Neural markers of negative symptom outcomes in distributed working memory brain activity of antipsychotic-naive schizophrenia patients

Since working memory deficits in schizophrenia have been linked to negative symptoms, we tested whether features of the one could predict the treatment outcome in the other. Specifically, we hypothesized that working memory-related functional connectivity at pre-treatment can predict improvement of negative symptoms in antipsychotic-treated patients. Fourteen antipsychotic-naive patients with first-episode schizophrenia were clinically assessed before and after 7 months of quetiapine monotherapy. At baseline, patients underwent functional magnetic resonance imaging while performing a verbal n-back task. Spatial independent component analysis identified task-modulated brain networks. A linear support vector machine was trained with these components to discriminate six patients who showed improvement in negative symptoms from eight non-improvers. Classification accuracy and significance was estimated by leave-one-out cross-validation and permutation tests, respectively. Two frontoparietal and one default mode network components predicted negative symptom improvement with a classification accuracy of 79% (p = 0.003). Discriminating features were found in the frontoparietal networks but not the default mode network. These preliminary data suggest that functional patterns at baseline can predict negative symptom treatment–response in schizophrenia. This information may be used to stratify patients into subgroups thereby facilitating personalized treatment.

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