The Unique Associations Between ADHD Symptoms and Children's School Readiness in a Preschool Sample

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Abstract

Attention-deficit/hyperactivity disorder (ADHD) symptoms are associated with impairment in academic outcomes starting as early as elementary school. There is some evidence of ADHD symptoms being negatively related to school readiness in preschoolers, though the literature is not extensive regarding all domains of school readiness and often does not differentiate between ADHD symptom dimensions. This study examined how the two symptom dimensions of ADHD, inattention (IA) and hyperactivity/impulsivity (HI), were uniquely related to multiple domains of school readiness (i.e., social-emotional, physical, language, cognitive, literacy, mathematics). Data from reports of 240 preschoolers' ADHD symptoms and school readiness were used in bivariate correlations and regression analyses to examine the associations between ADHD symptom levels and school readiness. Bivariate correlational analyses indicated that both symptom dimensions were negatively and significantly related to all school readiness domains. The regression analyses showed that IA symptoms were negatively and significantly related to all domains. Contrary to hypotheses, HI symptoms were positively related to cognitive, physical, language, and mathematics development. This work provides important information about the unique associations between the two ADHD symptom dimensions and school readiness outcomes. However, the strong correlation between IA and HI symptom levels makes it difficult to completely differentiate the two dimensions.

Keywords: ADHD, preschool, school readiness, inattention, hyperactivity/impulsivity

The Unique Associations Between ADHD Symptoms and Children's School Readiness in a Preschool Sample

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder with a worldwide childhood prevalence of 7.2% and a male to female ratio of 2:1 (American Psychiatric Association, 2022). It is defined by symptoms of inattention and/or hyperactivity/impulsivity and marked impairment in two or more settings. The *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition, Text Revision* (DSM-5 TR; American Psychiatric Association, 2022) identifies 18 symptoms of ADHD, with nine in each of the two dimensions: inattentive (IA) and hyperactive/impulsive (HI). Examples of inattentive symptoms include failing to give close attention to work, difficulty sustaining attention, and avoiding tasks that require sustained mental effort. Characteristic symptoms of hyperactivity/impulsivity are squirming or fidgeting in one's seat, running or climbing around in inappropriate situations, and interrupting others. The DSM-5 TR includes predominantly inattentive and predominantly hyperactive/impulsive presentations of ADHD, comprised, respectively, by cases meeting criteria in only the inattentive or hyperactive/impulsive symptom dimensions. The DSM-5 TR also includes a combined presentation, where one meets criteria for both symptom types. In preschoolers, hyperactive symptoms are more common, with the IA dimension more often emerging in elementary school (American Psychiatric Association, 2022). The presence of ADHD symptoms in preschool is associated with impaired school readiness, but there is a need for more research regarding the ADHD symptom dimensions' role. Deficits in school readiness have been shown to be associated with negative future educational outcomes, so it is important to further explore this topic to understand how the two symptom dimensions are differentially related to school readiness. School readiness consists of domains of development that are

necessary for the child's success in kindergarten, including social-emotional, physical, language, cognitive, literacy, and mathematics (Perrin et al., 2019; Teaching Strategies LLC, 2016). The goal of this study was to understand how the two ADHD symptom dimensions are uniquely related to each domain of preschoolers' school readiness.

Background

Previous research on the academic impairments associated with ADHD symptoms has often focused on older populations, finding a greater risk of poor test scores, increased dropout rates, and increased grade retention when compared to their unaffected peers (Barbaresi et al., 2007). Similarly, studies on preschoolers have observed lower levels of school readiness in children displaying elevated or more severe symptoms of ADHD (Perrin et al., 2019). Perrin et al. (2019) compared preschoolers with moderate to high symptom scores to their peers with fewer symptoms in the physical well-being and motor development, social and emotional development, approaches to learning, language development, and general knowledge and cognition domains of school readiness. Of the ten assessments and questionnaires administered, the group with more ADHD symptoms performed significantly worse in eight of them, indicating greater odds of impairment in all domains except cognition and general knowledge. Similarly, preschoolers with an ADHD diagnosis have demonstrated significantly more dysfunction than the typically developing controls in behavioral, pre-academic, and social domains (DuPaul et al., 2001).

