

# Using HVPT in foreign language instruction: Evidence from L2 French, Spanish, and Japanese

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New Sounds  
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# What is HVPT?

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- High variability phonetic training (HVPT) is an effective tool for learning non-native contrasts in lab settings (Thomson, 2018)
- Features of HVPT:
  - Typically, one of two tasks (see Carlet & Cebrian, 2022):
    - Forced choice identification (e.g. [l] or [ɫ]?)
    - Discrimination (e.g. *same or different?*)
  - Listeners hear multiple voices
  - Target contrasts presented in a variety of contexts / words
  - Given feedback on their responses



# Target Languages

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- HVPT studies mainly focus on L2 English (meta-analysis by Uchihara, Karas, and Thomson, 2021)
- Limited work on other languages, all showing beneficial effects (in lab settings):
  - Spanish /r-r-d/ (Herd, Jongman, & Sereno, 2013)
  - French /u-y/ (Melnik, 2019)
  - Japanese length (Tajima et al., 2008; Sadakata & McQueen, 2013)



# HVPT Beyond the Lab

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- Few studies have examined its efficacy outside a lab setting (Barriuso & Hayes-Harb, 2018)
- To our knowledge, none have looked at the effectiveness of HVPT as a required part of coursework
  - Students  $\neq$  study participants who self-select
  - Classroom imposes constraints on time, task type, etc.



# Research Questions

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When HVPT is implemented as required coursework...

1. Do students improve from pretest to posttest?
2. Can they generalize to new words?

# Participants



Spanish	Japanese	French
<ul style="list-style-type: none"><li>• 41 students</li><li>• 300-level phonetics</li><li>• 12 students (control group)</li><li>• 400-level advanced grammar</li></ul>	<ul style="list-style-type: none"><li>• 11 students</li><li>• 200-level language classes</li></ul>	<ul style="list-style-type: none"><li>• 11 students</li><li>• 300-level phonetics</li></ul>

- All students: (corrected-to-)normal vision, no speech or hearing disorders
- Heritage speakers were excluded from this analysis
- All L1 English except 1 French student (L1 Mandarin) and 1 Spanish (L1 French)



# Method

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## Pretest (Baseline)

- Week 1 of semester

## Training sessions

- One training per contrast, spaced throughout the semester
- Repeated until they reached 90% accuracy

## Posttests

- Posttest 1: Words from training sessions
- Posttest 2: Generalization to new words

# Target Contrasts



Spanish	Japanese	French
/r-r/ caro – carro	/ts-s/ tsuki – suki (つき・すき)	/u-y/ tout – tu
/r-d/ coro – codo	/ai-ae/ aimasu – aemasu (あいます・あえます)	/ã-ẽ-õ/ paon – pain – pont
/e-ei/ reno-reino	Vowel length yoji - yooji (よじ・ようじ)	/Ñ-Vn/ américain – américaine
<g-gu> /x-g/ agitar vs. *aguitar	Consonant length oto – otto (おと・おっと)	/s-z/ <ss-s> poisson – poison
Stress término - terminó (1 vs. 3) práctica - practica (1 vs. 2) aportara - aportará (2 vs. 3)	Nasals sennen – seinen – sen'en – seien (せんねん・せいねん・せんえん・せいえん)	Liaison il accepte – ils acceptant



# Six Speakers per Target Language



SP Speakers	JP Speakers	FR Speakers	Pre-Test	Training	Post-Test 1	Post-Test 2
F (Spain)	F (Saitama)	F (Quebec)	○	○		
M (Cuba)	M (Tokyo)	M (Quebec)	○	○		
F (Argentina)	F (Shizuoka)	F (France)	○	○	○	○
M (Mexico)	M (Niigata)	M (France)	○	○	○	○
F (Cuba)	F (Tokyo)	F (France)			○	○
M (Spain)	M (Kanagawa)	M (France)			○	○

continúo

continuó

はらいます

はらえます

¿Qué dijo la persona?  
What did the person say?



何と言いましたか。  
What did the speaker say?

