

Spring 5-2015

## **Affect Recognition and ADHD Symptoms in Preschoolers: A Serial Mediation Model of Social Cognition**

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Running Head: AFFECT RECOGNITION AND ADHD SYMPTOMS IN PRESCHOOLERS

The University of Southern Mississippi

Affect Recognition and ADHD Symptoms in Preschoolers:  
A Serial Mediation Model of Social Cognition

by

Annalise Hays

A Thesis  
Submitted to the Honors College of  
The University of Southern Mississippi  
in Partial Fulfillment  
of the Requirements for the Degree of  
Bachelor of Science  
in the Department of Psychology

May 2015

# AFFECT RECOGNITION AND ADHD SYMPTOMS IN PRESCHOOLERS

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# AFFECT RECOGNITION AND ADHD SYMPTOMS IN PRESCHOOLERS

## Abstract

Attention-deficit hyperactivity disorder (ADHD) has been addressed in a few studies as it relates to social cognition deficiency. Throughout these studies, it seems as if affect recognition may be linked to ADHD through deficits in the development of social skills. The current study tests to see if this mediation may also involve the influence of adaptability in children. It was hypothesized that poorer affect recognition would relate to ADHD symptoms in preschoolers and that this effect would occur indirectly by influencing the children's adaptability and social skills. A heterogeneous sample of 71 three to five year-old preschoolers participated. Children were administered the NEPSY (a neuropsychological battery designed for children), with the Affect Recognition subtest being of interest. Parents completed the parent version of the Behavioral Assessment System for Children-2<sup>nd</sup> edition, which included measures of ADHD symptoms, adaptability, and social skills. Two serial mediation models indicated that affect recognition related to ADHD symptoms (attention problems and hyperactivity) indirectly through adaptability and social skills. Only the serial mediation indirect effect was significant, indicating that lower affect recognition related to lower adaptability, which subsequently related to lower social skills and then to higher ADHD symptoms in preschoolers. These findings have important clinical implications in understanding the mechanism of how affect recognition may impact ADHD symptoms in young preschoolers. Furthermore, it can inform early interventions for young children who may be at risk for ADHD symptoms by providing a point of intervention.

**Key Words:** ADHD, attention problems, hyperactivity, affect recognition, social cognition, social skills, adaptability

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Affect Recognition and ADHD Symptoms in Preschoolers:  
A Serial Mediation Model of Social Cognition

**Problem Statement**

Although social deficits are a diagnostic feature of many psychological disorders, such as autism spectrum disorder (American Psychiatric Association, 2013), many people may not realize that children with attention-deficit/hyperactivity disorder (ADHD)—a common and familiar diagnosis—may also be affected socially. Although not core to the diagnostic criteria, social deficits are a common associated feature of ADHD, which is a neurodevelopmental, psychiatric disorder characterized by inattentiveness and hyperactivity/impulsivity (American Psychiatric Association, 2013). ADHD affects roughly 4 to 12% of school-age children (Stefanatos & Baron, 2007) and approximately 4% of the U.S. adult population (Montes, Garcia, & Ricardo-Garcell, 2007), and it is the leading cause of clinic referrals among children (Stefanatos & Baron, 2007). Individuals with ADHD experience significant impairment in associated areas beyond the core symptoms of the disorder, including social deficits and difficulties with adaptive functioning (American Psychiatric Association, 2013). The study of ADHD in children and adolescents is crucial in the field of psychology, because it is important for early identification of and intervention for the disorder. Particularly, identifying models that predict the mechanisms by which ADHD may develop are essential.

