

Brain structural elements in psychiatric disorders

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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, Ph.D., and Udo Dannlowski, MD, Ph.D., University of Münster, Germany, appears in *Biological Psychiatry*.

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 four 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](#)."

More information: Nils Opel et al. 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, *Biological Psychiatry* (2020). [DOI: 10.1016/j.biopsych.2020.04.027](https://doi.org/10.1016/j.biopsych.2020.04.027)

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