]lire 'we did not count today'  $(\acute{\mu})_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$

xu[lí]lire 'we did not eat today'  $(\acute{\mu}\mu)_{\sigma}(\mu)_{\sigma}$

xu[bwé]ene 'we did not see today'  $(\acute{\mu}\mu)_{\sigma}(\mu)_{\sigma}$

xu[dé]exere 'we did not cook today'  $(\acute{\mu}\mu)_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$

Pattern:  $\acute{\mu}\mu^{+}$

# Negative Recent Past

xu[bá]lire      'we did not count today'       $(\acute{\mu})_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$

xu[lí]lire      'we did not eat today'       $(\acute{\mu}\mu)_{\sigma}(\mu)_{\sigma}$

xu[bwé]ene      'we did not see today'       $(\acute{\mu}\mu)_{\sigma}(\mu)_{\sigma}$

xu[dé]exere      'we did not cook today'       $(\acute{\mu}\mu)_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$

Pattern:  $\acute{\mu}\mu^{+}$

# Negative Recent Past

xu[bá]lire      'we did not count today'       $(\acute{\mu})_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$

xu[lí]ire      'we did not eat today'       $(\acute{\mu}\mu)_{\sigma}(\mu)_{\sigma}$

xu[bwé]ene      'we did not see today'       $(\acute{\mu}\mu)_{\sigma}(\mu)_{\sigma}$

xu[dé]exere      'we did not cook today'       $(\acute{\mu}\mu)_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$

**Pattern:**  $\acute{\mu}\mu^{+}$

# Infinitive

oxú[maná

'to know'

$(\mu)_\sigma(\acute{\mu})_\sigma$

oxú[deexá

'to cook for each other'

$(\mu\mu)_\sigma(\acute{\mu})_\sigma$

oxúmu[sukú má

'to push him'

$(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\acute{\mu}})_\sigma$

oxú[luméráná

'to bite for each other'

$(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\acute{\mu}})_\sigma(\acute{\acute{\acute{\mu}}})_\sigma$

**Pattern:**  $\sigma\acute{\sigma}^+$

# Infinitive

oxú[maná	'to know'	$(\mu)_\sigma(\acute{\mu})_\sigma$
oxú[deexá	'to cook for each other'	$(\mu\mu)_\sigma(\acute{\mu})_\sigma$
oxúmu[sukú má	'to push him'	$(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\acute{\mu}})_\sigma$
oxú[luméráná	'to bite for each other'	$(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\acute{\mu}})_\sigma(\acute{\acute{\acute{\mu}}})_\sigma$

**Pattern:**  $\sigma\acute{\sigma}^+$

# Infinitive

oxú[maná 'to know'  $(\mu)_\sigma(\acute{\mu})_\sigma$

oxú[deexá 'to cook for each other'  $(\mu\mu)_\sigma(\acute{\mu})_\sigma$

oxúmu[sukúamá 'to push him'  $(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\mu})_\sigma$

oxú[luméráná 'to bite for each other'  $(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\mu})_\sigma(\acute{\mu})_\sigma$

**Pattern:**  $\sigma\acute{\sigma}^+$

# Infinitive

oxú[maná	'to know'	$(\mu)_\sigma(\acute{\mu})_\sigma$
oxú[deexá	'to cook for each other'	$(\mu\mu)_\sigma(\acute{\mu})_\sigma$
oxúmu[sukúamá	'to push him'	$(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\mu})_\sigma$
oxú[lumérána	'to bite for each other'	$(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\mu})_\sigma(\acute{\mu})_\sigma$

Pattern:  $\sigma\acute{\sigma}^+$

# Infinitive

oxú[maná	'to know'	$(\mu)_\sigma(\acute{\mu})_\sigma$
oxú[deexá	'to cook for each other'	$(\mu\mu)_\sigma(\acute{\mu})_\sigma$
oxúmu[sukúamá	'to push him'	$(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\mu})_\sigma$
oxú[luméráná	'to bite for each other'	$(\mu)_\sigma(\acute{\mu})_\sigma(\acute{\mu})_\sigma(\acute{\mu})_\sigma$