Throughout the literature, studies have looked at numerous factors that may contribute to ADHD symptoms. For example, ADHD symptoms, like other externalizing problems (e.g., aggression), have been linked to social cognition deficits, which are limitations in a person's capability to understand the minds of other people (Uekermann

et al., 2010), and one key theme throughout is affect recognition—or the ability to recognize emotions on the faces of others (e.g., Collin, Bindra, Raju, Gillberg, & Minnis, 2013). The research in this area has indicated that deficits in affect recognition may be particularly related to attention problems and not necessarily hyperactivity/impulsivity (Miller, Hanford, Fassbender, Duke, & Schweitzer, 2011). However, more research is needed to understand the role that deficits in affect recognition may play in contributing to the full spectrum of ADHD symptoms. Regardless, social context has been shown to be key to understanding the way in which the symptoms may develop and manifest themselves (Da Fonseca, Segquier, Santos, Poinso, & Deruelle, 2009). Thus, affect recognition may be linked to attention problems through deficits in the development of social skills (i.e., a mediational model).

The current study examined whether this mediation may also involve the influence of adaptability in children. Although related, adaptability is differentiated from social skills. Specifically, children's adaptability refers to how well they react and acclimate to certain social situations, whereas social skills refer to children's ability to perform appropriately in these specific situations. In the current study, it was hypothesized that poorer affect recognition would relate to ADHD symptoms in preschoolers and that this effect would occur indirectly by influencing the children's adaptability and then their social skills (i.e., in a serial mediation model). Results in support of this hypothesis could shed light on the mechanism by which social cognition deficits may impact ADHD symptoms in preschoolers and could have important theoretical and clinical implications for the disorder.

My project used archival data previously collected from a heterogeneous sample of 71 three- to six- year-old preschoolers (from Head Start centers and from private preschools, thus representing a range of socioeconomic groups). In the original collection, children were administered the NEPSY-II (a neuropsychological battery designed for children), with the Affect Recognition subtest being of interest. Parents completed the parent version of the Behavioral Assessment System for Children, Second Edition, which included measures of attention problems, hyperactivity, adaptability, and social skills. For this project, PROCESS (Hayes, 2013) syntax was used in SPSS to analyze the data examining a serial mediation model to determine whether the hypothesis was supported.

### **Introduction**

Attention-deficit hyperactivity disorder (ADHD) is a neurodevelopmental, psychiatric disorder characterized by inattentiveness and hyperactivity/impulsivity (American Psychiatric Association, 2013). As noted earlier, ADHD is a fairly prevalent disorder, with as many as 12% of school-age children receiving an ADHD diagnosis (Stefanatos & Baron, 2007). Given the high prevalence rates of ADHD, more and more research is being conducted to understand the etiology, course, prognosis, and associated features of the disorder. Indeed, the study of ADHD in children and adolescents is crucial in the field of psychology, because it is important in the early identification of and intervention for the disorder. Particularly, the identification of models that predict the mechanisms by which ADHD may develop are essential.

Beyond simply understanding the symptoms required for a diagnosis of ADHD, psychologists aim to discover the complexities that go along with the disorder. ADHD is

important to study, because it is the most common neurodevelopmental disorder among children (Polanczyk, de Lima, Horta, Biederman, & Rohde, 2007). ADHD is characterized by symptoms of attention problems and hyperactivity, which may have effects on educational, social, and family life (American Psychiatric Association, 2000). My study seeks to understand specific social cognition factors that may contribute to ADHD symptoms. Specifically, what are the social cognition deficits that may contribute to the manifestation of symptoms of ADHD?

This study examined emotional affect recognition and how that relates to ADHD symptoms. Several studies have examined ADHD as it relates to affect recognition, but the literature is lacking in understanding the mechanism by which these constructs relate. The specific goal of my study was to test whether deficits in affect recognition may have an indirect effect on preschool children's ADHD symptoms by negatively influencing their adaptability and social skills (i.e., in a serial mediational model).

### **ADHD and Social Cognition**

Research has shown that ADHD affects emotional functioning (Shaw, Stringaris, Nigg, & Leibenluft 2014). Shaw and colleagues note that individuals with ADHD have difficulty paying attention to and orienting themselves to the emotions of others. It could also be the case that dysfunction in emotional processing may impact the development of ADHD symptoms. My study explored the relation between deficits in emotion recognition and ADHD symptoms in preschoolers, including the examination of two other possible factors in this relation—which are adaptability and social skills of the preschoolers.

