Quiero comprar una guitara:
Lexical encoding of /r/ vs. /rr/ by L2 learners of Spanish

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Introduction

- Spanish has two rhotics that contrast only in intervocalic position: tap /r/ & trill /rr/ (IPA: /ɾ/ & /r/, respectively) (Hualde, 2005), e.g. *pero* ‘but’ vs. *perro* ‘dog’
- L1 American English speakers have difficulties with these sounds
  - In Rose (2010b), only 4 out of 21 learners differentiated the tap and trill environments natively in production
- Rose (2010a) however, found in an ABX task that discrimination of /r/-/rr/ was accurate across all learner levels (between 86.7% and 94.4%)
  - Listeners had more difficulty on /r/-/d/ (62.9%-82.5%)
- So the difficulty appears more articulatory than perceptual (Rose, 2010a; cf. Widdison; 1998; Hammond, 1999; Jimenez, 1987)
Introduction

• However, this lack of differentiation is apparent even when articulation doesn’t play a role:
  • Anecdotally, students make mistakes in orthography: e.g. *perro* for *pero*, *mirraba* for *miraba*, *caro* for *carro*
  • In Rose (2010b) 11 out of 21 learners did not differentiate the tap and trill environments in production at all
  • Could this apparent articulation difficulty also hide/reflect a difficulty in representing /r/ vs. /rr/ in mental representations of words?
L2 Lexical Encoding

• L2 learners have been shown to not accurately encode new contrasts in lexical representations (Pallier et al., 2001; Darcy et al, 2012; see talk later: Kojima & Darcy)

• If a lexical representation only encodes contrastive phonological information, then a new L2 distinction that is not recognized as a contrast by the learner’s phonology will be neutralized in lexical representations (Hayes-Harb & Masuda, 2008)

• Both /r/ and /rr/ are most often assimilated to English /r/ in cross-linguistic mapping data by naïve listeners (Rose, 2010a)
Research Question

• Is the /r/-/rr/ contrast in intervocalic position encoded in the lexical representations of L2 learners of Spanish?
Method

• We examined both perception/categorization and lexical encoding in the same learners

• Tasks:
  • Language Background Questionnaire
  • Lexical Decision
  • ABX
  • Word Familiarity Questionnaire
    • No learners had to be excluded based on low familiarity with the words in the experiment
Lexical Decision Task

• Participants had to decide whether the stimulus they heard was a real Spanish word or not

• Stimuli were created by exchanging trill /rr/ for tap /r/ or vice versa to create word-nonword (W-NW) pairs
  • Ex. guerra ‘war’, guera*; quiero ‘I want’, quiero*

• The same was done with /r/-/d/ and /rr/-/d/, as well as a control /p/-/f/ contrast

• In total, 10 W-NW pairs were created for each contrast, plus 24 W and 24 NW fillers

• 2 lists were created; each participant only heard either the word or the nonword of a W-NW pair = 128 stimuli + 10 practice

• Stimuli were recorded by 2 NSs of Spanish (1 male, 1 female)
ABX Task

• Participants heard 3 sentences in a row, each containing a nonword; they had to decide whether the last nonword was the same as the 1\textsuperscript{st} or the 2\textsuperscript{nd} nonword

\begin{align*}
\text{Le digo } \underline{\text{nera}} \text{ al profe} & \quad \text{Le digo } \underline{\text{nerra}} \text{ al profe} & \quad \text{Le digo } \underline{\text{nera}} \text{ al profe} \\
\text{A} & \quad \text{B} & \quad \text{X} \\
\text{NS female voice 1} & \quad \text{NS female voice 2} & \quad \text{NS male voice}
\end{align*}

• Test contrasts /r/-/rr/, /r/-/d/, /rr/-/d/; control contrast /p/-/f/:
5 NW pairs per contrast x 4 repetitions = 60 test trials & 20 control trials + 16 filler trials + 9 practice trials
Participants

• Intermediate speakers: enrolled in a 5th semester Spanish class
• Advanced speakers: mostly graduate students in Hispanic Linguistics or Literatures, some undergraduates in higher level classes
• Native Spanish speakers
ABX RESULTS
Overall Accuracy Data

Significant effect of condition for Intermediates only: Less accurate on Test

Effect of Group on the condition “Test”: $F(2, 84.8) = 22.6$, $p < .001$

→ Look at Test Condition in more detail
Main effect of “Group” (F(2,48) = 24.6, p < .001).

Mainly due to the Intermediates. Overall, the Advanced learners do not differ from the native speakers (p > .6)

Effect of “contrast” significant only for Intermediates and Advanced
Summary

• One contrast (/r-d/) is most difficult:
  • /r-d/ is the least accurate:
    Mean accuracy
    Intermediate: 64%
    Advanced: 82%
    Natives: 90%

• /r-rr/ is not too difficult to perceive:
  Mean accuracy
  Intermediate: 79%
  Advanced: 92%
  Natives: 93%

• /rr-d/ is least difficult:
  Mean accuracy
  Intermediate: 87%
  Advanced: 94%
  Natives: 96%

• There is no significant difference in accuracy between /r-rr/ and /rr-d/ but /r-d/ is significantly LESS accurate than both other contrasts
Summary

- Intermediates are less accurate on Test condition
- Native speakers show no significant difference in accuracy among the three contrasts
- Both Intermediates and Advanced are less accurate on /r-d/
- Overall, Advanced learners are not different from Native speakers
LEXICAL DECISION RESULTS
Lexical Decision Global Accuracy by contrast

ABX:
Accuracy for /r-rr/

<table>
<thead>
<tr>
<th>Overall Accuracy</th>
<th>/r/</th>
<th>/rr/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>.62</td>
<td>.42</td>
</tr>
<tr>
<td>Advanced</td>
<td>.56</td>
<td>.65</td>
</tr>
<tr>
<td>NS</td>
<td>.84</td>
<td>.85</td>
</tr>
</tbody>
</table>

Adv vs. Int: $p < .044$
Adv vs. NS: $p < .001$
Int vs. NS: $p < .001$
Discussion

• Is the /r/-/rr/ contrast in intervocalic position encoded in the lexical representations of L2 learners of Spanish?

• This contrast appears to be unstable, if encoded at all

• Could this apparent articulation difficulty also hide/reflect a difficulty in representing /r/ vs. /rr/ in mental representations of words?

• Yes, our data suggests that this difficulty originates in the way words are encoded
Implications

• Categorical discrimination ability does not directly relate to how these contrasts will be lexically encoded

• If learners can perceive a difference, even in a demanding ABX task, what prevents them from maintaining this distinction at the lexical level?
Thank you!

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References


