A Study on perceptual training of Japanese CSL Learner to Discriminate Mandarin Lexical Tones

Reporter: Li Feiya

SAIT Lab

2016.10.19

Outline

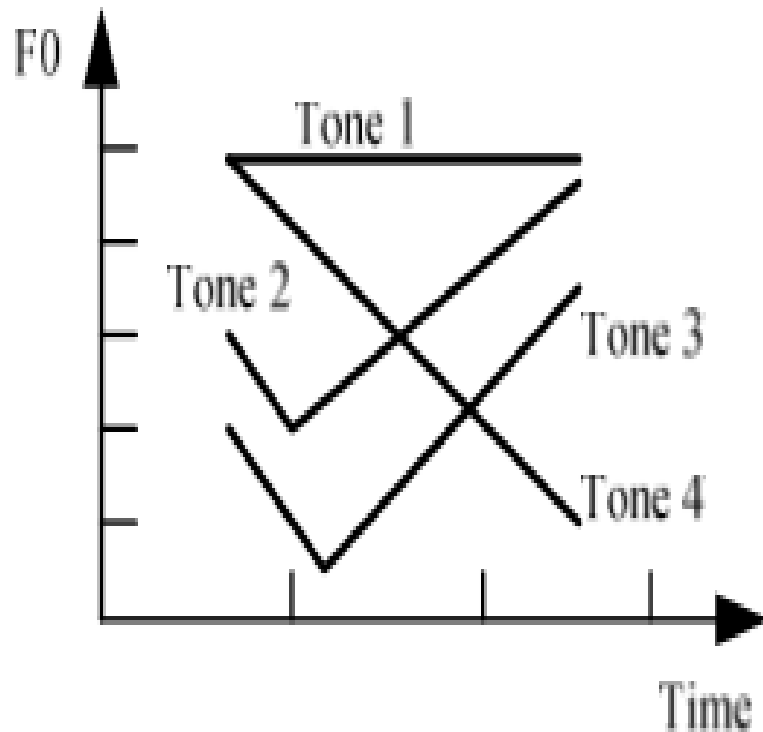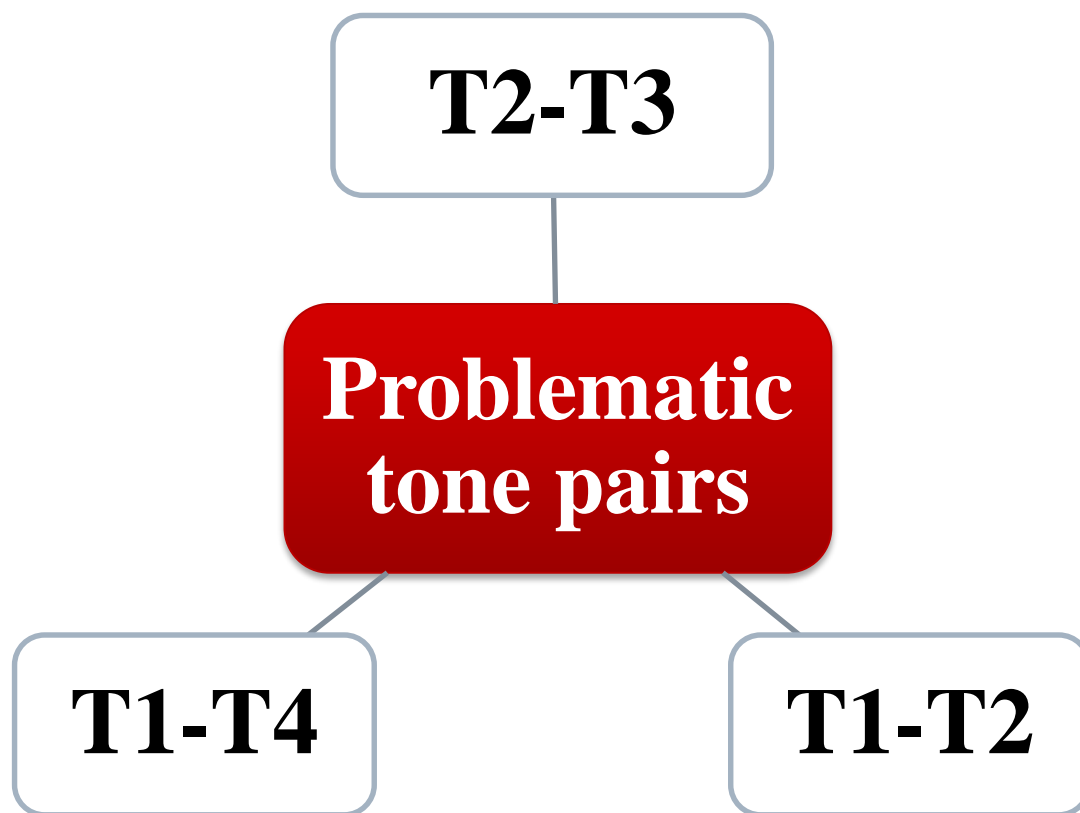1 **Introduction** 2 **Experiment** 3 **Results** 4 **Conclusion**