**Pattern:**  $\sigma \acute{\sigma}^+$



# Tone Patterns in Olusamia

	Negative Recent Past	Present	Infinitive	Conditional
1 $\sigma$ 1 $\mu$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$
1 $\sigma$ 2 $\mu$	$(\acute{\mu} \mu)_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$
2 $\sigma$ 2 $\mu$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}$	$(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
2 $\sigma$ 3 $\mu$	$(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\mu)_{\sigma}$
3 $\sigma$ 3 $\mu$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
3 $\sigma$ 4 $\mu$	$(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
<b>Basic Pattern</b>	$\acute{\mu} \mu^{+}$	$\mu \acute{\mu} \acute{\mu}^{+}$	$\sigma \acute{\sigma}^{+}$	$\sigma \acute{\sigma} \sigma^{+}$

# Poletto's (1998) Analysis

- L = Phonological Absence of Tone
- Every Stem has 1 H
- Morpheme-specific Constraints

# Poletto's (1998) Analysis

- L = Phonological Absence of Tone
- Every Stem has 1 H
- Morpheme-specific Constraints

# Poletto's (1998) Analysis

- L = Phonological Absence of Tone
- Every Stem has 1 H
- Morpheme-specific Constraints


# Derivation of Negative Recent Past

**Input:** xubalire

	STEM(H)	ALIGN(L)	*STRUC
☞ a. xu[bá lire			
b. xu[bá líre			*!
c. xu[ba líre		*!	
d. xu[ba liré		*!*	
e. xu[ba lire	*!		

# Derivation of Infinitive

**Input:** oxú[deexa

	STEM(H)	ALIGN(R)	*ALIGN(L)	*NO-RISE
 a. oxu[deexá				
b. oxú[deéxá				*!
c. oxú[dééxá			*!	
d. oxú[dééxa		*!	*	
e. oxú[deexa	*!			

# Morpheme-specific Constraints

	Negative Recent Past	Infinitive
Left Alignment	Complete ( $\mu$ )	Almost ( $\sigma$ )
Right Alignment	No	Complete

\*ALIGN(L) = \*ALIGN(STEM, LEFT, HIGH, LEFT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

ALIGN(R) = ALIGN(HIGH, RIGHT, STEM, RIGHT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

NO-RISE<sub>Present Habitual, Recent Past</sub>

(cf. also Akinlabi, 1996; Odden, 1998; Yip, 2002; Zoll, 2003)

# Morpheme-specific Constraints

	Negative Recent Past	Infinitive
Left Alignment	Complete ( $\mu$ )	Almost ( $\sigma$ )
Right Alignment	No	Complete

\*ALIGN(L) = \*ALIGN(STEM, LEFT, HIGH, LEFT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

ALIGN(R) = ALIGN(HIGH, RIGHT, STEM, RIGHT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

NO-RISE<sub>Present Habitual, Recent Past</sub>

(cf. also Akinlabi, 1996; Odden, 1998; Yip, 2002; Zoll, 2003)



# Morpheme-specific Constraints

	Negative Recent Past	Infinitive
Left Alignment	Complete ( $\mu$ )	Almost ( $\sigma$ )
Right Alignment	No	Complete

\*ALIGN(L) = \*ALIGN(STEM, LEFT, HIGH, LEFT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

ALIGN(R) = ALIGN(HIGH, RIGHT, STEM, RIGHT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

NO-RISE<sub>Present Habitual, Recent Past</sub>

(cf. also Akinlabi, 1996; Odden, 1998; Yip, 2002; Zoll, 2003)