tu

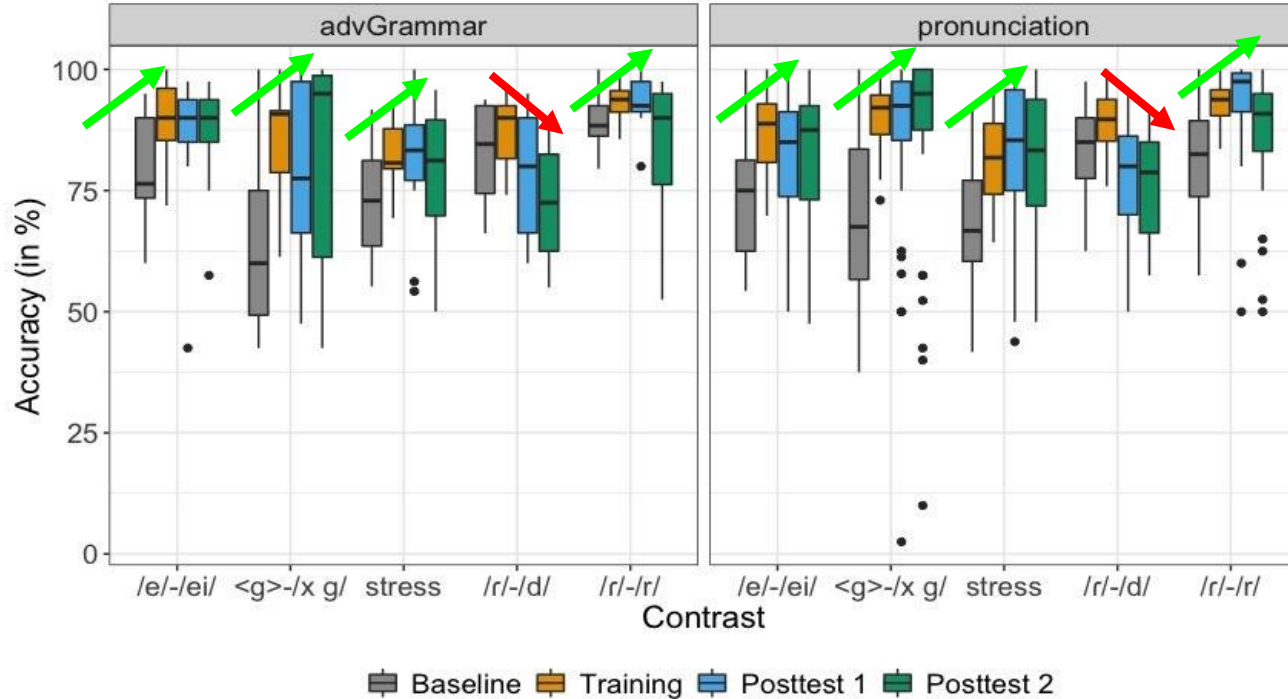
tout

Qu'est-ce que la personne a dit ?  
What did the person say?

# Results

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# Spanish

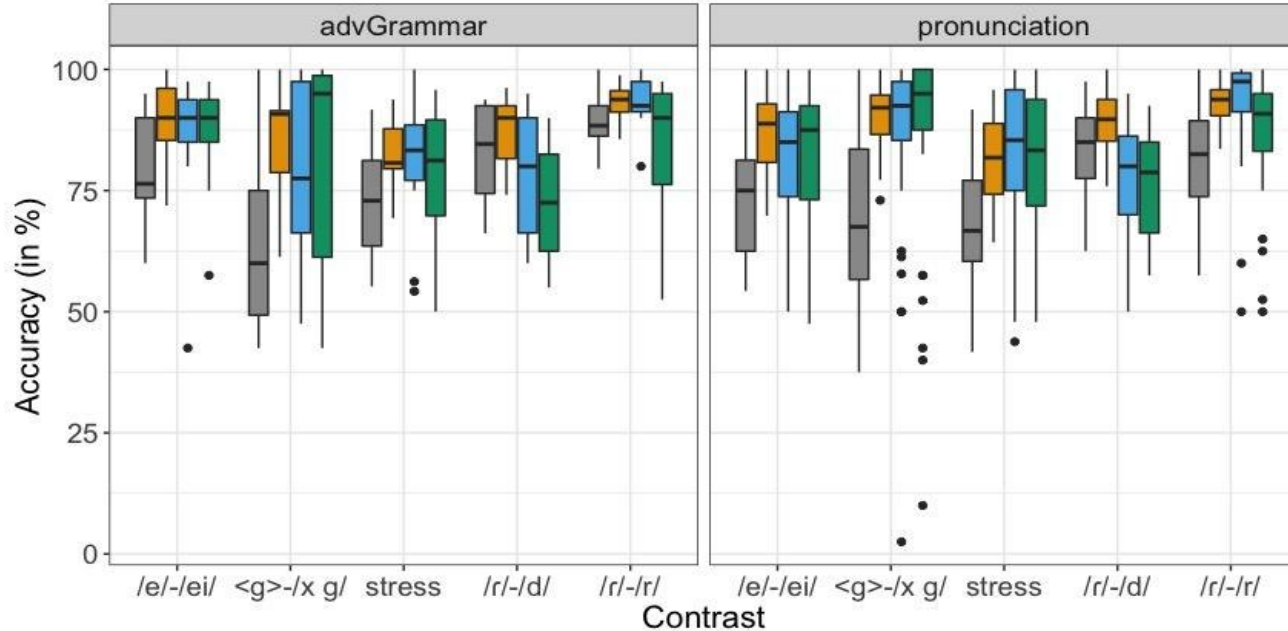


Similar patterns across instruction groups

Gains from baseline to posttests

/r/-/d/ → decline in performance

# Spanish



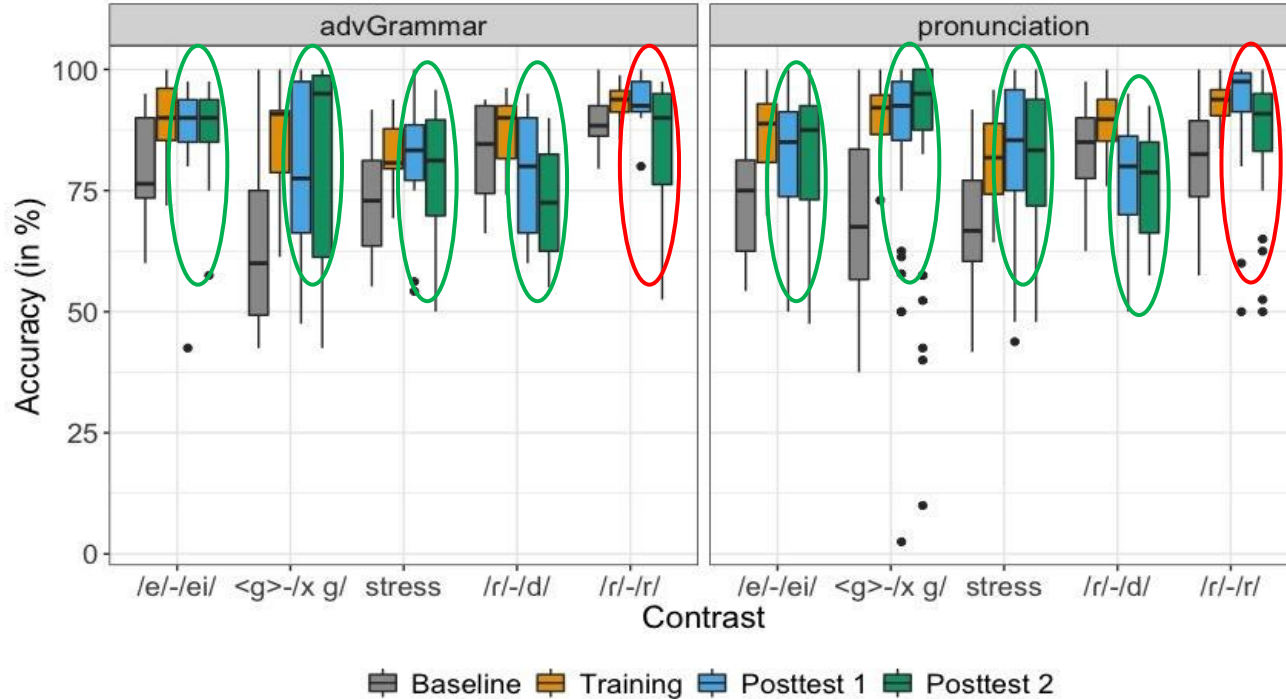
■ Baseline ■ Training ■ Posttest 1 ■ Posttest 2

