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An EEG study of forming new phonemic categories by naive listeners of Mandarin

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Abstract

The current study investigates the formation of new phonemic categories by examining the neurophysiological changes before and after training. Native English speakers tend to perceive Mandarin retroflexes as English fricatives ([ʂ] → [ʃ]) (Rasmussen & Bohn, 2015). In our experiment, native English speakers unfamiliar with Mandarin underwent a pre-training EEG recording in a passive auditory oddball paradigm. Then in two consecutive days, they learned Mandarin words containing retroflexes before undergoing a post-training EEG. The current result shows that the difference in the amplitude of P300 – an indicator of stimuli differentiation (Calcus et al., 2015) – between the retroflex [ʂ] (rare) and non-retroflex [ʃ] (frequent) is larger in post-training than pre-training, suggesting that they are learning to distinguish the two fricatives. Our current findings suggest that the formation of the new phonemic category can be observed in the processing stage that overlaps with P300.