Speech rate perception in Spanish L1 and L2: Effect of L1, perceived degree of regional accent and competence in L2

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Abstract
The present research examines the role of the following factors in the perception of speech rate in Spanish: the L1 (Spanish or French), the perceived degree of regional accent in Spanish and the competence in Spanish L2 (i.e. oral comprehension in L2). Results are the following: 1) The non-natives speakers of Spanish perceive the rate of speech as faster than natives. 2) The perceived degree of regional accent has no effect on the perception of speech rate in natives. 3) The oral comprehension in Spanish L2 plays a role in the perception of speech rate in non-natives: the worse the oral comprehension in L2, the faster the speech rate is perceived.

Reference

Available at:
http://archive-ouverte.unige.ch/unige:44959

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Effect of L1, perceived degree of regional accent and competence in L2

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Outline

- Introduction
  - Definition of perception of speech rate
  - Speech rate perception in L1 and L2

- Perception experiment
  - Effect of L1
  - Effect of perceived degree of regional accent in L1
  - Effect of the competences in L2

- Conclusion
Introduction
Speech rate perception

- Sensation of speed a listener gets from the rate of his interlocutor
Speech rate perception in L1

- Perceived degree of regional accent
  - Is the speech rate of an utterance perceived in a similar way whether the utterance is perceived as regionally marked or not?
Speech rate perception in L2

- Schwab & Grosjean (2004)

- Why does speech rate seem faster in a foreign language than in our mother tongue?

  ➔ Speech rate perception in French by Swiss German listeners
Speech rate perception in L2

- Schwab & Grosjean (2004)
  - Non-natives perceive speech rate as faster than natives.
  - The faster the physical speech rate, the larger the difference between natives and non-natives.
  - The worse the comprehension in L2, the faster speech rate is perceived (especially at normal and slow rates).
Objectives

- Examine the role of the following factors in the perception of speech rate in Spanish:
  - the L1 (Spanish/French),
  - the perceived degree of regional accent in Spanish L1
  - the competences in Spanish L2 (i.e. oral comprehension in L2)
Method
Participants

- 28 Spanish-speaking listeners from Spain ("SP")
- 40 French-speaking listeners from Switzerland and France ("FR")
Material

- Translation and adaptation in Spanish of PFC text (Durand et al., 2009)
- Recordings
  - 8 Spanish speakers from Barcelona (4 males and 4 females; mean age = 31.6, range = 19-55)
  - 8 Costa Rican speakers from San José (4 males and 4 females; mean age = 32; range = 20-52)
- Extraction of 3 utterances
  - 48 utterances (3 utterances x 16 speakers) produced at different speech rates
Material

- French experiment
  - 9 audio passages in Spanish (5 B1 and 4 B2)
  - Comprehension question (in French)

http://cvc.cervantes.es/ensenanza/dele/default.htm
Procedure

- Online testing with **Labguistic** (www.labguistic.com)
- Biographic and linguistic questionnaire
Procedure

- Spanish experiment
- Speech rate estimation
- Regional accent judgment
Procedure

- French experiment: Part 1
- Speech rate estimation
Procedure

- French experiment: Part 2
  - Comprehension questions

Où Marta doit-elle aller?
  - À la banque
  - Au bureau
  - À la pâtisserie
Data analysis

- Speech rate estimation: numeric values between 1 and 9
  ➔ Arcsine transformation: values between 0 and 1
- Spanish experiment:
  - Perceived degree of regional accent
  ➔ Arcsine transformation: values between 0 and 1
- French experiment:
  - Comprehension score
  ➔ Arcsine transformation: values between 0 and 1
Data analysis

3 analyses:

- Effect of L1: speech rate estimation in Spanish- and French-speaking listeners
- Spanish L1: effect of the perceived degree of regional accent
- Spanish L2: effect of the oral comprehension in Spanish

Mixed-effects regression model:

- Dependent variable: speech rate estimation
- Predictor: heard (i.e. produced) speech rate
Results and discussion
Results and discussion

- Effect of L1
- Effect of the perceived degree of regional accent in Spanish L1
- Effect of the oral comprehension in Spanish L2
Results and discussion

- **Effect of L1**
  - French and Spanish experiments
  - Dependent variable: speech rate estimation
  - Predictors:
    - Heard speech rate
    - L1
    - Interaction
Effect of L1

Speech rate estimation

 Heard speech rate (syll/min)

Speech rate estimation

FR
ES
Effect of L1

![Graph showing the effect of L1 on speech rate estimation. The x-axis represents the heard speech rate (syll/min), ranging from 250 to 500. The y-axis represents speech rate estimation, ranging from 0.0 to 1.0. Two lines are shown: one for FR (black) and one for ES (gray). The FR line is steeper than the ES line, indicating a stronger effect of L1 on speech rate estimation.]
Effect of L1

The faster the heard speech rate, the higher the rate estimation

F(1, 3060) = 160.77, p < .001
The FR (non-native) listeners perceive speech rate as being faster (0.52) than the SP (native) listeners (0.47)

F(1, 3060) = 16.81, p < .001
Effect of L1

Interaction Heard speech rate x L1
The difference between FR and SP listeners increases when the heard speech rate becomes faster

F(1, 3060) = 13.22, p < .001
Effect of L1

- Non-natives perceive speech rate as being faster than natives, especially when speech rate is fast.
Results and discussion

- **Effect of the perceived degree of regional accent in Spanish L1**
  - Spanish experiment
  - Dependent variable: speech rate estimation
  - Predictors:
    - Heard speech rate
    - Perceived degree of regional accent
    - Interaction
Effect of perceived degree of accent in L1

- Effect of the Heard speech rate
  \( F(1, 1276) = 158.97, p < .001 \)
  \( \rightarrow \) The faster the heard speech rate, the higher the rate estimation.
- No effect of the perceived degree of accent
- No interaction

\( \rightarrow \) The perceived degree of regional accent has no impact on the perception of speech rate in Spanish L1.
Results and discussion

- **Effect of the oral comprehension in Spanish L2**
  - French experiment
  - Dependent variable: speech rate estimation
  - Predictors:
    - Heard speech rate
    - Oral comprehension in Spanish
    - Interaction
Effect of oral comprehension in L2

- Effect of the Heard speech rate
  \((F(1, 1809) = 139.99, p < .001)\)
  ➔ The faster the heard speech rate, the higher the rate estimation.

- Effect of oral comprehension in Spanish
  \((F(1, 1809) = 4.9, p < .05)\)

- No interaction
Effect of oral comprehension in L2

Oral comprehension in Spanish

Speech rate estimation
The worse the oral comprehension in Spanish, the higher the rate estimation.

\[ F(1, 1809) = 4.9, p < .05 \]
Conclusion
Conclusion

- **Effect of L1**
  - Non-natives perceive speech rate as being faster than natives, especially when speech rate is fast.
  
  ➔ The different perception of speech rate in L1 and L2 is observed whether L1 and L2 are closely-related or not.
Conclusion

- No effect of the perceived degree of regional accent in L1

  ➞ The regional accent was ignored during the rate estimation.
Conclusion

- **Effect of oral comprehension in L2**
  - The worse the non-natives' comprehension in L2, the faster the speech rate is perceived.

  ➔ Weaker effect than in Schwab & Grosjean (2004)
  - Intercomprehension between Spanish and French
  - Comprehension measurements
Conclusion

The impression that the speech rate is faster in L2 than in L1 is confirmed
- Even in a closely-related language
- Especially at fast rates
- Especially with a not optimal oral comprehension in L2

- Same results in spontaneous speech?