

## Phonology or Morphology: Inter-speaker differences in Xhosa Labial Palatalization

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## Introduction to the pattern

- Labial palatalization in Xhosa (Bantu)
- Passivizing suffix: /-w/
- Root bilabials palatalize when preceding the passive suffix /-w/
- Schematically:
  - /B/ + /-w/ → J-w
  - labial +labial → palatal (!) + labial

## Introduction to the pattern

- Normal structure for passive verbs:
  - uku-fu<sup>n</sup>d-a 'to study, read'
  - i-ja-fu<sup>n</sup>d-w-a 'it is being studied' (passive = /-w/)
- Palatalization in passives containing bilabials:
  - uku-ʃa<sup>m</sup>b-a 'to wash'
  - i-ja-ʃa<sup>n</sup>d<sub>3</sub>-w-a 'it is being washed' (m<sup>b</sup> → <sup>n</sup>d<sub>3</sub>)
  - NOT \*ijaʃa<sup>m</sup>bwa

## It's atypical for palatalization...

- 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 in Xhosa:
  - In passive verbs, *only bilabials change*  
ijafu<sup>n</sup>dwa ↗ \*ijafu<sup>n</sup>d<sub>3</sub>wa
  - *Only [w] causes palatalization* (not [i] or [j])  
ijakx' oʃisa ↗ \*ijakx' oʃ'isa    ijaʃuja ↗ \*ijaʃ'uja

## ...It's also phonetically "unnatural"

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- [w] has no palatal constriction
  - Expectation: [w] should *reinforce* the labiality of labials rather than palatalize them (Ohala 1978)
- When the passive suffix surfaces as [-iw] (in monosyllabic roots), palatalization does not apply:
  - uku-<sup>mb</sup>-a 'dig' i-ja-<sup>mb</sup>-iw-a 'it is being dug'
  - \*i-ja-<sup>ɲ</sup>dz-iw-a
- → Why should palatalization occur (only) in the *absence* of anything like a palatal?

## The puzzle

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- How does the pattern in Xhosa really work?
- One view: it's a phonological process
  - [LAB] → [COR, -ant] / \_\_w (in various formulations)
  - (Stahlke 1976, Khumalo 1987, Gorecka 1989, Beckman 1993, Chen & Malambe 1998, Vondrasek 2001, Naidoo 2002, Bennett 2013/in press)
- Alternative view: it's really not phonology
  - It's a historical relic, and/or morphological in nature
  - (Louw 1975; Herbert 1977, 1990; Ohala 1978; Van der Spuy 2014; see also O'Bryan 1974, Anderson 1992)

## Structure of the talk

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1. Background from the literature
2. Our experiment
3. Data and results
4. Analysis and discussion
5. Summary and conclusion

## 1. Background and context

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## About isiXhosa

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- =Xhosa; Southern Bantu language, Nguni group
- Prototypically spoken in Eastern Cape in South Africa (≈5m speakers, out of ≈8.2m speakers total)



## Labial palatalization (1/2)

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- Labials shift to the nearest palatal equivalent (other features mostly stay the same)

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

(Doke 1954)

- Related patterns are found in related languages, albeit with some minor differences

## Labial palatalization (2/2)

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- Found in a few morphological contexts
  - Passive /-w/, locative suffix /-ini/, diminutive /-ana/ (We'll only talk about passives for now)
  - Also evident in historical changes: Proto-Bantu  $m_bwa > Xh. i^ndʒa$  'dog'
- Sometimes long-distance
  - sebenza 'work' → sec'en<sup>z</sup>wa 'be worked'
- Why: previous literature is mixed

## Explanation #1: phonology

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- A synchronic phonological process turns labials into palatals
- One version: Labial dissimilation
  - Avoidance of two Labials; supported by absence of Bw elsewhere
  - (Doke 1954, Gorecka 1989, Beckman 1993, Selkirk 1993, Bennett 2013/in press)
- Another version: a floating palatal feature, or assimilation to a covert /i/ or /j/
  - (Stahlke 1976, Khumalo 1987, Chen & Malambe 1998, Poulos & Msimang 1998, Jokweni 1999, Vondrasek 2001, Naidoo 2002)

## Explanation #2: history

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- A string of historical changes  
(Louw 1975; Herbert 1977, 1990; Ohala 1978; Bateman 2010; see also O'Bryan 1974, Anderson 1992, Van der Spuy 2014)
- /p+jw/ → p<sup>h</sup>jw → p<sup>h</sup>fw → t<sup>h</sup>fw → /tʃ/
- Passive suffix /-w/ used to have a front glide [j]
- Voicelessness of [p] gets extended, devoices the [j]
- Voiceless glide [f] misperceived as a fricative [ʃ]
- Labial component of [pʃ] is reanalyzed as an coarticulatory effect of following [w]
- End result: active verb has /p/, passive has /tʃ/  
(similar pathway for other bilabial sounds)

## History → ¬Phonology

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- 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 ~ sec'enzwa

