

STATISTICAL LEARNING OF L2 PHONOLOGY IN ADULTHOOD

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INTRODUCTION

- Adults have great difficulty learning non-native speech sounds in a second language.
- **Aim:** examine whether an implicit, *cross-situational learning*^{1,2} paradigm facilitates non-native sound acquisition.
- **Prediction:**
 - learners can keep track of linguistic information across various learning trials to learn novel words that contain non-native sounds, with no feedback or instructions on the new sounds;
 - presenting words in minimal pairs influences learning outcomes³, as phonologically similar words occur frequently in languages.
- Pre-registered study: <https://osf.io/2j6pe/>

RESEARCH QUESTIONS

1. Whether and how do non-native sounds and minimal pairs interfere with cross-situational learning?
2. Does learners' non-native sound perception develop during cross-situational learning?

MATERIALS & METHODS



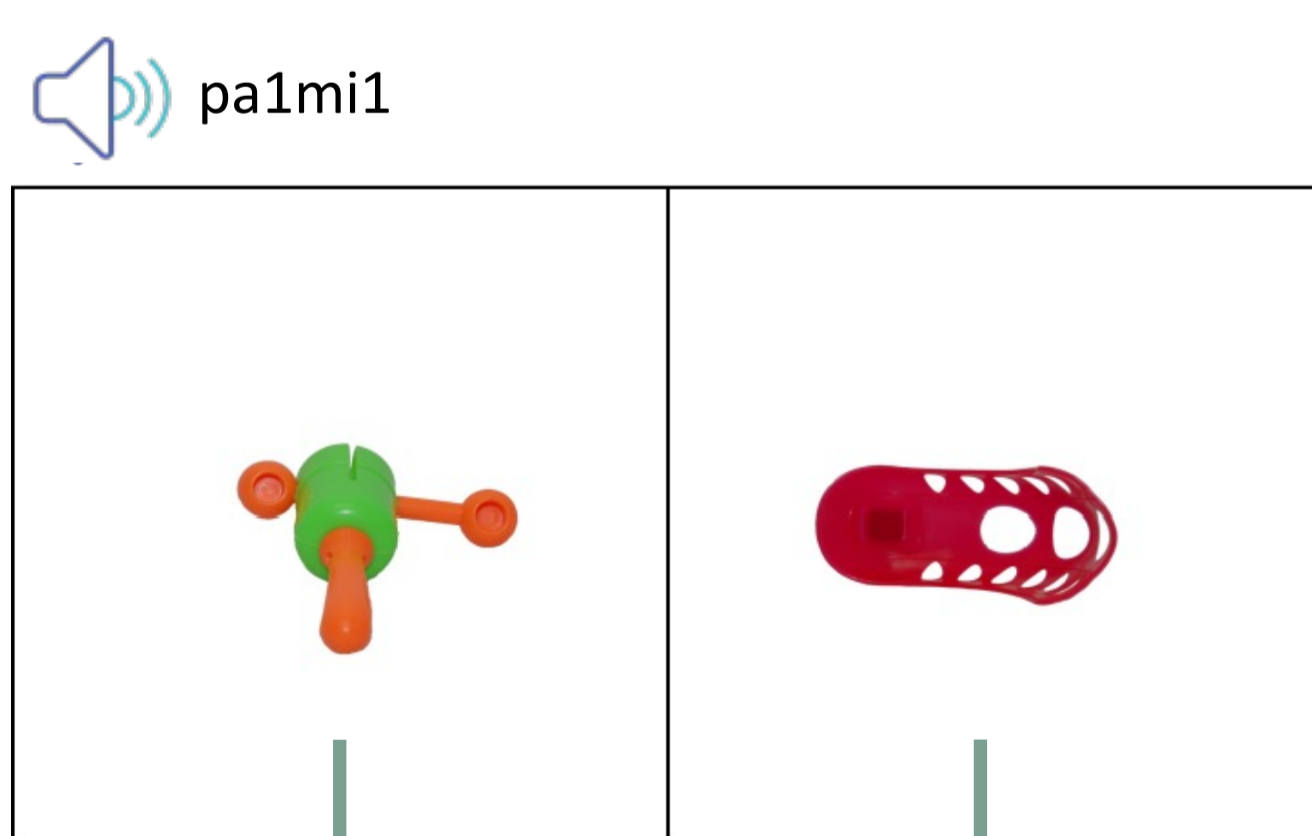
N=56

English native (N=28)
 Mandarin native (N=28)

Consonantal set		Vocalic set	
pa1mi1	pa4mi1	li1fa1	li4fa1
ta1mi1	ta4mi1	lu1fa1	lu4fa1
ka1mi1	ka4mi1	lei1fa1	lei4fa1

Note. Numbers refer to Mandarin **Tone 1** and **Tone 4**.

CROSS-SITUATIONAL LEARNING TASK



Different types of learning trials (n=144)

Consonantal minimal pair	pa1mi1	ta1mi1
Vocalic minimal pair	li1fa1	lu1fa1
Tonal minimal pair	pa1mi1	pa4mi1
Non minimal pair	pa1mi1	li4fa1

DEBRIEFING SESSION



Debriefing questionnaire

Noticing tone/pitch pattern?

