



Right hemisphere at the right time: electrophysiological evidence for right hemispheric syntactic processing in demanding condition



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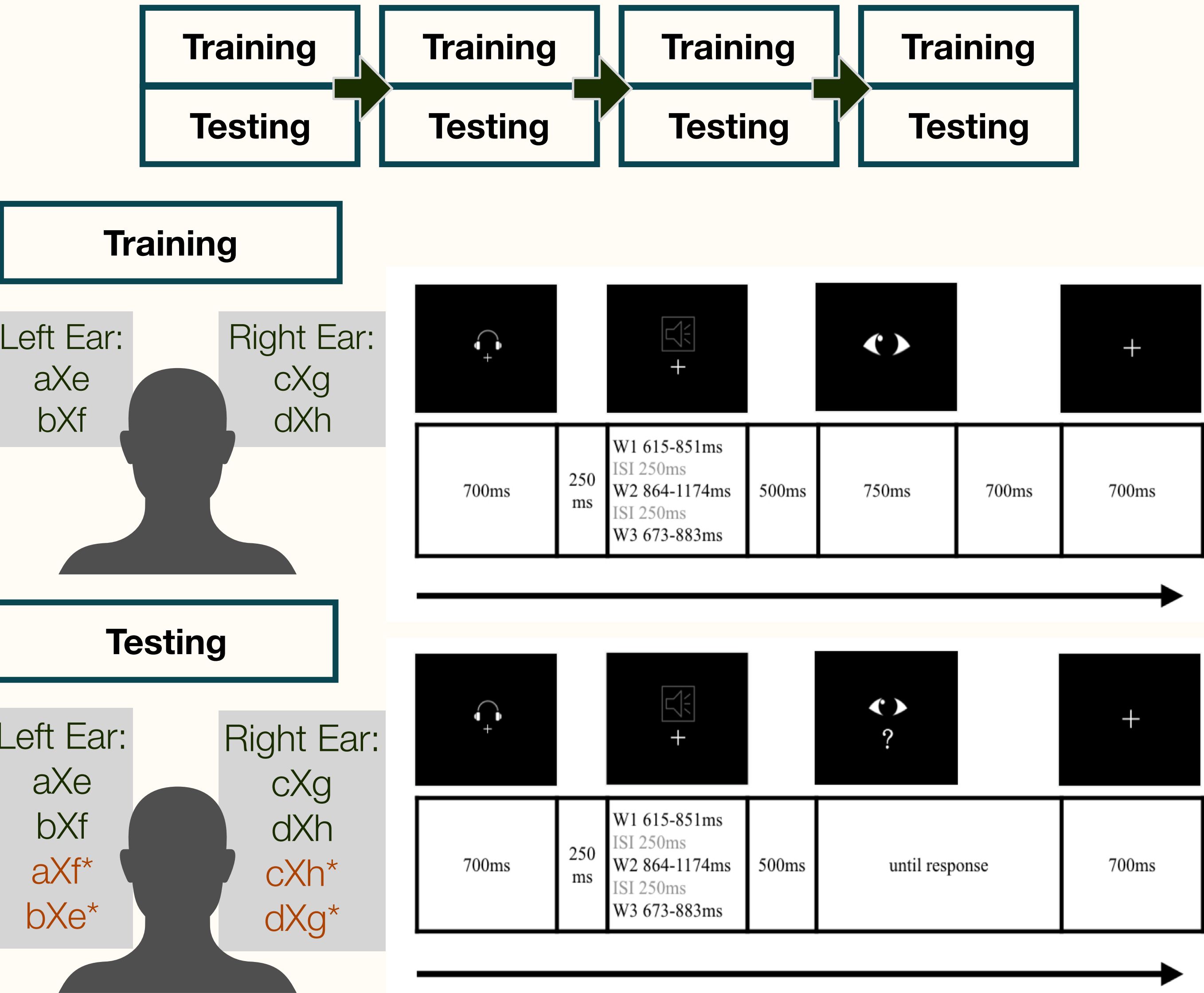
◆ Introduction

- Although syntactic processing is lateralized to the left hemisphere (LH), previous studies have revealed that the right hemisphere (RH) is also capable of processing syntactic information [1].
- However, the P600 responses to syntactic anomalies initially perceived by the right hemisphere (RH) has been reported in cases when the individuals also showed lower grammaticality judgment accuracy (e.g., lower-intermediate L2 learners [2], older adults [3][4])
- It still remains unclear whether the involvements of the RH are a potential interference causing the poorer language performance, or on the contrary, the RH is recruited as an assistance to aid the LH dealing with the challenging conditions which were reflected in the poor performance.

◆ Methods

- 56 right-handed native speakers of Taiwan Mandarin; all without familial sinistrality (FS-) (27 M, mean age: 22; range: 20 – 27).
- Non-adjacent dependency pairs were learned via monaural presentation to induce LH- and RH-biased responses (2 dependency pairs / ear).
- Participants listened to 3-item strings. Initial and ending items were both 2-syllable pseudo words, and the intervening items (Xs) were 3-syllable pseudo words [5][6].

