Wug-testing bilabial palatalisation in isiXhosa passivized verbs

Aaron Braver
Texas Tech University

Wm. G. Bennett
Rhodes University

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Introduction

- The phenomenon: Xhosa bilabial palatalization
  - uku-fund-a 'to study, read'
  - i-ya-fund-a 'it is studying'
  - i-ya-fund-w-a 'it is being studied' (passive = /-w/)
  - uku-hlamb-a 'to wash'
  - i-ya-hlanj-w-a 'it is being washed' (mb → nj)
  - → *NOT* *iyahlambwa
- /B/ + /-w/ → J -w
  labial + labial → palatal + labial

Palatal, not labial (!)

As palatalization, it's unusual

- Two apparent universals of palatalization:
  (based on surveys by Bateman 2007, Kochetov 2011)
  1. If labials palatalize, alveolars and/or velars do too
  2. If [w] causes palatalization, so does [j] (or [i])
- ...But that's not what we see with isiXhosa passives
  - In passive verbs, *only bilabials change*
    iyafundwa ↛ *iyafunjwa
  - *Only* [w] *causes palatalization* (not [i] or [j])
    iyakrobisa ↛ *iyakrotyisa

The puzzle

- How does the pattern we find in Xhosa work?
- One view: it's a phonological process
  - /mb/ → [ɲdʒ] before [w] (in various formulations)
  - (Stahlke 1975, Khumalo 1987, Beckman 1993, Chen & Malambe 1998, Vondrasek 2001, Naidoo 2002, Bennett 2013/in press)
- An alternative view: it's not really phonology
  - It's a historical relic, or is really morphological
  - (Louw 1975; Herbert 1977, 1990; Ohala 1978; Van der Spuy 2013; see also O'Bryan 1974, Anderson 1992)
- This talk presents some results from a new experimental study on this issue

Structure of the talk

1. Background from the literature
2. About our study: aims and methodology
3. Data and results
4. Analysis and discussion
5. Conclusions and ramifications for future work

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1. Background and context

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Labio-pal: some more details (1/2)

- The *what*: a constellation of changes

[p']	→ [tʃ']	*p*	→ *tsh*
[pʰ]	→ [tʃʰ]	*ph*	→ *tsh*
[ɓ]	→ [c']	*b*	→ *ty*
[bʱ]	→ [dʒ]	*bh*	→ *j*
[m]	→ [ɲ]	*m*	→ *ny*
[ᵐb]	→ [ᶮdʒ]	*mb*	→ *nj*

(Doke 1954)

- Related things happen in related lgs, with some slight differences in what changes to what
  - Ex: [ɓ]→[c'] in Xhosa, vs. →[tʃ'] in Zulu

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

- The *where*: found in a few morphological contexts
  - Passive /-w/, locative suffix /-ini/, diminutive /-ana/
  - Today I'm only going to talk about passive verbs
- Also evident in historical changes
  - Proto-Bantu *mbwa* > Xh. *inja* 'dog'
- Sometimes long-distance
  - *sebenza* 'work' ~ *setyenzwa* 'be worked'
- The *why*: previous literature gives a few different explanations

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One explanation: phonology

- Doke (1954:39): [emphasis mine –WB]
  - '**Palatalization is a phonological process**'
  - '...palatalization is generally due to the incompatibility of bilabial consonants with the semi-vowel w.'
- Key points:
  - It's a process (implies systematicity; part of the regular rules of the language)
  - Due to 'incompatibility of bilabials with [w]'
    - implies ***dissimilation***; **proble**m is two bilabials together
    - Other phonological analyses take other approaches, e.g. assimilation (Khumalo 1987, Naidoo 2002)

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Another account: history (1/2)

- Alternative account: a string of historical changes (Louw 1975; Herbert 1977, 1990; Ohala 1978; Bateman 2010)

$$pjw \rightarrow p\mathring{j}w \rightarrow pʃw \rightarrow tʃw \rightarrow /tʃ/$$

  - Starting point: /-w/ used to have a front glide /j/
  - Voicelessness of [p] gets extended, devoices the [j]
  - Voiceless glide [$\mathring{j}$] misperceived as a fricative [ʃ]
  - Labial component of [pʃ] is reanalyzed as an accidental effect of the following [w]
- End result: active verb has [p], passive has [tʃ] (similar pathway for other bilabial sounds)

