

Preschool and school-age irritability predict reward-related brain function

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Preschool irritability and concurrent irritability were uniquely associated with aberrant patterns of reward-related brain connectivity, highlighting the importance of developmental timing of irritability for brain function, finds a study published in the June 2018 issue of the *Journal of the American Academy of Child and Adolescent Psychiatry (JAACAP)*.

"Irritability is one of the most frequent reasons for treatment referral and is present across multiple emotional and behavioral disorders," said lead author Lea Dougherty, Ph.D., a clinical psychologist at the University of Maryland College Park. "Chronic [irritability](#) in school-age children and adolescents predicts depressive and anxiety disorders, suicidality, and functional impairment in adulthood. Despite its prevalence and central role in developmental psychopathology, the pathophysiology of irritability is largely unknown.

"These findings provide some insight into the neural circuitry underlying irritability and is a step toward uncovering biomarkers for early identification and treatment of youth irritability," Dr. Dougherty added.

The findings were based on a subset of children recruited for a longitudinal study examining early risk for depression. Children's irritability was assessed during the preschool period (ages 3.0-5.9 years) and three years later (ages 5.9-9.6 years). At the follow-up assessment, 46 children (28 females) performed monetary incentive delay tasks in which they either received rewards if they successfully hit a target, or no reward regardless of performance, while being scanned with fMRI

imaging.

The research team found that [children](#) who had more severe preschool irritability, controlling for concurrent irritability, exhibited altered reward-related connectivity: right amygdala with insula and inferior parietal lobe as well as left ventral striatum with lingual gyrus, post-central gyrus, superior parietal lobe and culmen.

Children with more versus less severe irritability concurrent with the neuroimaging assessment, controlling for preschool irritability, exhibited a similar pattern of altered connectivity between left and right amygdalae and superior frontal gyrus, and between left ventral striatum and precuneus and culmen. Neural differences associated with irritability were most evident between reward and no reward conditions when participants missed the target. These findings highlight how reward-related neural circuits may be altered in youth with increased irritability during preschool and school-age, suggesting possible mechanisms underlying mood dysregulation.

More information: Lea R. Dougherty et al, Preschool- and School-Age Irritability Predict Reward-Related Brain Function, *Journal of the American Academy of Child & Adolescent Psychiatry* (2018). [DOI: 10.1016/j.jaac.2018.03.012](#)

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