Disentangling the effects of affective dimensions and emotional categories in the perception of facial expressions of emotion: Affective ratings and event-related potential (ERP) findings

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Abstract

Facial expressions of emotion have been widely studied and have played an important role in theories of human emotion. However, the neural underpinnings of the emotional processing of faces are still not fully understood. In most studies, facial expression stimuli are simply categorized as basic emotions (e.g. happiness, fear) into experimental factors according to which emotion they express but their affective properties such as emotional intensity, arousal and valence are rarely controlled for and may confound the results. The first objective of the present study was to obtain dimensional ratings of perceived arousal and valence for a set of commonly used facial expressions (NimStim Face Stimulus Set). We found that the affective properties of emotion categories present relatively high intra-categorical variability and that ratings of arousal and valence show a quadratic association, mimicking findings for non-facial affective pictures. Secondly, we examined brain event-related potential (ERP) responses to affective dimensions and emotional categories by designing an experimental ERP task where these two factors were manipulated independently. Previous ERP studies relying on emotional categories alone have produced mixed results: some studies reported no emotional modulation of the N170 whereas others found differences between emotional categories. We found that affective arousal modulated N170 amplitude (high > low arousal), whilst basic emotion categories and valence did not. Our findings suggest that the emotional effects on the N170 may be driven by arousal, which could explain both negative and positive previous findings, depending on whether stimuli would, respectively, be matched for arousal or not.

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