1. Introduction—Mandarin Four Tones

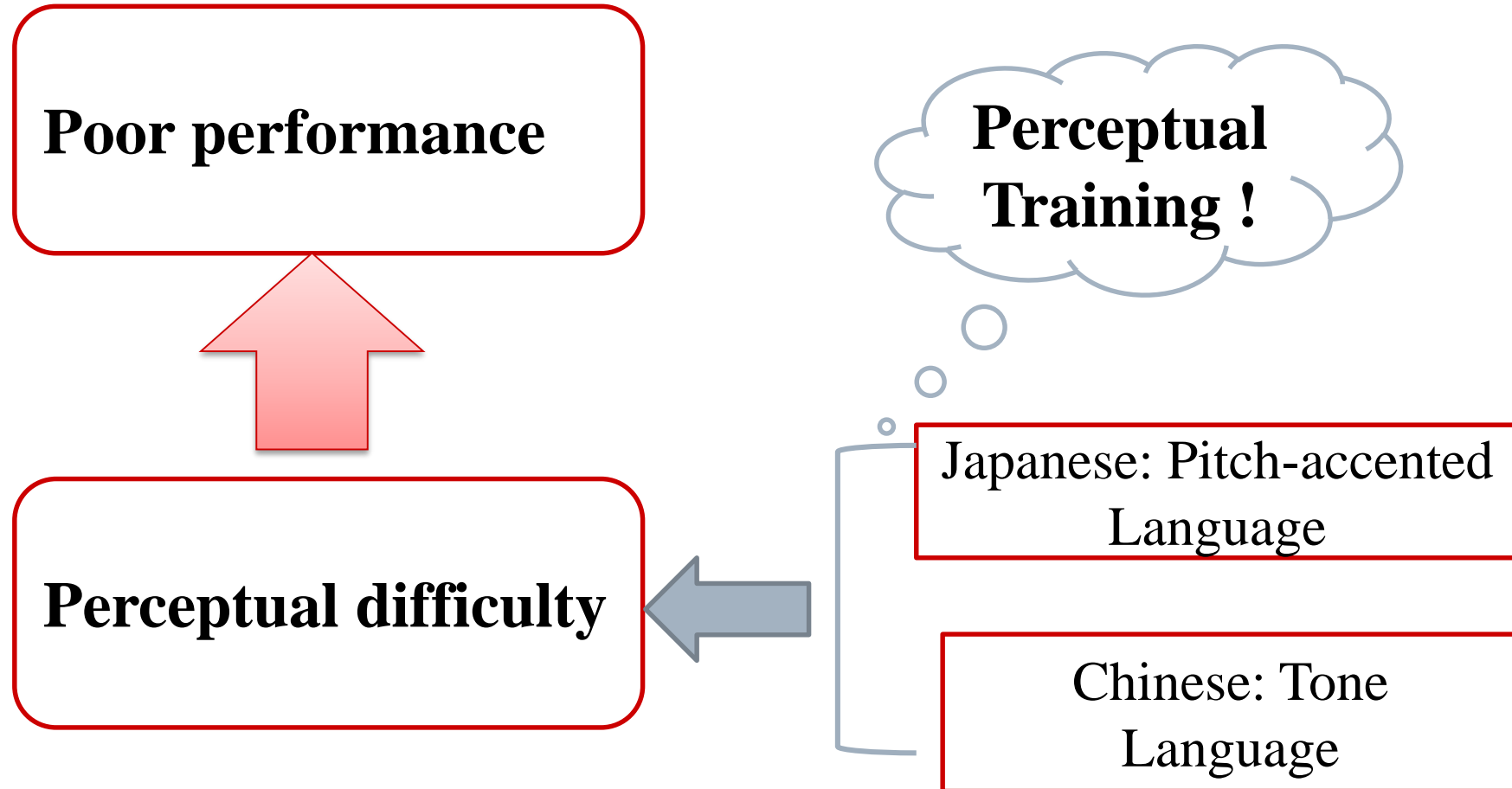*Distinctive F0 patterns of Chinese four tones.*

