

# Examining the effectiveness of HVPT for the comprehension of Spanish regional variants

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# L2 perception of regional variants

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- Familiarity with different dialects is important for listening comprehension (Major et al., 2005; Schmidt, 2009)
- However, learners often struggle with deciphering unfamiliar regional variants
  - /s/-aspiration (e.g., *pasta* as ['pah.ta]) not identified as /s/ the majority of the time by students in 3rd year courses and below (Schmidt, 2018)



# What helps with comprehension?

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- Higher proficiency level
- More experience with regional dialects through study abroad or target-language contacts
- Explicit instruction on regional variants

(Schmidt, 2009, 2018, 2023; Schoonmaker-Gates, 2017, 2018, 2024)



# What helps with comprehension?

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- Classroom learners need activities that draw their attention specifically to the nature of dialectal variants
  - Simple exposure in the classroom isn't enough (Schoonmaker-Gates, 2017)
- But, class time is limited
  - High variability phonetic training as homework outside of class could be a valuable tool



# High variability phonetic training

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- High variability phonetic training (HVPT) is an effective tool for learning non-native contrasts in a lab setting (Thomson, 2018)
- HVPT:
  - Forced choice identification task (e.g. /l/ or /r/?) or discrimination task (e.g. *same* or *different?*)
  - Listeners hear multiple voices and/or phonetic contexts
  - Given feedback on their responses



# Research questions

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When HVPT is used in combination with phonetics instruction on regional phonological variables:

- (a) Do learners improve in identification accuracy from pretest to posttest?
- (b) Are learners able to generalize to untrained words and untrained voices?

# Methods

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# Participants

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Group	<i>n</i>
Phon+HVPT	24
Phon+NoHVPT	9
noPhon+NoHVPT	17

Numbers not including:

- 11 learners who reported Spanish as an L1
- 3 learners that only completed the pretest





# Regional variables



## Distinción

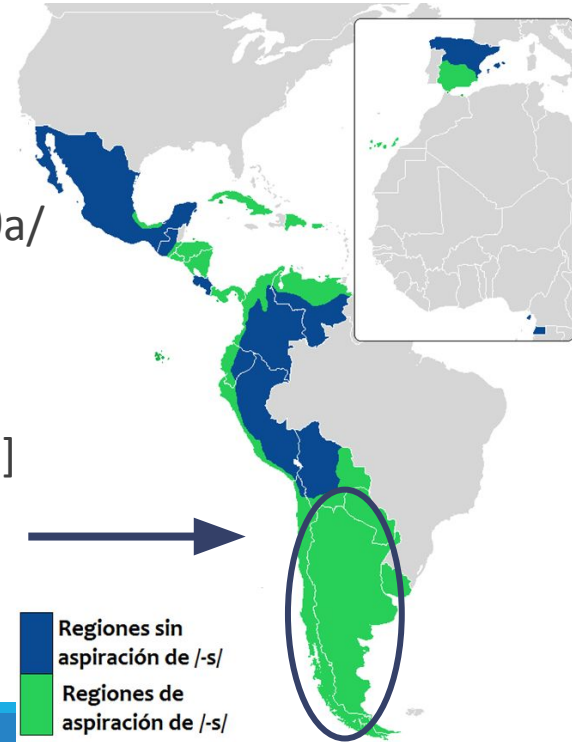
Contrast between /s/ and /θ/

e.g., *casa* /'ka.sa/ vs. *caza* /'ka.θa/

## Aspiración

/s/ in coda position realized as [h]

e.g., *gusta* ['guh.ta]





# Method

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## Pre-test

- In week 1 or 2 of semester

## Training

- A single training per contrast
- Timing of training differed between classes in accordance with their curriculum
- Had to reach 90% accuracy, or else repeat training

## Post-tests

- During finals week, divided into two tests:
  - Trained words (Post-test)
  - Generalization to new words (Generalization)

# Stimuli



Recorded by 6 native speakers of Argentine Spanish and Castilian Spanish (respectively):

AR speakers	SP speakers	pre-test	training	post-test	generalization
male	male	o	o	o	o*
female	male	o	o	o	o
female	male	o	o		
male	female	o	o		
female	male			o	o
male	male			o	o

# Instructions: Distinción

En esta actividad, escucharás a las personas de España. Escucharás una palabra y verás dos opciones en la pantalla.  
In this activity, you will hear the people from Spain. You will hear a word and see two options on the screen.

Haz click en la palabra que escuchas.  
Click on the word that you heard.

Example: seda vs. ceda

Haz click en 'Comenzar' para hacer el entrenamiento.  
Click 'Comenzar' to begin the training.

Comenzar >

ves

vez



¿Qué dijo la persona?

What did the person say?

¡Correcto!

Listen again:

**vez**



# Instructions: Aspiración

En esta actividad, escucharás a personas de Argentina. Escucharás una palabra y verás dos opciones en la pantalla.  
In this activity, you will hear people from Argentina. You will hear a word and see two options on the screen.

Haz click en la palabra que escuchas.  
Click on the word that you heard.

Ejemplo: bota vs. boṽta

Haz click en 'Comenzar' para hacer el entrenamiento.  
Click 'Comenzar' to begin the training.

Comenzar >

gato

gasto



¿Qué dijo la persona?

What did the person say?



Incorrecto

Listen again:

**gasto**



# Results

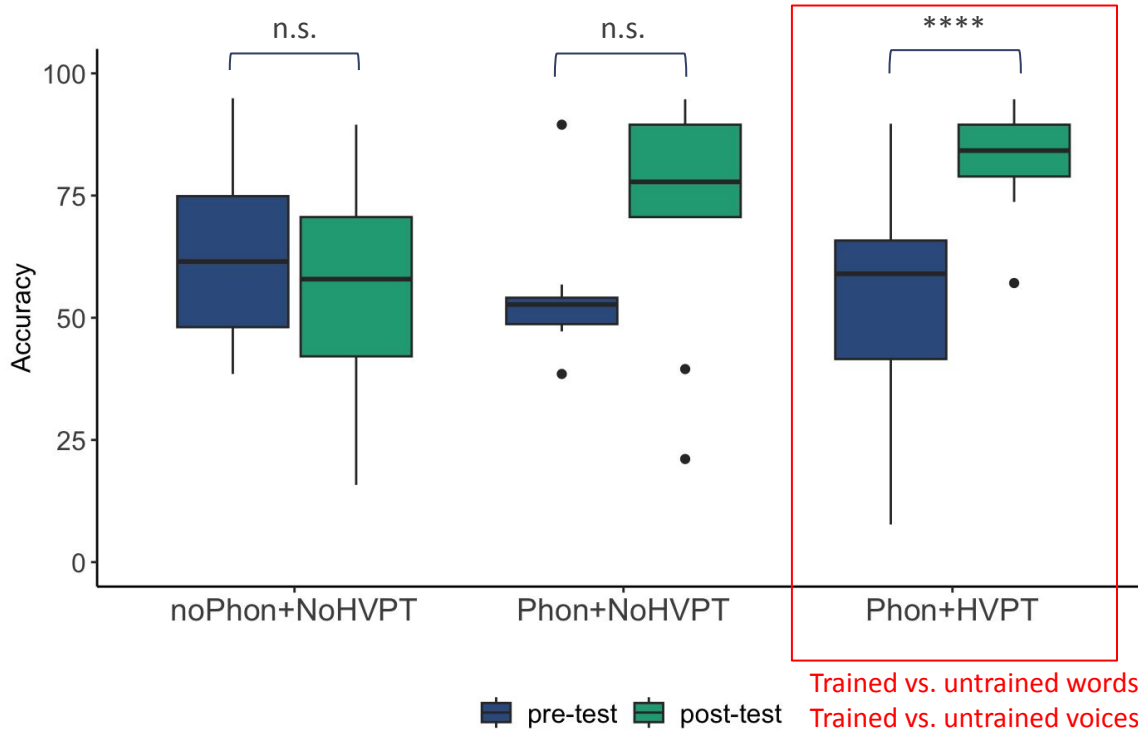
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# Distinción

# Do they get better at *distinción*?

Trained words, trained voices



- Marked improvement for groups with Phonetics instruction
- Phon+HVPT has a higher mean and lower SD

RM ANOVA

DV: accuracy

Random effect: listener

Between: learner group

Within: session (pre vs. post-test)

Main effect: session, learner group

Interaction: learner group\*session

Pairwise comparisons:

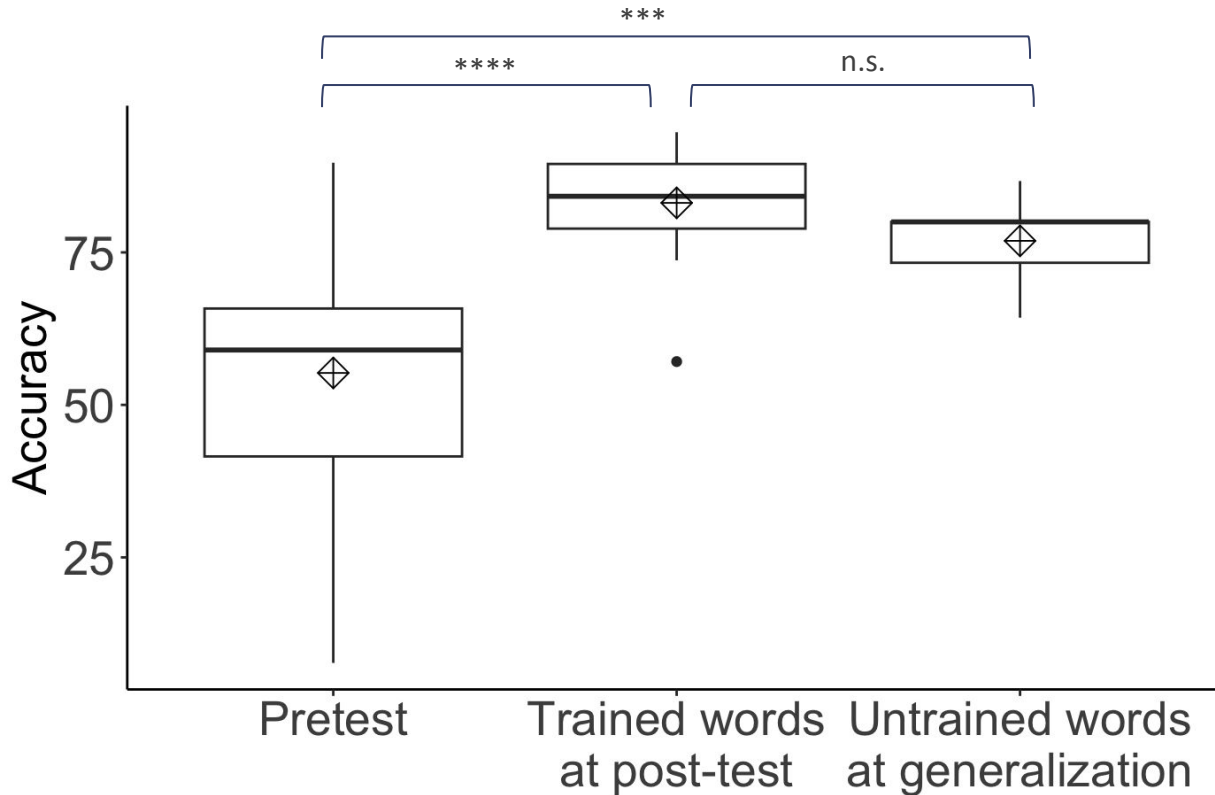
noPhon+NoHVPT → pre = post

Phon+NoHVPT → pre = post

Phon+HVPT → pre ≠ post

## Can they generalize *distinción*?

Trained (in the post-test) vs. untrained **words** (in the generalization test) [*only trained voices*]



