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The Influence of ADHD Symptoms and Social Impairment on Anxiety and Depression Symptoms in 8- to 10-year-old Children

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The Influence of ADHD Symptoms and Social Impairment on Anxiety and Depression Symptoms in 8- to 10-year-old Children

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Dedication

To my parents, Lisa and Bill Willis, who have shown me an enormous amount of love, guidance, and encouragement throughout my entire life, and have been the ultimate role models of hard work and dedication. Thank you for always believing in me. I love you.

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I would like to acknowledge my mentor, Dr. Kate Flory, as well as the faculty of the USC Clinical-Community Psychology PhD program, who have consistently provided me with invaluable knowledge, support, and encouragement throughout my completion of this thesis paper as well as courses for my Master's degree. I would also like to acknowledge the entire Social Behavior Study research team, for without their help with collecting and entering data, their dedication, and their amazing teamwork over the years, this work would not have been possible.

Abstract

Previous research has shown that Attention-Deficit/Hyperactivity Disorder (ADHD) is associated with impaired social functioning in children and adolescents. ADHD and increased social impairment have proven to be separately correlated with increased anxiety and depression symptoms as well. However, little research has examined these specific associations and interactions among ADHD, social functioning, and internalizing symptoms. The current study aimed to examine the influence of ADHD symptoms and social functioning on anxiety and depression symptoms in 321 8- to 10-year-old children, and specifically, if social impairment moderated the relation between ADHD symptoms and anxiety and depression symptoms. Data on ADHD, social functioning, and anxiety and depression symptoms were collected via a multi-rater approach (i.e., parent, teacher, children's self-reports as well as peer ratings from playgroups). Results indicated that increased ADHD symptoms were associated with increased anxiety and depression symptoms. Additionally, it was found that teacher-rated social impairment moderated the relation between ADHD symptoms and depression symptoms, such that ADHD symptoms were significantly related to depression symptoms only at average and high levels of social skills but were unrelated to depression symptoms at lower levels of social skills. Children with lower ADHD symptoms and higher social skills had the least depression symptoms, and interestingly, children with more ADHD symptoms and higher social skills had the most depression symptoms, which differs from the prediction that lower social skills would lead to more

depression symptoms. The current study filled a gap in and addressed limitations of previous research, and these findings will hopefully be able to inform future interventions and treatments targeting children with ADHD.

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Chapter 1

Introduction

ADHD Overview

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity, impulsivity, or a combination of these. To meet diagnostic criteria for ADHD, these symptoms must persist in multiple domains and cause impairment in or reduced quality of social, academic, or occupational functioning (American Psychiatric Association (APA), 2013). ADHD has considerable comorbidity with other disorders, such as conduct disorder (CD), oppositional defiant disorder (ODD), anxiety and mood disorders, learning disabilities, and other disorders (Biederman, Newcorn, & Sprich, 1991). ADHD affects about 1 in 20 school-aged children, with one recent study of a community-based sample finding prevalence rates as high as 8.7-10.6% in children 5 to 13 years of age (APA, 2013; Wolraich et al., 2014). Although once thought to be a childhood disorder, it has been found that ADHD symptoms can persist well into adolescence and adulthood, with about 2.5% to 4% of adults being affected worldwide (APA, 2013; Wilens, Faraone, & Biederman, 2004). Symptom severity may decline with age for some, but the majority of individuals with ADHD continue to struggle with substantial ADHD symptoms and impairment into adulthood (Biederman, Mick, & Faraone, 2000), which highlights the importance of creating effective interventions and treatments from a young age and throughout the lifespan for those with ADHD.

ADHD and Social Impairment

Although much research in the past has focused on the attention, behavioral, and academic difficulties often associated with ADHD, there is a growing interest in exploring difficulties in the social domain that often plague those with ADHD. Children and adolescents with ADHD often struggle with poor social and communication skills (Klimkeit, Graham, Lee, Morling, Russo, & Tonge, 2006) and experience peer relationship problems, with over half of these youth experiencing serious problems with peer relationships (Wehmeier, Schacht, & Barkley, 2010).

Teacher ratings of children with ADHD, versus children without ADHD, show that those with ADHD have significantly lower scores on social skills (DuPaul, Volpe, Jitendra, Lutz, Lorah, & Gruber, 2004). McConaughy, Volpe, Antshel, Gordon, and Eiraldi (2011) examined social impairment in 6- to 11-year-old children using six different measures; parent and teacher reports revealed that children with ADHD had significantly more social impairment on all six measures compared to those without ADHD. According to these parent and teacher ratings, 56-59% of those with ADHD had social skills deficits, 44% showed poor social functioning, and 26% had limited involvement in activities. As can be seen, social impairment is a concern for many children with ADHD.

Youth with ADHD have difficulties with various aspects of social functioning, including problems and increased negative features associated with peer relationships, lack of friendships, peer rejection, limitations in their activities with friends (if they do have any), and/or inability to maintain friendships (Blachman & Hinshaw, 2002; Wehmeier, Schacht, & Barkley, 2010). For example, Strine and colleagues (2006) found

that, in a nationally representative sample of children aged 4 to 17 years in the United States, children with a history of ADHD had almost 3 times as many peer problems as those without ADHD (21.1% vs. 7.3%) as reported by parents. Parent reports also showed that children with a history of ADHD were almost 10 times as likely to have difficulties that interfered with friendships (20.6% vs. 2.0%). Children with a history of ADHD also had more difficulties that interfered with leisure activities than those without ADHD (12.5% vs. 1.5%), which may lead to less participation in activities with friends.

Blachman and Hinshaw (2002) also found significant peer problems for those with ADHD in a study comparing girls aged 6 to 12 years, both with and without ADHD, in a naturalistic summer camp setting. They found that, even in a social situation with unfamiliar peers, those with ADHD had more immediate and consistent difficulty making and keeping friends compared to nondiagnosed girls. Girls with ADHD were more likely to have no friends and less likely to have multiple friends than nondiagnosed girls. The girls with ADHD who did participate in mutual friendships had lower quality relationships with increased levels of negative features, such as conflict and relational aggression, compared to nondiagnosed peers. The number of mutual friends predicted overall peer liking and disliking at the conclusion of the camp, which has implications for girls with ADHD considering they had little to no friends.

Youth with ADHD may experience social impairment for a variety of reasons. They may be unable to or have difficulty with taking turns, sharing, and cooperating with others (Barkley, 2006). Children and adolescents with ADHD often interact with their peers with behavior that is self-centered, intrusive, impulsive, commanding, and even hostile (Wehmeier et al., 2010). Many children with ADHD will initiate contact with

peers frequently, but do so in a manner that is perceived as inept, intrusive, and/or immature by others (Whalen & Henker, 1991). Staikova, Gomes, Tartter, McCabe, and Halperin (2013) found that parent-reported pragmatic language skills mediated the relation between ADHD and social impairment, suggesting that deficits in language may also contribute to social impairment for those with ADHD. These social skills deficits and undesirable behaviors make it difficult for children with ADHD to interact with peers effectively.

Additionally, youth with ADHD may not be competent at monitoring their own poor behavior in social interactions. For example, in a study of experimental manipulation of social success and failure, boys with ADHD were less socially effective in their interactions than comparison controls, but still rated their own performance more favorably, even when following failures (Hoza, Waschbusch, Pelham, Molina, & Milich, 2000). This lack of insight and poor social perception may play a role in the peer problems that children with ADHD experience (Hoza, et al., 2005), as they may not be able to recognize that their behaviors are undesirable and control them accordingly.

As a result of these poor behaviors in social settings, children with ADHD have fewer dyadic friends and are rated lower on social preference, less well liked, and more often in the rejected social status category compared to non-ADHD peers (Hoza, Mrug, Gerdes, Hinshaw, et al., 2005). Children with ADHD have also been found to be nominated as "nonfriends" by children who are of a higher social preference and better liked by others; these more popular peers are usually the most influential in peer groups, and their dislike of children with ADHD may be another obstacle in improving peer acceptance and social status that those with this diagnosis must overcome (Hoza, et al.,

2005). Additionally, children with ADHD are more likely to be both bullied by peers and bully peers themselves (Unnever & Cornell, 2003). Both bullying and being bullied has been associated with poorer psychosocial adjustment (Nansel, Overpeck, Pilla, Ruan, Simons-Morton, & Scheidt, 2001), as well as increased internalizing symptoms; being bullied was associated with more anxiety and bullying others has been associated with increased depression symptoms (Salmon James, & Smith, 1998). As can be seen, social impairment can cause both direct and indirect negative effects for children with ADHD.

Social Impairment and Internalizing Symptoms

Social impairment, which can lead to lack of friendships and rejection by peers, often contributes to negative consequences in youths' childhood development and beyond, for both those with and without ADHD. Multiple studies have found that peer rejection is associated with increased risk for internalizing problems during childhood, such as loneliness and depressed mood (Boivin, Hymel, & Burkowski, 1995; Boivin, Poulin, & Vitaro, 1994; Ladd & Troop-Gordon, 2003; Lopez & DuBois, 2005). Mayeux, Bellmore, and Cillessen (2007) found that children who were classified as peer rejected consistently throughout multiple assessment points over the course of one school year (via peer, teacher, and self-reports) were found to be more anxious, socially isolated, overtly aggressive, and victimized than were children who were never classified as rejected; these peer-rejected children were less sociable, and also self-reported less school competence than non-rejected children.

While impairment in social functioning during childhood can contribute to immediate negative effects for children, childhood impairment can also lead to continuing problems in adolescence. Middle-childhood peer rejection has been shown to

lead to lower numbers of reciprocal friends and higher internalizing symptoms in adolescence (Pedersen, Vitaro, Barker, & Borge, 2007). A longitudinal study following boys and girls from childhood to adolescence (i.e., kindergarten to 9th grade) found that peer-relation problems in early childhood predicted late childhood loneliness, as well as anxious and depressive symptoms in adolescence (Fontaine, et al., 2009).

Consequences of social impairment can lead to increased internalizing problems, but having a friend can actually serve as a protective factor for those children who are at risk of having problems with peers (Rubin, Fredstrom, & Bowker, 2008). In a one-year longitudinal study of 4th and 5th graders, Hodges, Boivin, Vitaro, and Bukowski (1999) found that peer victimization predicted increased internalizing and externalizing symptoms, but only for children who did not have a mutual best friend; victimization did not predict these issues for those children in mutual best friendships, emphasizing the importance of peer friendships and suggesting that having a best friend may prevent negative consequences such as victimization. Rubin and colleagues (2004) examined parental and peer relationships' effects on the psychosocial functioning of fifth graders; they found that higher friendship quality predicted decreased internalizing problems, and predicted increased social competence and global self-worth. For girls, high friendship quality predicted lower peer rejection and victimization, and also served as a buffer for low maternal support's effects on internalizing problems. However, since children with ADHD are often in the "rejected" social status category (Hoza, et al., 2005) and have lower quality friendships (Blachman & Hinshaw, 2002), they may not have the opportunity to benefit from this protective nature of high quality, mutual friendships.

Regardless of ADHD diagnosis, the various aspects of social impairment, such as

peer rejection and lack of/inability to maintain friendships, put youth at risk for negative outcomes including increased internalizing problems, such as anxiety, depression, loneliness, and social isolation. Children with ADHD, however, are more likely to experience social impairment, which puts them at an even greater risk for these adverse consequences.

ADHD and Internalizing Symptoms

Although consequences of social impairment have been linked to a higher risk of internalizing symptoms, ADHD itself has also been associated with increased internalizing disorders such as anxiety and depression. Approximately 1 in 4 children with ADHD have a comorbid anxiety disorder (Tannock, 2000), although some estimate the prevalence may be even higher (Costello, Egger, & Angold, 2004). The odds ratio of having an anxiety disorder is 2.1-4.3 times greater in ADHD-diagnosed children compared to the general population (Angold, Costello, & Erkanli, 1999). Additionally, children who have been diagnosed with an anxiety disorder have prevalence rates of comorbid ADHD that are higher than expected (Last, Hersen, Kazdin, Finkelstein, & Strauss, 1987). Up to one-third of children with ADHD may also have comorbid depression (Angold & Costello, 1993), and about 25-50% of children with depression also have comorbid ADHD (Pliszka, Carlson, & Swanson, 1999). The link between ADHD and increased internalizing disorders is strong and clear, and unfortunately affects many of those with ADHD.

In a study of children and adolescents, Faraone, Biederman, Weber, and Russell (1998) found that all three ADHD subtypes showed significantly higher rates of internalizing disorders than controls (as categorized via structured diagnostic interviews),

and those with ADHD also had significantly higher scores on internalizing scales of the parent-reported Child Behavior Checklist (CBCL). Blackman, Ostrander, and Herman (2005) found that children with ADHD and depression are more anxious and depressed than non-depressed children with ADHD; however, the depressed, ADHD children do not have more extreme levels of ADHD or aggression than non-depressed peers. These results suggest that those with ADHD and comorbid depression may suffer from significantly more impairment from internalizing problems, even more so than from the difficulties related to ADHD or aggression.

Problems with internalizing symptoms for those with ADHD extend far beyond childhood. In a longitudinal study that followed girls who participated in a naturalistic summer camp during childhood, Lee and Hinshaw (2006) found that, at a five-year follow-up in adolescence, internalizing problems in adolescence were predicted by hyperactivity-impulsivity symptoms in childhood; this suggests that girls with ADHD symptoms, especially those with hyperactive-impulsive symptoms, are at a greater risk for internalizing problems in adolescence. This association between ADHD symptoms and internalizing symptoms exists past adolescence as well. Michielsen and colleagues (2006) found that the association between ADHD symptoms and anxiety/depressive symptoms persists into late adulthood; in their study of older adults (ages 60 to 94 years), both ADHD diagnosis and more ADHD symptoms were associated with more internalizing symptoms both cross-sectionally and longitudinally over six years. Comorbid internalizing symptoms can also negatively impact quality of life in adulthood. In a study of young Taiwanese men, Yang, Tai, Yang, and Gau (2013) found that the negative correlation between ADHD symptoms in childhood and quality of life in

adulthood was mediated by anxiety and depression symptoms, as well as mediated by persisting adult ADHD symptoms. Since comorbid internalizing problems for those with ADHD seem to persist throughout the lifespan, it is important to address this link between ADHD and internalizing symptoms in childhood in order to inform treatment of these issues early in life.

How ADHD and Social Impairment Relate to Anxiety and Depression Symptoms

Previous studies have established that there are links between ADHD and social impairment, social impairment and internalizing symptoms, and ADHD and internalizing symptoms. Some studies have also found associations among ADHD, social impairment, and internalizing issues combined. For example, in a study of 7- to 12-year-old children whom were all diagnosed with ADHD, social functioning was significantly correlated with anxiety and depression symptoms (Karustis, Power, Rescorla, Eiraldi, & Gallagher, 2000). Specifically, Karustis and colleagues (2000) found that both parent-reported and child-reported anxiety was positively correlated with parent-reported social problems; they also found that parent-reported depression, but not child-reported depression, was significantly associated with parent-reported social problems. Unfortunately, there was no control (i.e., non-ADHD) group in this study. In another study that examined only ADHD-diagnosed youth (aged 10 to 14 years) with no comparison group, Becker, Langberg, Evans, Girio-Herrera, and Vaughn (2014) found that a comorbid depression diagnosis, but not comorbid anxiety diagnosis, was significantly associated with lower parent-reported social functioning; anhedonia and social anxiety symptoms were associated with lower youth-reported social skills, and lower youth- and parent-reported social acceptance, for these youth with ADHD.

Another study emphasizing the association among ADHD symptoms, social impairment, and internalizing symptoms was conducted with Hispanic adolescents; ADHD symptoms were significantly associated with social problems at higher (but not lower) levels of depression for these youth (Becker, et al., 2013); however, since this study only examined one ethnic group, it may lack generalizability to a more diverse populations.

Additionally, Blackman, Ostrander, and Herman (2005) found that children with both ADHD and depression had greater impairment in social functioning than those with ADHD alone; these results suggest an association among ADHD, internalizing symptoms, and social impairment, and also suggest that the negative consequences and impairment from all three of these constructs combined may be far greater than from each construct alone.

The Current Study

It is clear that there are associations among ADHD, social impairment, and internalizing symptoms; all of these constructs can lead to negative consequences and cause significant impairment separately, but their combined effect may lead to even more severe impairment. However, the nature of the interaction relations among all three constructs is not particularly clear. The current study examined the relation(s) among ADHD symptoms, social impairment, and anxiety and depression symptoms in a sample of 8- to 10-year-old children both with and without ADHD diagnoses. The previously mentioned studies sometimes used reports from multiple raters, but rarely in the past, if at all, have studies examined data from four sources: child self-, parent, and teacher reports, in combination with peer sociometric data for each participant. The current study

investigated parent- and teacher-reported ADHD symptoms, social impairment information collected from parents, teachers, and peer sociometrics from playgroups, and child self-reported internalizing symptoms, to further understand the relations among of these variables.

The current study's research questions and hypotheses regarding 8- to 10-year-old children were as follows:

(1) What was the relation between ADHD symptoms and social impairment? It was hypothesized that there will be significant positive correlations between ADHD symptoms and social impairment.

(2) What was the relation between ADHD symptoms and anxiety symptoms, and the relation between ADHD symptoms and depression symptoms? It was hypothesized that there will be significant positive correlations between ADHD symptoms and anxiety symptoms, and between ADHD symptoms and depression symptoms.

(3) What was the relation between social impairment and anxiety symptoms, and the relation between social impairment and depression symptoms? It was hypothesized that there will be significant positive correlations between social impairment and anxiety symptoms, and between social impairment and depression symptoms.

(4) Does social functioning moderate the relation between ADHD symptoms and anxiety symptoms, as well as between ADHD symptoms and depression symptoms (see Figure 1.1 and Figure 1.2)? It was hypothesized that there will be significant interactions between ADHD symptoms and social impairment in

predicting anxiety and depression symptoms (separately); specifically, it was predicted that social impairment would moderate the relation between ADHD symptoms and anxiety and depression symptoms, such that higher social impairment and ADHD symptoms would predict the highest levels of anxiety symptoms as well as the highest levels of depression symptoms.

The current study also conducted several exploratory analyses. The main analyses provided the general guideline for this secondary set of analyses. The first set of exploratory analyses examined whether the two symptoms dimensions of ADHD (i.e., inattention symptoms and hyperactive-impulsive symptoms) related differentially to the other variables examined in the model. The second set of exploratory analyses examined whether the results differed if a categorical ADHD diagnosis was used instead of a continuous measure of ADHD symptoms. The third set of exploratory analyses examined whether the results differ for each gender (i.e., male and female).

The current study examined ADHD symptoms measured as a continuous variable, as opposed to a categorical variable of ADHD diagnosis, since subthreshold symptoms of ADHD are associated with numerous negative consequences, including adverse educational outcomes (Bussing, Mason, Bell, Porter, & Garvan, 2010) as well as social impairment; children with subthreshold inattention symptoms have more difficulties in social domains of functioning (e.g., lower levels of positive friendship qualities) than comparison peers (Rielly, Craig, & Parker, 2006). Subthreshold ADHD diagnoses have been associated with other comorbid psychological symptoms, such as depression, anxiety, mania, and trauma, smoking, and alcohol consumption, in adolescents (Malmberg, Edbom, Wargelius, & Larsson, 2011). Additionally, previous research has

found that ADHD is best measured on a continuum of symptom severity (i.e., a dimensional model) as opposed to using categorical diagnoses (i.e., dichotomous model) (Marcus & Barry, 2011). Using subthreshold ADHD symptoms rather than discrete ADHD diagnoses may allow for a clearer picture of the levels of impairment associated with varying degrees of ADHD symptom severity. Additionally, examining subthreshold symptoms may allow for the detection of negative social impairment and internalizing symptoms patterns for those with subthreshold ADHD diagnoses that may have otherwise been missed if discrete diagnoses were used.

