

The role of birth weight on the causal pathway to child and adolescent ADHD symptomatology: a population-based twin differences longitudinal design

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J Child Psychol Psychiatry. 2018 Jul 12.

doi: 10.1111/jcpp.12949.

Abstract

BACKGROUND:

Available evidence points towards lower birth weight as a risk factor for the development of attention deficit/hyperactivity disorder (ADHD) symptoms. We probed the causal nature of this putative effect of birth weight on ADHD symptoms using the twin differences design, which accounts for genetic and shared environmental confounds.

METHOD:

In a large population-based twin sample - 3,499 monozygotic (MZ) and 6,698 dizygotic (DZ) pairs - parents, teachers or twins rated the twins' ADHD symptoms at nine assessment waves (2-16 years). We implemented the twin differences design, which completely accounts for shared environmental and genetic confounding in MZ twins. We tested whether: (a) the lighter-born twins had elevated ADHD symptoms compared to the heavier-born twins, by regressing within-pair differences of ADHD symptoms on within-pair differences of birth weight among MZ twins; (b) the effect of birth weight on ADHD was moderated by gender, gestational age and low birth weight; (c) this effect changed with age at ADHD assessment using adapted latent growth curve models; and (d) results differed for inattention and hyperactivity/impulsivity.

RESULTS:

Birth weight significantly predicted ADHD symptoms from early childhood to late adolescence. The lighter-born twin had more ADHD symptoms than the heavier-born cotwin among MZ twins across assessment waves and raters. No moderation effect was detected. The magnitude of the effect of birth weight decreased significantly across time for hyperactivity/impulsivity, but the decrease failed to reach significance for inattention. Estimates for inattention were significantly larger than for hyperactivity/impulsivity at each time point, implying stronger effect of birth weight on inattention symptoms.

CONCLUSIONS:

Our findings provide stringent evidence for environmental effect of lower birth weight on the causal pathway to elevated ADHD symptoms. Effect of birth weight persists across a 14-year period from childhood into late adolescence, in particular for inattention symptoms.