Learners improved after training  
Higher average for trained words

RM ANOVA

DV: accuracy

Random: listener

Within: session (pre vs. post-test vs. generalization)

Session was significant

Pairwise comparisons:

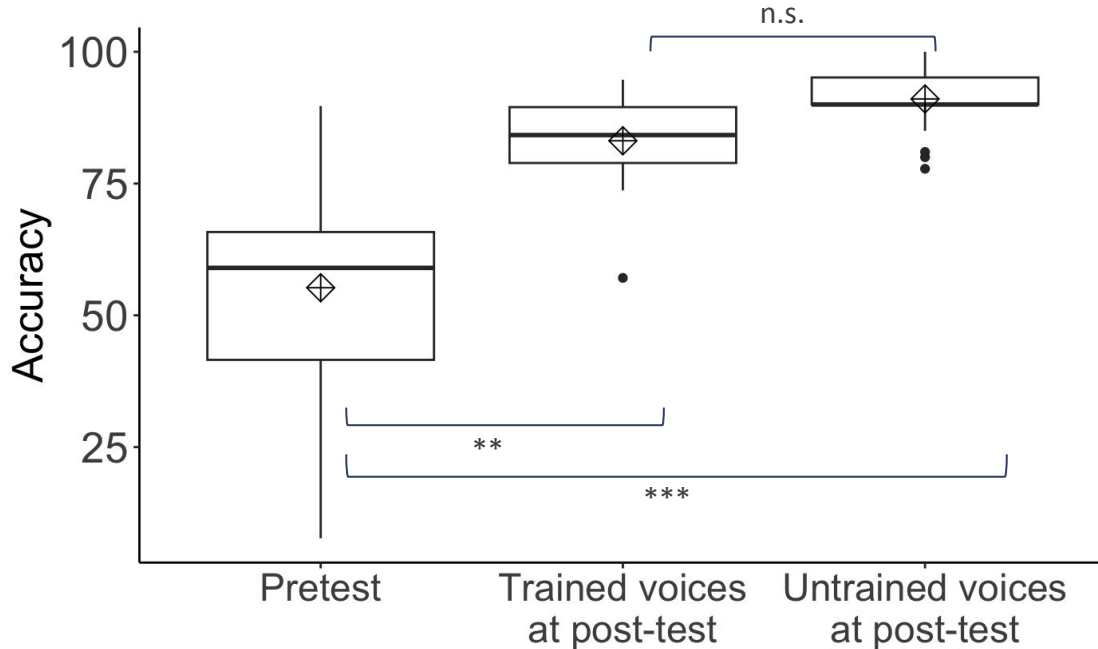
Pre-test  $\neq$  Trained at post-test

Pre-test  $\neq$  Untrained at generaliz.

Untrained = Trained words

# Can they generalize *distinción*?

Trained vs. untrained **voices** [only trained words]



Learners improved after training  
Higher average for untrained voices

RM ANOVA

DV: accuracy

Random: listener

Within: voices per session (pre vs. trained voices vs. untrained voices)

Session was significant

Pairwise comparisons:

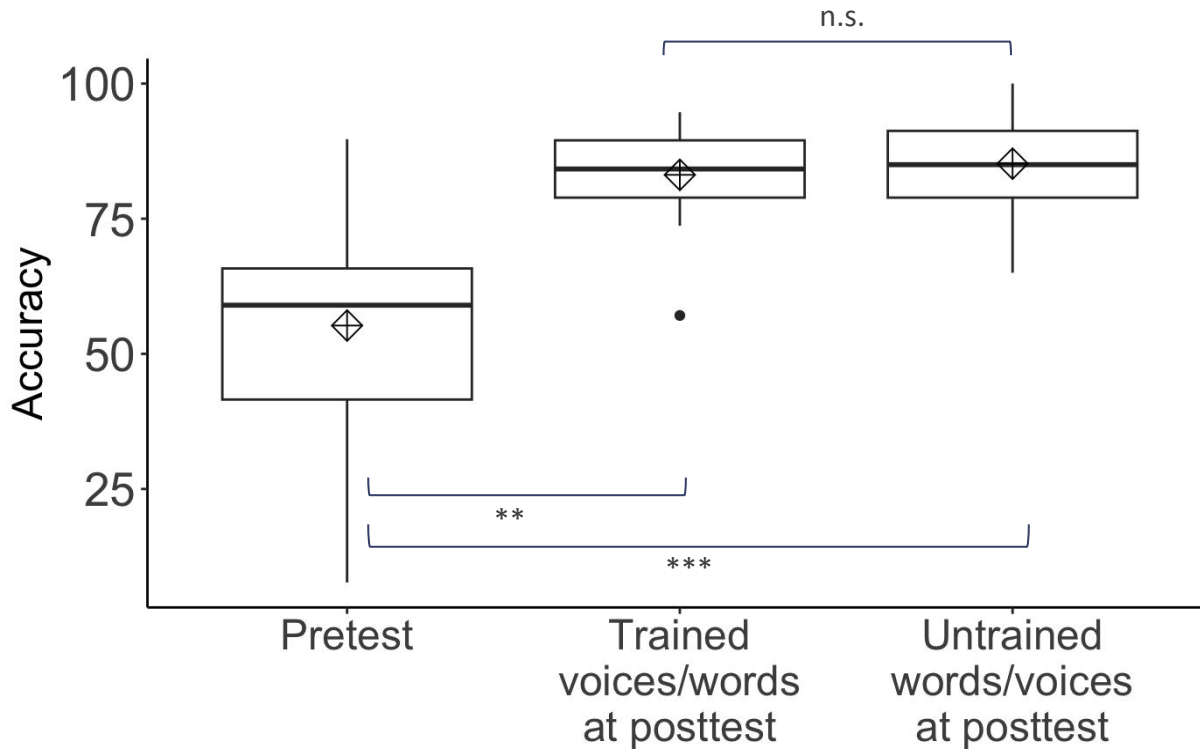
Pre-test  $\neq$  Trained at post-test

Pre-test  $\neq$  Untrained at post-test

Untrained = Trained voices

# Can they generalize *distinción*?

Trained words/voices vs. Untrained words/voices



Learners improved after training, and this training generalized to untrained voices and words.

RM ANOVA

DV: accuracy

Random: listener

Within: voices/words per session (pre vs. trained vs. untrained)

Session was significant

Pairwise comparisons:

Pre-test  $\neq$  Trained at post-test


Pre-test  $\neq$  Untrained at post-test

Untrained = Trained words/voices



# Summary for *Distinción*

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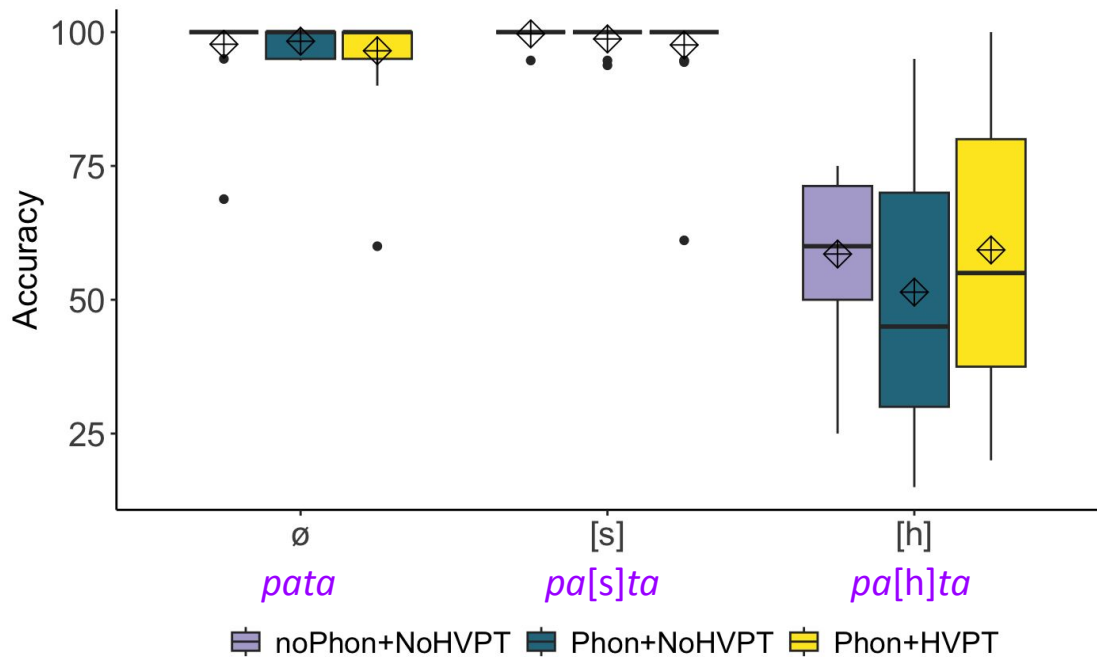
- Phon+HVPT → Outperforms all groups in identification of *distinción*
    - But... phonetics training in and of itself leads to improvement as well
  - For group that received training (Phon+HVPT):
    - No statistical differences between trained and untrained words/voices
-  They can generalize to untrained words and voices





# Aspiración

# At pre-test

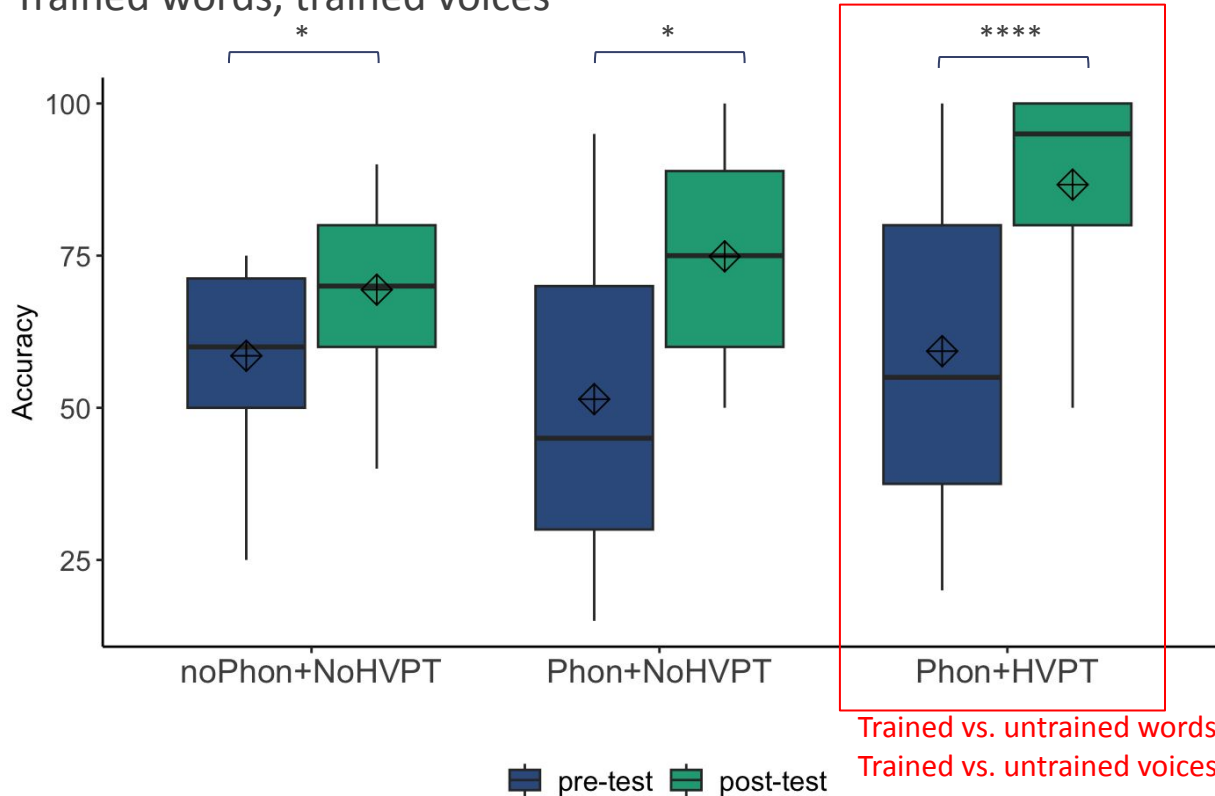


Ceiling effect for *pata* and *pa[s]ta*

They are not doing great with *pa[h]ta*

# Do they get better with [h]?

Trained words, trained voices



Phon+HVPT outperforms everyone else

RM ANOVA

DV: accuracy on [h]

