

Differential neural contributions to native- and foreign-language talker identification

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Abstract

Humans are remarkably adept at identifying individuals by the sound of their voice, a behavior supported by the nervous system's ability to integrate information from voice and speech perception. Talker-identification abilities are significantly impaired when listeners are unfamiliar with the language being spoken. Recent behavioral studies describing the language-familiarity effect implicate functionally integrated neural systems for speech and voice perception, yet specific neuroscientific evidence demonstrating the basis for such integration has not yet been shown. Listeners in the present study learned to identify voices speaking a familiar (native) or unfamiliar (foreign) language. The talker-identification performance of neural circuitry in each cerebral hemisphere was assessed using dichotic listening. To determine the relative contribution of circuitry in each hemisphere to ecological (binaural) talker identification abilities, we compared the predictive capacity of dichotic performance on binaural performance across languages. We found listeners' right-ear (left hemisphere) performance to be a better predictor of overall accuracy in their native language than a foreign one. The enhanced predictive capacity of the classically language-dominant left-hemisphere on overall talker-identification accuracy demonstrates functionally integrated neural systems for speech and voice perception during natural talker identification.

Keywords: Talker identification; Language proficiency; Laterality; Hemispheric specialization; Voice perception