Relative Immaturity in Childhood and Attention-Deficit/Hyperactivity Disorder Symptoms From Childhood to Early Adulthood: Exploring Genetic and Environmental Overlap Across Development

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Abstract

Objective
Attention-deficit/hyperactivity disorder (ADHD) has been linked to immaturity relative to peers in childhood, yet it is unclear how such immaturity is associated with ADHD across development. This longitudinal twin study examined the genetic and environmental contributions to the association between parent’s perception of their child’s immaturity relative to peers (RI) in childhood and ADHD symptoms across development.

Method
1,302 twin pairs from the Twin Study of Child and Adolescent Development (TCHAD) were followed prospectively from childhood to early adulthood. Parent ratings of RI were collected at ages 8-9 and parent and self-ratings of ADHD symptoms at ages 8-9, 13-14, 16-17 and 19-20, using the Child Behavior Checklist Attention Problems (AP) scale. Additionally, ADHD symptoms corresponding to DSM criteria were used for sensitivity analysis. Analyses were conducted using longitudinal structural equation modeling with multiple raters.

Results
RI-related etiological factors, predominantly influenced by genes, explained 10-14% of variance in ADHD symptoms between ages 8-9 to 16-17. The influence of these factors on ADHD symptoms attenuated to 4% by ages 19-20. The remaining variance in ADHD symptoms was primarily explained by genetic factors independent of RI, which remained relatively stable across development, explaining 19-30% of the variance in ADHD symptoms from ages 13-14 to 19-20.

Conclusion
Our results show that RI is significantly associated with ADHD symptoms, particularly during childhood/adolescence, and that the association is primarily explained by a shared genetic liability. Nevertheless, the magnitude of associations across development were modest, highlighting that RI is merely one aspect contributing to the complex etiology of ADHD symptoms.