Random: listener

Between: learner group

Within: session (pre vs. posttest)

Main effect: session, learner group

Interaction: learner group\*session

Pairwise comparisons

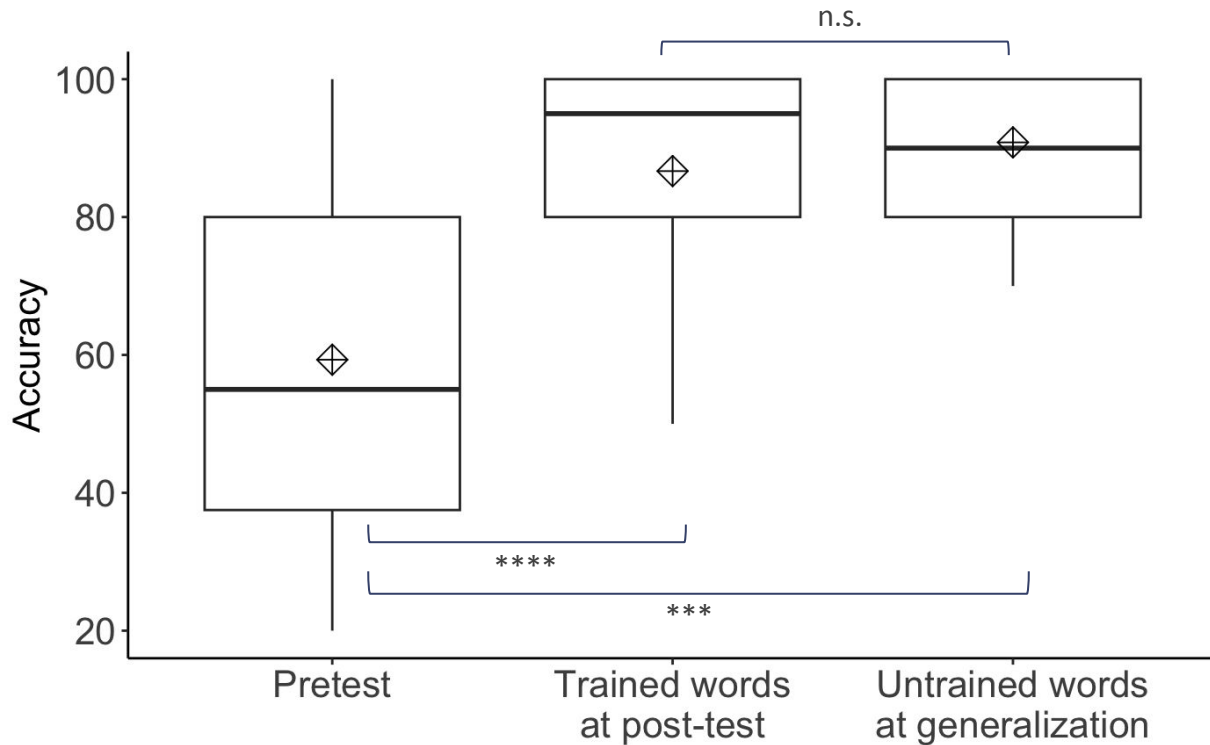
noPhon+NoHVPT → pre ≠ post

Phon+NoHVPT → pre ≠ post

Phon+HVPT → pre ≠ post

# Do they generalize [h]?

Trained (in the post-test) vs. untrained **words** (in the generalization test) *[only trained voices]*



Learners improved after training, and this training generalized to untrained words.

RM ANOVA

DV: accuracy on [h]

Random: listener

Within: session (pre vs. post-test vs. generalization)

Session was significant

Pairwise comparisons:

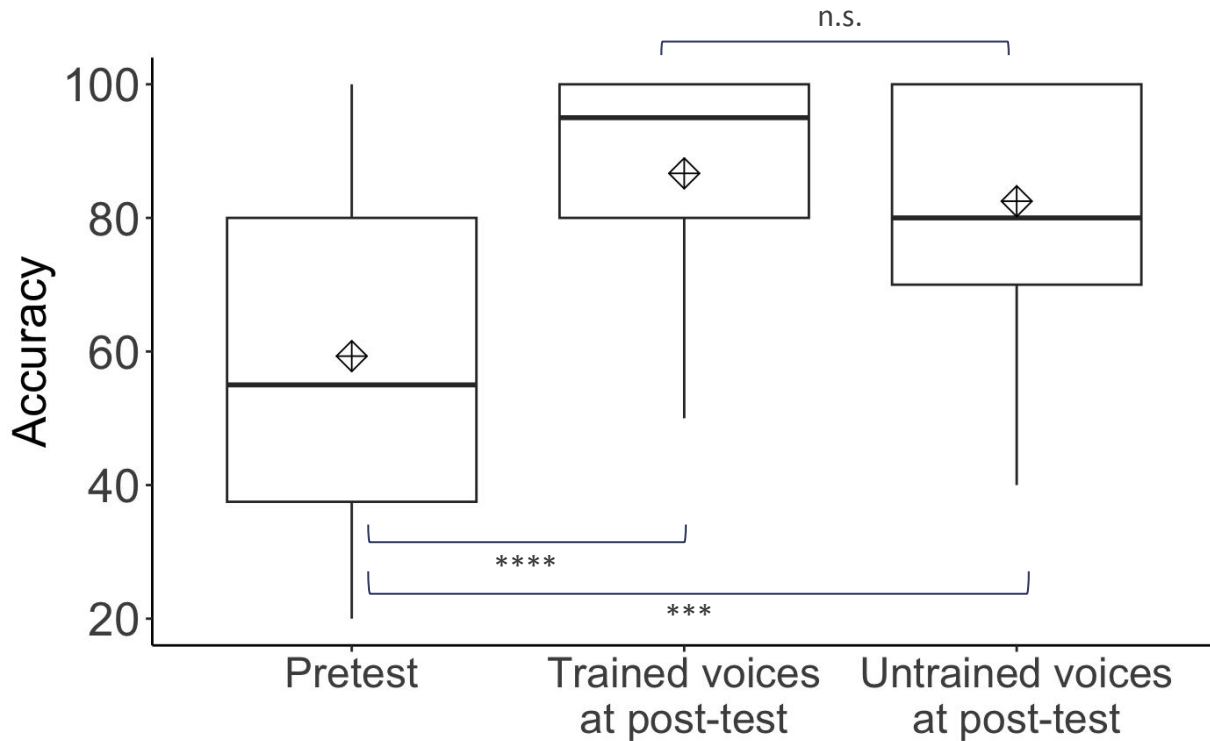
Pre-test  $\neq$  Trained at post-test

Pre-test  $\neq$  Untrained at generaliz.

Untrained = Trained words

# Do they generalize [h]?

Trained vs. untrained **voices** [only trained words]



Learners improved after training, and this training generalized to untrained voices.

RM ANOVA

DV: accuracy on [h]

Random: listener

Within: voices per session (pre vs. trained voices vs. untrained voices)

Session was significant

Pairwise comparisons:

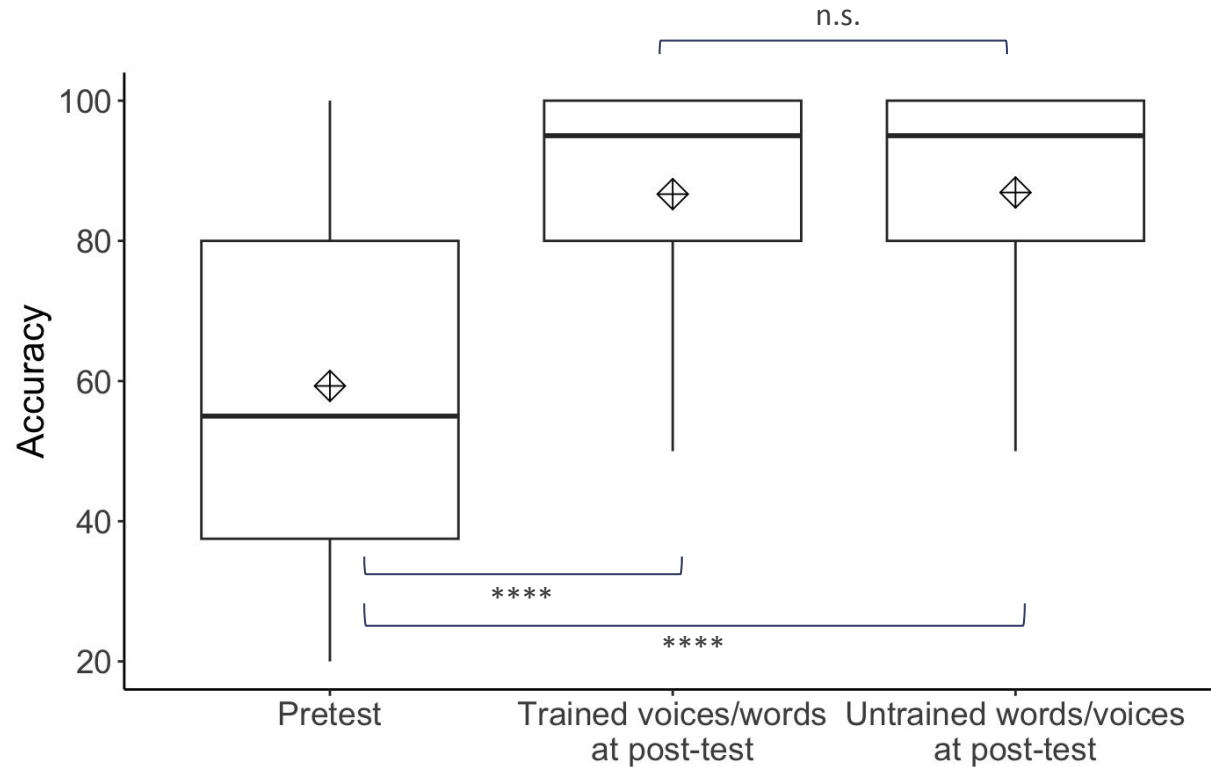
Pre-test  $\neq$  Trained at post-test

Pre-test  $\neq$  Untrained at post-test

Untrained = Trained voices

# Do they generalize [h]?

Trained words/voices vs. untrained words/voices



Learners improved after training, and this training generalized to untrained voices and words.

