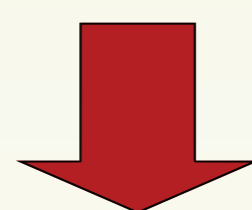


Objective

To determine whether the prominence of lexically-contrastive pitch in the L1 shapes perception of non-native tone patterns (Thai), in a hierarchical pattern

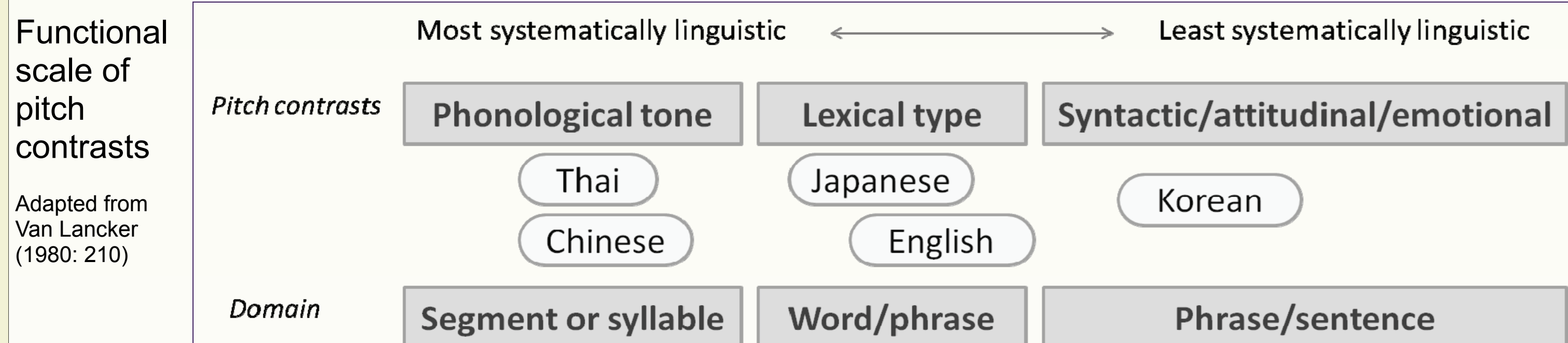
Previous studies

- * Suprasegmental dimensions such as word stress or tone are difficult to perceive for nonnative speakers whose first language (L1) does not use this dimension in a lexically-contrastive manner (1, 2).
- * Perceptual accuracy for a nonnative phonetic dimension varies as a reflection of its prominence in the L1 (*Feature Hypothesis*, 3).
- * **Speakers of various L1s differ in their accuracy** in perceiving nonnative tones. L1 tone speakers outperform speakers of non-tone languages (4) and L1 pitch-accent speakers outperform English speakers (5).
- * However, English or Dutch speakers are also able to attend to pitch patterns in Mandarin (6, 7).
- * Pitch height and pitch direction (used in tone identification) are weighted differently across languages (6) – potentially making **certain tones (level vs. contour)** easier to perceive than others.



- * **Are these differences the result of listeners' varying ability to attend to F0, as a function of pitch prominence in their L1?**
- * **And are certain tone patterns easier than others?**

Prediction: tone perception is hierarchical



Type	Domain	Prominence
Tone (Mandarin)	Lexical, syllable	Maximal
Pitch-accent (Japanese)	Lexical, word	High-intermediate (pitch is exclusive)
Word stress (English)	Lexical, word	Low-intermediate (pitch is non-exclusive)
Intonation-only (Korean)	Non lexical	Low

mā vs. mǎ (mother vs. horse)

INsert vs. inSERT

DEsert vs. deSERT

Ame vs. aME (rain vs. candy)

AXB categorization task

Thai tones

- 3 level tones (Low, Mid, High)
- 2 contour tones (Rising, Falling)

