A phonetic description of Chemehuevi

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Introduction

• Chemehuevi is a southern Numic language of the Shoshonean branch of Uto-Aztecan.
• Spoken in:
  – Western Arizona at the Colorado River Indian Tribes Reservation
  – Eastern California at the Chemehuevi Valley Indian Reservation
• Approximately 5 speakers of the Chemehuevi, all over the age of 50.
• Children are no longer learning Chemehuevi as a first language.
Introduction

Previous Work:

  – A 20 page SPE-style analysis of the sound system
• Major (2005) Chemehuevi Phonology
  – A general description of phonology (phonemes) of Chemehuevi, based on his 1969 field work
• Sapir (1930a, b; 1931) worked on Southern Paiute, which he claims is closely related
  – Detailed description of the sounds as he perceived them
• Little phonetic data/description of other Uto-Aztecan languages.
Issues in the literature

• How are final stops realized?
• What is the relation between alveolar fricatives and affricates?
• How are vowels distributed across speakers?
• Are there word-final voiceless vowels?
• Does Chemehuevi have an /e/ phoneme?
Recordings

Digitized Recordings
• Roy Major (1969)
  – Two speakers (BW,female; PE,female)
• Guy Tyler (1972)
  – One speaker (BW,female)
• Margaret Press (1973-74)
  – One speaker (MHM,female)

• Quality varies on the above recordings, for example:
  – Frequency range of one recording missing lower and higher frequencies
  – Crickets in the background
Sample recording: BW

/n i n i p uu s i…/ ‘my cat’
Crickets in the background: MHM

Cricket chirps

Machinery
Recordings

Digitized and Digital Recordings
  – One speaker (JHJ,male)

Summary
  – 5 different recordings of 4 different speakers
  – One of the four speakers still alive
# Sound inventory: Consonants

<table>
<thead>
<tr>
<th></th>
<th>Bilabial</th>
<th>Alveolar</th>
<th>Velar</th>
<th>Labialized Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plosive</td>
<td>p</td>
<td>t</td>
<td>k</td>
<td>$k^w$</td>
<td>?</td>
</tr>
<tr>
<td>Fricative</td>
<td>$\beta$ /$\gamma$</td>
<td>s</td>
<td>$\gamma$</td>
<td>$\gamma^w$</td>
<td>h</td>
</tr>
<tr>
<td>Affricate</td>
<td></td>
<td>ts</td>
<td>tʃ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td>n</td>
<td>η</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flap</td>
<td></td>
<td>r</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximant</td>
<td>w</td>
<td>j</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Word final stops

- Word final stops may occur aspirated word finally.
- Vowel elision (Sapir 1930a) may contribute to aspiration
/s/ vs./ʃ/ and /ts/ vs. /tʃ/

- Speakers vary in use of alveolar fricatives and affricates
  - MHM /s/ and /ts/
  - JHJ /s/ and /tʃ/
  - BW /s/ and /ts/
- /s/ and /ʃ/ are also reported to
- May be dialectal variation

JHJ /aɪp̟tʃi/ ‘little boy’

MHM /aɪp̟tsɪ/ ‘little boy’

4389 Hz

5176 Hz
Sound Inventory: Vowels

Chemehuevi also has a vowel length distinction.
Vowel Measurements

• Measured stressed vowels
  – Second syllable in polysyllabic words (Major, 2005)
  – First syllable in bisyllabic words with vowel elision (monosyllabic)

• Measured duration, intensity of vowel, intensity of preceding vowel, and frequency of first three formants.
Vowels: Stress

- As a check for stress the intensity of the stressed vowel and the intensity of the preceding vowel were measured (in intensity units).

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Stressed vowel</th>
<th>Preceding vowel</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHM</td>
<td>72.63</td>
<td>67.73</td>
<td>3.9</td>
</tr>
<tr>
<td>JHJ</td>
<td>81.40</td>
<td>79.13</td>
<td>2.27</td>
</tr>
<tr>
<td>BW</td>
<td>72.32</td>
<td>69.48</td>
<td>2.84</td>
</tr>
</tbody>
</table>

- Supports previous claims of stress.

- F1 and F2 were also measured for each speaker.
Vowel Chart 1: MHM
Vowel Chart: JHJ

The diagram illustrates the distribution of vowel sounds across different frequency levels. The x-axis represents F1 (Hz), while the y-axis represents F2 (Hz). Different vowels are represented by distinct symbols and colors, as indicated in the key on the right.
Vowel Chart: BW

![Graph showing vowel chart with F1 and F2 axes. The chart includes symbols for different vowels: a, i, o, ü, u. The vowels are plotted in different regions corresponding to their F1 and F2 values. The chart is labeled with axes and value ranges: F1 from 0 to 1200, and F2 from 0 to 3000.](image-url)
Word final voiceless vowel

- Sapir (1930a) claimed that Southern Paiute has vowel elision.

Chemehuevi has word final voiceless vowels and vowel deletion
F2 and /ɪ/

F2 in Chemehuevi /ɪ/ is strangely weak compared to the other formants for MHM and JHJ.

[Audio of /karɪtɪɡa/ ‘chair’]

Peak F3 is slightly higher in this example than peak F2.
Phoneme /e/?

- Major (2005) claimed that in his data the phoneme /e/ occurred.
- Press (1975, 1979) and (Laird 1976, 1984) do not indicate such a phoneme in their work on Chemehuevi.
- An analysis of BW a speaker recorded by Major (1969) shows that the examples of the phoneme /e/ indicated by Major (2005) fall well into BW’s /i/ phoneme.
- To an American English speaker the phonemes may sound like an /e/, based on this phonetic analysis they are indeed /i/.
Vowel Chart: BW
Similarities to related languages

• Voiceless vowels and vowel elision:
  – Chemehuevi
  – Southern Ute (Oberly, p.c.)
  – Southern Paiute (Sapir, 1930a)
  – Tohono O’odham

• Other possibilities?

• Very little existing phonetic analysis of Uto-Aztecan languages to support many typological claims.
Phonetic Documentation

• Phonetics of Uto-Aztecan languages
• Why phonetics?
  – Physical description, not impressionistic
  – Interesting phonetic phenomena in Uto-Aztecan language
    • Lack of F2 in /ɨ/
    • Voiceless vowels
• Documenting Language
  – Grammar without phonetics?
  – Phonetic documentation for community use