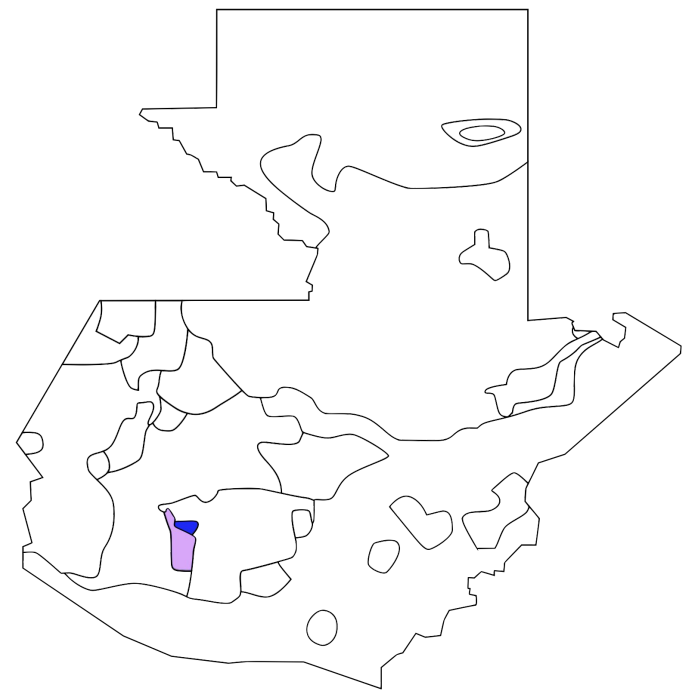


Final Sonorant Devoicing in Tz'utujil and Beyond

Maya C. Wax Cavallaro, UCSC

25th Workshop on Structure and Constituency in Languages of the Americas
May 29, 2021

mwaxcava@ucsc.edu



Tz'utujil

- K'ichean-branch Mayan language
- ~70,000 native speakers
- mainly in the area around Lake Atitlán in the Guatemalan highlands
- Dayley (1985) grammar - San Juan La Laguna, to a lesser extent Santiago Atitlán
- Consultant I am currently working with from Santa María Visitación (SMV)



Tz'utujil

Cf. Tz'utujila 'Tz'utujil' (people) 

Liquids and glides devoice syllable-finally.

(1) Liquid/glide devoicing in Tz'utujil (Dayley 1985)







- a. way [waj] 'tortilla'
- b. tewlaj [tɛϕlax] 'very cold'
- c. jul [xʊl] 'hole'
- d. warnaq [warnaq^h] 'he has gone to sleep'

Nasals devoice only word-finally.

(2) Nasal devoicing in Tz'utujil (Dayley 1985)

- a. naan [na:ɲ̥] 'lady'
- b. xinwa'i [ʃinwaʔi] 'I ate'

(3) SMV Tz'utujil

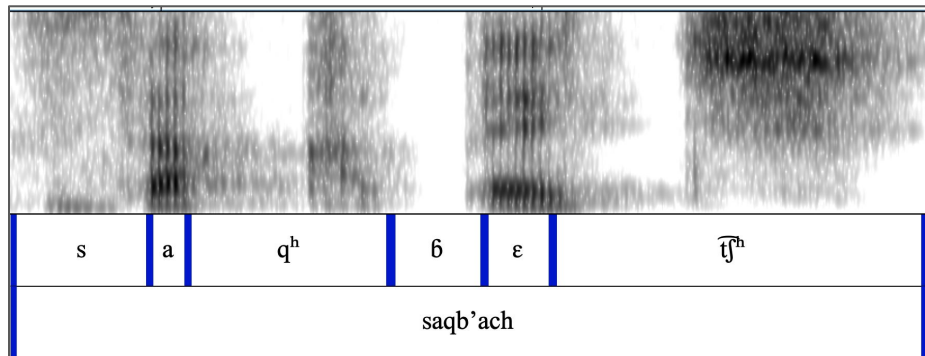
- a. jul 'hole' 
- b. q'oor 'masa' 
- c. tew 'cold' 
- d. ch'ooy 'mouse' 
- e. alkalde 'mayor' 
- f. meem 'mute' 

Tz'utujil

Approximant devoicing patterns with simple stop/affricate aspiration.

