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

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To cite this version:


HAL Id: hal-01737829
https://hal.archives-ouvertes.fr/hal-01737829
Submitted on 19 Mar 2018

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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)

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
- \(\Delta C, \Delta V \& PV\) (Pairwise Variability Index)

Results, Analysis and Discussion

Articulation Rate

<table>
<thead>
<tr>
<th>Variant</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

Articulation Rate & Vowel space

- Faster speech rates \(\rightarrow\) compression of vowel space
- For short vowels, CAS speakers do not compress their vowel space as much as MEX speakers

Vowel space reduction in stressed vs unstressed vowels is greater for MEX than CAS \((p = .078)\)

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