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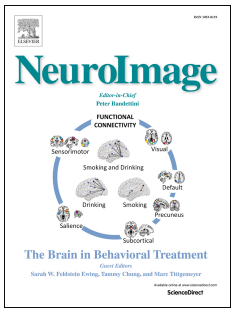

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Advances in Microstructural Diffusion Neuroimaging for Psychiatric Disorders

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Abstract

Understanding the neuropathological underpinnings of mental disorders such as schizophrenia, major depression, and bipolar disorder is an essential step towards the development of targeted treatments. Diffusion MRI studies utilizing the diffusion tensor imaging (DTI) model have been extremely successful to date in identifying microstructural brain abnormalities in individuals suffering from mental illness, especially in regions of white matter, although identified abnormalities have been biologically non-specific. Building on DTI's success, in recent years more advanced diffusion MRI methods have been developed and applied to the study of psychiatric populations, with the aim of offering increased sensitivity to subtle neurological abnormalities, as well as improved specificity to candidate pathologies such as demyelination and neuroinflammation. These advanced methods, however, usually come at the cost of prolonged imaging sequences or reduced signal to noise, and they are more difficult to evaluate compared with the more simplified approach

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