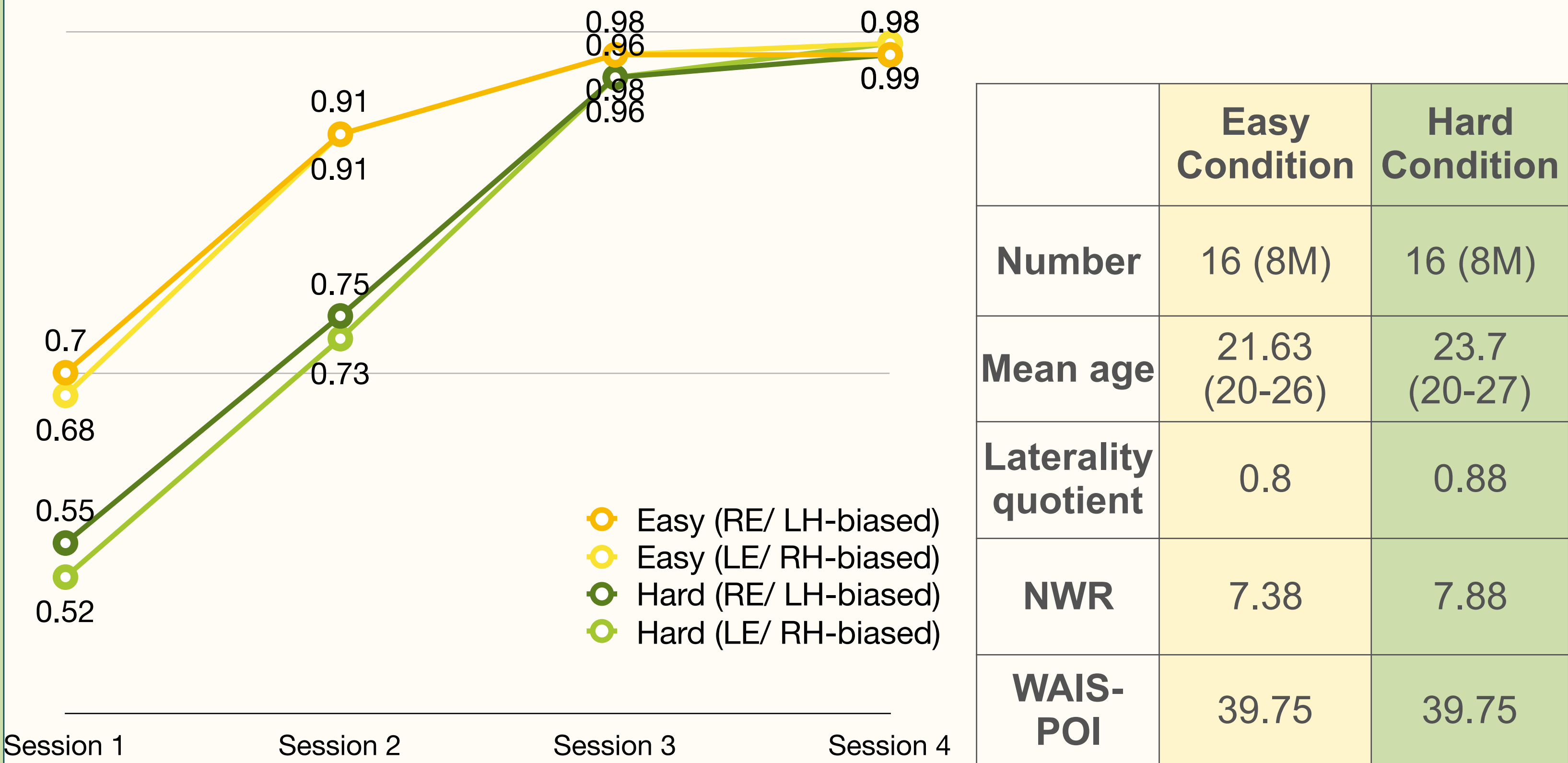
Easy Condition (variability = 24)			Hard Condition (variability = 3)		
Àotuó	Liàokuànguǒ Gòuchuángsǔn Chuánkǎnjì	Zānè	Àotuó	Liàokuànguǒ Gòuchuángsǔn Chuánkǎnjì	Zānè
Mǐniǔ	Jǐngwēnmò ...(and 20 more)	Dǔsuō	Mǐniǔ		Dǔsuō



