

Rapid pre-attentive voice recognition of a famous speaker: neural correlates of voice familiarity

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Abstract (max 300 words)

Recognizing familiar voices and identifying speakers is a basic, yet remarkable human ability. Previous research has established a voice area in the right temporal cortex that helps extracting relevant acoustic features while listening to speech (Belin *et al.*, 2004).

A previous Mismatch Negativity (MMN) study by Beauchemin *et al.* (2006) contrasted brain responses to personally familiar and unfamiliar voices and reported an effect of voice familiarity on voice processing seen in larger MMNs by familiar voices.

The present study investigates the neural patterns of voice familiarity processing for publicly, but not personally familiar voices. Therefore, a classic oddball paradigm contrasted two two-syllable German utterances ('Kinder' and 'Tochter') by the former German chancellor Angela Merkel with the same words being uttered by two unknown female speakers with matched age, regional background and voice quality. Angela Merkel can be considered a famous speaker publicly familiar to most German native speakers. Electroencephalogram was recorded from 32 active electrodes while 21 participants were presented with the different voices in standard or deviant position. Voice processing indices were quantified as MMNs and P3a differences, and cortical sources of both difference wave forms were estimated with variable resolution electromagnetic tomography.

The results showed differences in latency and amplitude for both MMN and P3a: Merkel's voice elicited a smaller but earlier MMN than the control voices. The P3a, by contrast, was both larger and later in response to Merkel. The topographic distribution of the MMN in response to Merkel suggested right hemispheric activation, overlapping with the voice area, and activation in the left superior temporal gyrus for the control voices.

These results indicate that voice recognition is an automatic and pre-attentive process, occurring within the first 150 ms of the acoustic signal, yielding similar recognition patterns for famous compared to personally familiar voices.

[Abstract Word count: 296]

References

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