**Affect recognition.** Uekermann et al. (2010) hypothesized that some parts of social cognition may be affected in individuals with ADHD. The results showed that there was a strong positive correlation between ADHD and social cognition deficiencies. Individuals with ADHD had problems, specifically, with facial affect recognition and with recognizing speech patterns and inflections. Additionally, there was found to be some evidence of empathy deficits in individuals with ADHD. The authors found that some aspects of social cognition are affected by having ADHD, which may relate to deficits in neurological functioning. More studies need to be completed toward this end to further investigate the complexity of these relations. This study sought to fill some of the literature gap in this area.

Related to emotion recognition is the ability to recognize verbal cues, particularly as they relate to emotion. In one particular study, researchers gave children verbal tests to discover differential development of recognition at certain ages. As the authors expected, they found that the ability to recognize such cues increases with age (Sauter, Panattoni, & Happé, 2013). Thus, emotion recognition is a developmental process that, when deficient, could be involved in a developmental disorder, such as ADHD.

Certainly affect recognition requires perspective taking. When examining the ability of children with ADHD to understand the perspectives of others, Nilsen and colleagues found that their perspective-taking of others may not be as strong as it is among those without ADHD, which could possibly inhibit aspects of their communication with others (Nilsen, Mewhort-Buist, Gillis, & Fugelsang, 2012). Lack of perspective-taking may also relate to deficits in recognizing different affective states of

others. Thus, overall, the literature suggests a link between affect recognition deficits and ADHD symptoms but more research is needed in this area.

Additional research with other clinical populations, such as children with autism, could also be important to consider in the context of ADHD. For example, researchers studying facial emotion recognition in children with autism found that the children with autism, as a whole, tended to recognize mild facial expressions less quickly than other groups. No significant correlation was found between social anxiety and facial recognition (Wong, Beidel, Sarver, & Sims, 2012). Although this study was with children with autism, not children with ADHD, it shows the importance of considering affect recognition among clinical child populations within a social context. My study considers this possibility by specifically examining adaptability and social skills.

**Adaptability and social skills.** Research examining the adaptability of children with ADHD suggests that they may be slower to react than are children who do not have ADHD (Spinelli et al., 2011). Spinelli and colleagues found that reaction times may be slower, on average, in children with ADHD but that this tendency also varies within individuals (Spinelli et al., 2011). Additionally, problems with social skills have been reported in 52% to 82% of children with ADHD (Barkley, DuPaul, & McMurray, 1990). These problems are said to even start in preschool children, and they are reported by parents, teachers, and friends (DuPaul, McGoey, Eckert, & VanBrakle, 2001). As a result of such findings on adaptability and social skills deficits in children with ADHD, my study explored these factors as they may relate to emotion recognition and ADHD symptoms among preschoolers.

Researchers have addressed similar questions with other clinical populations. For example, in a 2006 study, researchers looked into the social skills of patients with psychosis. They searched for a relation between cognition and social skills as mediated by facial affect recognition. Though the study seemed to show a relation, the authors concluded that more research needed to be done to determine if such a mediation existed (Addington, Saeedi, & Addington, 2006). My study fills such a gap in the literature by examining these constructs in relation to symptoms of a more common disorder (i.e., ADHD) among children.

