Research on attention-deficit/hyperactivity disorder (ADHD) in children has suggested that neuropsychological impairments associated with the disorder relate negatively to academic performance. Given that the behavioral symptoms of ADHD also predict poor academic performance, behavioral symptoms of ADHD may function as a mediator between neuropsychological functioning and academic achievement. This study examined if an indirect effect of neuropsychological impairments on academic achievement through ADHD symptoms exists, considering inattention and hyperactivity/impulsivity as separate mediators. Participants were 59 caregiver-child dyads. Results showed that inattentive ADHD symptoms mediated the relation between attention/executive functioning and language and academic achievement. Hyperactivity/impulsivity symptoms predicted unique variance in academic achievement, they do not mediate the relation between AEFL and academic achievement.

**INTRODUCTION**

- Research on attention-deficit/hyperactivity disorder (ADHD) in children has suggested that neuropsychological impairments associated with the disorder—including problems with executive functioning, sustained attention, selective attention, and behavioral inhibition—relate negatively to academic performance (e.g., Barry et al., 2002; Biederman et al., 2004; Loë & Feldman, 2007).
- Given that the behavioral symptoms of ADHD also predict poor academic performance (Rogers et al., 2011), behavioral symptoms of ADHD may function as a mediator between neuropsychological functioning and academic achievement.
- The purpose of the current study was to examine if an indirect effect of neuropsychological impairments on academic achievement through ADHD symptoms exists, considering inattention and hyperactivity/impulsivity as separate mediators.

**METHODS**

- **Participants**
  - Participants were 59 caregivers (56 females, 3 males) and their 59 children (25 females, 34 males). Caregivers were ages 24 to 68 years ($M = 38.11; SD = 8.32$).
  - Children were ages 8 to 13 years ($M = 10.53; SD = 1.22$), and the majority were identified as European American (67.8%) and African American (30.2%).
- **Measures**
  - Caregivers completed a battery of assessments including:
    - **Behavior Assessment System for Children - Parent Rating Scale** (BASC-PRS; Reynolds & Kamphaus, 1992). The BASC-PRS is an omnibus rating scale designed to take a broad sampling of a child's behavior. Caregivers rate how often they observe the child engaging in various behaviors on a 4-point scale, ranging from “never” to “always.”
    - A DSM-IV ADHD Checklist (APA, 1994). This checklist includes separate scales for inattention and hyperactivity/impulsivity.
    - Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999)
    - Wechsler Individual Achievement Test (Psychological Corporation, 1992) screener
  - Neuropsychological Assessment of Children (Korkman et al., 1998), a developmental neuropsychology battery that includes indexes of attention/executive functioning and language, among others.
  - Standardized composites were created (1) between the two measures of inattention, (2) between the two measures of hyperactivity/impulsivity, (3) between the indexes of attention/executive functioning and language (AEFL), and (4) among the academic achievement subtests.
- **Procedures**
  - This project was approved and conducted in compliance with the University of Alabama Institutional Review Board.
  - Participants were part of a larger study investigating Attention-deficit/hyperactivity disorder symptomatology and aggression.
  - Caregivers read the informed consent letter prior to testing or completion of any measures. Caregivers received $20 for their participation in the study.

**RESULTS**

- Mediational models using PROCESS (Hayes, 2013) with bootstrapping analytical techniques with 10,000 samples with replacement were examined.
- Analyses examining inattention as a mediator indicated that AEFL predicted a significant amount of variance in inattention, yielding a point estimate of $-0.2$ (95% CI [-0.3, -0.1]). The total effect of AEFL in predicting academic achievement was only marginally significant ($p = .07$), yielding a point estimate of .11 (95% CI [.01, .23]).
- There was a significant indirect effect of AEFL on academic achievement through inattention, yielding a point estimate of $-0.06$ (95% CI [.01, .16]).
- The direct effect of AEFL on academic achievement (i.e., accounting for inattention) was non-significant, yielding a point estimate of $-0.04$ (95% CI [.08, .16]).
- In contrast, an indirect effect of AEFL on academic achievement through hyperactivity/impulsivity was not supported, despite hyperactivity/impulsivity predicting unique variance in academic achievement in the overall model, $B = -2.52$ (95% CI [-4.94, -1.1]).
- Results demonstrated a relation between both neuropsychological functioning and inattention and between inattention and academic achievement.

**DISCUSSION**

- The pattern of findings suggest that inattentive behaviors may be the most problematic of the ADHD symptoms when considering academic performance. Hyperactivity/impulsivity symptoms may be less useful when predicting the academic performance of a child.
- These results have both educational and clinical implications. For example, assessment batteries for children referred for academic difficulties should assess for the presence of ADHD symptoms, specifically inattention, even if ADHD is not the referral question. Likewise, efficacy of interventions targeting academic performance for school-aged children may be improved with inclusion of a component to minimize inattention.
- Future research should include a larger sample from a more diverse background in order to increase the generalizability of the results. Additionally, this study was limited by its reliance on parent report for children symptoms of ADHD and academic performance. Future research should include child and teacher-reported ADHD symptoms and academic achievement measures to ensure accuracy of findings.

![Figure 1. Mediation Model with of the effect AEFL on Academic Achievement via Inattentional ADHD symptoms](image-url)