Attention Deficit Hyperactivity Disorder Symptoms and Low Educational Achievement: Evidence Supporting a Causal Hypothesis.

dee Zeeuw EL, van Beijsterveldt CE, Ehli EA, de Geus EJ, Boomsma DI.

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Abstract

Attention Deficit Hyperactivity Disorder (ADHD) and educational achievement are negatively associated in children. Here we test the hypothesis that there is a direct causal effect of ADHD on educational achievement. The causal effect is tested in a genetically sensitive design to exclude the possibility of confounding by a third factor (e.g. genetic pleiotropy) and by comparing educational achievement and secondary school career in children with ADHD who take or do not take methylphenidate. Data on ADHD symptoms, educational achievement and methylphenidate usage were available in a primary school sample of ~10,000 12-year-old twins from the Netherlands Twin Register. A substantial group also had longitudinal data at ages 7-12 years. ADHD symptoms were cross-sectionally and longitudinally, associated with lower educational achievement at age 12. More ADHD symptoms predicted a lower-level future secondary school career at age 14-16. In both the cross-sectional and longitudinal analyses, testing the direct causal effect of ADHD on educational achievement, while controlling for genetic and environmental factors, revealed an association between ADHD symptoms and educational achievement independent of genetic and environmental pleiotropy. These findings were confirmed in MZ twin intra-pair differences models, twins with more ADHD symptoms scored lower on educational achievement than their co-twins. Furthermore, children with ADHD medication scored significantly higher on the educational achievement test than children with ADHD who did not use medication. Taken together, the results are consistent with a direct causal effect of ADHD on educational achievement.