- DV: Accuracy
- Within: Contrast, Session
- Between: Group

Results:

- Group
- Contrast, Session
- Contrast\*Session

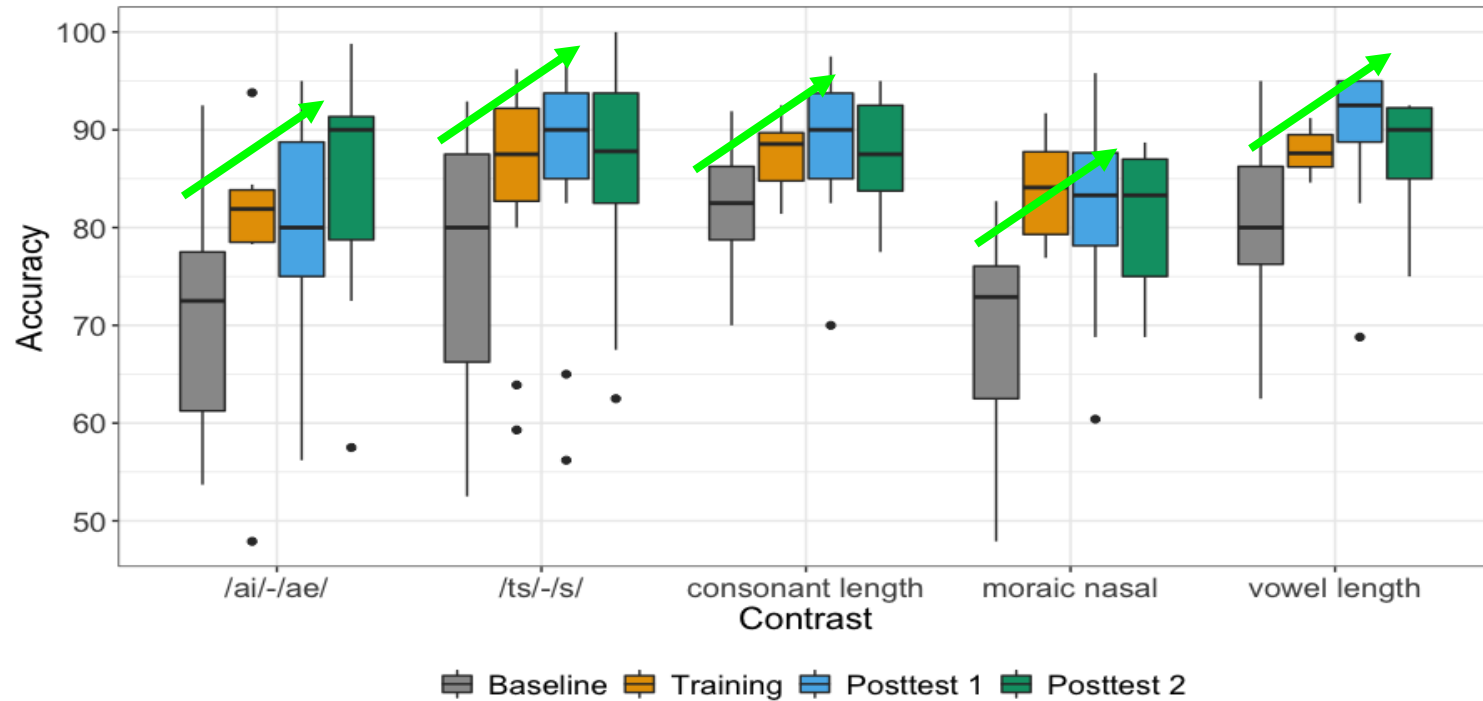
# Spanish



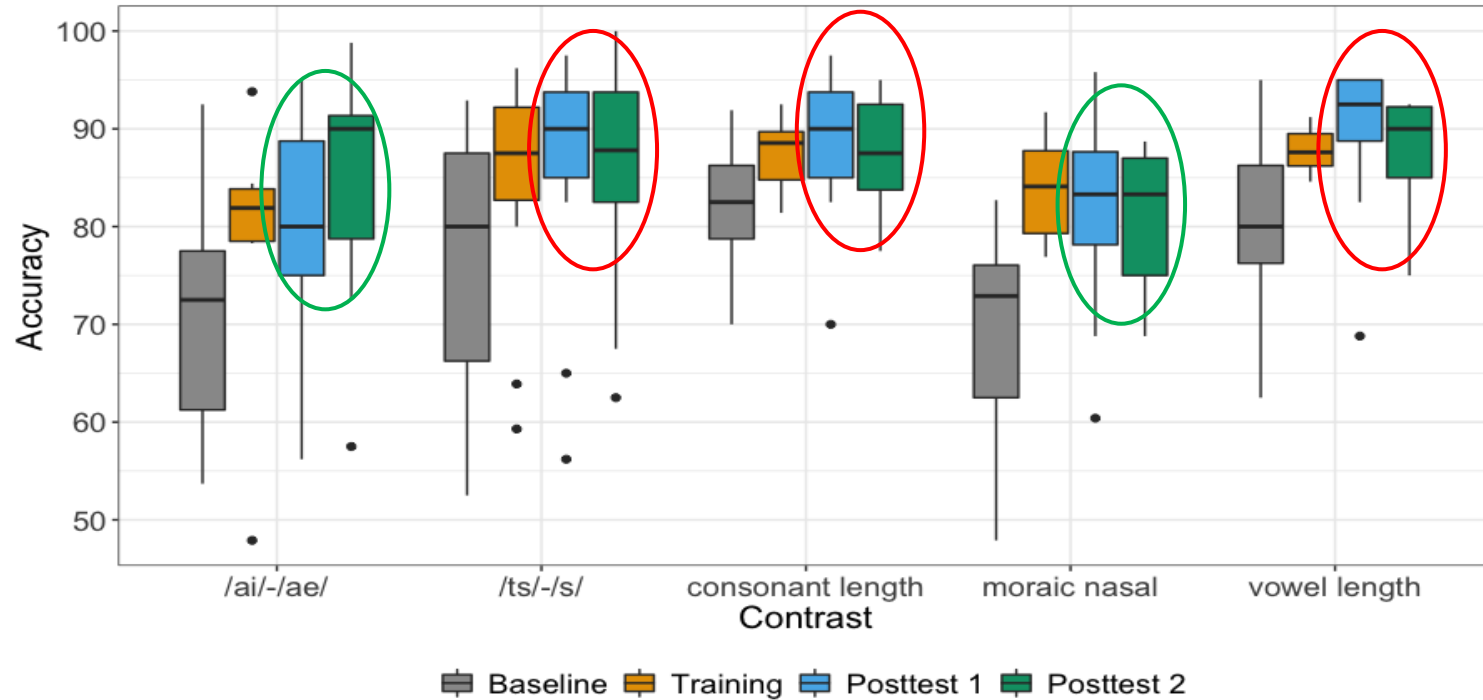
## Pairwise comparisons

- Baseline → statistically different from Posttests (all contrasts)
- Posttests not statistically different from each other
  - Except with /r/-/r/ (lower scores in Posttest 2)