Anxiety and depression were examined separately in the current study, as opposed to a combined latent internalizing symptoms variable, since there is a possibility for differential effects for these internalizing symptoms. By exploring distinct anxiety and depression dimensions, greater understanding is obtained and specificity is increased. Previously mentioned studies (Becker, et al., 2013; Becker, et al., 2014; Blackman, Ostrander, & Herman, 2005; Karustis et al., 2000) have found clear associations among ADHD, social impairment, and internalizing symptoms, but the findings were mixed regarding anxiety and depression. Karustis and colleagues (2000) reported that using both a broad-band construct of internalizing symptoms and examining anxiety and depression separately were helpful; while the broad-band construct aided in explaining overall trends, the researchers said that there were multiple instances when, in addition to the contribution of the broad-band internalizing construct, depression or anxiety each explained a unique portion of the variance in parent-reported social problems. Using a broad-band latent variable of internalizing symptoms can be helpful, but examining the distinct anxiety and depression domains provides better specificity and a more thorough

understanding of the complex relations among these domains, ADHD, and social impairment.

The current study examined child self-reported anxiety and depression symptoms, as opposed to parent-reported internalizing symptoms. Previous research has found that children report having higher levels of most types of problems compared to their parents' reports for them (Wong, Jenvey, & Lill, 2012). In a study examining general population samples of adolescents from 24 countries, it was found that adolescents reported significantly more problems than their parents reported about them (Rescorla, Achenbach, Ivanova, Dumenci, Almqvist, Bilenberg, Bird, & Broberg, 2007). In a study of 10- to 11-year-old children, Mesman and Koot (2000) found that, out of a potential 120 problem items, parents' reports were only associated with child self-reported anxiety and depression for 9 and 11 items, respectively; Mesman and Koot (2000) also found that teachers' reports were actually more closely associated with children's self-reports than parents' reports. These studies suggest that parents report less symptoms than youth actually endorse, and may be missing problems that are not directly observable, such as internalizing symptoms. Parent reports may be limited to more overt/observable behaviors (e.g., externalizing symptoms) and also are limited to observations within the home and family (Achenbach, McConaughy, & Howell, 1987). For these reasons, the current study examined child self-reported anxiety and depression symptoms.

A moderation model was used in the current study as opposed to a mediation model. Previous research has found that ADHD symptoms are directly, positively correlated with both anxiety symptoms and depression symptoms; since there is already an existing relation between ADHD and internalizing symptoms, social impairment is

expected to modify the existing relation between them (i.e., expected to be a moderator), instead of serving as the link between ADHD internalizing symptoms (i.e., not expected to mediate). In addition to this theoretical reasoning, the current study collected cross-sectional data only, which is better suited for a moderation model; a mediation model would be more appropriate for longitudinal data, which was not collected in the current study.

Understanding the link among ADHD symptoms, social impairment, and anxiety and depression symptoms, as well as their substantial impact on functioning, has important implications for children. Although ADHD and social impairment have been associated with internalizing symptoms individually, the combination of all these constructs may lead to even greater impairment in functioning. However, little to no research has examined this topic as thoroughly as the current study, with children or other age groups. The current study aimed to address this gap in research and provide insight into the impact of ADHD symptoms and social impairment on internalizing symptoms specifically in elementary-aged children, in the hopes of informing future prevention and intervention research.

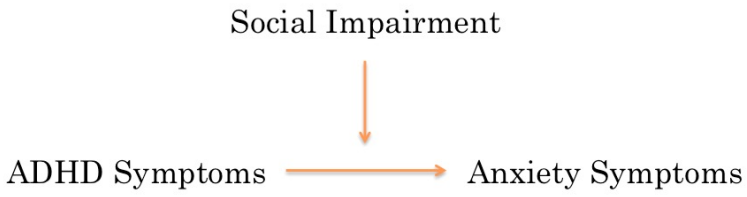

Figure 1.1 *Moderation model with anxiety symptoms as the outcome variable.*

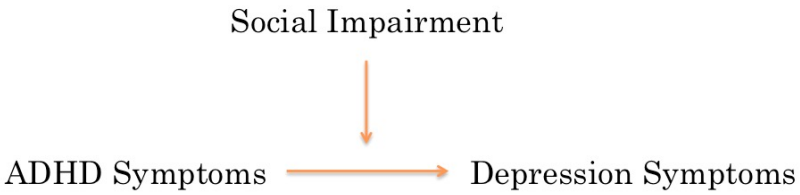

Figure 1.2 *Moderation model with depression symptoms as the outcome variable.*

Chapter 2

Method

Participants

Participants were boys and girls between the ages of 8 and 10 years who participated in a U.S. Department of Education-funded Social Behavior Study with their primary caregivers/legal guardians. There were 372 children who participated in the study (63.9% boys and 46.4% Caucasian). Of the 372 children, 321 of them were eligible and included in the current study's data analyses (see Table 2.1).

Primary caregivers of participants completed a phone screen before participating in the study. Participants who had a diagnosis of autism, pervasive developmental disorder, or mental retardation were excluded from the study; these disorders can affect social functioning and often have overlapping symptoms with ADHD. Participants were also excluded from analyses if their *Wechsler Abbreviated Scale of Intelligence- Second Edition* (WASI-II; Wechsler, 2011) score was less than 80, to eliminate the potential confounds of cognitive deficits. If the participant had parent-reported mania, as diagnosed by the *Children's Interview for Psychiatric Syndromes: Parent Version* (P-ChIPS; Fristad, Teare, Weller, Weller, & Salmon, 1998; Weller et al., 1999), he or she was excluded from analyses since some of the symptoms of mania are similar to ADHD symptoms, and may be difficult to differentiate. Because measures were collected from both parents and teachers, children who were homeschooled were excluded since they would be unable to provide teacher measures. Since participants were evaluated off of

their ADHD medication(s), those who were on ADHD medications that were unable to be withheld for a day (e.g., Strattera, Intuniv, Kapvay), other psychiatric medications, or medications that may affect ADHD symptoms, were excluded from the study.

Procedure

All data was collected at either a large Southeastern university or a large Midwestern university in the United States (see Table 2.1); all procedures at the two sites were identical, and all personnel at both sites were trained using the same manual. Participants were recruited through advertisements placed throughout each University's community (e.g., pediatrician offices, recreational centers, grocery stores, letters sent to parents through schools). Parents of participants and participants read and signed a consent form or an assent form, respectively, that were approved by the Institutional Review Board of each respective university before completing individual evaluation sessions. The primary caregivers of the participants received monetary compensation for their time and effort, and in a few cases when needed, compensation for transportation. All participants were evaluated when not on ADHD medication, for both the individual and playgroup sessions.

Participants completed an individual evaluation (i.e., in either two shorter sessions or one longer session), in which a variety of measures (described below) were separately administered to both them and their primary caregivers. Participants and primary caregivers were in different testing rooms for the duration of the individual evaluation.

After the individual evaluation was completed, participants were eligible to participate in a 3-hour playgroup. The same-sex playgroups were comprised of approximately ten boys or ten girls that did not know each other previously, about half

with ADHD diagnosis (although the "non-ADHD" children could have subthreshold ADHD symptoms). Every effort was made to schedule ten participants for each playgroup and give reminders to the primary caregivers (e.g., phone calls, emails), but some playgroups had less than ten (M= 8.13, SD= 1.68) due to last-minute cancellations or participants who did not come to the playgroup as planned. Additionally, efforts were made to not include children from the same grade and school so that none of the children would know each other, but a few children knew each other previously from activities outside of school (e.g., church, Boy Scouts).

Supervising staff members were trained to not give any feedback or corrections during the playgroup; exceptions were made in cases when the child showed severe physical aggression (to self or others) or extreme distress. Playgroup sessions were videotaped in order to observe and code the behavior of the children (at a later date). Children participated in several structured and unstructured activities, after first pairing up in partners, getting to know them, and introducing their partners to the group. Structured activities included: unanimously deciding on a team name, and then decorating a team banner only after unanimous agreement on the name was reached; attempting to complete the "Riverwalk" activity, where all group members must cross a twenty foot "river" while only stepping on "lilypads" (i.e., 10-by-10 inch mats) and must start over if anyone touched the "water" (i.e., the floor); and solving a puzzle together, with each child only touching/using their assigned 10 puzzle pieces. Unstructured activities included: two free-play periods, where children were told to "play with whoever they want, and with whatever toy(s) they want" (toys included Lincoln Logs, basketball hoop, racecars, dolls, drawing). All six of these coded activities were each

twenty minutes long, whether the activity's tasks were completed or not. The completion of the tasks required social interaction, teamwork, communication, and cooperation on behalf of the participants. After the last activity, children were able to participate in snack time and a craft activity while children were taken out of the room individually to participate in sociometric ratings, which included both self- and peer-ratings. Children were told that all of their responses would remain private, and were asked not to discuss their responses with any other group members.

Measures

Demographic information. Primary caregivers of participants filled out a questionnaire about their own and their children's demographic information. Information collected included the child's age, gender, and race, as well as their family's socioeconomic status (SES; as measured by average annual household income; see Table 2.2).

ADHD symptoms. The measures used to assess continuous ADHD symptoms were the *Disruptive Behavior Disorders Rating Scale-Parent Version* (DBD-PV; Pelham, Evans, Greenslade, & Milich, 1992) and *Disruptive Behavior Disorders Rating Scale-Teacher Version* (DBD-TV; Pelham et al., 1992). The DBD-PV and DBD-TV are measures of parent-rated and teacher-rated (respectively) symptoms of ADHD, ODD, and CD, according to criteria set forth in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text revision; DSM-IV-TR; American Psychiatric Association, 2000). The DBD-PV and DBD-TV are each comprised of the same 45 items, and the respondents rated the participant for each symptom on a 4-point Likert scale (0=not at all, 1=just a little, 2=pretty much, 3=very much). Symptoms of ADHD marked "pretty much"

or “very much” were considered endorsed and used for symptom count scores. The highest rating between the parent report and teacher report will be taken for each item; the same symptom will not by counted twice if it appears on both versions (parent and teacher) of the rating scale (Pelham, et al., 1992). Scores for ADHD were the number of endorsed ADHD symptoms summed, with higher scores being indicative of more symptoms. The DBD-PV and DBD-TV both include the same 9 items measuring ADHD-inattentive symptoms and 9 items measuring ADHD- hyperactivity/impulsivity symptoms, yielding 18 possible ADHD symptoms overall. Endorsed symptoms were summed for each ADHD subtype, yielding separate scores for inattention and hyperactivity-impulsivity (i.e., maximum score of 9 for each subtype), along with a total ADHD symptom score (i.e., maximum total ADHD symptom score of 18). The reliability and validity of these measures is well established (Pelham, et al., 1992). The measures demonstrated excellent reliability in the current study, for both the combined parent/teacher measure (α= .94) as well as the parent (α= .95) and teacher (α= .95) measures separately. This measure takes parents approximately 10 minutes to complete and takes teachers approximately 5 to 10 minutes to complete.

Social impairment/functioning. Social functioning/impairment was assessed through the Social Skills Improvement System-Parent Version (SSIS-PV; Gresham & Elliot, 2008) and Social Skills Improvement System-Teacher Version (SSIS-TV; Gresham & Elliot, 2008), as well as peer sociometric data from playgroups.

The SSIS-PV and SSIS-TV both assess social functioning of youth in two domains: Social Skills and Problem Behaviors. The current study will use only the Social Skills items in data analyses. The Social Skills subscale has 46 items and assesses seven

subdomains, including Assertiveness, Communication, Cooperation, Empathy, Engagement in Activities, Responsibility-taking, and Self-Control. Respondents rated the participants' behaviors during the past two months for each item, using a 4-point frequency scale (0=never, 1=seldom, 2=often, 3=almost always). The current study used the average of the parents' and teachers' answered items as the score (with a range of 0 to 3), since so many teachers completed the SSIS-TV but left many questions unanswered (i.e., only 188 teachers out of 293 answered every item). Higher scores indicated better social skills. The SSIS-PV has previously demonstrated excellent psychometric properties for parents, with a coefficient alpha at .95. For the SSIS-PV, the test-retest reliability for total Social Skills was found to be .84 in previous studies (Gresham & Elliot, 2008). For the current study, the SSIS-PV continued to display excellent reliability (α= .95). The SSIS-TV has also previously demonstrated excellent psychometric properties; the Social Skills subscale has a coefficient alpha at .97 and test-retest reliability for Total Social Skills at .82 (Gresham & Elliot, 2008). The SSIS-TV displayed excellent reliability in the current study as well (α= .97). The SSIS-PV and SSIS-TV each take approximately 10 to 25 minutes to complete.

Peer sociometric data were obtained from each child at the conclusion of each playgroup session. Each participant was rated by each of the other members of the playgroup (i.e., each participant had up to 9 ratings from peers). Children were shown a picture of the other children in their group and asked, "How much did you like (child's name)?" Participants responded on a scale from 1 to 4 (1 =not at all, 2=a little, 3=pretty much, 4=very much); higher scores indicate higher likeability. The current study

averaged the likeability ratings for each participant, such that each participant received on average likeability rating.

Anxiety symptoms. Continuous anxiety symptoms were measured using the child-reported *Screen for Child Anxiety Related Emotional Disorders* (SCARED; Birmaher et al., 1997). The SCARED is a self-report measure of anxiety symptoms for youth aged 8 to 18 years old. The SCARED has 41 items that relate to various symptoms of anxiety as classified by the DSM-IV (APA, 2000), and the children are asked to choose one of three options that best describes them for the last three months. These three options are scored from 0 to 2 (0= not true or hardly ever true, 1=somewhat true or sometimes true, and 2=very true or often true), giving an overall anxiety score of 0 to 82. The current study uses this score to measure continuous symptoms of anxiety. The SCARED has good internal consistency with previously demonstrated coefficient alpha values ranging between .78 and .87 (Birmaher, et al., 1999). The SCARED continued to demonstrate excellent reliability in the current study (α= .91). Several studies have shown that the SCARED child version has moderate agreement with the SCARED parent version (intraclass correlation coefficients = 0.37-0.62, and 0.55) (Birmaher, et al., 1997; Wren, Bridge, & Birmaher, 2004). As recommended by Birmaher and colleagues (1999), research staff administering the questionnaire read the items aloud to the child. This measure takes approximately 5 to 15 minutes to administer.

Depression symptoms. Continuous depression symptoms were measured using the *Children's Depression Inventory 2 Self-Report* (CDI-2; Kovacs, 2010). The CDI-2 is a 28-item self-report measure of depressive symptoms for youth aged 7 to 17 years old. It yields a total score, two scale scores (Emotional Problems and Functional Problems), and

four subscale scores (Ineffectiveness, Interpersonal Problems, Negative Mood, Negative Self-Esteem). The current study used the total score in data analyses. Children are asked to choose one of three statements that best represents their own depressive symptoms over the past two weeks; these statements are scored on a scale of 0 for no symptoms, 1 for mild symptoms, and 2 for more moderate/clear symptoms. Fourteen items are reverse-coded. Responses were summed for a total depressive symptoms score that ranged from 0 to 56, with higher scores indicating more depression symptoms. The CDI-2 has well-established psychometric properties with internal consistency coefficients ranging from .73 to .91 and test-retest coefficients ranging from .76 to .92. For the current study, the CDI-2 continued to display sufficient reliability (α= .82). The CDI-2 was read aloud to the children by research staff and takes approximately 5 to 15 minutes to administer. The CDI has been found to be the most commonly used scale for assessing depressive symptoms in youth (Erford, et al., 2011).

Table 2.1 *Total Participants: Collection Sites and Eligibility Status (N = 372)*

	n	*%*
Collection Site	--	
Midwestern University	202	54.3
Southeastern University	170	45.7
Eligibility Status	--	
Eligible	321	86.3
Ineligible due to medication	11	3.0
Ineligible due to IQ	29	7.8
Incomplete Evaluation	5	1.3
Ineligible Other	6	1.6

Table 2.2 *Demographic and descriptive variables for participants (N=321)*

	n	*%*
Gender	--	--
Male	205	63.9
Female	116	36.1
Age (in years)	--	--
8	125	38.9
9	109	34.0
10	87	27.1
Ethnicity	--	--
Caucasian	149	46.4
Non-Caucasian	172	53.6
Average Annual Household Income	--	--
$0 to $10,000	38	11.8
$10,001 to $14,999	27	8.4
$15,000 to $24,999	51	15.9
$25,000 to $49,999	56	17.4
$50,000 to $74,999	49	15.3
$75,000 to $99,999	37	11.5
$100,000 to $149,000	44	13.7
$150,000 to $199,999	15	4.7
$200,000 or more	4	1.2
ADHD Diagnoses	--	--
No ADHD Diagnosis	170	53.0
ADHD Diagnosis	151	47.0
ADHD- Inattentive	43	13.4
ADHD- Hyperactive/Impulsive	6	1.9
ADHD- Combined	102	31.8

Chapter 3

Results

Data analyses for the current study were performed using IBM SPSS Statistics software version 23. Only those participants who participated in both the individual and playgroup sessions, and also met eligibility criteria (i.e., WASI score of 80 or above, no mania diagnosis, no exclusionary medications taken on the days of the sessions) were included in data analyses. The sample used in the current study's data analyses was comprised of 321 children (63.9% boys and 46.4% Caucasian). Hierarchical multiple regression analyses models (i.e., one set of research questions examined anxiety symptoms as the outcome, and then the same set of research questions were examined except with depression symptoms as the outcome) were used to answer the research questions.

Continuous measures of ADHD symptoms and social impairment were used as predictor (i.e., independent) variables in the data analyses. Continuous measures of anxiety symptoms and depression symptoms were used as the outcomes (i.e., dependent) variables in separate data analyses. Variables that were used as covariates in the data analyses were from the demographic questionnaire. Since participant's age, gender, race, and average annual household income were all found to be significantly correlated with the predictor or outcome variables, or with each other, they were all used as covariates in the data analyses. All predictor variables were centered before being used in data analyses.

Power Analyses

Using G*Power software (Faul, Erdfelder, Buchner, & Lang, 2009), a priori power analyses were conducted to ensure that there would be sufficient power to test statistical significance at the error rate of .05. Using 7 total predictor variables (i.e., 3 predictors of interest, and 4 covariates), it was found that a total of 54 participants were needed to detect a large effect size of .35, and a total of 119 participants were needed to detect a medium effect size of .15. A total of 863 participants were needed to detect a small effect size of .02. Although detecting small effect sizes may not have been possible, there was sufficient power to detect both medium and large effect sizes, as there were 321 participants total.