RM ANOVA

DV: accuracy on [h]

Random: listener

Within: voices/words per session (pre vs. trained vs. untrained)

Session was significant

Pairwise comparisons:

Pre-test  $\neq$  Trained at post-test

Pre-test  $\neq$  Untrained at post-test

Untrained = Trained words/voices



# Summary of *Aspiración*

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- Phon+HVPT → Outperforms all groups in identification of [h]
- For group that received training (Phon+HVPT):
  - No statistical differences between trained and untrained words/voices
  - ✔ They can generalize to untrained words and voices

# Discussion

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# Discussion

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- Learners had relatively low accuracy at pretest
  - Need explicit training on these variants
- HVPT facilitated improvement in accuracy for both regional variants
  - Just having phonetics instruction also works, but higher accuracy when combined with HVPT
- Learners were able to generalize to new words and new voices



# Discussion

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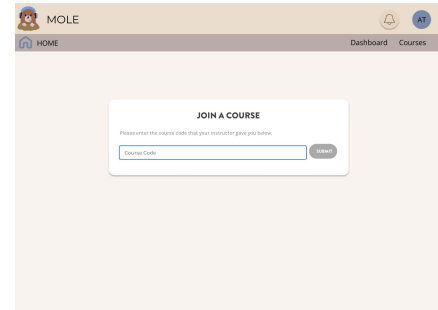
- Small n's so far, particularly for Phon+NoHVPT
- Need another control group to isolate effect of HVPT
  - noPhon+HVPT
- Experience comes in different shapes and sizes
  - Lots of data needed to weed out other sources of exposure to these forms, such as study abroad, instructor, etc.
- Collect data from other institutions

# In the works

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Working on developing user-friendly website with grant from Spencer Foundation



Multilingual Online Listening Exercises (MOLE)

- French, Japanese, and Spanish





# iGra[θ]ia[h]!

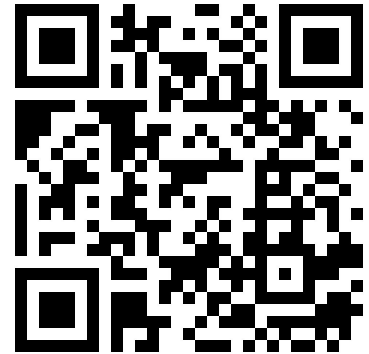
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If you're interested in using our future website in your courses, sign up to be a beta tester:

<https://tinyurl.com/HVPTMOLE>

Silvina Bongiovanni    [sbongio@msu.edu](mailto:sbongio@msu.edu)

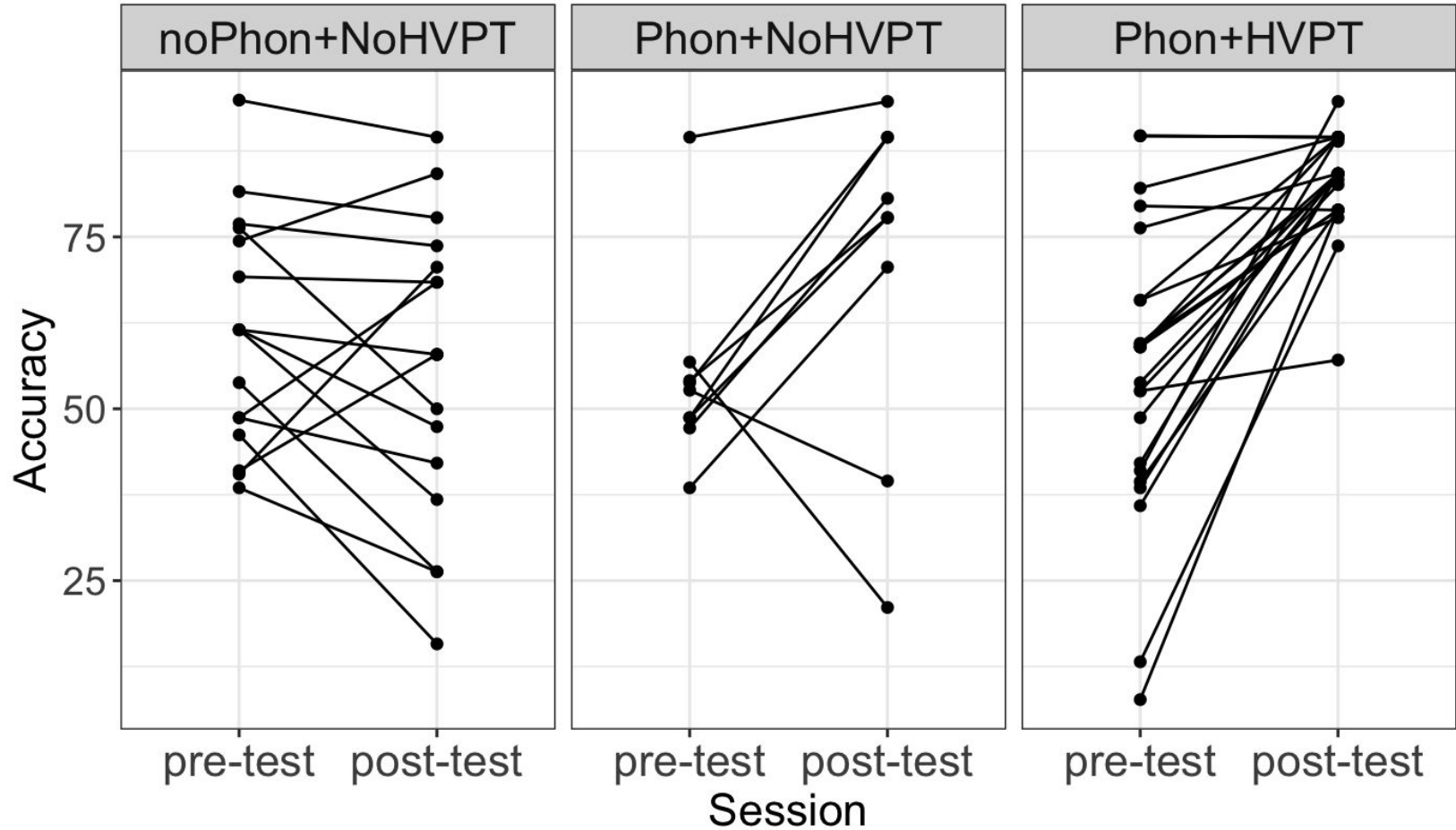
Danielle Daidone      [daidoned@uncw.edu](mailto:daidoned@uncw.edu)



