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

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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 \( \rightarrow \) 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 \( \rightarrow \) shorter durations \( \rightarrow \) reduction of vowel space [5]
  - Stressed vs unstressed vowels \( \rightarrow \) 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)

Methods & Metrics

Segmentation and Annotations
- Phones, syllables and words
- Pauses, disfluences, hesitations, filled pauses, lengthened words

Articulation Rate
- 4,618 Inter-Pausal Units (IPUs)
- Excluded IPUs containing < 3 syll. / hesitations/lengthened words

Rhythm measures
- \( \Delta C, \Delta V \) & PVI (Pairwise Variability Index)

Results, Analysis and Discussion

<table>
<thead>
<tr>
<th>AR</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS</td>
<td>7.3</td>
</tr>
<tr>
<td>MEX</td>
<td>6.6</td>
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</tbody>
</table>

- CAS speakers produce almost one syllable more than MEX
- CAS articulate faster and centralize less 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 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

References