ASYMMETRICAL PROCESSING OF VOWEL AND TONE INFORMATION IN PERCEPTION OF MANDARIN SPEECH

Ting Huang & Yu-Xuan Zhang*

INTRODUCTION

· Approximately 60-70% of the world's languages are tone languages but little is known about its processing, particularly tone processing

AIM

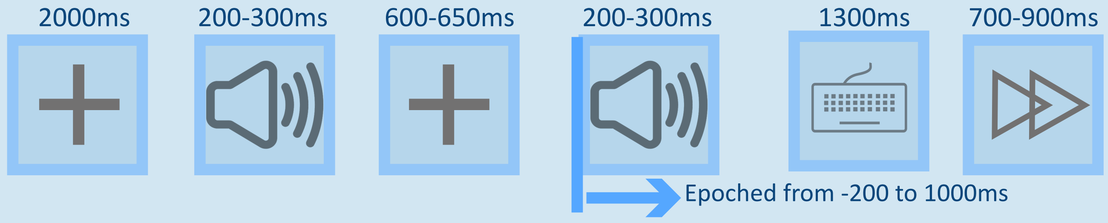
· Examine electrophysiological processing of tone and vowel in Mandarin monosyllable words under different task demands

METHOD

· Scalp potentials were recorded by 64-channel NeuroSCAN system at asample rate of 1000Hz

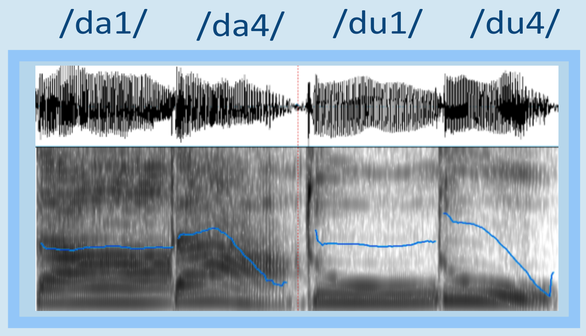
/da1/

/da1/	same Vowel same Tone
/da4/	same Vowel different Tone
/du1/	different Vowel same Tone
/du4/	different Vowel different Tone



Native Chinese speakers divided into:
· Word Classification (N=20) → · the whole word
· Tone Classification (N=20) → · the tone regardless of consonant and vowel

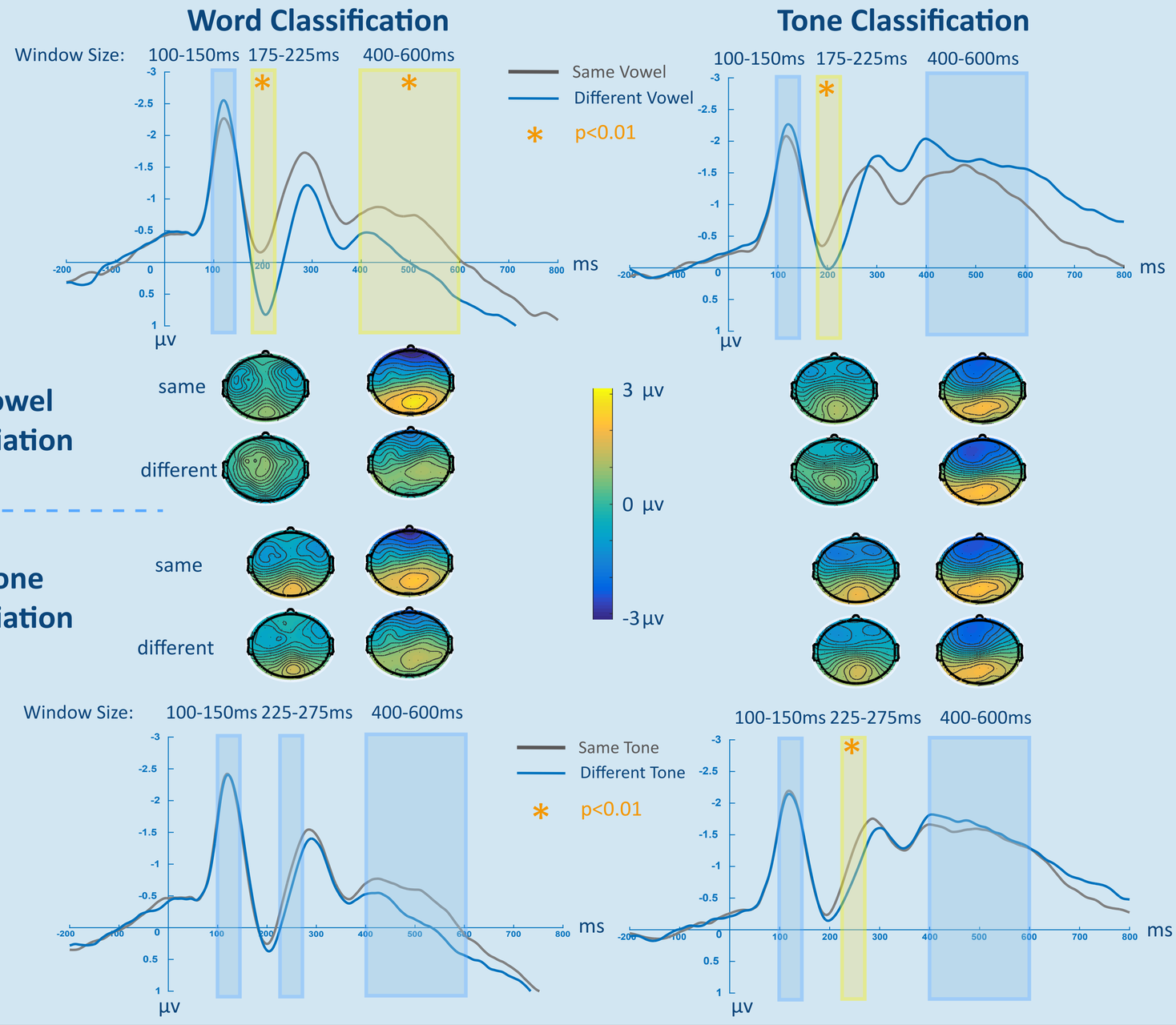
Judge wether the two stimuli were same/different in



Data analyses:

· EEG data were analyzed using EEGlab (Delorme & Makeig, 2004) and ERPlab (Lopez-Calderon & Luck, 2014) Matlab toolboxes
· Filtered with a bandpass of 0.1-30 Hz
· Re-referenced to the average of all eletrodes
· The current analyses focused on the second stimuli, particularly, the influence of task demand on phonological (Vowel, Tone) processing

RESULTS



Summary

Vowel variation:
· had an effect in P2 (175-225ms) and N400 (400-600ms) areas in Word Classification
· had an effect in P2(175-225ms) in Tone Classification

Tone variation:
· no effect in Word Classification
· had an effect in P2(225-275ms) in Tone Classification

Conclusion

Vowel information:
· Extracted early in processing (~200ms) regardless of task demand
· Processed late (400-600ms) when making word, but not tone, judgments

Tone information:
· Extracted early in processing (~250ms) for tone, but not word judgments
· No late processing regardless of task demand

Overall, tone information was processed less prominently and more subject to task demand and modulation than vowel

State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, Beijing 100875, China
*Corresponding author: zhangyuxuan@bnu.edu.cn