

The interaction of verb and direct object tone in Bulu

Emily Clem

clem.43@osu.edu

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Background on Bulu

- Bantu (A.74)
- Cameroon
- 858,000 speakers (Lewis et al., 2013)
- Original fieldwork in Columbus, OH: January 2013-present

A tonal contrast in Bulu

- (1) a. òfùmbí
'orange'
- b. màkùs òfùmbí
'I am buying an orange'
- c. màdzí ófùmbí
'I am eating an orange'

What factors cause the change of the initial tone of the direct object in (1c)?

Does this tonal process occur after all verbs?

1 Introduction

2 Tonal Interactions

- Tonal Agreement
- Initial High Tone Assignment

3 Preliminary Analysis

- Analysis of Tonal Agreement
- Analysis of Initial High Tone Assignment
- Analysis of Low Tone Preservation

4 Conclusion

Yukawa (1992)

- Object nouns with initial L undergo a tonal change after H-final verbs

$$(2) \begin{aligned} (C)\grave{V}(C)(C\acute{V}\sim) &\rightarrow (C)\hat{V}(C)(C\acute{V}\sim) \\ (C)\grave{V}C\grave{V}\sim &\rightarrow (C)\acute{V}C\grave{V}\sim \\ (C)\grave{V}C\check{V}\sim &\rightarrow (C)\acute{V}C\check{V}\sim \\ (C)\grave{V}CC\grave{V}\sim &\rightarrow (C)\hat{V}C\grave{V}\sim \\ (C)\grave{V}CC\check{V}\sim &\rightarrow (C)\hat{V}CC\check{V}\sim \end{aligned}$$

- No change occurs after L-final verbs
- All changes involve the addition of an H component
- These processes could be classified as raising

- Contrary to the claims of Yukawa (1992), objects following L-final verbs undergo a process of tonal change

- (3) a. ówùndò
 'peanut'
- b. màkùs òwùndò
 'I am buying peanuts'
- c. màdží ówùndò
 'I am eating peanuts'

- Together, (1) and (3) suggest tonal agreement rather than raising

Two distinct patterns

- This tonal agreement process does not occur after all verbs

Present

- (4) a. èsíngì
'cat'
- b. màkùs èsíngì
'I am buying a cat'
- c. màdží ésíngì
'I am eating a cat'

Future

- (5) a. èsíngì
'cat'
- b. mējkùs ésíngì
'I will buy a cat'
- c. mējdží ésíngì
'I will eat a cat'

- Verbs of some tenses (4) condition agreement between V and DO
- Verbs of other tenses (5) condition initial H on all DOs

Goldsmith (1976)

- Igbo (Igboid, Nigeria) DOs undergo tonal changes after verbs of certain tenses

(6) H → M
HH → HM
LH → MH

- This Object Tone Mutation is attributed to a floating suffixal high tone

- A similar floating H can be posited to account for the Bulu data

- Some TAMs trigger tonal agreement between the verb stem and DO
 - Present
 - Past
 - Recent past 2
- A final floating H that surfaces on the DO is posited for other TAMs
 - Recent past 1
 - Future

- (7) a. ówùndò
 'peanut'
 b. mǎkùs òwùndò
 'I bought peanuts'
 c. mǎkùs ówùndò màkájì
 'I bought the peanuts that I wanted'

- When nouns are heads of relative clauses, agreement is blocked (7c)
- Gimba (1998) posits that prosodic phrase structure can account for variability in interactions between V and DO in Bole (Chadic, Nigeria)
- A similar analysis can be extended to Bulu to account for this pattern

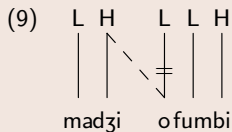
Prosodic conditioning (cont.)

- (8) a. [_{P-P}[_w mǎkùs] [_w òwùndò]]
‘I bought peanuts’
- b. [_w mǎkùs] [_{P-P}[_w ówùndò] [_w màkájì]]
‘I bought the peanuts that I wanted’

- DOs form a phonological phrase (P-phrase) with the verb (8a)
- Heads of RCs form a P-phrase with the verb of the RC (8b)
- The P-phrase boundary between V and DO blocks tonal changes (8b)
- Tonal agreement and initial high tone assignment only apply when the V and DO occur in the same P-phrase

Autosegmental representation of tonal agreement

- Tonal agreement between V and DO can be represented as spreading




- The H of the verb stem spreads to the initial syllable of the noun
- The L associated with that syllable is then delinked

- Tonal agreement modeled using NOJUMP in OT framework
- NOJUMP constrains changing tone level across syllable boundary (Hyman and VanBik, 2004)
- Constraint applies specifically to boundary between V and DO in Bulu

OT analysis of tonal agreement (cont.)

