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 → 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

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, disfluences, hesitations, filled pauses, lengthened words

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

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)

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?

Results, Analysis and Discussion

Articulation Rate

<table>
<thead>
<tr>
<th></th>
<th>AR</th>
<th>SD</th>
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<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

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)

Vowel space

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

Rhythm patterns

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- CAS articulate faster and centralize less than MEX

References