- ☐ **Tone1: high-level**

- ☐ **Tone2: high-rising**

- ☐ **Tone3: low-dipping**

- ☐ **Tone4: high-falling**

1. Introduction— Difficulties of Japanese Learner in Acquiring Mandarin Tones
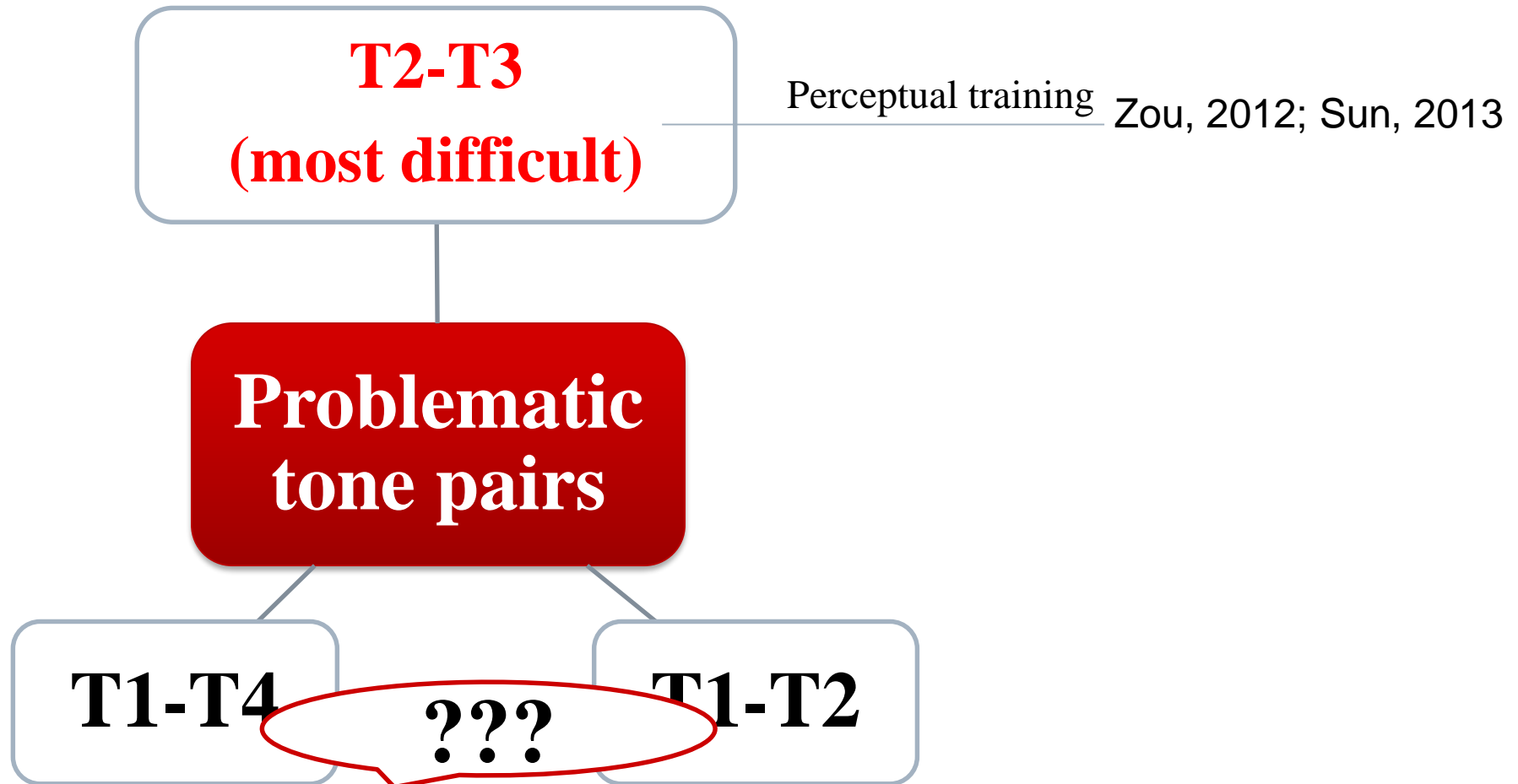
T2-T3

Problematic tone pairs

T1-T4

T1-T2

1. Introduction— Possible Main Reason

Poor performance

Perceptual Training !

