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EVIDENCE FOR WIDESPREAD THINNING OF THE CEREBRAL CORTEX IN PATIENTS WITH FIRST-EPISODE PSYCHOSIS WITH POOR INSIGHT

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Background: Through conceptualizing poor insight in psychotic disorders as a form of anosognosia (neurological deficit), frontal lobe dysfunction is often ascribed a vital role in its pathogenesis. Whether non-frontal brain regions are important for insight remains to be investigated. In the current work, we used a multi-method approach to examine the neural morphometry of all cortical regions for insight in first-episode psychosis.
Methods: Insight was rated in 79 people with a first-episode psychosis with the awareness of illness and awareness of treatment need and efficacy items of the Scale for assessment of Unawareness of Mental Disorder. Participants were assessed with magnetic resonance imaging. Cortical thickness analysis and voxel-based morphometry were utilized to identify the neuroanatomical basis of insight.
Results: Cortical thickness technique revealed that poorer awareness of illness was associated with regional thinning in the left middle frontal (Dorsolateral prefrontal cortex, BA9) and left inferior temporal gyri (BA20). Poorer awareness of treatment need and efficacy was associated with widespread cortical thinning, most prominently in the left medial frontal gyrus (BA6), left precuneus (BA7) and left temporal gyri (BA20/38/39). No significant associations emerged between any insight measure and gray matter volumes using voxel-based morphometry.
Discussion: The results confirm predictions derived from the anosognosia/neuropsychology account and assert that regional thickness in frontal cortex is associated with awareness of illness in the early phase of a psychotic disorder. The fact that prominent thickness reductions emerged in non-frontal regions of the brain in parietal and temporal cortices for both awareness of illness and awareness of treatment need/efficacy suggests that the neural signature of insight involves a network of brain structures, and not only the frontal lobes, as previously suggested.

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GLOBAL AND LOCAL CONNECTIVITY CHANGES IN SCHIZOPHRENIA INVESTIGATED BY DIFFUSION CONNECTOME

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Background: New ways of representing diffusion data emerged recently and achieved to create structural connectivity maps in healthy brains (Hagmann P et al. (2008)). These maps have the capacity to study alterations over the entire brain at the connection and network level. This is of high interest in complex disconnection diseases like schizophrenia. In this Pathology where multiple lines of evidence suggest the association of the pathology with abnormalities in neural circuitry and impaired structural connectivity, the diffusion imaging has been widely applied. Despite the large findings, most of the research using the diffusion just uses some scalar map derived from diffusion to show that some markers of white matter integrity are diminished in several areas of the brain (Kyriakopoulos M et al (2008)). Thanks to the structural connection matrix constructed by the whole brain tractography, we report in this work the network connectivity alterations in the schizophrenic patients.
Methods: We investigated 13 schizophrenic patients as assessed by the DIGS (Diagnostic Interview for genetic studies, DSM IV criteria) and 13 healthy controls. We have got from each volunteer a DT-MRI as well as Qball imaging dataset and a high resolution anatomic T1 performed during the same session; with a 3 T clinical MRI scanner. The controls were matched on age, gender, handedness, and parental social economic-status. For all the subjects, a low resolution connection matrix is obtained by dividing the cortex into 66 gyral based ROIs. A higher resolution matrix is constructed using 250 ROIs as described in Hagmann P et al. (2008). These ROIs are respectively used jointly with the diffusion tractography to construct the high and low resolution densities connection matrices for each subject. In a first step the matrices of the groups are compared in term of connectivity, and not in term of density to check if the pathological group shows a loss of global connectivity. In this context the density connection matrices were binarized. As some local connectivity changes were also suspected, especially in frontal and temporal areas, we have also looked for the areas where the connectivity showed significant changes.
Results: The statistical analysis revealed a significant loss of global connectivity in the schizophrenic's brains at level 5%. Furthermore, by constructing specific statistics which represent local connectivity within the anatomical regions (66 ROIs) using the data obtained by the finest resolution (250 ROIs) to improve the robustness, we found the regions that cause this significant loss of connectivity. The significance is observed after multiple testing corrections by the False Discovery Rate.
Discussion: The detected regions are almost the same as those reported in the literature as the involved regions in schizophrenia. Most of the connectivity decreases are noted in both hemispheres in the fronto-frontal and temporo-temporal regions as well as some temporal ROIs with their adjacent ROIs in parietal and occipital lobes.

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MEASUREMENT OF MORPHOLOGICAL CHANGES IN SCHIZOPHRENIC PATIENTS USING BRAIN MAGNETIC RESONANCE IMAGING

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Background: This study was performed to compare and measure the changes of corpus callosum of the schizophrenic patients with those of controls, to compare according to clinical symptoms,onset age.