Kats-Gold, Besser, and Priel, (2007) examined boys who were at risk for ADHD and the relation between their possible ADHD symptoms and social skills. These researchers concluded that the boys at risk for ADHD had more impaired emotion recognition than did the non-at-risk boys. The tests showed that this inhibited emotion recognition in the at-risk boys plays a role in their social functioning and behavior problems in comparison to the social functioning and behavior of non-at-risk boys (Kats-Gold et al., 2007). The authors of the study concluded that more research needs to be performed to increase the sample size and improve the generalizability of the results of the study. This article highlights the importance of considering sample size and demographic factors as well as acknowledges that research is a continuous process—both of which will be considered for my proposed study. Other studies indicate that these relations can be multi-faceted and impacted (moderated) by other factors. For example, research has shown that those children who seemed to have a close friend in their life had fewer problems with social skills one year later (Becker, Fite, Luebbe, Stoppelbein, & Greening, 2013). Therefore, it is also important to address multiple factors when

considering a complex model in the relation between affect recognition deficits and ADHD symptoms.

**Other factors related to social cognition and externalizing problems.** One particular study that may be related in some aspects to my own study is one that examined Theory of Mind (ToM) in children (Sharp & Vanwoerden, 2014). ToM relates to children's ability to recognize and identify different emotions and, thus, it involves studying their social cognition. A child's ToM development is tested through false-belief tasks. For instance, if they are told that their friend thinks the crayon is in the desk but the teacher hides it under the table, will they know that the friend will look in the desk? Or, will they believe that, because they know it is under the table, that their friend will automatically know that, too? This development begins around age four. The problem in the reviewed study was to examine ToM and its relation to social cognition, particularly to psychopathic traits. The authors sought evidence to support that psychopathy might have some relation to ToM development. The researchers concluded that they successfully challenged the idea that there is no relation between ToM and psychopathy. Although their research showed some correlation between ToM and psychopathic traits, they concluded that more research needs to be done to further develop the study. Reactive and proactive aggression are aspects of the study that were not completely explored, and they point out that further work could be done in this area to provide a deeper study of development in future research (Sharp & Vanwoerden, 2014). Certainly, also, how ToM relates to other externalizing problems—including symptoms of ADHD—could be examined. Although my study did not examine ToM directly, it did examine how affect

recognition, which is closely related to and relevant for ToM, relates to ADHD symptoms.

Another study showed that ToM typically develops by five years of age in the preschoolers. Through teacher evaluations, a correlation was shown between ToM and social skills such as play and talkativeness (Wright & Mahfoud, 2014). It is interesting to consider these results in relation to my own topic, which deals with social skills and children's ability to express emotions. That is, these concepts could be important to keep in mind when studying other aspects of preschoolers' social cognition.

### **Importance of Parent Report Data**

The proposed study will utilize the Behavior Assessment System for Children, 2<sup>nd</sup> Edition (BASC-2-PRS; Reynolds & Kamphaus, 2004), which measures child behavior and emotional functioning. This omnibus rating scale is widely used in research examining child psychopathology. For example, it was used in one particular study to determine if children with ADHD would score higher on the clinical scales of the BASC-2-PRS than a control group. The results indicated that children with different types of ADHD scored higher on particular subsections of the BASC-2-PRS than did others (Manning & Miller, 2001). Such nuances may be important to keep in mind for my own study.

### **Current Study and Hypotheses**

Upon review of the literature surrounding my topic, I have realized that there are some studies that have examined constructs similar to my area of study. On the other hand, none of these studies seem to make the connection that my study seeks to make between affect recognition and ADHD symptoms. My study seeks to establish a

significant correlation between these two in preschoolers. Also, I will proceed to go another step in seeking to explain some other possible factors contributing to the relation between affect recognition and ADHD symptoms. Two other factors that I theorize come into play here are children's adaptability and social skills. I propose what is referred to as a serial mediation model. I hypothesized that affect recognition will be related directly to ADHD symptoms. Furthermore, I hypothesized that this relation will occur indirectly—and sequentially—through the factors of adaptability and social skills (i.e., a serial mediation model). This question has not been addressed in the literature. Thus, my study will fill an important gap in the literature.

### **Method**

My study used an archival dataset that had not been analyzed to address my specific question. These data were analyzed to address my question in particular to see if there was any relationship (i.e., sequential mediation) as my hypothesis suggests.