Although the two symptom dimensions of ADHD are strongly correlated, they are not consistently related to school readiness in the same way. Thus, more targeted research is required to better understand the unique associations between the two symptom dimensions of ADHD and school readiness. Tan et al. (2022) observed school readiness in preschoolers as it correlated to

their IA and HI symptoms, finding negative correlations for both dimensions when examined individually. Multiple regression analyses, however, indicated that only IA was a significant predictor of school readiness when accounting for the relation between HI and IA. The negative association between IA symptoms and school readiness is consistent across studies, but HI symptoms have varied results, especially once other variables are controlled. Specifically, HI symptoms have been observed to be both positively and negatively associated with academic achievement (Polderman et al., 2010).

In research focusing on specific school readiness domains and the two ADHD dimensions, IA symptoms tend to be a more consistent predictor of lower school readiness levels. For example, inattentiveness has a well-established negative relationship with literacy skills in early childhood populations, likely due to the attention that is required to acquire reading skills (Walcott et al., 2010). Results from the Walcott et al. (2010) study indicated that inattention in preschool was negatively correlated with pre-literacy and kindergarten phonemic awareness and letter naming. Other examinations of literacy skills in early childhood confirmed previous results regarding inattention (Ogg et al., 2016; Polderman et al., 2010; Sims & Lonigan., 2012). Sims and Lonigan (2012) compared preschoolers' HI and IA symptoms to the emergent literacy skills of phonological awareness, print knowledge, and definitional vocabulary. The results indicated that teacher reported IA symptoms were uniquely and negatively associated with all three skills, whereas teacher reported HI did not have significant associations to any of the literacy skills. Symptoms of IA in preschool have been shown to impact reading comprehension at 8 years of age, indicating lasting effects of inattention on learning outcomes (O'Neill et al., 2016). The O'Neill et al. (2016) study also examined language development at 5 years of age as a mediator for this relationship. Their results indicated that IA,

but not HI, was negatively linked to language skills, which mediated the effect of IA symptoms on literacy skills.

Examinations of cognition in preschoolers continue to show IA as having greater association with deficits than HI. Ramos et al. (2013) studied how ADHD symptoms relate to cognitive status in a preschool population. Their results indicated that the IA and combined symptom groups, but not the hyperactive group, had significantly lower results on the cognitive task than the symptom-free group. These results are consistent with previous findings of IA being linked to poor academic achievement (Ramos et al., 2013).

There is less data about the physical development element of school readiness, including gross and fine motor skills and coordination, and IA and HI symptoms. As with other domains of school readiness, children's motor skills have been negatively related to inattentive but not hyperactive symptoms (Ramos et al., 2013). Furthermore, Peyre et al. (2019) found that inattention at three years of age had a negative association with motor skills at five and six years of age. The authors theorize that these results may be due to the attentional skills on which motor learning depends, as well as deficits in the coding, storage, and retrieval processes of learning that may coincide with inattention. Thus, despite limited research, there is some evidence of inattention having a negative correlation with physical development in preschoolers.

The domain with which HI symptoms are most often found to have a significant correlation is social and emotional development. Zoromski et al. (2015) examined IA and HI symptoms and their relation to academic, social, and behavioral functioning from early childhood through adolescence. They found a significant positive association between hyperactive symptoms and social impairment in the early and middle childhood samples, but IA was not a significant predictor of social functioning in the early childhood sample. However,

Ogg et al. (2016) observed significant negative correlations between both symptom dimensions and interpersonal skills in a kindergarten sample. Zoromski et al. (2015) did identify a significant positive correlation between IA and social impairment in the middle childhood sample, noting that low emotional knowledge and an inability to attend to positive social behaviors affect social functioning.