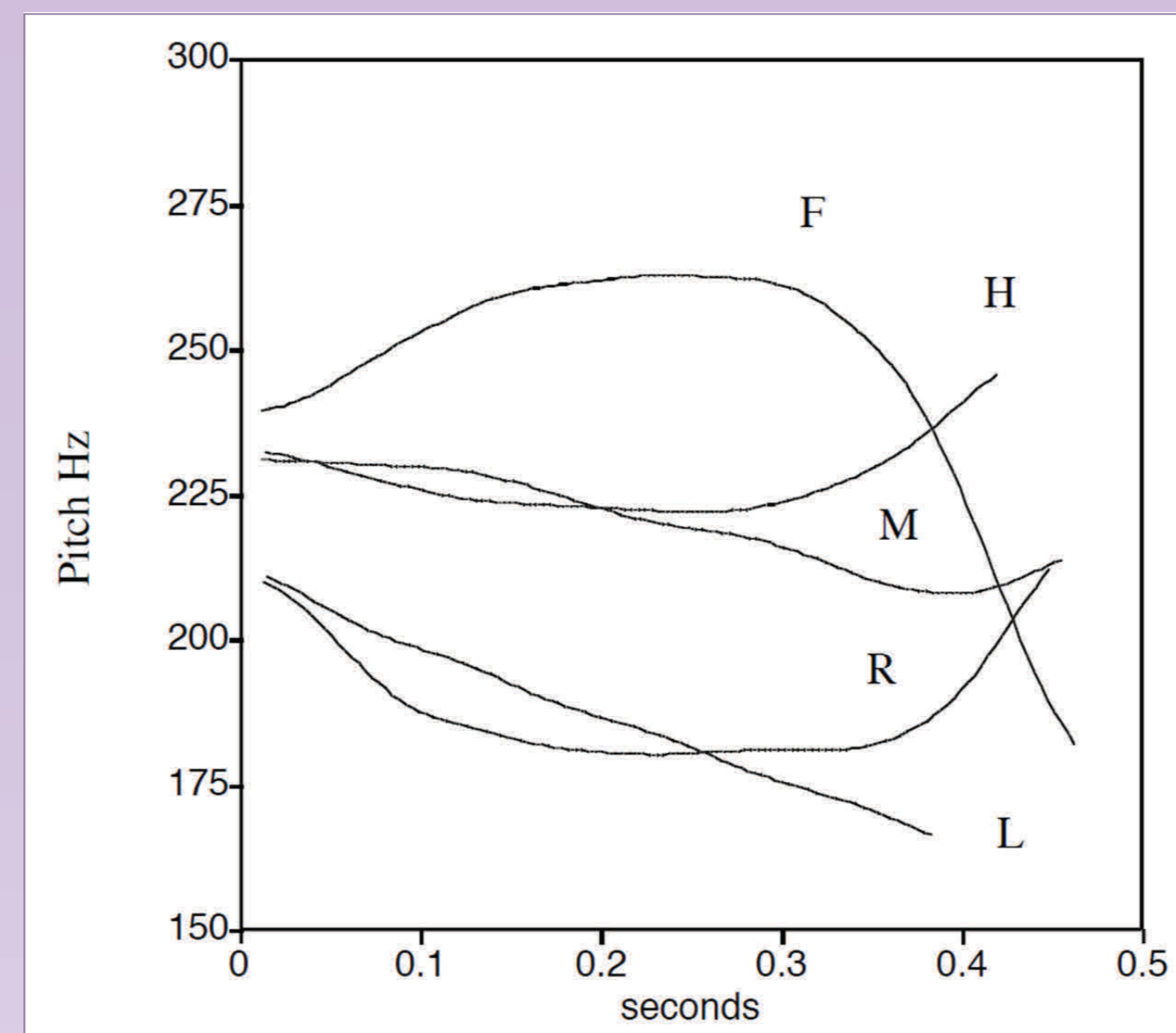


Figure 1: Contour shapes of Thai tones in citation form. Representative examples from one speaker. From Zsiga & Nitisoraj, 2007, p. 347