### **Participants**

From a larger study, a total of 71 preschoolers attending PACE Head Start and other non Head Start preschools in Hattiesburg, Mississippi, and one of their parents or primary caregivers and preschool teachers participated in the study. Participants in this study were part of a larger grant-funded study investigating positive parenting as a protective factor for children at risk for externalizing behaviors. The 71 preschoolers were comprised of 36 (50.7%) males and 35 (49.3%) females and ranged in age from 3 to 6 years of age ( $M = 4.04$ ,  $SD = .73$ ). The race distribution was 62.0% Caucasian, 31.0% African American, 1.4% Hispanic/Latino, 1.4% Asian-American, 1.4% classified as "other" and 2.8% did not respond to this item. Race information was missing for two

participants. Only children without major developmental disabilities were eligible for participation in the study. All participants met this criterion.

The parents and guardians of the children ranged in age from 22 to 47 ( $M = 32.16$ ,  $SD = 5.75$ ). The sample represented a diverse socioeconomic status background. Their income ranged from no income/dependent on welfare to earns 100,000 or more ( $M = 8.25$ ,  $SD = 4.37$ , on a scale from 1 to 13). Data for parent age and income were missing for two participants. Of the guardians, there were 2 males and 65 females (2.8% male and 91.5% female). Parent gender was missing for four participants. Additional descriptive statistics for the sample are presented in Table 1.

## Measures

**Demographic Questionnaire.** A demographic questionnaire was used to obtain socioeconomic and socio-cultural information about the child and his/her family. Information was also collected about the developmental history and the child's and family's mental health history.

**Behavior Assessment System for Children-2-Parent Rating Scale.** The Behavior Assessment System for Children-2-Parent Rating Scale (BASC-2-PRS; Reynolds & Kamphaus, 2004) was administered to parents. The BASC-2 is a multi-dimensional assessment system that measures both adaptive and problem behaviors of children. The items are scored on a 4-point scale ranging from *Never* to *Almost Always*. The BASC-2 has demonstrated good reliability. Reynolds and Kamphaus (2004) reported internal consistencies for the composites, with alpha coefficients ranging from .85 to .93. Alpha coefficients for the subscales range from .77 to .87. For the proposed study, the

Adaptability, Social Skills, Attention Problems, and Hyperactivity subscales are the variables of interest.

**Neuropsychological Assessment of Children – II.** The Neuropsychological Assessment of Children – II (NEPSY- II; Korkman, Kirk, & Kemp, 2007) was administered to the children. The Affect Recognition subtest is of interest for the proposed study. Children were tested directly and determined whether faces displayed in a stimulus book showed happy, sad, angry, or disgusted emotions.

### **Procedure**

IRB approval was obtained for the original larger study before participant recruitment began. Parents were recruited from Parent-Teacher Organization (PTO) meetings at various Head Start Centers and preschools. Parents were also recruited through various announcements posted in the school as well as flyers and consent forms sent home with the children. Parents consented to participate by signing a written informed consent. Following parental consent, parents completed the demographic form and BASC-2-PRS, then children were administered the NEPSY-II. Parents received a \$10 Walmart gift card after completing the packet

## **Results**

### **Descriptive Statistics**

Descriptive statistics for the variables of interest in the current study are presented in Table 2. No substantial skew was noted for any of the variables, so no transformations of the data were deemed necessary.

### **Correlations**

Zero-order correlations among all the variables of interests were run to determine how the hypothesized predictor, mediators, and outcome variables were related (Table 3). Results indicated that affect recognition was significantly negatively correlated with attention problems,  $r = -.27, p = .03$ , significantly positively correlated with adaptability,  $r = .28, p = .01$ , and marginally positively correlated with social skills,  $r = .21, p = .07$ . Adaptability was significantly positively correlated with social skills,  $r = .62, p < .001$ , and significantly negatively correlated with attention problems,  $r = -.42, p < .001$ . Social skills were significantly negatively correlated with attention problems,  $r = -.54, p < .001$ , and significantly negatively correlated with hyperactivity,  $r = -.33, p = .01$ . Attention problems were significantly positively correlated with hyperactivity,  $r = .64, p < .001$ . Notably, neither affect recognition nor adaptability significantly related to hyperactivity.

