Dissertation Prospectus

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1 Introduction

This dissertation will address how phonology and phonetics account for differences in voice quality. Primarily this will discussed with respect to the Santiago Laxopa Zapotec (SLZ), an Oto-Manguean language spoken by about 1000 speakers in the municipality of Santiago Laxopa, Ixtlán, Oaxaca, Mexico (Adler & Morimoto 2016, Adler et al. 2018, Brinkerhoff, Duff & Wax Cavallaro 2021, Foley, Kalivoda & Toosarvandani 2018, *Santiago Laxopa* 2022, Sichel & Toosarvandani 2020, Silva-Robles et al. 2022).

There are several questions that this dissertation will seek to address the first has to do with the phonetic realization of the four-way voice quality distinction found in SLZ's vocal inventory (Adler & Morimoto 2016). These four voice qualities are: breathy, checked, modal and rearticulated. Preliminary investigations into these voice qualities by myself and Adler & Morimoto (2016) has revealed some information about these vowels. Breathy vowels are realized with breathy phonation during any point of the vowel. Checked and rearticulated are both realized with creaky phonation but in different locations within the vowel (i.e., checked vowels have creakiness at the end while rearticulated vowels have creakiness in the middle). Modal vowels do not exhibit any atypical phonation.

These preliminary studies also set out to show how these voice quality distinctions could be captured using well established spectral measures. Most notably spectral-tilt (Fischer-Jørgensen 1968). Adler & Morimoto (2016) showed that the four voice quality distinctions could be accounted for using spectral-tilt in their two subjects by the means of H1-A1 and H1-A3. However, recent work I have conducted on ten speakers of SLZ shows that spectral-tilt is not a very good measure for capturing the phonation contrasts. In fact none of the spectral-tilt measures were able to capture all of the differences. Instead I found that Strength of Excitation (Murty & Yegnanarayana 2008, Mittal, Yegnanarayana & Bhaskararao 2014) was a better measure for capturing the voice quality contrasts in SLZ. This is in line with more recent work by Chai & Garellek (2022) where they show and discuss how traditional spectral-tilt measures are not as robust as previously thought. These problems with traditional spectral-tilt measures lead them to create a new spectral-tilt measure Residual H1 which performs better in many regards than other measures. This dissertation will seek to explain why spectral-tilt measures fail to capture the contrasts in SLZ and the role that Strength of Excitation and other acoustic measures play in establishing and describing contrasts.

All of this phonetic knowledge plays a critical role in describing how a phonologically distinct

vowels are produced. However, another question is whether this phonetic knowledge has any bearing on phonological theories concerning voice quality. For example, does one phonological theory of voice quality better represent the Zapotec data than others?

Additionally, the data and the nature of the contrast has some bearing on the question of underlying representations in phonology. In particular, how are these different voice quality qualities best represented in the mental lexicon of speakers? This is especially important when there are multiple phonation types that rely on the same type of physical realization but realize it in different portions of the vowel (e.g., checked vs. rearticulated). The data from SLZ suggests that this is an important aspect of the language. If it is believed that phonological representations correspond to phonetic realizations then these phonetic differences need to be represented in those phonological representations. Arellanes Arellanes (2009) presents one solution for the Central Valley Zapotec language of San Pablo Güilá were these checked and rearticulated vowels are associated with strong or weak glottal stops. Another solution that might bear fruit is in the work from Q-theory's *Q* segments which are further subdivided into three smaller *q* ssegments (Shih & Inkelas 2019) which can be treated as a formalization of Articulatory Phonology's onset, target, and offset gestures (Browman & Goldstein 1988, 1989, 1992). It is also possible that a new theory of segmental representations needs to be created in order to capture what is occurring in the SLZ and the other Zapotecan languages where these voice quality distinctions are widespread (**garciaPhonationTypesTones2018**).

2 Outline and structure of dissertation

3 Timeline for dissertation

References

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Table 1: Dissertation timeline with milestone and dates

Milestone	Date
Prospectus Completed	September 2023
Apply for funding	Fall quarter 2023
IRB application	Fall quarter 2023
Design perception experiment	Fall 2023
Create Stimuli for experiment	Winter 2024
Pilot the study	Winter/Spring 2024
Travel to Santiago Laxopa	Summer 2024
Process data	Summer 2024
First draft completed	December 2024
Complete defense draft	January 2025
Defend Dissertation	March 2025
Revisions completed	May 2025
Submit Dissertation	May 2025

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