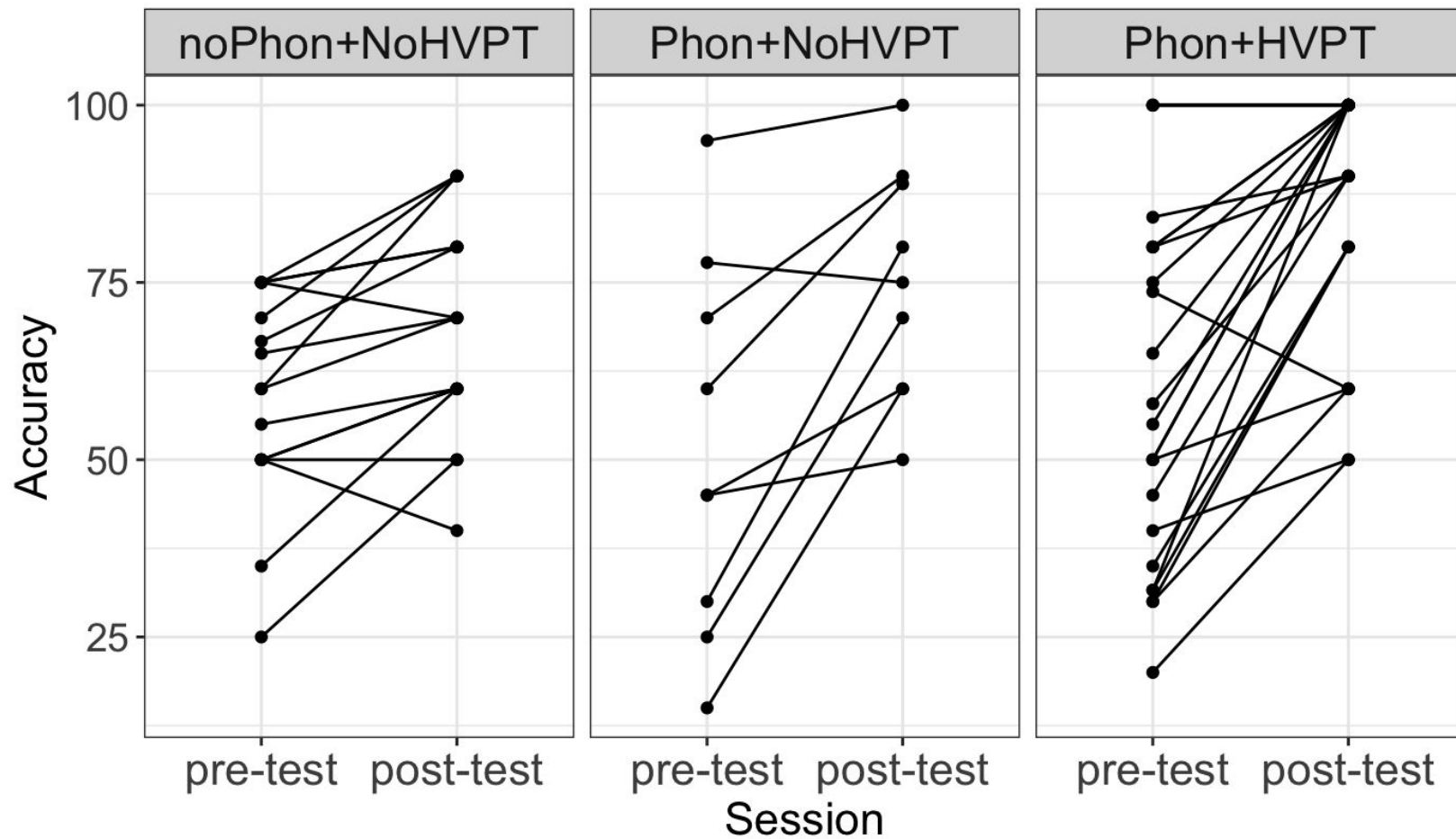
# Extra slides

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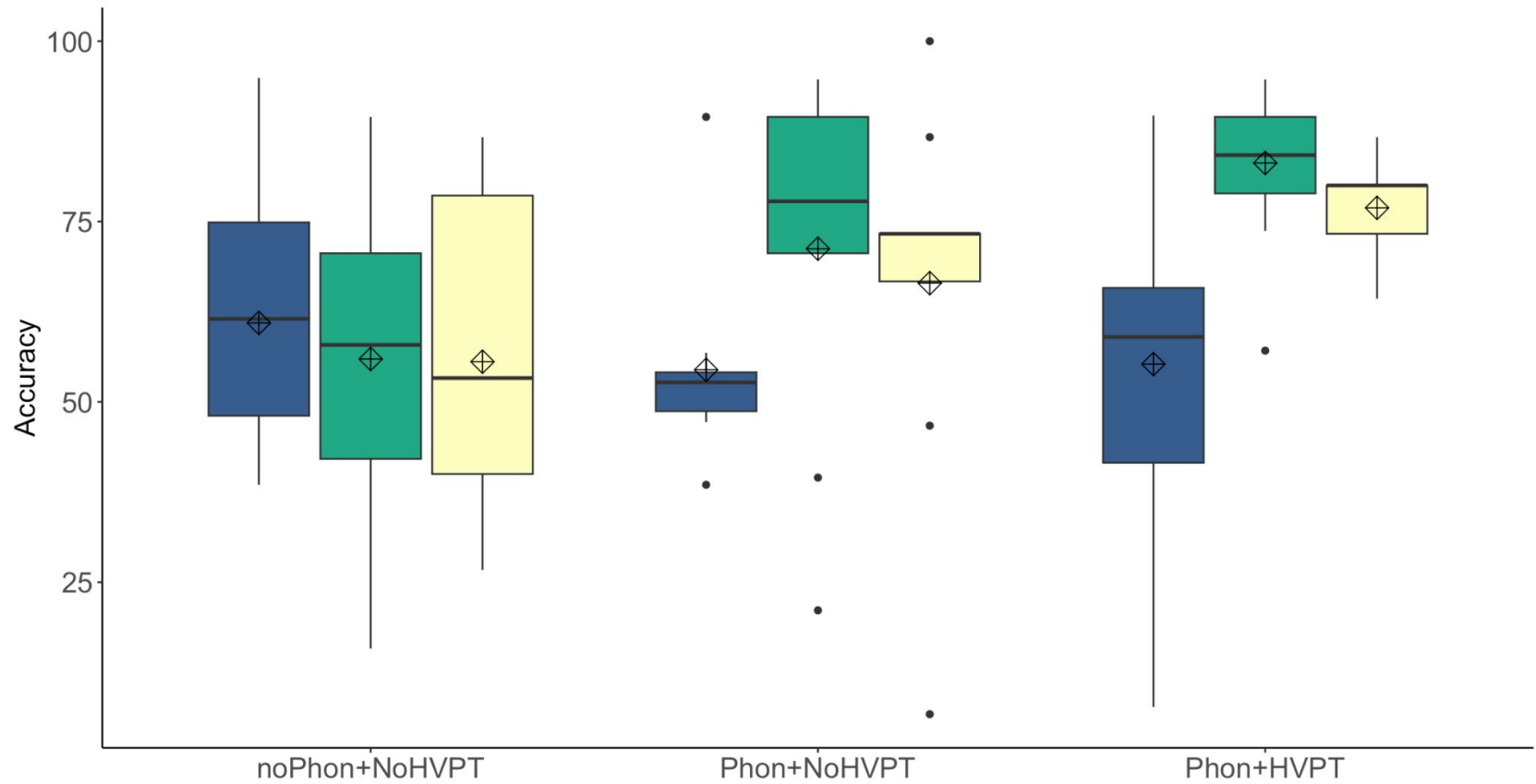
# Distincion



