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Brain activity in teens predicts future mood health

Imbalanced network function is associated with development of more severe depression, indicating a potential neurobiological marker for risk prediction

Philadelphia, May 30, 2019 – An imbalance of functioning in attention-related brain systems may help forecast the course of teen depression, according to a [study](#) published in [Biological Psychiatry: Cognitive Neuroscience and Neuroimaging](#), published by Elsevier. Proper coordination of frontoinsula brain networks help us regulate our attention between external goals and self-focused or emotional thinking. But abnormalities in the coordination between these networks were not only evident in teens with more severe depression, but also, critically, predicted increased depressive symptoms two weeks later.

“The teen years are a time of remarkable growth and opportunity, as young people forge new relationships, learn how to navigate intense emotions, and make the transition to independence. However, it is also during adolescence that a high and growing number of teens experience clinical depression and related mood problems for the first time,” said first author Roselinde Kaiser, PhD, University of Colorado Boulder.

“Our challenge as clinicians, scientists, and parents, is: how do we predict which teens will experience mood problems in the near future?”

Dr. Kaiser and colleagues tested the idea of using fMRI to predict future mood health. They measured the activity of frontoinsula networks while adolescents played a difficult computer game involving emotional images. Current prediction tools mostly use self-report, which can be unreliable in teens.

“Our results showed that adolescents who showed imbalanced coordination across brain systems—that is, lower coordination among areas involved in goal-directed attention, and higher coordination among areas involved in self-focused thought—went on to report bigger increases in depression two weeks later, bigger mood swings, and higher intensity of negative mood in daily life,” said Dr. Kaiser.

Network functioning provided a better prediction of future mood health beyond current symptoms—a critical distinction, the authors wrote, as it suggests that frontoinsula network functioning could predict who might develop more severe depression between two teens with the same current symptoms.

“This very interesting study highlights the important role that frontoinsula circuits, measured using fMRI during the processing of emotional stimuli, may play in regulating our mood, and how impairment in the function of this network may underlie present and ongoing negative mood states,” said Cameron Carter, MD, Editor of *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*.

Although the study assessed mood health at only two weeks later, the findings indicate that fronto-insular network functioning may be useful to predict future mood health in teens. If confirmed in longer clinical studies, the findings suggest that this measure could provide a neurobiological risk predictor to help guide interventions to prevent severe depression.

Notes for editors

The article is "Fronto-insular Network Markers of Current and Future Adolescent Mood Health," by Roselinde H. Kaiser, Elena Peterson, Min Su Kang, Julie Van Der Feen, Blaise Aguirre, Rachel Clegg, Franziska Goer, Erika C. Esposito, Randy P. Auerbach, and Diego A. Pizzagalli (<https://doi.org/10.1016/j.bpsc.2019.03.014>). It appears 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 +1 214 648 0880. Journalists wishing to interview the authors may contact Roselinde Kaiser, PhD, at roselinde.kaiser@colorado.edu.

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

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