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

Fabian Santiago, Paolo Mairano

To cite this version:


HAL Id: hal-01737829

https://hal.archives-ouvertes.fr/hal-01737829

Submitted on 19 Mar 2018

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
Do Spaniards speak faster than Mexicans?

Studying Spanish Rhythm in natural speech

Fabian Santiago & Paolo Mairano
fabian.santiago-vargas@univ-paris8.fr, P.Mairano@warwick.ac.uk

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 speech 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)
- 57 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)

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>
</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 ⇒ 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