◆ References & Acknowledgement

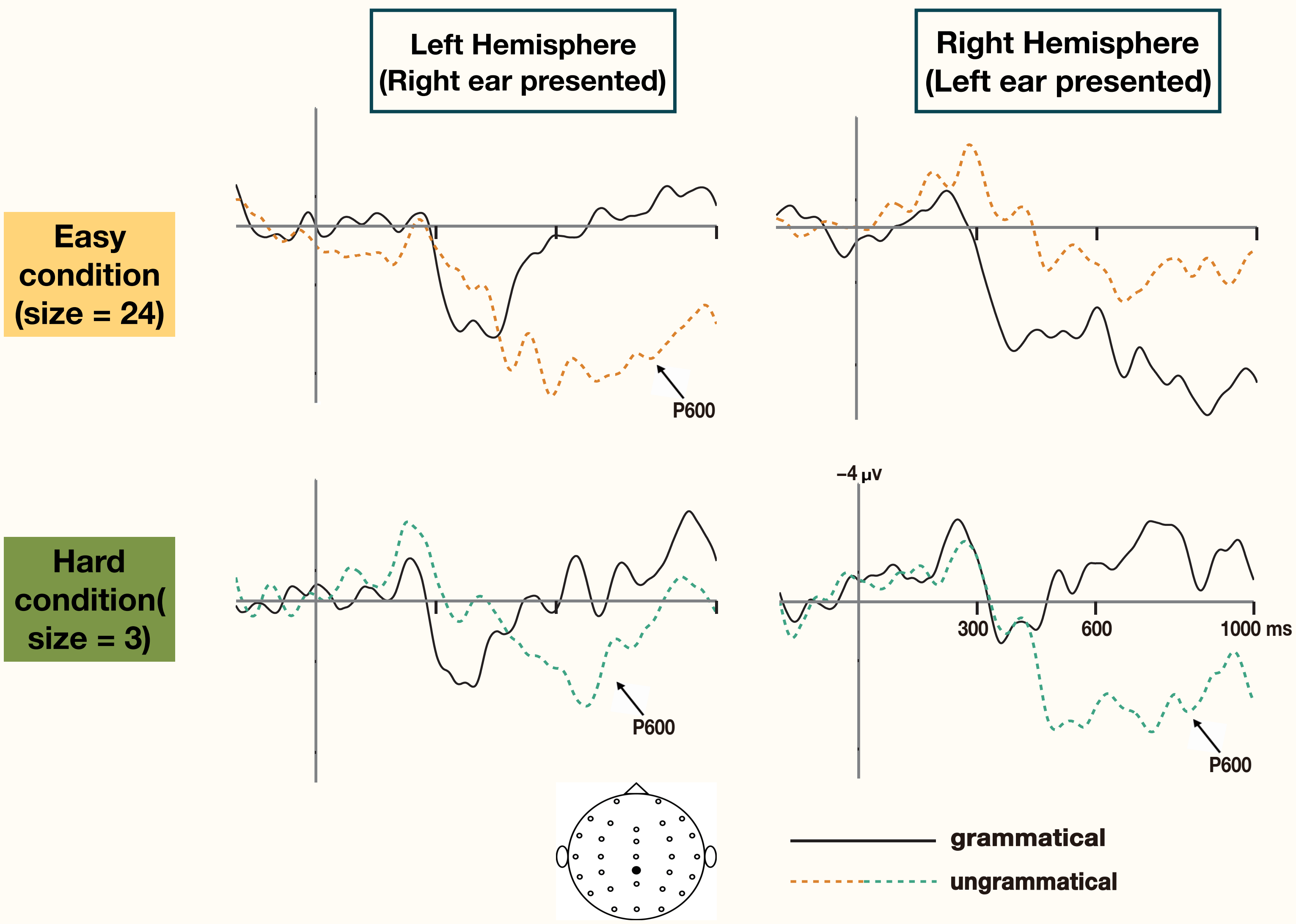
[1] Lee & Federmeier (2015). Psychological Science. [2] Chen, Yeh, Lu, Hsieh, Chou, Su, Lee (2018). Journal of Chinese Language Teaching. [3] Leckey & Federmeier (2017). Psychophysiology. [4] Chen, Chen, & Lee (2017) Psychophysiology, 54, Supplement 1, S73. [5] Gómez (2002). Psychological Science. [6] Hsu, Tomblin, & Christiansen (2014). Frontiers in Psychology.

◆ Behavioral Results



- Mastering non-adjacent dependency takes longer time with lower than higher intervening variability.

◆ ERP Results



◆ Discussions & Conclusions

- Both hemispheres are capable of picking up non-adjacent statistical regularities from language-like input.
- When the proficiency of the AL were controlled to be equally high (accuracy > 80%) across the conditions, participants in the easy condition (variability of the intervening item = 24) showed a P600 grammaticality response only in their LH. On the other hand, the participants in the more challenging condition (variability = 3) showed bilateral P600 responses.
- Our results further demonstrated that RH P600 can be elicited even with high behavioral performance, disfavoring the hypothesis that LH-like syntactic processing in the RH may be deleterious. These RH P600 responses, however, were seen when the syntactic regularity is less salient and harder to master, and thus corroborating the compensatory hypothesis