



Review

Meta-analysis of organizational skills interventions for children and adolescents with Attention-Deficit/Hyperactivity Disorder



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HIGHLIGHTS

- Organizational skills interventions have positive effects on outcomes related to ADHD.
- Moderate improvements in organizational skills of children with ADHD rated by teachers
- Large improvements in organizational skills of children with ADHD rated by parents
- Modest improvements on the ratings of symptoms of inattention and academic performance
- The review notes methodological limitations of the organizational skills training trials

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ABSTRACT

Background: In addition to problems with attention and hyperactivity, children with ADHD present with poor organizational skills required for managing time and materials in academic projects. Organizational skills training (OST) has been increasingly used to address these deficits. We conducted a systematic review and meta-analysis of OST in children with ADHD.

Objectives: The objective of this study was to systematically review the evidence of the effects of OST for children with ADHD for organizational skills, attention, and academic performance.

Methods: We searched 3 electronic databases to locate randomized controlled trials published in English in peer-reviewed journals comparing OST with parent education, treatment-as-usual, or waitlist control conditions. Standardized mean difference effect sizes from the studies were statistically combined using a random-effects meta-analysis across six outcomes: teacher- and parent-rated organizational skills, teacher- and parent-rated inattention, teacher-rated academic performance, and Grade Point Average (GPA). Risk of bias was assessed for randomization, allocation concealment, blinding of participants and treatment personnel, blinding of outcome assessors, incomplete outcome data, and selective outcome reporting.

Results: Twelve studies involving 1054 children (576 treatment, 478 control) were included in the meta-analyses. Weighted mean effect sizes for teacher- and parent-rated outcome measures of organizational skills were $g = 0.54$ (95% CI 0.17 to 0.91) and $g = 0.83$ (95% CI 0.32 to 1.34), respectively. Weighted mean effect sizes of teacher- and parent-rated symptoms of inattention were $g = 0.26$ (95% CI 0.01 to 0.52) and $g = 0.56$ (95% CI 0.38 to 0.74), respectively. Weighted standardized mean effect size for teacher-rated academic performance and GPA were $g = 0.33$ (95% CI 0.14 to 0.51) and $g = 0.29$ (95% CI 0.07 to 0.51), respectively.

Conclusions: OST leads to moderate improvements in organizational skills of children with ADHD as rated by teachers and large improvements as rated by parents. More modest improvements were observed on the ratings of symptoms of inattention and academic performance.

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Abbreviations: AAPC, Adolescent academic problems checklist; ADHD, Attention-Deficit/Hyperactivity Disorder; APRS, Academic Performance Rating Scale; CPS, Classroom Performance Survey; CSI, Child Symptom Inventory; COSS, Children's Organizational Skills Scale; DBD, Disruptive Behavior Disorders Rating Scale; HPC, Homework Problem Checklist; OST, Organizational skills training; TAU, Treatment as usual.

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1. Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder that affects approximately 5% of children in the general population (Polanczyk, de Lima, Horta, Biederman, & Rohde, 2007). The etiology of ADHD is still undetermined but may involve a complex interaction between multiple genes and environmental risk factors (Faraone, 2000). Children with ADHD have been shown to be more prone to drop out of school (Kent et al., 2011) and to be more susceptible to developing other psychiatric disorders, substance abuse, criminality, and adverse health events (Dalsgaard, Mortensen, Frydenberg, & Thomsen, 2002, 2013; Dalsgaard, Ostergaard, Leckman, Mortensen, & Pedersen, 2015; Maibing et al., 2015). Thus, developing effective treatments for ADHD is an important public health priority.

Besides ADHD symptoms, children with ADHD also show a range of attention and executive functions deficits (Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005). As defined by the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (DSM-5) (American Psychiatric Association, 2013), four out of the nine ADHD symptoms of inattention relate directly to problems with organization and planning (i.e., loses things, is forgetful, has difficulties organizing tasks, and fails to finish tasks). These symptoms have been linked to poor academic performance in children with ADHD (Nigg, 2005; Willcutt et al., 2005).

The topic of organizational skills in children with ADHD has emerged as an area of research and clinical focus because of its potential impact on academic success as children with ADHD also have problems managing school materials and meeting deadlines. Organizational skills deficits often multiply with the increase of task demands (Booster, Dupaul, Eiraldi, & Power, 2012; Langberg et al., 2010). In addition, problems such as procrastination and failure to plan, prioritize, and organize academic tasks tend to increase from childhood to adolescence (Booster

et al., 2012; Langberg et al., 2010), and persist into adulthood (Barkley & Fischer, 2011). Poor organizational skills are also associated with academic underachievement, as well as psychosocial, occupational, and economic difficulties (Kent et al., 2011; Masetti et al., 2008; Murphy, 2002; Murphy, Barkley, & Bush, 2002). Even in gifted students with ADHD, organizational skills deficits were shown to hinder academic performance (Leroux & Levitt-Perlman, 2000). Thus, due to their chronic course and adverse consequences, organizational skills have become a focus of treatment and clinical research in children with ADHD.

Although OST targets a specific set of organizational skills, symptoms of inattention are also an important outcome in OST treatment studies. Most children with ADHD exhibit a range of neurocognitive deficits in the domains of sustained attention, working memory, and cognitive control (Diamond, 2013; Nigg, 2005; Willcutt et al., 2005). It is likely that organizational skills such as task planning and materials management also rely on the same executive functions that are impaired in ADHD. Indeed, it has been noted that organizational problems may be associated with skill deficits (not having the skill) and performance deficits (not having sufficient motivation to perform the skill) as well as with the neurocognitive functions that may underlie specific organizational skills (Abikoff et al., 2013). Given that acquisition and practice of a new behavior can influence neural development via mechanisms of neuroplasticity (Rapoport & Gogtay, 2008; Skoe & Kraus, 2012), it is possible that OST can engage the reciprocal associations of organizational skills with ADHD symptoms and neurocognitive functions. For example, as children learn and practice organizational skills during OST they also engage and exercise neurocognitive functions (such as sustained attention and cognitive control). This practice of executive functions may in turn translate into reduction of ADHD symptoms of inattention. Other mechanisms of change in inattention may be engaged in multi-component OST interventions that include elements such as

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