# Aspiración



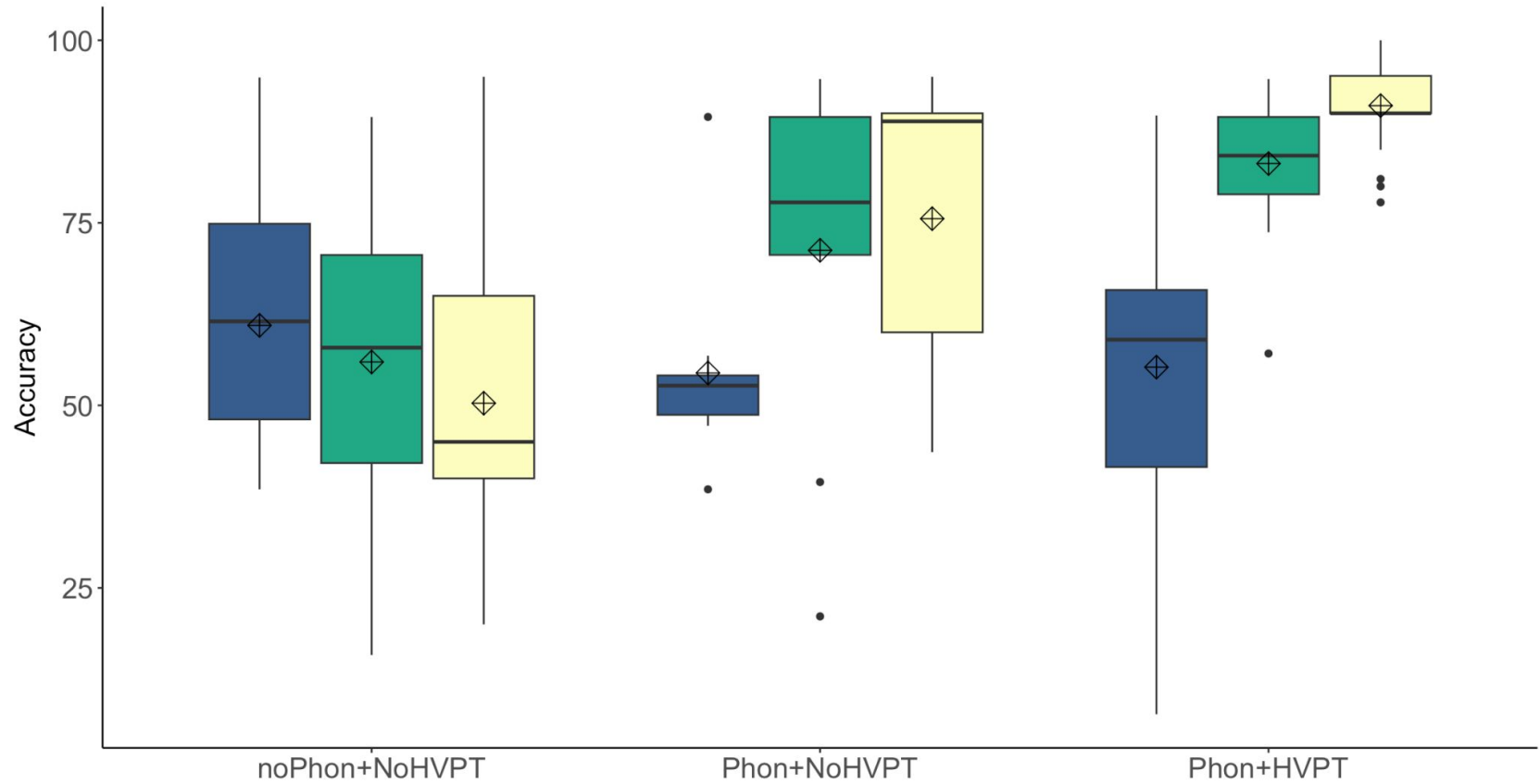
# Distinción



■ Pretest ■ Trained words at post-test ■ Untrained words at generalization

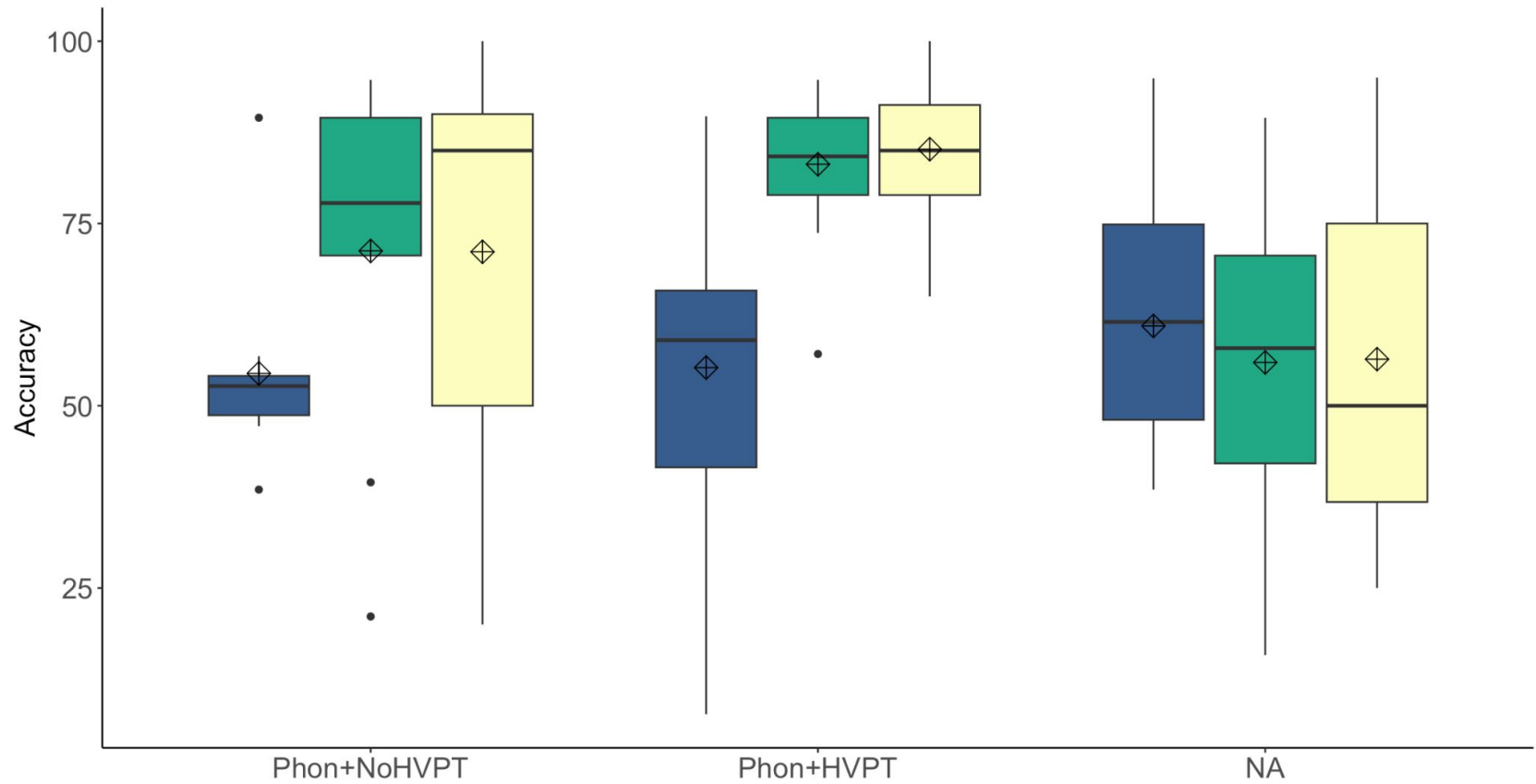


# Distinción



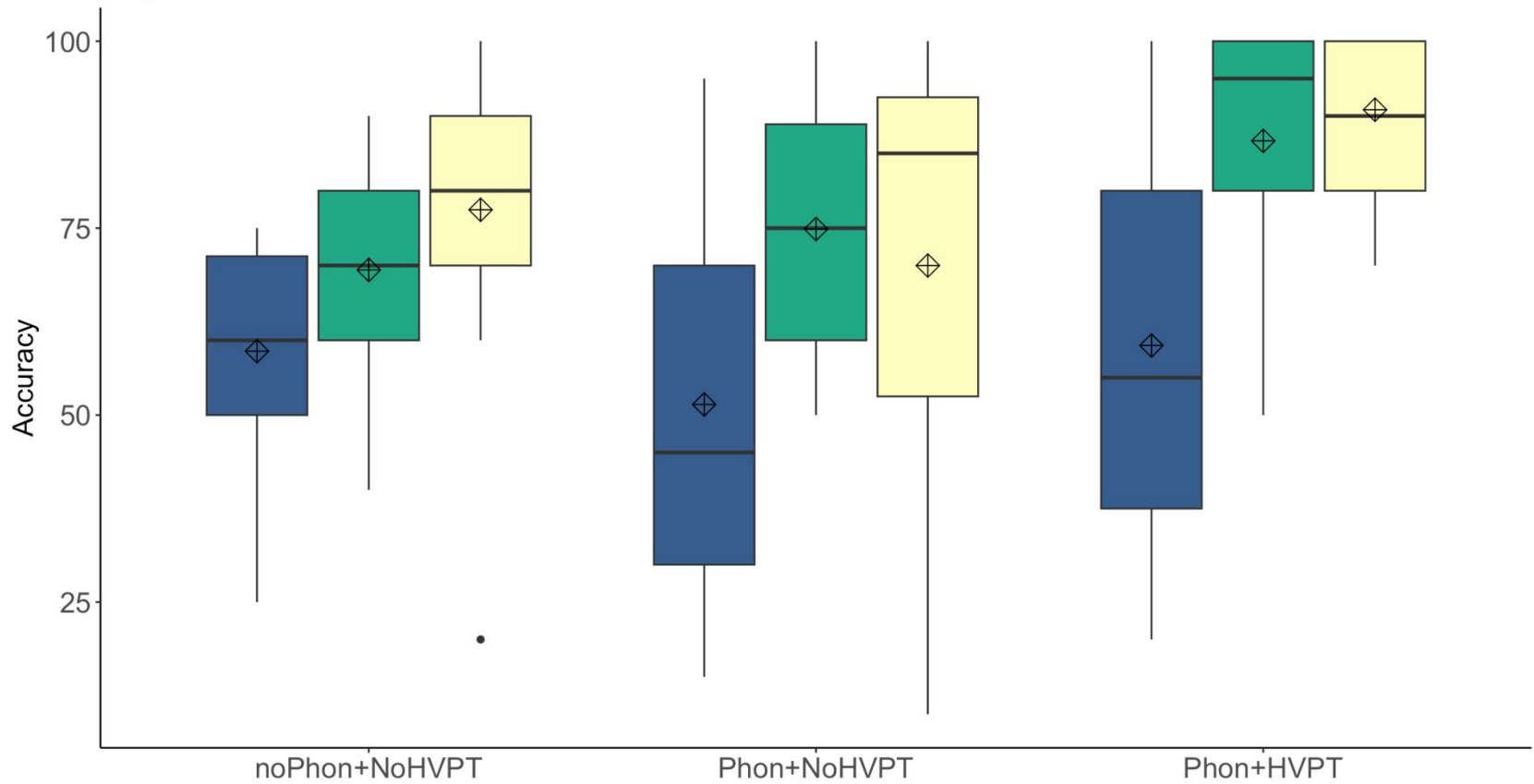
■ Pretest ■ Trained voices at post-test ■ Untrained voices at generalization

# Distinción



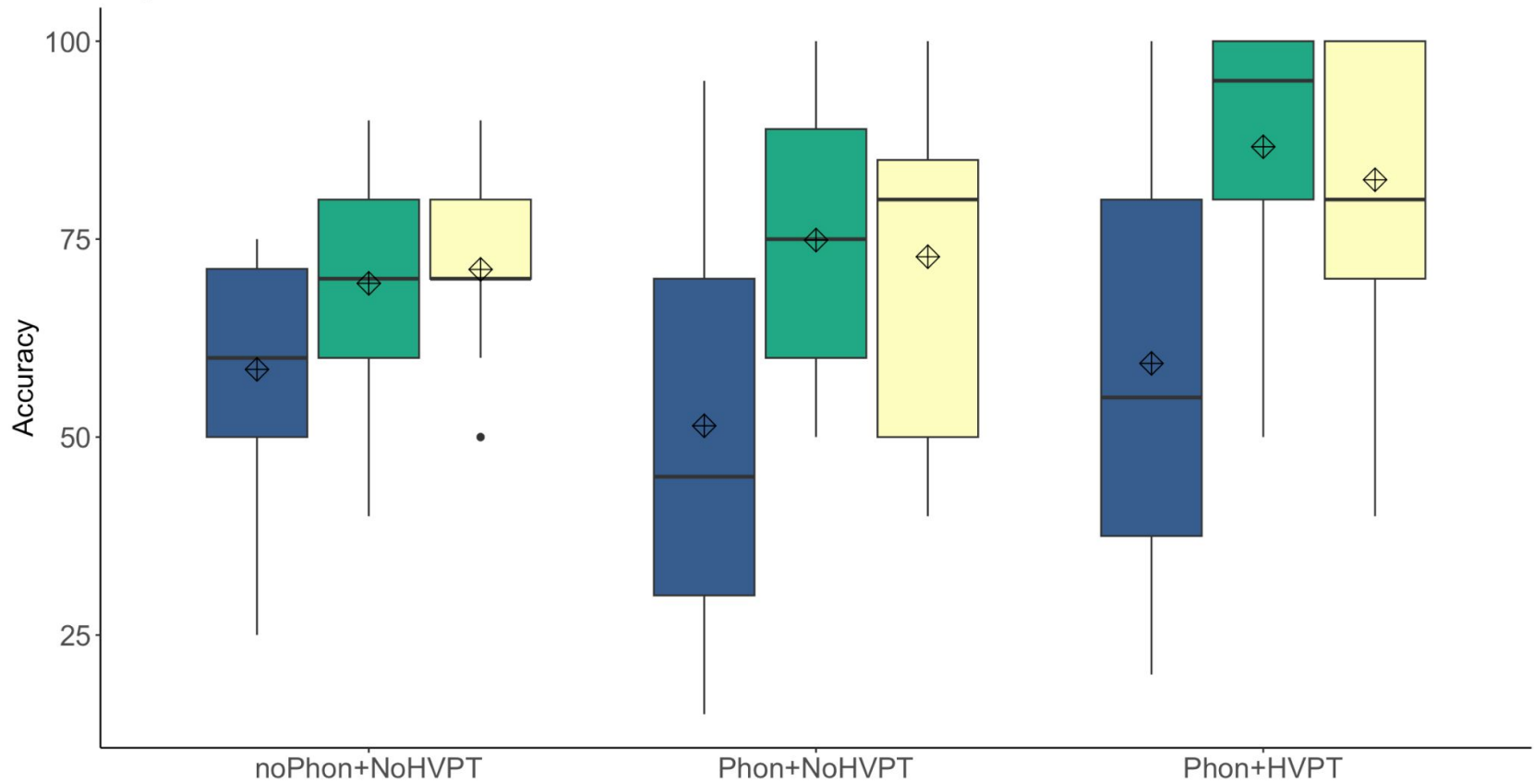
■ Pretest ■ Trained words/voices at post-test ■ Untrained words/voices at generalization

# Aspiración



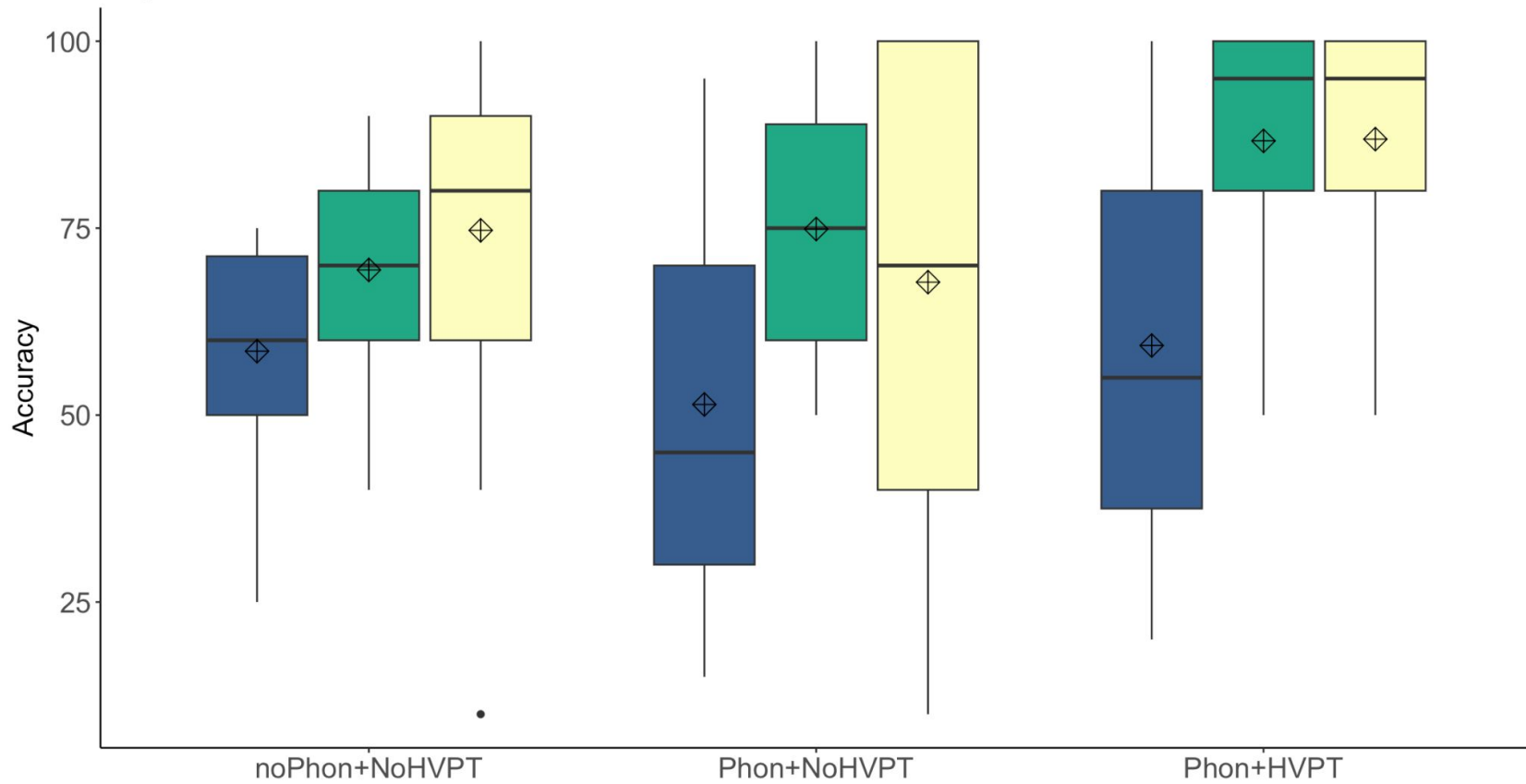
■ Pretest ■ Trained words at post-test ■ Untrained words at generalization