# Japanese

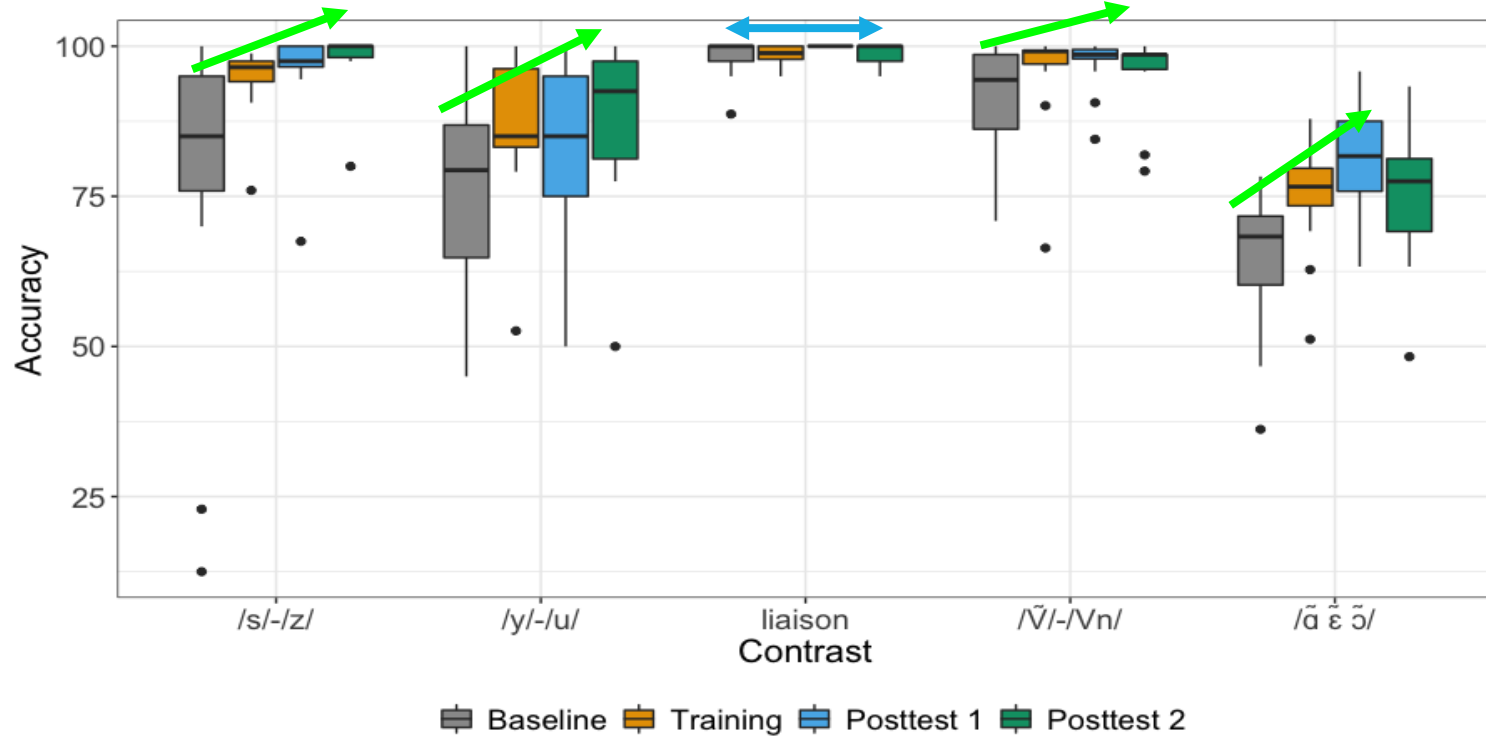


# Japanese

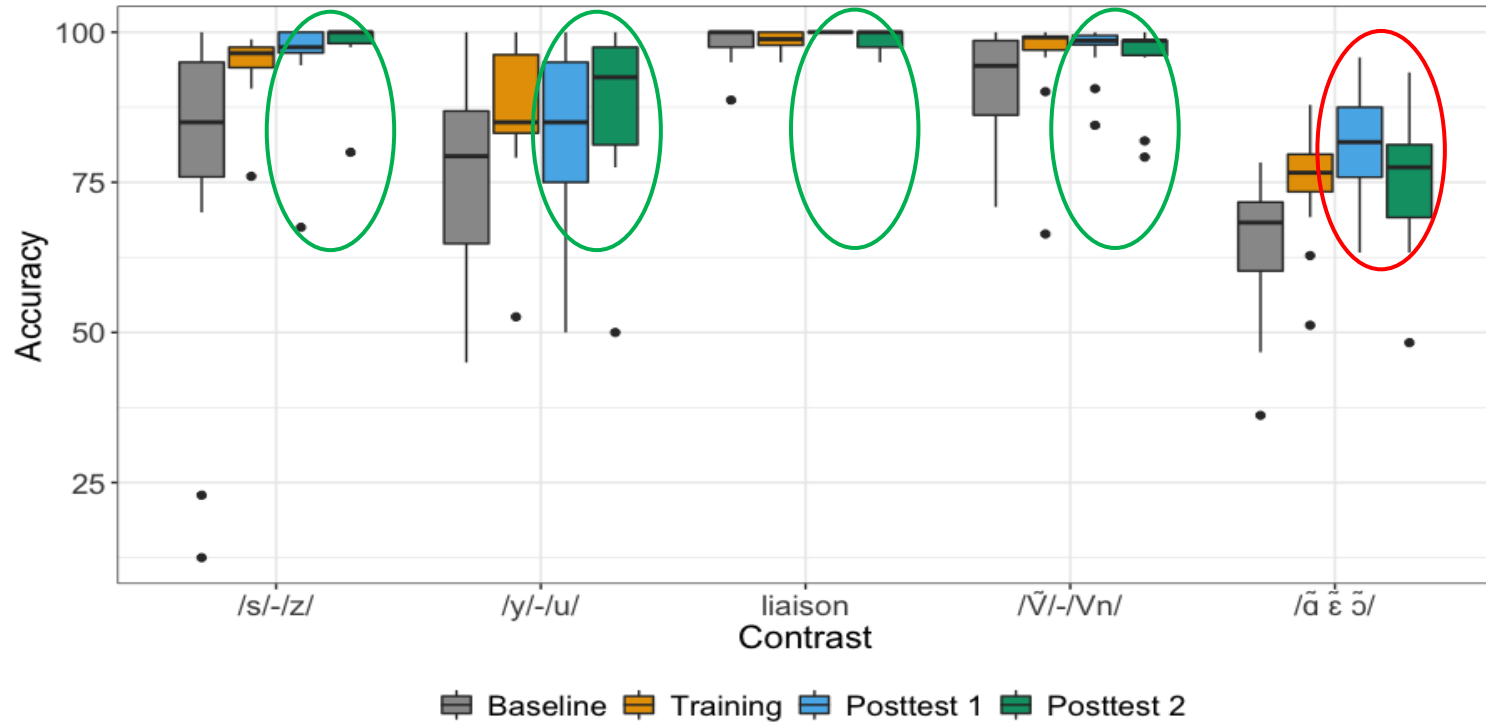




# French



# French



# Discussion

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# Back to RQs

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- RQ1: Do students improve from pretest (baseline) to posttest?
  - For the most part, yes! Including control SP group with no phonetic instruction
  - Exceptions:
    - SP /r-d/ performance declined
    - FR liaison at ceiling on pretest



# Back to the RQs

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- RQ2: Can they generalize to new words?
  - Yes, with some exceptions
    - For SP, all except /r-r/
    - For JP, new words numerically lower for /ts-s/ and consonant and vowel length
    - For FR, new words numerically lower for nasal vowels



# Classroom Benefits

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- Reinforce learning outcomes in listening
  - Ex: match HVPT contrast to unit on Japanese verb forms:  
“I sing”                    *utaimasu*  
“I can sing”                *utaemasu*
- Pedagogically useful to include non-traditional HVPT contrasts
  - Even upper-level students initially struggled with sound-spelling correspondences



# In the Works

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## Multilingual Online Listening Exercises (MOLE)

- Spanish, Japanese, and French

Working on developing open educational resource

The screenshot shows the MOLE website interface. At the top left is the MOLE logo (a mole character) and the text 'MOLE'. To the right are a notification bell icon and a user profile icon labeled 'AT'. Below this is a navigation bar with 'HOME' (with a house icon), 'Dashboard', and 'Courses'. The main content area features a white box titled 'JOIN A COURSE' with the instruction 'Please enter the course code that your instructor gave you below.' Below the instruction is a text input field labeled 'Course Code' and a 'Submit' button.



# Thank you! Questions?

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If you're interested in using our future website in your courses, sign up for more information here:

<https://tinyurl.com/HVPTMOLE>





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- Barriuso, T. A., & Hayes-Harb, R. (2018). High variability phonetic training as a bridge from research to practice. *CATESOL Journal*, 30(1), 177-194.
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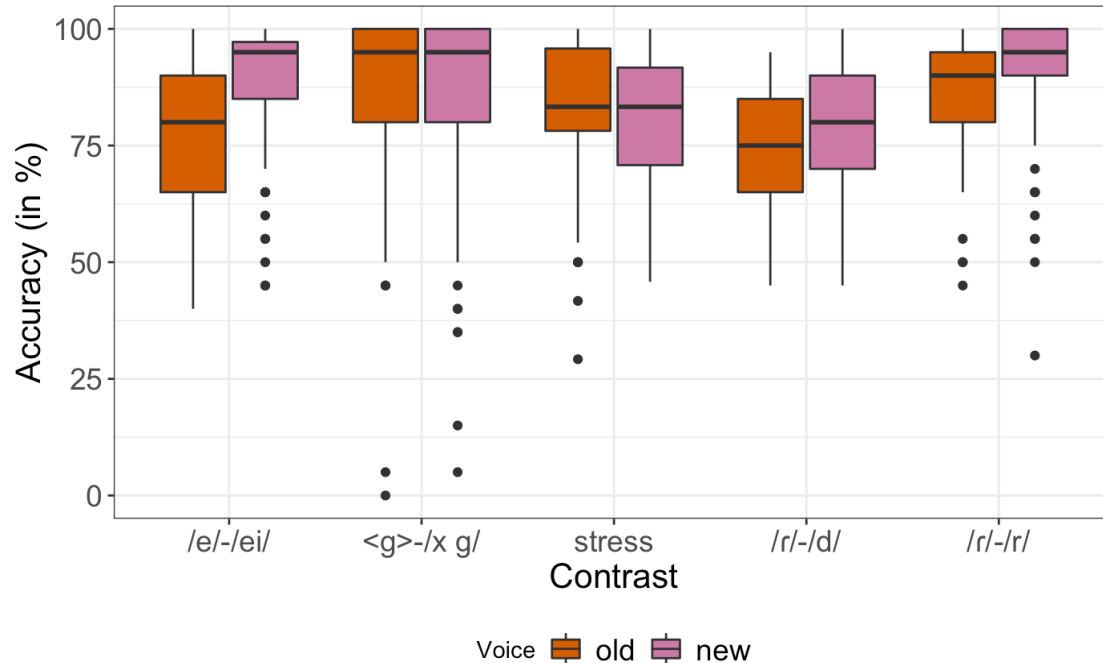
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- Tajima, K., Kato, H., Rothwell, A., Akahane-Yamada, R., & Munhall, K. G. (2008). Training English listeners to perceive phonemic length contrasts in Japanese. *The Journal of the Acoustical Society of America*, 123, 397-413. <https://doi.org/10.1121/1.2804942>
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# Additional slides

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# Spanish



Posttest 1 + Posttest 2 data

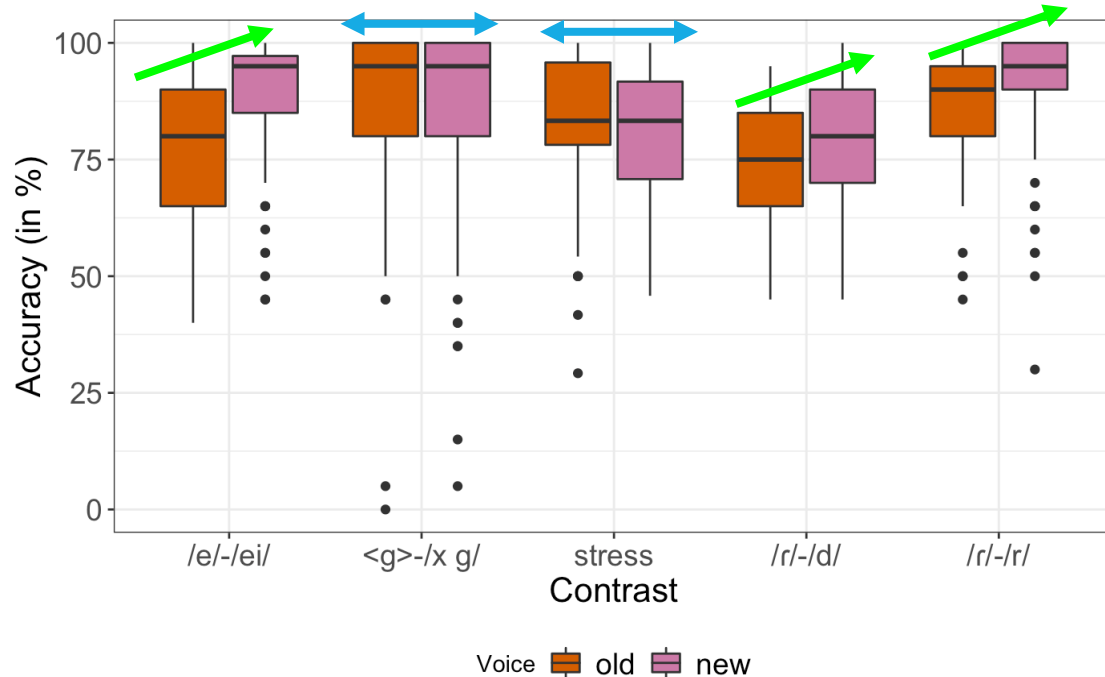
RM ANOVA

- DV: Accuracy
- Within: Contrast, Session, Voice

Results:

