Wug-testing a case of ‘unnatural’ labial palatalization in Xhosa

Wm. G. Bennett
Rhodes University
w.bennett@ru.ac.za

Aaron Braver
Texas Tech University
aaron.braver@ttu.edu

Palatalization Conference
University of Tromsø/CASTL
4 December 2014

Introduction to the pattern
• Xhosa bilabial palatalization:
  /B/ + /-w/ → J-w
  labial + labial → palatal (l) + labial
• Normal pattern for passive verbs:
  • uku-fu’d-a ‘to study, read’
  • i-ja-fu’d-a ‘it is studying’
  • i-ja-fu’d-w-a ‘it is being studied’ (passive = /-w/)
• Palatalization:
  • uku-la’m-a ‘to wash’
  • i-ja-la’dʒ-w-a ‘it is being washed’ (m → ɲdʒ)
  → NOT *ija’la’bwa

It’s atypical for palatalization…
• Some apparent universals of palatalization:
  (from Bateman 2007, Kochetov 2011)
  1. If labials palatalize, then coronals/dorsals do too
  2. If back vocoids cause palatalization, then front vocoids do too
• …But that’s not what we see with Xhosa:
  • In passive verbs, only bilabials change
    ija’fu’dwa → *ija’fu’dʒwa
  • Only [w] causes palatalization (not [l] or [j])
    ija’k’βi’sa → *ija’k’βi’sa    ija’b’uya → *ija’c’uya

…It’s also phonetically “unnatural”
• [w] involves nothing like a palatal constriction
• Expectation: [w] is more likely to reinforce the labiality of labials than palatalize them (Ohala 1978)
• The passive suffix in Xhosa does appear as [-iw], with monosyllabic verb roots
• But, there is no palatalization in this case:
  uku-la’b-a ‘dig’    i-ja-la’-iβ-w-a ‘it is being dug’
  *i-ja-la’dʒ-iβ-a
  → Why should palatalization occur (only) in the absence of anything like a palatal?
The puzzle and possibilities

- How does the pattern in Xhosa really work?
- One view: it’s a phonological process
  - \([\text{LAB}] \rightarrow [\text{COR, –ant}] / \_w\) (in various formulations)
- Alternative view: it’s really not phonology
  - It’s a historical relic, and/or morphological in nature
- This talk presents some results from a new experimental study of the phenomenon

Structure of the talk

1. Background from the literature
2. About our study and methodology
3. Data and results
4. Analysis and discussion
5. Summary and conclusion

About isiXhosa

- Xhosa; Southern Bantu language, Nguni group
- Prototypically spoken in Eastern Cape in South Africa (≈5m speakers, out of ≈8.2m speakers total)
Labio-pal: some more details (1/2)

- The **what**: a constellation of changes
  
  $\begin{align*}
  [p'] & \rightarrow [t'] & p \rightarrow tsh \\
  [pʰ] & \rightarrow [tʃ'] & ph \rightarrow tsh \\
  [b] & \rightarrow [dʒ] & b \rightarrow j \\
  [m] & \rightarrow [ɲ] & m \rightarrow ny \\
  [m] & \rightarrow [ɲdʒ] & mb \rightarrow nj
  \end{align*}$

- Generalization: labials shift to the nearest palatal equivalent (other features mostly stay the same)
- Related patterns are found in related languages, albeit with some minor differences

Explanation #1: phonology

- One family of accounts: a synchronic phonological process turns labials into palatals

- One approach: Labial dissimilation
  
  - Avoidance of two Labials; supported by absence of $w$ elsewhere
  

- Another approach: a floating palatal feature, or assimilation to a covert $/i$ or $/j/$
  

Labio-pal: some more details (2/2)

- The **where**: found in a few morphological contexts
  
  - Passive /-w/, locative suffix /-ini/, diminutive /-ana/

- Also evident in historical changes:
  
  - Proto-Bantu *mbwa* $>$ Xh. *péza* ‘dog’

