

University of Calgary
SLLLC, Linguistics

Perception of L2 Lexical Pitch Accents

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Outline

1. Previous Research
2. The Present Study
 - Research Questions
 - Methodology
3. Results
4. Discussion
5. Conclusion

Introduction

Lexical Pitch Accents (LPAs)

- LPAs contrast lexical items
- Signal the lexical contrast over moras or syllables (Jun 2005)

Language	Lexical items	
Norwegian	vonne = water (n.) 	vonne = water (v.) 
Serbian	grad = hail (n.)	grad = city (n.)
	duga = rainbow (n.)	duga = long (adj.)

Previous Research

- Languages with the non-lexical nature of pitch contrasts (Quam and Swingley, 2010)
 - English and French
- Learners of tone languages use pitch in recognition of words (Ota et al. 2018)
 - Cantonese and Mandarin

Previous Research

- Perception constrained by the acoustic characteristics of the pitch contrast (Ota 2003)
- Pitch accent ‘robust’ acoustic cues (Grice et al. 2017):

1. Alignment – Fo peak

2. Height – Fo target on the starred tone (H*)

3. Tonal onglide – Fo movement

Study Goals

RQs:

- 1) Can L2 listeners perceive the distinction between differently accented words?
- 2) Which acoustic cues contribute to the discrimination of different LPAs?

Methodology

Stimuli:

- Serbian speakers (1 female & 1 male)
- 4 sentences: each had one target lexical item
- Serbian LPAs:
 - 2 LPAs: L*H (rising) and H*L (falling)

(Godjevac 2005, Smiljanić 2013)

Methodology

For example:

Ovo je línija crvene boje

[ovo je línija tsrvne boje]

This is line.NOM [red color].GEN

‘This is a red line.’

L*H

Ovo je màlina crvene boje

[ovo je màlina tsrvne boje]

This is raspberryNOM [red color].GEN

‘This is a red raspberry.’

