Do Spaniards speak faster than Mexicans? Studying Spanish Rhythm in natural speech

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Background
• Speakers do not produce speech with similar temporal patterns → Different articulation rates (AR)
• Factors affecting AR:
  – Dialectal variations in English [1], French [2], Dutch [3], etc.
  – Speaking style and gender [4]
• Relation between speech rates and vowel space:
  – Faster speak rates → shorter durations → reduction of vowel space [5]
  – Stressed vs unstressed vowels → vowel reduction

Goals
• Compare different temporal patterns of two varieties of Spanish: Castilian Spanish (Madrid) vs Mexican Spanish (Mexico City)
  – Does AR differ across these two varieties?
  – Does AR affect the compression of vowel space similarly?
  – Do these varieties display similar rhythmic patterns?

Corpus
✓ 22 speakers (university students) 10 from Madrid (CAS) and 12 from Mexico City (MEX)
✓ 5.7 hours of speech
✓ Gender-balanced
✓ Read (short stories) vs spontaneous speech (interview, narration & description of a painting)

Segmentation and Annotations
✓ Phones, syllables and words
✓ Pauses, disfluencies, hesitations, filled pauses, lengthened words

Methods & Metrics

<table>
<thead>
<tr>
<th>Articulation Rate</th>
<th>AR</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS</td>
<td>7.3</td>
<td>1.41</td>
</tr>
<tr>
<td>MEX</td>
<td>6.6</td>
<td>1.37</td>
</tr>
</tbody>
</table>
• CAS speakers produce almost one syllable more than MEX
• Speakers articulate faster in reading tasks than in spontaneous speech
• Interaction of task*gender between the two groups

Vowel space
• Extraction of F1 & F2 at the mid-point of each vowel
• Degree of dispersion: sum of Euclidean distances from the gravity center to each vowel per speaker

Rhythm measures
• ΔC, ΔV & PVI (Pairwise Variability Index)

Results, Analysis and Discussion

Articulation Rate & Vowel space
• Faster speech rates → compression of vowel space
• For short vowels, CAS speakers do not compress their vowel space as much as MEX speakers

Rhythm patterns
• Durational differences between stressed vs unstressed vowels are greater in MEX (15%) than in CAS (7%) (p < .003)

Mexican Spanish seems to be less syllable-timed than Castilian Spanish

CAS articulate faster and centralize less than MEX

References