

Abnormal modulation of cortical networks during language processing in schizophrenia

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Language dysfunction is central to the schizophrenic syndrome. Are these abnormalities mediated by the abnormal activation of regionally distinct neural modules or by dysfunction within widespread neural networks? We used event-related fMRI to determine whether the neural correlates of conceptual and morphosyntactic processing could be dissociated in schizophrenia. During functional scanning on a 1.5T GE MRI scanner, normal, pragmatically anomalous and syntactically anomalous sentences were presented word-by-word (300ms, 100ms ISI) in a pseudorandom counterbalanced sequence. In processing all sentences, schizophrenic patients showed significantly less activity than matched controls in several regions within the left temporal lobe (left posterior superior temporal, inferior temporal, fusiform, parahippocampal and temporal pole). Patients activated other regions more than controls, particularly in the parietal cortex. In contrasting pragmatically and syntactically violated sentences, it was striking that the anterior superior temporal cortex that shows increased response to pragmatic anomalies in controls, showed an increased response to syntactic violations in schizophrenics. Conversely, the posterior middle temporal gyrus and the anterior medial frontal cortex that show increased response to syntactic anomalies in controls, showed an increased response to pragmatic anomalies in patients. The normal patterns of modulation within widespread networks mediating the computation of the form and meaning of language appear to be disrupted and even reversed in schizophrenia. This provides evidence that language dysfunction in schizophrenia results from abnormal modulation and interactions within widespread cortical networks.