Overall, despite the research that exists on the associations between ADHD symptoms and school readiness in preschool populations, there are gaps and inconsistencies in this work that make it difficult to draw clear conclusions. The preexisting literature lacks consistent results about symptoms' associations with domains, particularly regarding IA's association with social-emotional development, and requires further exploration for a consensus. Moreover, there is an inconsistent use of subjective and objective assessments of school readiness domains between studies, making it difficult to compare results. The literature would benefit from a study that not only contains all domains of school readiness, but also uses a consistent measurement of all domains. Finally, the literature lacks a study that explores how distinct dimensions of ADHD symptoms are uniquely associated with all domains of school readiness while the children are still in preschool. Many of these studies measure ADHD symptoms in preschool as they relate to skills in elementary school, and a study that looks at a snapshot of the ADHD symptom dimensions and all school readiness domains during preschool would give greater insight to the deficits as they arise at that age.

Current Study

This study used the *Teaching Strategies Gold® Assessment System* (TS Gold; Teaching Strategies LLC, 2016) as an index of school readiness, which measures six domains of development: social-emotional, physical, language, cognitive, literacy, and mathematics

(Teaching Strategies LLC, 2016). The TS Gold is an authentic assessment built to measure child development from birth to kindergarten. Authentic assessments in the early childhood setting often refer to observations of performance-based assessments, commonly found within the child's curriculum. These assessments allow the teachers to evaluate the child's development and emergence of new skills as they learn. The TS Gold differs from many other authentic assessments because it acts as a stand-alone instrument to measure school readiness, rather than needing to use multiple assessments to gather data in all domains (Lambert et al., 2015).

The purpose of this study was to further examine how the dimensions of ADHD symptoms are related to the domains of school readiness. Though previous studies have examined preschool ADHD symptoms and school readiness, they often do not examine all domains of school readiness, and those that do are limited to a different measure for each domain. Moreover, research that has investigated multiple domains of school readiness often does not observe HI and IA symptoms separately, but instead looks at ADHD symptoms together as a single dimension. Thus, my goal with this research was to gain specific knowledge regarding the dimensions of ADHD symptoms and their unique associations with a single multi-domain measure of school readiness.

Given the documented negative associations between ADHD symptoms and school outcomes (Perrin et al., 2019; Polderman et al., 2010), I predicted that the bivariate correlational analyses would reveal a negative relation for both IA and HI symptom levels for all domains of school readiness measured. Additionally, previous research investigating both IA symptoms and HI symptoms as distinct factors in regression models indicates that IA symptoms are uniquely and negatively linked with most school readiness domains after controlling for HI symptoms, whereas HI symptoms most often only have unique and negative associations with social-

emotional school readiness (Polderman et al., 2010; Tan et al., 2022; Zoromski et al., 2015). Thus, in regression analyses, I predicted there would be unique negative associations between IA symptom levels and the language, cognitive, literacy, physical, and mathematics domains. Further, I predicted HI levels would only be uniquely and negatively associated with the social-emotional development domain.

Method

Participants and Procedures

Participants were recruited from preschools in and around Burlington, Vermont as part of the Hoza Laboratory's evaluation of the preschool physical activity program, *Kiddie CATs on the Move*. For this study, data from participants across three different *Kiddie CATs on the Move* program years were used. In each of these years, 7 – 10 classrooms participated in the program evaluation, and some classrooms participated in multiple years. If students were in evaluation classrooms for more than one of these three years, data from the first year they participated were used. Because these data are coming from a larger study wherein a physical activity intervention was introduced to study its effects on preschoolers' school readiness, only the participants' baseline data from the Fall was used to minimize any influence of the intervention. This study used a sample of 240 children, with males making up 57.5% of participants. ADHD symptom levels were reported by teachers, and the school readiness data and demographic (i.e., gender, age, and race/ethnicity) data came from school records. Participants were included only if all teacher reports and school readiness data were complete. Participants' ages at the beginning of the school year ranged from 2.94 to 5.58 (M_{age} = 4.04, SD_{age} = .61). The participants were ethnically and racially diverse (52.9% White, 22.9% African American, 13.3% Asian, 0.4%

Latino/Latina, 0.4% Native American/American Indian/Alaska Native, 8.7% Other, 1.7% Unspecified).