Missing Data

There were low amounts of missing data for children's and primary caregiver measures, as well as for peer-rated sociometric ratings from the group sessions. Staff members checked for missing data at the end of each individual session before the participant left the testing site; if there was still any missing data or questions about data, attempts were made over the phone or at the playgroup session to obtain the necessary information from the parent measures (but not the children's measures). Staff members also checked the peer-rated sociometric measures before they left the laboratory after the playgroup session.

However, there were more missing data for teacher measures. Although teachers were provided monetary compensation for their participation in the study, not all teachers completed measures. If a child's primary teacher was not responsive to the researchers' first electronic correspondence, reminder emails were sent to them via email. If there was

still no response, efforts were made to obtain a secondary teacher's name from the primary caregivers and consequently contact this teacher. Approximately 91-92% of participants' teachers completed measures (see Table 3.1). Specifically, for the eligible participants that were used in data analyses, only 7.8% were missing the DBD from the teacher and only 8.7% were missing the SSIS from the teacher.

There was a fairly low amount of missing data for the current study (see Table 3.1). There was no association between the missing data from the SSIS-TV or peer rating and the other main variables; this was examined by creating "missing data variables" for the SSIS-TV and peer ratings and comparing bivariate correlations of them with the rest of the variables used in the analyses. For the SSIS-TV, having teachers who did not participate in the study was significantly associated with the child being non-Caucasian or from a lower income household, but not associated with any of the other main variables. For peer rating, not attending a playgroup (and therefore not receiving peer ratings) was significantly associated with being female, which was expected since more boys were recruited for the study and they consequently had more playgroups than the girls. Considering the low amount of missing data and its lack of association with dependent measures, the list-wise deletion method was used to handle all missing data. Additionally, according to the power analyses, 119 participants were needed to detect a medium effect size, and the list-wise deletion method left many more participants than this upon which analyses were conducted.

Assumptions

The assumptions of a multiple regression moderation model were examined, including a linear relation between the predictor and outcome variables, independence of

residuals, homoscedasticity, and normal distribution of errors. Measures were taken to address any violations of the aforementioned assumptions (e.g., examined the effects of outliers). The six assumptions of regression indicated for each variable as follows:

(1) Independence of errors (residuals) was assessed by examining the Durbin-Watson statistic and was indicated for all models (Anxiety: Parent = 2.09, Teacher = 2.04, and Peer Rating = 1.96; Depression: Parent = 2.13, Teacher, 2.08, and Peer Rating = 2.09).

(2) The studentized residuals were plotted against the (unstandardized) predicted values in order to assess the linear relation between the predictor variables and outcome variables. Additionally, partial regression plots between each independent variable and dependent variable were also created to examine this assumption. Partial regression plots showed approximately linear relationships between the continuous predictor variables (ADHD Symptoms, SSIS-Parent, SSIS-Teacher, Peer Rating) and the outcome variables (Anxiety Symptoms and Depression Symptoms).

(3) Homoscedasticity of residuals (equal error variances) was assessed by examining the scatter plots of studentized residuals and unstandardized predicted values. Homoscedasticity of residuals was indicated for all variables, as assessed by equally spread residuals across the scatter plots of studentized residuals and (unstandardized) predicted values.

(4) Absence of multicollinearity was assessed by examining the correlation coefficients, and the Tolerance/VIF values. The bivariate correlation coefficients indicated absence of multicollinearity for all independent

variables (i.e., all correlation coefficients were less than 0.7), and the Tolerance/VIF values also indicated absence of multicollinearity in all variables (i.e., all VIF values were less than 10).

(5) Absence of significant outliers was assessed by examining the studentized deleted residuals, with any cases that were greater than ±3 standard deviations being considered potential outliers. Three cases were greater than 3 standard deviations above the mean for anxiety symptoms, and 5 cases were greater than 3 standard deviations above the mean for depression symptoms (with one of the included cases being an outlier for both anxiety and depression symptoms). These potential outlier cases were included in all analyses since removing them did not change most of the main analyses results, except for the ADHD symptoms main effect became non-significant in steps 3 and 4 of the anxiety regression model for parent-reported social impairment and peer rating, but remained the same in Step 2. Additionally, for these particular variables, having a small number of high scores for anxiety or depression symptoms is expected and clinically relevant. Absence of leverage points was indicated, since all cases had leverage values below .02. Absence of influential points was also indicated, as all cases had Cook's Distance values below 1.

(6) Normal distribution of errors (residuals) was assessed by inspection of histograms with superimposed normal curves as well as examination of P-P Plots, and was indicated for all variables.

Descriptive Statistics

In order to gain more insight into the current study's sample, descriptive analyses (i.e., histograms, means, standard deviations, skewness, and kurtosis) were calculated for each of the predictor and outcome variables (see Table 3.2). The mean age of the sample was 8.88 years (*SD*= .81). According to the DBD of the combined parent report and teacher report, the average number of ADHD symptoms was 8.79 (*SD*= 6.21), with a range from the minimum of 0 symptoms to the maximum of 18 symptoms. The mean score for the SSIS-Parent report was 89.99 (*SD*= 19.68), with a minimum of 31 and a maximum of 138. The mean score for the SSIS-Teacher report was 80.87 (*SD*= 23.64), with a minimum of 32 and a maximum of 133. The average peer rating of likeability was 3.34 (*SD*= .45) with a minimum of 1.33 and a maximum of 4. The mean anxiety symptom score, as measured by the SCARED, was 27.03 (*SD*=14.77), with a minimum of 1 and a maximum of 76. For the SCARED, any scores of 25 or above are suggestive of an anxiety disorder; in the current study, 52.02% children (i.e., 167 out of 321) had scores of 25 or above, suggesting that more than half may meet criteria for an anxiety disorder. The mean depression symptom score, as measured by the CDI-2, was 8.94 (*SD* =6.41), with a minimum score of 0 and a maximum score of 35. For the CDI-2, raw scores of 0 to 11 are considered average. For the current study, 28.35% (i.e., 91 out of 321 children) had scores that were above average; specifically, 13.40% of the children were in the high average range (i.e., raw scores of 12 to 15), 7.48% were in the elevated range (i.e., raw scores of 16 to 18), and 7.48% were in the very elevated range (i.e., raw scores of 19 and above). More details can be found in Table 3.2.

Correlations among Study Variables

Correlations between all demographic information variables and predictor and outcome variables were also examined (see Table 3.2). Any demographic information variables that were significantly correlated with the predictor variables (i.e., ADHD symptoms or social impairment), the outcome variables (i.e., anxiety symptoms or depression symptoms), or each other, were included as covariates in the analyses regarding anxiety and depression; consequently, age, gender, race, and household income were all included as covariates in all analyses. There were many correlations among the covariates, predictor variables, and outcome variables, in the anticipated directions.

Increased ADHD symptoms were associated with being male (r= -.20, p<.01) and being from a lower income household (r= -.19, p<.01). As predicted, increased ADHD symptoms were associated with lower parent-rated social skills (r= -.45, p<.01), lower teacher-rated social skills (r= -.58, p<.01), decreased peer-rated likeability (r= -.21, p<.01), as well as increased anxiety symptoms (r= .13, p<.05) and increased depression symptoms (r= .22, p<.01).

Lower parent-rated social skills were associated with being male (r= .12, p<.05) and being from a lower income household (r= .16, p<.01). Lower parent-rated social skills were associated with lower teacher-rated social skills (r=.29, p<.01). As predicted, lower parent-rated social skills were also associated with more ADHD symptoms (r= -.45, p<.01) and more depression symptoms (r= -.18, p<.01).

Lower teacher-rated social skills were associated with being male (r= .20, p<.01), being non-Caucasian (r= -.24, p<.01), and lower income (r= .25, p<.01). Lower teacher-rated social skills were associated with lower parent-rated social skills (r= .29, p<.01). As

predicted, lower teacher-rated social skills were associated with more ADHD symptoms (r= -.58, p<.01), lower peer-rated likeability (r= .21, p<.01), increased anxiety symptoms (r= -.15, p<.05), and increased depression symptoms (r= -.16, p<.01).

Lower peer-rated likeability was associated with more ADHD symptoms (r= -.21, p<.01) and lower teacher-rated social skills (r= .21, p<.01). Lower peer-rated likeability was also associated with decreased age (r= .15, p<.05) and being male (r= .35, p<.01).

Increased anxiety symptoms were associated with being younger (r= -.13, p<.05), being non-Caucasian (r= .19, p<.01), and being from a lower income household (r= -.17, p<.01). Increased anxiety symptoms were associated with more ADHD symptoms (r= .13, p<.05) and lower teacher-rated social skills (r= -.15, p<.05). Increased anxiety symptoms were also associated with increased depression symptoms (r= .49, p<.01).

Increased depression symptoms were associated with lower income (r= -.18, p<.01). Increased depression symptoms were also associated with increased ADHD symptoms (r= .22, p<.01), increased anxiety symptoms (r= .49, p<.01), lower parent-rated social skills (r= -.18, p<.01), and lower teacher-rated social skills (r= -.16, p<.01).

Regression Results: Primary Findings

A series of hierarchical multiple regression analyses were conducted, all with age, gender, race, and household income included as covariates in the first step of each model. The outcome variables were either anxiety symptoms or depression symptoms. The ADHD symptoms variable was added in the second step of each model, and each measure of social impairment was added in the third step (i.e., SSIS-parent report, SSIS-teacher report, or peer rating) of their respective models. An interaction term of ADHD symptoms and each measure of social impairment was created and added in the fourth

step of each model to examine the moderating effect of social impairment on the relation between ADHD symptoms and anxiety or depression symptoms. There were 6 models in total (i.e., examining SSIS-parent, SSIS- teacher, or peer rating for anxiety symptoms as the outcome, and then the same with depression symptoms as the outcome). Results of each model are presented in tables, including *B*, SE, β, t, and *p* values, as well as R^2, ΔR^2, *F* for ΔR^2, and *df* values.

Primary findings: anxiety symptoms as the dependent variable.

The first regression model examined whether parent-reported social impairment (i.e., SSIS-Parent) moderated the relation between ADHD symptoms and anxiety symptoms (see Table 3.3). The first step of the analysis examined the main effects of the four covariates (i.e., age, gender, race, and household income) on anxiety symptoms. Results indicated that age, gender, and race significantly predicted anxiety symptoms. Specifically, younger children, females, and non-Caucasians had more anxiety symptoms. In the second step, age, gender, and race continued to significantly predict anxiety. The main effect of ADHD symptoms was added in the second step and significantly predicted anxiety symptoms as well. As ADHD symptoms increased, anxiety symptoms increased. In the third step, age, gender, race, and ADHD symptoms continued to be predictive of anxiety symptoms, but parent-reported social impairment (i.e., SSIS-Parent), was not significantly predictive of anxiety symptoms as anticipated. In the fourth and final step, age, race, gender, and ADHD symptoms were still significantly predicting anxiety symptoms, but contrary to hypothesis, the interaction between ADHD symptoms and parent-reported social impairment was not significant.

This suggests that parent-reported social impairment did not moderate the relation between ADHD symptoms and anxiety symptoms.

The second regression model examined whether teacher-reported social impairment (i.e., SSIS-Teacher) moderated the relation between ADHD symptoms and anxiety symptoms (see Table 3.4). The first step of the analysis examined the main effects of the four covariates (i.e., age, gender, race, and household income) on anxiety symptoms. Results indicated that age, gender, race, and income significantly predicted anxiety symptoms. Specifically, younger children, females, non-Caucasians, and those from lower income households had more anxiety symptoms. In the second step, age, gender, and race continued to significantly predict anxiety, but income did not. The ADHD symptoms variable was added in this second step and significantly predicted anxiety symptoms. As ADHD symptoms increased, anxiety symptoms increased. In the third step, age and gender continued to be predictive of anxiety symptoms, but race, income, and ADHD symptoms were not. Teacher-reported social impairment (i.e., SSIS-Teacher) was added in this third step and was not significantly predictive of anxiety symptoms as anticipated. In the fourth and final step, age and gender were still significantly predicting anxiety symptoms, but race, income, and ADHD symptoms did not. Contrary to hypothesis, the interaction between ADHD symptoms and teacher-reported social impairment was not significant, suggesting that teacher-reported social impairment does not moderate the relation between ADHD symptoms and anxiety symptoms.

The third regression model examined whether peer ratings of likeability moderated the relation between ADHD symptoms and anxiety symptoms (see Table 3.5).

The first step of the analysis examined the main effects of the four covariates (i.e., age, gender, race, and household income) on anxiety symptoms. Results indicated that age and race significantly predicted anxiety symptoms. Specifically, younger children and non-Caucasians had more anxiety symptoms. In the second step, age and race continued to significantly predict anxiety. The ADHD symptoms variable was added in this second step and did not predicted anxiety symptoms, which was unexpected. However, in the third step, ADHD symptoms significantly predicted anxiety symptoms in the expected direction, along with age and race. Peer-rated likeability was added in this third step and was not significantly predictive of anxiety symptoms as anticipated. In the fourth and final step, age, race, and ADHD symptoms still significantly predicted anxiety symptoms, but, contrary to hypothesis, the interaction between ADHD symptoms and peer-rated likeability was not significant. This suggests that peer-rated likeability does not moderate the relation between ADHD symptoms and anxiety symptoms.

Primary findings: depression symptoms as the dependent variable.

The first regression model with depression symptoms as the outcome examined whether parent-reported social impairment (i.e., SSIS-Parent) moderated the relation between ADHD symptoms and depression symptoms (see Table 3.6). The first step of the analysis examined the main effects of the four covariates (i.e., age, gender, race, and household income) on depression symptoms. Results indicated that income was the only covariate that significantly predicted depression symptoms. Specifically, children from lower income households had more depression symptoms. In the second step, income continued to significantly predict depression, and the ADHD symptoms variable was added and significantly predicted depression symptoms as well. As ADHD symptoms

increased, depression symptoms increased. In the third step, income and ADHD symptoms continued to be predictive of depression symptoms, but parent-reported social impairment (i.e., SSIS-Parent), was not significantly predictive of depression symptoms as anticipated. In the fourth and final step, income and ADHD symptoms were still significantly predicting depression symptoms, but contrary to hypothesis, the interaction between ADHD symptoms and parent-reported social impairment was not significant. This suggests that parent-reported social impairment did not moderate the relation between ADHD symptoms and depression symptoms.

The second regression model with depression symptoms as the outcome examined whether teacher-reported social impairment (i.e., SSIS-Teacher) moderated the relation between ADHD symptoms and depression symptoms (see Table 3.7). The first step of the analysis examined the main effects of the four covariates (i.e., age, gender, race, and household income) on depression symptoms. Results indicated that income was the only covariate that significantly predicted depression symptoms. Specifically, children from lower income households had more depression symptoms. In the second step, income continued to significantly predict depression, and the ADHD symptoms variable was added and significantly predicted depression symptoms as well. As ADHD symptoms increased, depression symptoms increased. In the third step, income and ADHD symptoms continued to be predictive of depression symptoms, but teacher-reported social impairment (i.e., SSIS-Teacher), was not significantly predictive of depression symptoms as anticipated. In the fourth and final step, income and ADHD symptoms were still significantly predicting depression symptoms. Additionally, as expected, the interaction between ADHD symptoms and teacher-reported social impairment was significant. This

suggests that teacher-reported social impairment has a moderating effect on the relation between ADHD symptoms and depression symptoms. Simple slopes analyses were examined for this significant interaction (see Figure 3.1). The simple slopes analyses revealed ADHD symptoms was significantly related to depression symptoms only at average and high levels of social skills (B = .18, p = .03 and B = .34, p = .002, respectively), but was unrelated to depression symptoms at lower levels of social skills (B = .03, *ns*). The analyses also revealed that children with the lowest ADHD symptoms and highest social skills had the least depression symptoms, whereas children with more ADHD symptoms and high social skills had the most depression symptoms. For children with a low level of social skills, depression symptom levels did not change significantly based on ADHD symptom level.

The third regression model with depression symptoms as the outcome examined whether peer-rated likeability moderated the relation between ADHD symptoms and depression symptoms (see Table 3.8). The first step of the analysis examined the main effects of the four covariates (i.e., age, gender, race, and household income) on depression symptoms. Results indicated that none of the covariates significantly predicted depression symptoms. In the second step, the ADHD symptoms variable was added and significantly predicted depression symptoms. As ADHD symptoms increased, depression symptoms increased. In the third step, ADHD symptoms continued to be predictive of depression symptoms, but peer ratings were not significantly predictive of depression symptoms as anticipated. In the fourth and final step, symptoms still significantly predicted depression symptoms. However, contrary to hypothesis, the interaction between ADHD symptoms and peer ratings was not significant.

Summary of primary analyses.

Bivariate correlations of primary analyses variables were in the expected directions. Increased ADHD symptoms were related to decreased parent- and teacher-reported social skills, decreased peer rating, and increased anxiety and depression symptoms. Poor parent-and teacher-reported social skills were associated with increased depression symptoms, but only poor teacher-reported social skills were associated with increased anxiety symptoms. Unexpectedly, peer ratings were not associated with anxiety or depression symptoms.

Generally, increased ADHD symptoms predicted more anxiety and depression symptoms in the regression model. However, once placed into a regression model with ADHD symptoms, social impairment was not predictive of anxiety or depression symptoms above and beyond ADHD symptoms, suggesting that ADHD symptoms are the driving force behind increased internalizing symptoms. Additionally, children with the lowest ADHD symptoms and highest social skills had the least depression symptoms, whereas children with more ADHD symptoms and high social skills had the most depression symptoms, again suggesting that ADHD symptoms may be the driving force behind increased internalizing symptoms.

Regression Results: Secondary Analyses

In addition to the main analyses of interest, several exploratory analyses were conducted.

Secondary analyses: inattention symptoms.

The first of the secondary analyses was examining the same research questions as the main analyses, except looking at inattention symptoms specifically instead of total

ADHD symptoms. Inattention symptoms were significantly correlated with lower parent-reported social skills, lower teacher-reported social skills, lower peer ratings, as well as increased anxiety and depression symptoms (see Table 3.9).

Inattention symptoms: anxiety symptoms as the dependent variable.

The first regression model for the inattention symptoms analyses examined whether parent-reported social impairment (i.e., SSIS-Parent) moderated the relation between inattention symptoms and anxiety symptoms (see Table 3.10). The first step of the analysis examined the main effects of the four covariates (i.e., age, gender, race, and household income) on anxiety symptoms. Results indicated that age and race significantly predicted anxiety symptoms, such that younger children and non-Caucasian children had higher levels of anxiety symptoms. In the second step, inattention symptoms significantly predicted anxiety symptoms, such that higher levels of inattention symptoms predicted higher levels of anxiety symptoms. In the third step, there was no significant main effect of parent-reported social impairment predicting anxiety symptoms. In the fourth and final step, the interaction between inattention symptoms and parent-reported social impairment did not significantly predict anxiety symptoms, suggesting that parent-reported social impairment did not moderate the relation between inattention symptoms and anxiety symptoms.