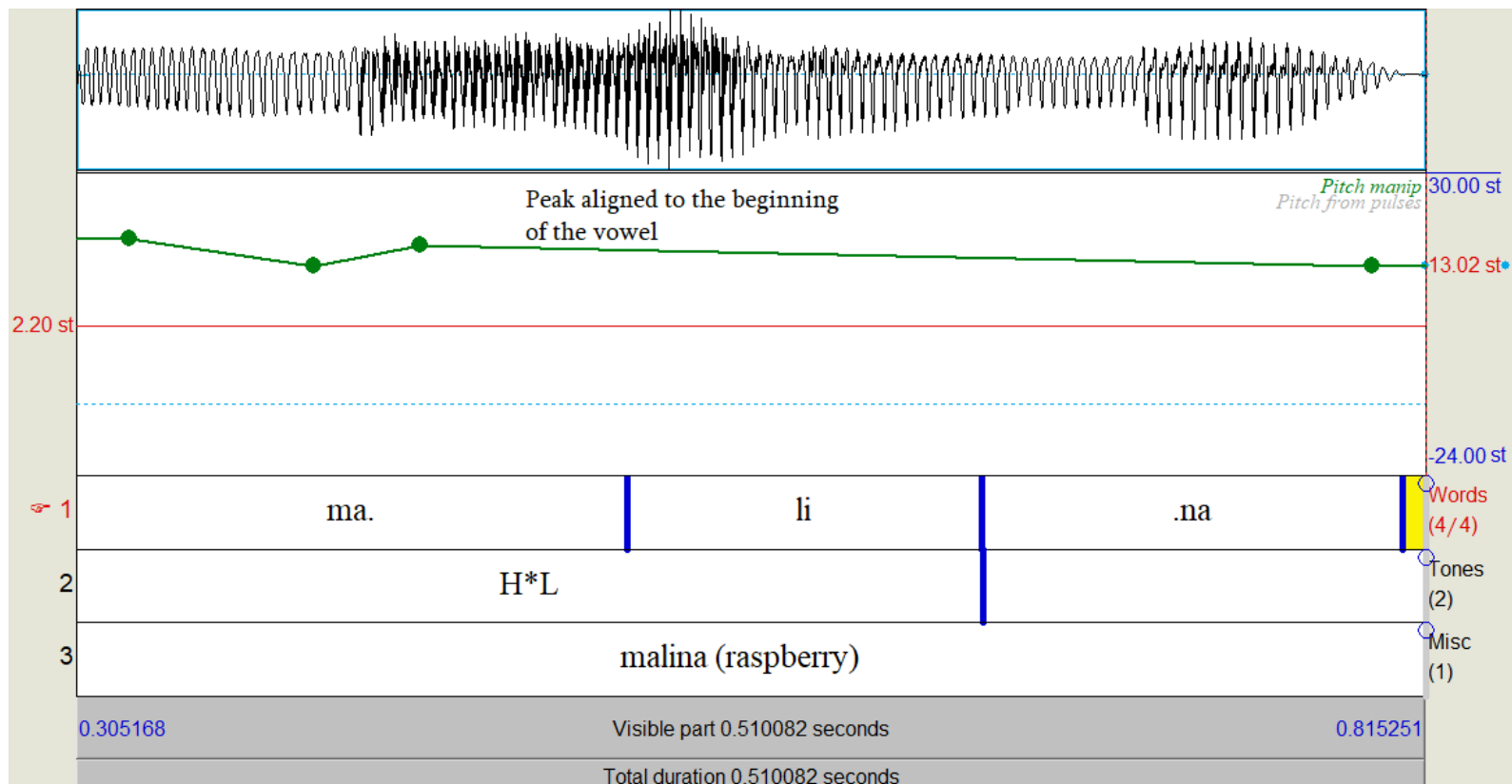
H*L

Methodology

Types of manipulation (Praat):

1. Original
2. Alignment

