The Contrast System in Tohono O’odham Stops

Cynthia Kilpatrick, Colleen Fitzgerald, Namrata Dubey
The University of Texas at Arlington

1. Tohono O’odham and stop contrast

- Tohono O’odham (also called Papago) is an Uto-Aztecan language spoken in Southern Arizona and Sonora, Mexico.
- Early descriptions (cf. Mason 1950) characterize the stop system as having no voicing contrast.
- Writing by some native speakers (taught by outsiders) reflects no laryngeal contrast.
- Later researchers (Alvarez and Hale 1970, Hale 1959, Saxton 1963, Saxton et al. 1989) describe a system with a voicing or fortis/lenis contrast, and note the presence of preaspiration before the so-called ‘voiceless’ series.
- Fitzgerald (1996) characterizes the system as one with a phonological voicing contrast, with the relevant phonetic detail of preaspiration.

2. Preaspiration

- Preaspiration occurs rarely in the world’s languages (Silverman 2003)
- Scottish Gaelic (Shuken 1979)
- Lule Sami (Engstrom 1987)
- Icelandic (Thrannson 1978)
- Scottish English (Gordeeva and Scobbie 2007)
- Influences on duration of preaspiration:
  - Place of articulation and position of the consonant
  - Early descriptions of the consonant (Ni Chasaide & O’Dochartaigh 1984)
  - In O’odham, length of preceding vowel also appears to play a role (Fitzgerald 1996)

3. The questions

- Is contrast in the stop system of Tohono O’odham represented by the presence of preaspiration before the ‘voiceless’ stops?
- Is there a significant difference between duration of preaspiration in ‘voiced’ and ‘voiceless’ stops?
- What other factors affect the duration of preaspiration in O’odham?
  - Duration or quality of the preceding vowel?
  - Function or content words?

4. The data under analysis

- Recently digitized legacy recordings transcribed by Madeleine Mathiot
- Recorded in the late 1950s, so fewer language contact effects
- Extraordinarily clear recordings in a naturalistic context - telling stories
- Substantial corpus of 3 stories = 50+ minutes
  - Coyote and Skunk
  - Coyote and Turkey
  - Coyote and Quail
- All recordings by a single speaker: Jose Pancho
- Acknowledged master of the verbal arts who worked with linguists and anthropologists starting in the 1950s and into the 70’s
- For the current work, we examine the following tokens:
  - 240 ‘voiced’ stops
  - 380 ‘voiceless’ stops

5. Measuring preaspiration

- For the so-called ‘voiceless’ series, preaspiration was measured from offset of preceding vowel to closure of the following consonant:
  - If preaspiration is a cue to voicelessness, there should be little or no preaspiration in ‘voiced’ stops:

6. Results

- **Voicing**: duration of preaspiration for ‘voiceless’/stops (mean = 89ms) was significantly longer than for ‘voiced’ stops (rarely present)
- **Vowel length**: positive correlation between length of preceding vowel and length of preaspiration; duration of preaspiration increased as vowel length increased
- **Function vs. Content words**: Significant difference between the duration of preaspiration in function words and content words; content (mean = 126.8ms) had significantly longer duration than function words (mean = 39.5ms)

7. Conclusions and further questions

- Preaspiration provides a reliable cue for voicelessness in O’odham
  - Longer vowel length results in longer preaspiration
  - Duration of preaspiration is longer in content words than in function words
  - Place of articulation of consonant affects the duration of preaspiration, but this is in need of further study
  - Including function words, *
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- Other questions also remain:
  - Are there other environmental effects on preaspiration?
  - How does preaspiration interact with phonological processes such as gemination and devoicing?

References


Contact: kilpatrick@uta.edu