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Another account: history (2/2)

- For the historical account, palatalization is NOT necessarily an active part of phonology
  - Speakers learn active forms with labials, and passive forms with palatals
  - They switch out one for the other as needed
- Both good and bad sides to this story:
  - Phonological changes involved are weird; but the historical steps are attested in dialect variation
  - Doesn't clearly work for words where palatalization happens across other sounds (e.g. sebenza ~ setyenzwa)

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Recap: two competing hypotheses

- Phonological hypothesis: Palatalization is part of the phonology of the language
  - Speakers learn it as a rule that changes labial consonants into palatal ones
- Morphological hypothesis: Palatalization is in the lexicon, not phonology
  - There is no change in the synchronic phonology
  - Speakers memorize palatalized verb forms (like suppletive forms, e.g. *go/went*, *swim/swam*)

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2. Our Experiment

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Our experiment: overall design

- The two hypotheses make different predictions about how speakers will treat unfamiliar words
- If palatalization is part of phonology, then speakers will apply the change in new words
- If palatalization is just a trend in the lexicon, speakers will ***NOT*** apply the change in new words
- A 'wug test' should tease them apart

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Method: stimuli

- 40 nonce verb roots, all with CVC structure
  - Vowels were all either /a/ or /o/
  - Last consonant {mb, m, nj, ny}
- 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

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Method: task and presentation

iyafamba → iya____wa

- Task: fill in the blank
  - Stimuli were presented in a morphological frame typical of active verbs (in Xhosa orthography)
  - Speakers 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

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Method: participants

- 10 native speakers of isiXhosa
  - 5 male, 5 female; Age range 21–42 (mean =26)
  - 9 from Eastern Cape, 1 from Gauteng (but with family in Eastern Cape)
  - All 10 identified Xhosa as the language they spoke the most at home
- None reported medical issues related to speech or hearing
- Participants also did 2 other experiments in the same session (order of tasks was counterbalanced)

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Method: data handling

- 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)
- Statistical analysis excluded forms with reading errors, and those that didn't have the suffix [-w]

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3. Data and results

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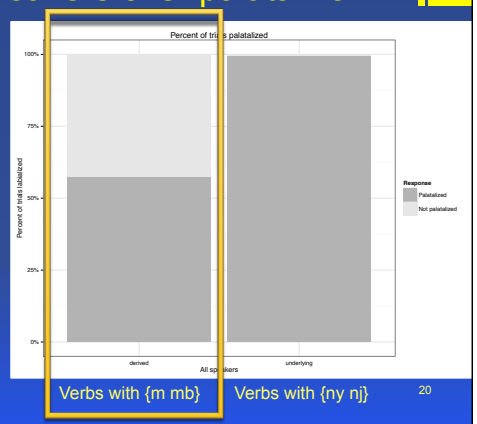
Q1: Do speakers ever palatalize?

- Key:
  Dark = palatal
  Light = not
- Average over all speakers: palatalize in ~60% of cases
- Answer: Yes!



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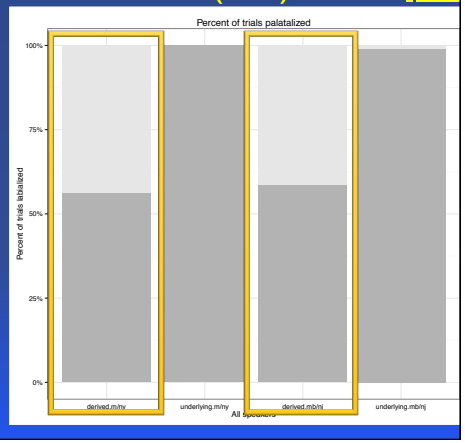
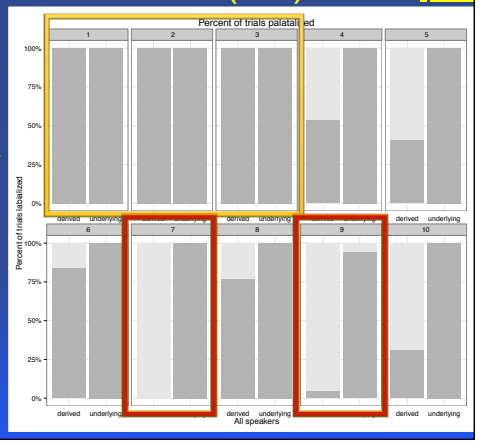
Rate of palatalization (1/2)