Measures

ADHD Symptom Levels

ADHD symptoms were measured using The ADHD Rating Scale-IV Preschool Version (McGoey, et al., 2007). The items in the rating scale are consistent with the 18 ADHD symptoms defined in The *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000), where nine items are inattentive symptoms, and the other nine items are hyperactive/impulsive symptoms. Items assessing inattention include phrases such as "Has difficulty sustaining attention in tasks or play activities," and items assessing hyperactivity/impulsivity include items such as "Runs about or climbs excessively in situations in which it is inappropriate" (McGoey et al., 2007). All symptoms from the DSM-IV-TR are consistent with the symptoms in the current DSM-5-TR (American Psychiatric Association, 2022). The frequency of behaviors was reported by participants' classroom teachers on a 4-point Likert scale (0 = Rarely/Never, 1 = Sometimes, 2 = Often, 3 = Always). The ADHD Rating Scale-IV demonstrated high internal reliability (inattention: $\alpha = .95$; hyperactivity/impulsivity: $\alpha = .90$). Responses were averaged separately across the IA and HI symptoms to create a symptom level score for each symptom dimension.

School Readiness

School readiness was assessed using the *Teaching Strategies Gold® Assessment System* (TS Gold; Teaching Strategies LLC, 2016), which assesses children's school readiness across four developmental domains (social-emotional, physical, language, and cognitive) and two content domains (literacy and mathematics). The TS Gold is an authentic assessment, meaning it

allows teachers to observe development as it naturally occurs in the classroom (Lambert, 2020). For all 60 items, teachers rated their student's development according to expectations for the child's age and year in preschool (Lambert, 2020). The TS Gold showed strong internal reliability across all domains (social-emotional: $\alpha = .95$; physical: $\alpha = .88$; language: $\alpha = .96$; cognitive: $\alpha = .96$; literacy: $\alpha = .91$; mathematics: $\alpha = .91$). Item responses were coded as below, meeting, or exceeding expectations based on teacher responses on a developmentally normed progression. The percentage of items in which the child met or exceeded expectations was used as the school readiness value, and this was calculated for each of the six domains.

Data Analytic Plan

Descriptive and regression analyses were performed on the data using IBM SPSS Version 28 software. Bivariate correlational analyses were used to examine the relations among demographic variables, IA and HI symptom scores, and the TS Gold domain variables. The results determined if any demographic variables should be considered as covariates in the regression models. Next, a series of two-step hierarchical regression analyses were used to examine the unique associations between ADHD symptom levels and each domain of school readiness. The first step of each model included any demographic variables that were significantly correlated with primary study variables. After accounting for demographics as covariates, the two ADHD symptom dimension scores were introduced in the second step.

Results

Preliminary Correlations

Preliminary correlation analyses (see Table 1) indicated there were significant positive correlations among all TS Gold variables, such that higher performance in one domain was linked with higher performance in the other domains. Inattention and hyperactivity symptom

levels were strongly correlated ($r = .78$, $p < .001$), indicating a large amount of shared variance between the two ADHD symptom dimensions. Symptom levels for both ADHD dimensions were negatively correlated with all TS Gold domains, meaning higher symptom levels were associated with lower percentages of meeting or exceeding expectations.

Age was significantly associated with language development such that older children were more likely to be meeting or exceeding expectations in the language domain. Sex was significantly linked with ADHD symptom levels in both symptom dimensions and most domains of school readiness. Specifically, boys were rated significantly higher than girls on IA and HI symptom levels. Moreover, girls had higher levels of meeting or exceeding expectations than boys in all school readiness domains except for mathematics. Given these findings, both sex and age were included as covariates in the regression analyses.