(4) Obstruent aspiration in Tz'utujil (Dayley 1985)

- a. chikop [tʃikɔp^h] 'animal'
- b. tapq'iiij [tap^hʒi:x] 'albino'
- c. tut [tʊt^h] 'palmera'
- d. saqb'ach [saq^hbətʃ^h] 'hailstone'



(5) Aspiration in SMV Tz'utujil

saqb'ach 'hail'

kuuk 'squirrel'



Sonorant devoicing and simple stop/affricate aspiration

- Occur in the same positions (codas)
- Involve spread vocal folds
- May be the result of the same/similar phonetic pressures
- Can both result from the same constraints

Campbell, Kaufman, and Smith-Stark (1986) “Meso-America as a Linguistic Area”

- **A rule which devoices final sonorants** (usually l r y w, but also nasals and even vowels in some languages)
 - several Mayan languages (especially Quichean), in Nahuatl, Pipil, Xincan, Totonac, Tepehua, Tarascan, and Sierra Popoluca...as well as in the more southerly Cacaopera and Sumu.
- ...reaches only a small and discontinuous portion of the languages of the area
- relatively unhelpful in defining MA as a LA
- note also the very widespread phonetic aspiration of final stops

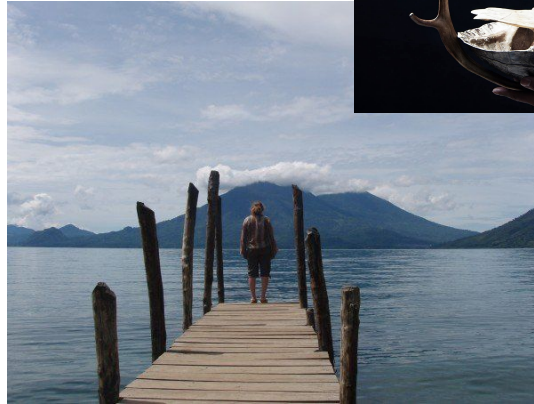


Upshot:

- Tz'utujil sonorant devoicing is one realization of [+spread glottis] ([+SG]) at the right edge of phonological domains
- The same phenomenon is also realized as final aspiration of simple stops and affricates
- Viewing these two processes as realizations of one phenomenon provides insight into the areal typology of Mesoamerica and the wider typology of sonorant devoicing.

In this talk:

- 1) Sonorant devoicing
- 2) Phonetic Motivation
- 3) OT Analysis
- 4) Typology
 - a) Mayan family
 - b) Beyond Mayan
 - c) Mesoamerica
- 5) Conclusion



Sonorant Devoicing

Sonorant devoicing: Why is it interesting?

Most final devoicing literature is about obstruent devoicing

- Neutralizing to unmarked form

Voiceless sonorants are marked (Blevins 2018)

- All spoken languages have phonemes that could be described as voiceless stops
- Contrastive voiceless sonorants only occur in ~5% of languages

Sonorant devoicing: Why is it interesting?

Tz'utujil sonorant devoicing is typologically rare

- Positional - occurs in codas, not assimilatory
 - Sonorant devoicing as assimilation more widely attested
- Word-internal, syllable-final
 - Phrase-final sonorant devoicing more widely attested
- Not neutralizing
 - Most final devoicing literature focuses on obstruent (incomplete) neutralization

Consonant inventory of Tz'utujil

	Bilabial	Alveolar	Alveo-affricate	Palato-alveolar	Velar	Uvular	Glottal
Obstruents							
Simple	p /p/	t /t/	tz /t͡s/	ch /t͡ʃ/	k /k/	q /q/	
Glottalized	b' /b'/	d' /d'/	tz' /t͡s'/	ch' /t͡ʃ'/	k' /k'/	q' /q'/	/ʔ/
Fricatives		s /s/		x /ʃ/		j /x/	
Sonorants							
Nasals	m /m/	n /n/					
Lateral		l /l/					
Trill		r /r/					
Glides	w /w/			y /j/			

