Abstract

Attention-deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by developmentally inappropriate levels of inattention and/or hyperactivity/impulsivity which lead to impairment in multiple settings (American Psychiatric Association, 2013). Childhood ADHD has been concurrently associated with various neurocognitive deficits and one in particular that has been under examination over the past several years is working memory (WM). WM is a temporary storage system that is responsible for maintenance and/or manipulation of information in order to complete complex cognitive and behavioral tasks. Researchers have postulated that WM is one of several potential endophenotypes of ADHD (Castellanos & Tannock, 2002) and/or that WM is a core underlying neurocognitive deficit of the disorder which is responsible for the manifestation of inattentive and/or hyperactive/impulsive behaviors (Rapport et al., 2001). In particular, there has been growing interest in examining WM in this population because several purported interventions for the disorder involve some form of WM training, which are operating under the premise that improved WM will result in a reduction of core ADHD symptomatology. However, the associations between ADHD and WM remain unclear, perhaps in part due to the behavioral and cognitive heterogeneity of this disorder. This dissertation consists of three studies designed to further explore gaps in the literature. The first study examined the specific nature of WM weaknesses in children with ADHD with regard to distinct WM processes (i.e., maintenance and manipulation) and modalities (i.e., auditory-verbal and visuospatial). Analyses revealed significant Group x Condition ($p = 0.02$) and Group x Modality ($p = 0.03$) interactions which indicated differentially poorer performance by those with ADHD on manipulation relative to maintenance and visual-spatial relative to auditory-verbal

tasks, respectively, as compared to their typically-developing peers. Study 2 investigated the impact of WM deficits on academic achievement and school functioning in children with ADHD and found a relative double dissociation. Weaknesses in WM, but not ADHD symptom severity, was significantly associated with poorer performance on all measures of academic achievement (all $p < 0.01$). In contrast, higher levels of inattention and hyperactivity/impulsivity ($p < 0.04$), but not WM deficits ($p > 0.10$), were significantly associated with poorer teacher-ratings of behavioral functioning and clinician-ratings of global functioning. The final study examined the longitudinal relations between ADHD and WM by determining whether early preschool WM performance predicted school-aged ADHD symptom severity or whether early ADHD symptoms predicted later WM performance. Analyses revealed that preschool WM did not significantly predict later ADHD symptoms ($p > 0.10$), but that preschool inattentive symptoms (but not hyperactivity/impulsivity symptoms) significantly predicted school-aged children's WM ability ($p < 0.001$). Taken together, findings from these three projects suggest that while on a group-level children with ADHD demonstrate a pattern of WM difficulties, these difficulties may not be evident in all children with the disorder. Also, while WM ability is strongly linked to academic outcomes in children regardless of ADHD status, WM does not appear to be driving the manifestation of behavioral symptoms of the disorder and thus these findings reduce the likelihood that WM represents the core deficit of ADHD.