Perceptual difficulty

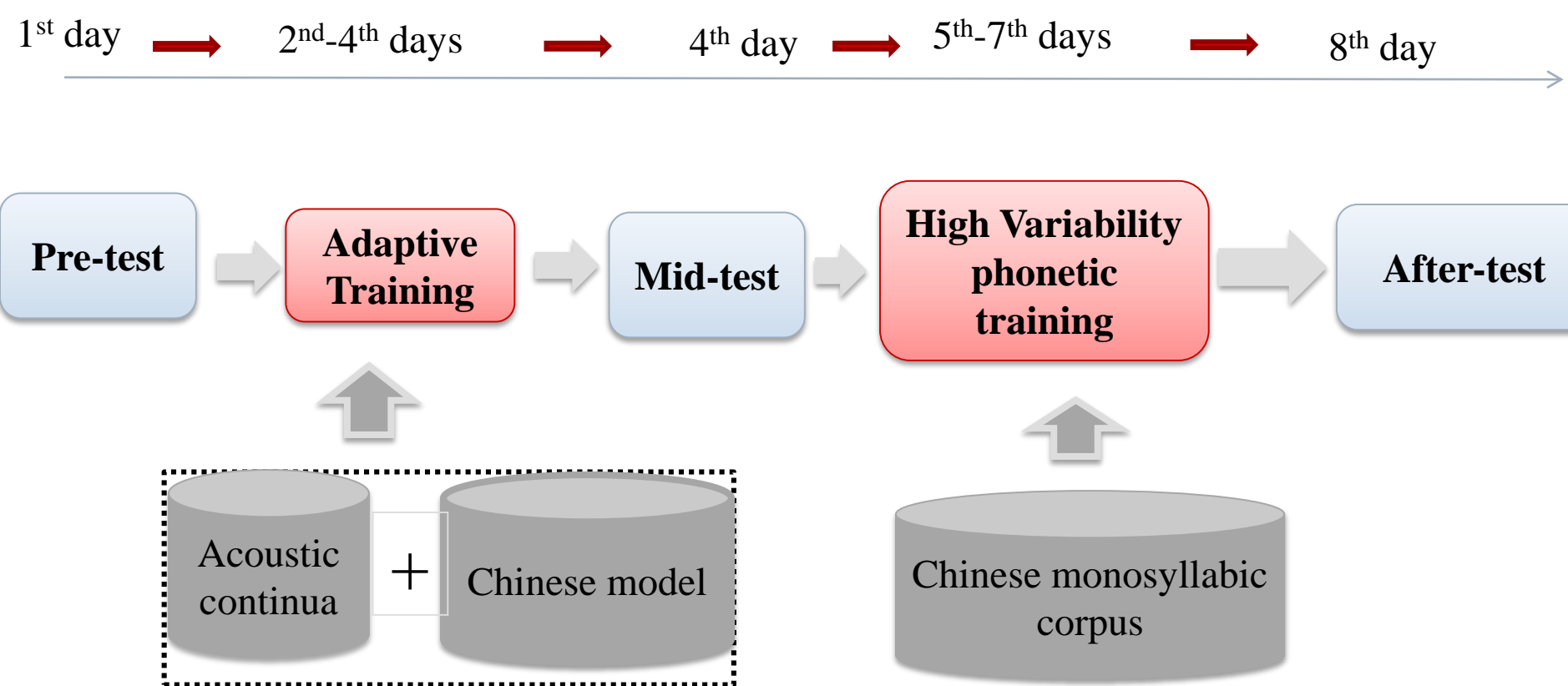Japanese: Pitch-accented Language

Chinese: Tone Language

1. Introduction— Perceptual Training

☐ Perceptual trainings for foreigners learning Mandarin tones.

  ■ High Variability Phonetic Training (wang,1999&2003).

    ☐ utilizing a wide range of highly variable natural syllables to make materials close to what happens in real-world speech processing.

  ■ Adaptive Training (Zou, 2012)

    ☐ Synthesizing continua with the key acoustic cues continuously changing for training subjects to get native-like perception capability.

  ■ Hybrid Perceptual Training (Sun, 2013)

1. Introduction— Proposal

T2-T3

(most difficult)

Perceptual training — Zou, 2012; Sun, 2013

Problematic tone pairs

T1-T4   **???**   **T1-T2**

2.Experiment- Procedure

1st day → 2nd-4th days → 4th day → 5th-7th days → 8th day

Pre-test → Adaptive Training → Mid-test → High Variability phonetic training → After-test

Acoustic continua + Chinese model

Chinese monosyllabic corpus

2.Experiment- Materials

Pre/mid/after-test	132 continua stimuli
	80 nature syllables
Adaptive training	132 Continua stimuli
High Variability phonetic Training	total 260 nature stimuli
generalization test （**60 nature stimuli respectively**）	new syllables
	New speakers

