
Valence specific effects of right vs. left prefrontal cTBS on late emotion sensitive ERPs

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Abstract

Emotionally arousing stimuli obtain selective and prioritized processing. This is reflected in two emotion sensitive components: the "early posterior negativity" (EPN) and the "late positive complex" (LPC). Basic research suggests that the dorsolateral prefrontal cortex (DLPFC) contributes to emotional stimulus categorization (Cacioppo et al., 1993; Kensinger and Corkin, 2003). In order to investigate the causal influence of lateralized prefrontal structures on emotion-related neural networks and processes (Davidson, 1992), left vs. right DLPFC activity was selectively reduced by means of inhibitory continuous theta burst stimulation (cTBS, Huang et al., 2005). After the stimulation protocol, participants passively viewed positive, neutral, and negative German nouns while EEG was recorded. We hypothesized the stimulation site to differentially influence valence specific ERPs. We found a main effect of *arousal* in the EPN-time interval (200-300ms, posterior electrodes, cf. Kissler et al. (2007)) and in the LPC time interval (440 – 520ms, fronto-parietal electrodes), irrespective of the word's valence. In the LPC time interval we further observed a main effect of *stimulation* and an interaction of *stimulation*emotion*. In line with Davidson (1992), this interaction uncovered a differential influence of the stimulation site on negative compared to positive words: Left frontal stimulation led to enhanced activity in response to negative stimuli whereas right frontal stimulation caused enhanced amplitudes in response to positive stimuli. Overall, prefrontal stimulation mainly influenced rather late processing stages (LPC) that have previously been linked with attentional capture, evaluation, and memory encoding (Kissler et al., 2009).

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