The interaction of verb and direct object tone in Bulu

Emily Clem
clem.43@osu.edu

The Ohio State University

45th Annual Conference on African Linguistics
April 18, 2014
I would like to thank the members of the Spring 2013 Field Methods course and the Spring 2014 Undergraduate Research Seminar at OSU, Becca Morley, Jefferson Barlew, Deborah Morton, Rebecca Cover, Bob Levine, Larry Hyman, Peter Jenks, Sharon Rose, and Betsy Pillion for helpful discussion and feedback. I also appreciate very much the financial support of the OSU College of Arts and Sciences and the OSU Undergraduate Student Government. The greatest debt of gratitude is owed to my Bulu consultant, whose knowledge, patience, and willingness make this project possible. All errors are mine alone.
Background on Bulu

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

b. màkùs ̀fùmbí
   ‘I am buying an orange’

c. màdží ̀fùmbí
   ‘I am eating an orange’
Research questions

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

Does this tonal process occur after all verbs?
Overview

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
Previous description of Bulu

Yukawa (1992)

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

\[
\begin{align*}
(2) \quad (C)V(C)(C\ddot{V}) & \rightarrow (C)V(C)(C\ddot{V}) \\
(C)V(C)V & \rightarrow (C)V(C)V \\
(C)V(C)V & \rightarrow (C)V(C)V \\
(C)V(C)V & \rightarrow (C)V(C)V \\
(C)V(C)V & \rightarrow (C)V(C)V \\
(C)V(C)V & \rightarrow (C)V(C)V \\
(C)V(C)V & \rightarrow (C)V(C)V
\end{align*}
\]

- 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 ówùndò
    ‘I am buying peanuts’

    c. màdzí 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

<table>
<thead>
<tr>
<th>Present</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>a. èsĩŋì</td>
<td>a. èsĩŋì</td>
</tr>
<tr>
<td>‘cat’</td>
<td>‘cat’</td>
</tr>
<tr>
<td>b. màkùs èsĩŋì</td>
<td>b. mejkùs èsĩŋì</td>
</tr>
<tr>
<td>‘I am buying a cat’</td>
<td>‘I will buy a cat’</td>
</tr>
<tr>
<td>c. màdʒí èsĩŋì</td>
<td>c. mejdʒí èsĩŋì</td>
</tr>
<tr>
<td>‘I am eating a cat’</td>
<td>‘I will eat a cat’</td>
</tr>
</tbody>
</table>

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

Goldsmith (1976)

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

(6) \( H \rightarrow M \)
    \( HH \rightarrow HM \)
    \( LH \rightarrow MH \)

- 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. m̀kùs òwùndò
   ‘I bought peanuts’

c. m̀kùs ówùndò m̀káji
   ‘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
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

---

(8) a. \[
\text{P-p}[w \text{ mǎkùs}] [w \text{ èwùndò}]
\]

‘I bought peanuts’

b. \[
[w \text{ mǎkùs}] \text{P-p}[w \text{ èwùndò}] [w \text{ màkéji}]
\]

‘I bought the peanuts that I wanted’
Tonal agreement between V and DO can be represented as spreading

\[(9) \quad \text{L H} \quad \text{L L H} \]

\text{madʒi} \quad \text{ofumbi}

- The H of the verb stem spreads to the initial syllable of the noun
- The L associated with that syllable is then delinked
Optimality Theory analysis of tonal agreement

- Tonal agreement modeled using \textsc{NoJump} in OT framework
- \textsc{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.)

\[(10)\]

<table>
<thead>
<tr>
<th>Input: /màdzí òfùmbí/</th>
<th>IDENT(T)(V)</th>
<th>*CONTOUR</th>
<th>NOJUMP</th>
<th>IDENT(T)(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. màdzí òfùmbí</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b. mù dzí ófùmbí</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. màdzí ófùmbí</td>
<td></td>
<td></td>
<td>**!</td>
<td></td>
</tr>
<tr>
<td>d. màdzí ôfùmbí</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>e. màdzì ôfùmbí</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

- \text{IDENT(T)}_V \text{ and IDENT(T)}_N require faithfulness to V and DO tones
- \text{*CONTOUR} constrains contour tones on monomoraic syllables
- Candidate b is the optimal output because it only violates IDENT(T)_N
Initial H assignment on DOs involves linking of floating H

\[(11)\quad \text{mejkus} \quad e \text{ siŋ gi} \]

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 $\text{Max}(T)_V$ in OT framework
- $\text{Max}(T)_V$ 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)

<table>
<thead>
<tr>
<th>Input: /mêjkùs’₁ è₂sìŋgì/</th>
<th>MAX(T)_V</th>
<th>IDENT(T)_V</th>
<th>*CONTOUR</th>
<th>NOJUMP</th>
<th>IDENT(T)_W</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. mêjkùs è₂sìŋgì</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ê mêjkùs é₁sìŋgì</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. mêjkùs é₂sìŋgì</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>d. mêjkùs è₁sìŋgì</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. mêjkùs₁s è₂sìŋgì</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
</tr>
</tbody>
</table>

- 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. màdzì́ òsàn

‘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.
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
OT analysis of low tone preservation

- **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: \textit{Contrast}(L)

- The domain is defined as the phonological word
OT analysis of low tone preservation (cont.)

(15)

<table>
<thead>
<tr>
<th>Input: /màdzí ósán/</th>
<th>IDENT(T)_N</th>
<th>*CONTOUR</th>
<th>NOJUMP</th>
<th>CONTRAST(L)</th>
<th>IDENT(T)_M</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. màdzí ósán</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>b. màdzí ósán</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>c. mùàdzí ósàn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>d. màdzí ôsán</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. màdzì àosán</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **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**
Prominence of low tones

- **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. ∅)
Conclusions

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.
Future work

- 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