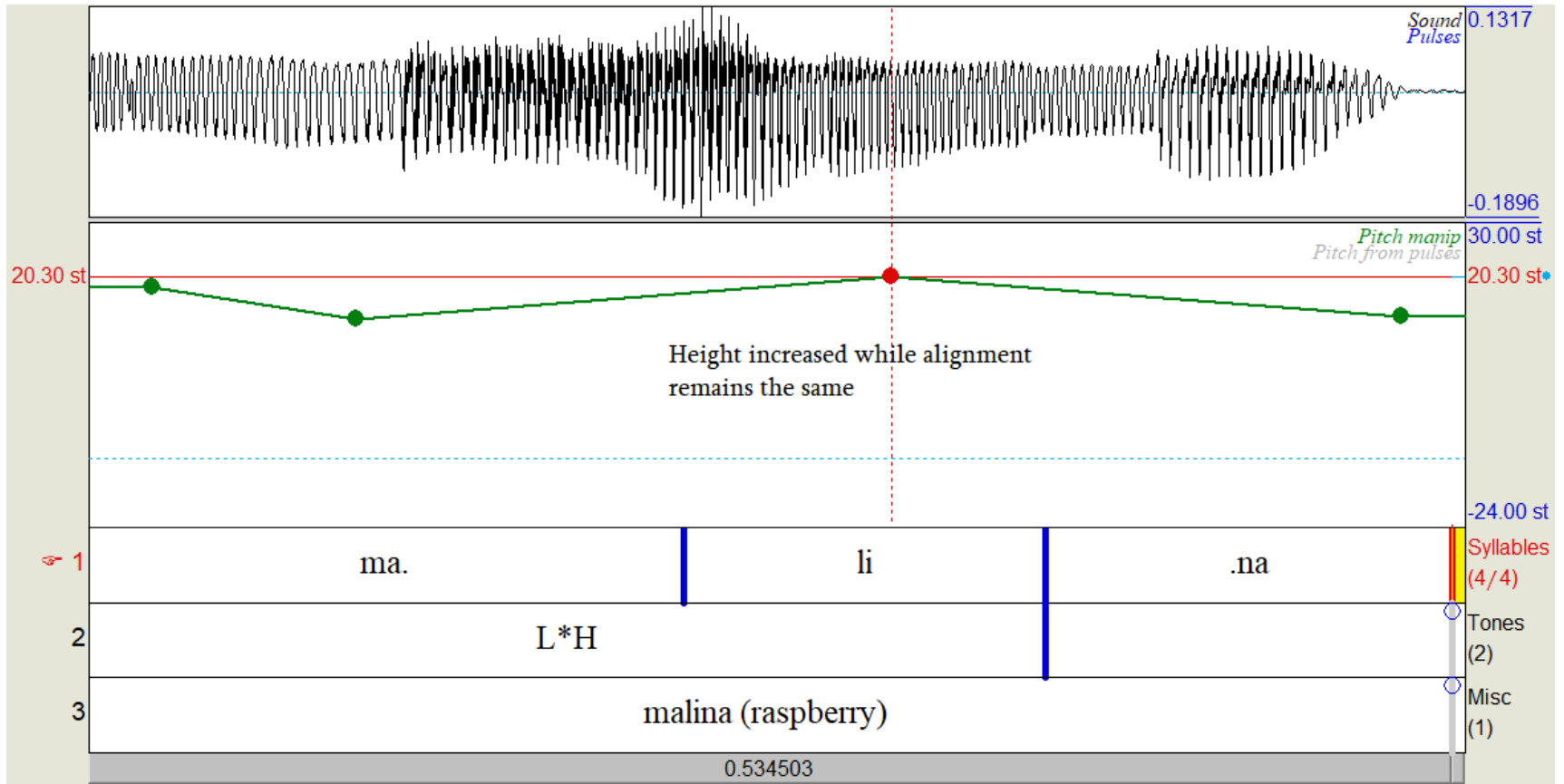
Relative to the duration of the pitch accent (Grice et al. 2017) ~ 10 – 20 ms