# Morpheme-specific Constraints

	Negative Recent Past	Infinitive
Left Alignment	Complete ( $\mu$ )	Almost ( $\sigma$ )
Right Alignment	No	Complete

\*ALIGN(L) = \*ALIGN(STEM, LEFT, HIGH, LEFT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

ALIGN(R) = ALIGN(HIGH, RIGHT, STEM, RIGHT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

NO-RISE<sub>Present Habitual, Recent Past</sub>

(cf. also Akinlabi, 1996; Odden, 1998; Yip, 2002; Zoll, 2003)

# Morpheme-specific Constraints

	Negative Recent Past	Infinitive
Left Alignment	Complete ( $\mu$ )	Almost ( $\sigma$ )
Right Alignment	No	Complete

\*ALIGN(L) = \*ALIGN(STEM, LEFT, HIGH, LEFT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

ALIGN(R) = ALIGN(HIGH, RIGHT, STEM, RIGHT)<sub>INF.,FUT.,PRES,REC.PAST</sub>

NO-RISE<sub>Present Habitual, Recent Past</sub>

(cf. also Akinlabi, 1996; Odden, 1998; Yip, 2002; Zoll, 2003)

# Problems with Morpheme-specific Constraints on Tone

- Ad hoc and conceptually problematic
- Unmotivated for affixes  
(Horwood, 2002; Trommer, 2002, 2005)
- Problematic Interpretation

# Problems with Morpheme-specific Constraints on Tone

- Ad hoc and conceptually problematic
- Unmotivated for affixes  
(Horwood, 2002; Trommer, 2002, 2005)
- Problematic Interpretation

# Problems with Morpheme-specific Constraints on Tone

- Ad hoc and conceptually problematic
- Unmotivated for affixes  
(Horwood, 2002; Trommer, 2002, 2005)
- Problematic Interpretation

# An Anonymous Tone Linking Analysis

- Distinctive Tone Mapping = Different Melodies
- Each melody specifies its TBU
- Standard Left-to-Right Mapping

# An Anonymous Tone Linking Analysis

- Distinctive Tone Mapping = Different Melodies
- Each melody specifies its TBU
- Standard Left-to-Right Mapping

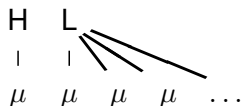


# An Anonymous Tone Linking Analysis

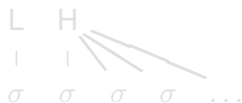
- Distinctive Tone Mapping = Different Melodies
- Each melody specifies its TBU
- Standard Left-to-Right Mapping

# Left-to-Right Linking to Melody-Specific TBUs

## Negative Recent Past



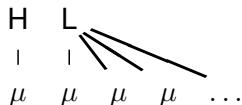
## Infinitive



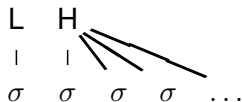
(cf. Goldsmith, 1990)

# Left-to-Right Linking to Melody-Specific TBUs

## Negative Recent Past



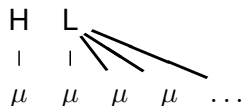
## Infinitive



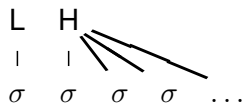
(cf. Goldsmith, 1990)

# Left-to-Right Linking to Melody-Specific TBUs

## Negative Recent Past



## Infinitive



(cf. Goldsmith, 1990)

# Left-to-Right Linking by Constraints (Zoll,1997;Yip,2002)

**ALIGN-L:** Each tone is assigned a violation for each TBU that intervenes between the one it is associated to and the left edge of the word

\***SPECIFY:** Each TBU should be associated with at least one tone

\***CONTOUR:** Avoid Contour Tones

# Left-to-Right Linking by Constraints (Zoll,1997;Yip,2002)

**ALIGN-L:** Each tone is assigned a violation for each TBU that intervenes between the one it is associated to and the left edge of the word