Phonetic Motivation

Domain generalization

Historical accounts of final devoicing as domain generalization (e.g. Hock 1991, Westbury & Keating 1986)

- Extension of an utterance-final phenomenon to word-level phonology
- Phonetic pressures
 - Difficulty of maintaining subglottal air pressure necessary for voicing over a long utterance
 - Spreading of the vocal folds towards the end of an utterance in anticipation of non-speech breathing
- Myers & Padgett (2014) tested this with two artificial learning experiments
 - Preference for word-level phonology
 - Utterance-final words disproportionately represented in the learner's lexicon

Domain generalization in Tz'utujil

Tz'utujil is an interesting case:

- Sonorant devoicing
- Generalization to the syllable level
- Simple obstruent aspiration

Sonorant devoicing

- Same phonetic pressures as obstruent devoicing
 - Difficulty of maintaining subglottal air pressure necessary for voicing over a long utterance
 - Spreading of the vocal folds towards the end of an utterance in anticipation of non-speech breathing
- Tz'utujil doesn't have voiced obstruents

Domain generalization in Tz'utujil

Generalization to the syllable-level

- Myers and Padgett (2014) did not look for this or rule it out
- Word-final syllables in the lexicon
 - Fixed final stress - final syllables in Tz'utujil are prominent
 - Pye (1983) Mayan telegraphese
 - Children acquiring K'iche' (closely-related Mayan language with final stress and final aspiration/devoicing) produce only final (stressed) syllables - favoring perceptual salience over semantic complexity/informativity
 - Word-internal codas are rare

What about final aspiration?

Three possibilities:

- Final sonorant devoicing and final aspiration result from the same phonetic pressures and are different phonetic realizations of the same phenomenon.
 - AnderBois (2011) - Word-final aspiration and phrase-final /h/-epenthesis in Yukatek Maya
 - Final Laryngeal Strengthening - [SG] at the right edge of larger prosodic constituents
- Final sonorant devoicing and final aspiration are two entirely unrelated processes that happen to pattern together.
- Different phonetic motivations for final aspiration and final devoicing, but they have been generalized and phonologized into one syllable-level rule/phenomenon/puff of air.

OT Analysis


Analysis

Constraint penalizing [-SG] codas:

*[-SG]CODA

Assign one violation mark for every consonant that occurs in the coda of a syllable and is [-SG].

(6) Sonorant devoicing in /xul/ → [xu̥] ‘hole’

	/xul/	DEP	MAX	*[-SG]CODA	ID([SG])
a.	xul			*W	L
b.	 xu̥				*
c.	xu		*W		L
d.	xulu	*W			L

Analysis

Voiceless fricatives are [+SG] (Vaux 1998)

- Pattern with aspirated stops
- Produced with spread vocal folds
- Can occur in both onsets and codas in Tz'utujil

Glottalized stops and affricates occur in codas:

IDENT([CG])

AOV for every corresponding input-output pair with differing values for [CG].

(7) /si:k'/ → [si:k'] 'tobacco'

	/si:k'/	ID([CG])	*[-SG]CODA	ID([SG])
a.	☞ si:k'		*	
b.	si:k ^h	*W	L	*W

Analysis

Distribution of nasals differs from that of other sonorants:


*FINAL[-SG]

Assign one violation mark for every consonant that occurs word-finally and is [-SG].


*VOICELESSNASAL (*N̥)

Assign one violation mark for every nasal consonant that is [-voice].