## Recap: two competing hypotheses

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- 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

## Recap: two competing hypotheses

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- If palatalization is phonological, then speakers will apply the change in novel words
- If palatalization is just in the lexicon, speakers will *NOT* apply the change in novel words
- A wug test (Berko 1958) should tease them apart

## 2. Our Experiment

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### Method: stimuli

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- 40 nonce verb roots, all with CVC structure
  - Vowels were all either /a/ or /o/
  - Last consonant {mb, m, nj, ny} = [ᵐb, m, ɲdʒ, ɲ]
  - Ex: *hlama, famba, foma, komba*
- 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: task

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*iya-famba* → *iya\_\_\_wa*

- Task: fill in the blank
  - Stimuli presented in a frame typical of active verbs (in Xhosa orthography)
  - Speakers read the active form, then made 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

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- 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

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- Speakers were recorded using a 'head'-mounted microphone, in the sound laboratory of the Rhodes University linguistics department
- Responses were coded for:
  - target consonant palatal?
  - appropriate application of passive /-w/
- Analysis excluded forms with reading errors, and those that didn't add [-w] in the passive form

## 3. Data and results

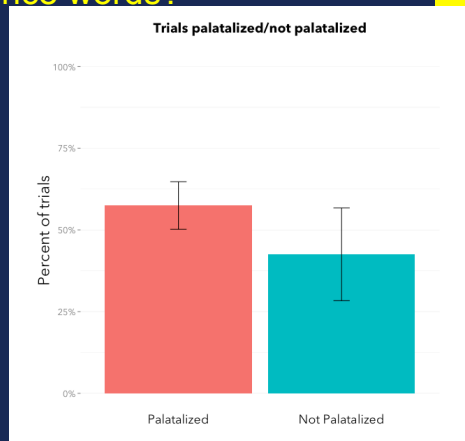
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## Q1: Do speakers ever palatalize in nonce words?

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- 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)

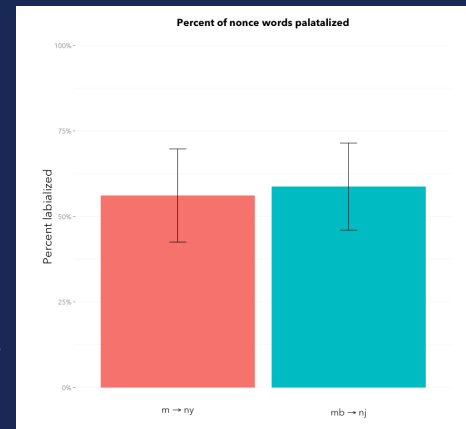


## Effect of final consonant

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

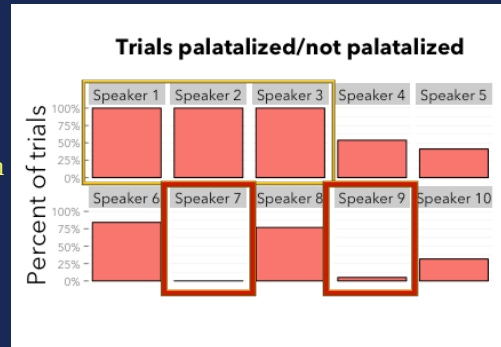
Two-sample proportions test: proportion of /m/ tokens palatalized (.791) is not significantly different from proportion of /mb/ tokens palatalized (.793)



## Cross speaker differences

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



## Long-distance productivity?

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- 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 → iya\_\_\_wa 'iyakhonyiswa'
- 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?

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## 4. Interpretation and discussion

## Which hypothesis is right?

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- 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?

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- For some speakers, palatalization is phonological
  - Speakers couldn't have memorized palatalized forms for nonce words they'd never heard
  - Speakers who systematically 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
  - They DO use palatalization sometimes, but apparently only in words that they already know
    - Palatalized forms are lexically stored

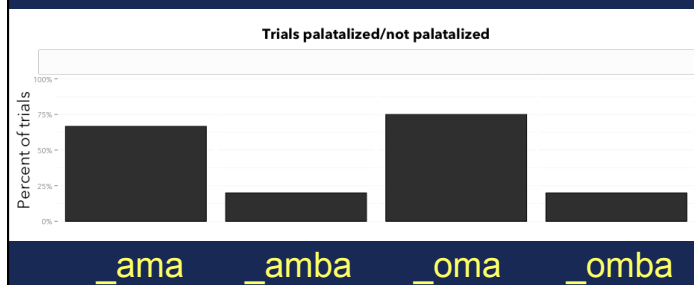
## Analogy?

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- Speakers who palatalize ~100% → phonological
- Speakers who palatalize ~0% → lexical
- Speakers in the middle → analogy strategy?
  - Don't have a clear phonological rule
  - Don't just have palatalization lexically stored
    - They palatalize nonce words by analogy with words they already know

## Speaker 5 (~30%) by ending

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## 5. Summary and conclusions



## Summary

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- 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

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- 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

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## Siyabulela!

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