- Voice
- Contrast
- Session
- Contrast\*Voice

# Spanish



Posttest 1 + Posttest 2 data

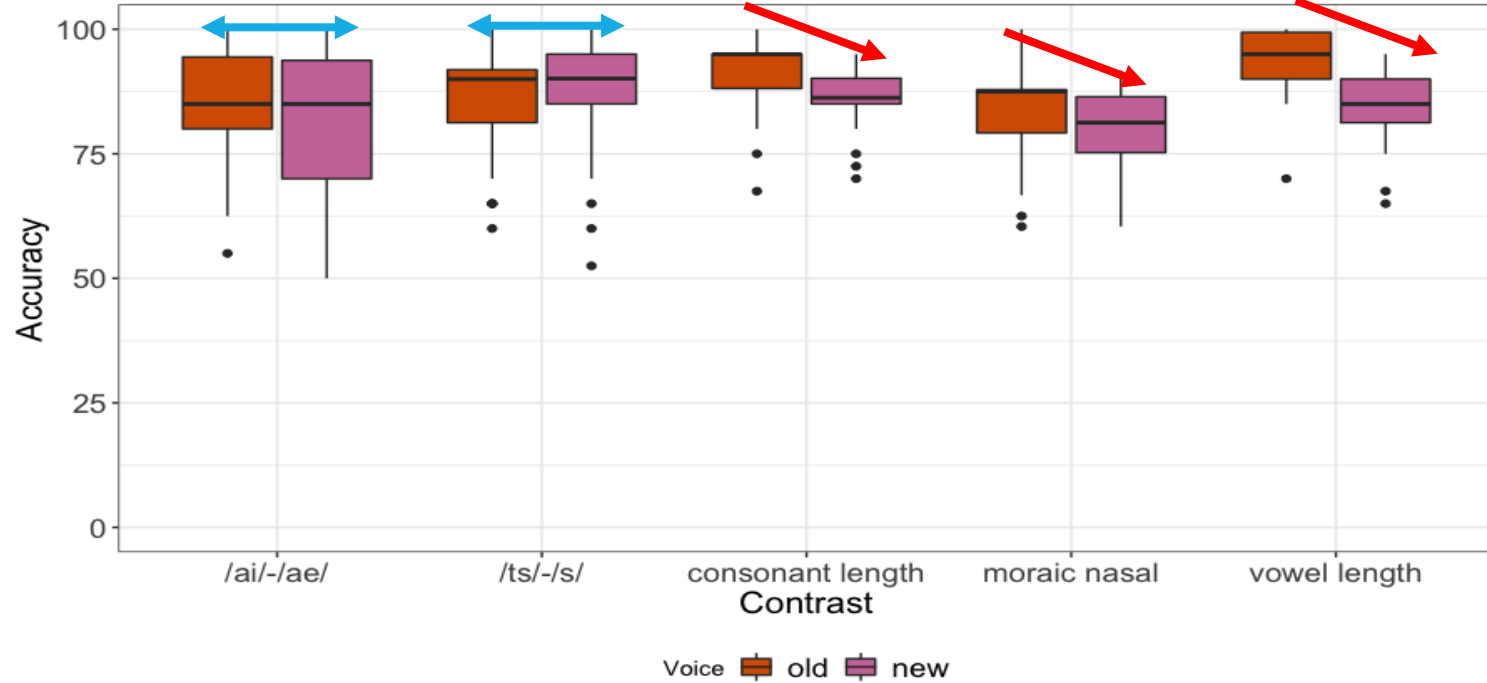
RM ANOVA

- DV: Accuracy
- Within: Contrast, Session, Voice

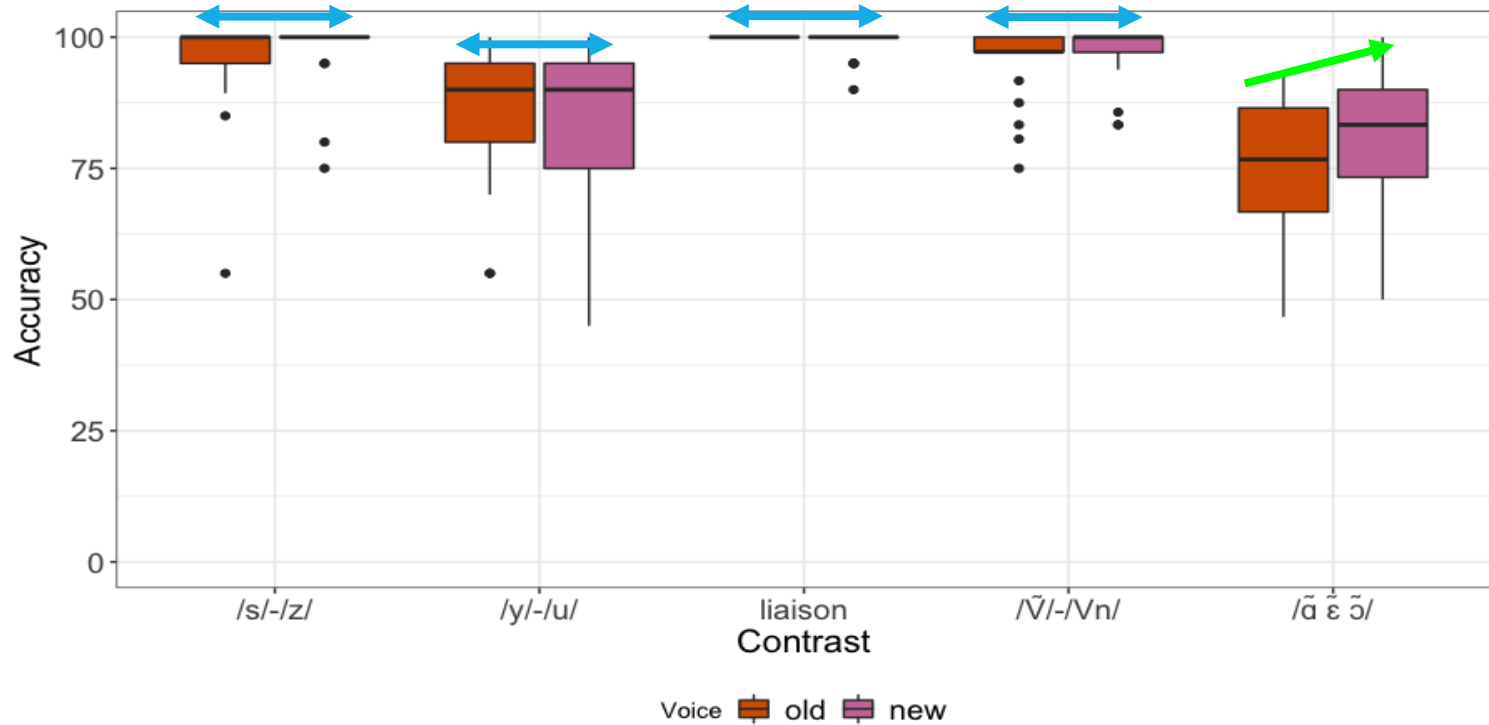
Pairwise comparison