# T1-T2&T1-T4 Continua
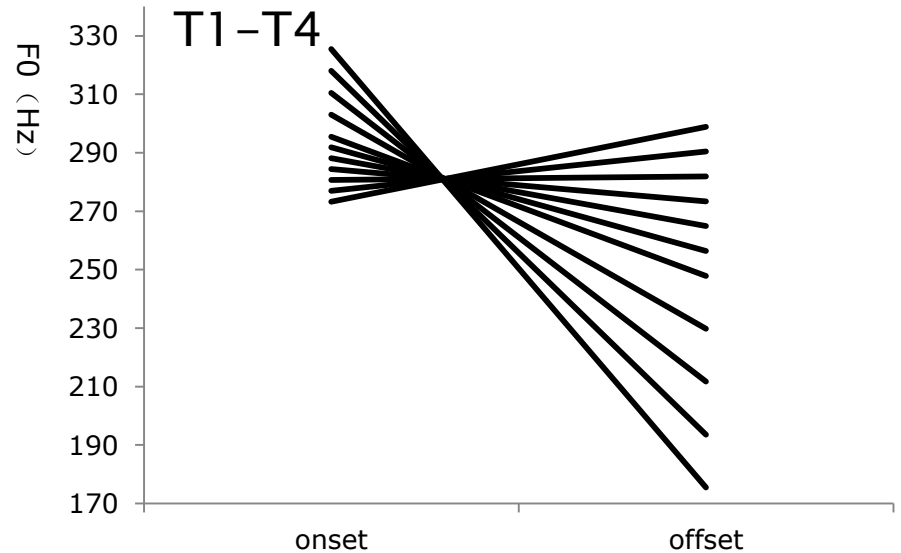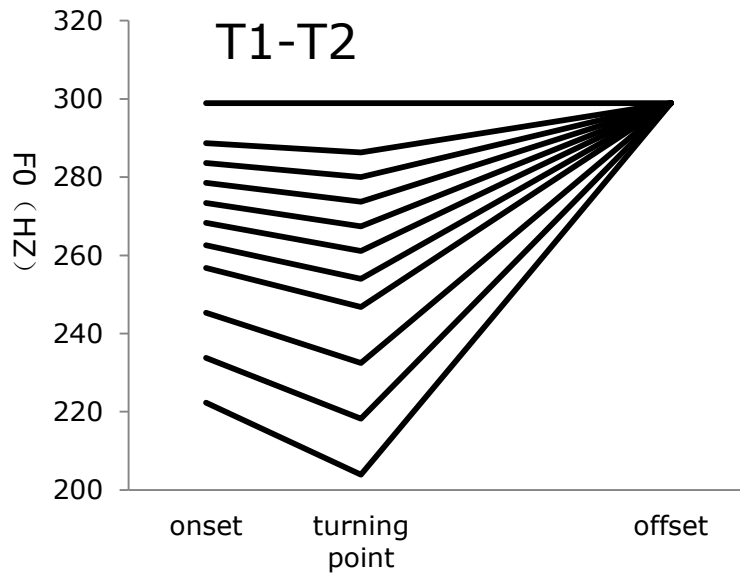
☐ **Unequal 10 steps, 11stimuli of each pair**   **da   hua   chuan**

☐ **6 kind of syllabic structures**

☐ **11 stimuli * 6 syllabic structures * 2Tones**   **di   sui   jian**

2.Experiment- Japanese Subjects

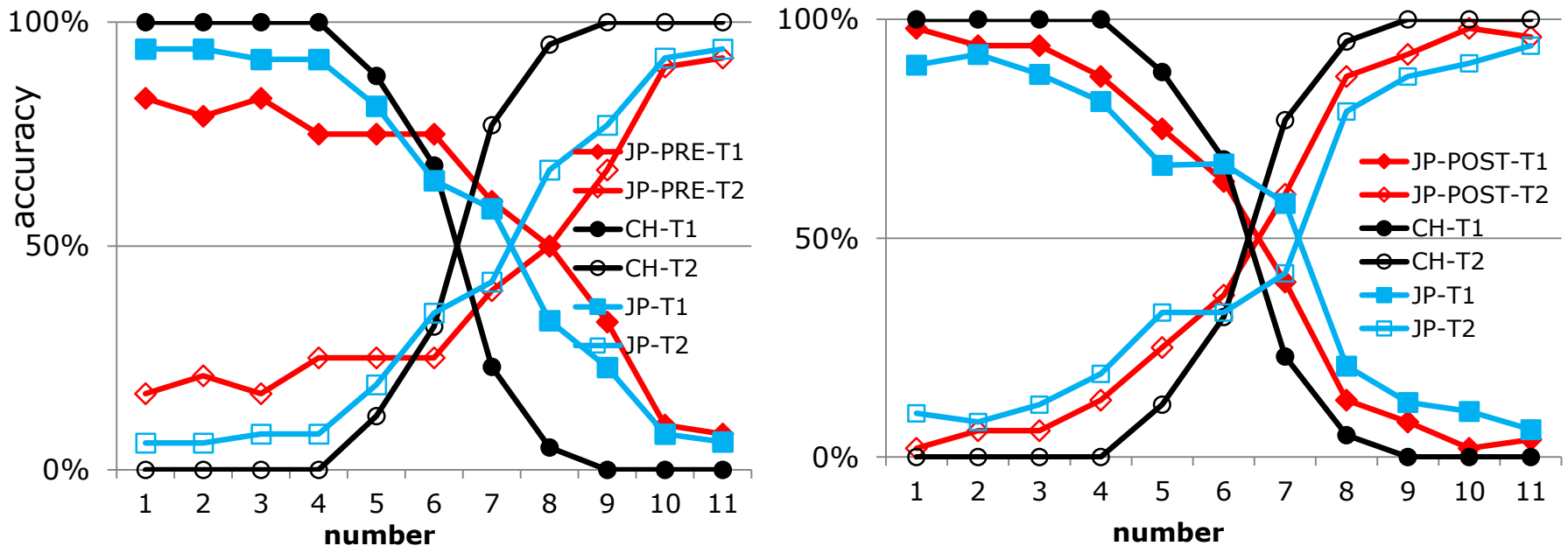|	experimental group	control group
Number	8	8
gender	5 female 3 male	8 male
Average age	24-year-old	29-year-old
length of Chinese learning	1-month	3-month