- Sometimes long-distance
  
  - se'enza 'work' $\rightarrow$ see'enzwa ‘be worked’

- Today we’re only going to talk about passive verbs

- The **why**: previous literature gives a few different explanations

Explanation #2: history

- Main alternative: a string of historical changes
  

  $\begin{align*}
  /p+jw/ & \rightarrow pjw \rightarrow pjw \rightarrow tjw \rightarrow /tʃ/ \\
  /p+jw/ & \rightarrow /-w/ \text{ used to have a front glide } [j] \\
  \text{Voicelessness of } [p] & \text{ gets extended, devoices the } [j] \\
  \text{Voiceless glide } [j] & \text{ misperceived as a fricative } [ʃ] \\
  \text{Labial component of } [pʃ] & \text{ is reanalyzed as an coarticulatory effect of following } [w] \\
  \text{End result: active verb has } /p/, \text{ passive has } /tʃ/ \\
  \end{align*}$

- (similar pathway for other bilabial sounds)
History → ¬ Phonology

- For the historical account, palatalization is NOT necessarily an active part of phonology
  - Speakers learn active forms with labials, learn passive forms with palatals, switch them as needed
- Both good and bad sides to this story:
  - Phonological changes involved are weird; but the historical steps are very reasonable, and some intermediate steps are attested in dialect variation
  - Doesn’t clearly explain forms where palatalization is long-distance, e.g. sebenza ~ secenzwa

Recap: two competing hypotheses

- Phonological hypothesis: Palatalization is part of the phonology of the language; learned as a rule
- Lexical hypothesis: Palatalization is in the lexicon, not phonology; no rule for the change
- They make testably different predictions:
  - If palatalization is part of phonology, then speakers will apply the change in new words
  - If palatalization is just in the lexicon, speakers will NOT apply the change in new words
  - A wug test (Berko 1958) should tease them apart

Previous experimental studies

- No previous work on Xhosa labial palatalization has taken an experimental approach
- Herbert (1990) reports an informal experiment on labio-pal in other Southern Bantu languages:
  - 2 Zulu speakers presented with 20 nonce nouns, asked to make diminutive forms
  - Palatalization in 6/20 and 10/20 trials (=avg. 40%)
  - NB: the generalizations are different for palatalization in diminutives; not systematic
- Naidoo (2002) intuits incomplete neutralization, and suggests experimentally testing for it

2. Our Experiment
Method: stimuli

- 40 nonce verb roots, all with CVC structure
  - Vowels were all either /a/ or /o/
  - Last consonant {mb, m, nj, ny} = [m b ɲ dʒ ɲ]
- 40 real verbs, used as fillers
- Stimuli shown to speakers on a laptop, in randomized order
- Participants saw 3 real verb examples in the instructions, and did 9 practice items first

Method: presentation and task

- iyafamba → iya____ wa
- Task: fill in the blank
  - Stimuli were presented in a morphological frame typical of active verbs (in Xhosa orthography)
  - Speakers were asked to read the active form, and then to make a passive form of the verb
  - Participants were instructed that some words might be unfamiliar, and that they should take their best guess at what sounds most natural

Method: participants

- 10 native speakers of isiXhosa
  - 5 male, 5 female; Age range 21–42 (mean =26)
  - 9 from Eastern Cape; 8 grew up at least partly in Grahamstown
  - All 10 identified Xhosa as the language they spoke the most at home
  - Other lgs: English (everyone), Afrikaans, Zulu
  - Participants also did 2 other experiments in the same session (order of tasks was counterbalanced)

Method: recordings and coding

- Speakers were recorded using a ‘head’-mounted microphone, in the sound laboratory of the Rhodes University linguistics department
- Responses were coded for:
  - whether the target consonant was palatal
  - morphology added to the verb (usually –w)
- Analysis excluded forms with reading errors, and those that didn’t add [-w] in the passive form
3. Data and results

Q1: Do speakers ever palatalize in nonce words?