Regression Analyses

Results of the hierarchical regression analyses are displayed in Table 2. After controlling for age, sex, and HI symptom levels, IA symptom levels were a unique, significant predictor for all domains of school readiness, such that higher teacher reported IA symptom levels were linked with lower percentages of meeting or exceeding school readiness expectations. When age, sex, and IA symptom levels were controlled, HI symptom levels were positively and significantly associated with the school readiness domains of physical, language, cognitive, and mathematics development. These results indicate that higher levels of teacher reported HI symptoms were uniquely linked to higher levels of meeting or exceeding school readiness expectations in the physical, language, cognitive, and mathematics domains.

Discussion

The goal of this paper was to understand how inattention and hyperactivity/impulsivity symptom levels are uniquely related to the individual domains of school readiness. For my first hypothesis, I predicted that IA and HI symptom levels would have negative relations to all domains of school readiness in the bivariate correlations. My second hypothesis contained two parts for the regression models. First, I predicted that after controlling for HI symptom levels, IA symptom levels would be significantly and negatively related to the language, cognitive, literacy, physical, and mathematics domains. Second, I expected HI symptom levels to only have a significant and negative relation to the social-emotional domain of school readiness after accounting for IA symptom levels in the regression analyses.

The results confirmed my first hypothesis. Higher symptom scores for both HI and IA were linked with a greater likelihood of not meeting or exceeding expectations in all school readiness domains in the bivariate correlation analyses. These results are consistent with previous literature, which suggests that elevated levels of ADHD symptoms may be associated with an increased risk of school readiness impairment in young children (Perrin et al., 2019; Polderman et al., 2010; Tan et al., 2022).

The second hypothesis was partially supported by the results. I predicted that IA symptom levels would be uniquely related to the language, cognitive, literacy, physical, and mathematics development domains, and the results indicated that once HI was controlled in the regression analyses there were negative and significant correlations to all these domains, as well as the social-emotional domain. Contrary to my prediction that HI symptom levels would only be uniquely related to social-emotional development once IA symptom levels were controlled, the results of the regression analyses demonstrated a positive and significant relation between HI

symptom levels and the domains of physical, language, cognitive, and mathematics development.

The IA symptom levels' results in the context of the regression analyses are widely supported by previous literature, which indicates unique negative relations between IA symptoms and school readiness in all domains (Ogg et al., 2016; O'Neill et al., 2016; Ramos et al., 2013; Sims & Lonigan, 2012; Tymms & Merrell, 2011). Importantly, previous work also highlights inconsistent findings regarding the association between IA symptoms and social-emotional readiness in early childhood samples (Ogg et al., 2016; Zoromski et al., 2015). Similar to the current work, Ogg et al. (2016) observed negative relations between IA and interpersonal skills for children aged four through six when controlling for HI in partial correlations.

There have been several ideas put forth to explain the school readiness deficits associated with inattention. These findings could be due to children not being able to pay attention and thus not absorbing the material in the classroom (Tymms & Merrell, 2011). This inability to attend can extend to the learning of social cues (Ogg et al., 2016) and motor skills (Peyre et al., 2019), further impacting the child's development in multiple domains. The difference in the regression results between IA and HI symptom levels could be due to some of the inherent differences between the dimensions and how they present themselves. Sims and Lonigan (2012) noted that given the disruptive nature of HI symptoms, this dimension of ADHD is more frequently noticed and addressed by teachers and parents. Inattentive symptoms, on the other hand, may go unnoticed, thus leaving children without intervention and increasing the chances of future negative outcomes. Finally, in measures of ADHD, items pertaining to inattention imply that the child is not engaged with their schoolwork, whereas the hyperactive or impulsive symptoms describe the child as being disruptive but not necessarily disengaged (Sims & Lonigan, 2012).

These differences can highlight how inattention may pose a greater risk to meeting school readiness expectations.