\***SPECIFY:** Each TBU should be associated with at least one tone

\***CONTOUR:** Avoid Contour Tones

# Left-to-Right Linking by Constraints (Zoll,1997;Yip,2002)

**ALIGN-L:** Each tone is assigned a violation for each TBU that intervenes between the one it is associated to and the left edge of the word

**\*SPECIFY:** Each TBU should be associated with at least one tone

**\*CONTOUR:** Avoid Contour Tones

# Left-to-Right Linking by Constraints (Zoll,1997;Yip,2002)

**ALIGN-L:** Each tone is assigned a violation for each TBU that intervenes between the one it is associated to and the left edge of the word

**\*SPECIFY:** Each TBU should be associated with at least one tone

**\*CONTOUR:** Avoid Contour Tones



# Left-to-Right Linking by Constraints (Zoll,1997;Yip,2002)

	*SPECIFY	*CONTOUR	ALIGN-L
<p>a.</p>			*
<p>b.</p>			*!*
<p>c.</p>		*!	
<p>d.</p>	*!		*

# Markedness Constraints on TBU Linking

\* $\sigma_T$

Avoid syllable TBUs

\* $\mu_T$

Avoid mora TBUs

**UNIFORMITY:** All tones in a prosodic word  
are associated to the same type of TBU

# Markedness Constraints on TBU Linking

\* $\sigma_T$

Avoid syllable TBUs

\* $\mu_T$

Avoid mora TBUs

**UNIFORMITY:** All tones in a prosodic word  
are associated to the same type of TBU

# Markedness Constraints on TBU Linking

\* $\sigma_T$                       Avoid syllable TBUs

\* $\mu_T$                       Avoid mora TBUs

**UNIFORMITY:**      All tones in a prosodic word  
are associated to the same type of TBU

## IDENT |

If an underlying tone **T** is linked to a TBU **U**

any output tone corresponding to **T**

must be linked to a TBU corresponding to **U**

# Derivation of Negative Recent Past

Input: liire +  $\begin{matrix} H_a & L_b \\ | & \\ \mu_1 & \end{matrix}$

	UNIFORMITY	IDENT	* $\sigma_T$	* $\mu_T$
<p>a. l i i r e</p>				**
<p>b. l i i r e</p>		*!	**	

# Derivation of Infinitive

Input: deexa +  $\begin{matrix} L_a & H_b \\ | \\ \sigma_1 \end{matrix}$

	UNIFORMITY	IDENT	* $\sigma_T$	* $\mu_T$
$\begin{matrix} L_a & H_b \\   &   \\ \mu & \mu \\   &   \\ a. & d & e & e & x & a \end{matrix}$			*!	**
$\begin{matrix} L_a & H_b \\   &   \\ \sigma_1 & \sigma_2 \\ / &   & \backslash & / &   \\ \mu & \mu & \mu & \mu & \mu \\   &   &   &   &   \\ b. & d & e & e & x & a \end{matrix}$			**	

# Derivation of Conditional

Input: biidooka +  $\sigma_1$

$L_a$      $H_b$      $L_c$   
 |  
 $\sigma_1$

	UNIF	IDENT	...
<p style="margin-left: 100px;"> <math>L_a</math>    <math>H_b</math>    <math>L_a</math>                      /    \    \    /  <math>\mu</math>    <math>\mu</math>    <math>\mu</math>    <math>\mu</math>    <math>\mu</math>            a. b i i d o o k a         </p>		*!	
<p style="margin-left: 100px;"> <math>L_a</math>    <math>H_b</math>    <math>L_c</math>                         <math>\sigma_1</math>    <math>\sigma_2</math>    <math>\sigma_3</math>            /    \    /    \    /    \    /  <math>\mu</math>    <math>\mu</math>    <math>\mu</math>    <math>\mu</math>    <math>\mu</math>            b. b i i d o o k a         </p>			



