

Publication

Reproducible grey matter patterns index a multivariate, global alteration of brain structure in schizophrenia and bipolar disorder

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Schizophrenia is a severe mental disorder characterized by numerous subtle changes in brain structure and function. Machine learning allows exploring the utility of combining structural and functional brain magnetic resonance imaging (MRI) measures for diagnostic application, but this approach has been hampered by sample size limitations and lack of differential diagnostic data. Here, we performed a multi-site machine learning analysis to explore brain structural patterns of T1 MRI data in 2668 individuals with schizophrenia, bipolar disorder or attention-deficit/ hyperactivity disorder, and healthy controls. We found reproducible changes of structural parameters in schizophrenia that yielded a classification accuracy of up to 76% and provided discrimination from ADHD, though it lacked specificity against bipolar disorder. The observed changes largely indexed distributed grey matter alterations that could be represented through a combination of several global brain-structural parameters. This multi-site machine learning study identified a brain-structural signature that could reproducibly differentiate schizophrenia patients from controls, but lacked specificity against bipolar disorder. While this currently limits the clinical utility of the identified signature, the present study highlights that the underlying alterations index substantial global grey matter changes in psychotic disorders, reflecting the biological similarity of these conditions, and provide a roadmap for future exploration of brain structural alterations in psychiatric patients.

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