Length-based allomorphy in Xhosa noun class prefixes

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Overview

• Certain noun class prefixes in Xhosa (Bantu, Nguni, South Africa) alternate based on the length of the following root

• The Question: are these alternations synchronically productive, or just the remnant of historical change?

• We argue that these alternations are part of speakers’ synchronic grammars

Length-based allomorphy in class 10

• Class 10:
  – izi(N)- before 1-syllable roots
  – ii(N)- elsewhere

<table>
<thead>
<tr>
<th>Singular (9)</th>
<th>Plural (10)</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>in-to</td>
<td>izin-to</td>
<td>‘thing(s)’</td>
</tr>
<tr>
<td>in-dlu</td>
<td>izin-dlu</td>
<td>‘house(s)’</td>
</tr>
<tr>
<td>in-dlela</td>
<td>in-dlela</td>
<td>‘road(s)’</td>
</tr>
<tr>
<td>in-tombi</td>
<td>in-tombi</td>
<td>‘girl(s)’</td>
</tr>
</tbody>
</table>

Length-based allomorphy in class 5

• Class 5:
  – ili- before 1-syllable roots
  – i- elsewhere

<table>
<thead>
<tr>
<th>Singular (5)</th>
<th>Plural (6)</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ili-fu</td>
<td>ilifu</td>
<td>ama-fu</td>
</tr>
<tr>
<td>ili-tye</td>
<td>ilice</td>
<td>ama-tye</td>
</tr>
<tr>
<td>i-cephe</td>
<td>[i</td>
<td>epʰe]</td>
</tr>
<tr>
<td>i-dada</td>
<td>[i</td>
<td>dada]</td>
</tr>
</tbody>
</table>
Length-based allomorphy in class 11

- Class 11:
  - ulu- before 1-syllable roots
  - u- elsewhere

<table>
<thead>
<tr>
<th>Singular (11)</th>
<th>Plural (10)</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ulu-vo</td>
<td>izim-vo</td>
<td>'opinion(s)'</td>
</tr>
<tr>
<td>ulu-su</td>
<td>izin-tsu</td>
<td>'skin(s)'</td>
</tr>
<tr>
<td>u-phondo</td>
<td>iim-pondo</td>
<td>'horn(s)'</td>
</tr>
<tr>
<td>u-cango</td>
<td>iin-gcango</td>
<td>'door(s)'</td>
</tr>
</tbody>
</table>

Possible representations

a. Remnant of a historical process; only in the lexicon (learned for each word)
   Speakers should *not* apply the pattern to novel words or nonce items

b. Synchronic phonological pattern; active in the grammar (learned as a rule)
   Speakers should apply the pattern to novel words or nonce items

Theoretical import

- Other robust cases of length-based allomorphy are mostly metrical in nature
- **Ex:** Sharanawa (Gonzalez 2005; Faust & Loos 2002:132)
  - (ka-\textipa{pa})-ni \quad (ke.\textipa{ne})-(\textipa{pa}.\textipa{ke})-ni
    go-down-remote past \quad write-in order-remote past
    'Went down' \quad 'Wrote in order'
  - \textipa{pa}- after odd \quad \textipa{pake}- after even

- The Xhosa case isn’t so obviously metrical
  - Not iterative; it’s about minimality
  - Some alternations don’t involve moras (iin/-izin-)

Experiment 1

Wug-testing length-based allo-morphy
Experiment design

- **Wug task** (Berko 1958)
  - Singular ↔ Plural

- Block 1: ii(N) vs. izi(N) - (9/sg → 10/pl)
- Block 2: i- vs. ili- - (6/pl → 5/sg)

Data capture

- Stimuli presented on a laptop in random order
- Participants saw 3 real-noun sg/pl examples in the instructions, then did 14 practice items
- Audio recorded, responses coded for class prefix added

Participants

- 10 native speakers of isiXhosa
  - 5 male, 5 female
  - Age
    - Range: 21–42
    - Mean: 26
  - Other languages
    - English (≈ all)
    - Afrikaans (2)
    - Zulu (2)
    - Sotho (2)

Block 1 (class 9/sg. → 10/pl): Stimuli

- Singular class 9 → plural class 10
  - 10 monosyllabic roots
  - 10 disyllabic roots

  - 20 filler/distractor items (part of a separate experiment)
    - 10 monosyllabic, 10 disyllabic
Block 1: Task