### **Mediational Models**

The PROCESS computational tool (Hayes, 2013) was used in SPSS to examine the two hypothesized serial mediation models. For each model, the predictor was affect recognition, the first mediator in the series was adaptability, and the second mediator in the series was social skills. For the first serial mediation model examined, attention problems was the outcome variable. For the second serial mediation model examined, hyperactivity was the outcome variable.

The first examined serial mediation model indicated that affect recognition related to attention problems indirectly through adaptability and social skills. Only the serial mediation indirect effect was significant, indicating that affect recognition related to adaptability,  $B = .80, SE = .33, p = .02$ , which subsequently related to social skills,  $B =$

.56,  $SE = .09$ ,  $p < .001$ , which then subsequently related (negatively) to attention problems,  $B = -.47$ ,  $SE = .14$ ,  $p = .001$ , in preschoolers (Figure 1). The indirect effect through this serial path was significant, based on 5,000 samples with replacement to produce bias corrected bootstrap confidence intervals,  $B = -.21$ ,  $SE = .10$ ,  $CI [-.49, -.06]$ . Importantly, the serial paths both reversing the order of the serial mediators (adaptability and social skills) as well as reversing the order of the predictor and outcome variables (affect recognition and attention problems) were not significant, thus providing further support for the directionality of this specific model.

The second examined serial mediation model indicated that affect recognition related to hyperactivity indirectly through adaptability and social skills. Only the serial mediation indirect effect was significant, indicating that affect recognition related to adaptability,  $B = .80$ ,  $SE = .33$ ,  $p = .02$ , which subsequently related to social skills,  $B = .56$ ,  $SE = .09$ ,  $p < .001$ , which then subsequently related (negatively) to attention problems,  $B = -.39$ ,  $SE = .16$ ,  $p = .02$ , in preschoolers (Figure 2). The indirect effect through this serial path was significant, based on 5,000 samples with replacement to produce bias corrected bootstrap confidence intervals,  $B = -.18$ ,  $SE = .11$ ,  $CI [-.49, -.03]$ . As with the attention problems model, the serial paths both reversing the order of the serial mediators (adaptability and social skills) as well as reversing the order of the predictor and outcome variables (affect recognition and hyperactivity) were not significant, thus providing further support for the directionality of this specific model.

### **Discussion**

The current study indicated a significant indirect effect of affect recognition on ADHD symptoms through adaptability and social skills. It is important to note that

adaptability and social skills did not demonstrate a significant indirect effect by themselves, but, instead the serial mediation of the two together demonstrated a significant effect. These findings have important clinical implications in understanding the mechanism of how affect recognition deficits may impact ADHD symptoms in young preschoolers. Consideration of this serial mediation model of social cognition deficits may help parents better understand some of the factors which may affect their child's ADHD. Furthermore, it can inform preventative efforts as well as early interventions for young children who may be at risk for ADHD symptoms, particularly attention problems, by highlighting points of intervention.

The total and direct effects may have been present for attention problems but not hyperactivity for several possible reasons. One possible reason is that these skills (i.e., affect recognition, adaptability, and social skills) are related to ADHD diagnoses, which primarily include attention problems. That is, most children with ADHD have attention problems—or attention problems and hyperactivity—whereas very few have hyperactivity alone (American Psychiatric Association, 2013). Nevertheless, an indirect effect between affect recognition and hyperactivity through these serial mediators does indicate an important connection among these variables deserving further attention (Hayes, 2013). These findings are important to fill a literature gap regarding ADHD and social cognition.