# Aspiración



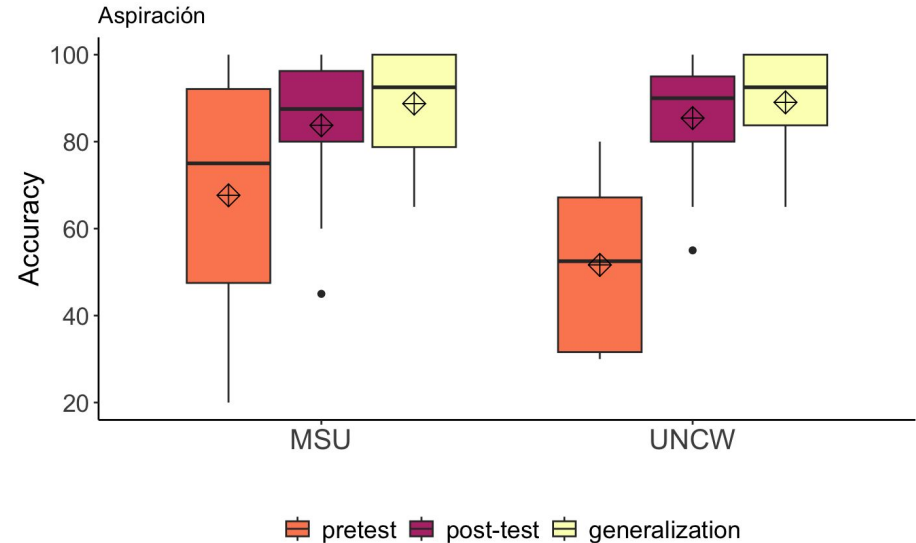
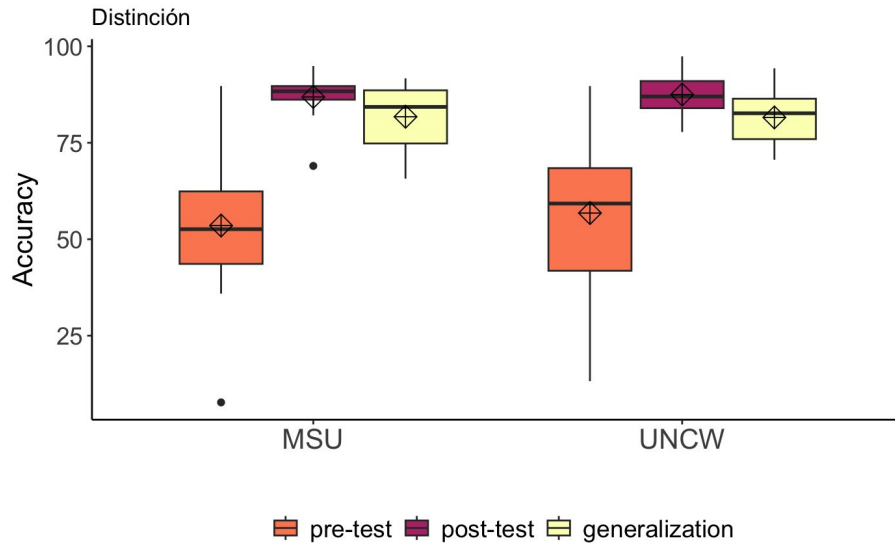
■ Pretest ■ Trained voices at post-test ■ Untrained voices at generalization

# Aspiración

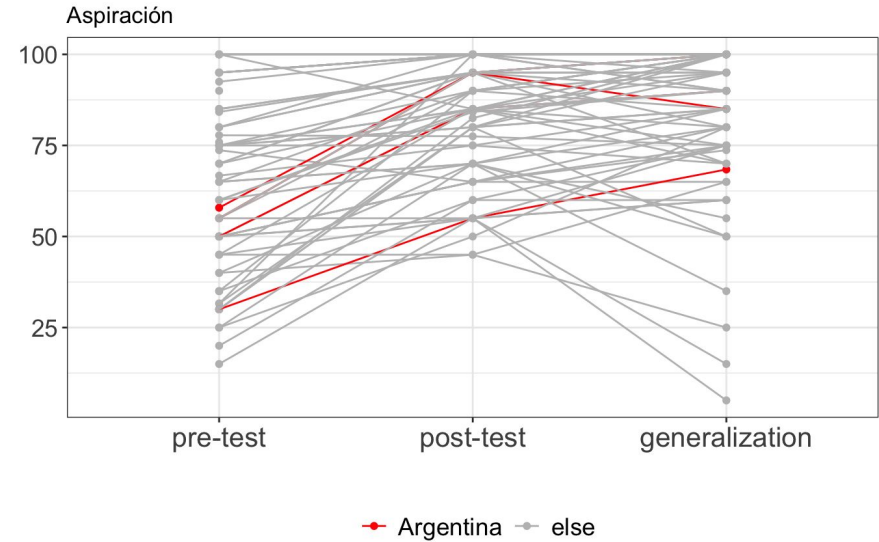
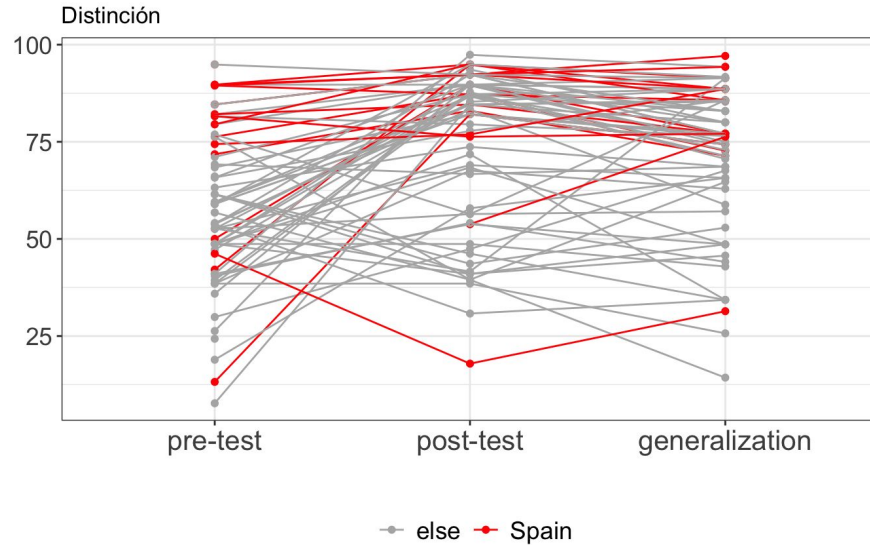


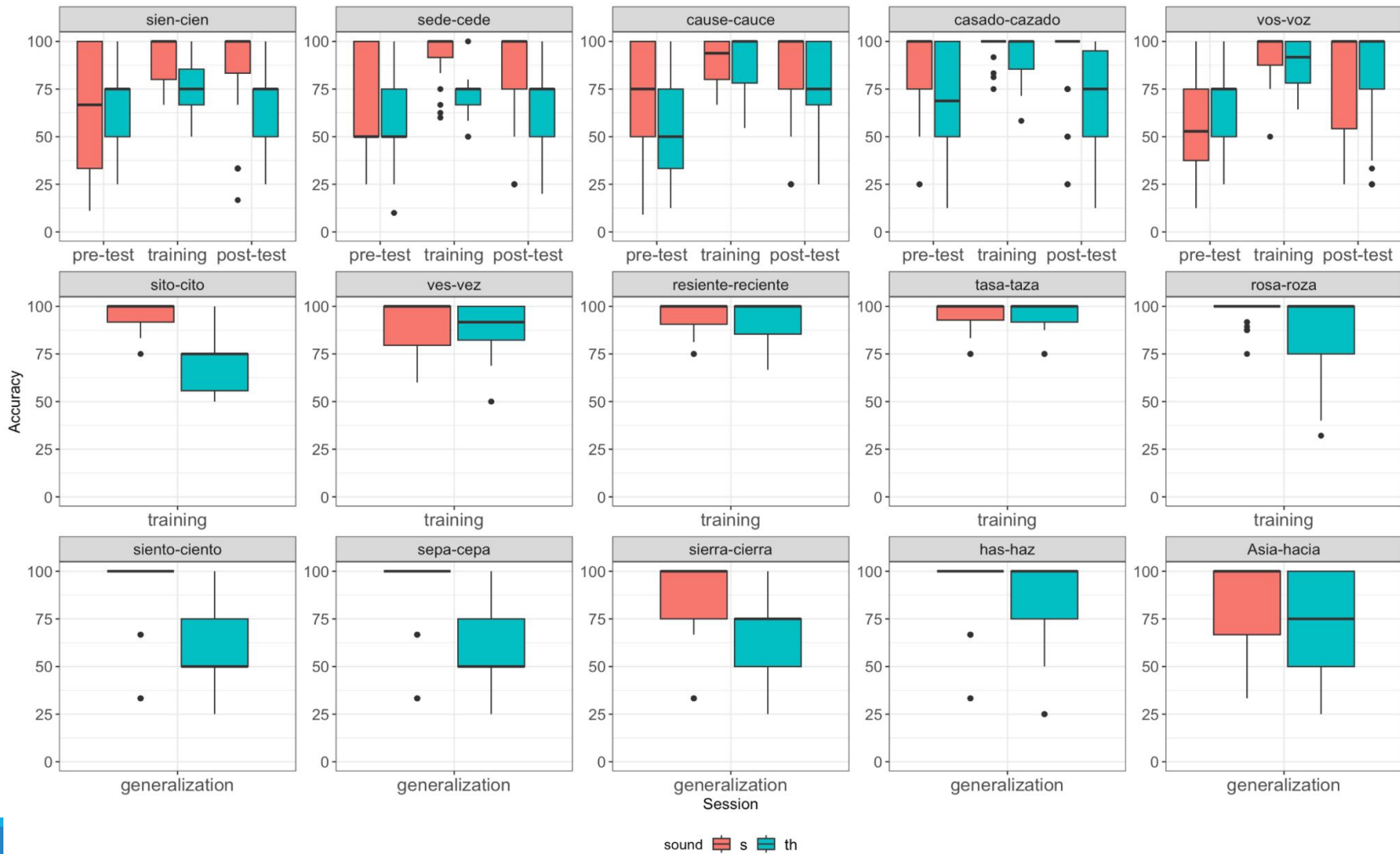
■ Pretest ■ Trained voices at post-test ■ Untrained voices at generalization

