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Changes in brain networks may help youth adapt to childhood adversity

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A new study in *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging* reports a neural signature of emotional adaptation that could help researchers understand how the brain adapts to childhood adversity and predict which kids may be vulnerable to developing later psychopathology.

Family stressors can take a toll on children and approximately two-thirds of youth will experience some form of childhood adversity by the age of 18. Research has primarily focused on how adversity at a young age can lead to mood disorders in adolescence, but most children exhibit resilience to adverse experiences. So senior author Dr. Marilyn Essex, Professor of Psychiatry at the University of Wisconsin, and colleagues followed 132 kids from infancy to 18 years old to search for a neurobiological mechanism of emotional adaptation.

"The study shows us how experience changes the brain and how resilience reflects healthy emotion regulation," said Dr. Cameron Carter, Editor of Biological Psychiatry: Cognitive Neuroscience and Neuroimaging.

The researchers chose to focus on common types of childhood adversity, such as negative parenting, parental conflict and financial stress that occurred between infancy and 11 years of age. When the youth were 15 to 18 years old, the researchers studied their behavior to look for symptoms of anxiety and depression - they defined emotional adaptation as an absence of these symptoms. The researchers then studied brain

responses during emotional processing using functional magnetic resonance imaging to look for associations between brain activity, childhood adversity, and emotional adaption.

When the adolescents viewed images that evoke negative emotions, those who experienced childhood adversity had a more reactive amygdala, a region of the brain involved in emotion processing. "Childhood adversity may sensitize the amygdala to negative emotional content, but this appears to be a normative, adaptive response that could allow better detection of threat for kids growing up in stressful environments," said first author of the study Dr. Ryan Herringa, Assistant Professor of Child and Adolescent Psychiatry at the University of Wisconsin-Madison.

The researchers also looked at a connection between the amygdala and prefrontal cortex, an important circuit for regulating emotion. Childhood adversity was associated with a stronger connection between these brain regions, but was reduced in adolescents with high anxiety and depressive symptoms. Herringa explained this could mean that the ability of the brain to strengthen the connection between the amygdala and prefrontal cortex strengthens emotional adaptation.

"These findings point to a neural circuit that may be involved in emotional resilience and could be used as a potential treatment target for individuals suffering from anxiety and depression in the wake of adversity," Herringa said.

More information: Ryan J. Herringa et al. Enhanced Prefrontal-Amygdala Connectivity Following Childhood Adversity as a Protective Mechanism Against Internalizing in Adolescence, *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging* (2016). DOI: 10.1016/j.bpsc.2016.03.003

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