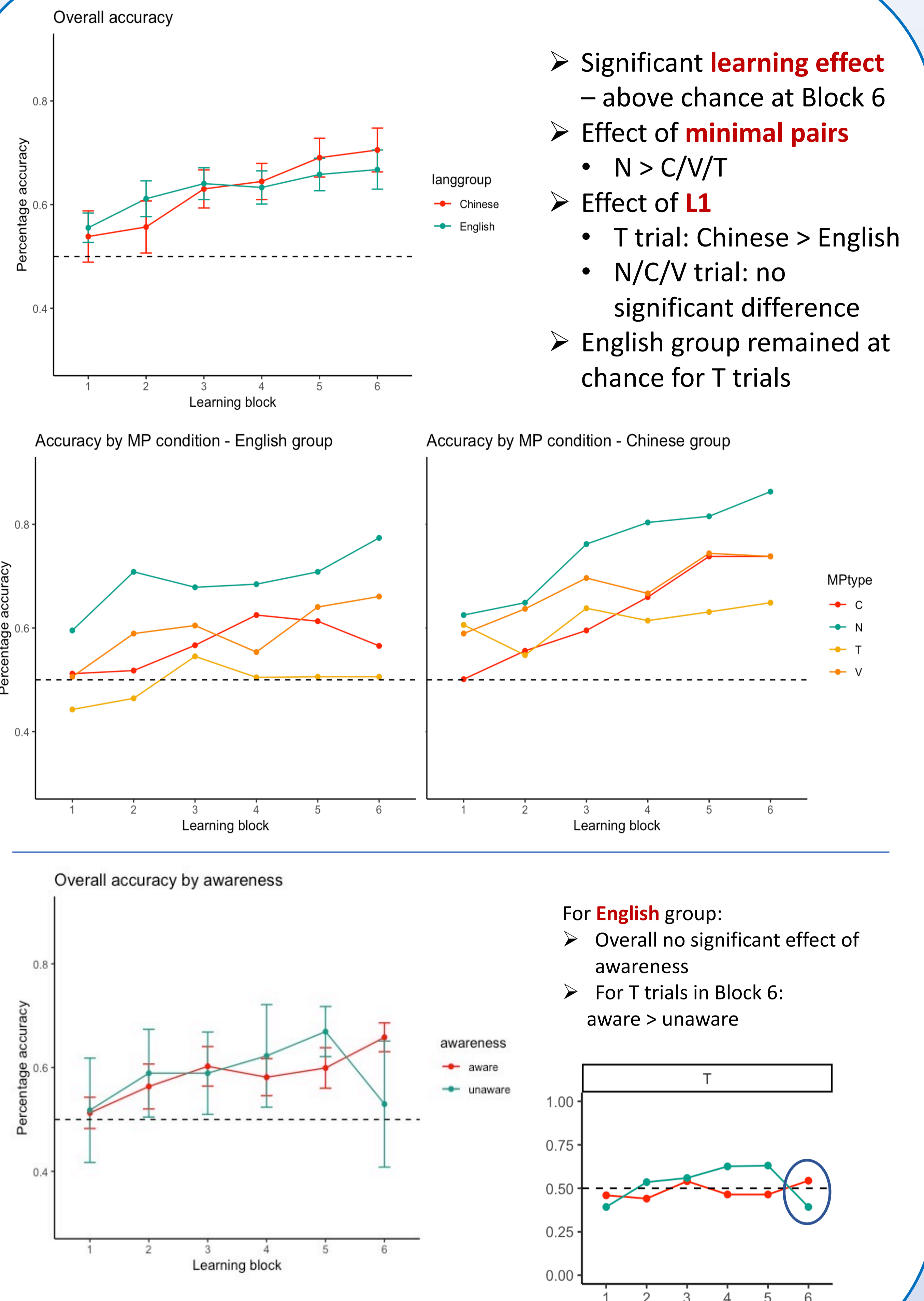


Aware Learner



Unaware Learner

RESULTS



- Significant **learning effect** – above chance at Block 6
- Effect of **minimal pairs**
 - N > C/V/T
- Effect of **L1**
 - T trial: Chinese > English
 - N/C/V trial: no significant difference
- English group remained at chance for T trials

DISCUSSION

- Successful cross-situational learning of novel words with non-native sounds.
- The presence of minimal pairs and non-native sounds interferes with CSL outcomes.
- For English participants, the 10-min CSL exposure is not sufficient to improve tonal perception significantly.

FURTHER DIRECTIONS

- **Perception-production link** – measure tonal production
- **Individual differences** – what are the predictors of learners' tonal performance?
 - Auditory processing ability
 - Pre-training perceptual ability
 - Working memory...
- Effect of **explicit instructions**

References

- [1] Yu, C., & Smith, L. B. (2007). Rapid word learning under uncertainty via cross-situational statistics. *Psychological science*, 18(5), 414-420.
- [2] Monaghan, P., Schoetensack, C., & Rebuschat, P. (2019). A single paradigm for implicit and statistical learning. *Topics in cognitive science*, 11(3), 536-554.
- [3] Escudero, P., Mulak, K. E., & Vlach, H. A. (2016). Cross-situational learning of minimal word pairs. *Cognitive Science*, 40(2), 455-465.