THE NEURAL CIRCUITRY UNDERLYING ERROR MONITORING DURING SOCIAL COGNITION

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Grant 306/2016

Background: The field of error monitoring is a growing research area within cognitive neuroscience, which is particularly relevant to inform models of cognitive control and psychopathology. However, the role of the error monitoring circuitry during social cognition remains to be elucidated.

Aims: It is aimed to map the neural mechanisms underlying one's contemplation on actions, which potentially reflect social behavior. How is cognitive control of socially directed actions implemented once the error-monitoring system has identified a fault and adjustments are needed?

Method: This project combines behavioral, electroencephalographic (EEG), and functional magnetic resonance imaging (fMRI) studies to explore the neural networks of error detection and error awareness in the specific context of social cognition. We use incongruent social attention cues (based on gaze and facial expression signals) to trigger frequent errors (such as inhibitory control) in healthy individuals. A pro-saccade/anti-saccade go/no-go task where the instructions are based on emotion recognition and interpretation of social attention signals is employed. Keypress responses and instructions based on non-social cues are used as controls.

Preliminary results: We found that frequency-domain EEG components bring advantages to study error monitoring in complex scenarios, as the social ones, once it carries information from locked and non-phase-locked signals. Midfrontal theta, mostly associated with alert mechanisms triggering behavioral adjustments, also seems to reflect pre-response attentional mechanisms, acting not only as a neuronal marker of error commission but also as a predictor of success. Moreover, our findings suggest the connection of key nodes of the salience network to determine action performance.

Keywords: Error metacognition; Social error monitoring; Cognitive control; EEG; fMRI.

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