Method & Analysis

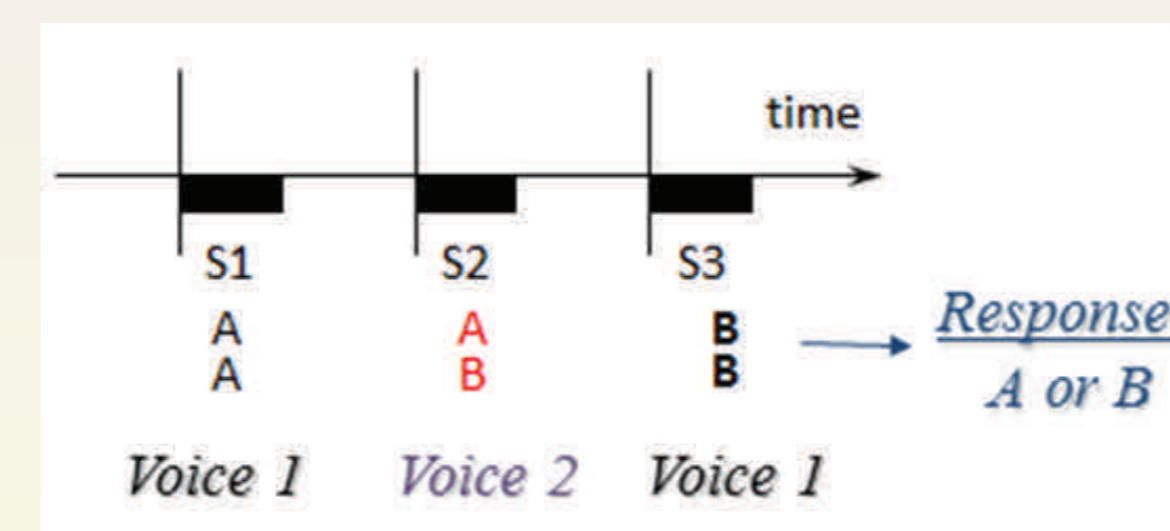
- Words & nonwords presented in triplets (48 „test“, 48 „control“)
- Accuracy rates and reaction times
- 3 test conditions:

Test Conditions		Control Condition	
Direction (n=12)	Height (n=12)	Mixed (n=24)	Control (n=48)
rising-falling	low-mid	low-rising low-falling	consonant
rising-falling	low-high	mid-rising mid-falling	vowel
rising-falling	mid-high	high-rising high-falling	

Table 1: Overview of conditions

Stimuli

- Monosyllabic CVV items varied in each condition
- Recorded by 1 male and 1 female Thai native speaker



Participants

- N = 2 Thai native speakers
- N = 10 Mandarin speakers
- N = 11 Japanese speakers
- N = 10 English speakers
- N = 10 Korean speakers

Without knowledge of Thai

SELECTED REFERENCES

[1] Dupoux, Pallier, Sebastián-Gallés, & Mehler (1997) [2] Burnham, Kirkwood, Luksaneeyanawin & Pansottee (1992) [3] McAllister, Flege & Piske (2002) [4] Wayland & Guion (2004) [5] Burnham, Francis, Webster, et al. (1996) [6] Francis, Ciocca, Ma & Fenn (2008) [7] Braun & Johnson (2011) [8] Bohn (1995)

Contact: {vkschaefer; idarcy}@indiana.edu

Results

Across Conditions:

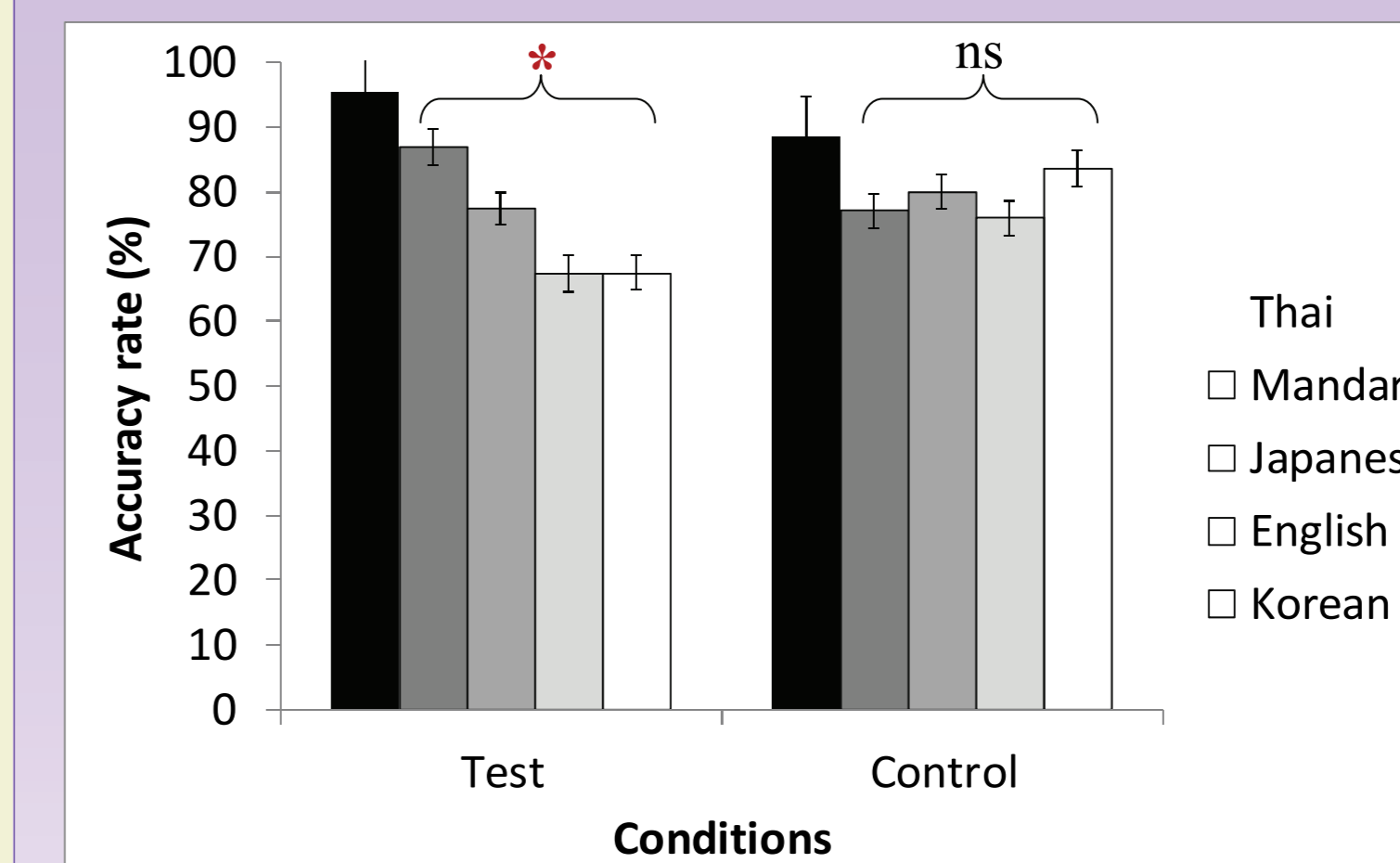


Fig. 2: Accuracy in each group

- Test condition, effect of group for Accuracy: $F(3, 67.3) = 11.3, p < 0.001$ (excluding Thai)
- Test condition, effect of group for Reaction time: $F(3, 47.3) = 2.98, p < 0.05$ (excluding Thai)