Methodology

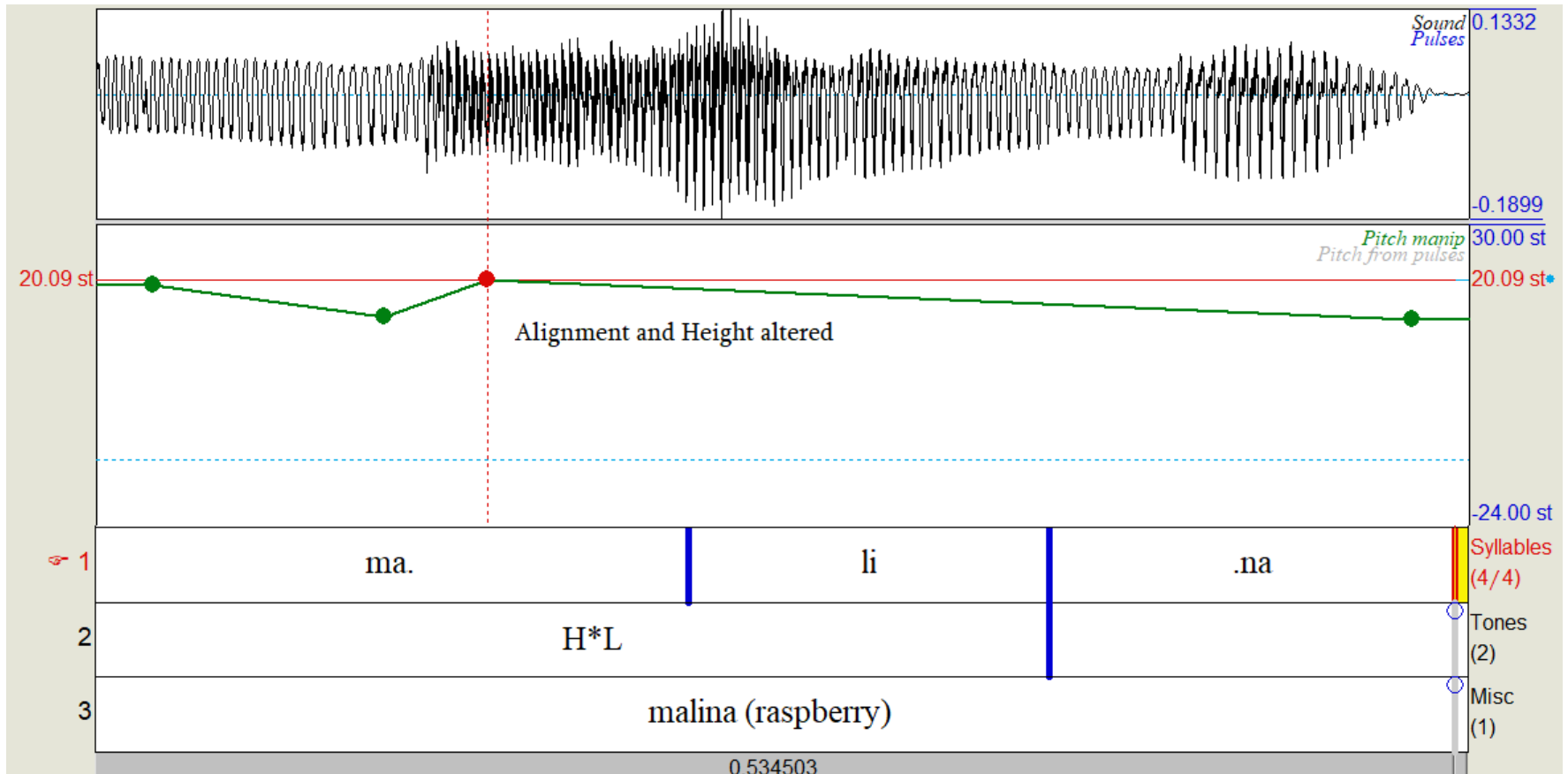
3. Height

Based on Dawson et al. (2017):
about 50Hz



Methodology

4. Alignment+Height



Methodology

Types of manipulation:

1. Original
2. Alignment
3. Height
4. Alig_Height



- With pairwise combinations there were **10** conditions

Methodology

Pitch Accent combinations:

1. L*H (rising)
2. H*L (falling)
3. L*H (rising) - H*L (falling)
4. H*L (falling) - L*H (rising)

Methodology

Participants (naïve listeners):

- 5 Canadian English (mean age = 30, 2 female, 3 male)
- 2 Chinese (1 Cantonese & 1 Mandarin, mean age = 24, both female)

Procedure:

- AX discrimination task in PsychoPy3 (Pierce et al. 2019)