The second regression model for the inattention symptoms analyses examined whether teacher-reported social impairment (i.e., SSIS-Teacher) moderated the relation between inattention symptoms and anxiety symptoms (see Table 3.11). The results were similar to the previous regression model examining inattention symptoms and parent-reported social impairment. In the first step, age and race significantly predicted anxiety

symptoms, such that younger children and non-Caucasian children had higher levels of anxiety symptoms. In the second step, inattention symptoms significantly predicted anxiety symptoms, such that higher levels of inattention symptoms were associated with higher levels of anxiety symptoms. In Step 3, the main effect of teacher-rated social impairment was not significant. In Step 4, the interaction between inattention symptoms and teacher-rated social impairment was not significant, suggesting that teacher-rated social impairment did not moderate the relation between inattention symptoms and anxiety symptoms.

The third regression model for the inattention symptoms analyses examined whether peer ratings of likeability moderated the relation between inattentions symptoms and anxiety symptoms (see Table 3.12). These results were similar to the parent-rated and teacher-rated social impairment models with anxiety symptoms as the outcome. Age and race were significant predictors of anxiety symptoms in Step 1 and inattention symptoms were a significant predictor of anxiety symptoms in Step 2. The main effect of peer rating in Step 3 and the interaction between inattention symptoms and peer rating in Step 4 did not significantly predict anxiety symptoms. This suggested that peer rating of likeability did not moderate the relation between inattention symptoms and anxiety symptoms.

Inattention symptoms: depression symptoms as the dependent variable.

The first model for inattention symptoms with depression symptoms as the outcome examined whether parent-rated social impairment moderated the relation between inattention symptoms and depression symptoms (see Table 3.13). In Step 1, household income was the only covariate to significantly predict depression symptoms, such that children from lower income households had more depression symptoms. In

Step 2, inattention symptoms significantly predicted depression symptoms, such that higher levels of inattention symptoms were associated with higher levels of depression symptoms. In Step 3, the main effect of parent-rated social impairment was not significant. In the fourth and final step, the interaction of inattention symptoms and parent-rated social impairment was not significant, which suggested that parent-reported social impairment did not moderate the relation between inattention symptoms and depression symptoms.

The second model for inattention symptoms with depression symptoms as the outcome examined whether teacher-reported social impairment moderated the relation between inattention symptoms and depression symptoms (see Table 3.14). Similar to the previous model examining parent-reported social impairment, income significantly predicted depression symptoms in Step 1 and inattention symptoms significantly predicted depression symptoms in Step 2. In Step 3, the main effect of teacher-reported social impairment was not significant. However, in Step 4, the interaction of inattention symptoms and teacher-reported social impairment was significant, suggesting that teacher-reported social impairment moderated the relation between inattention symptoms and depression symptoms. Simple slopes analyses were examined for this significant interaction (see Figure 3.2). The simple slopes analyses revealed that level of inattention symptoms was significantly related to depression symptoms at average and high levels of social skills (B = .36, p = .01 and B = .59, p = .001, respectively), but was unrelated to depression symptoms at lower levels of social skills (B = .13, *ns*). The analyses revealed that children with lower inattention symptoms and a high level of social skills had the least depression symptoms, whereas children with more inattention symptoms and a high

level of social skills had the most depression symptoms. For children with a low level of social skills, depression symptom levels did not change significantly based on inattention symptom level.

The third model for inattention symptoms with depression symptoms as the outcome examined whether peer ratings of likeability moderated the relation between inattention symptoms and depression symptoms (see Table 3.15). In Step 1, none of the covariates significantly predicted depression symptoms. In Step 2, the main effect of inattention symptoms was significant, such that higher levels of inattention symptoms predicted more depression symptoms. The main effect of peer rating was not significant in Step 3. In Step 4, the interaction of inattention symptoms and peer rating was not significant, suggesting that peer rating of likeability did not moderate the relation between inattention symptoms and depression symptoms.

Secondary analyses: hyperactive/impulsive symptoms.

The second set of secondary analyses examined the same research questions as the main analyses, except looking at hyperactive/impulsive symptoms specifically instead of total ADHD symptoms. Hyperactive/impulsive symptoms were significantly correlated with lower parent-reported social skills, lower teacher-reported social skills, lower peer ratings, as well as increased depression symptoms (see Table 3.16). Unlike inattention symptoms, hyperactive/impulsive symptoms were not significantly correlated with anxiety symptoms.

Hyperactive/impulsive symptoms: anxiety symptoms as the dependent variable.

The first model for hyperactive/impulsive symptoms with anxiety symptoms as the outcome examined whether parent-reported social impairment moderated the relation

between hyperactive/impulsive symptoms and anxiety symptoms (see Table 3.17). In Step 1, age, gender, and race all significantly predicted anxiety symptoms, such that younger children, females, and non-Caucasians had higher levels of anxiety symptoms. The main effect of hyperactive/impulsive symptoms was not significant in Step 2, suggesting that hyperactive/impulsive symptoms do not predict anxiety symptoms. In Step 3, the main effect of parent-reported social impairment was also not significant. In the fourth and final step, the interaction between hyperactive/impulsive symptoms and parent-reported social impairment was not significant, suggesting that parent-reported social impairment did not moderate the relation between hyperactive/impulsive symptoms and anxiety symptoms.

The second model for hyperactive/impulsive symptoms with anxiety symptoms as the outcome examined whether teacher-reported social impairment moderated the relation between hyperactive/impulsive symptoms and anxiety symptoms (see Table 3.18). All four covariates significantly predicted anxiety symptoms in Step 1, such that younger children, females, non-Caucasians, and children from lower income households had more anxiety symptoms. In Steps 2 and 3, the main effect of hyperactive/impulsive symptoms and the main effect of teacher-reported social impairment were not significant, respectively. In Step 4, the interaction between hyperactive/impulsive symptoms and teacher-reported social impairment was not significant, suggesting that teacher-reported social impairment does not moderate the relation between hyperactive/impulsive symptoms and anxiety symptoms.

The third model for hyperactive/impulsive symptoms with anxiety symptoms as the outcome examined whether peer rating of likeability moderated the relation between

hyperactive/impulsive symptoms and anxiety symptoms (see Table 3.19). In Step 1, age and race significantly predicted anxiety symptoms, such that younger children and non-Caucasians had more anxiety symptoms. The main effect of hyperactive/impulsive symptoms in Step 2 and the main effect of peer rating in Step 3 were not significant. However, in Step 4, the interaction between hyperactive/impulsive symptoms and peer rating was significant, suggesting that peer rating moderates the relation between hyperactive/impulsive symptoms and anxiety symptoms. Simple slopes analyses were examined for this significant interaction (see Figure 3.3). The simple slopes analyses revealed that level of hyperactive/impulsive symptoms was significantly related to anxiety symptoms only at high levels of peer likeability (B = 1.09, p = .03), but was unrelated to anxiety symptoms at lower levels and mean peer ratings (B = -.42 and B = .33, respectively, *ns*). The analyses revealed that children with lower hyperactive/impulsive symptoms and a high level of peer likeability had the least anxiety symptoms, whereas children with higher levels of hyperactive/impulsive symptoms and a high level of peer likeability had the most anxiety symptoms. For children with a low or average level of peer likeability, anxiety symptom levels did not change significantly based on hyperactive/impulsive symptom level.

Hyperactive/impulsive symptoms: depression symptoms as the dependent variable.

The first model for hyperactive/impulsive symptoms with depression symptoms as the outcome examined whether parent-reported social impairment moderated the relation between hyperactive/impulsive symptoms and depression symptoms (see Table 3.20). In Step 1, the only covariate that significantly predicted depression symptoms was

household income, such that children from lower income households had higher levels of depression symptoms. In Step 2, the main effect of hyperactive/impulsive symptoms was significant, such that increased hyperactive/impulsive symptoms predicted increased depression symptoms. The main effect of parent-reported social impairment in Step 3 and the interaction between hyperactive/impulsive symptoms and parent-reported social impairment in Step 4 did not significantly predict depression symptoms.

The second model for hyperactive/impulsive symptoms with depression symptoms as the outcome examined whether teacher-reported social impairment moderated the relation between hyperactive/impulsive symptoms and depression symptoms (see Table 3.21). Similar to the interaction seen for inattention symptoms and teacher-reported social impairment predicting depression, in Step 4 the interaction between hyperactive/impulsive symptoms and teacher-reported social impairment was significant. Simple slopes analyses were conducted for this significant interaction (Figure 3.4). The simple slopes analyses revealed that level of hyperactive/impulsive symptoms was significantly related to depression symptoms only at high levels of social skills (B = .59, p = .008), but was unrelated to depression symptoms at lower levels and mean peer ratings (B= -.09 and B = .25, respectively, *ns*). The analyses revealed that children with lower hyperactive/impulsive symptoms and a high level of social skills had the least depression symptoms, whereas children with higher levels of hyperactive/impulsive symptoms and a high level of social skills had the most depression symptoms. For children with a low or average level of social skills, depression symptom levels did not change significantly based on hyperactive/impulsive symptom level.

The third model for hyperactive/impulsive symptoms with depression symptoms as the outcome examined whether peer ratings of likeability moderated the relation between hyperactive/impulsive symptoms and depression symptoms (see Table 3.22). In Step 1, none of the covariates significantly predicted depression. In Step 2, the main effect of hyperactive/impulsive symptoms was significant, such that increased hyperactive/impulsive symptoms predicted increased depression symptoms. The main effect of peer rating in Step 3 and the interaction between hyperactive/impulsive symptoms and peer rating in Step 4 were not significant.

Summary of inattention symptoms and hyperactive/impulsive symptoms.

Inattention symptoms were significantly correlated with anxiety symptoms (r = .14, $p < .05$) and depression symptoms (r = .23, $p < .01$). Hyperactive/impulsive symptoms were significantly correlated with depression symptoms (r = .17, $p < .01$), but, unlike inattention symptoms, hyperactive/impulsive symptoms were not correlated with anxiety symptoms (r = .09, *ns*).

Inattention symptoms were moderately to strongly correlated with parent-reported social skills (r = -.40, $p < .01$) and teacher-reported social skills (r = -.52, $p < .01$). Hyperactive/impulsive symptoms were also significantly correlated with parent-reported social skills (r = -.41, $p < .01$) and teacher-reported social skills (r = -.55, $p < .01$), with moderate to large effect sizes similar to those of the inattention symptoms correlations. Inattention symptoms were correlated with peer ratings of likeability (r = -.16, $p < .05$) with a small effect size. Hyperactive/impulsive symptoms were also correlated with peer ratings of likeability (r = -.25, $p < .01$), with a slightly larger effect size than inattention symptoms.

In the regression models for anxiety symptoms, the main effect of inattention symptoms was significant, in that increased inattention symptoms predicted increased anxiety symptoms. However, the main effect was not significant for hyperactive/impulsive symptoms predicting anxiety symptoms. In the primary analyses, total ADHD symptoms (i.e., both inattention and hyperactive/impulsive symptoms combined) significantly predicted anxiety (for the parent- and teacher-reported groups); these exploratory analyses suggest that inattention symptoms may be the driving force that accounts for this relation between ADHD symptoms and anxiety symptoms, since hyperactive/impulsive symptoms did not significantly predict anxiety. However, there was one significant interaction between hyperactive/impulsive symptoms and peer rating predicting anxiety symptoms. The level of hyperactive/impulsive symptoms was significantly related to anxiety symptoms only at high levels of peer likeability, but was unrelated to anxiety symptoms at lower levels and average peer ratings. Children with lower hyperactive/impulsive symptoms and a high level of social skills/most liked by peers had the least anxiety symptoms, whereas children with higher levels of hyperactive/impulsive symptoms and a high level of social skills/most liked by peers had the most anxiety symptoms.

In the regression models for depression symptoms, both increased inattention symptoms and increased hyperactive/impulsive symptoms separately predicted increased depression symptoms. Additionally, there was a significant interaction between inattention symptoms and teacher-reported social impairment, as well as between hyperactive/impulsive symptoms and teacher-reported social impairment, predicting depression symptoms. For these interactions, while the level of inattention symptoms was

significantly related to depression symptoms at both average and high levels of social skills, the level of hyperactive/impulsive symptoms was significantly related to depression symptoms only at high levels of social skills, but not at average levels of social skills. Both inattention symptoms and hyperactive/impulsive symptoms were unrelated to depression symptoms at low levels of social skills. Children with lower inattention or hyperactive/impulsive symptoms and a high level of social skills had the least depression symptoms, whereas children with more inattention or hyperactive/impulsive symptoms and a high level of social skills had the most depression symptoms.

Secondary analyses: ADHD diagnosis.

The third set of secondary analyses examined the same research questions as the main analyses, except looking at categorical ADHD diagnosis (i.e., ADHD diagnosis or no ADHD diagnosis) instead of continuous ADHD symptoms. ADHD diagnosis was significantly correlated with lower parent-reported social skills, teacher-reported social skills, and peer ratings of likeability, as well as increased depression symptoms (Table 3.23). Unlike continuous ADHD symptoms, ADHD diagnosis was not significantly correlated with anxiety symptoms. ADHD diagnosis was also significantly correlated with being male and lower household income.

ADHD diagnosis: anxiety symptoms as the dependent variable.

The first model for ADHD diagnosis with anxiety symptoms as the outcome examined whether parent-reported social impairment moderated the relation between ADHD diagnosis and anxiety symptoms (see Table 3.24). In Step 1, age and race significantly predicted anxiety symptoms, such that younger children and non-Caucasians

had higher levels of anxiety symptoms. The main effect of ADHD diagnosis was not significant in Step 2, suggesting that ADHD diagnosis does not predict anxiety symptoms. In Step 3, the main effect of parent-reported social impairment was also not significant. In the fourth and final step, the interaction between ADHD diagnosis and parent-reported social impairment was not significant, suggesting that parent-reported social impairment did not moderate the relation between ADHD diagnosis and anxiety symptoms.

The second model for ADHD diagnosis with anxiety symptoms as the outcome examined whether parent-reported social impairment moderated the relation between ADHD diagnosis and anxiety symptoms (see Table 3.25). In Step 1, age and race significantly predicted anxiety symptoms, such that younger children and non-Caucasians had higher levels of anxiety symptoms. The main effect of ADHD diagnosis was not significant in Step 2, suggesting that ADHD diagnosis does not predict anxiety symptoms. In Step 3, the main effect of teacher-reported social impairment was also not significant. In the fourth and final step, the interaction between ADHD diagnosis and teacher-reported social impairment was not significant, suggesting that teacher-reported social impairment did not moderate the relation between ADHD diagnosis and anxiety symptoms.

The third model for ADHD diagnosis with anxiety symptoms as the outcome examined whether peer rating of likeability moderated the relation between ADHD diagnosis and anxiety symptoms (see Table 3.26). In Step 1, age and race significantly predicted anxiety symptoms, such that younger children and non-Caucasians had higher levels of anxiety symptoms. The main effect of ADHD diagnosis was not significant in

Step 2, suggesting that ADHD diagnosis does not predict anxiety symptoms. In Step 3, the main effect of peer rating was also not significant. However, in the fourth and final step, the interaction between ADHD diagnosis and peer rating was significant, suggesting that peer rating does moderate the relation between ADHD diagnosis and anxiety symptoms. The simple slopes analyses revealed that ADHD diagnosis was significantly related to anxiety symptoms only at high levels of peer ratings (B = 7.01, p = .02), but was unrelated to anxiety symptoms at lower levels and mean peer ratings (B= -4.33 and B = 1.34, respectively, *ns*; see Figure 3.5). The analyses revealed that children with no ADHD diagnosis and a high level of peer ratings/who were most well liked had the least anxiety symptoms, whereas children with an ADHD diagnosis and a high level of peer ratings/most well liked had the most anxiety symptoms. For children with a low or average level of peer ratings, anxiety symptom levels did not change significantly based on ADHD diagnosis status.

ADHD diagnosis: depression symptoms as the dependent variable.

The first model for ADHD diagnosis with depression symptoms as the outcome examined whether parent-reported social impairment moderated the relation between ADHD diagnosis and depression symptoms (see Table 3.27). In Step 1, only household income significantly predicted depression symptoms, such that children from lower income households had higher levels of depression symptoms. The main effect of ADHD diagnosis was not significant in Step 2, suggesting that ADHD diagnosis does not predict depression symptoms. In Step 3, the main effect of parent-reported social impairment was significant, such that lower parent-reported social skills predicted increased depression symptoms. In the fourth and final step, the interaction between ADHD diagnosis and

parent-reported social impairment was not significant, suggesting that parent-reported social impairment did not moderate the relation between ADHD diagnosis and depression symptoms.

The second model for ADHD diagnosis with depression symptoms as the outcome examined whether teacher-reported social impairment moderated the relation between ADHD diagnosis and depression symptoms (see Table 3.28). In Step 1, only household income significantly predicted depression symptoms, such that children from lower income households had higher levels of depression symptoms. The main effect of ADHD diagnosis was significant in Step 2, such that having an ADHD diagnosis predicted higher levels of depression symptoms. In Step 3, the main effect of teacher-reported social impairment was not significant. In the fourth and final step, the interaction between ADHD diagnosis and parent-reported social impairment was not significant, suggesting that teacher-reported social impairment did not moderate the relation between ADHD diagnosis and depression symptoms.

The third model for ADHD diagnosis with depression symptoms as the outcome examined whether peer rating of likeability moderates the relation between ADHD diagnosis and depression symptoms (see Table 3.29). In Step 1, none of the covariates significantly predicted depression symptoms. The main effect of ADHD diagnosis in Step 2 and the main effect of ADHD diagnosis in Step 3 were not significant. In the fourth and final step, the interaction between ADHD diagnosis and parent-reported social impairment was not significant, suggesting that peer rating of likeability did not moderate the relation between ADHD diagnosis and depression symptoms.

ADHD diagnosis: summary of results.

Generally, ADHD diagnosis did not significantly predict anxiety symptoms. However, children with no ADHD diagnosis and who were most well liked had the least anxiety symptoms, and children with an ADHD diagnosis and who were most well liked had the most anxiety symptoms. Although ADHD diagnosis significantly predicted depression in the model examining teacher-reported social impairment, it did not predict depression for the parent-reported social impairment and peer rating models, suggesting that ADHD diagnosis did not significantly predict depression symptoms.

Secondary Analyses: Gender.

The fourth set of secondary analyses examined the same research questions as the main analyses, except looking at the effects of gender specifically. Being male was correlated with lower parent-reported social skills, teacher-reported social skills, and peer ratings of likeability, as well as increased ADHD symptoms (see Table 3.2). Gender was not significantly correlated with anxiety symptoms or depression symptoms.

For the gender analyses, the four covariates were added in the Step 1 and three main effects of gender, ADHD symptoms, and either parent-report social impairment, teacher-reported social impairment, or peer rating, were added in Step 2. three 2-way interaction terms, which were added in the Step 3 of each model, were created between gender and ADHD symptoms, between gender and either parent-report social impairment, teacher-reported social impairment, or peer rating, and between ADHD symptoms and either parent-report social impairment, teacher-reported social impairment, or peer rating. A 3-way interaction term, which was added in the Step 4 of each model,

was created between gender, ADHD symptoms, and either parent-report social impairment, teacher-reported social impairment, or peer rating.

Gender: anxiety symptoms as the dependent variable.