(10)

Input: /màdzí òfùmbí/	$IDENT(T)_V$	*CONTOUR	NoJUMP	$IDENT(T)_N$
a. màdzí òfùmbí			*!	
b.  màdzí ófùmbí				*
c. màdzí ófùmbì				**!
d. màdzí ôfùmbí		*!		
e. màdzì òfùmbí	*!			

- $IDENT(T)_V$ and $IDENT(T)_N$ require faithfulness to V and DO tones
- *CONTOUR constrains contour tones on monomoraic syllables
- Candidate b is the optimal output because it only violates $IDENT(T)_N$

Autosegmental representation of high tone assignment

- Initial H assignment on DOs involves linking of floating H



- The floating H after the verb links to the initial syllable of the noun
- The L associated with that syllable is then delinked

OT analysis of initial high tone assignment

- High tone assignment modeled using $MAX(T)_V$ in OT framework
- $MAX(T)_V$ requires faithfulness to V tones, including floating H
- Ranking must allow initial high tone assignment instead of agreement following verbs of specific tenses

OT analysis of initial high tone assignment (cont.)

(12)

Input: /mêjkùs'₁ è₂síngì/	$MAX(T)_V$	$IDENT(T)_V$	* $CONTOUR$	$NOJUMP$	$IDENT(T)_N$
a. mêjkùs è₂síngì	*!				
b. ☞ mêjkùs é₁síngì				*	
c. mêjkùs é₂síngì	*!			*	*
d. mêjkùs è₁síngì		*!			
e. mêjkùs₁ è₂síngì			*!	*	

- $MAX(T)_V$ ranked above $NOJUMP$ to allow floating H to surface
- Candidate b is the optimal output because it only violates $NOJUMP$

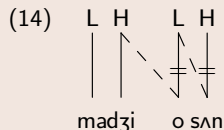
- These processes do not always result in a simple replacive initial tone
- They can also trigger changes in subsequent tones of the word

- (13) a. **òsán**
'squirrel'
- b. màkùs **òsán**
'I am buying a squirrel'
- c. màdzí **ósàn**
'I am eating a squirrel'

- When changing the initial tone would eliminate the only L in a word, this L is preserved on subsequent syllables

Autosegmental representation of low tone preservation

- Low tone preservation involves relinking of delinked noun tone




- The H of the verb stem spreads to the initial syllable of the noun
- The L associated with that syllable is then delinked
- The delinked L then relinks to the following syllable
- The H associated with that syllable is then delinked

- CONTRAST constrains the deletion of the only tone of a certain height within that tonal domain (Donnelly, 2007)
- Preservation of low tones in Bulu can be modeled using a modified version of this constraint: CONTRAST(L)
- The domain is defined as the phonological word

OT analysis of low tone preservation (cont.)

(15)

Input: /màdzí òsán/		<i>IDENT(T)_V</i>	<i>*CONTOUR</i>	<i>NoJUMP</i>	<i>CONTRAST(L)</i>	<i>IDENT(T)_N</i>
a.	màdzí òsán			*!		
b.	màdzí ósán				*!	*
c.	 màdzí ósàn					**
d.	màdzí ôsán		*!			
e.	màdzì òsán	*!				

- *CONTRAST(L)* ranked above *IDENT(T)_N* to allow lexical L to surface
- Candidate c is the optimal output because it only violates *IDENT(T)_N*

- CONTRAST(L) implies the existence of CONTRAST(H)
- CONTRAST(H) must be ranked below all other constraints discussed
- The higher ranking of CONTRAST(L) reflects the prominent role of low tones in Bulu phonology
- This suggests an underlying contrast of H vs. L (rather than H vs. \emptyset)

Description

- Bulu exhibits a process of tonal agreement between verbs of certain tenses and their direct objects
- Verbs of other tenses condition an initial high tone on direct objects due to a suffixal floating H component of the TAM marker
- Both processes can be blocked by intervening P-phrase boundaries

Analysis

- OT can be used to provide a unified account of both patterns

Implications

- Typologically, Bulu can be classified as displaying a H vs. L contrast
- The behavior of low tones suggests that they play a more prominent role in the phonology of Bulu than in some other Bantu languages
- The preference for preserving low tones provides evidence for the existence of separate CONTRAST(L) and CONTRAST(H) constraints

- Discover which other tenses condition each tonal pattern
- Investigate the role of suffixal floating H in other tonal processes
- Determine other constructions that can affect phonological phrasing and block these tonal interactions
- Explore the role of CONTRAST(L) in other phonological processes

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