2016/10/15

3.Results- the Perceptual Model of Native Chinese Speaker

12 Native Chinese Speakers
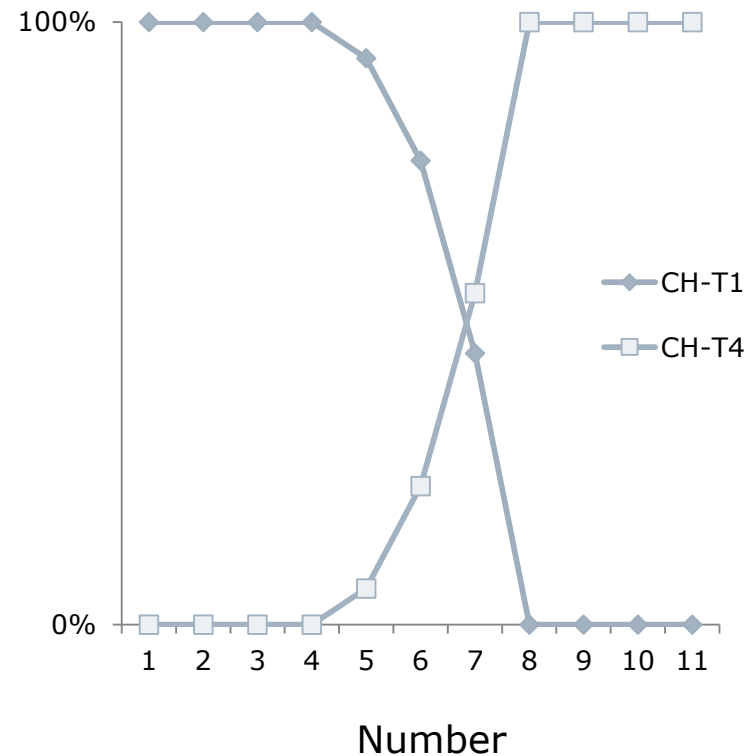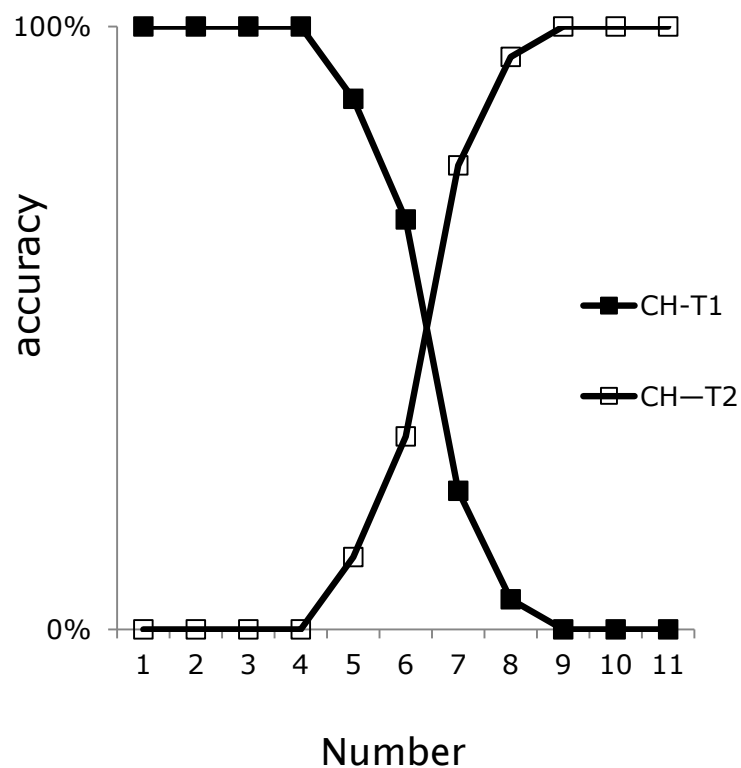
3.Results-Discrimination of continua

