Tone and phonation in Santiago Laxopa Zapotec

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Contents

1 Introduction

- Most work on the interaction of tone and phonation has been based on descriptions of southeast and far east Asian languages.
- This lead to strong claims on the interaction between tone and phonation (Masica 1976, Thurgood 2002, Yip 2002, Enfield 2005, Michaud 2012, Brunelle & Kirby 2016).
- Main claim from these authors is that tone and phonation are codependent. This is often referred to as a register system.
  - Meaning that we only observe certain tones with certain phonations.
  - Mandarin Tone 3 is always associated with creaky voice (Duanmu 2007).
- This claim has also been made in the reverse that certain phonation types are associated with specific tonal patterns.
  - Breathy voice stereotypically appears with high pitch and creaky voice sterotypically appears with low pitch (Esling et al. 2019).
    * TODO: Look for earlier references to these claims.

  - This is often born out with research into register systems.
  - Also found in pathological voice quality (Klatt & Klatt 1990, Titze 2000, Esling et al. 2019).

- Research into Mesoamerican languages, however, shows that these claims are too strong or exaggerated (Suárez 1983, Campbell, Kaufman & Smith-Stark 1986, Silverman 1997, DiCanio 2008, Esposito 2010, Campbell 2017a,b).

- Most languages of the Oto-Manguean language family exhibits independent tone and phonation.

  - Tone and phonation freely co-occur or exhibit a much freer distribution than what is found in register languages.
  - San Lucas Quiaviní Zapotec is one such example.

Table 1: SLQZ tone and phonation

	High	Low	Falling	Rising
Modal	✓	✓	✓	✓
Breathy	X	✓	✓	X
Creaky	✓	✓	✓	X
Interrupted	✓	✓	✓	X

- This paper adds to this debate by:

- Silverman (1997)

2 Santiago Laxopa Zapotec

- Spoken by approxiametly 1000 speakers in the municipality of Santiago Laxopa, Ixtlan, Oaxaca, Mexico (Adler & Morimoto 2016, Adler et al. 2018, Foley, Kalivoda & Toosarvandani 2018, Foley & Toosarvandani 2020).

- Member of the Northern Zapotec branch of the Oto-Manguean language family.

- Data for SLZ was collected from two native language speakers of SLZ, who live in Santa Cruz, CA.

  - Based on data from approximately 200 nouns
  - Collected between Spring 2020 and Fall 2022

Table 2: SLZ tones

High	a^{1}	*xha*	[z̨a^{1}]	'clothing.POSS'
Mid	a^{2}	*lhill*	[ɾiʒ^{2}]	'house.POSS'
Low	a^{3}	*yu'*	[çuˀ^{3}]	'earth'
Rising	a^{21}	*yu'u*	[juˀu^{21}]	'quicklime (Sp. cal)'
Falling	a^{13}	*yu'u*	[juˀu^{13}]	'house'

2.1 Tone in SLZ

- SLZ has five surface tones as represented in Table 2.

- Following discussion from [Brinkerhoff, Duff, & Wax Cavallaro (2022)], these tones are limited in their appearance.

- It is true that all five patterns can surface on a syllable but there is a restriction in what tonal patterns are allowed to surface on words that are larger than bimoraic.

- The patterns that we observe on bimoraic nominals are:
  - HL
  - MH
  - LL

- This has the appearance of being a prototypical "word tone" language following Pike's (1948) categorization.

- However, recent work from Shih & Inkelas (2019) and McPherson (In press) has argued that the "word tone" description is epiphenomenal and can be derived via surface constraints on tone.

- What is important to take away from this is that there are still five distinct tonal patterns that are productive in the speakers.

2.2 Phonation in SLZ

- SLZ has four different contrastive phonation types on the vowels.

