

Quierro comprar una guitarra:
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: /r/ & /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', *quierro**
- 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 1st or the 2nd nonword

Le digo nera al profe

A

NS female voice 1

Le digo nerra al profe

B

NS female voice 2

Le digo nera al profe

X

NS male voice

- 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

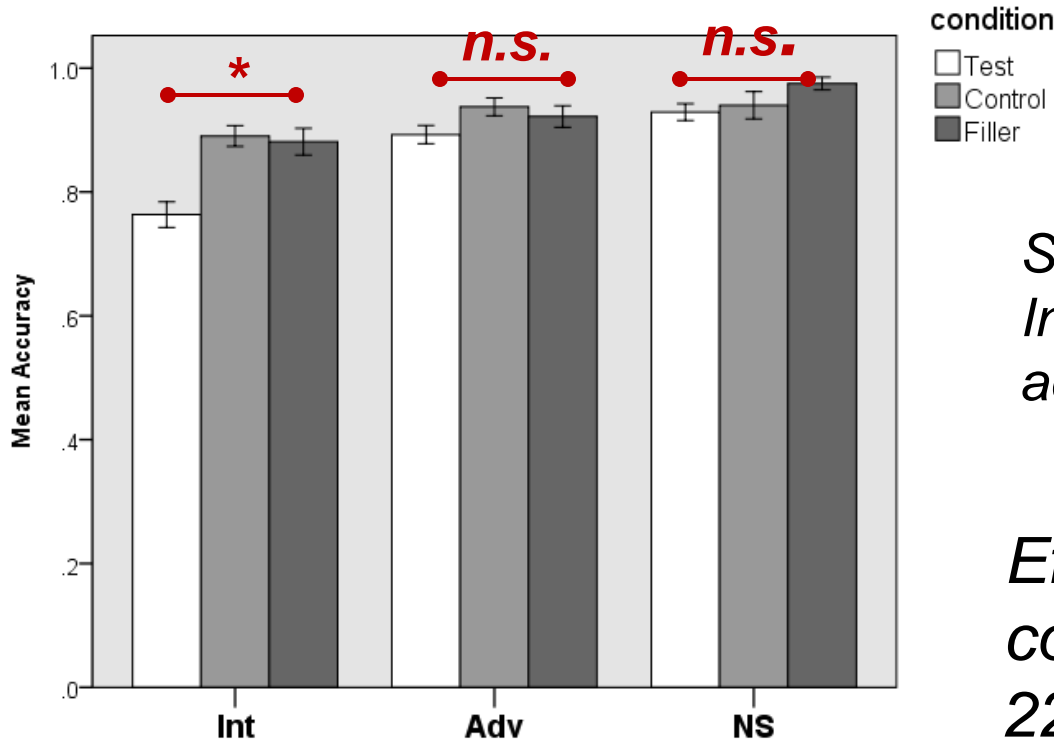
- Intermediate speakers: enrolled in a 5th semester Spanish class
- Advanced speakers: mostly graduate students in Hispanic Linguistics or Literatures, some undergraduates in higher level classes
- Native Spanish speakers



ABX RESULTS



Overall Accuracy Data



Int n=21
Adv n=20
NS n=10

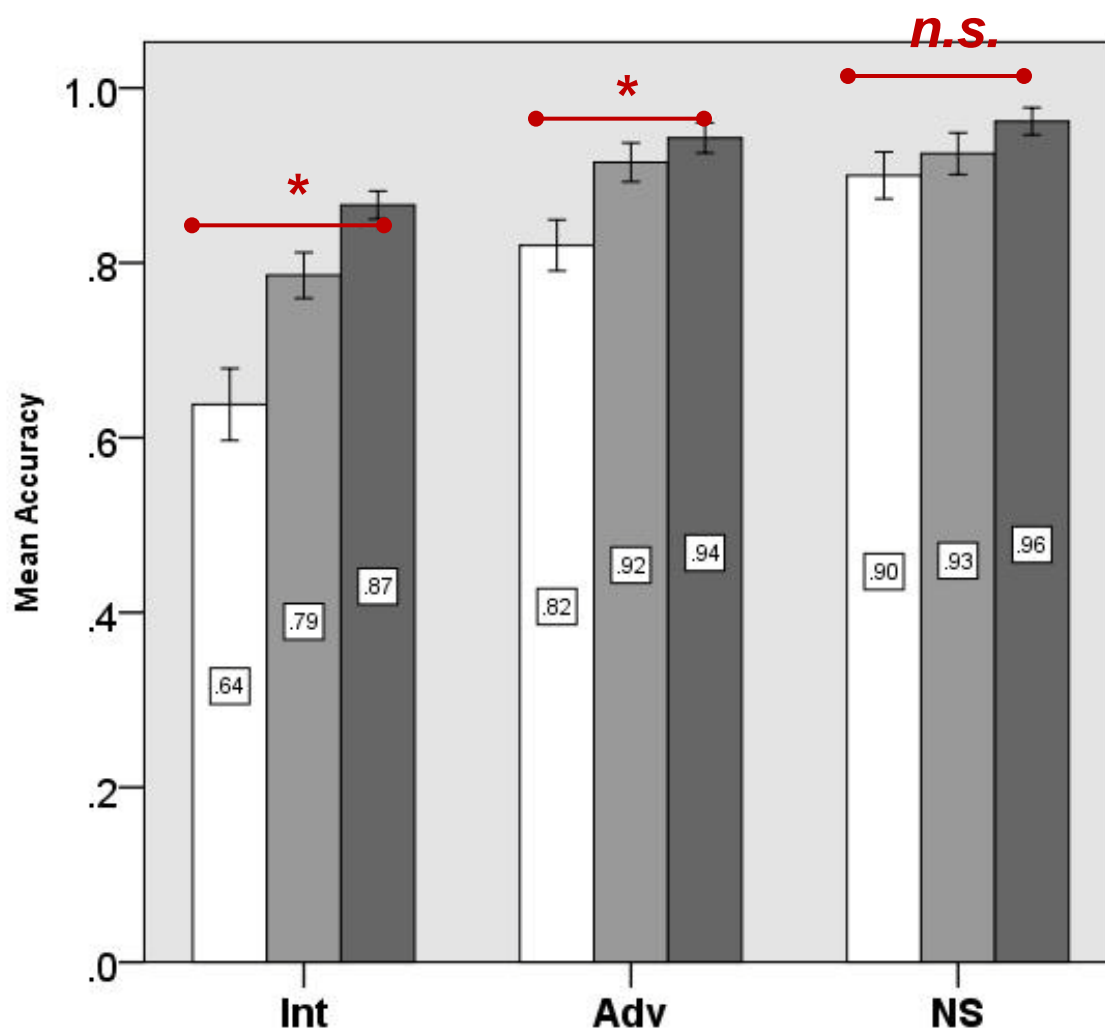
Significant effect of condition for Intermediates only: Less accurate on Test

