Reward-related ventral striatum activity links polygenic risk for attention-deficit/hyperactivity disorder to problematic alcohol use in young adulthood.

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Abstract

BACKGROUND:
Problematic alcohol use in adolescence and adulthood is a common and often debilitating correlate of childhood attention-deficit/hyperactivity disorder (ADHD). Converging evidence suggests that ADHD and problematic alcohol use share a common additive genetic basis, which may be mechanistically related to reward-related brain function. In the current study, we examined whether polygenic risk for childhood ADHD is linked to problematic alcohol use in young adulthood through alterations in reward-related activity of the ventral striatum, a neural hub supporting appetitive behaviors and reinforcement learning.

METHODS:
Genomic, neuroimaging, and self-report data were available for 404 non-Hispanic European-American participants who completed the ongoing Duke Neurogenetics Study. Polygenic risk scores for childhood ADHD were calculated based on a genome-wide association study meta-analysis conducted by the Psychiatric Genomics Consortium and tested for association with reward-related ventral striatum activity, measured using a number-guessing functional magnetic resonance imaging paradigm, and self-reported problematic alcohol use. A mediational model tested whether ventral striatum activity indirectly links polygenic risk for ADHD to problematic alcohol use.

RESULTS:
Despite having no main effect on problematic alcohol use, polygenic risk for childhood ADHD was indirectly associated with problematic alcohol use through increased reward-related ventral striatum activity.

CONCLUSIONS:
Individual differences in reward-related brain function may, at least in part, mechanistically link polygenic risk for childhood ADHD to problematic alcohol use.