- Randomized stimuli presented in pairs with a 1000 ms inter-stimulus interval
- 4 sentences x 2 speakers x 10 conditions = 80 trials

Methodology

Data Analysis:

- Generalized Estimating Equation, i.e. GEE under Genlin procedures in SPSS v 25
($\alpha = 0.05$ was applied for all tests)
- **Accuracy scores** and **RTs**
- Determine the effect of:
 - 1) Conditions (10)
 - 2) Pitch accent combination (4)

Results

I. Accuracy scores

First Language	Speakers					Total
	F1	F2	M1	M2	M3	
English	66 %	71 %	59 %	66%	60%	64%
Mandarin & Cantonese (in that order)	71 %	53 %				62%

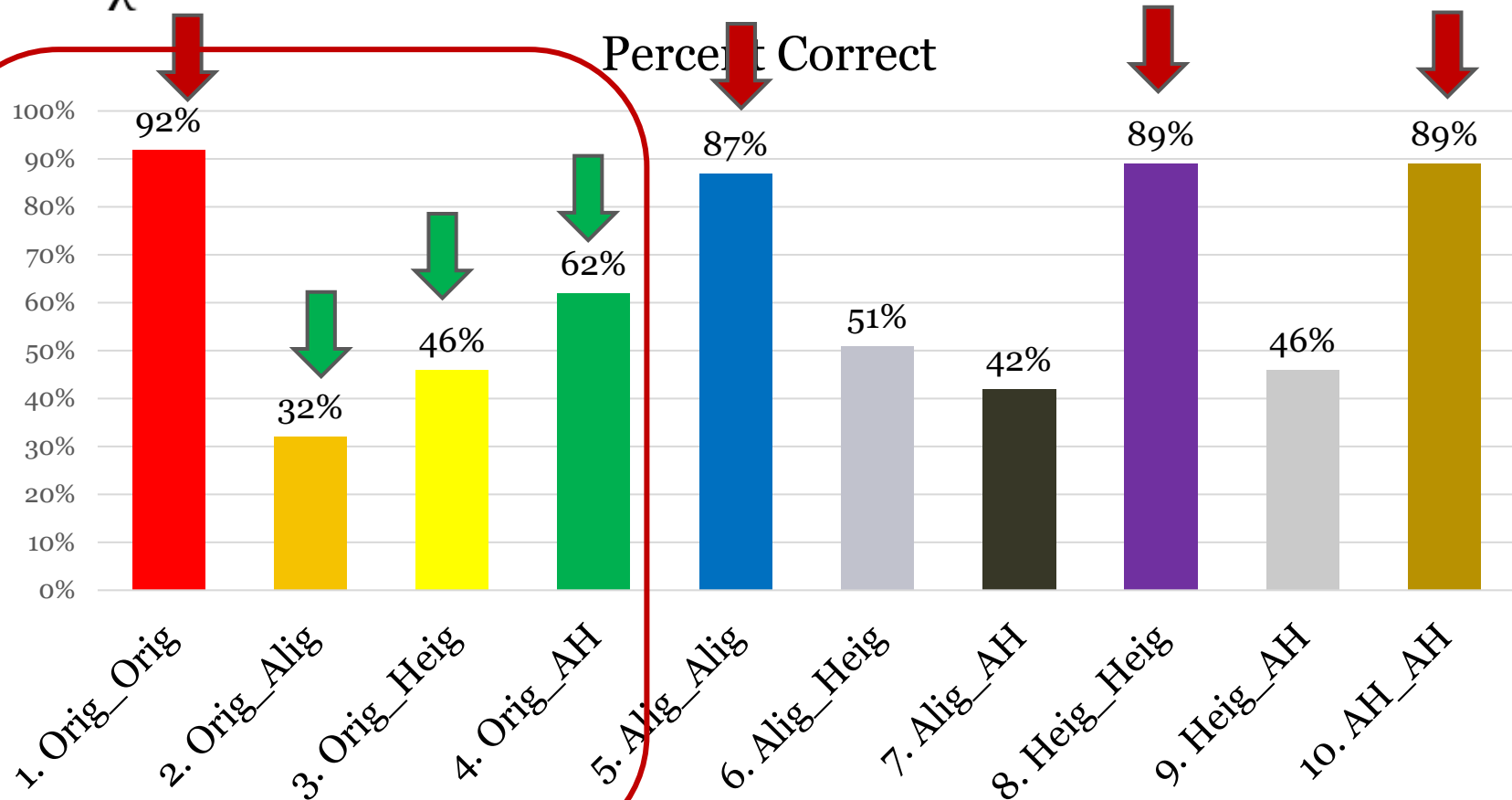
- Language groups were not sig. different
 $\chi^2(6) = .196, p = .658$

