



Press Release

Media contact

Rhiannon Bugno

+1 254 522 9700

BPCNNI@sobp.org

Brain structural differences observed in children with conduct disorder with and without childhood maltreatment

Philadelphia, February 7, 2023 – Characterized by antisocial behaviors and low academic achievement, conduct disorder (CD) impacts an estimated 9.5% of individuals in the United States. Childhood maltreatment is a major risk factor for CD. Past CD studies have identified structural alterations in various brain regions, such as those implicated in emotion processing, learning, and social cognition. A new [study](#) appearing in [Biological Psychiatry: Cognitive Neuroscience and Neuroimaging](#), published by Elsevier, has now assessed whether youths with CD who experienced childhood maltreatment differ at the brain level from those with CD without a history of maltreatment.

The research, led by Marlene Staginnus, a PhD student at the University of Bath, UK, tested the ecophenotype model, which proposes that maltreatment-related psychopathology is distinct from forms of psychopathology that do not develop as a result of childhood maltreatment. The study included 146 healthy controls and 114 youths with CD. The researchers collected structural MRI data to study cortical structure, including the volume, area, and thickness of the cortex, the outer layer of the brain.

Graeme Fairchild, PhD, Department of Psychology, University of Bath, Bath, UK, the senior author on the paper, said, “Our findings have important implications for theory, research, and clinical practice for those working in mental health or forensic services for young people. First, they suggest that, despite having the same diagnosis, conduct disordered youths with and without maltreatment differ from each other in brain structure and also differ from healthy youth in different ways. To be more specific, the conduct disordered youth with a history of childhood maltreatment showed far more extensive changes in brain structure than the non-maltreated youth with CD -- multiple brain regions were affected, and several different aspects of cortical structure (cortical thickness, surface area, and folding) were altered. The maltreated youth with CD also differed more in comparison to the healthy youth than their non-maltreated counterparts.”

In line with the researchers' hypotheses, maltreated and non-maltreated CD youths displayed distinct alterations compared to healthy controls. When combining the CD youths with and without maltreatment into a single group, the CD group displayed lower cortical thickness in the right inferior frontal gyrus. However, when the maltreated and non-maltreated youths were separately compared with healthy controls, those who had experienced maltreatment displayed more widespread structural changes in comparison to healthy controls than did their non-maltreated counterparts.

Cameron Carter, MD, editor of *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, said of the study, “the authors use structural MRI to measure the changes in brain structure associated with CD and highlight the unique contribution of childhood maltreatment to these changes. The study provides neurobiological insights into the heterogeneity of CD with implications for understanding pathophysiology and informing future treatment development.”

These findings may help guide research toward better understanding the prevention, assessment, and treatment of CD. They also beckon to researchers to explore whether there is a distinct pathway between maltreatment and antisocial behavior, or if such brain differences translate to differences in treatment responsiveness.

Dr. Fairchild recommends that “maltreatment history be assessed in future neuroimaging studies of conduct disorder and other psychiatric disorders of childhood and adolescence.”

Notes for editors

The article is "Testing the Ecophenotype Model: Cortical Structure Alterations in Conduct Disorder With Versus Without Childhood Maltreatment," by Marlene Staginnus, Harriet Cornwell,, Nicola Toschi, Maaïke Oosterling, Michal Paradysz, Areti Smaragdi, Karen González-Madruga, Ruth Pauli, Jack C. Rogers, Anka Bernhard, Anne Martinelli, Gregor Kohls, Nora Maria Raschle, Kerstin Konrad, Christina Stadler, Christine M. Freitag, Stephane A. De Brito, and Graeme Fairchild (<https://doi.org/10.1016/j.bpsc.2022.12.012>). It appears as an Article in Press in *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, published by Elsevier.

The article is openly available at [https://www.biologicalpsychiatrycnni.org/article/S2451-9022\(22\)00347-0/fulltext](https://www.biologicalpsychiatrycnni.org/article/S2451-9022(22)00347-0/fulltext).

Copies of this paper are also available to credentialed journalists upon request; please contact Rhiannon Bugno at +1 254 522 9700 or BPCNNI@sobp.org. Journalists wishing to interview the authors may contact Graeme Fairchild, PhD, at gf353@bath.ac.uk.

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

Cameron S. Carter, MD, is Professor of Psychiatry and Psychology and Director of the Center for Neuroscience at the University of California, Davis. His disclosures of financial and conflicts of interests are available [here](#).

About *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*

Biological Psychiatry: Cognitive Neuroscience and Neuroimaging is an official journal of the [Society of Biological Psychiatry](#), whose purpose is to promote excellence in scientific research and education in fields that investigate the nature, causes, mechanisms and treatments of disorders of thought, emotion, or behavior. In accord with this mission, this peer-reviewed, rapid-publication, international journal focuses on studies using the tools and constructs of cognitive neuroscience, including the full range of non-invasive neuroimaging and human extra- and intracranial physiological recording methodologies. It publishes both basic and clinical studies, including those that incorporate genetic data, pharmacological challenges, and computational modeling approaches. The 2021 Journal Impact Factor™ score, from Clarivate, for *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging* is 6.050. www.sobp.org/bpcnni

About Elsevier

As a global leader in information and analytics, [Elsevier](#) helps researchers and healthcare professionals advance science and improve health outcomes for the benefit of society. We do this by facilitating insights and critical decision-making for customers across the global research and health ecosystems.

In everything we publish, we uphold the highest standards of quality and integrity. We bring that same rigor to our information analytics solutions for researchers, health professionals, institutions and funders.

Elsevier employs 8,700 people worldwide. We have supported the work of our research and health partners for more than 140 years. Growing from our roots in publishing, we offer knowledge and valuable analytics that help our users make breakthroughs and drive societal progress. Digital solutions such as [ScienceDirect](#), [Scopus](#), [SciVal](#), [ClinicalKey](#) and [Sherpath](#) support strategic [research management](#), [R&D performance](#), [clinical decision support](#), and [health education](#). Researchers and healthcare professionals rely on our over 2,700 digitized journals, including *The Lancet* and *Cell*; our over 43,000 eBook titles; and our iconic reference works, such as *Gray's Anatomy*. With the [Elsevier Foundation](#) and our external [Inclusion & Diversity Advisory Board](#), we work in partnership with diverse stakeholders to advance [inclusion and diversity](#) in science, research and healthcare in developing countries and around the world.

Elsevier is part of [RELX](#), a global provider of information-based analytics and decision tools for professional and business customers. www.elsevier.com

Media contact

Rhiannon Bugno, Editorial Office

Biological Psychiatry: Cognitive Neuroscience and Neuroimaging

+1 254 522 9700

BPCNNI@sobp.org