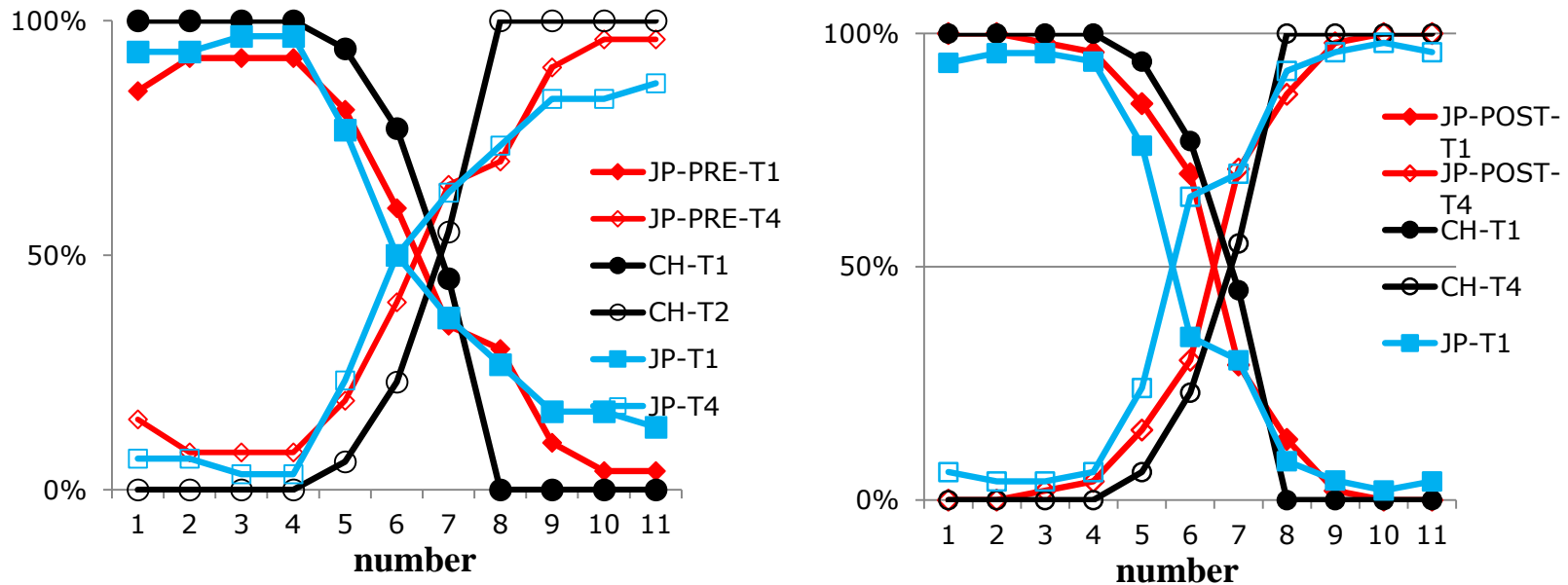*Results of perceiving T1-T2 continua before and after training,*

Deviation scores of perceptual results of Chinese and Japanese in 3 tests: 0.25、0.16、0.12.

$$Z_j = \sqrt{\frac{1}{11} \sum_{i=1}^{11} (S_{c,i} - S_{j,i})^2}$$

3.Results-Discrimination of continua

Results of perceiving T1-T4 continua before and after training,
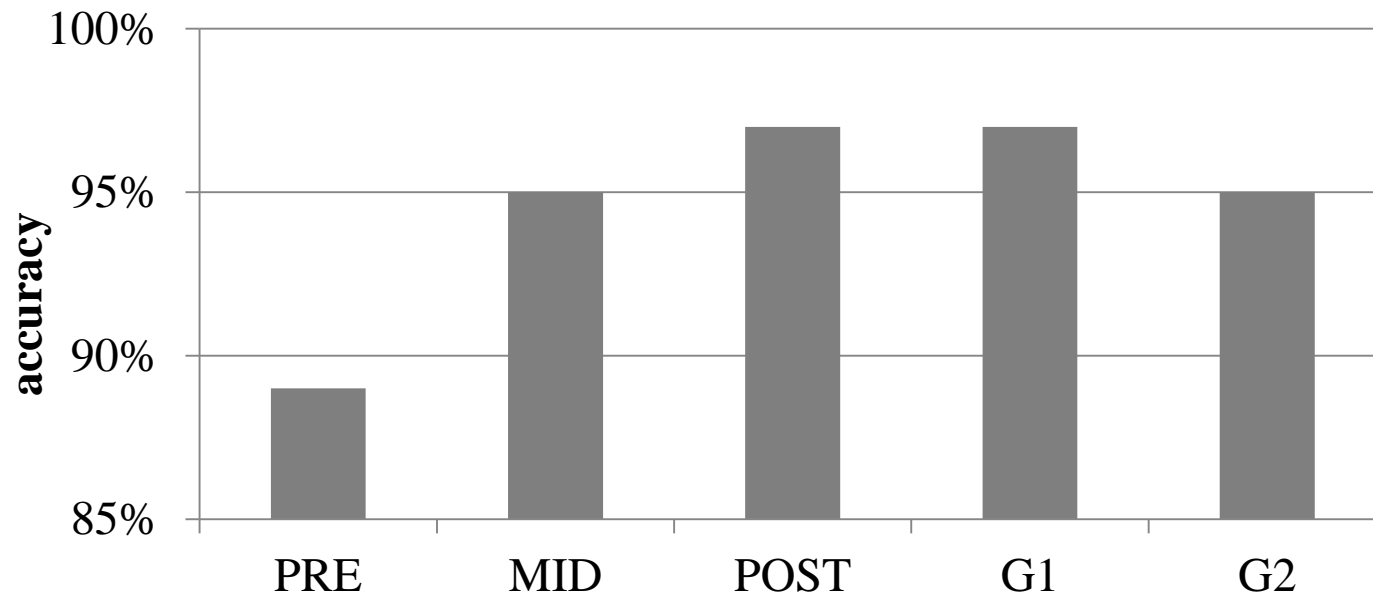

Deviation scores of perceptual results of Chinese and Japanese in 3 tests: 0.15、0.08、0.07. .