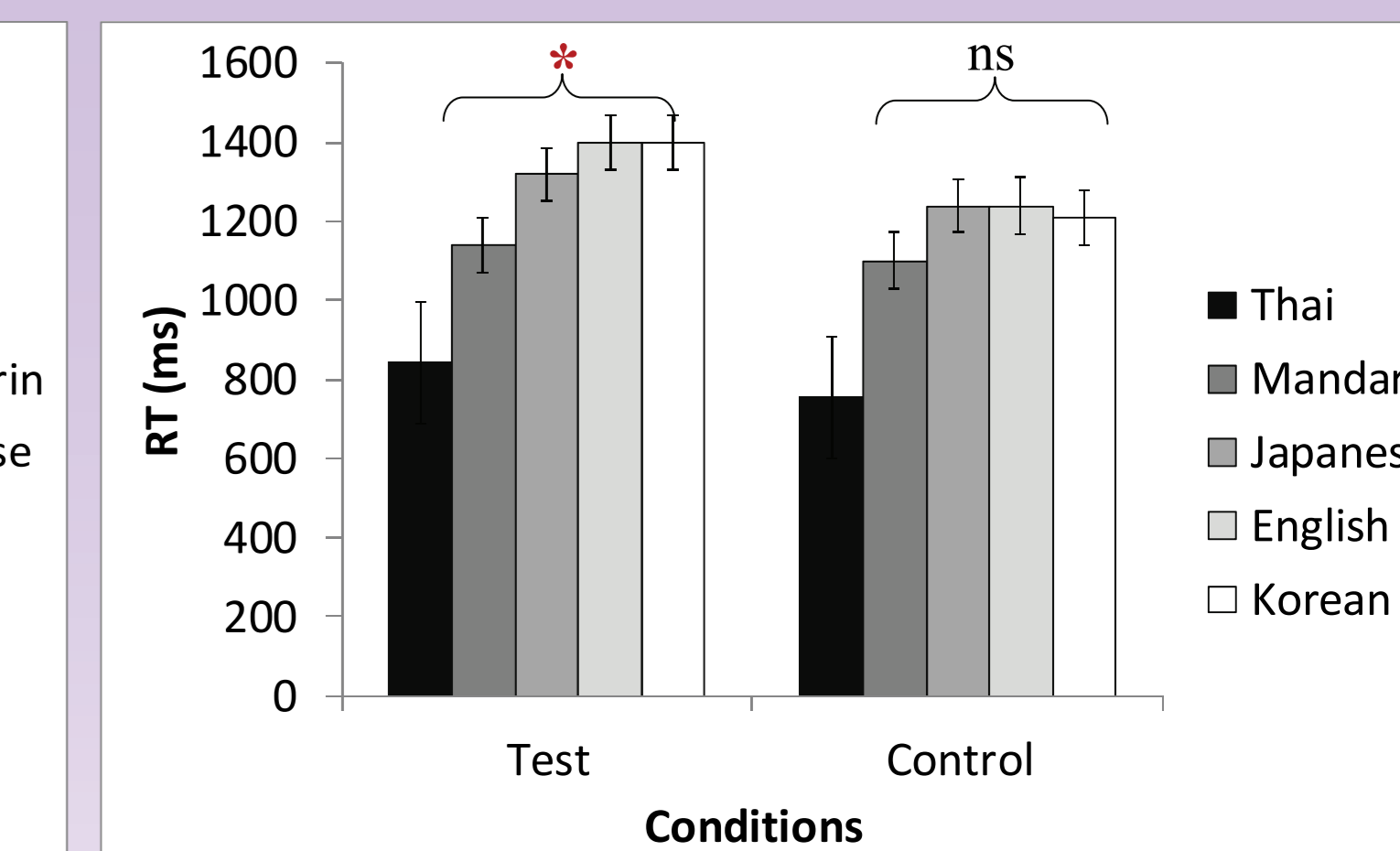


Fig. 3: Reaction time in each group

By Condition:

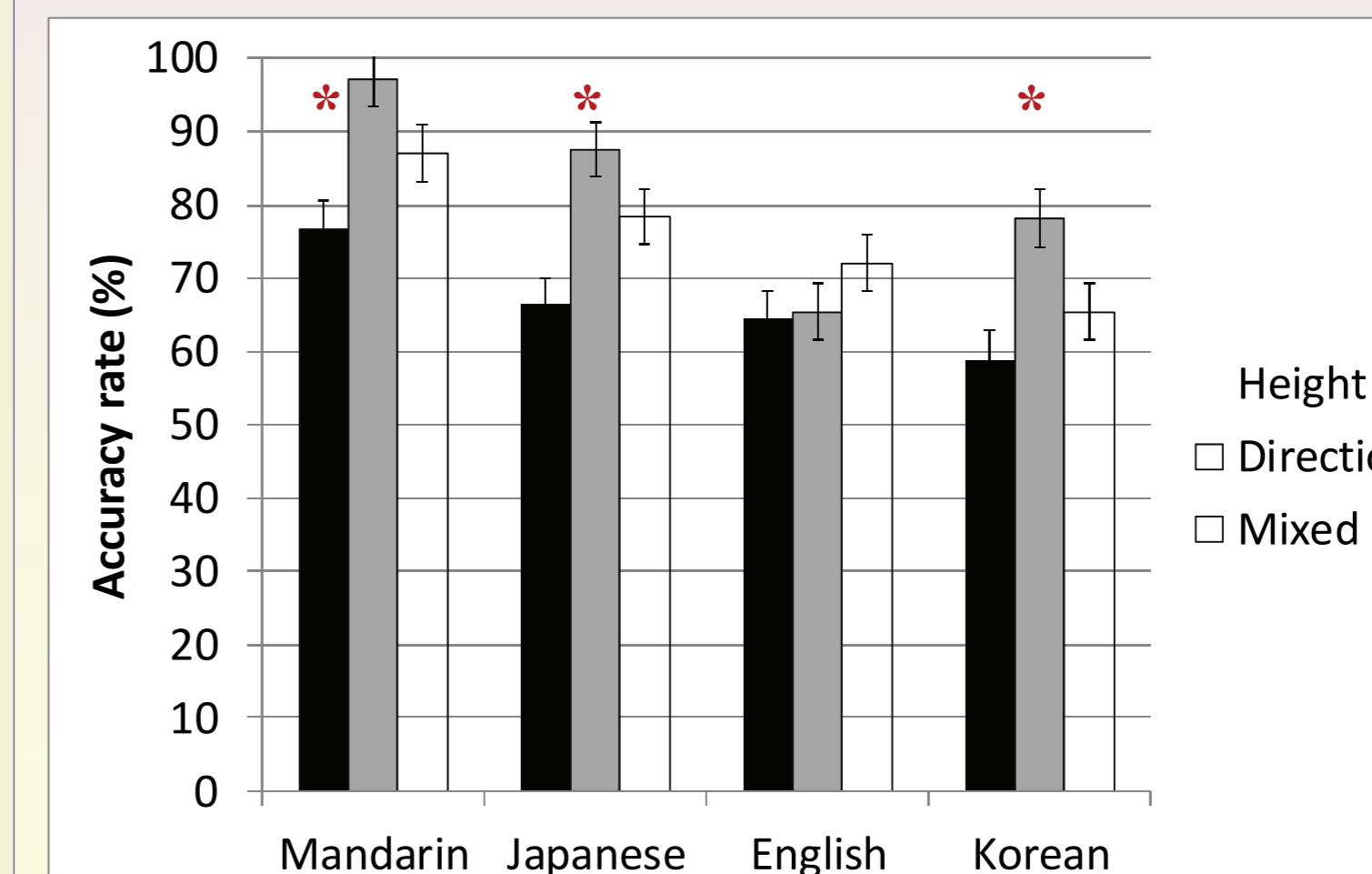


Fig. 4: Accuracy in each condition by group

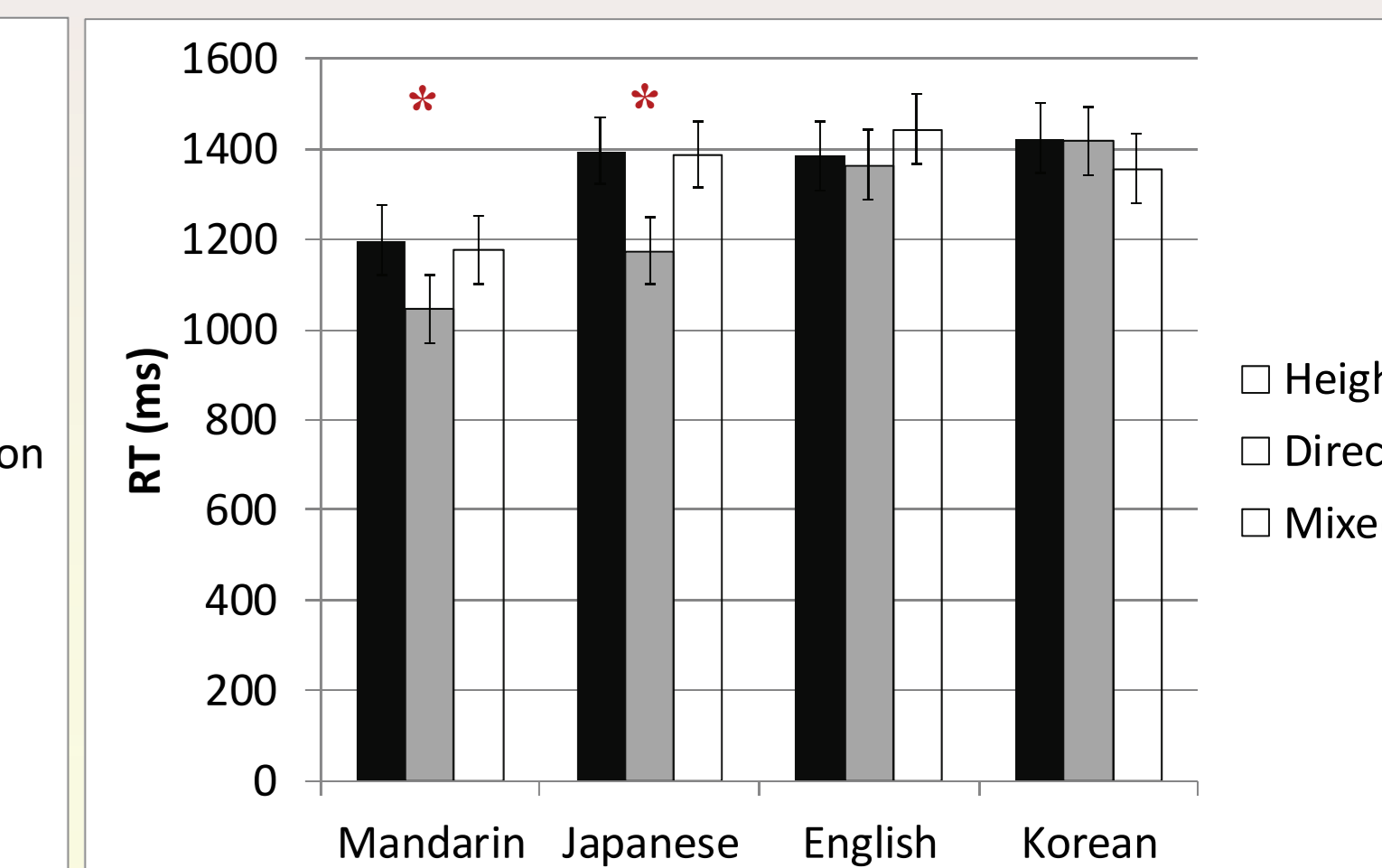


Fig. 5: Reaction time in each condition by group

- "Height" condition overall most difficult, "Direction" condition most accurate

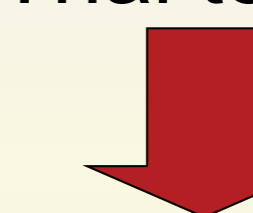
Summary and Discussion

Differences in functional prominence to signal lexical contrast shape nonnative tonal perception

- The accuracy patterns observed in all tone conditions were similar to the predicted hierarchy: Mandarin (M = 96%), Japanese (M = 77%), English and Korean (M = 67% for both)

Accuracy differences in the height vs. the direction conditions (except English) indicate that regardless of L1, for Thai tones, **tracking pitch direction is easier than tracking pitch height**

- Because the Direction condition has fewer tone comparisons (RF, FR) than Height? — Yet, what about the Mixed condition which has the highest number of comparisons?
- English: Perhaps a disyllabic domain is necessary to be able to apply pitch perception to Thai tones



Nonnative Thai tone perception may not be solely driven by L1 influence in terms of pitch prominence but can also depend on language-independent factors (8), or possibly an interaction of the two.