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Behavioral and electrophysiological evidence of incidental learning, generalization and retention of speech categories from continuous speech

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Abstract

Speech learning involves discovering linguistically-relevant categories embedded in continuous speech. But, learning has been investigated mostly across isolated sound tokens. Here, we investigated incidental learning across continuous multi-talker Mandarin speech in the context of a videogame in which participants behavior was directed at navigating a virtual environment, not speech learning. Unbeknownst to the native-English participants, acoustically-variable Mandarin keywords were embedded in the continuous sentences, and were associated with game actions and events. Participants were not informed about the keywords, made no categorization decisions, and received no overt feedback. Post-training results indicated robust keyword learning that persisted at least 10 days. Further, the electrophysiological N100 component evoked by keywords during passive listening to continuous Mandarin was greater post-training than pre-training. This neural enhancement was not observed for equally-frequent control keywords unassociated with game behaviors. Participants learned functionally-relevant non-native speech categories incidentally from continuous speech input across considerable acoustic variability.