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Neuronal correlates of the perception of static and dynamic facial expressions of emotion: fMRI study

Understanding the emotions of others is crucial for appropriate social communication. The face is believed to be the most important channel of emotional expression in humans. Most research on the importance of facial expressions for social interaction has been conducted using static faces as stimuli. Moreover, up to now neuroimaging investigations of the neural basis of emotion perception have been mainly conducted using static displays. It was suggested that static facial expressions of emotion activate the emotion-related brain regions, such as the amygdala, especially in the case of fear. Those claims are less clear for dynamic facial expressions, since some studies used artificial facial stimuli (e.g. avatars). The goal of our study was to explore if activations of emotion-related brain areas are similar for both, static and dynamic stimuli. We used realistic stimuli derived from standardized and valid set of facial expressions (ADFES, van der Schalk 2011).

We found that irrespective of specific emotion (happiness, anger) dynamic stimuli activated widespread patterns of activation, presumably involved in motion perception (e.g. V5/MT, superior temporal sulcus) as well as brain areas related to mirror neuron system (e.g. inferior frontal gyrus). Presentation mode by emotion specific interactions indicated specific activations for unique emotions: e.g. insula for happiness, amygdala for anger.

Our findings indicate that dynamic face stimuli result in more pronounced and distributed activation patterns when compared to static faces. This could be interpreted in terms of higher ecological validity of the dynamic face stimuli facilitating the perception of emotional facial expressions.