

# Interaction of tone and phonation in Santiago Laxopa Zapotec

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## 1 Introduction

## 2 Tone and Phonation

Tone, as a linguistic phenomenon, is very wide spread and is present in many of the world's languages (Yip 2002). Most of the tonal languages that have received the most attention are languages from Africa and Asia with languages of the America's receiving some attention (Pike 1948, Silverman 1997, Campbell 2017a,b). Because of the focus on mostly African and Asian tonal languages certain assumptions are commonly held about what is possible for tonal languages. One of the assumptions that is made is that tone and phonation are heavily dependent on each other (Andruski & Ratliff 2000, Yip 2002, Garellek et al. 2013, Brunelle & Kirby 2016, Wee 2019, Hyman & Leben 2020, Garellek & Esposito 2021). For example, Mandarin tone three, which is produced as a dipping tone in careful speech and a falling tone in rapid speech, has creakiness throughout the vowel. This creakiness is often the sole clue to differentiate it from a normal falling tone (Duanmu 2007, Kuang 2017).

Oto-Manguean languages from Mexico clearly show that the behavior between tone and phonation in Asia is not the only way in which tone and phonation can interact. In fact, Oto-Manguean languages have what Silverman (1997) calls "laryngeally complex" vowels. These laryngeally complex vowels are ones where tone and phonation are entirely independent from one another. This means that any tone can co-occur with any phonation type. Some work has been done that adequately shows this such as Avelino Becerra (2004), Chávez-Peón (2010), DiCanio (2012), and Uchihara (2016). One of the more detailed of these studies is Chávez-Peón (2010) who investigates the phonetic cues to tone, stress, and phonation in San Lucas Quiaviní Zapotec (SLQZ) a Valley Zapotec variety. Chávez-Peón shows how tone and phonation are mostly independent from each other with a notable exception being the restriction of Rising tone in SLQZ which can only appear with modal phonation. The distribution of tone and phonation type is presented in Table 1.

My qualifying paper will add to this lesser studied area of phonetics and phonology by investigating the interaction of tone and phonation in Santiago Laxopa Zapotec.

Table 1: SLQZ tone and phonation

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

### 3 Overview of Santiago Laxopa Zapotec

Santiago Laxopa Zapotec (SLZ) is a variety of Sierra Norte Zapotec, a member of the Oto-Manguean language family, and spoken by approximately 800 to 1200 people in the municipality of Santiago Laxopa, Oaxaca, Mexico (Adler et al. 2018, Sichel & Toosarvandani 2020). Similar to other Oto-Manguean languages, SLZ exhibits Silverman’s (1997) “laryngeally complex vowels”.

### 4 Methods and materials

### 5 Laryngeal Articulator Model

### 6 Conclusion

## References

- Adler, Jeff, Steven Foley, Jed Pizarro-Guevara, Kelsey Sasaki & Maziar Toosarvandani. 2018. The derivation of verb initiality in Santiago Laxopa Zapotec. In Jason Merchant, Line Mikkelsen, Deniz Rudin & Kelsey Sasaki (eds.), *A reasonable way to proceed: Essays in honor of Jim McCloskey*, 31–49. Santa Cruz, Berkeley, Chicago: University of California.
- Andruski, Jean E. & Martha Ratliff. 2000. Phonation types in production of phonological tone: the case of Green Mong. *Journal of the International Phonetic Association* 30(1-2). 37–61. <https://doi.org/10.1017/S0025100300006654>.
- Avelino Becerra, Heriberto. 2004. *Topics in Yalálag Zapotec, with particular reference to its phonetic structures*. Los Angeles, CA: University of California, Los Angeles dissertation. 315 pp.
- Brunelle, Marc & James Kirby. 2016. Tone and Phonation in Southeast Asian Languages. *Language and Linguistics Compass* 10(4). 191–207. <https://doi.org/10.1111/lnc3.12182>.
- Campbell, Eric W. 2017a. Otomanguean historical linguistics: Exploring the subgroups. *Language and Linguistics Compass* 11(7). e12244. <https://doi.org/10.1111/lnc3.12244>.

- Campbell, Eric W. 2017b. Otomanguean historical linguistics: Past, present, and prospects for the future. *Language and Linguistics Compass* 11(4). e12240. <https://doi.org/10.1111/lnc3.12240>.
- Chávez-Peón, Mario E. 2010. *The interaction of metrical structure, tone, and phonation types in Quiavini Zapotec*. University of British Columbia dissertation. <https://doi.org/10.14288/1.0071253>.
- DiCanio, Christian T. 2012. Coarticulation between tone and glottal consonants in Itunyoso Trique. *Journal of Phonetics* 40(1). 162–176. <https://doi.org/10.1016/j.wocn.2011.10.006>.
- Duanmu, San. 2007. *The phonology of standard Chinese*. 2nd ed (Oxford Linguistics). Oxford ; New York: Oxford University Press. 361 pp.
- Garellek, Marc & Christina M. Esposito. 2021. Phonetics of White Hmong vowel and tonal contrasts. *Journal of the International Phonetic Association*. 1–20. <https://doi.org/10.1017/S0025100321000104>.
- Garellek, Marc, Patricia Keating, Christina M. Esposito & Jody Kreiman. 2013. Voice quality and tone identification in White Hmong. *The Journal of the Acoustical Society of America* 133(2). 1078–1089. <https://doi.org/10.1121/1.4773259>.
- Hyman, Larry M. & William R. Leben. 2020. Tone Systems. In Carlos Gussenhoven & Aojun Chen (eds.), *The Oxford Handbook of Language Prosody*, 44–65. Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780198832232.013.6>.
- Kuang, Jianjing. 2017. Covariation between voice quality and pitch: Revisiting the case of Mandarin creaky voice. *The Journal of the Acoustical Society of America* 142(3). 1693–1706. <https://doi.org/10.1121/1.5003649>.
- Pike, Kenneth L. 1948. *Tone Languages: A Technique for Determining the Number and Type of Pitch Contrasts in a Language, with Studies in Tonemic Substitution and Fusion*. Ann Arbor, MI: University of Michigan Press.
- Sichel, Ivy & Maziar Toosarvandani. 2020. Pronouns and Attraction in Sierra Zapotec. In Andrew Hedding & Morwenna Hoeks (eds.), *Syntax and semantics at Santa Cruz, Volume IV* (Syntax & Semantics at Santa Cruz (SASC) 4). Santa Cruz, CA: Linguistics Research Center.
- Silverman, Daniel. 1997. Laryngeal complexity in Otomanguean vowels. *Phonology* 14(2). 235–261. <https://doi.org/10.1017/S0952675797003412>.
- Uchihara, Hiroto. 2016. Tone and registrogenesis in Quiavini Zapotec. *Diachronica* 33(2). 220–254. <https://doi.org/10.1075/dia.33.2.03uch>.
- Wee, Lian-Hee. 2019. *Phonological Tone*. 1st edn. Cambridge University Press. <https://doi.org/10.1017/9781316410912>.

Yip, Moira Jean Winsland. 2002. *Tone* (Cambridge Textbooks in Linguistics). Cambridge ; New York: Cambridge University Press. 341 pp.