



Press Release

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Brain Imaging Identifies Biomarkers of Mental Illness

New study in Biological Psychiatry identifies predictive signature in adolescents

Philadelphia, November 9, 2023 – Research and treatment of psychiatric disorders are stymied by a lack of biomarkers – objective biological or physiological markers that can help diagnose, track, predict, and treat diseases. In [a new study](#), researchers use a very large dataset to identify predictive brain imaging-based biomarkers of mental illness in adolescents. The work appears in [Biological Psychiatry](#), published by Elsevier.

Traditionally, psychiatric disorders such as depression have been diagnosed based on symptoms according to subjective assessments. The identification of biomarkers to aid in diagnosis and treatment selection would greatly advance treatments.

In the current study, the investigators used brain imaging data from the Adolescent Brain Cognitive Development (ABCD) Study of nearly 12,000 children aged 9 to 10 at the beginning of the study. Modern neuroimaging techniques, including resting-state functional connectivity (rsFC) analysis, allow researchers to investigate the organization of brain circuits through their interaction with one another over time.

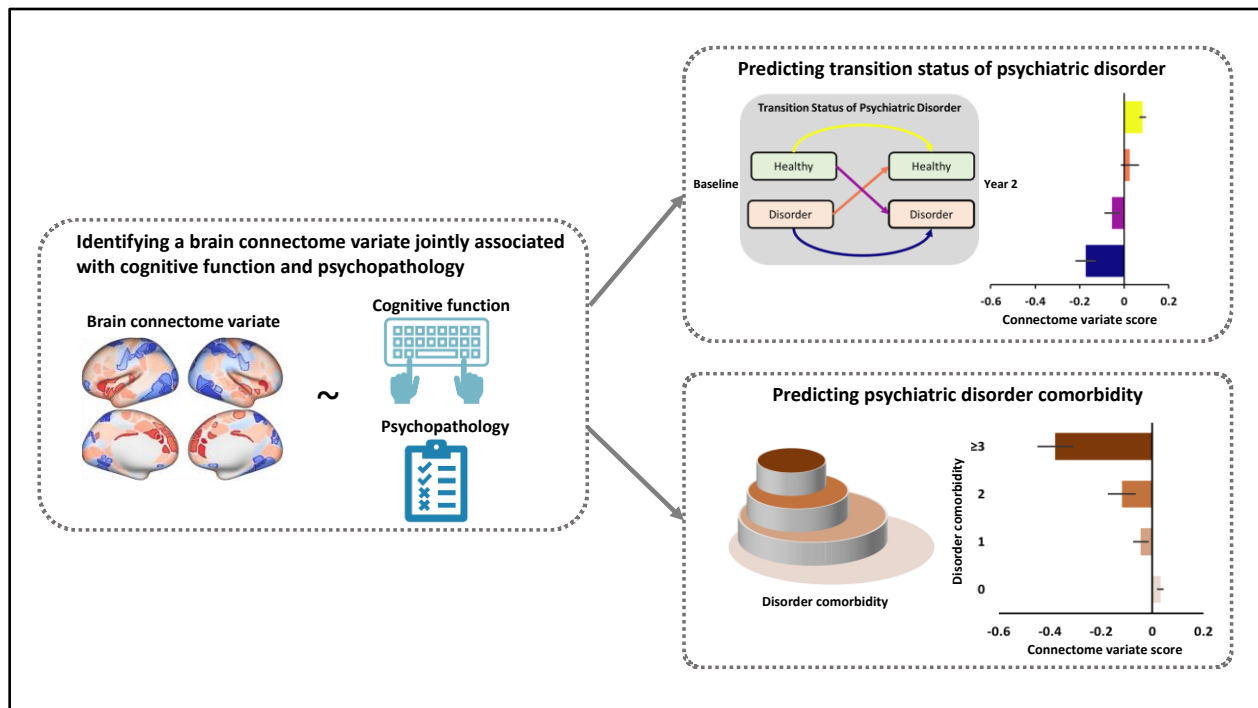
Yihong Yang, PhD, senior author of the study, at the Neuroimaging Research Branch, National Institute on Drug Abuse, said, *“Using a functional MRI dataset, we identified a brain connectivity variate that is positively correlated with cognitive functions and negatively correlated with psychopathological measures.”*

Cognition has long been studied in the context of mental disorders, and recent research has pointed to shared neurobiology between the two, as supported in this new study.

This brain-based variate predicted how many psychiatric disorders were identified in participants at the time of the scan and over the following two years. It also predicted the transition of diagnosis across disorders over the two-year follow-up period.”

Dr. Yang added, *“These findings provide evidence for a transdiagnostic brain-based measure that underlies individual differences in developing psychiatric disorders in early adolescence.”*

John Krystal, MD, Editor of *Biological Psychiatry*, said of the work, *“Mental illness in adolescence has emerged as a cardinal public health challenge in the post-COVID era. More than ever before, we would benefit from better ways to identify adolescents at risk. This study uses data from the landmark ABCD Study to illustrate how neuroimaging data could illuminate risk for mental illness across the spectrum of diagnoses.”*



Caption: In a new study, researchers use a very large dataset to identify predictive brain imaging-based biomarkers of mental illness in adolescents (Credit: Xiang Xiao, Christopher Hammond, Betty Jo Salmeron, Danni Wang, Hong Gu, Tianye Zhai, Hieu Nguyen, Hanbing Lu, Thomas Ross, Yihong Yang).

Dr. Yang added, *“Finding biomarkers of mental illnesses, rather than relying on symptoms, may provide a more precise means of diagnosis, and thereby aligning psychiatric diagnosis with other medical diagnoses.”*

Notes for editors

The article is "Brain Functional Connectome Defines a Transdiagnostic Dimension Shared by Cognitive Function and Psychopathology in Preadolescents," by Xiang Xiao, Christopher Hammond, Betty Jo Salmeron, Danni Wang, Hong Gu, Tianye Zhai, Hieu Nguyen, Hanbing Lu, Thomas J. Ross, and Yihong Yang (<https://doi.org/10.1016/j.biopsych.2023.08.028>). It appears online as an Article in Press in *Biological Psychiatry*, published by [Elsevier](https://www.elsevier.com).

Copies of this paper are available to credentialed journalists upon request; please contact Rhiannon Bugno at Biol.Psych@sobp.org. Journalists wishing to interview the authors may contact Yihong Yang, PhD, at yihongyang@intra.nida.nih.gov.

The authors' affiliations and disclosures of financial and conflicts of interests are available in the article.

John H. Krystal, MD, is Chairman of the Department of Psychiatry at the Yale University School of Medicine, Chief of Psychiatry at Yale-New Haven Hospital, and a research psychiatrist at the VA Connecticut Healthcare System. His disclosures of financial and conflicts of interests are available [here](#).

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The journal publishes novel results of original research which represent an important new lead or significant impact on the field, particularly those addressing genetic and environmental risk factors, neural circuitry and neurochemistry, and important new therapeutic approaches. Reviews and commentaries that focus on topics of current research and interest are also encouraged.

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