Results

I. Accuracy scores

Condition was highly significant

($\chi^2(6) = 1306.679, p < .001$)

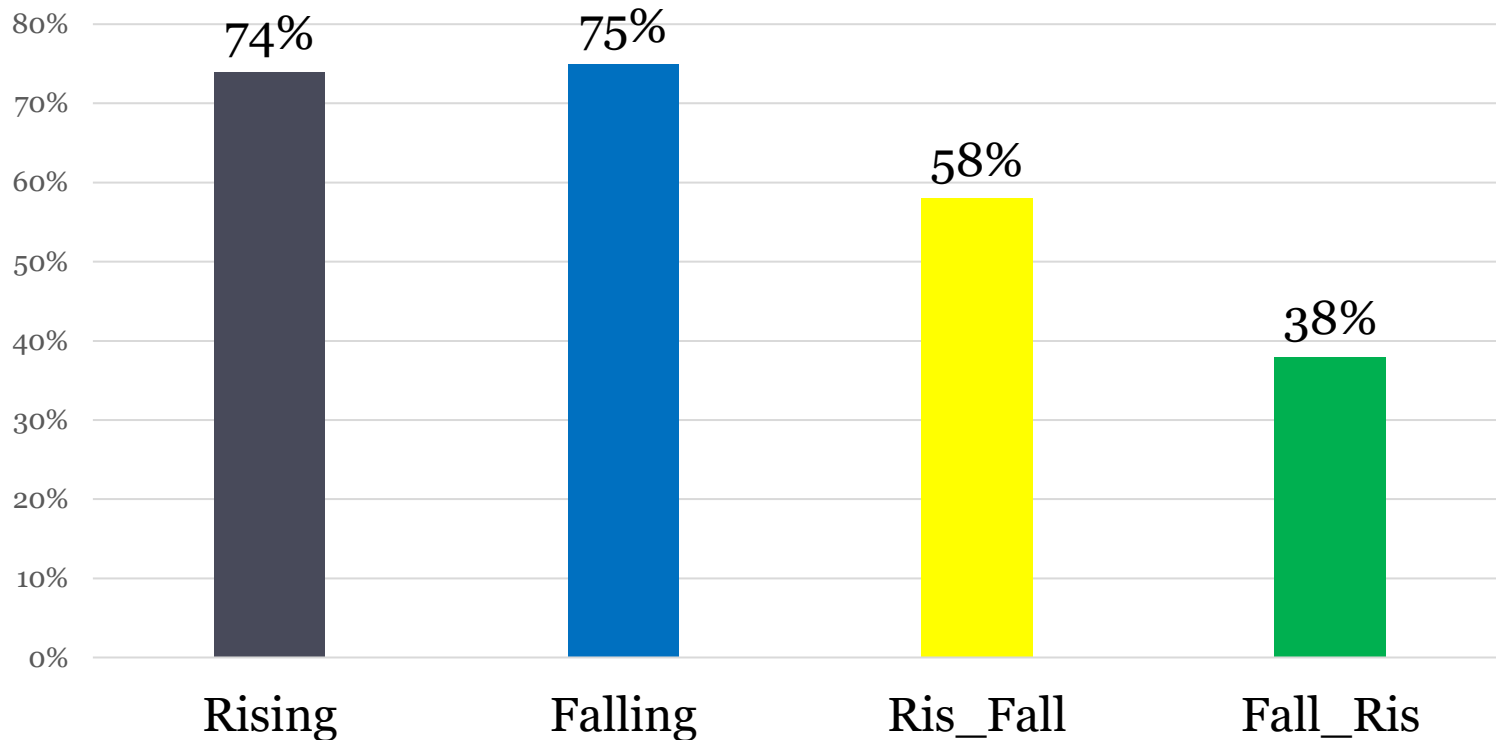


Results

I. Accuracy scores

PA combinations: $\chi^2 (3) = 127.691, p < .001$