- New is better than old
- No statistical difference with <g>-/x g/ and stress

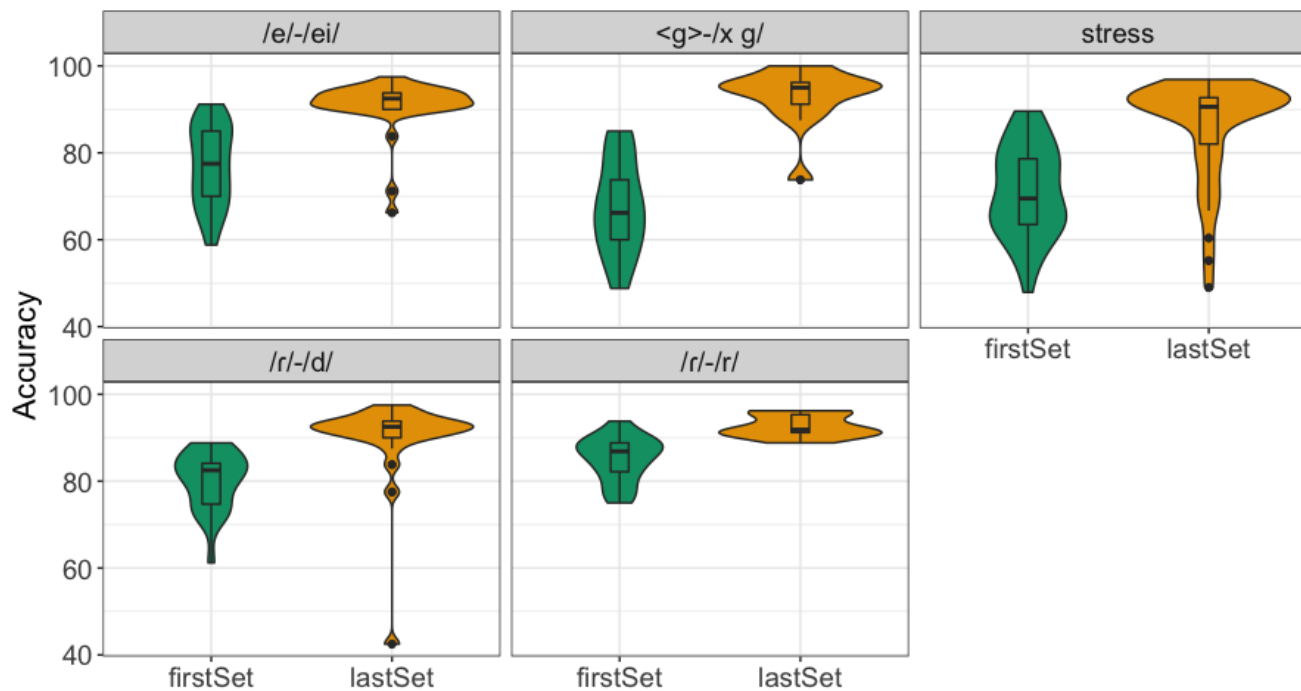
# Japanese



# French

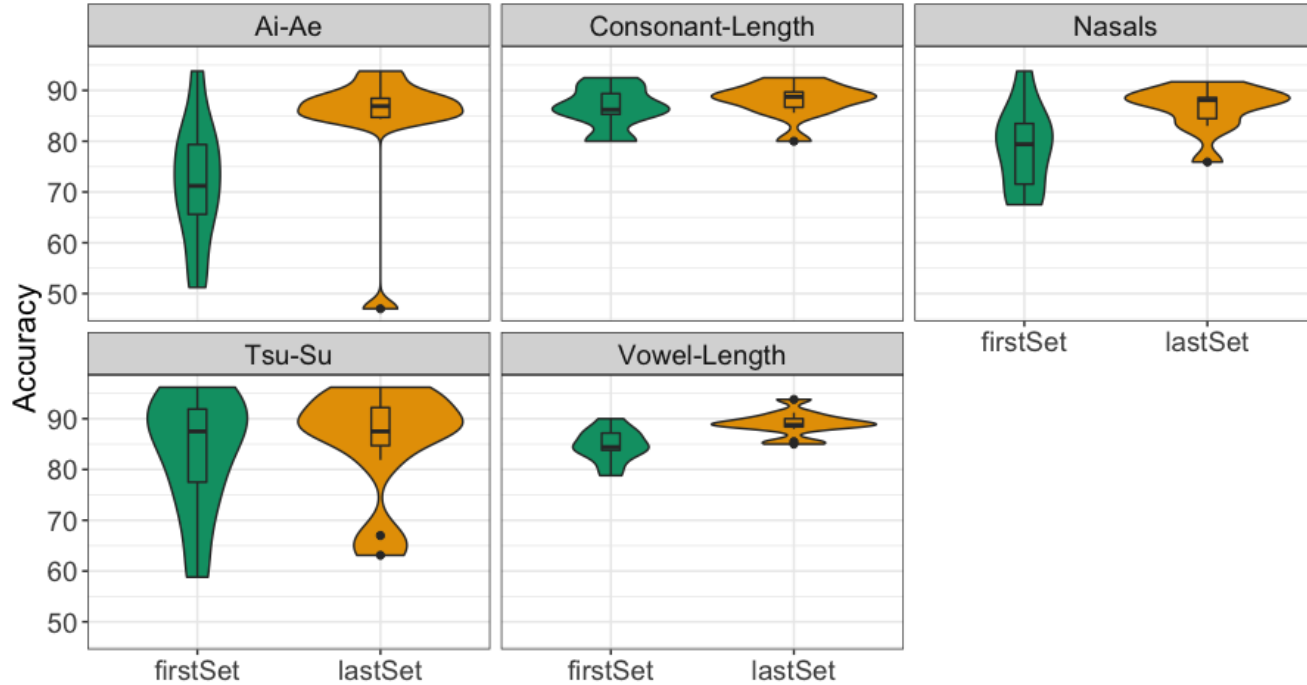


# Spanish Training





# Japanese Training



# French Training