Although there has been limited work that documents a positive association between HI symptoms and school readiness outcomes, partial correlations have shown a positive relation between literacy skills and HI when controlling for income, age, sex, and nonverbal cognitive ability test scores (Sims & Lonigan, 2012). Previous literature has discussed some qualities of HI symptoms that may explain the positive relations observed. In a study by Ogg et al. (2016), HI's relation to academic enablers, behaviors that promote learning, was examined in partial correlations while controlling for IA. Although zero order correlations showed a negative relation between HI and academic enablers, the partial correlations revealed that HI was positively and significantly related to motivation and engagement, indicating greater participation in class, initiative to learn, and persistence during challenging activities (Ogg et al., 2016). These positive relations between HI symptoms and school readiness outcomes when controlling for IA symptoms could be due to the high correlation often observed between IA and HI symptom levels. Specifically, this multicollinearity could result in a situation where the impairing aspects of HI symptoms may overlap with IA symptoms, accounting for the differences between the correlation findings and analyses that examine unique effects.

These positive results can further be explained by work that examines impulsivity as a promoter of learning (Tymms & Merrell, 2011). Specifically, findings highlight that children with higher impulsivity scores performed better in mathematics and reading than their peers. The impulsivity item "blurts out answers" from The *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* (American Psychiatric Association, 1994) was the greatest indicator of this effect, which the authors theorized as being due to greater cognitive engagement and excitability

to share and participate (Tymms & Merrell, 2011). Furthermore, positive relations between HI and school readiness have been observed in regression analyses when viewing school readiness as a single variable (Tan et al., 2022). The authors discussed this finding as possibly being due to the increased motor activity displayed by children with ADHD, and especially those with symptoms of HI. Partaking in gross motor activity during challenging activities and executive functioning tasks could potentially enhance working memory and thus promote learning (Tan et al., 2022). This increased motor movement could also explain the positive relation HI symptoms had to the physical development domain.

Strengths and Limitations

This paper has a few limitations to be considered in future research. First, this study used teacher reports for the ADHD symptoms. It is possible that the children exhibit different behaviors at home, thus future research should use both parent and teacher reports to gain a greater understanding of the child's behavior in multiple settings. Further, this study used a community sample and assessed ADHD symptom levels as a continuous variable, as opposed to examining differences in school readiness outcomes based on whether the child has an ADHD diagnosis. Thus, these results may not be applicable to a clinical sample of preschoolers, and future research could be dedicated to understanding if these results are replicable for other groups. Moreover, the data for this study were collected in tandem with the implementation of a physical activity intervention designed to decrease ADHD symptoms. Although the data were collected at the beginning of the school year, there is some possibility of the program impacting school readiness outcomes. There are also a couple of statistical limitations to this study. First, there was a high correlation between IA and HI symptom levels, meaning the unique effects in the regression analyses were based on the small portion of non-overlapping variance remaining

in the predictors after accounting for the strong correlation between the ADHD symptoms variables. This overlap between the two ADHD variables could indicate multicollinearity playing a role in the changes in results between correlation and regression analyses, particularly with the positive results associated with HI symptoms. Finally, these results are only correlational, and thus causation cannot be assumed. Additionally, future research should be aimed towards understanding the processes underlying associations between ADHD symptom levels and school readiness. Previous studies have mentioned executive functioning (Tan et al., 2022) and working memory (Peyre et al., 2019) as possible factors underlying IA and HI symptoms and could be the focus of future studies.

Despite the limitations to the study, there were also a number of strengths. For example, there was a large sample size that was ethnically and racially diverse. Furthermore, high internal reliability for the ADHD Rating Scale-IV Preschool Version and TS Gold indicated that the items within the measures were consistent throughout and were all assessing the same construct. Finally, this study used a single, multi-domain measure to assess all domains of school readiness, which has not previously been done. The nature of the TS Gold allows for the assessment of the whole child with developmental expectations for each domain, creating similar standards held between domains throughout the assessment (Lambert, 2020). As an authentic assessment, the TS Gold collects data about children's development as it arises in the classroom and is thus more subjective than other assessments of development (Lambert, 2015). Future research could attempt to replicate this study's results using measurements of school readiness that are more objective.

