Affective and motivational influences on action monitoring

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The error-related negativity (ERN/Ne) and subsequent error positivity (Pe) is a two-component response-locked event-related brain potential (ERP) complex observed when subjects make mistakes in speeded reaction time tasks. On correct trials, the correct response negativity (CRN) has also been linked to response monitoring processes. A number of studies have reported abnormalities of these response monitoring ERP components in relation to psychopathology; in particular, to disorders characterized by affective distress (e.g., anxiety and depression). I will first review studies from our laboratory in which we investigated the relationship between error-related brain activity and affective distress. In a series of subsequent studies, we sought to further understand within-subject factors that modulate the magnitude of error-related brain activity; in particular, I will discuss two studies in which we manipulated anxiety and motivation during response monitoring. In the first study, we measured error-related brain activity while spider phobic undergraduates performed a modified flankers task in both a control and provocation condition. The Pe and P300 were significantly reduced in the provocation condition, but the provocation had no effect on performance measures or the ERN/Ne and CRN. In a second study, we manipulated the value of errors on a trial-by-trial basis in a flankers task. High-value errors were characterized by a reliably higher ERN/Ne and reduced Pe; no differences were found in terms of the CRN or behavioral measures. These results will be discussed in terms of the relationship between altered error-related brain activity in affectively distressed subjects and both anxiety and motivation.

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