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FUNCTIONAL MRI IN TWINS DISCORDANT FOR SCHIZOPHRENIA DURING A WORKING MEMORY TASK: PRELIMINARY RESULTS FROM THE EUTWINSS STUDY

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Introduction: Working memory deficits are considered a core feature of disturbed cognition in schizophrenia. Recent neuropsychological studies in twins suggest that there are shared genetic factors between schizophrenia and executive processes.
Aim: We used a co-twin control design to test the hypothesis that prefrontal activation during a working memory task is seen both in affected as well as unaffected twins discordant for schizophrenia, thus reflecting genetic load on this putative endophenotype.
Methods: As part of EUTwinsS, a multi-centre collaborative study on twins with schizophrenia, we obtained functional MRI scans during a Sternberg working memory task (with one maintenance and one manipulation variations) of twins discordant for schizophrenia (5 monozygotic pairs, 7 dizygotic pairs) and compared them to 10/4 healthy MZ/DZ twins, matched for age and gender.
Results: Comparing the overall task-related effects ($p < 0.001$, uncorrected), we found stronger activation in control twins compared to either Sz-affected or unaffected twins in the right middle frontal gyrus and medial fronto-orbital cortex, and compared to Sz-affected twins also in the left cerebellum and right inferior occipital cortex. Comparing the manipulation vs. maintenance trials, healthy controls showed stronger activation than Sz-affected twins in the left hippocampus, but smaller in right caudate and anterior cingulate, while unaffected co-twins showed diminished right middle and left superior and middle frontal gyri compared to either group.
Conclusions: While diminished prefrontal activation in unaffected co-twins might indicate compensatory processes during executive control, the overall activation deficits are consistent with a genetic effect on prefrontal cortical efficiency.

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