# Week 5: Natural Classes and Rules

## 1  Santiago Laxopa Zapotec

Santiago Laxopa Zapotec (SLZ; *Dille'xhunh Laxup* [diʒẽʔʐun lːaʂːupʰ]) is a variety of Zapotec spoken by about 1000 people in the town of Santiago Laxopa, Oaxaca, Mexico. It is a member of the Zapotecan language family, which is part of the larger Oto-Manguean language family.

Table 1: Consonant inventory for Santiago Laxopa Zapotec

|  | bilabial | alveolar | post-alveolar | retroflex | palatal | velar | labio-velar | uvular |
|---|---|---|---|---|---|---|---|---|
| stop | pː b | tː d |  |  |  | kː g | kʷː gʷ |  |
| fricative |  | sː z | ʃː ʒ | ʂː ʐ | çː |  |  | ʁ |
| affricate |  | t͡sː d͡z |  | t͡ʃː |  |  |  |  |
| nasal | mː | nː n |  |  |  |  |  |  |
| lateral |  | lː l |  |  |  |  |  |  |
| trill |  | rː |  |  |  |  |  |  |
| approximate |  |  |  |  |  |  | wː |  |

SLZ has a four phonemic vowels, which are shown in Table 2.[1]

Table 2: Vowel qualities in Santiago Laxopa Zapotec.

|  | front | central | back |
|---|---|---|---|
| high | i |  | u |
| mid | e |  |  |
| low |  | a |  |

In addition to these vowel qualities, Santiago Laxopa Zapotec has three phonemic phonations: breathy voice (e.g., /a̤/ ), creaky voice (e.g., /a̰/), modal voice (e.g., /a/).[2]

SLZ also has a number of phonemic tones that are realized as differences in pitch. There are a total of five tones: High (˥), Mid (˧), Low (˩), Rising (˩˥), Falling (˥˩), which won't be discussed in this handout.

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[1]The high back vowel /u/ is realized as [o] in some contexts, but this is not phonemic and is restricted to certain lexical items. Additionally, older speakers tend to realize /u/ as [o] in all contexts, while younger speakers have a more stable realization of /u/ as [u] save for a few lexical items like *me'edo'* [mːḛdo̰ʔ] 'baby'.

[2]There is a fourth phonation type called checked voice, which is a complex segment consisting of a vowel and glottal stop (e.g., /a͡ʔ/), but we will not worry about them in this handout.

## 2   Natural Classes

Some natural classes (for this language) are listed below. For each natural class, Provide the features that define the class. Remember to use the least number of features possible.

1. [pː, tː, kː, kʷː, sː, ʃː, ʂː, çː, ts͡ː, tʃ͡ː]

2. [mː, nː, lː, rː, wː]

3. [b, d, g, gʷ, z, ʒ, ʐ, dz͡, ʁ, n, l]

4. [i, e, i̤, e̤, ḭ, ḛ, ĩʔ, ẽʔ]

## 3   Listing Segments

List all the segments that belong to the following natural classes.

1. [+labial]

2. [+long, +sonorant]

3. [+continuant, -long]

4. [+high, -constructed glottis, -spread glottis]

5. [-high, -low, -constructed glottis, +spread glottis]

6. [+constricted glottis]

7. [+spread glottis]

## 4   Rules

Write rules to capture the following generalizations. Use as few features as possible to pick out all and only the relevant inputs, outputs, and environments.

1. Sonorants that follow a breathy vowel devoice

2. Long obstruents become short and aspirated word finally

3. Short stops become fricatives word finally

4. Long sonorants become voiceless when they are word initial and followed by a consonant

2