1. Modal: [a] <*a*>
2. Breathy: [a̤] <*ah*>
3. Checked: [aˀ] <*a'*>
4. Laryngealized: [aˀa] <*a'a*>

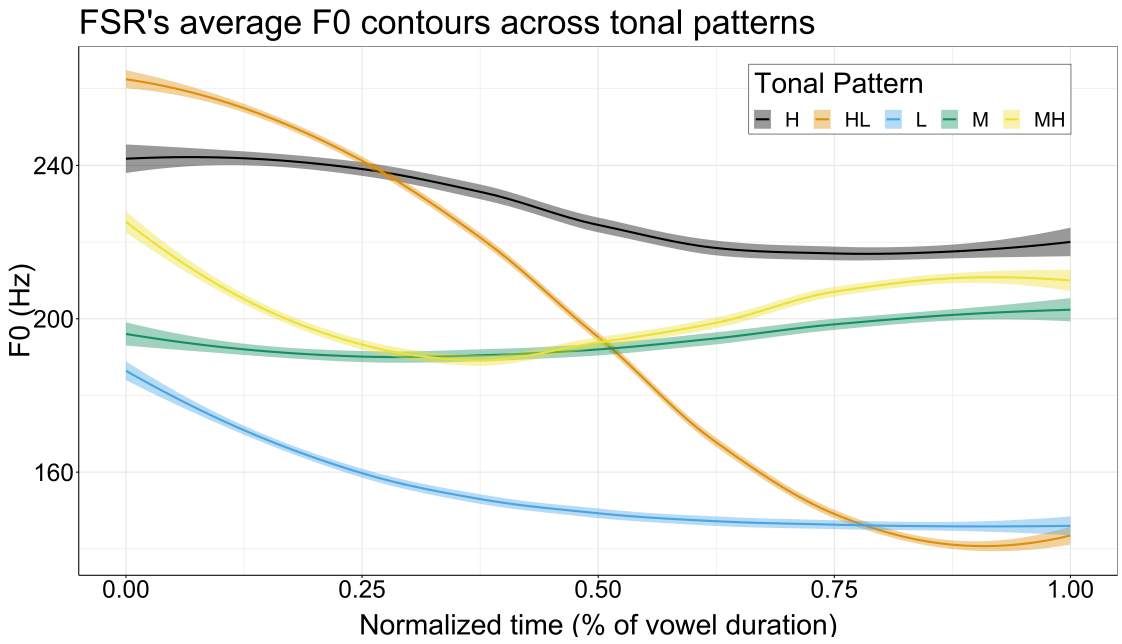

Figure 1: Tonal contrasts for FSR averaged and time normalized.

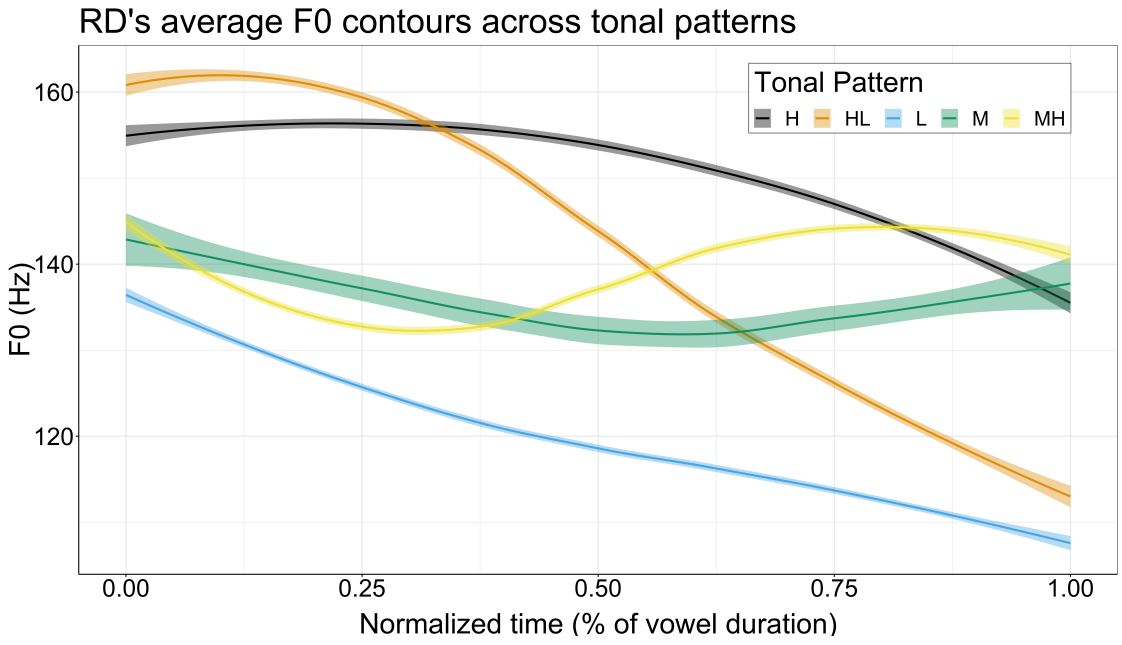

Figure 2: Tonal contrasts for RD averaged and time normalized.

- Even though all of these contrastive phonation involve varying degrees of laryngealization, different configurations of the larynx, I choice to use the term laryngealized to refer to one of the phonation contrasts following the arguments from Avelino (2010).
  - Laryngealized vowels do not have one consistent production of

3 Interaction of Tone and Phonation

- Table 3 shows the observed patterns between tone and phonation in SLZ.

Table 3: Distribution of tone and voice quality in SLZ on a syllable

	Modal	**Breathy**	**Checked**	**Laryngealized**
H	✓	–	✓	✓
M	✓	✓	✓	✓
L	✓	✓	✓	✓
HL	✓	✓	✓	✓
MH	✓	✓	–	✓

- The striking observations that we find is that

4 Acoustic Measurements

- One way to investigate these interactions

5 Challenges to theories

6 Conclusion

7 Other discussion points

7.1 Esposito 2010

7.2 Jaye Meeting

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