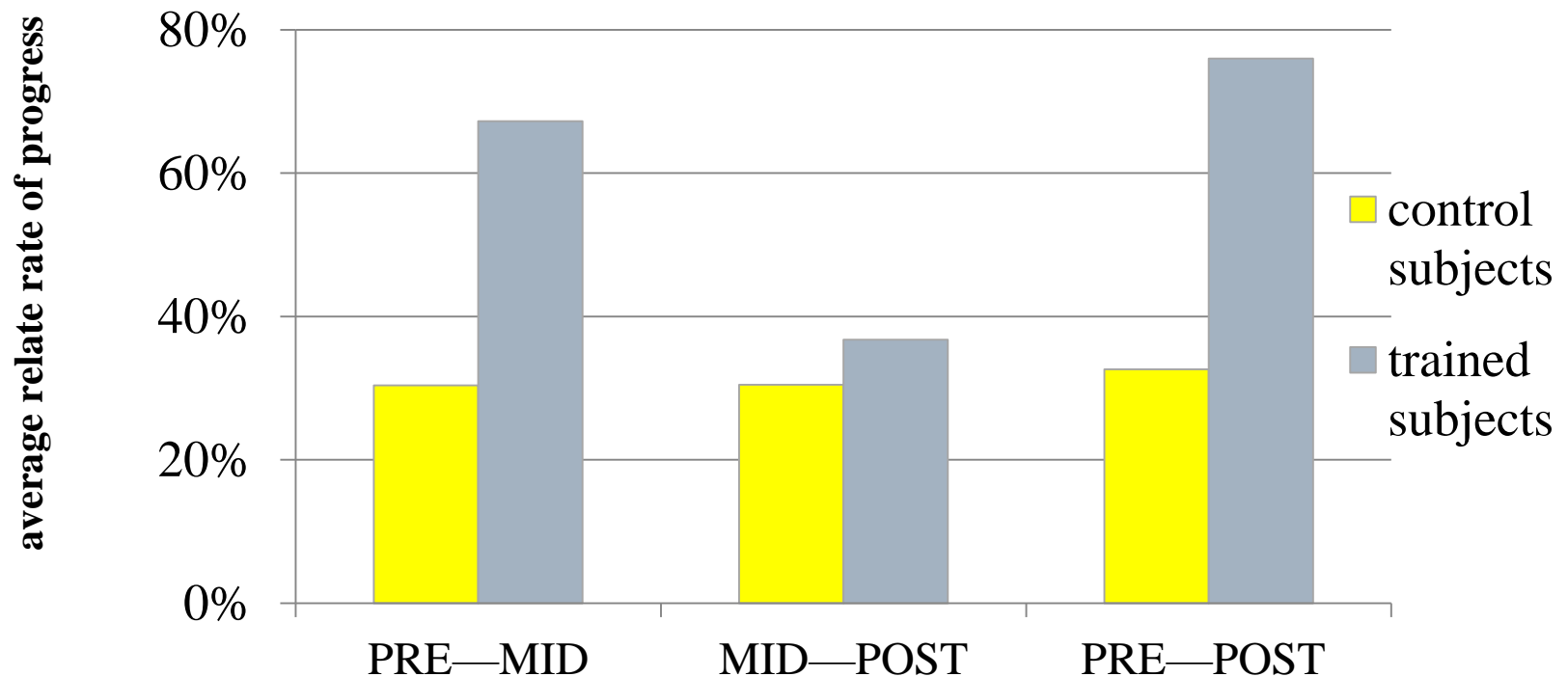$$Z_j = \sqrt{\frac{1}{11}\sum_{i=1}^{11}(S_{c,i} - S_{j,i})^2}$$

3.Results-Identification of natural syllables

☐ *Accuracy of natural syllables identification in all tests.*

3.Results-Identification of natural syllables

☐ *Two groups' average relative rate of progress of natural syllables in 3 tests.* $\quad R = \dfrac{E_1 - E_0}{E_0}$

4.Conclusion

- ☐ **Hybrid perceptual training could improve Japanese listeners' perceptual ability of T1-T4 and T1-T2 in isolated Mandarin words.**

- ☐ **The ability could generalized to new materials.**

- ☐ **Discrimination of T1-T4 pairs are much easier than T1-T2 pairs for Japanese subjects.**

Thanks for your attention!
Q&A