Evidence suggests that cognitive deficits are a core feature of schizophrenia. The concept of "cognitive dysmetria" has been introduced to characterize disintegration of fronto-thalamic-cerebellar circuitry which constitutes a key network for a variety of neuropsychological symptoms in schizophrenia. The present multimodal study aimed at investigating effective and structural connectivity of the fronto-thalamic circuitry in schizophrenia. fMRI effective connectivity analysis using dynamic causal modeling (DCM) and diffusion tensor imaging (DTI) were combined to examine cognitive control processes in 38 patients with schizophrenia and 40 matched healthy controls. Significantly lower fractional anisotropy (FA) was detected in patients in the right anterior limb of the internal capsule (ALIC), the right thalamus and the right corpus callosum. During Stroop task performance patients demonstrated significantly lower activation relative to healthy controls in a predominantly right lateralized fronto-thalamo-cerebellar network. An abnormal effective connectivity was observed in the right connections between thalamus, anterior cingulate and dorsolateral prefrontal cortex. FA in the ALIC was significantly correlated with the thalamic BOLD.
signal, cognitive performance and fronto-thalamic effective connectivity in patients. Present data provide evidence for the notion of a structural and functional defect in the fronto-thalamo-cerebellar circuitry, which may be the basis of specific cognitive impairments in schizophrenia.

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