Tone and phonation in Santiago Laxopa Zapotec

Introduction: Most descriptions about the interaction between tone and phonation are based on SE and E Asian languages (Masica 1976, Thurgood 2002, Yip 2002, Enfield 2005, Michaud 2012, Brunelle & Kirby 2016). These descriptions have lead to widespread claims about what is possible in languages with tone and phonation, specifically that tone and phonation are dependent. This means that certain tones will bear specific phonations or that certain phonation types only appear with certain tones. For example, Mandarin's tone 3 is associated with creaky voice (Duanmu 2007) and Vietnamese's low falling tone is associated with breathy voice (Thurgood 2002). This, however, is not the true for Oto-Manguean languages where tone and phonation are independent from one another (Silverman 1997).

This paper investigates the interaction of tone and phonation in Santiago Laxopa Zapotec (SLZ), an understudied Oto-Manguean language spoken by roughly 1000 people in the municipality of Santiago Laxopa in the Sierra Norte of Oaxaca, Mexico. SLZ, like other Oto-Manguean languages, contains a robust systems of both tone and phonation which are independent from each other (Silverman 1997). Much of the work into Oto-Manguean tone and phonation has been devoted to issues about timing of tone relative to phonation and the relative timing of phonation in the vowel (Silverman 1997, Blankenship 2002).

Description: SLZ has five surface tonal patterns on syllables: three level tones H(igh), M(id), L(ow) and two contour tones HL and MH. SLZ also has four phonation types: Modal, Breathy, Checked, and Laryngealized. These different tones and voice qualities are allowed to appear essentially independent from one other in the nominal domain, as seen in Table 1.

Table 1: Distribution of tone and voice quality in SLZ on a syllable

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

Methodology: Data was collected from two native SLZ language consultants living in Santa Cruz, CA in person, when conditions were safe, and via Zoom. Consultants were recorded repeating three times the phrase *shnia' WORD chone las.* 'I say WORD three times'. Vowels were extracted from the resulting audio files and processed using VoiceSauce (Shue, Keating & Vicenik 2009).

Upshot: This paper provides: (i) a description of the tone and phonation systems of SLZ and their interactions based on elicitation data of nominals; (ii) addresses questions relative to the timing of tone and phonation; and (iii) raises several hypothetical questions about the observed patterns of tone and phonation.

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