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

*→ Look at **Test Condition** in more detail*



Test Condition



contrast

- r - d
- r - rr
- rr - d

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



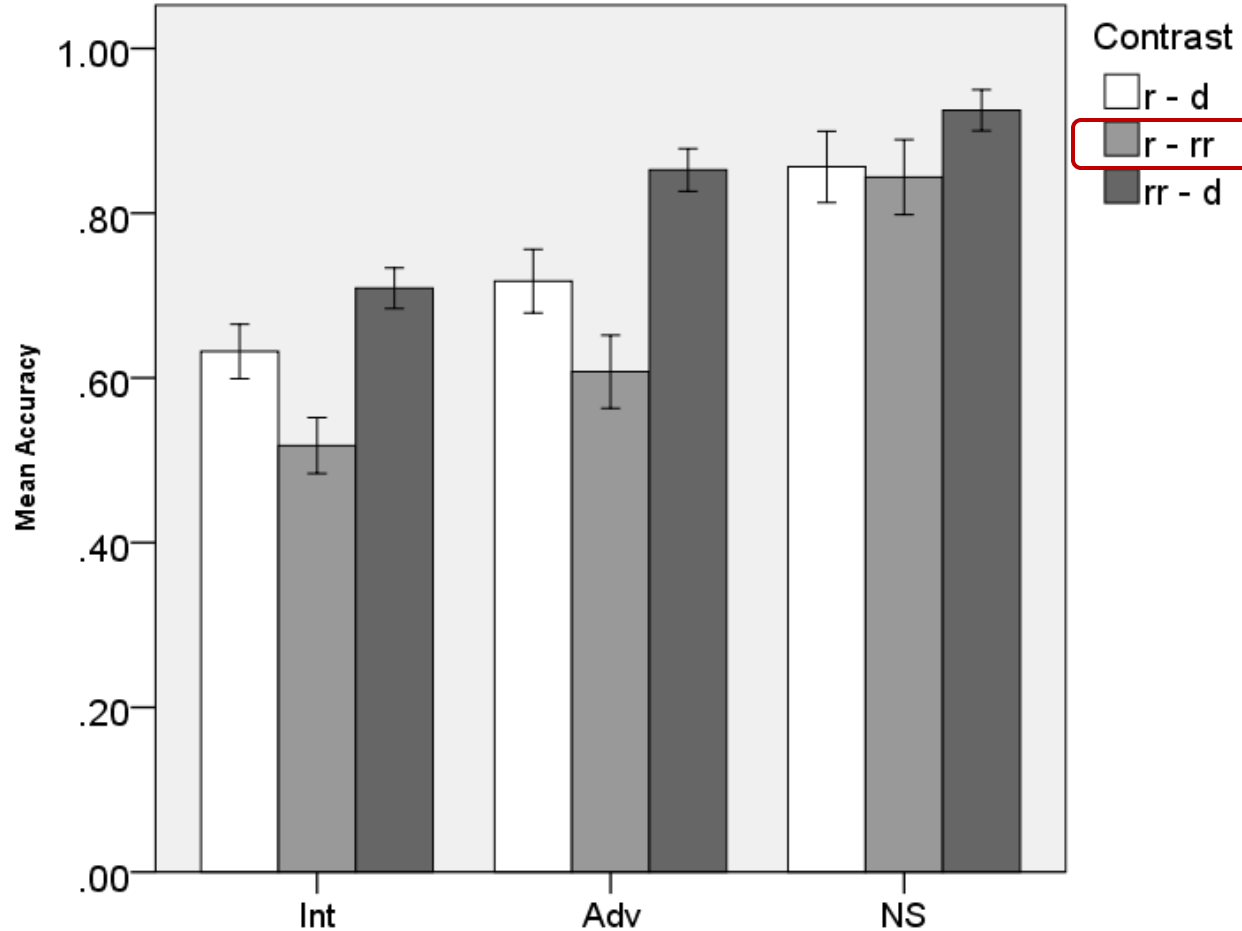
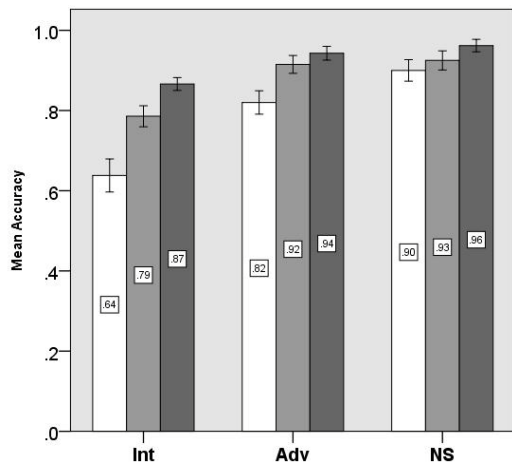
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LEXICAL DECISION RESULTS