(8) /ʃinwaʔi/ → [ʃinwaʔi] 'I ate'

	/ʃinwaʔi/	*FINAL[-SG]	*N̥	*[-SG]CODA	ID([SG])
a. 	ʃinwaʔi			*	
b.	ʃin̥waʔi		*W	L	*W

(9) /na:n/ → [na:n̥] 'lady'

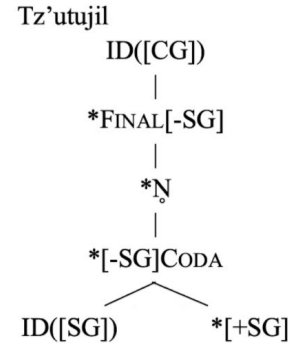
	/na:n/	*FINAL[-SG]	*N̥	*[-SG]CODA	ID([SG])
a.	na:n	*W	L	*W	L
b. 	na:n̥		*		*

Variation

Ranking of *N̥ relative to *FINAL[-SG] and *[-SG]CODA can account for the difference between Tz'utujil and closely-related Kaqchikel:

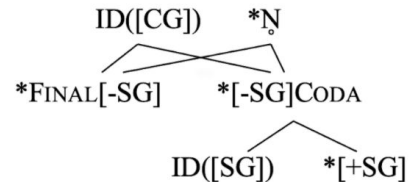
(10) /me:m/ → [me:m̥] 'mute' in Tz'utujil; FINAL[-SG] >> *N̥ >> **[-SG]CODA

	/me:m/	*FINAL[-SG]	*N̥	*[-SG]CODA	ID([SG])
a.	me:m	*W	L	*W	L
b.	me:m̥		*		*



(11) /mem/ → [mem] 'mute' in Kaqchikel; *N̥ >> *FINAL[-SG], *[-SG]CODA Kaqchikel

	/mem/	*N̥	*FINAL[-SG]	*[-SG]CODA	ID([SG])
a.	mem		*	*	
b.	me:m̥	*W	L	L	*W



Variation

Final aspiration is much more widely attested than final devoicing in the Mayan language family (Bennett 2016):

*VOICELESSSONORANT (*R̥)

AOV for every sonorant consonant that is [-voice].

Can account for attested Mayan languages with no sonorant devoicing and either coda aspiration or word-final aspiration.

Predictions

Within the Mayan family: 3 implicational relations

- word-internal \Rightarrow word-final
 - domain generalization
- final devoicing \Rightarrow final aspiration
- nasals \Rightarrow liquids and glides

Typology: Beyond Mayan

Typology

PBase (Mielke, n.d.)

- ~40 languages with sonorant devoicing rules, mostly assimilatory
- Small handful of languages with positional (final) sonorant devoicing
 - Most (Central Outer Koyukon, Eastern Ostyak, O'odham, Tepecano, and Tz'utujil) devoice all sonorants
 - Southeastern Tepehuan and Huasteca Nahuatl - only liquids, not nasals or glides.

*VOICELESSGLIDE

(*W̥)

AOV for every glide consonant that is [-voice].

Typology

PBase (Mielke, n.d.) - 11 languages purely final sonorant devoicing

- Yucatec Maya - nasals and liquids but not glides
- Russian and North Highland Mixe - nasals but not other sonorants

*VOICELESSSONORANT (Revised)

AOV for every approximant (liquid or glide) consonant that is [-voice].

Implicational prediction:

final glide devoicing \Rightarrow final liquid devoicing

Pbase - Languages with final sonorant devoicing

	Family	Devoices nasals	Devoices approx.	Devoices liquids	Word-internal devoicing?	Obstr. Aspiration	Obstr. Devoice Same
Tz'utujil	Mayan	✓	✓	✓	✓	✓	NA
Khanty (Ostyak, Eastern)	Uralic	✓	✓	✓		✓	✓
O'odham (Papago)	Uto-Aztecan	✓	✓	✓			✓
Faroese	Indo-European	✓	✓	✓		✓ (phonemic)	
Koyukon, Central Outer	Athabaskan	✓	✓	✓		✓ (not final)	
Tepecano	Uto-Aztecan	✓	NA	✓		✓	✓
Tepehuan, Southeastern	Uto-Aztecan			✓	✓	✓	Just /v/?
Nahuatl, Huasteca	Uto-Aztecan			✓	✓	✓	
Maya (Yucatan)	Mayan	✓		✓	✓	✓	NA
Russian	Indo-European	Just /m/					✓
Mixe, North Highland (Totontepec Mixe)	Mixe-Zoque	✓		NA		✓	