The first model for gender with anxiety symptoms as the outcome examined the 2-way and 3-way interactions between gender, ADHD symptoms, and parent-reported social impairment predicting anxiety symptoms (see Table 3.30). In Step 1, age and race significantly predicted anxiety symptoms, such that younger children and non-Caucasians had higher levels of anxiety symptoms. Step 2 included the main effects of gender, ADHD symptoms, and parent-reported social impairment. The main effect of gender was significant, such that being female predicted higher levels of anxiety symptoms. The main effect of ADHD symptoms was also significant, such that increased ADHD symptoms predicted increased anxiety symptoms. The main effect of parent-reported social impairment was not significant. In Step 3, 2-way interactions between gender and ADHD symptoms, gender and parent-reported social impairment, and ADHD symptoms and parent-reported social impairment were not significant. In the fourth and final step, the 3-way interaction between gender, ADHD symptoms, and parent-reported social impairment was not significant.

The second model for gender with anxiety symptoms as the outcome examined the 2-way and 3-way interactions between gender, ADHD symptoms, and teacher-reported social impairment predicting anxiety symptoms (see Table 3.31). In Step 1, age and race significantly predicted anxiety symptoms, such that younger children and non-Caucasians had higher levels of anxiety symptoms. Step 2 included the main effects of gender, ADHD symptoms, and teacher-reported social impairment. The main effect of

gender was significant, such that being female predicted higher levels of anxiety symptoms. The main effect of ADHD symptoms and teacher-reported social impairment were not significant. In Step 3, 2-way interactions between gender and ADHD symptoms, gender and teacher-reported social impairment, and ADHD symptoms and teacher-reported social impairment were not significant. In the fourth and final step, the 3-way interaction between gender, ADHD symptoms, and teacher-reported social impairment was not significant.

The third model for gender with anxiety symptoms as the outcome examined the 2-way and 3-way interactions between gender, ADHD symptoms, and peer rating of likeability predicting anxiety symptoms (see Table 3.32). In Step 1, age and race significantly predicted anxiety symptoms, such that younger children and non-Caucasians had higher levels of anxiety symptoms. Step 2 included the main effects of gender, ADHD symptoms, and peer rating. The main effect of ADHD symptoms was significant, such that increased ADHD symptoms predicted increased anxiety symptoms. The main effect of gender and peer rating were not significant. In Step 3, 2-way interactions between gender and ADHD symptoms, gender and peer rating, and ADHD symptoms and peer rating were not significant. In the fourth and final step, the 3-way interaction between gender, ADHD symptoms, and peer rating was not significant.

Gender: depression symptoms as the dependent variable.

The first model for gender with depression symptoms as the outcome examined the 2-way and 3-way interactions between gender, ADHD symptoms, and parent-reported social impairment predicting depression symptoms (see Table 3.33). In Step 1, household income significantly predicted depression symptoms, such that children from lower

income households had higher levels of depression symptoms. Step 2 included the main effects of gender, ADHD symptoms, and parent-reported social impairment. The main effect of ADHD symptoms was significant, such that increased ADHD symptoms predicted higher levels of depression symptoms. The main effects of gender and parent-reported social impairment were not significant. In Step 3, 2-way interactions between gender and ADHD symptoms, gender and parent-reported social impairment, and ADHD symptoms and parent-reported social impairment were not significant. In the fourth and final step, the 3-way interaction between gender, ADHD symptoms, and parent-reported social impairment was not significant.

The second model for gender with depression symptoms as the outcome examined the 2-way and 3-way interactions between gender, ADHD symptoms, and teacher-reported social impairment predicting depression symptoms (see Table 3.34). In Step 1, household income significantly predicted depression symptoms, such that children from lower income households had higher levels of depression symptoms. Step 2 included the main effects of gender, ADHD symptoms, and teacher-reported social impairment. The main effect of ADHD symptoms was significant, such that increased ADHD symptoms predicted higher levels of depression symptoms. The main effects of gender and teacher-reported social impairment were not significant. In Step 3, 2-way interactions between gender and ADHD symptoms, gender and teacher-reported social impairment, and ADHD symptoms and teacher-reported social impairment were not significant. In the fourth and final step, the 3-way interaction between gender, ADHD symptoms, and teacher-reported social impairment was not significant.

The third model for gender with depression symptoms as the outcome examined the 2-way and 3-way interactions between gender, ADHD symptoms, and peer rating of likeability predicting depression symptoms (see Table 3.35). In Step 1, none of the covariates significantly predicted depression symptoms. Step 2 included the main effects of gender, ADHD symptoms, and peer rating. The main effect of ADHD symptoms was significant, such that increased ADHD symptoms predicted increased depression symptoms. The main effect of gender and peer rating were not significant. In Step 3, 2-way interactions between gender and ADHD symptoms, gender and peer rating, and ADHD symptoms and peer rating were not significant. In the fourth and final step, the 3-way interaction between gender, ADHD symptoms, and peer rating was not significant.

Gender: summary of results.

Generally, being female significantly predicted increased anxiety symptoms (except for the peer rating model, which had a smaller sample size). Gender did not significantly predict depression symptoms for any of the models.

Table 3.1 *Data Used in Analyses for Each Measure (N= 321)*

	n	*%*
DBD Total (Parent and Teacher combined)	303	94.4
Parent DBD	321	100
Teacher DBD	296	92.2
SSIS Parent Report	320	99.7
SSIS Teacher Report	293	91.3
Peer Rating	233	72.6
SCARED	321	100
CDI-2	321	100

Table 3.2 *Correlations among Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age	1.00									
2. Gender	-.002	1.00								
3. Race	.03	-.03	1.00							
4. Income	.03	.01	-.51**	1.00						
5. ADHD Symptoms	.06	-.20**	.08	-.19**	1.00					
6. SSIS-Parent	-.06	.12*	-.05	.16**	-.45**	1.00				
7. SSIS-Teacher	-.05	.20**	-.24**	.25**	-.58**	.29**	1.00			
8. Peer Rating	.15*	.35**	-.06	-.01	-.21**	.04	.21**	1.00		
9. Anxiety Symptoms	-.13*	.09	.19**	-.17**	.13*	-.09	-.15*	.01	1.00	
10.Depression Symptoms	-.093	-.013	.071	-.18**	.22**	-.18**	-.16**	-.05	.49**	1.00
Mean	8.88	.36	.54	4.36	8.79	1.96	1.73	3.34	27.03	8.94
Standard Deviation	.81	.48	.50	2.09	6.21	.43	.50	.45	14.77	6.41
Skewness	.22	.58	-.14	.06	.001	-.05	.07	-.1.14	.51	1.24
Kurtosis	-1.43	-1.67	-1.99	-.88	-1.42	.01	-.81	2.04	.01	1.91

Note. $N = 321$. *$p < 0.05$; **$p < 0.01$. The covariates are age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income (average per year, in dollars).

Table 3.3 *Hierarchical Multiple Regression for ADHD Symptoms and SSIS-Parent with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-2.54	1.03	-.14	-2.46	.01*				
Gender	3.49	1.72	.11	2.03	.04*				
Race	4.15	1.92	.14	2.16	.03*				
Income	-.87	.46	-.12	-1.90	.06				
Total Step 1						.08***	.08***	6.62	297
2.	--	--	--	--	--				
Age	-2.70	9.39	-.15	-2.63	.009**				
Gender	4.28	1.03	.14	2.46	.01*				
Race	4.24	1.74	.14	2.23	.03*				
Income	-.68	1.90	-.10	-1.48	.14				
ADHD Symptoms	.33	.14	.14	2.40	.02*				
Total Step 2						.10*	.02*	5.74	296
3.	--	--	--	--	--				
Age	-2.72	1.03	-.15	-2.64	.009**				
Gender	4.31	1.74	.14	2.48	.01*				
Race	4.27	1.91	.14	2.24	.03*				
Income	-.67	.47	-.09	-1.43	.15				
ADHD Symptoms	.30	.15	.13	2.01	.045*				
SSIS-Parent	-.83	2.12	-.02	-.39	.70				
Total Step 3						.10	.000	.15	295
4.	--	--	--	--	--				
Age	-2.63	1.03	-.14	-2.55	.01*				
Gender	4.42	1.74	.14	2.54	.01*				
Race	4.51	1.92	.15	2.35	.02*				
Income	-.62	.47	-.09	-1.32	.19				
ADHD Symptoms	.32	.15	.13	2.08	.04*				
SSIS-Parent	-.71	2.13	-.02	-.33	.74				
ADHD x SSIS-Parent	-.38	.33	-.06	-1.15	.25				
Total Step 4						.10	.004	1.33	294

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.4 *Hierarchical Multiple Regression for ADHD Symptoms and SSIS-Teacher with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. Covariates	--	--	--	--	--				
Age	-2.69	1.08	-.15	-2.49	.01*				
Gender	3.68	1.79	.12	2.05	.04*				
Race	4.17	1.96	.14	2.13	.03*				
Income	-.98	.48	-.14	-2.06	.04*				
Total Step 1						.09***	.09***	6.78	271
2.	--	--	--	--	--				
Age	-2.90	1.07	-.16	-2.70	.007**				
Gender	4.57	1.82	.15	2.52	.01*				
Race	4.27	1.95	.14	2.19	.03*				
Income	-.76	.48	-.11	-1.59	.11				
ADHD Symptoms	.346	.14	.15	2.43	.02*				
Total Step 2						.11*	.02*	5.88	270
3.	--	--	--	--	--				
Age	-2.95	1.07	-.16	-2.75	.006**				
Gender	4.85	1.82	.16	2.66	.008**				
Race	3.75	1.98	.13	1.90	.06				
Income	-.72	.48	-.10	-1.49	.46				
ADHD Symptoms	.21	.17	.09	1.26	.21				
SSIS-Teacher	-3.07	2.16	-.10	-1.42	.16				
Total Step 3						.12	.01	2.03	269
4.	--	--	--	--	--				
Age	-2.98	1.07	-.16	-2.77	.006**				
Gender	4.78	1.83	.16	2.62	.09**				
Race	3.74	1.98	.13	1.89	.06				
Income	-.71	.48	-.10	-.147	.14				
ADHD Symptoms	.21	.17	.09	1.23	.22				
SSIS-Teacher	-3.00	2.16	-.10	-1.39	.17				
ADHD x SSIS-Teacher	.25	.30	.05	.85	.40				
Total Step 4						.12	.002	.71	268

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.5 *Hierarchical Multiple Regression for ADHD Symptoms and Peer Rating with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. Covariates	-	-	-	-	-				
Age	-2.78	1.24	-.15	-2.24	.03*				
Gender	2.88	2.20	.09	1.31	.19				
Race	6.60	2.37	.21	2.78	.006**				
Income	-.41	.59	-.05	-.70	.49				
Total Step 1						.09**	.09***	5.32	215
2.	--	--	--	--	--				
Age	-2.95	1.24	-.16	-2.39	.02*				
Gender	3.28	2.20	.10	1.49	.14				
Race	6.54	2.36	.21	2.77	.006**				
Income	-.19	.60	-.03	-.32	.75				
ADHD Symptoms	.33	.17	.13	1.97	.05				
Total Step 2						.11	.02	3.88	214
3.	--	--	--	--	--				
Age	-3.05	1.25	-.16	-2.44	.02*				
Gender	2.86	2.34	.09	1.23	.22				
Race	6.66	2.37	.22	2.81	.005**				
Income	-.16	.60	-.02	-.27	.79				
ADHD Symptoms	.35	.17	.14	2.04	.04*				
Peer Rating	1.28	2.40	.04	.54	.59				
Total Step 3						.11	.001	.29	213
4.	--	--	--	--	--				
Age	-3.02	1.25	-.16	-2.42	.02*				
Gender	3.23	2.34	.10	1.38	.17				
Race	6.74	2.37	.22	2.85	.01**				
Income	-.08	.60	-.01	-.14	.89				
ADHD Symptoms	.35	.17	.14	2.05	.04*				
Peer Rating	-.08	2.58	.002	-.03	.98				
ADHD x Peer Rating	.58	.41	.10	1.41	.16				
Total Step 4						.12	.01	1.98	212

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.

* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.6 *Hierarchical Multiple Regression for ADHD Symptoms and SSIS-Parent with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. Covariates	--	--	--	--	--				
Age	-.62	.46	-.08	-1.35	.18				
Gender	.07	.76	.01	.10	.92				
Race	-.32	.85	-.03	-.37	.71				
Income	-.65	.21	-.21	-3.19	.002**				
Total Step 1						.05**	.05**	3.62	297
2.	--	--	--	--	--				
Age	-.72	.45	-.09	-1.60	.11				
Gender	.58	.76	.04	.75	.45				
Race	-.26	.84	-.02	-.31	.76				
Income	-.53	.20	-.17	-2.61	.01*				
ADHD Symptoms	.21	.06	.20	3.46					
Total Step 2					.001**	.08**	.04	12.00	296
3.	--	--	--	--	--				
Age	-.75	.45	.09	-1.66	.10				
Gender	.63	.76	.05	.82	.43				
Race	-.22	.84	-.02	-.27	.79				
Income	-.51	.20	-.16	-2.47	.01*				
ADHD Symptoms	.17	.07	.16	2.59	.01*				
SSIS-Parent	-1.27	.93	-.09	-1.36	.18				
Total Step 3						.09	.01	1.85	295
4.	--	--	--	--	--				
Age	-.79	.45	-.10	-1.74	.08				
Gender	.57	.76	.04	.75	.45				
Race	-.33	.84	-.03	-.39	.70				
Income	-.53	.21	-.17	-2.57	.01*				
ADHD Symptoms	.17	.07	.16	2.52	.01*				
SSIS-Parent	-1.32	.93	-.09	-1.42	.16				
ADHD x SSIS-Parent	.17	.14	.07	1.15	.25				
Total Step 4						.09	.004	1.33	294

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.7 *Hierarchical Multiple Regression for ADHD Symptoms and SSIS-Teacher with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. Covariates	--	--	--	--	--				
Age	-.59	.49	-.07	-1.22	.22				
Gender	.44	.81	.03	.55	.58				
Race	-.09	.88	-.01	-.10	.92				
Income	-.67	.21	-.21	-3.12	.002**				
Total Step 1						.05**	.05**	3.56	271
2.	--	--	--	--	--				
Age	-.72	.48	-.09	-1.51	.13				
Gender	1.00	.81	.07	1.24	.22				
Race	-.03	.87	-.002	-.04	.97				
Income	-.53	.21	-.17	-2.49	.01*				
ADHD Symptoms	.22	.06	.21	3.41	.001**				
Total Step 2						.09**	.04**	11.62	270
3.	--	--	--	--	--				
Age	-.73	.48	-.09	-1.53	.13				
Gender	1.06	.81	.08	1.31	.19				
Race	-.15	.88	-.01	-.17	.86				
Income	-.52	.21	-.17	-2.43	.02*				
ADHD Symptoms	.19	.08	.18	2.45	.02*				
SSIS-Teacher	-.71	.96	-.06	-.74	.46				
Total Step 3						.09	.002	.55	269
4.	--	--	--	--	--				
Age	-.79	.48	-.09	-1.62	.11				
Gender	.98	.81	.07	1.22	.22				
Race	-.17	.87	-.01	-.19	.85				
Income	-.51	.21	-.16	-2.39	.02*				
ADHD Symptoms	.18	.08	.17	2.39	.02*				
SSIS-Teacher	-.62	.96	-.05	-.65	.52				
ADHD x SSIS-Teacher	.31	.13	.13	2.32	.02*				
Total Step 4						.09*	.02*	5.37	268

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.8 *Hierarchical Multiple Regression for ADHD Symptoms and Peer Rating with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. Covariates	--	--	--	--	--				
Age	-.82	.54	-.10	-1.53	.13				
Gender	.52	.95	.04	.54	.59				
Race	.01	1.03	.001	.01	.99				
Income	-.36	.25	-.11	-1.40	.16				
Total Step 1						.03	.03	1.44	215
2.	--	--	--	--	--				
Age	-.95	.52	-.12	-1.81	.07				
Gender	.81	.93	.06	.87	.39				
Race	-.03	1.00	-.003	-.03	.97				
Income	-.20	.25	-.06	-.78	.44				
ADHD Symptoms	.24	.07	.23	3.38					
Total Step 2					.001**	.08**	.05	11.44	214
3.	--	--	--	--	--				
Age	-.94	.53	-.12	-1.77	.08				
Gender	.86	.99	.06	.86	.39				
Race	-.05	1.01	-.004	-.05	.96				
Income	-.20	.25	-.06	-.79	.43				
ADHD Symptoms	.24	.07	.23	3.27	.001**				
Peer Rating	-.15	1.02	-.01	-.15	.88				
Total Step 3						.08	.00	.02	213
4.	--	--	--	--	--				
Age	-.92	.53	-.12	-1.74	.08				
Gender	1.03	1.00	.07	1.03	.30				
Race	-.01	1.01	-.001	-.01	.99				
Income	-.17	.26	-.05	-.65	.52				
ADHD Symptoms	.24	.07	.23	3.29	.001**				
Peer Rating	-.78	1.10	-.06	-.72	.48				
ADHD x Peer Rating	.27	.18	.11	1.54	.12				
Total Step 4						.09	.01	2.38	212

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.

* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.9 *Correlations among Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age	1.00									
2. Gender	-.002	1.00								
3. Race	.03	-.03	1.00							
4. Income	.03	.01	-.51**	1.00						
5. Inattention Sx	.05	-.15**	.06	-.14*	1.00					
6. SSIS-Parent	-.06	.12*	-.05	.16**	-.40**	1.00				
7. SSIS-Teacher	-.05	.20**	-.24**	.25**	-.52**	.29**	1.00			
8. Peer Rating	.15*	.35**	-.06	-.01	-.16*	.04	.21**	1.00		
9. Anxiety Sx	-.13*	.09	.19**	-.17**	.14*	-.09	-.15*	.01	1.00	
10.Depression Sx	-.09	-.01	.07	-.18**	.23**	-.18**	-.16**	-.05	.49**	1.00
Mean	8.88	.36	.54	4.36	4.73	1.96	1.73	3.34	27.03	8.94
Standard Deviation	.81	.48	.50	2.09	3.44	.43	.50	.45	14.77	6.41
Skewness	.22	.58	-.14	.06	-.17	-.05	.07	-.1.14	.51	1.24
Kurtosis	-.1.43	-1.67	-1.99	-.88	-1.54	.01	-.81	2.04	.01	1.91

Note. $N = 321$. *$p < 0.05$; **$p < 0.01$. Sx = Symptoms. The covariates are age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income (average per year, in dollars).

