

Children at risk for schizophrenia show disordered brain networks

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A team of neuroscientists led by a Wayne State University School of Medicine professor has discovered stark developmental differences in brain network function in children of parents with schizophrenia when compared to those with no family history of mental illness.

The study, led by Vaibhav Diwadkar, Ph.D., assistant professor of psychiatry and [behavioral neurosciences](#) and co-director of the Division of [Brain Research](#) and Imaging Neuroscience, was published in the March 2012 issue of the American Medical Association journal [Archives of General Psychiatry](#) and is titled, "Disordered Corticolimbic Interactions During Affective Processing in Children and Adolescents at Risk for Schizophrenia Revealed by Functional Magnetic Resonance Imaging and Dynamic Causal Modeling."

The results provide significant insight into plausible origins of schizophrenia in terms of dysfunctional [brain](#) networks in adolescence, demonstrate sophisticated analyses of [functional magnetic resonance imaging](#) (fMRI) data and clarify the understanding of developmental mechanisms in normal versus vulnerable brains. The resulting information can provide unique information to psychiatrists.

The study took place over three years, using MRI equipment at Harper University Hospital in Detroit. Using fMRI the researchers studied brain function in young individuals (8 to 20 years of age) as they observed pictures of human faces depicting positive, negative and neutral [emotional expressions](#). Participants were recruited from the metropolitan

Detroit area. Because children of patients are at highly increased risk for [psychiatric illnesses](#) such as schizophrenia, the team was interested in studying brain network function associated with emotional processing and the relevance of impaired network function as a potential predictor for schizophrenia.

To investigate brain networks, the researchers applied advanced analyses techniques to the fMRI data to investigate how [brain regions](#) dynamically communicate with each other. The study demonstrated that children at risk for the illness are characterized by reduced network communication and disordered network responses to emotional faces. This suggests that brain developmental processes are going awry in children whose parents have schizophrenia, suggesting this is a subgroup of interest to watch in future longitudinal studies.

"Brain network dysfunction associated with emotional processing is a potential predictor for the onset of emotional problems that may occur later in life and that are in turn associated with illnesses like schizophrenia," Diwadkar said. "If you clearly demonstrate there is something amiss in how the brain functions in children, there is something you can do about it. And that's what we're interested in."

The results don't show whether schizophrenia will eventually develop in the subjects. "It doesn't mean that they have it, or that they will have it," he said.

"The kids we studied were perfectly normal if you looked at them," he said. "By using functional brain imaging we are trying to get underneath behavior."

"We are able to do this because we can investigate dynamic changes in brain network function by assessing changes in the fMRI signal. This allowed us to capture dramatic differences in how regions in the [brain](#)

[network](#) are interacting with each other," he said.

According to the National Alliance on Mental Illness, schizophrenia affects men and women with equal frequency, but generally manifests in men in their late teens or early 20s, and in women in their late 20s or early 30s.

Provided by Wayne State University

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