

Abstract

Background: Executive dysfunction as a cognitive theory of autism spectrum disorder (ASD) has received a lot of attention in the past decades. Literature examining various components of executive functioning in individuals with ASD had increased vastly, but these had yielded inconsistent findings. Many studies were limited by factors such as small sample sizes, a wide age range and comorbidities such as intellectual disabilities. These inconsistent findings are best summarized and compared by meta-analysis.

Objectives: The aims of this meta-analysis were to summarise the existing literature on executive functioning in children and adolescents with high-functioning ASD and to examine the effect of confounding variables on the expression of executive functioning deficits.

Method: English literature published between 1978 and 31 March 2015 was retrieved from MEDLINE, Embase, PsycINFO and Web of Science, together with backward reference search of included articles and reviews. Case-control studies of children and adolescents with high-functioning ASD compared to typical developing controls were included. Effect sizes in the form of Hedges's g were pooled under the random effect model. Subgroup analysis was performed to explore the effect of comorbid attention-deficit/hyperactivity disorder (ADHD) and whether IQ was matched in the samples. Meta-regression was performed for age, intelligence, gender and medication status.

Results: Ninety-five articles were included, amounting to 265 effect sizes and a total of 2,908 ASD and 2,927 typically developing subjects. Subjects with ASD had

impaired performances in all components of executive functioning, including verbal and spatial working memory, flexibility, planning and generativity ($g = .59 - .67$). Less impairment was observed in the inhibition construct ($g = .41$). Subgroup analysis showed that impairments were still significant for flexibility, generativity and working memory when exclusively analysing studies which excluded ASD subjects with comorbid ADHD or when the ASD subjects were matched on IQ.

Conclusion: This meta-analysis supports the executive dysfunction account of autism. Flexibility, working memory and generativity appear to play key roles in underlying the executive dysfunction hypothesis.

Keywords: executive function, high-functioning autism spectrum disorder, meta-analysis