- Block 1 (9/sg. → 10/pl.)
  - On each trial, speakers see a singular nonce noun with the class 9 prefix i(N)-
  - Speakers produce the plural of that nonce noun, with one of the two class 10 allomorphs, izi(N)- or ii(N)-

Block 2 (class 6/pl. → 5/sg.): Stimuli

- 10 monosyllabic roots
- 10 disyllabic roots
- distinct from block 1
- 20 filler/distractor items (part of a separate experiment)
  - 10 monosyllabic, 10 disyllabic
  - distinct from block 1

Block 1 (9/sg. → 10/pl.): Examples

- into → izinto or iinto
- indlu → izindlu or iindlu
- indlela → izindlela or iindlela
- intombi → izintombi or iintombi

Block 2: Task

- Block 2 (6/pl. → 5/sg.)
  - On each trial, speakers see a plural nonce noun with the class 6 prefix ama-
  - Speakers produce the singular of that nonce noun, with one of the two class 5 allomorphs, ili- or i-
Block 2 (6/pl. → 5/sg.): Examples

• amafu → ilifu or ifu
• amatye → ilitye or itye
• amacephe → ilicephe or icephe
• amadada → ilidada or idada

Results: Block 1 (9/sg. → 10/pl.)

• Speakers were more likely to use izi(N)- with short roots and ii(N)- with long roots

Results

• In both blocks, speakers’ knowledge of length-based prefix alternations extends to novel words

The “other” category

• Real class prefixes, but not izi(n)- or ii(n)-
• Most common: ama- (class 6 pl.)
• Two likely reasons for ama- responses
  – i-CVCV forms may be ambiguous between class 5 i(l)i- and class 9 i(n)-
  – Some frequent nouns in class 9 have class 6 plurals (a 9/sg.~6/pl. paradigm exists)
  ex: in-doda → ama-doda ‘man’ / ‘men’
Results: Block 2 (6/pl. → 5/sg.)

- Speakers were more likely to use ili- with short roots and i- with long roots

![Diagram showing prefix choice by stem length (Block 2)]

Statistics

- Linear mixed model regressing prefix choice against root length with participant and item as random effects

- Combined Block 1 and Block 2
  - With “other” responses: $t = 0.915$, ns.
  - Without “other” responses: $t = 4.841$, $p < 0.001$

um-

- “Other”: responses other than i- and ili-

  - Most common responses:
    - um- (class 1 or 3)
    - u- (class 1a or 11)

- A likely explanation for um-s:
  - Most clan names and other ethnonyms follow an irregular 1/sg. → 6/pl. paradigm
  - ex: um-Xhosa → ama-Xhosa
    ‘Xhosa person/people’

Experiment 2

Forced-choice follow-up
Why forced choice?

- “Other” responses cloud interpretation
- Participants must decide between two given forms, with no “other” options

Experiment design

- Given a singular form, select one of two possible plural forms
- Just one block (all 9/sg. → 10/pl.)
- 60 trials
  - 30 long roots
  - 30 short roots

Experiment 2: Examples

ingo

iingo  izingo

imfongo

imfongo  izimfongo

Participants

- Native speakers of Xhosa in South Africa
- 8 in-person via Superlab (3 thrown out due to interference during testing)
- 9 online via Moodle online survey
  - 34 logins, 9 complete responses
Results

• Both online and in-person, participants showed knowledge of the length-based alternation

• The effect is more pronounced online than in-person

• Linear mixed model regressing prefix choice against root length with participant and item as random effects:
  - In-person: $t = 3.212$, $p < 0.01$
  - Web: $t = 6.561$, $p < 0.001$

Results: In-person

• Speakers were more likely to use izi(N)- with short roots and ii(N)- with long roots

Results: Web

• Speakers were more likely to use izi(N)- with short roots and ii(N)- with long roots

Web vs. In-person

• Self-selection:
  - All in-person participants completed the task
  - Many web participants stopped part way through
    • Because they lacked clear intuitions?
Summary

- Xhosa speakers use root length to decide between class prefix allomorphs
- This alternation is represented in speakers’ synchronic grammars

Conclusion

- The length-based alternations are not just a historical vestige
  - Speakers have some linguistic awareness of length as the basis for the allomorphy
  - They can extend that knowledge to the treatment of novel words; it’s not lexicalized

- Length-based allomorphy can be synchronically active even when its motivation is historical, rather than phonologically/phonetically motivated
  - Bisyllabic minimality as driving factor?
  - iin- ~ izin-: no difference in mora count
  - Prefix usually doesn’t count for minimality of stem, but seems to do so here.
Thanks!

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