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Machine learning predicts conduct disorder in kids

Highly accurate model uses factors across biopsychosocial domains

Philadelphia, April 12, 2022 – Conduct disorder (CD) is a common yet complex psychiatric disorder featuring aggressive and destructive behavior. Factors contributing to the development of CD span biological, psychological, and social domains. Researchers have identified a myriad of risk factors that could help predict CD, but they are often considered in isolation. Now, [a new study](#) uses a machine-learning approach for the first time to assess risk factors across all three domains in combination and predict later development of CD with high accuracy.

The study appears in [Biological Psychiatry: Cognitive Neuroscience and Neuroimaging](#), published by Elsevier.

The researchers used baseline data from over 2,300 children aged 9 to 10 enrolled in the Adolescent Brain Cognitive Development (ABCD) Study, a longitudinal study following the biopsychosocial development of children. The researchers “trained” their machine-learning model using previously identified risk factors from across multiple biopsychosocial domains. For example, measures included brain imaging (biological), cognitive abilities (psychological), and family characteristics (social). The model correctly predicted the development of CD two years later with over 90% accuracy.

Cameron Carter, MD, Editor of *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, said of the study: “These striking results using task-based functional MRI to investigate the function of the reward system suggest that risk for later depression in children of depressed mothers may depend more on mothers’ responses to their children’s emotional behavior than on the mother’s mood *per se*.”

The ability to accurately predict who might develop CD would aid researchers and healthcare workers in designing interventions for at-risk youth with the potential to minimize or even prevent the harmful effects of CD on children and their families.

“Findings from our study highlight the added value of combining neural, social, and psychological factors to predict conduct disorder, a burdensome psychiatric problem in youth,” said senior author Arielle Baskin-Sommers, PhD at Yale University, New Haven, CT, USA. “These findings offer promise for developing more precise identification and intervention approaches that consider the multiple factors that contribute to this disorder. They also highlight the utility of leveraging large, open-access datasets, such as ABCD, that collect measures about the individual across levels of analysis.”

Notes for editors

The article is "Classifying conduct disorder using a biopsychosocial model and machine learning method," by Lena Chan, Cortney Simmons, Scott Tillem, May Conley, Inti Brazil, Arielle Baskin-Sommers (<https://doi.org/10.1016/j.bpsc.2022.02.004>). It appears as an Article in Press in *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, published by [Elsevier](#).

Copies of this paper are available to credentialed journalists upon request; please contact Rhiannon Bugno at BPCNNI@sobp.org or +1 254 522 9700. Journalists wishing to interview the authors may contact Arielle Baskin-Sommers at arielle.baskin-sommers@yale.edu.

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](#).

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