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Brain structural elements in psychiatric disorders

Analysis of brain-imaging data from a large consortium reveals shared patterns and distinct signatures

Philadelphia, July 7, 2020 – Researchers have previously identified brain structural signatures associated with individual neurological diseases using techniques such as magnetic resonance imaging (MRI). In a new [study](#), a team of scientists based in Germany has compared data from multiple studies to find brain structural abnormalities shared between four different neuropsychiatric conditions. The researchers also found brain signatures that were unique to individual conditions.

The work, led by Bernhard T. Baune, MD, PhD, and Udo Dannlowski, MD, PhD, University of Münster, Germany, appears in [Biological Psychiatry](#), published by Elsevier.

Co-first author Nils Opel, MD, (together with Janik Goltermann, MSc) said of the work, “the identification of shared and disorder-specific brain structural signatures might enhance the future development of biologically informed diagnostic applications in psychiatry.”

The team analyzed data collected as part of the effort by an international research consortium called ENIGMA, for “Enhancing Neuro Imaging Genetics through Meta Analysis,” which uses genetic and imaging studies to understand brain diseases. The 11 multi-center studies collected brain-imaging data from over 12,000 people.

“We found that 4 major psychiatric disorders – major depression, bipolar disorder, schizophrenia, and obsessive-compulsive disorder – show a surprisingly high level of similarity in their brain structural abnormalities,” said Dr. Opel. The shared brain areas showing structural aberrations were mainly in cortical areas associated with cognitive processing, memory and self-awareness.

On the flipside, Dr. Opel added, “we were able to identify regional abnormalities with high specificity for certain disorders.” Interestingly, these distinct structural differences sometimes appeared in the same area for two disorders, but in opposite directions from the norm.

In contrast, attention-deficit/hyperactivity disorder and autism spectrum disorder did not share brain structural signatures with any other disorders. That may be because those disorders are considered developmental diseases with a distinct etiology from the other psychiatric conditions, which have more in common.

The researchers do not yet understand the mechanisms behind the shared structural elements, but a growing body of evidence shows that these psychiatric disorders also share common genetic as well as environmental influences, which might underlie the current findings.

“Our understanding arising from brain imaging studies of the biology of neuropsychiatric disorders is changing,” said John H. Krystal, MD, Editor of *Biological Psychiatry*. “Initially, we focused on the individual properties of particular patient groups. Then, some imaging studies suggested that neuropsychiatric disorders were dimensionally related. This new study affirms the dimensional relationship among some disorders, but suggests that some categorical distinctions may exist at the biological level.”

The finding of regional abnormalities specific to individual conditions, Dr. Opel added, “could help shift the focus of future psychiatric and neuroscientific research on brain regions that appear to be central to disorder-specific biological processes and hence might facilitate the discovery of mechanisms underlying the development of specific psychiatric disorders.”

Notes for editors

The article is "Cross-Disorder Analysis of Brain Structural Abnormalities in Six Major Psychiatric Disorders – A Secondary Analysis of Mega- and Meta-Analytical Findings from the ENIGMA Consortium," by Nils Opel, Janik Goltermann, Marco Hermesdorf, Klaus Berger, Bernhard T. Baune, Udo Dannlowski (<https://doi.org/10.1016/j.biopsych.2020.04.027>). It appears in *Biological Psychiatry*, published by [Elsevier](#).

Copies of this paper are available to credentialed journalists upon request; please contact Rhiannon Bugno at Biol.Psych@sobp.org or +1 254 522 9700. Journalists wishing to interview the authors may contact Nils Opel at n_opel01@uni-muenster.de or +49 251 8356610.

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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