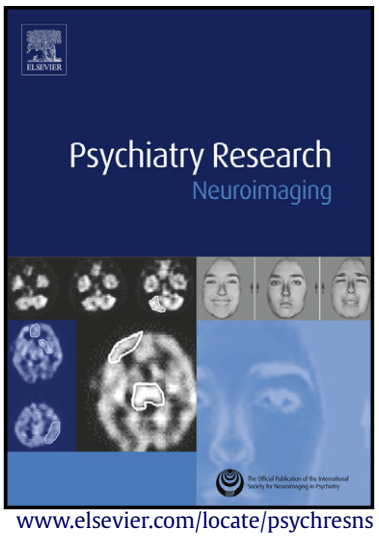

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Dysconnectivity of the inferior frontal gyrus: implications for an impaired self-other distinction in patients with schizophrenia

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Abstract

Ego disturbances in schizophrenia might be caused by a failure of the efference copy mechanism, which compares efferent with reafferent signals and attenuates the sensory consequences of self-produced movements. We carried out a functional magnetic resonance imaging study in which 16 patients with schizophrenia and 16 healthy matched controls were studied while performing both intentional and unintentional continuous hand movements in two consecutive experiments. We periodically varied the delay of visual feedback to create a sensory-motor discrepancy. Exclusively for intentional movements the activation pattern of the inferior frontal gyrus (IFG) in patients was opposite to that of controls: less attenuated during time-congruent feedback and less activated during time-incongruent feedback. Additionally, several functional connections within the mismatch detection network (IFG with insula, putamen, medial orbitofrontal cortex) were affected. Also, activity of the dysconnected orbitofrontal cortex was correlated with ego disturbance in patients. We discuss that in healthy individuals the IFG might enable a distinction between self and non-self using time-characteristics of feedback, whereas in patients this sensory mismatch detection appears to be altered. Moreover, due to the dysconnectivity of the IFG, the efferent and reafferent signal exchange between perceptual and motor areas seems to be affected. This might cause self-monitoring deficits in patients, phenomena that contribute to the emergence of ego disturbances.

Keywords: Efference copy, Agency, Inferior frontal gyrus, Schizophrenia, Functional magnetic resonance imaging (fMRI), Functional connectivity