Pbase - Languages with final sonorant devoicing

	Family	Devoices nasals	Devoices approx.	Devoices liquids	Word-internal devoicing?	Obstr. Aspiration	Obstr. Devoice Same
Tz'utujil	Mayan	✓	✓	✓	✓	✓	NA
Khanty (Ostyak, Eastern)	Uralic	✓	✓	✓		✓	✓
O'odham (Papago)	Uto-Aztecan	✓	✓	✓			✓
Faroese	Indo-European	✓	✓	✓		✓ (phonemic)	
Koyukon, Central Outer	Athabaskan	✓	✓	✓		✓ (not final)	
Tepecano	Uto-Aztecan	✓	NA	✓		✓	✓
Tepehuan, Southeastern	Uto-Aztecan			✓	✓	✓	Just /v/?
Nahuatl, Huasteca	Uto-Aztecan			✓	✓	✓	
Maya (Yucatan)	Mayan	✓		✓	✓	✓	NA
Russian	Indo-European	Just /m/					✓
Mixe, North Highland (Totontepec Mixe)	Mixe-Zoque	✓		NA		✓	

Predictions - revised

- word-internal \Rightarrow word-final
 - domain generalization
- **final glide devoicing \Rightarrow final liquid devoicing**
- nasals doing something different
- final devoicing \Rightarrow final aspiration

Pbase - Languages with final sonorant devoicing

	Family	Devoices nasals	Devoices approx.	Devoices liquids	Word-internal devoicing?	Obstr. Aspiration	Obstr. Devoice Same
Tz'utujil	Mayan	✓	✓	✓	✓	✓	NA
Khanty (Ostyak, Eastern)	Uralic	✓	✓	✓		✓	✓
O'odham (Papago)	Uto-Aztecan	✓	✓	✓			✓
Faroese	Indo-European	✓	✓	✓		✓ (phonemic)	
Koyukon, Central Outer	Athabaskan	✓	✓	✓		✓ (not final)	
Tepecano	Uto-Aztecan	✓	NA	✓		✓	✓
Tepehuan, Southeastern	Uto-Aztecan			✓	✓	✓	Just /v/?
Nahuatl, Huasteca	Uto-Aztecan			✓	✓	✓	
Maya (Yucatan)	Mayan	✓		✓	✓	✓	NA
Russian	Indo-European	Just /m/					✓
Mixe, North Highland (Totontepec Mixe)	Mixe-Zoque	✓		NA		✓	

Patterns

- word-internal \Rightarrow word-final
 - domain generalization
- final glide devoicing \Rightarrow final liquid devoicing
- **final devoicing \Rightarrow final aspiration**
 - **This is a tendency, but not a universal**
 - **This could be a typological distinction similar to [voice] vs. [sg] languages**
- nasals don't always pattern with other sonorants






Nasals

- Why are they different from other sonorants?
 - Different articulation
 - Devoiced/voiceless nasals
 - Can't have same turbulence/frication as other devoiced/voiceless sonorants
 - Harder to perceive?
 - Prenasalization, nasal vowels, etc.
- Tz'utujil nasals
 - Partial devoicing
 - Don't generalize to the syllable level
 - Perceptibility
 - Articulation

Mesoamerica Beyond Phase

- Mesoamerican languages and final aspiration/devoicing understudied
- Final devoicing may be more common in MA than we think
- Ex: Zapotec
 - Lenis-fortis distinction - sometimes [SG], sometimes [voice], sometimes ?
 - No ejectives/implosives
 - Quijoquitani Zapotec (Black 1995)
 - Marlett & Ward (1988) - fortis obstruents aspirated word-finally, lenis obstruents devoice word-finally
 - Regnier (1993) - lenis-fortis distinction neutralized word-finally, both are voiceless and aspirated