- Key:
  - pink = palatal
  - green = not

- Average over all speakers: palatalize in ~60% of trials

- Answer: Yes!

Binomial test: proportion of palatalized tokens (.575) is greater than expected (.5), p < .05 (1-sided)

Effect of final consonant

- /mb/ vs. /m/: no significant effect
- Speakers didn’t treat the different labial consonants differently

Two-sample proportions test: proportion of /m/ tokens palatalized (.791) is not significantly different from proportion of /mb/ tokens palatalized (.793)

Cross speaker differences

- Differences between speakers are extreme
- Rate of palatalization ranges from 100%...
- ...to 0%
Long-distance productivity?

- Is palatalization also productive in long-distance cases?
- Some speakers added the suffix /-is/ into passive forms; this separates the [-w] from the root iyakhoma → iyawwa → iyakhyawwa
- Speaker 4 palatalized ~50% of time overall
  - 14/20 labial forms had something added before /-w/
  - 7 of those had palatalization, 7 did not
  - ~50% palatalization rate in long-distance cases
- Tentative answer: yes?

Q2: Are underlying and derived palatals identical?

- Preliminary data from 2 speakers
- Linear Mixed Model:
  - F2 regressed against underlying/derived as a fixed factor, and with speaker as a random factor

- F2 at start of consonant
  - No significant differences between derived (358.75 Hz) and underlying palatals (376.26 Hz) (t=.437, ns)

- F2 at 30 ms before start of consonant
  - No significant differences between derived (526.34 Hz) and underlying palatals (522.28 Hz) (t=.087, ns)
4. Interpretation and discussion

Which hypothesis is right?

- The phonological hypothesis predicts speakers **will** apply palatalization to nonce words
  - Speakers 1, 2, 3 bear this out: 100% palatalization
  - Speakers 6 & 8 are close too: ≥70% palatalization
- The lexical hypothesis predicts that speakers will **not** apply palatalization to nonce words
  - Speaker 7 bears this out: 0% palatalization of labials
  - Speakers 9 & 10 are similar: ≤30% palatalization

What does it mean?

- For some speakers, palatalization is phonological
  - Nonce words are unfamiliar: speakers couldn't have memorized palatalized forms for them
  - So, speakers who systematically palatalize nonce words must be applying a general phonological rule
- For other speakers, palatalization is lexical
  - 'Non-palatalizing' speakers **DO** still palatalize in at least some of the real-word practice and filler items
  - So, they **DO** use palatalization (to at least some extent), but apparently only in words that they know
  - This fits with palatalized forms being lexically stored

Analogy

- Speakers who palatalize ~100% → phonological
- Speakers who palatalize ~0% → morphological
- Speakers in the middle → analogy strategy?
  - Don't have a clear phonological rule
  - Don't just have palatalization lexically stored
  - Palatalize nonce words by analogy with words they already know, but not categorically
5. Summary and conclusions

Summary

- We’ve wug-tested labial palatalization
  - It’s productive for some speakers, not others
  - This suggests that it’s a genuine phonological pattern for some speakers, but not for others
- The different accounts of palatalization proposed in previous work are both right for some speakers, but not for all of them
- This variation does not appear to correlate with any of the sociolinguistic factors we asked about

Broader implications

- A single linguistic pattern can be learned/analyzed very differently by different speakers
- Xhosa labial palatalization is typologically unusual. But the reason for this weirdness ISN’T that it’s really a morphological pattern.
- It’s genuinely phonological for at least some speakers
- This means that even ‘phonetically unnatural’ patterns can be learned as real phonology

Siyabulela!

For helpful discussion and/or assistance in collecting data, we want to thank: Msindisi Sam, Mbeleli Mpondi, Seunghun Lee, Andrew Van der Spuy, Shigeto Kawahara, Olona Tywabi, Danica Kreusch, Kelly Goldstuck, Mark de Vos, Lionel Posthumus, Hazel Mitchley, and Jochen Zeller.
References


References (cont.)