

Action monitoring in psychiatric disorders

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People suffering from a psychiatric disorder often display deviant behavior that may suggest underlying disturbances in action monitoring. Several neuropsychiatric disorders, like schizophrenia and obsessive-compulsive disorder, have been investigated with regard to action monitoring using different neuroimaging techniques (ERPs, PET, and fMRI). The results from these studies point to an abnormal activated area in the brain, known as the anterior cingulate cortex (ACC).

The ACC is part of a control network involving the prefrontal cortex, the basal ganglia, and the limbic areas. Because of its location and connections to other structures in the brain, this area has been described as the interface between cognition, motor control, and the drive of the organism (Paus, 2001, *Nat Rev Neurosci*). A number of ERP studies showed that the ACC generates the error-related negativity, an ERP component elicited after the detection of an erroneous response.

While some disorders have been investigated extensively, others have not been studied, in spite of the fact that in a number of these disorders the major symptoms do suggest ACC involvement. More specifically, we were interested in action monitoring processes in (1) people with conversion disorder, showing paresis to one arm (CP), and (2) people with a borderline personality disorder (BPD). In two separate experiments, all participants performed a speeded two-choice reaction task (Eriksen-Flankers).

In sum, the results showed that patients with CP had difficulty in initiating responses with their affected hand, which was reflected in increased pre-response conflict. However, the ACC activity associated with erroneous responses was not different for responses with their healthy or affected hand. Patients with BPD, on the other hand, showed largely reduced ERN amplitudes compared to a matched control group. The results from both experiments will be discussed in relation to the nature of the disorder and existing theories on action monitoring.

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