Conclusion

This paper found that symptoms of IA are a unique negative predictor of preschoolers meeting or exceeding school readiness expectations. Moreover, the results indicated that HI symptoms are a unique positive predictor of preschoolers' physical, language, cognitive, and mathematics development. These results must also be considered in the context of the strong correlation between IA and HI symptom levels, meaning for this sample there was not a strong differentiation between these two dimensions. Given the greater risk of school readiness impairment associated with inattention, research on and development of interventions to manage these symptoms could potentially increase school readiness and better prepare children for the academic and social demands of elementary school. Without these efforts to decrease ADHD symptomology and thus increase school readiness, children who display impairment in the school readiness domains are at a greater risk for poor educational outcomes as they progress through school (Perrin et al., 2019). Some potential ADHD interventions include physical activity (Hoza et al., 2020; Vazou & Mavilidi, 2021) and one-on-one skills training to increase instruction following, functional communication, and tolerance (Ísfeld Víðisdóttir & Sveinbjörnsdóttir, 2021). These studies on various interventions have demonstrated improvements to preschoolers' ADHD symptoms, indicating them as potential options in the attempt to better the future educational outcomes of children displaying ADHD symptoms in preschool.

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Table 1

Means, Standard Deviations, and Intercorrelations among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	*M*	*SD*
1. Age	--										4.04	.61
2. Sex[a]	-.06	--									1.42	.50
3. IA Symptom Levels	-.11	-.20**	--								.83	.80
4. HI Symptom Levels	.02	-.26***	.78***	--							.72	.72
5. Social-Emotional Development	-.01	.19**	-.39***	-.28***	--						.74	.32
6. Physical Development	-.03	.19**	-.35***	-.21**	.69***	--					.88	.23
7. Language Development	.15*	.19**	-.46***	-.26***	.72***	.60***	--				.76	.33
8. Cognitive Development	-.01	.17**	-.40***	-.23***	.79***	.68***	.80***	--			.77	.32
9. Literacy Development	.12	.15*	-.43***	-.27***	.61***	.54***	.74***	.68***	--		.72	.22
10. Mathematics Development	-.01	.08	-.28***	-.14*	.69***	.55***	.70***	.73***	.79***	--	.75	.24

Note. IA = inattentive; HI = hyperactive/impulsive.

[a]1 = males, 2 = females.

*$p < .05$, **$p < .01$, ***$p < .001$.

Table 2

ADHD Symptom Levels Predicting Development in School Readiness Domains

Outcome	Step	Variable	*b*	*t*	ΔR^2
Social-Emotional	1	Age	-.001	-.023	.037
		Sex[a]	.124**	3.025**	
	2	IA Symptom Levels	-.177***	-4.622***	.134
		HI Symptom Levels	.042	.989	
Physical	1	Age	-.009	-.364	.037
		Sex[a]	.088**	2.984**	
	2	IA Symptom Levels	-.142***	-5.150***	.123
		HI Symptom Levels	.067*	2.201*	
Language	1	Age	.085*	2.508*	.061
		Sex[a]	.132**	3.174**	
	2	IA Symptom Levels	-.253***	-6.813***	.195
		HI Symptom Levels	.116**	2.802**	
Cognitive	1	Age	.000	-.006	.028
		Sex[a]	.109**	2.623**	
	2	IA Symptom Levels	-.237***	-6.265***	.170
		HI Symptom Levels	.117**	2.784**	
Literacy	1	Age	.049*	2.098*	.041
		Sex[a]	.072*	2.522*	
	2	IA Symptom Levels	-.148***	-5.641***	.165
		HI Symptom Levels	.050	1.735	
Mathematics	1	Age	-.003	-.110	.007
		Sex[a]	.040	1.242	
	2	IA Symptom Levels	-.137***	-4.457***	.090
		HI Symptom Levels	.076*	2.238*	

Note. IA = inattentive; HI = hyperactive/impulsive; *b*s are unstandardized coefficients at the predictor's entry into the hierarchical model.

[a]1 = males, 2 = females.

*$p < .05$, **$p < .01$, ***$p < .001$.