Table 3.10 *Hierarchical Multiple Regression for Inattention Symptoms and SSIS-Parent with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-2.44	1.00	-.13	-2.44	.02*				
Gender	3.01	1.67	.10	1.80	.07				
Race	4.50	1.87	.15	2.40	.02*				
Income	-.67	.45	-.10	-1.51	.13				
Total Step 1						.07**	.07**	6.14**	314
2.	--	--	--	--	--	--	--	--	--
Inattention Symptoms	.637	.24	.15	2.69	.007**				
Total Step 2						.09	.02	7.26	313
3.	--	--	--	--	--	--	--	--	--
SSIS-Parent	-1.24	2.06	-.04	-.60	.55				
Total Step 3						.10	.001	.36	312
4.	--	--	--	--	--	--	--	--	--
Inattention x SSIS-Parent	-.08	.58	-.01	-.14	.89				
Total Step 4						.10	.00	.02	311

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.11 *Hierarchical Multiple Regression for Inattention Symptoms and SSIS-Teacher with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. Covariates	--	--	--	--	--				
Age	-2.67	1.05	-.14	-2.54	.01*				
Gender	3.00	1.75	.10	1.72	.09				
Race	4.51	1.92	.15	2.36	.02*				
Income	-.72	.46	-.10	-1.55	.12				
Total Step 1						.08**	.08**	6.07**	287
2.	--	--	--	--	--	--	--	--	--
Inattention Symptoms	.68	.25	.16	2.72	.007**				
Total Step 2						.10**	.02**	7.41**	286
3.	--	--	--	--	--	--	--	--	--
SSIS-Teacher	-1.89	2.01	-.06	-.94	.351				
Total Step 3						.10	.003	.87	285
4.	--	--	--	--	--	--	--	--	--
Inattention x SSIS-Teacher	.34	.53	.04	.64	.52				
Total Step 4						.11	.001	.41	284

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.12 *Hierarchical Multiple Regression for Inattention Symptoms and Peer Rating with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-2.43	1.21	-.13	-2.01	.046*				
Gender	2.38	2.14	.07	1.11	.27				
Race	7.03	2.30	.23	3.06	.002**				
Income	-.11	.57	-.02	-.20	.84				
Total Step 1						.08**	.08**	4.80**	227
2.	--	--	--	--	--	--	--	--	--
Inattention Symptoms	.81	.29	.18	2.78	.006**				
Total Step 2						.11**	.03**	7.75**	226
3.	--	--	--	--	--	--	--	--	--
Peer Rating	1.84	2.32	.06	.80	.43				
Total Step 3						.11	.003	.63	225
4.	--	--	--	--	--	--	--	--	--
Inattention x Peer	.09	.71	.01	.12	.90				
Rating						.11	.000	.02	224
Total Step 4									

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.13 *Hierarchical Multiple Regression for Inattention Symptoms and SSIS-Parent with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-.68	.44	-.09	-1.52	.13				
Gender	-.12	.74	-.01	-.17	.87				
Race	-.30	.83	-.02	-.36	.72				
Income	-.57	.20	-.19	-2.87	.004**				
Total Step 1						.04*	.04*	3.15*	314
2.	--	--	--	--	--	--	--	--	--
Inattention	.40	.10	.21	3.86	<.001**				
Symptoms						.08**	.04**	14.91**	313
Total Step 2									
3.	--	--	--	--	--	--	--	--	--
SSIS-Parent	-1.40	.89	-.09	-1.57	.12				
Total Step 3						.09	.01	2.46	312
4.	--	--	--	--	--	--	--	--	--
Inattention x SSIS-Parent	.41	.25	.09	1.66	.10				
Total Step 4						.10	.01	2.77	311

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.14 *Hierarchical Multiple Regression for Inattention Symptoms and SSIS-Teacher with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-.61	.47	-.08	-1.29	.20				
Gender	.29	.78	.02	.37	.71				
Race	-.08	.85	-.01	-.09	.93				
Income	-.59	.21	-.19	-2.88	.004**				
Total Step 1						.04*	.04*	3.15*	287
2.	--	--	--	--	--	--	--	--	--
Inattention Symptoms	.41	.11	.22	3.80	.000***				
Total Step 2						.09***	.05***	14.41***	286
3.	--	--	--	--	--	--	--	--	--
SSIS-Teacher	-.46	.89	-.04	-.52	.61				
Total Step 3						.10	.001	.27	285
4.	--	--	--	--	--	--	--	--	--
Inattention x SSIS-Teacher	.46	.23	.11	1.99	.047*				
Total Step 4						.10*	.01*	3.97*	284

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.15 *Hierarchical Multiple Regression for Inattention Symptoms and Peer Rating with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-.72	.52	-.09	-1.38	.17				
Gender	.45	.92	.03	.49	.62				
Race	.11	.99	.01	.11	.91				
Income	-.27	.25	-.09	-1.11	.27				
Total Step 1						.02	.02	1.09	227
2.	--	--	--	--	--	--	--	--	--
Inattention	.45	.12	.24	3.63	.000***				
Symptoms Total Step 2						.07***	.05***	13.17***	226
3.	--	--	--	--	--	--	--	--	--
Peer Rating	-.14	.98	-.01	-.14	.89				
Total Step 3						.07	.000	.02	225
4.	--	--	--	--	--	--	--	--	--
Inattention x Peer	.48	.30	.11	1.62	.11				
Rating Total Step 4						.08	.01	2.63	224

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.16 *Correlations among Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age	1.00									
2. Gender	-.002	1.00								
3. Race	.03	-.03	1.00							
4. Income	.03	.01	-.51**	1.00						
5. Hyp./Imp. Sx	.05	-.21**	.09	-.19**	1.00					
6. SSIS-Parent	-.06	.12*	-.05	.16**	-.41**	1.00				
7. SSIS-Teacher	-.05	.20**	-.24**	.25**	-.55**	.29**	1.00			
8. Peer Rating	.15*	.35**	-.06	-.01	-.23**	.04	.21**	1.00		
9. Anxiety Sx	-.13*	.09	.19**	-.17**	.09	-.09	-.15*	.01	1.00	
10.Depression Sx	-.09	-.01	.07	-.18**	.17**	-.18**	-.16**	-.05	.49**	1.00
Mean	8.88	.36	.54	4.36	3.98	1.96	1.73	3.34	27.03	8.94
Standard Deviation	.81	.48	.50	2.09	3.23	.43	.50	.45	14.77	6.41
Skewness	.22	.58	-.14	.06	.28	-.05	.07	-.1.14	.51	1.24
Kurtosis	-1.43	-1.67	-1.99	-.88	-1.37	.01	-.81	2.04	.01	1.91

Note. $N = 321$. *$p < 0.05$; **$p < 0.01$. Sx = Symptoms. Hyp./Imp. Sx = hyperactive/impulsive symptoms. The covariates are age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income.

Table 3.17 *Hierarchical Multiple Regression for Hyperactive/Impulsive Symptoms and SSIS-Parent with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-2.57	1.03	-.14	-2.50	.01*				
Gender	3.45	1.71	.11	2.02	.045*				
Race	4.20	1.91	.14	2.20	.03*				
Income	-.87	.46	-.12	-1.89	.06				
Total Step 1						.08***	.08***	6.70***	298
2.	--	--	--	--	--	--	--	--	--
Hyp./Imp. Symptoms	.42	.27	.09	1.59	.11				
Total Step 2						.09	.01	2.52	297
3.	--	--	--	--	--	--	--	--	--
SSIS-Parent	-1.70	2.09	-.05	-.82	.42				
Total Step 3						.09	.002	.67	296
4.	--	--	--	--	--	--	--	--	--
Hyp/Imp x SSIS-Parent	-1.11	.64	-.10	-1.74	.08				
Total Step 4						.10	.01	3.03	295

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED. Hyp./Imp. Sx = hyperactive/impulsive symptoms.

* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.18 *Hierarchical Multiple Regression for Hyperactive/Impulsive Symptoms and SSIS-Teacher with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-2.73	1.08	-.15	-2.53	.01*				
Gender	3.64	1.79	.12	2.04	.04*				
Race	4.23	1.96	.14	2.16	.03*				
Income	-.97	.48	-.14	-2.05	.04*				
Total Step 1						.09***	.09***	6.87***	272
2.	--	--	--	--	--	--	--	--	--
Hyp./Imp. Symptoms	.47	.28	.10	1.71	.09				
Total Step 2						.10	.01	2.94	271
3.	--	--	--	--	--	--	--	--	--
SSIS-Teacher	-3.97	2.11	-.14	-1.88	.06				
Total Step 3						.11	.01	3.54	270
4.	--	--	--	--	--	--	--	--	--
Hyp./Imp. x SSIS-Teacher	.61	.59	.06	1.04	.30				
Total Step 4						.12	.004	1.09	269

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED. Hyp./Imp. Sx = hyperactive/impulsive symptoms.

* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.19 *Hierarchical Multiple Regression for Hyperactive/Impulsive Symptoms and Peer Rating with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-2.81	1.23	-.15	-2.28	.02*				
Gender	2.85	2.20	.08	1.30	.20				
Race	6.66	2.36	.22	2.82	.005**				
Income	-.40	.59	-.05	-.69	.49				
Total Step 1						.09***	.09***	5.42***	216
2.	--	--	--	--	--	--	--	--	--
Hyp./Imp. Symptoms	.25	.32	.05	.79	.43				
Total Step 2						.09	.003	.62	215
3.	--	--	--	--	--	--	--	--	--
Peer Rating	.70	2.42	.02	.29	.77				
Total Step 3						.09	.000	.08	214
4.	--	--	--	--	--	--	--	--	--
Hyp./Imp. x Peer Rating	1.65	.71	.16	2.31	.02*				
Total Step 4						.12*	.02*	5.34*	213

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED. Hyp./Imp. Sx = hyperactive/impulsive symptoms.

* $p < 0.05$ (two-tailed). ** $p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.20 *Hierarchical Multiple Regression for Hyperactive/Impulsive Symptoms and SSIS-Parent with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-.65	.46	-.08	-1.42	.16				
Gender	.04	.76	.003	.05	.96				
Race	-.27	.85	-.02	-.32	.75				
Income	-.65	.21	-.21	-3.17	.002**				
Total Step 1						.05**	.05**	3.67**	298
2.	--	--	--	--	--	--	--	--	--
Hyp./Imp. Symptoms	.30	.12	.15	2.56	.01*				
Total Step 2						.07*	.02*	6.58*	297
3.	--	--	--	--	--	--	--	--	--
SSIS-Parent	-1.69	.92	-.11	-1.84	.07				
Total Step 3						.08	.01	3.38	296
4.	--	--	--	--	--	--	--	--	--
Hyp./Imp. x SSIS-Parent	.19	.28	.04	.66	.51				
Total Step 4						.08	.001	.43	295

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2. Hyp./Imp. Sx = hyperactive/impulsive symptoms.

* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.21 *Hierarchical Multiple Regression for Hyperactive/Impulsive Symptoms and SSIS-Teacher with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-.63	.48	-.08	-1.30	.20				
Gender	.40	.81	.03	.50	.62				
Race	-.04	.88	-.003	-.04	.97				
Income	-.66	.21	-.21	-3.10	.002**				
Total Step 1						.05**	.05**	3.61**	272
2.	--	--	--	--	--	--	--	--	--
Hyp./Imp. Symptoms	.30	.12	.15	2.42	.02*				
Total Step 2						.07*	.02*	5.86*	271
3.	--	--	--	--	--	--	--	--	--
SSIS-Teacher	-	.95	-.10	-1.37	.17				
Total Step 3	1.30					.08	.01	1.88	270
4.	--	--	--	--	--	--	--	--	--
Hyp./Imp. x SSIS-Teacher	.67	.26	.15	2.60	.01*				
Total Step 4						.10*	.02*	6.74*	269

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2. Hyp./Imp. Sx = hyperactive/impulsive symptoms.

* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.22 *Hierarchical Multiple Regression for Hyperactive/Impulsive Symptoms and Peer Rating with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-.86	.53	-.11	-1.60	.11				
Gender	.48	.95	.03	.50	.62				
Race	.08	1.02	.006	.08	.94				
Income	-.35	.25	-.11	-1.37	.17				
Total Step 1						.03	.03	1.49	216
2.	--	--	--	--	--	--	--	--	--
Hyp./Imp. Symptoms	.33	.14	.17	2.43	.02*				
Total Step 2						.05*	.03*	5.91*	215
3.	--	--	--	--	--	--	--	--	--
Peer Rating	-.34	1.04	-.02	-.33	.74				
Total Step 3						.05	.000	.11	214
4.	--	--	--	--	--	--	--	--	--
Hyp./Imp. x Peer	.37	.31	.09	1.19	.23				
Rating						.06	.01	1.42	213
Total Step 4									

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2. Hyp./Imp. Sx = hyperactive/impulsive symptoms.

* $p < 0.05$ (two-tailed). ** $p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.23 *Correlations among Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age	1.00									
2. Gender	-.002	1.00								
3. Race	.03	-.03	1.00							
4. Income	.03	.01	-.51**	1.00						
5. ADHD Dx	.07	-.11*	.06	-.22*	1.00					
6. SSIS-Parent	-.06	.12*	-.05	.16**	-.38**	1.00				
7. SSIS-Teacher	-.05	.20**	-.24**	.25**	-.39**	.29**	1.00			
8. Peer Rating	.15*	.35**	-.06	-.01	-.15**	.04	.21**	1.00		
9. Anxiety Sx	-.13*	.09	.19**	-.17**	.05	-.09	-.15*	.01	1.00	
10.Depression Sx	-.09	-.01	.07	-.18**	.13*	-.18**	-.16**	-.05	.49**	1.00
Mean	8.88	.36	.54	4.36	.47	1.96	1.73	3.34	27.03	8.94
Standard Deviation	.81	.48	.50	2.09	.50	.43	.50	.45	14.77	6.41
Skewness	.22	.58	-.14	.06	.12	-.05	.07	-.1.14	.51	1.24
Kurtosis	-1.43	-1.67	-1.99	-.88	-2.00	.01	-.81	2.04	.01	1.91

Note. $N = 321$. *$p < 0.05$; **$p < 0.01$. Dx = Diagnosis. No ADHD diagnosis = 0 and ADHD diagnosis = 1. The covariates are age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income.

Table 3.24 *Hierarchical Multiple Regression for ADHD Diagnosis and SSIS-Parent with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-2.47	1.00	-.13	-2.48	.01*				
Gender	2.98	1.67	.10	1.79	.08				
Race	4.55	1.87	.15	2.44	.02*				
Income	-.67	.45	-.09	-1.50	.14				
Total Step 1						.07***	.07***	6.22***	315
2.	--	--	--	--	--	--	--	--	--
ADHD Diagnosis	1.39	1.67	.05	.84	.40				
Total Step 2						.08	.002	.70	314
3.	--	--	--	--	--	--	--	--	--
SSIS-Parent	-2.77	2.04	-.08	-1.36	.18				
Total Step 3						.08	.01	1.85	313
4.	--	--	--	--	--	--	--	--	--
ADHD Dx x SSIS-Parent	-1.10	4.09	-.02	-.27	.79				
Total Step 4						.08	.000	.07	312

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.25 *Hierarchical Multiple Regression for ADHD Diagnosis and SSIS-Teacher with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-2.70	1.05	-.15	-2.58	.01*				
Gender	2.97	1.74	.10	1.70	.09				
Race	4.56	1.91	.15	2.39	.02*				
Income	-.71	.46	-.10	-1.54	.12				
Total Step 1						.08***	.08***	6.17***	288
2.	--	--	--	--	--	--	--	--	--
ADHD Diagnosis	1.91	1.75	.07	1.09	.28				
Total Step 2						.08	.004	1.19	287
3.	--	--	--	--	--	--	--	--	--
SSIS-Teacher	-3.50	1.88	-.12	-1.86	.06				
Total Step 3						.09	.01	3.46	286
4.	--	--	--	--	--	--	--	--	--
ADHD Dx x SSIS-Teacher	-.55	3.68	-.01	-.15	.88				
Total Step 4						.09	.000	.02	285

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.26 *Hierarchical Multiple Regression for ADHD Diagnosis and Peer Rating with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-2.46	1.20	-.13	-2.04	.04*				
Gender	2.34	2.13	.07	1.10	.27				
Race	7.09	2.29	.23	3.10	.002**				
Income	-.11	.57	-.01	-.19	.85				
Total Step 1						.08**	.08**	4.90**	228
2.	--	--	--	--	--	--	--	--	--
ADHD Diagnosis	1.38	2.00	.05	.69	.49				
Total Step 2						.08	.002	.47	227
3.	--	--	--	--	--	--	--	--	--
Peer Rating	1.06	2.36	.03	.45	.65				
Total Step 3						.08	.001	.20	226
4.	--	--	--	--	--	--	--	--	--
ADHD Dx x Peer Rating	12.53	4.51	.30	2.78	.006**				
Total Step 4						.11**	.03**	7.72**	225

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.27 *Hierarchical Multiple Regression for ADHD Diagnosis and SSIS-Parent with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-.70	.44	-.09	-1.59	.11				
Gender	-.15	.74	-.01	-.21	.84				
Race	-.25	.82	-.02	-.31	.76				
Income	-.56	.20	-.18	-2.85	.005**				
Total Step 1						.04*	.04*	3.21*	315
2.	--	--	--	--	--	--	--	--	--
ADHD Diagnosis	1.36	.73	.11	1.86	.06				
Total Step 2						.05	.01	3.47	314
3.	--	--	--	--	--	--	--	--	--
SSIS-Parent	-2.13	.89	-.14	-2.38	.02*				
Total Step 3						.07*	.02*	5.68*	313
4.	--	--	--	--	--	--	--	--	--
ADHD Dx x SSIS-Parent	2.67	1.78	.12	1.50	.14				
Total Step 4						.07	.01	2.24	312

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.28 *Hierarchical Multiple Regression for ADHD Diagnosis and SSIS-Teacher with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-.64	.47	-.08	-1.36	.17				
Gender	.25	.78	.02	.32	.75				
Race	-.03	.85	-.002	-.03	.98				
Income	-.59	.21	-.19	-2.86	.005**				
Total Step 1						.04*	04*	3.20*	288
2.	--	--	--	--	--	--	--	--	--
ADHD Diagnosis	1.64	.78	.13	2.11	.04*				
Total Step 2						.06*	.02*	4.47*	287
3.	--	--	--	--	--	--	--	--	--
SSIS-Teacher	-1.34	.83	-.10	-1.61	.11				
Total Step 3						.07	.01	2.59	286
4.	--	--	--	--	--	--	--	--	--
ADHD Dx x SSIS-Teacher	2.72	1.62	.13	1.67	.10				
Total Step 4						.08	.01	2.80	285

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.29 *Hierarchical Multiple Regression for ADHD Diagnosis and Peer Rating with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. Covariates	--	--	--	--	--	--	--	--	--
Age	-.75	.52	-.10	-1.46	.15				
Gender	.41	.992	.03	.45	.65				
Race	.18	.98	.01	.18	.86				
Income	-.27	.25	-.08	-1.09	.28				
Total Step 1						.02	.02	1.14	228
2.	--	--	--	--	--	--	--	--	--
ADHD Diagnosis	1.32	.86	.10	1.54	.13				
Total Step 2						.03	.01	2.37	227
3.	--	--	--	--	--	--	--	--	--
Peer Rating	-.47	1.01	-.03	-.46	.64				
Total Step 3						.03	.001	.21	226
4.	--	--	--	--	--	--	--	--	--
ADHD Dx x Peer Rating	2.50	1.96	.14	1.28	.20				
Total Step 4						.04	.01	1.63	225

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.30 *Hierarchical Multiple Regression for Gender and SSIS-Parent with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-2.58	1.04	-.14	-2.48	.01*				
Race	4.10	1.93	.14	2.13	.03*				
Income	-.84	.46	-.12	-1.82	.07				
Total Step 1						.07***	.07***	7.37***	298
2.	--	--	--	--	--	--	--	--	--
Gender	4.31	1.74	.14	2.48	.01*				
ADHD Symptoms	.30	.15	.13	2.01	.045*				
SSIS-Parent	-.83	2.12	-.02	-.39	.70				
Total Step 2						.10*	.03*	3.35*	295
3.	--	--	--	--	--	--	--	--	--
Gender x ADHD Sx	.24	.32	.06	.75	.45				
Gender x SSIS-Parent	-5.35	4.56	-.09	-1.17	.24				
ADHD Sx x SSIS-Parent	-.54	.34	-.09	-1.58	.12				
Total Step 3						.11	.01	1.49	292
4.	--	--	--	--	--	--	--	--	--
Gender x ADHD x SSIS-Parent	.90	.70	.10	1.29	.20				
Total Step 4						.12	.01	1.67	291

