

Cortico-Striatal dysfunction during real-world comprehension in schizophrenia

Tatiana Sitnikova*, W. Caroline West*, Gina R. Kuperberg*[^]

**Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Boston, MA*

[^]Tufts University, Medford, MA

An impaired ability to integrate perceived information into an overall semantic representation has been proposed as a fundamental cognitive deficit underlying schizophrenia. Previous studies of this abnormality have focused primarily on language. Clinically, however, schizophrenia is characterized by abnormalities in both verbal and non-verbal domains. In this event-related fMRI study, 20 patients with schizophrenia and 20 healthy participants viewed short, silent movies of common real-world activities. The final movie scenes were either congruous or anomalous (e.g., in a congruous movie, a man in a bathroom smeared shaving cream on his face, and then shaved; in an anomalous movie, instead of shaving, he stroked a rolling pin across his face). In both participant groups, fMRI BOLD signal was similarly increased for anomalous relative to congruous movie endings in the left temporal and inferior-prefrontal cortices. This suggested that the neural mechanisms of retrieving semantic knowledge relevant for our real-world comprehension are relatively intact in schizophrenia. However, in the fronto-striatal circuit, involving the left dorsolateral prefrontal cortex and the basal ganglia, a scene-congruency effect was found only in the healthy group but not in the schizophrenia group. This brain mechanism might be involved in orchestrating parallel processing of alternative stimulus interpretations, a function that is crucial to comprehending novel and unusual events. The dysfunction of this mechanism in schizophrenia might lead to an over-reliance on analysis of the semantic associations between stimuli by the temporal/inferior-prefrontal network. This could lead to a tendency to “jump to conclusions”, and in turn, to delusions and the non-goal-directed, disorganized thought that characterize the schizophrenic syndrome.