Mesoamerica Beyond Pbase

- Santiago Laxopa Zapotec (Wax Cavallaro, work in progress)
 - Fortis stops aspirated word-finally
 - *yet* ‘tortilla’ 
 - Incomplete neutralization?
 - *yag* ‘tree’ 
 - Devoiced/voiceless vowels
 - *xhidw* ‘cat’ 
 - Spanish Loanwords
 - Voiceless vowels
 - *patw* (Sp. *pato*) ‘duck’ 
 - Final /r/ devoicing (possibly from Spanish)
 - *player* (Sp. *playera*) ‘t-shirt’ 

Conclusion

Conclusion

- Sonorant devoicing in Tz'utujil results from the phonologization and generalization of phonetic pressures at the utterance level
- The resulting constraints produce multiple [+spread glottis] ([+SG]) phenomena at the right edge of phonological domains
 - Aspiration of stops and affricates
 - Devoicing of liquids and glides
 - Partial devoicing of nasals
- If we consider final aspiration and final devoicing to be two possible realizations of the same phenomenon, this phenomenon may be much more widespread and continuous within Mesoamerica than previously thought
- While final sonorant devoicing is typologically rare and not particularly widespread within MA, it is much more common within MA than outside of the area

Maltiyoox!

Thank you to Tzutu Kan for being an incredible expert and resource, especially during this challenging time, to my Tz'utujil friends and teachers for sharing their language and knowledge with me, to Ryan Bennett for leading me through this process and sharing his vast knowledge of Mayan, and to Junko Ito, Grant McGuire and Jaye Padgett for their ideas and guidance!

References

- AnderBois, Scott. 2011. Strong positions and laryngeal features in Yukatek Maya. In Suzi Lima, Kevin Mullin & Brian Smith (eds.), *North East Linguistic Society (NELS) 39* 1.41–54.
- Bennett, Ryan. 2016. Mayan phonology. *Language and Linguistics Compass* 10.469-514.
- Black, Cheryl A. 1995. Laryngeal licensing and syllable well-formedness in Quiégolani Zapotec. *Work Papers of the Summer Institute of Linguistics, University of North Dakota Session* 39.11-32.
- Blevins, Juliette. 2018. Evolutionary Phonology and the life cycle of voiceless sonorants. In Sonia Cristofaro and Fernando Zúñiga (eds.) *Typological hierarchies in synchrony and diachrony*. Amsterdam/Philadelphia: John Benjamins. 29-60.
- Dayley, Jon. 1985. *Tzutujil grammar*, vol. 107 University of California Publications in Linguistics. Berkeley, CA: University of California Press.
- Hock, Hans Henrich (1991). *Principles of historical linguistics*. 2nd edn. Berlin & New York: Mouton de Gruyter.
- Mielke, Jeff. n.d. P-base: A database of phonological patterns. Online: <https://pbase.phon.chass.ncsu.edu/> (accessed in 2021-02-16).
- Myers, Scott, and Jaye Padgett. 2014. Domain generalisation in artificial language learning. *Phonology* 31.399-433.
- Pye, Clifton. 1983. Mayan Telegraphese: Intonational Determinants of Inflectional Development in Quiché Mayan, *Language* 59.583-604.
- Vaux, Bert. 1998. The laryngeal specifications of fricatives. *Linguistic Inquiry* 29.497–511.
- Westbury, John R. & Patricia A. Keating (1986). On the naturalness of stop consonant voicing. *JL* 22. 145–166.

Check out Tzutu Kan's music!

Spotify:

<https://open.spotify.com/artist/332oZY7nIzB8Ps6wOauMWn?si=ouf8cUjRSYePYLEWkkCS9g>

Soundcloud: <https://soundcloud.com/ma-ya-hip-hop>

Bandcamp:

<https://actitudmusic.bandcamp.com/album/jun-winaq-rajawal-q-j-tributo-a-los-20-nawales>

Barrett (2016) “Mayan Language Revitalization, Hip Hop, and Ethnic Identity in Guatemala” - on Tzutu's Maya Cosmvision Hip Hop Collective: https://uknowledge.uky.edu/lin_facpub/72/

