Neural networks of emotion processing of faces and words

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Abstract

Although much reading happens in an emotional context, little is known about the relationship between emotions and reading. The existence of emotional valence effects in reading is hotly disputed. Some found emotion effects in reading in occipital regions whereas others found a rather large network of brain activation in parietal, superior temporal and frontal lobes. Almost no studies found specific effects of emotional valence, differences are typically found between emotional and neutral words but not between positive and negative words. In an event-related fMRI experiment with faces and words two questions were addressed: 1. Is there evidence for specific effects of emotional valence on brain activation using multivariate nonlinear pattern classifiers that are potentially more sensitive to detect effects that emerge in partially overlapping brain networks? 2. Is there evidence that basic emotion networks involved in processing emotions in faces are also involved in processing of emotions in words? Participants made emotional valence judgments to happy and sad faces and words. A classical roi analyses showed that only faces activated regions involved in emotion processing, namely the amygdala. A support vector machine (SVM) classifier was then trained on brain activity of group-rois of faces and words. First results revealed that the classifier was able to discriminate between positive and negative faces and positive and negative words using the voxel time series extracted from the amygdala. Thus, the SVM revealed emotion specific effects in the amygdala for faces and words, which were not visible in the classic analyses.

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