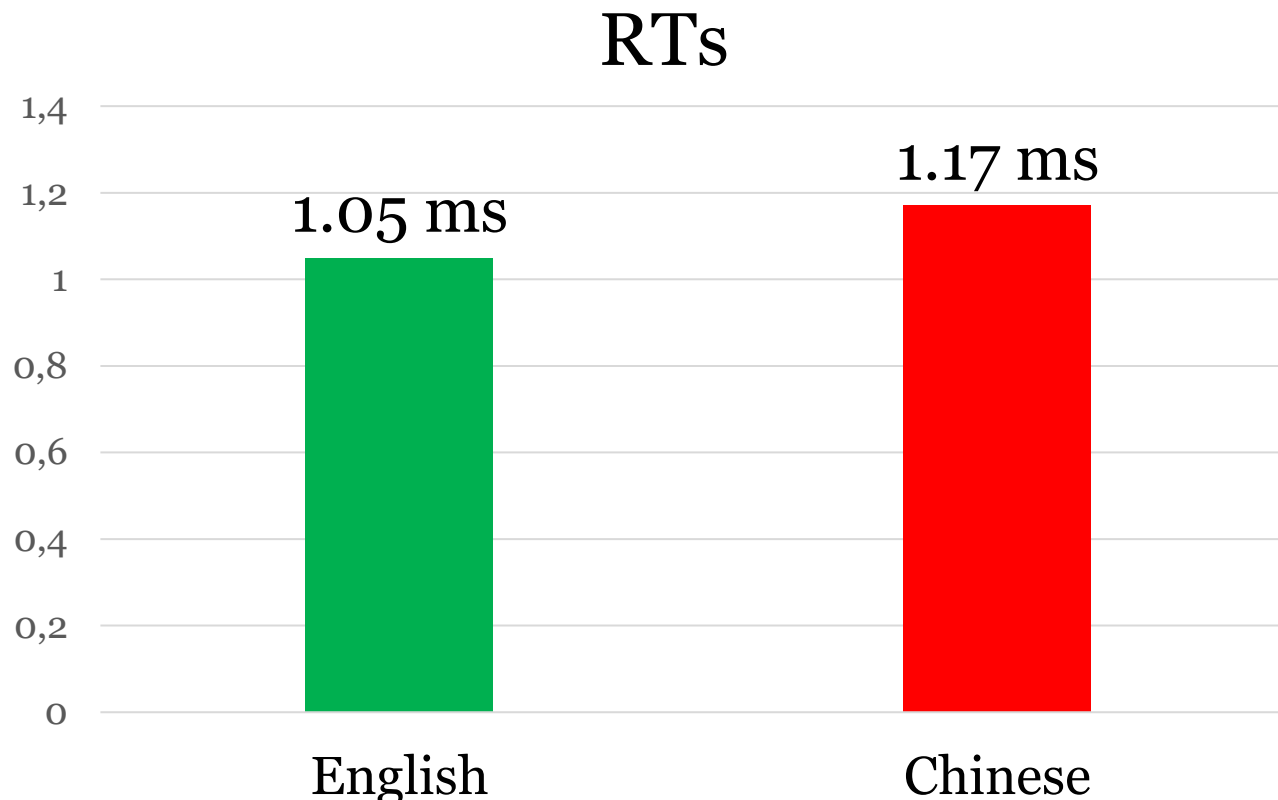
Percent Correct



Results

II. Reaction Times (correct)

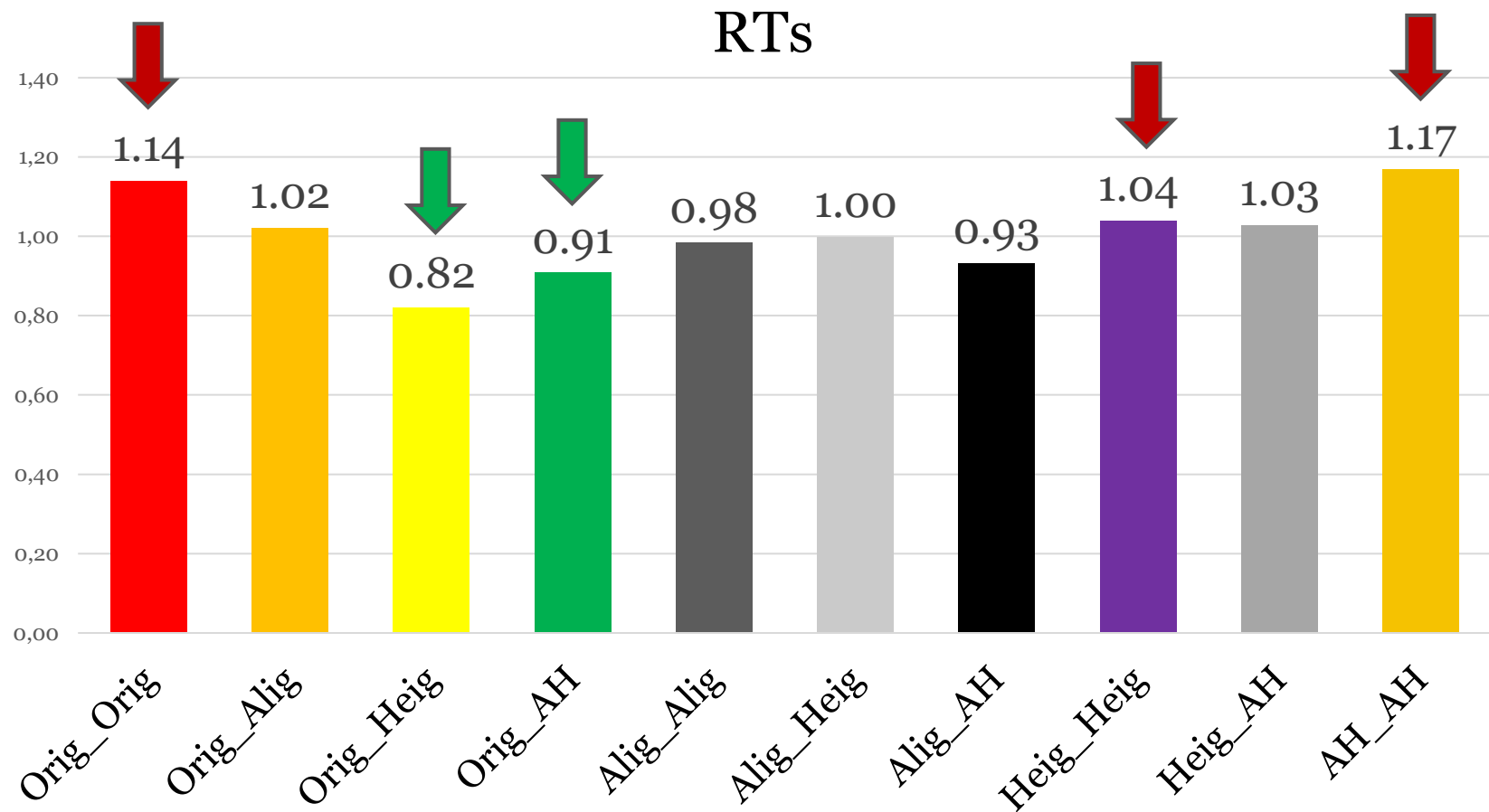
- Language Groups: $\chi^2 (6) = 1.291, p = .256$