# Non-Uniform Output

Input: biidooka +  $\begin{matrix} L_a & H_b & L_c \\ | & & \\ \sigma_1 & & \end{matrix}$

	UNIF	IDENT	...
$\begin{array}{c} L_a \\   \\ \sigma_1 \\ / \quad \backslash \\ \mu \quad \mu \\   \quad   \\ a. \quad b \quad i \quad i \end{array} \quad \begin{array}{c} H_b \\   \\ \mu \\   \\ d \quad o \end{array} \quad \begin{array}{c} L_c \\   \\ \mu \quad \mu \\   \quad   \\ o \quad k \quad a \end{array}$	*!		
$\begin{array}{c} L_a \\   \\ \sigma_1 \\ / \quad \backslash \\ \mu \quad \mu \\   \quad   \\ b. \quad b \quad i \quad i \end{array} \quad \begin{array}{c} H_b \\   \\ \sigma_2 \\ / \quad \backslash \\ \mu \quad \mu \\   \quad   \\ d \quad o \quad o \end{array} \quad \begin{array}{c} L_c \\   \\ \sigma_3 \\ / \quad \backslash \\ \mu \quad \mu \\   \quad   \\ k \quad a \end{array}$			

# Inputs without TBUs (Negative Recent Past)

**Input:** liire +  $H_a$   $L_b$

	UNIF	IDENT	* $\sigma_T$	* $\mu_T$
<p>a. l i i r e</p>				**
<p>b. l i i r e</p>			*!*	

# Non-Uniform Input (Negative Recent Past)

**Input:** liire +  $\begin{matrix} H_a \\ | \\ \mu_1 \end{matrix}$   $\begin{matrix} L_b \\ | \\ \sigma_2 \end{matrix}$

	UNIF	IDENT	* $\sigma_T$	* $\mu_T$
<p>a. l i i r e</p>		*		**
<p>b. l i i r e</p>		*	*!*	

# Too few TBUs ...

	Negative Recent Past	Present	Infinitive	Conditional
1 $\sigma$ 1 $\mu$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$
1 $\sigma$ 2 $\mu$	$(\acute{\mu} \mu)_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$
2 $\sigma$ 2 $\mu$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}$	$(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
2 $\sigma$ 3 $\mu$	$(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\mu)_{\sigma}$
3 $\sigma$ 3 $\mu$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
3 $\sigma$ 4 $\mu$	$(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
<b>Basic Pattern</b>	$\acute{\mu} \mu^{+}$	$\mu \acute{\mu} \acute{\mu}^{+}$	$\sigma \acute{\sigma}^{+}$	$\sigma \acute{\sigma} \sigma^{+}$

## If possible

- H is retained
- the rightmost L is retained

# Too few TBUs ...

	Negative Recent Past	Present	Infinitive	Conditional
1 $\sigma$ 1 $\mu$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$
1 $\sigma$ 2 $\mu$	$(\acute{\mu} \mu)_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$
2 $\sigma$ 2 $\mu$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}$	$(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
2 $\sigma$ 3 $\mu$	$(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\mu)_{\sigma}$
3 $\sigma$ 3 $\mu$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
3 $\sigma$ 4 $\mu$	$(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
<b>Basic Pattern</b>	$\acute{\mu} \mu^{+}$	$\mu \acute{\mu} \acute{\mu}^{+}$	$\sigma \acute{\sigma}^{+}$	$\sigma \acute{\sigma} \sigma^{+}$

