that the compensatory effect may take time to emerge may explain conflicting results within prior cross-sectional samples. These findings also have implications for research investigating the link between ADHD symptoms and EF abilities, as anxiety symptoms may be an important moderator to consider when attempting to explain why the correlation between ADHD symptoms and EF abilities is often weaker than expected. Finally, clinical implications for this work help to provide empirical evidence to support anecdotal experiences reported by individuals with ADHD and the clinicians who assess them, who often report that anxiety symptoms help them to improve EF performance.

Categories: ADHD/Attentional Functions
Keyword 1: attention deficit hyperactivity disorder
Keyword 2: executive functions
Keyword 3: anxiety
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40 Metamemory performance of children with ADHD in comparison to typically developing children.

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Objective: Metamemory is an aspect of metacognition that is one's knowledge of memory and understanding of their own memory performance (Kreutzer et al., 1975). Executive function skills are foundational skills required for the development of metamemory in early school-age children (Lockl & Schneider, 2007; Lecce et al., 2015). Previous studies have suggested children with Attention-Deficit/Hyperactivity Disorder (ADHD) may have weaker study and organizational strategies, suggesting weaker metamemory skills (O'Neill & Douglas, 1991; Voelker et al., 1989). The current study aimed to examine the metamemory knowledge of typically developing (TD) children and children with ADHD on a novel declarative metamemory questionnaire. We hypothesized that the ADHD group would have worse metamemory performance than the TD group and that executive functioning skills would be significantly associated with metamemory for all groups.
Participants and Methods: The current study recruited a total of 93 English-speaking children between the ages of 6 to 12 years old, including 70 typically developing (TD) children (M age=9.1+1.92; females 49%), and 23 children with diagnoses of ADHD (M age=9.56+1.27; females 57%). Fifty-seven percent of the ADHD group reported daily use of stimulant medication, but no participants took medication on the day of testing. The participant groups did not significantly differ regarding age or sex. Participants completed the Measure of Metamemory (MoM-10) which included 10 multiple choice questions (i.e., Accuracy) and asked participants to explain their multiple-choice answer (i.e., Explanation). This provided three scores: Accuracy (max 10 points), Explanation (max 20 points), and Total (max 30 points). Additionally, participants' parents completed the 12-item Behavior Rating Inventory of Executive Function, 2nd Edition (BRIEF-2) Screening form, evaluating the child's executive functioning, which provided a percentile based on age and sex.
Results: Within the ADHD group, BRIEF-2 percentiles and MoM-10 scores did not differ between those who were medicated and those who were not. As previous literature has shown, the TD and ADHD groups significantly differed on the BRIEF-2 screening score percentiles ($t(91)=-5.78$, $p<0.001$; TD M=52.89+26.1; ADHD M=85.26+13.82). The TD and ADHD groups did not significantly differ on either the MoM-10 Accuracy ($p=0.13$; TD M=7.22+1.84; ADHD M=7.87+1.32), the Explanation ($p=0.08$; TD M=9.34+3.80; ADHD M=10.57+2.92), or Total ($p=0.13$). There was a trend towards a significant correlation between the Explanation scores and BRIEF-2 for TD participants ($r=-0.23$, $p=0.06$), but there was no significant correlation between Explanation, Accuracy, or Total scores and the BRIEF-2 for the ADHD group.
Conclusions: Our results tentatively suggest a possible association between metamemory and parent reported executive functioning for TD children, supporting the expected association between the development of executive functioning and the development of metamemory. However, there was no association between metamemory and executive functioning for children with ADHD,

likely due to the restricted range of executive functioning scores for this group (i.e., M=85.25+13.82; Range 55-99). Additionally, metamemory did not significantly differ between diagnostic groups. Children with ADHD may have comparable metamemory knowledge to TD children as a result of executive functioning instruction and support they have received. Rather, there may be group differences in the application of metamemory judgement and strategies.

Categories: ADHD/Attentional Functions
Keyword 1: executive functions
Keyword 2: metamemory
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41 Adaptive Implementation of Cognitive Control in School-Aged Children with ADHD: A Diffusion-Model Analysis

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Objective: Because cognitive resources are limited, models of cognitive control predict that additional control is engaged only if it improves task performance. Increased response caution, which occurs when individuals increase the threshold of information needed before making a decision, is one example of cognitive control adaptation. While previous studies have measured increased response caution via increased reaction time, the diffusion model can be used to derive a boundary separation parameter that directly indexes response caution and eliminates capturing alternative influences on reaction time. This study aims to determine if school-aged children, either with or without ADHD, show adaptive changes in response caution during a set-shifting task. These groups have demonstrated mixed results when analyzing reaction time, so this study utilizes diffusion modeling to measure response caution more directly. The set-shifting task presents switches in a random order such that they cannot be predicted; therefore, increasing response caution is only adaptive following errors, called post-error slowing (PES), but not following switch trials. It is predicted that children will show increased response caution only when adaptive. If child with ADHD adapt their response caution fundamentally differently, then there will be individual differences in change in boundary separation.

Participants and Methods: Children ages 8-12 with (n=193) and without (n=70) ADHD completed the Navon set-shifting task. Participants saw one of four global shapes made up of local shapes and were asked to identify one or the other based upon the background color. Of the 144 trials, 70 presented a switch between global and local. Trials were presented in the same randomized order for all participants, self-paced, and followed by feedback on correctness. The diffusion model parameters boundary separation (a), drift rate (v), and nondecision time (Ter) were estimated by condition, including a) post-error versus after correct and b) post-switch versus post-same. For PES analyses, only participants with a sufficient number of errors for modeling were included (ADHD n=113, control n=19).

Results: Participants were slower on trials immediately following errors ($F(1, 130)=119.76$, $p<.001$, $\eta2=.48$) and switches ($F(1, 261)=154.93$, $p<.001$, $\eta2=.37$). In PES, slowing was attributable to increased boundary separation, $F(1, 130)=16.11$, $p<.001$, $\eta2=.11$, as well as slower drift rate and longer nondecision time (both $p<.01$, $\eta2 >.05$). However, as predicted, post-switch slowing was only attributable slower drift rate and longer nondecision time (both $p<.001$, $\eta2 >.10$), not increased boundary separation, $F(1, 261)=0.77$, $p=.38$, $\eta2<.01$. Overall, children with ADHD had slower drift rates ($F(1, 261)=4.63$, $p<.001$, $\eta2=.10$) and narrower boundary separation ($F(1, 261)=10.56$, $p=.001$, $\eta2=.04$). However, there were no ADHD x trial-type interactions for PES or post-switch (both $p>.33$, $\eta2<.01$).

Conclusions: School-aged children demonstrated increased response caution following errors, but not following switches. This demonstrates an adaptive use of cognitive control. The diffusion model was crucial in determining this, as reaction time slowed following switches for reasons unrelated to cognitive control. Additionally, although children with ADHD demonstrated slower drift rates and narrower boundary separation overall, they showed no differences when adapting response caution.

Categories: ADHD/Attentional Functions
Keyword 1: cognitive control