
Encoding and integration of social information from human faces and voices

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Abstract

Successful social interaction requires correct interpretation of dynamic facial and vocal signals, such as emotional facial expressions and speech melody (prosody). It has recently been shown that the neural correlate for integration of signals from these modalities is situated at the overlap of right hemispheric face- and voice-sensitive superior temporal sulcus (STS) cortices. Building on this research, we show that the fine-scale spatial activation patterns within modality-specific areas in the STS areas indeed carry information about perceived emotional tone. Furthermore, we combine functional magnetic resonance imaging (fMRI) and diffusion tensor imaging (DTI) to clarify which other brain areas are recruited in concert with STS regions to extract the meaning of facial and vocal stimuli. Using a factorial adaptation design we demonstrate significant response habituation in the orbitofrontal cortex (OFC) which occurs similarly during perception of emotional faces, voices and face-voice combinations. These functional data are in line with DTI findings showing converging fiber projections from three different STS modules to the OFC which run through the external capsule for the voice area, through the dorsal superior longitudinal fasciculus (SLF) for the face area and through the ventral SLF for the audiovisual integration area. This suggests a key role of the OFC for processing of dynamic social signals and proposes that the OFC is part of the extended system for both face and voice perception. Our findings show that combining different neuroimaging methods can successfully be used to tap social signal processing stages in great detail.

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