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.31 *Hierarchical Multiple Regression for Gender and SSIS-Teacher with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-2.81	1.09	-.15	-2.59	.01*				
Race	4.17	1.98	.14	2.11	.04*				
Income	-.92	.48	-.13	-1.93	.06				
Total Step 1						.08***	.08***	7.55***	272
2.	--	--	--	--	--	--	--	--	--
Gender	4.85	1.82	.16	2.66	.008**				
ADHD Symptoms	.21	.17	.09	1.26	.21				
SSIS-Teacher	-3.07	2.16	-.10	-1.42	.16				
Total Step 2						.12**	.04**	4.08**	269
3.	--	--	--	--	--	--	--	--	--
Gender x ADHD Sx	.09	.36	.02	.26	.80				
Gender x SSIS-Teacher	-2.01	4.32	-.04	-.46	.64				
ADHD x SSIS-Teacher	.19	.31	.04	.62	.54				
Total Step 3						.12	.004	.42	266
4.	--	--	--	--	--	--	--	--	--
Gender x ADHD x SSIS-Teacher	-.26	.64	-.04	-.40	.69				
Total Step 4						.12	.001	.16	265

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.32 *Hierarchical Multiple Regression for Gender and Peer Rating with Anxiety Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-2.65	1.24	-.14	-2.14	.03*				
Race	6.62	2.38	.21	2.79	.006**				
Income	-.44	.59	-.06	-.74	.46				
Total Step 1						.08***	.08***	6.50***	216
2.	--	--	--	--	--	--	--	--	--
Gender	2.86	2.34	.09	1.23	.22				
ADHD Symptoms	.35	.17	.14	2.04	.04*				
Peer Rating	1.28	2.40	.04	.54	.59				
Total Step 2						.11	.03	2.00	213
3.	--	--	--	--	--	--	--	--	--
Gender x ADHD Sx	.08	.40	.02	.20	.84				
Gender x Peer Rating	.52	.45	.09	1.15	.25				
ADHD x Peer Rating	-7.24	6.07	-.10	-1.19	.23				
Total Step 3						.12	.02	1.19	210
4.	--	--	--	--	--	--	--	--	--
Gender x ADHD x Peer Rating	-.48	1.05	-.04	-.46	.65				
Total Step 4						.12	.001	.21	209

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is anxiety symptoms as measured by the SCARED.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.33 *Hierarchical Multiple Regression for Gender and SSIS-Parent with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Parent									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-.62	.46	-.08	-1.36	.18				
Race	-.32	.85	-.03	-.38	.71				
Income	-.65	.20	-.21	-3.19	.002**				
Total Step 1						.05**	.05**	4.84**	298
2.	--	--	--	--	--	--	--	--	--
Gender	.63	.76	.05	.82	.41				
ADHD Symptoms	.17	.07	.16	2.59	.01*				
SSIS-Parent	-1.27	.93	-.09	-1.36	.18				
Total Step 2						.09**	.04**	4.63**	295
3.	--	--	--	--	--	--	--	--	--
Gender x ADHD Sx	.23	.14	.12	1.63	.11				
Gender x SSIS-Parent	2.15	2.00	.08	1.07	.28				
ADHD x SSIS-Parent	.18	.15	.07	1.19	.23				
Total Step 3						.10	.01	1.40	292
4.	--	--	--	--	--	--	--	--	--
Gender x ADHD x SSIS-Parent	.23	.31	.06	.74	.46				
Total Step 4						.10	.002	.55	291

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.34 *Hierarchical Multiple Regression for Gender and SSIS-Teacher with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
SSIS- Teacher									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-.61	.48	-.07	-1.26	.21				
Race	-.09	.88	-.01	-.10	.92				
Income	-.66	.21	-.21	-3.09	.002**				
Total Step 1						.05**	.05**	4.66**	272
2.	--	--	--	--	--	--	--	--	--
Gender	1.06	.81	.08	1.31	.19				
ADHD Symptoms	.19	.08	.18	2.45	.02*				
SSIS-Teacher	-.71	.96	-.06	-.74	.46				
Total Step 2						.09**	.04**	4.15**	269
3.	--	--	--	--	--	--	--	--	--
Gender x ADHD Sx	.04	.16	.02	.28	.78				
Gender x SSIS-	-.02	1.91	-.001	-.01	.99				
Teacher	.30	.14	.13	2.16	.03				
ADHD x SSIS-						.11	.02	1.81	266
Teacher									
Total Step 3									
4.	--	--	--	--	--	--	--	--	--
Gender x ADHD x	-.44	.28	-.14	-1.56	.12				
SSIS-Teacher									
Total Step 4						.12	.01	2.44	265

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

Table 3.35 *Hierarchical Multiple Regression for Gender and Peer Rating with Depression Symptoms as the Outcome*

Step and Variable	*B*	SE	β	t	*p*-value	R^2	ΔR^2	*F* for ΔR^2	*df*
Peer Rating									
1. (Covariates)	--	--	--	--	--	--	--	--	--
Age	-.80	.53	-.10	-1.49	.14				
Race	.01	1.02	.001	.01	.99				
Income	-.36	.25	-.11	-1.43	.16				
Total Step 1						.03	.03	1.82	216
2.	--	--	--	--	--	--	--	--	--
Gender	.86	.99	.06	.86	.39				
ADHD Symptoms	.24	.07	.23	.23	.001**				
Peer Rating	-.15	1.02	-.01	-.01	.88				
Total Step 2						.08*	.05*	3.90*	213
3.	--	--	--	--	--	--	--	--	--
Gender x ADHD Sx	.11	.17	.06	.66	.51				
Gender x Peer Rating	.21	.19	.09	1.09	.28				
ADHD x Peer Rating	-3.39	2.57	-.11	-1.32	.19				
Total Step 3						.10	.02	1.63	210
4.	--	--	--	--	--	--	--	--	--
Gender x ADHD x Peer Rating	-.27	.45	-.06	-.61	.55				
Total Step 4						.10	.002	.37	209

Note. All analyses include the following covariates: age (8, 9, or 10 years), gender (0 = male; 1 = female), race (0 = Caucasian; 1 = non-Caucasian), and household income. Outcome is depression symptoms as measured by the CDI-2.
* $p < 0.05$ (two-tailed). **$p < 0.01$ (two-tailed). *** $p < 0.001$ (two-tailed).

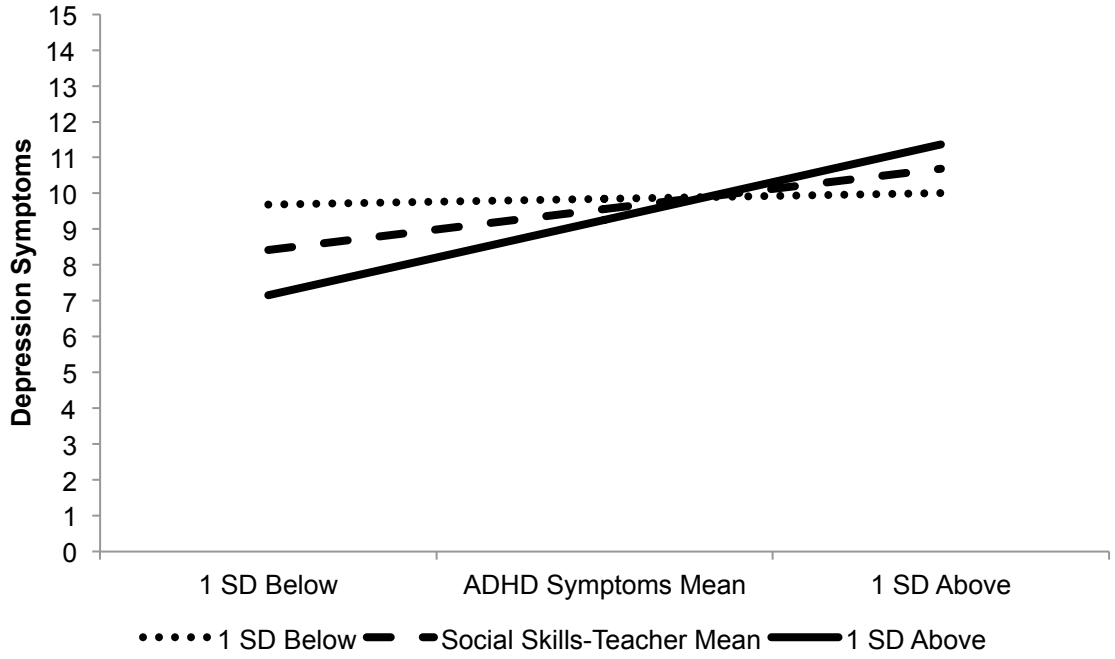

Figure 3.1 *Teacher-reported social impairment moderates the relation between ADHD symptoms and depression symptoms.*

Note. The lines represent the effect of the interaction of ADHD symptoms and teacher-rated social impairment (i.e., social skills) on number of depression symptoms. The lines represent one standard deviation below the mean (1 SD Below), the mean, and one standard deviation above the mean (1 SD Above) for teacher-rated social impairment, following the procedures outlined by Cohen et al. (2003). The simple slopes at the social skills mean and one standard deviation above the mean (i.e., high levels of social skills) were statistically significant, $p < .05$.

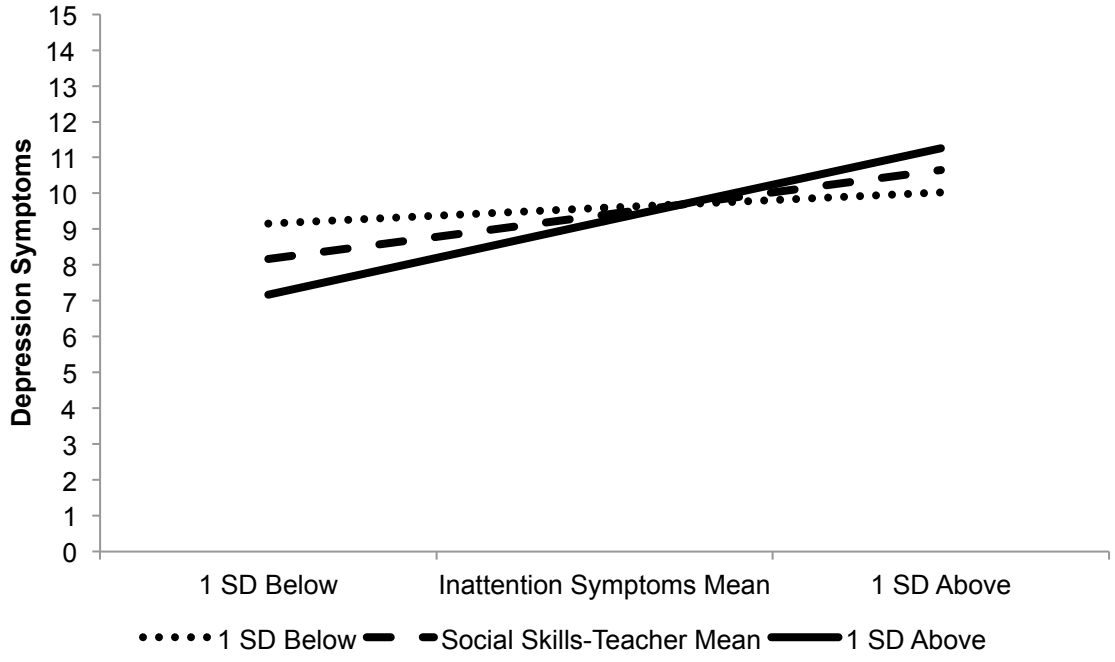

Figure 3.2 *Teacher-reported social impairment moderates the relation between inattention symptoms and depression symptoms.*

Note. The lines represent the effect of the interaction of inattention symptoms and teacher-rated social impairment (i.e., social skills) on number of depression symptoms. The lines represent one standard deviation below the mean (1 SD Below), the mean, and one standard deviation above the mean (1 SD Above) for teacher-rated social impairment, following the procedures outlined by Cohen et al. (2003). The simple slopes at the social skills mean and one standard deviation above the mean (i.e., high levels of social skills) were statistically significant, $p < .05$.

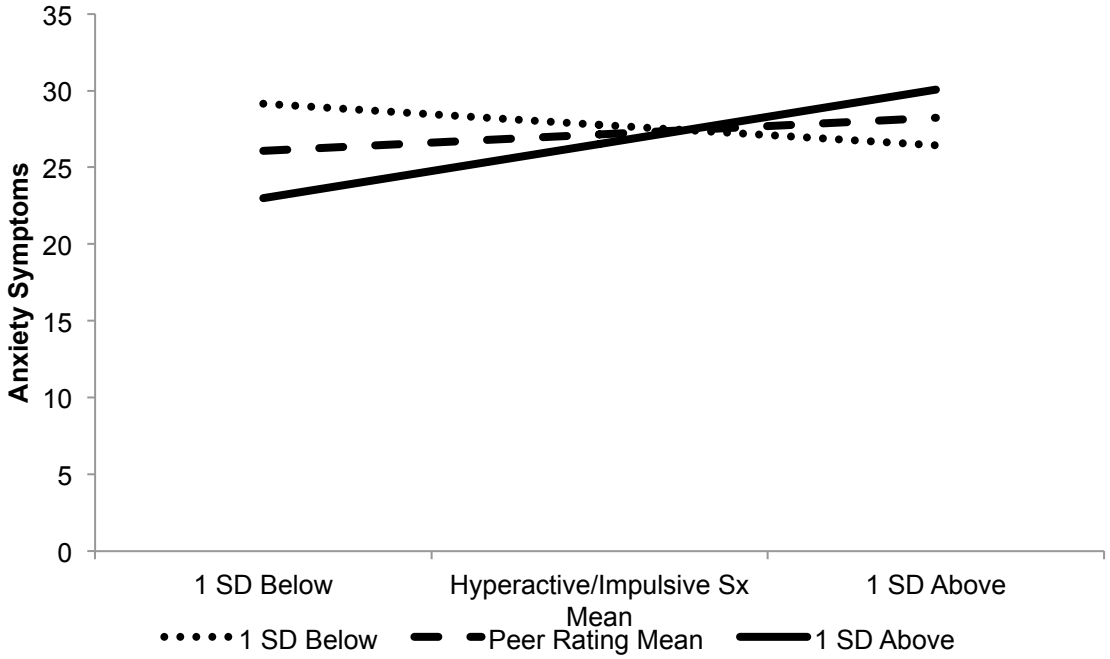

Figure 3.3 *Peer rating moderates the relation between hyperactivity/impulsivity symptoms and anxiety symptoms.*

Note. The lines represent the effect of the interaction of hyperactivity/impulsivity symptoms and peer ratings of likeability on number of anxiety symptoms. The lines represent one standard deviation below the mean (1 SD Below), the mean, and one standard deviation above the mean (1 SD Above) for peer rating, following the procedures outlined by Cohen et al. (2003). Only the simple slope at the one standard deviation above the peer rating mean (i.e., high ratings of likeability) was statistically significant, $p < .05$.

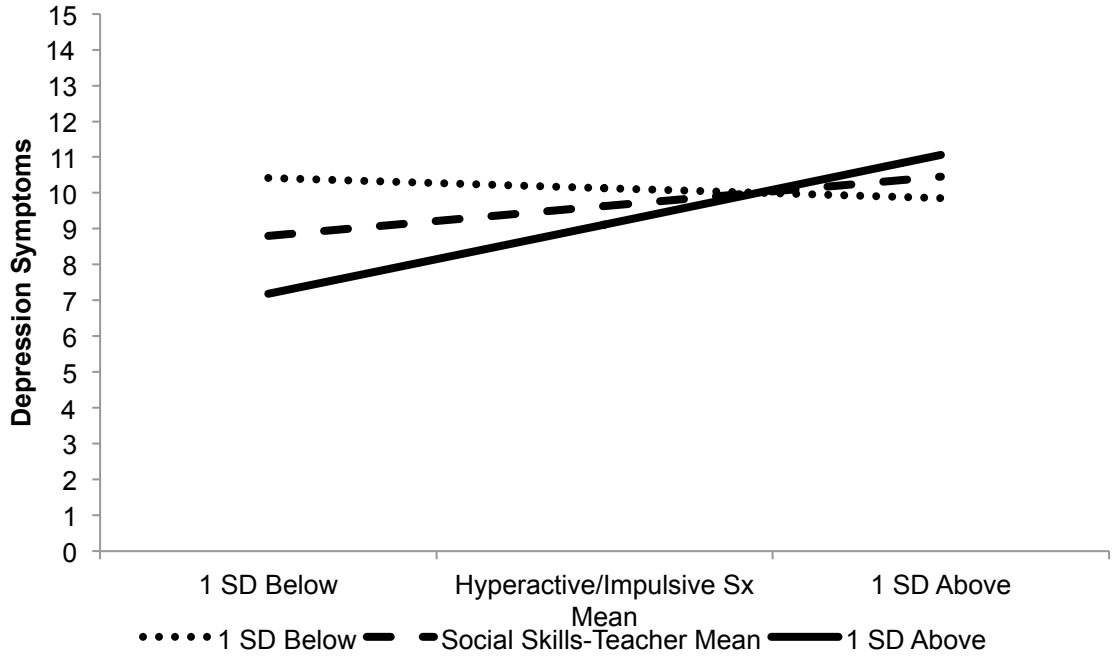

Figure 3.4 *Teacher-reported social impairment moderates the relation between hyperactivity/impulsivity symptoms and depression symptoms.*

Note. The lines represent the effect of the interaction of hyperactivity/impulsivity symptoms and teacher-rated social impairment (i.e., social skills) on number of depression symptoms. The lines represent one standard deviation below the mean (1 SD Below), the mean, and one standard deviation above the mean (1 SD Above) for teacher-rated social impairment, following the procedures outlined by Cohen et al. (2003). Only the simple slope at one standard deviation above the mean (i.e., high levels of social skills) was statistically significant, $p < .05$.

