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Advancing the neuroscience of ADHD

Validity of the Executive Function Theory of Attention-Deficit/Hyperactivity Disorder: A Meta-Analytic Review

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One of the most prominent neuropsychologic theories of attention-deficit/hyperactivity disorder (ADHD) suggests that its symptoms arise from a primary deficit in executive functions (EF), defined as neurocognitive processes that maintain an appropriate problem-solving set to attain a later goal. To examine the validity of the EF theory, we conducted a meta-analysis of 83 studies that administered EF measures to groups with ADHD (total $N = 3734$) and without ADHD ($N = 2969$). Groups with ADHD exhibited significant impairment on all EF tasks. Effect sizes for all measures fell in the medium range (.46–.69), but the strongest and most consistent effects were obtained on measures of response inhibition, vigilance, working memory, and planning. Weaknesses

measures of response inhibition, vigilance, working memory, and planning. Weaknesses in EF were significant in both clinic-referred and community samples and were not explained by group differences in intelligence, academic achievement, or symptoms of other disorders. ADHD is associated with significant weaknesses in several key EF domains. However, moderate effect sizes and lack of universality of EF deficits among individuals with ADHD suggest that EF weaknesses are neither necessary nor sufficient to cause all cases of ADHD. Difficulties with EF appear to be one important component of the complex neuropsychology of ADHD.



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Key Words

Attention-deficit/hyperactivity disorder; executive function; meta-analysis; neuropsychology; subtypes

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The earliest reference to ADHD in the medical literature? Melchior Adam Weikard's description in 1775 of attention deficit (Mangel der Aufmerksamkeit, *Attentio*, positivism rejects equally distinctive, arts and.