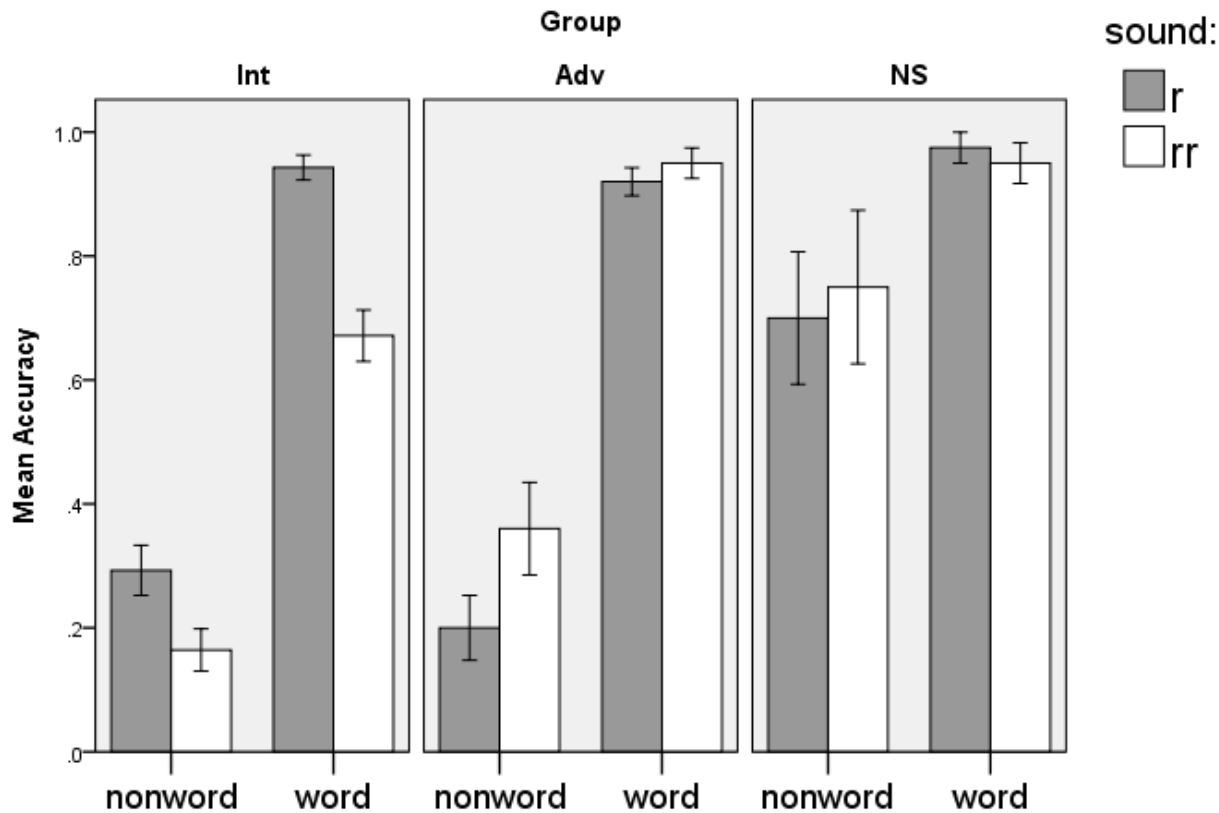
Lexical Decision Global Accuracy by contrast

ABX:





Accuracy for /r-rr/



Overall Accuracy	/r/	/rr/
Intermediate	.62	.42
Advanced	.56	.65
NS	.84	.85

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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