- /m/ vs. /mb/: no significant effect
- This means speakers didn't treat the different labial consonants differently



Rate of palatalization (2/2)

- Big differences between speakers!
- Some palatalized 100% of the time
- Some speakers palatalized never
- Some speakers fall in between



Q2: Long-distance palatalization

- Some speakers added the suffix /-is/ into passive forms; this separates the [-w] from the root

  iyakhoma → iya___wa 'iyakhonyiswa'

- Q2: is palatalization also productive in these long-distance cases?
- Speaker 4 palatalized ~50% of time overall
  - 14 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?

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4. Interpretation and discussion

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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

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What's it mean?

- For some speakers, palatalization is phonological
  - Nonce words are unfamiliar: speakers couldn't have memorized palatalized forms for them
  - So, speakers who palatalize nonce words must be applying a general phonological rule
- For other speakers, palatalization is lexical
  - 'Non-palatalizing' speakers DID 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

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5. Summary and conclusions

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Summary

- We've wug-tested labial palatalization
  - It's productive for some speakers, not for 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

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Broader implications

- A single linguistic pattern can be learned/analyzed very differently by different speakers
  - ...even speakers from the same speech community!
  - This suggests that experiments of this sort should avoid pooling data across speakers
- Xhosa labial palatalization is typologically unusual ...but this ISN'T because it's non-phonological
  - It's genuinely phonological for at least some speakers
  - This means that even 'phonetically unnatural' patterns can be learned as real phonology

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Plans for future work

- 'Q3': When labials get palatalized, do they end up exactly like underlying palatal consonants?
- 'Q4': are there phonetic differences between the two groups of speakers?
- We're working on these in our data right now
- More future plans: (tentative)
  - Repeat the experiment in other dialect areas
  - Other tasks: forced choice, and rating
  - Test L2 speakers, see if they pattern like L1s
  - Test palatalization in other contexts (loc, dim)

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Siyabulela!

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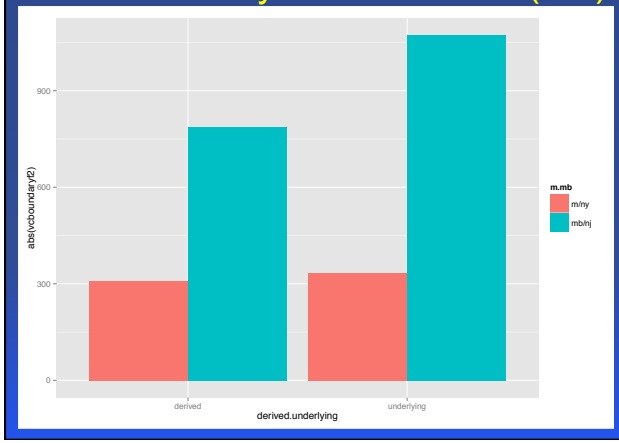
Preliminary acoustic data (1/2)



F2 at start of C

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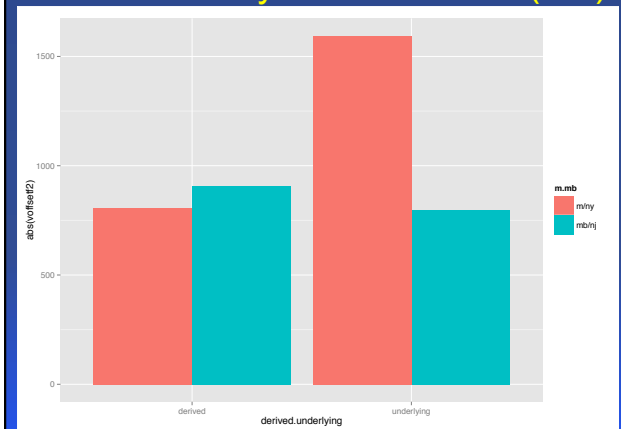
Preliminary acoustic data (2/2)



F2 30ms before C

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