Results

II. Reaction Times

- Condition: $\chi^2(3) = 44.918, p < .001$

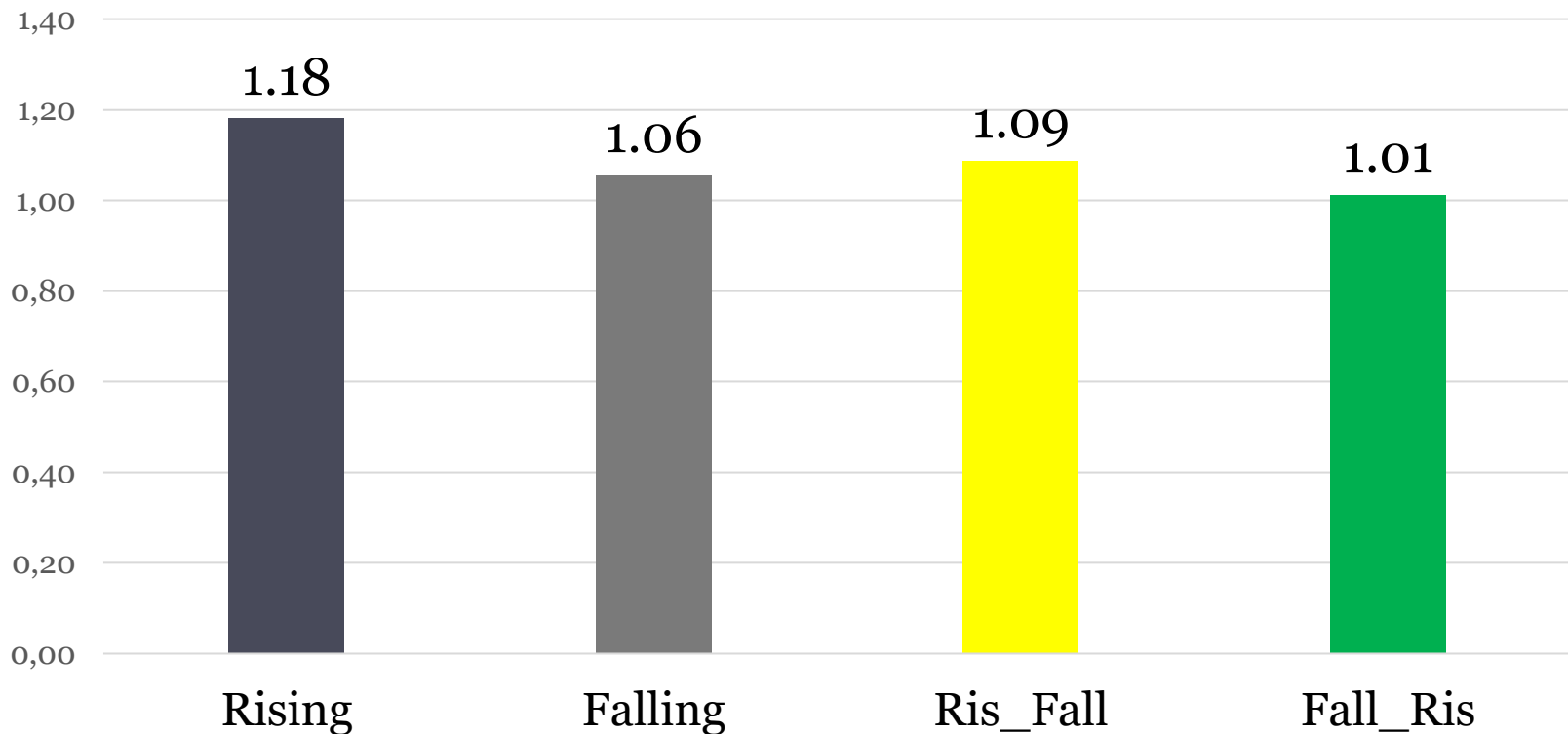


Results

II. Reaction Times

- Pitch accent combination: $\chi^2(3) = 4.878, p = .181$

RTs



Discussion

1. No considerable language differences on discrimination and reaction times
2. Greater acoustic difference - greater accuracy and lower processing times
3. Movement of the pitch – no effect on processing times & low accuracy scores

Discussion

RQ 1: Can L2 listeners perceive the distinction between differently accented words?

- English and Chinese speakers can perceive the acoustic differences in Serbian LPAs

RQ 2: Which phonetic cues contribute to the discrimination of different lexical pitch accents?

- Alignment and Height in tandem are most 'robust' acoustic cues

Conclusion

- Robust acoustic cues important for discriminating L2 LPAs
- Greater acoustic manipulation – faster processing times
- No language differences

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