Disambiguating isiXhosa noun classes with phonotactic clues

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Introduction

- Bantu languages are famous for their complex noun class systems
- Q: How do speakers learn noun class membership?
- Hypothesis: Root phonotactics can help clue speakers in

Xhosa

- Bantu (Nguni)
- South Africa’s Eastern Cape and surroundings
- Approximately 8.2 million speakers

Noun classes in Xhosa

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
<th>Class</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>umuntu</td>
<td>abantu</td>
<td>1/2</td>
<td>person</td>
</tr>
<tr>
<td>u-mama</td>
<td>oo-mama</td>
<td>1a/2a</td>
<td>mama</td>
</tr>
<tr>
<td>um-lamba</td>
<td>lambo</td>
<td>3/4</td>
<td>river</td>
</tr>
<tr>
<td>i-gama</td>
<td>ama-gama</td>
<td>5/6</td>
<td>name</td>
</tr>
<tr>
<td>isi-tya</td>
<td>izi-tya</td>
<td>7/8</td>
<td>dish</td>
</tr>
<tr>
<td>i-nkomo</td>
<td>ii-nkomo</td>
<td>9/10</td>
<td>cow</td>
</tr>
<tr>
<td>ulu-su</td>
<td>11</td>
<td></td>
<td>stomach</td>
</tr>
<tr>
<td>ubu-nu</td>
<td>14</td>
<td></td>
<td>humanity</td>
</tr>
<tr>
<td>ubu-tya</td>
<td>15</td>
<td></td>
<td>food</td>
</tr>
</tbody>
</table>

Homophonous prefixes

- With long (2+ syllable) nouns, classes 5 and 9 can both be [i-]:
  
<table>
<thead>
<tr>
<th>Noun</th>
<th>Class</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ilikhaya</td>
<td>ama-ilikhaya</td>
<td>5/6</td>
</tr>
<tr>
<td>il-gama</td>
<td>ama-gama</td>
<td>5/6</td>
</tr>
<tr>
<td>il-mota</td>
<td>ii-mota</td>
<td>9/10</td>
</tr>
<tr>
<td>il-nkomo</td>
<td>ii-nkomo</td>
<td>9/10</td>
</tr>
</tbody>
</table>

Disambiguating classes 5 and 9

- Short (1 syllable) nouns:
  
<table>
<thead>
<tr>
<th>Noun</th>
<th>Class</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ili-fu</td>
<td>ama-fu</td>
<td>5/6</td>
</tr>
<tr>
<td>ili-tye</td>
<td>ama-tye</td>
<td>5/6</td>
</tr>
<tr>
<td>ili-nja</td>
<td>izi-nja</td>
<td>9/10</td>
</tr>
<tr>
<td>ili-tno</td>
<td>izi-tno</td>
<td>9/10</td>
</tr>
</tbody>
</table>
The history of classes 5 and 9

- Class 5: *li > i(li)
- Class 9: *ni > i(n)

Class 9 nouns often retain the nasal:
- i-cuwa ‘salt’
- Also i-li-twimi ‘languages’

Post-nasal alternations

- When the class 9 adjectival prefix (en-) is added to roots:
  - de-aspiration (-khulu ‘big’ > en-kulu ‘cl.9-big’)  
  - hardening (-tie ‘good’ > en-tie ‘cl.9-good’)  

- This doesn’t happen with class 5
  - ∴ unaspirated and ‘hardened’ initial Cs may signal class 9

Historical change leads to synchronic phonotactics

• *-kaya ‘home’
  - i-n-kaya → i-kaya
  - i-li-khaya → i-khaya (5)

If -kaya takes the class 9 prefix with a nasal, deaspiration occurs and the modern version surfaces as -kaya.
If -kaya takes the class 5 prefix with no nasal, deaspiration doesn’t occur and the modern version surfaces as -kaya.

• *.-komo ‘cow’
  - i-n-komo → i-nkomo (9)
  - i-li-khomo → i-khomo

If -komo takes the class 9 prefix with a nasal, historical aspiration fails to apply and the modern version surfaces as -komo.
If -komo takes the class 5 prefix with no nasal, historical aspiration applies and the modern version surfaces as -komo.

The prediction

• Ambiguous i-C1VC2V nouns:
  - If C1 is a sound that would result from a post-nasal consonant change (i.e. unaspirated or hard), it’s likely to be class 9
  - If C1 is a sound that would undergo a post-nasal consonant change (i.e. aspirated or non-hard), it’s likely to be class 5
Testing the prediction

- **Wug task** (Berko 1958)
  - Nonce items don’t have any semantic clues to noun class
  - So, nonce words offer a way to test whether speakers are aware of the phonotactic clues to noun class

2. Our experiment

Stimuli

- 20 nonce nouns
  - 10 with shape i-CV (short)
  - 10 with shape i-CVCV (long)

  - First C is either:
    - An *undergoer* of post-nasal changes, or
    - A *result* of post-nasal changes
    - Five of each, for each noun shape (=20 total)

Method: on each trial...

- Shown a singular nonce noun
- Speakers read the singular form, then produced a plural form

Method: expectations

- **IF C1 is a post-nasal change *undergoer* (fricative, aspirate, implosive, /l/),**
  **THEN** speakers should treat the word as cl. 5,
  **SO** they will give plurals with ama- (cl. 6)

- **IF C1 is the *result* of a post-nasal change (voiced, unaspirated, nasal),**
  **THEN** speakers would treat the word as cl. 9
  **SO** they will give plurals with ii(N)-/izi(N)- (cl. 10)

Method

- Stimuli presented on a laptop in random order
- Participants saw 3 real-noun sg/pl examples in the instructions, then did 14 practice items
Participants

- 10 native speakers of isiXhosa
  - 5 male, 5 female
  - Age
    - Range: 21–42
    - Mean: 26
- Other languages
  - English
  - Afrikaans
  - Zulu

3. Results

Results

- Speakers choose class 5/6 (ama) when initial C is an undergoer, and 9/10 (ii) when C is a result

4. Summary and Discussion

Summary

- Speakers have intuitions about nonce words’ noun class membership
- The status of initial consonants as results or undergoers of post-nasal changes influences speakers’ decisions
  - Undergoers are likely to be class 5/6, while results are likely to be class 9/10
Discussion

• Synchronic phonotactics can come from historical patterns

• Speakers make use of phonotactic clues in determining noun class

• Noun classes aren’t simply semantic or arbitrary—phonology plays a role