# What about the instructor?

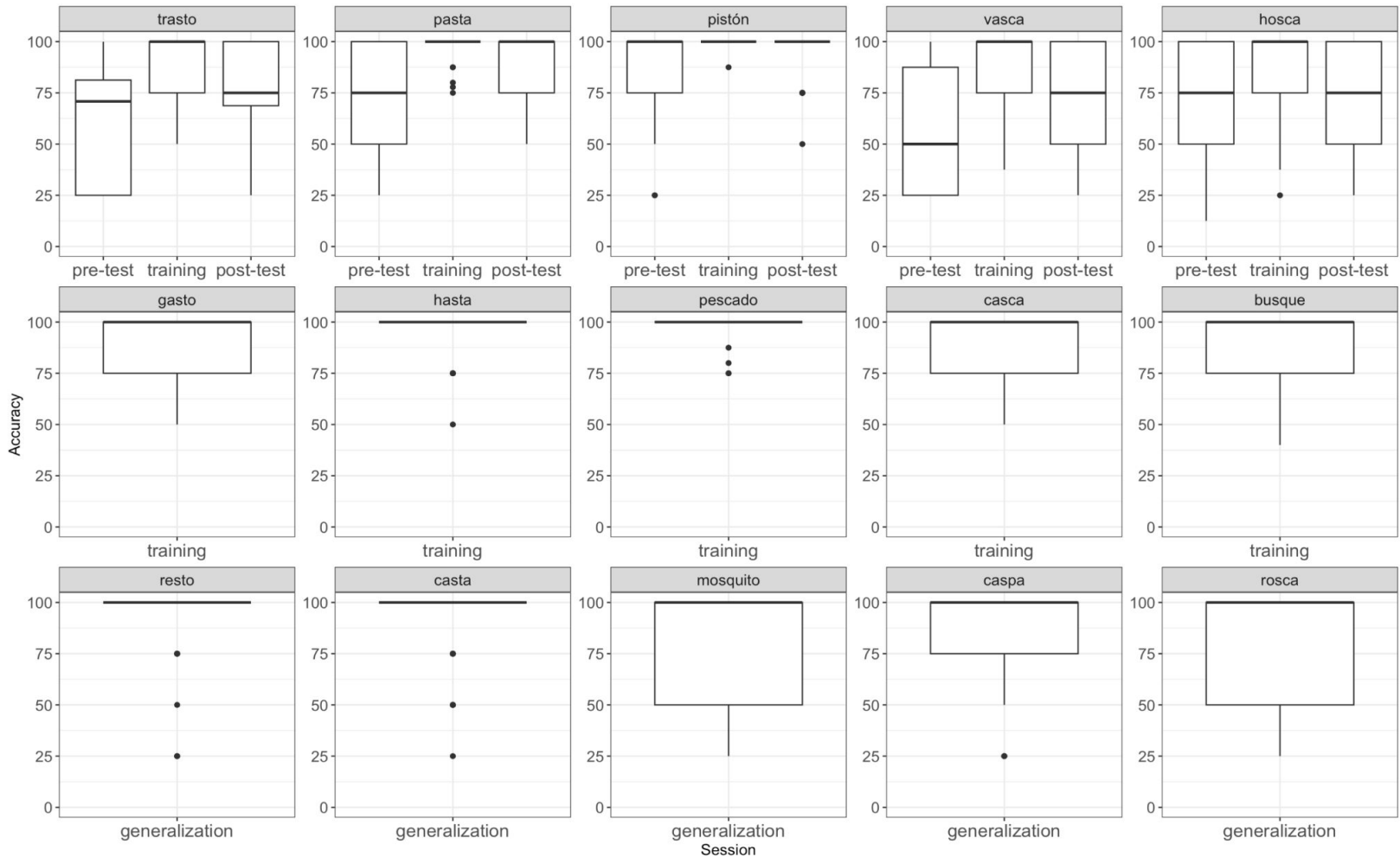


# Study abroad?











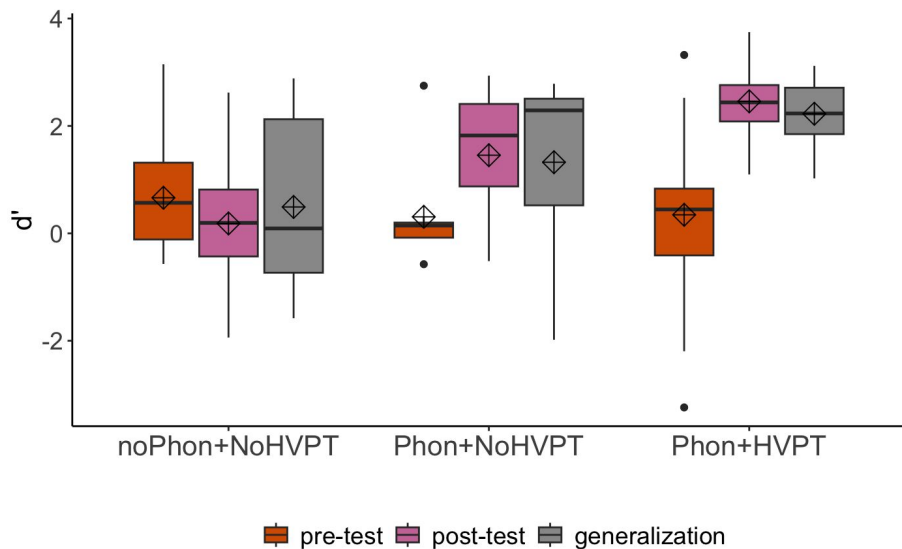
# Sensitivity and response bias

- We tallied hit, miss, false alarm and correct rejection.

		/θ/	
		present	absent
response	/θ/	hit	false alarm
	/s/	miss	correct rejection

# Distinción: Sensitivity

- $d'$  → sensitivity
  - 0-1: no sensitivity
  - 2-4: sensitivity

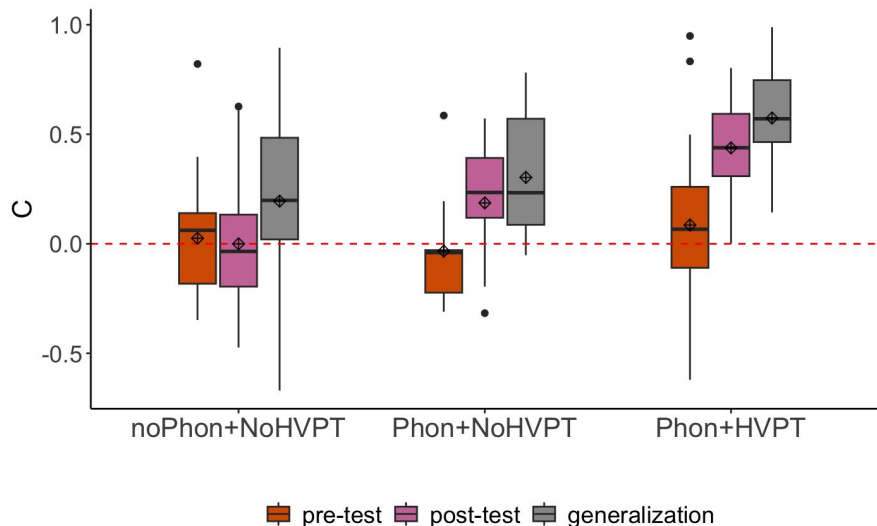


+Phonetics instruction → improvement in sensitivity

+HVPT → sensitivity goes even higher

# Distinción: Response bias

- $c \rightarrow$  response bias
  - Zero: no bias
  - Positive  $c$ : bias towards /s/
  - Negative  $c$ : bias towards /θ/



noPhon+NoHVPT  $\rightarrow$  no bias

Bias for Phon+HVPT  $\rightarrow$  They dismiss /θ/ more often

- But... when they don't identify /θ/, false negatives (miss) or false positives (false alarm)?
  - We see a reduction in misses (to ~0)

They hear /θ/ and they respond /s/

–But not the other way around–

They hear /s/ and they **\*\*don't\*\*** respond <c, z>

Phon+NoHVPT  $\rightarrow$  tiny reduction in false alarms

# Aspiración: Sensitivity and response bias

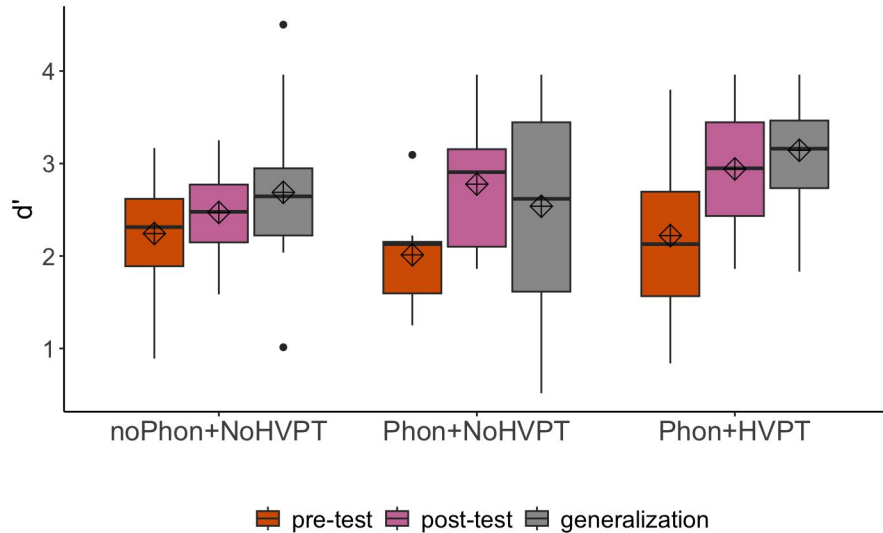


- We tallied hit, miss, false alarm and correct rejection.
  - *pata* vs. *pa[h]ta*

		[h]	
		present	absent
response	[h]	hit	false alarm
	∅	miss	correct rejection

# Aspiración: Sensitivity

- $d'$  → sensitivity to [h]
  - 0-1: no sensitivity
  - 2-4: sensitive

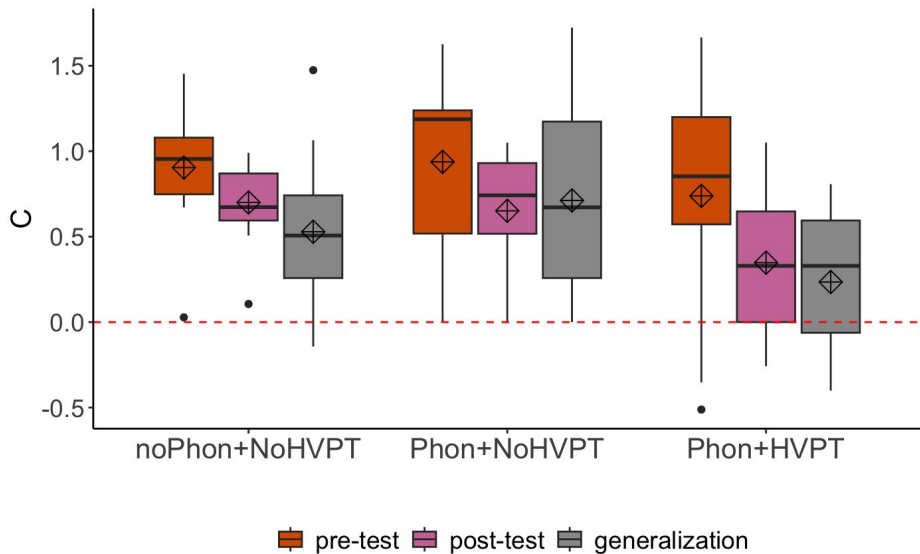


Groups that received Phonetics training show the greatest improvement

Phon+HVPT > Phon+NoHVPT

# Aspiración: Response bias

- $C \rightarrow$  response bias
  - Positive  $c$ : bias towards  $\emptyset$
  - Negative  $c$ : bias towards  $[h]$
  - Zero  $c$ : no bias



Phon+HVPT  $\rightarrow$  marked reduction in bias

Phon+NoHVPT  $\rightarrow$  Little reduction in bias  
but... do we see a reduction in false positives (false alarm) and negatives (misses)?

- $\rightarrow$  Low incidence of false positives
- $\rightarrow$  They show misses, but little reduction over time

They were presented with  $[h]$  and responded  $\emptyset$