### **Limitations**

One limitation of the study is that the findings can only be generalized to populations similar to the same age as the children tested in the current study, which included only preschoolers. Likewise, although ADHD was conceptualized as a dimensional construct

with a community sample, consistent with research on the latent structure of ADHD (Marcus & Barry, 2011), findings may only apply to a community sample, as was used in the current study. It is difficult to know how the findings would generalize to a clinical sample of individuals diagnosed with ADHD. Finally, although significant findings emerged, the pattern of findings may have differed with a larger sample size and more power to detect complex interrelations among the variables of interest.

### **Future Directions**

Future research could seek to build upon this study by increasing the sample size to allow more power to detect true relations among variables that may have relatively low effect sizes that were not detected in the current study. The current study findings could also be upwardly extended by testing a broader age range of children. In fact, testing children in elementary school may increase the relevance of a social cognition and social skills model such as the one examined in the current study. It would also be pertinent to examine other social cognitive factors that are relevant to adaptability, social skills, and ADHD, such as theory of mind (e.g., Sharp & Vanwoerden, 2014). Likewise, future research should consider other neurocognitive impairments (e.g., executive functioning) as they may relate to ADHD symptoms through adaptability and social skills.

Given the findings that affect recognition related directly to attention problems but only indirectly to hyperactivity, it would be informative to examine this model among children with ADHD by presentation (i.e., predominantly inattentive, predominantly hyperactive-impulsive, and combined presentations) to determine if the model holds only for children with inattention symptoms in their presentation. That is, if affect recognition does not appear to relate to ADHD, predominantly hyperactive-impulsive presentation, it

would provide further evidence in support of earlier studies findings (e.g., Miller et al., 2011) that affect recognition may be more important in understanding inattention than hyperactivity.

### **Conclusions**

In conclusion, this study is important to help clinicians and pediatricians in working with and even diagnosing children with ADHD. It can educate parents or guardians of children with ADHD on the different factors that could be involved with their child's diagnosis.

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Table 1

*Descriptive Statistics of the Sample*

	Frequency	Percent
Gender		
Male	36	50.7
Female	35	49.3
Race		
Caucasian	44	62.0
African American	22	31.0
Hispanic American	1	1.4
Asian American	1	1.4
Other	1	1.4
Guardian Gender		
Male	2	2.8
Female	65	91.5
Income		
Earns no income/dependent on welfare	3	4.2
Earns less than \$10,000	8	11.3
\$10,000-\$14,999	5	7.0
\$15,000-\$19,999	2	2.8
\$20,000-\$24,999	10	14.1
\$35,000-\$39,999	2	2.8
\$40,000-\$49,999	2	2.8
\$50,000-\$59,999	4	5.6
\$60,000-\$74,999	6	8.5
\$75,000-\$99,999	14	19.7
Earns \$100,000 or more	13	18.3

Table 2

*Descriptive Data for Variables of Interest*

	Min	Max	Mean	SD	Skewness	Kurtosis
Affect Recognition Total	1	18	10.14	3.21	-.61	1.22
Adaptability	27	67	47.63	9.21	.02	-.84
Social Skills	33	68	50.42	8.46	-.21	-.74
Attention Problems	33	74	51.61	9.07	.35	-.23
Hyperactivity	37	88	49.93	9.25	1.38	3.26

*Note.* Min = Minimum; Max = Maximum; SD = Standard Deviation. Affect Recognition Total based on NEPSY-II scaled score; Adaptability, Social Skills, Attention Problems, and Hyperactivity based on BASC-2-PRS *T* scores.

Table 3

*Correlations Among Variables of Interest*

	Adaptability	Social Skills	Attention Problems	Hyperactivity
Affect Recognition	.28*	.21 <sup>a</sup>	-.27*	-.04
Adaptability	-	.62***	-.42***	-.18
Social Skills		-	-.54***	-.33**
Attention Problems			-	.64***
Hyperactivity				-

*Note.* Affect Recognition Total based on NEPSY-II scaled score; Adaptability, Social Skills, Attention Problems, and Hyperactivity based on BASC *T* scores.