## If possible

- H is retained
- the rightmost L is retained

# Too few TBUs ...

	Negative Recent Past	Present	Infinitive	Conditional
1 $\sigma$ 1 $\mu$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}$
1 $\sigma$ 2 $\mu$	$(\acute{\mu} \mu)_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$	$(\acute{\mu} \acute{\mu})_{\sigma}$
2 $\sigma$ 2 $\mu$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}$	$(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
2 $\sigma$ 3 $\mu$	$(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\mu)_{\sigma}$
3 $\sigma$ 3 $\mu$	$(\acute{\mu})_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu)_{\sigma}(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
3 $\sigma$ 4 $\mu$	$(\acute{\mu} \mu)_{\sigma}(\mu)_{\sigma}(\mu)_{\sigma}$	$(\mu \acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}(\acute{\mu})_{\sigma}$	$(\mu \mu)_{\sigma}(\acute{\mu})_{\sigma}(\mu)_{\sigma}$
<b>Basic Pattern</b>	$\acute{\mu} \mu^{+}$	$\mu \acute{\mu} \acute{\mu}^{+}$	$\sigma \acute{\sigma}^{+}$	$\sigma \acute{\sigma} \sigma^{+}$

## If possible

- H is retained
  
- the rightmost L is retained

# Joint Solution

**ALIGN(PWD,Left,H,Left):** The left edge of each Prosodic Word is aligned to the left edge of a H tone.

# Joint Solution

**ALIGN(PWD,Left,H,Left):** The left edge of each Prosodic Word is aligned to the left edge of a H tone.



# Retaining H (Infinitive)

Input: da +  $\begin{matrix} L_a & H_b \\ | & \\ \sigma_1 & \end{matrix}$

	*CONTOUR	IDENT	ALIGN(PWD,Left,H,Left)
$\begin{matrix} & & H_b \\ & &   \\ & & \sigma_1 \\ & &   \\ \text{a. d} & \text{a} & \end{matrix}$			
$\begin{matrix} & & L_a \\ & &   \\ & & \sigma_1 \\ & &   \\ \text{b. d} & \text{a} & \end{matrix}$			*!

# Retaining H (Infinitive)

Input: da +  $\begin{matrix} L_a & H_b \\ | & \\ \sigma_1 & \end{matrix}$

	*CONTOUR	IDENT	ALIGN(PWD,Left,H,Left)
$\begin{matrix} & & H_b \\ & &   \\ & & \sigma_1 \\ & &   \\ \text{a. d} & & \text{a} \end{matrix}$			
$\begin{matrix} & & L_a & H_b \\ & &   & \\ & & \sigma_1 & \\ & &   & \\ \text{b. d} & & \text{a} & \end{matrix}$	*!		

# Retaining Rightmost L (Conditional)

Input: diba +  $\sigma_1$

$L_a$      $H_b$      $L_c$   
 |  
 $\sigma_1$

		ALIGN(PWD,Left,H,Left)	
		$H_b$	$L_c$
		$\sigma_1$	$\sigma_3$
☞	a. d i b a		
		$L_a$	$H_b$
		$\sigma_2$	$\sigma_1$
	b. d i b a		
		*!	

# Summary

- Abandoning underspecified tone reveals classical left-to-right linking
- Morpheme-specific constraints on tone linking are obviated
- Distinctive TBUs ( $\mu$  vs.  $\sigma$ ) are captured by anonymous tone linking

## Open Question:

Are there phonologically induced TBU alternations?

# Summary

- Abandoning underspecified tone reveals classical left-to-right linking
- Morpheme-specific constraints on tone linking are obviated
- Distinctive TBUs ( $\mu$  vs.  $\sigma$ ) are captured by anonymous tone linking

## Open Question:

Are there phonologically induced TBU alternations?

# Summary

- Abandoning underspecified tone reveals classical left-to-right linking
- Morpheme-specific constraints on tone linking are obviated
- Distinctive TBUs ( $\mu$  vs.  $\sigma$ ) are captured by anonymous tone linking

## Open Question:

Are there phonologically induced TBU alternations?

# Summary

- Abandoning underspecified tone reveals classical left-to-right linking
- Morpheme-specific constraints on tone linking are obviated
- Distinctive TBUs ( $\mu$  vs.  $\sigma$ ) are captured by anonymous tone linking

## Open Question:

Are there phonologically induced TBU alternations?