\*\*\*  $p < .001$ . \*\* $p < .01$ . \* $p < .05$ . <sup>a</sup>trend,  $p < .10$ .

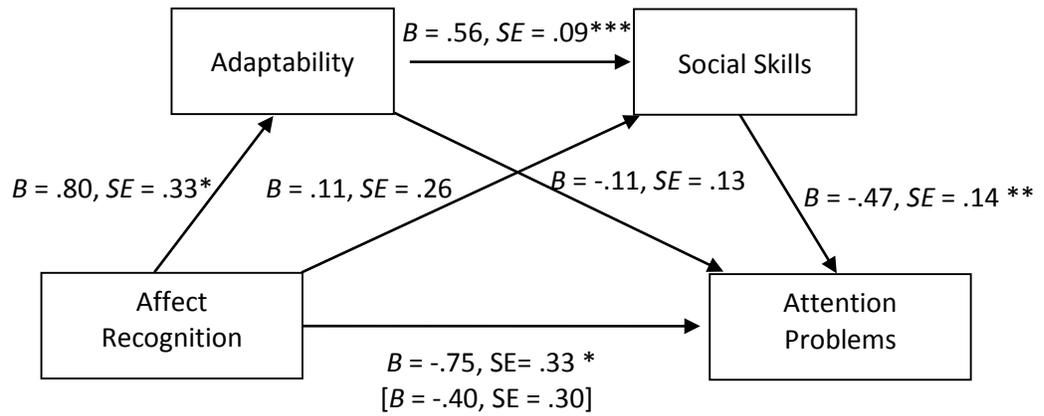


Figure 1. Model examining adaptability and social skills as serial mediators in the relation between affect recognition and attention problems in preschoolers.

Note. The direct effect (controlling for both mediators) is shown in brackets. The indirect effect through this serial path was significant,  $B = -.21, SE = .10, CI [-.48, -.06]$ .

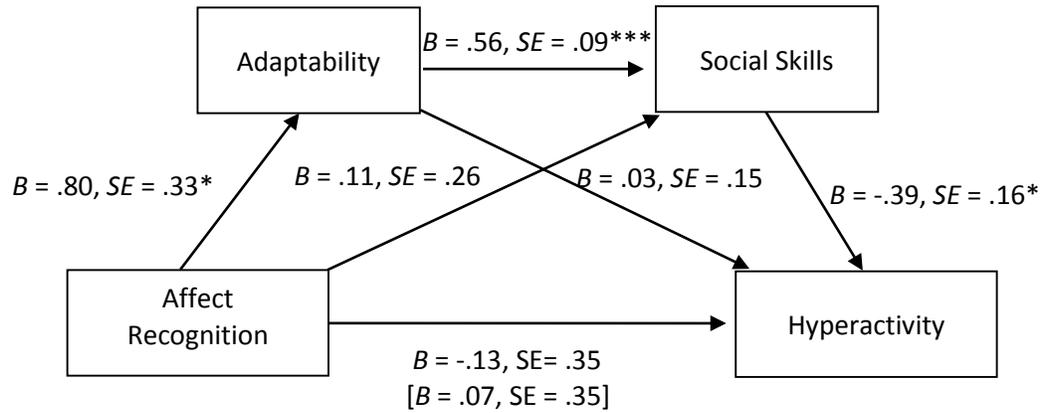


Figure 2. Model examining adaptability and social skills as serial mediators in the relation between affect recognition and hyperactivity in preschoolers.

Note. The direct effect (controlling for both mediators) is shown in brackets. The indirect effect through this serial path was significant,  $B = -.18, SE = .11, CI [-.49, -.03]$ .