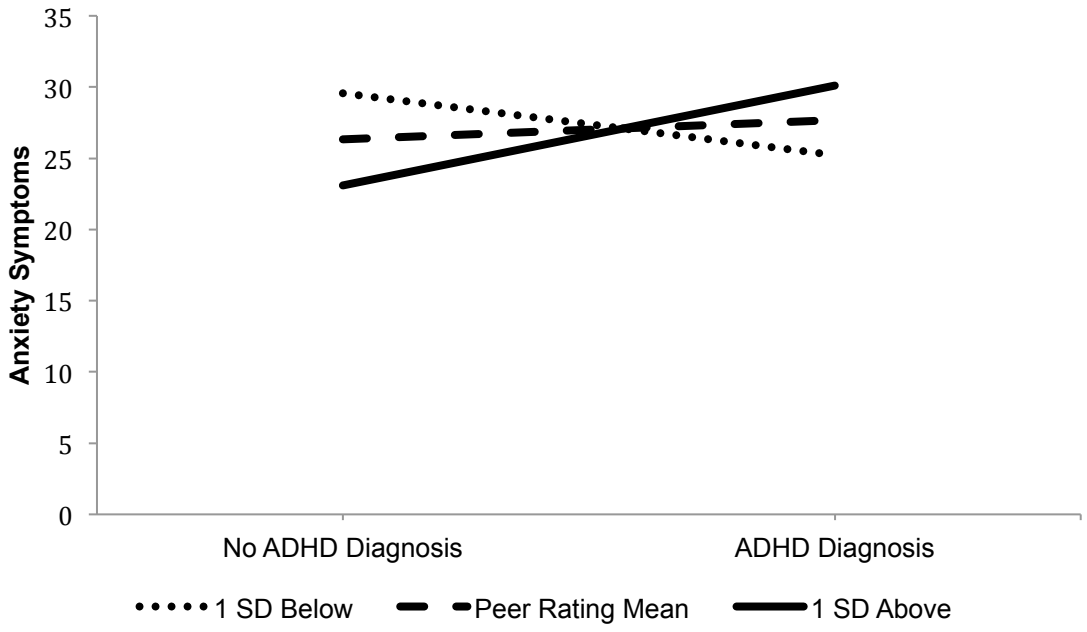

Figure 3.5 *Peer rating moderates the relation between ADHD diagnosis and anxiety symptoms.*

Note. The lines represent the effect of the interaction of ADHD diagnosis and peer ratings of likeability on number of anxiety symptoms. The lines represent one standard deviation below the mean (1 SD Below), the mean, and one standard deviation above the mean (1 SD Above) for peer rating, following the procedures outlined by Cohen et al. (2003). Only the simple slope at the one standard deviation above the peer rating mean (i.e., high ratings of likeability) was statistically significant, $p < .05$.

Chapter 4

Discussion

The present study examined the associations among ADHD, social impairment, and anxiety and depression symptoms in a sample of 8- to 10-year-old children. Specifically, social impairment was examined as a potential moderator of the relation between ADHD symptoms and internalizing symptoms. This study offers an important contribution to existing literature by incorporating a multi-rater method, with parent- and teacher-reported ADHD symptoms, parent-, teacher-, and peer-rated social impairment, and child self-reported internalizing symptoms.

Primary Findings

As expected, ADHD symptoms were significantly associated with increased anxiety symptoms and depression symptoms. Increased ADHD symptoms predicted increased anxiety symptoms for parent- and teacher-reported social impairment models, which is consistent with previous literature (Angold, Costello, & Erkanli, 1999; Costello, Egger, & Angold, 2004; Faraone, Biederman, Weber, & Russell, 1998; Tannock, 2000). As predicted, increased ADHD symptoms predicted increased depression symptoms for all main analyses models, which is in agreement with previous literature (Angold & Costello, 1993; Faraone, Biederman, Weber, & Russell, 1998; Pliszka, Carlson, & Swanson, 1999). These results reiterate the importance of parents, teachers, and clinicians in recognizing the link between ADHD symptoms and internalizing issues among children. It is especially important for clinicians to incorporate interventions for

internalizing issues for youth being treated for ADHD. It has previously been found that children with ADHD and depression are more anxious and depressed than non-depressed children with ADHD, but these depressed children with ADHD do not have more extreme levels of ADHD or aggression than non-depressed peers (Blackman, Ostrander, & Herman, 2005). Youth with ADHD and comorbid depression may suffer from significantly more impairment from internalizing problems, even more so than from the difficulties related to ADHD or aggression. Although the externalizing symptoms associated with ADHD may be more disruptive to others and may lead parents, teachers, and clinicians to focus on targeting ADHD symptoms, the internal struggle with depression may cause even more suffering to the child with ADHD and its treatment should not be ignored. It should be noted that ADHD symptoms were not significantly associated with anxiety symptoms for the peer rating model, which used a smaller sample than the other models; the smaller sample size may be the cause for this disparity.

Teacher-reported social impairment was associated with increased anxiety symptoms, which is consistent with previous literature, but parent-reported social impairment and peer rating were unexpectedly not associated with anxiety symptoms. Both parent-reported and teacher-reported social impairment were associated with increased depression symptoms, which is consistent with previous literature, but peer ratings were unexpectedly not associated with depression symptoms. It was found that that the parent-reported social impairment, teacher-reported social impairment, and peer rating of likeability did not significantly predict anxiety or depression symptoms in the regression analyses, which is in contrast to previous literature that found associations between social impairment and internalizing symptoms (Boivin, Vitaro, & Bukowski

1999; Fontaine, et al., 2009; Pedersen, Vitaro, Barker, & Borge, 2007). Although in bivariate correlations parent- and teacher-reported social impairment was associated with increased depression symptoms and teacher-reported social impairment was associated with increased anxiety symptoms, this association was no longer significant when social impairment was placed into regression models with ADHD symptoms; this suggested that social impairment, while it may have some associations with internalizing symptoms, did not predict above and beyond ADHD symptoms. ADHD symptoms seemed to be the driving force behind increased internalizing symptoms.

The parent- and teacher-reported social impairment measure (i.e., SSIS) used in the current study focuses heavily on the child's social skills, or lack thereof. However, it does not thoroughly examine the consequences of having social skills deficits, such as peer rejection or victimization, lack of friendships, and poor quality friendships, which have been found to lead to increased internalizing symptoms (Boivin, Hymel, & Burkowski, 1995; Boivin, Poulin, & Vitaro, 1994; Ladd & Troop-Gordon, 2003; Lopez & DuBois, 2005; Mayeux, Bellmore, & Cillessen, 2007). It is possible that a child that has highly-rated social skills (e.g., says "please" and "thank you," speaks in an appropriate tone of voice, resolves disagreements calmly, takes responsibility for his/her own actions) in the eyes of parents and teachers may still have difficulty with making friends or being rejected by peers for various reasons. It may be the case that peer rejection or victimization, lack of friendships, and poor quality friendships may contribute more to anxiety and depression symptoms than social skills deficits alone.

Unexpectedly, all models in the main analyses except for one suggested that social impairment does not moderate the relation between ADHD symptoms and

internalizing symptoms. The one model that did reveal a moderation effect was the one examining teacher-reported social impairment moderating the relation between ADHD symptoms and depression symptoms, such that kids with high ADHD symptoms and high social skills had the most depression symptoms. This differs from the prediction that high ADHD symptoms and *low* levels of social skills would lead to the most depression symptoms. One possible explanation for this unexpected finding is that perhaps it is not representative of an actual, clinically relevant effect, but rather due to chance, having conducted so many statistical analyses. However, if this finding is indeed true, one explanation for it is that those children with higher social skills and high ADHD symptoms are more socially aware, and therefore more aware of how their ADHD may impact their relationships with others; if a child has generally high social skills but is also aware of their struggle with ADHD symptoms that often interfere with social functioning, perhaps this frustration could lead to increased depression symptoms. Conversely, if a child with ADHD has low social skills and little awareness into their skills deficit, they may not be as attuned to rejection from peers, and therefore less likely to develop depression as a result of their social skills deficit. It is a possibility that a child who is aware of appropriate social behaviors and can display them properly, but has difficulty doing so or has to exert much effort to do so, in part due to his or her ADHD symptoms, could become more depressed. It can be argued that having to constantly exert effort into displaying appropriate social skills while combating symptoms of ADHD is a form of chronic stress, and chronic stress has been found to predict depression (Hammen, Davila, Brown, Ellicott, & Gitlin, 1992). This has implications for treatment of children with ADHD; these results suggest that a child with ADHD who may seem to possess adequate

social skills is still at risk for depression symptoms. Future research is needed to further explore this unexpected finding, and to examine the potential influence of social awareness, as well as other aspects of social functioning aside from social skills, such as peer victimization and rejection, poor quality friendships, and lack of reciprocal friendships.

Secondary Findings

Inattention and hyperactive/impulsive symptoms.

Increased inattention symptoms were associated with increased anxiety and depression symptoms, suggesting that both anxiety and depression interventions may be important for those that suffer from the inattention subtype of ADHD. However, increased hyperactive/impulsive symptoms were only associated with increased depression symptoms and were mostly unrelated to anxiety symptoms. This suggests that there may be a greater link between hyperactive/impulsive symptoms and depression compared to anxiety. Since a child with hyperactivity symptoms may not fit the stereotype of a depressed child with low energy, it would be especially important to take into account other presentations of childhood depression for those with hyperactivity symptoms, such as increased irritability.

Although hyperactive/impulsive symptoms were mostly unrelated to anxiety, it was found that children with lower hyperactive/impulsive symptoms and a higher peer-rated likeability had the least anxiety symptoms, whereas children with higher levels of hyperactive/impulsive symptoms and a higher peer-rated likeability had the most anxiety symptoms. This is an unanticipated result, as it was predicted that higher ADHD symptoms and lower peer ratings would lead to more anxiety symptoms. Children with

higher ADHD symptoms who were well liked by peers still had increased anxiety symptoms. This is important for interventions, since children who appear to be well liked and better socially adjusted may not receive treatment for anxiety because it may be assumed that they would not have anxiety issues.

The moderation analyses results for the inattention and hyperactive/impulsive symptoms are similar to the main analyses results for overall ADHD symptoms; children with high social skills and either low inattention or hyperactive/impulsive symptoms had the least depression symptoms, whereas children with high social skills and either high inattention or hyperactive/impulsive symptoms had the most depression symptoms. As previously stated in the discussion of the main analyses, this may be due to children with higher social skills having more social awareness, and therefore more awareness of how their ADHD symptoms may interfere with their social functioning, which may cause them distress. Additionally, it is also a possibility that this effect was due to chance, having conducted so many statistical tests.

ADHD diagnosis.

Unlike continuous ADHD symptoms, ADHD diagnosis status was not significantly associated with and did not predict anxiety symptoms, except for the finding that children with no ADHD diagnosis and a high level of peer-rated likeability had the least anxiety symptoms, whereas children with an ADHD diagnosis and a high level of peer-rated likeability had the most anxiety symptoms. Children with ADHD who are well liked by peers may be more socially aware and socially skilled than those children who have ADHD and are not well liked by peers. These well-liked children with ADHD may experience greater stress than children without ADHD or children with ADHD who are

not as socially aware. In order for socially aware children with ADHD to maintain their positive social status with peers, they may struggle and have difficulty in overcoming their ADHD symptoms in order to behave in a socially appropriate manner, which could then result in increased anxiety symptoms.

ADHD diagnosis was associated with increased depression symptoms. Having an ADHD diagnosis predicted increased depression symptoms in the teacher rater model in the regression analysis, but not in the parent or peer rater models; this differs from the primary findings in which continuous ADHD symptoms was used instead of diagnosis and ADHD symptoms were associated with increased depression symptoms in all models. This suggests that using ADHD symptoms instead of ADHD diagnosis may be more sensitive when assessing risk for depression symptoms. In the model with parent-rated social skills, lower social skills were associated with increased depression symptoms, which was expected and consistent with previous research. (Boivin, Vitaro, & Bukowski 1999; Fontaine, et al., 2009; Pedersen, Vitaro, Barker, & Borge, 2007). This has implications for treatment, in that children with poor social skills should be evaluated for depression. Teachers who notice students that struggle to effectively interact with peers should also keep in mind that these students may be at greater risk for depression symptoms, and should be monitored.

Gender.

Being female was associated with increased anxiety symptoms in both the parent-rated and teacher-rated models, which is consistent with previous literature (APA, 2013). Parents, teachers, and clinicians should be aware of this increased risk for anxiety in

females, especially for those females who have other risk factors for anxiety, such as ADHD.

However, there was no difference between males' and females' depression symptoms. Although depression is generally present in females more than in males (APA, 2013), this difference in prevalence rates may emerge in adolescence. In a longitudinal study of 11- to 21-year-olds by Hankin and colleagues (1998), it was found that gender differences for overall rates of depression started emerging between ages 13 and 15 years. Since the children in the current study were 8 to 10 years old, there may not be a gender difference in depression symptoms due to the young age of the sample.

There were no other significant effects of gender in the analyses, suggesting that the primary findings do not differ based on gender.

Strengths of the Current Study

The current study was one of the first of its kind. While previous studies have relied on only one rater or few raters, the current study used data from parent, teacher, child self-, and peer reports. This allowed for examination of patterns of behaviors found at home, at school, and in directly observable social settings.

The methodology of the study was designed in a way to standardize procedures across participants and to minimize bias and confounding effects, and the research staff members participated in rigorous trainings of the study's procedures and strictly adhered to them as much as possible.

The sample used in the current study allows for more generalizability than previous studies. While many studies often lack variety in their participant pool, the

current study's sample was diverse in both race and SES, and included an almost equal number of children with ADHD as those without ADHD.

The current study also examined continuous ADHD symptoms instead of an ADHD diagnosis status (i.e., at least 6 symptoms of inattention or hyperactivity/impulsivity). Having children with a range of ADHD symptoms represented in the sample allow for more specificity and takes into account children who may be experiencing subthreshold ADHD symptoms, which would have been lost if ADHD diagnosis alone was used.

Limitations and Future Directions

While this study has many strengths and is possibly the first of its kind to be conducted, it also has several limitations that should be acknowledged, and these limitations could be expanded upon by future research. First and foremost, the study did not use longitudinal data. Given the cross-sectional nature of the design, conclusions are limited regarding the direction of the relations among ADHD, social impairment, and internalizing symptoms. A longitudinal design could clarify the causal pathway direction for social impairment and internalizing symptoms, which would be important to prevention and treatment of these issues. Additionally, having the same children attend multiple playgroups with each other over time may be beneficial. As will be discussed below, overall the peer ratings were relatively high, and the children spending more time with each other may allow for relationships to develop and likeability to vary. However, the logistics of scheduling 10 of the same children in multiple playgroups would prove to be difficult due to parents' varying schedules.

The peer ratings from the group play sessions, while integral to the multi-rater approach of this study's design, seem to have a high mean rating of 3.343 out of a possible 4 (*SD*= .453), suggesting that the children rated their peers rather highly for the most part. This could possibly be due to some children not wanting to rate another child poorly (although they were told their ratings would remain private), or perhaps due to the children not spending enough time with each other (i.e., only one 3 hour playgroup) to develop negative perceptions of their peers. Perhaps having the children pick a specific child with whom they would like to play with most and a specific child they would not want to play with again would yield more definitive results versus a Likert scale rating of 1 to 4.

Only child self-reported measures were considered for anxiety and depression symptoms, but it could be helpful to use both child and parent-reported, or even teacher-reported, internalizing symptoms. Conversely, social impairment was rated by parents, teachers, and peers. In future research, it may be beneficial to have the children's perspectives on how well they socialize, and if they have any worries about their social skills and ability to make and maintain friendships.

As previously stated, the SSIS measure does not thoroughly examine aspects of social impairment such as peer rejection or victimization, lack of friendships, and poor quality friendships, and instead focuses on specific social skills. The SSIS has all positively-framed items (i.e., an endorsement of the item means the child has that desirable social skill). Although a few of the items examine peer relations (e.g., "starts conversations with peers," "makes friends easily," and "interacts well with other children"), there are no items that assess more negative peer interactions. The SSIS

includes the items “stays calm when teased” and “tolerates peers when they are annoying,” which highlights the ability to effectively cope with negative social situations; however, it would have been useful to have items that directly tap into peer rejection and negative peer interactions, such as, “is teased often by peers,” “is often considered annoying by peers,” “has friends but has conflicts with them often,” or “has difficulty maintaining friendships over time.” A measure that assesses these other qualities of social functioning aside from social skills would be beneficial for examining increased anxiety and depression symptoms resulting from social impairment in the future.

Anxiety symptoms were assessed by the child self-reported SCARED measure. One potential reason why anxiety symptoms were not associated with social impairment and why the anxiety symptoms models of moderation analyses did not yield the predicted results could be that the current study’s population seemed to have a relatively high average for anxiety symptoms (M = 27.03, SD = 14.77). A study examining the psychometrics of the SCARED found that “anxiety cases” had an average total score of 26.76 (SD= 14.68) and “nonanxiety cases” had an average score of 17.24 (SD= 12.06) (Birmaher, Brent, Chiapetta, Bridge, Monga, and Baugher, 1999). The current study’s average anxiety score is higher than the average of just the “anxiety cases” in that study, suggesting that the current study’s participants may have more anxiety than other samples. If the participants had more anxiety in general, there may not be as much variation in anxiety scores to see a significant effect of social impairment. Additionally, although it is outside the scope of this paper’s focus, it would be beneficial to examine social phobia symptoms specifically from the SCARED to see whether social impairment

relates more to social-related anxiety versus a general total score of anxiety symptoms which encompassed multiple types of anxiety.

The current study only focused on children of ages 8 to 10 years. Future research is needed to examine the relation between ADHD, social impairment, and internalizing symptoms in older age groups. It would be beneficial to investigate these current study's research questions in older youth, such as middle school and high school-aged students. Adolescence marks a critical period in youths' social development and well-being, and it has been found that teens with more negative interactions in friendships have higher levels of depression and social anxiety (La Greca & Harrison, 2005). Examining the effects of ADHD, social impairment, and internalizing disorders in this age group could yield better prevention and treatment options for adolescents with ADHD.

The current study recruited more boys than girls (females = 36.1%), since ADHD is more prevalent in boys. However, a larger sample of girls may have yielded different results, especially for anxiety, since females tend to have higher levels of anxiety than males in this 8- to 10-year-old age group (APA, 2013).

Additionally, the current study recruited from the general community, and while some of the participants had existing diagnoses of ADHD, future research could examine these variables within clinical populations since results may differ between diagnosed and undiagnosed samples.

Implications

The current study reiterated the importance of monitoring children with ADHD symptoms for internalizing symptoms, since they are at a greater risk of experiencing them compared to children without ADHD symptoms. Specifically, children with

inattention symptoms are at a greater risk for both anxiety and depression symptoms, while children with hyperactivity/impulsivity symptoms are at increased risk for depression symptoms. Since children with hyperactive/impulsive symptoms are usually seen as being "on the go," and do not fit the typical "low energy" or withdrawn symptoms of depression, these findings are of great importance; these children could be easily overlooked, but screening these children for internalizing issues would be beneficial and lead to earlier treatment interventions.

Girls are also at a greater risk for anxiety symptoms compared to boys, which is consistent with previous literature. Identifying ADHD symptoms and internalizing symptoms, both clinical level and subthreshold symptoms, at an earlier age would greatly improve the well-being and outcomes of these children. Without this knowledge and early identification, these youth would most likely experience increasing ADHD and internalizing symptoms throughout adolescence and adulthood, and would suffer from the resulting impairment that both ADHD and internalizing issues can cause.

For children with ADHD symptoms who have high social skills or who are well-liked by peers, it is important to be aware that they are still at risk for depression symptoms or anxiety symptoms. Even when a child with ADHD seems to get along with peers and not have as many social problems, they should still be monitored for internalizing symptoms. This especially has implications for school settings, in which children who get along well with others are usually seen as "doing well"; these children are most likely not the first referred for treatment interventions, compared to the children who are actively disrupting peers during class and are in conflict with peers at recess. These findings can help inform teachers and school counselors, who could possibly

screen children with ADHD for internalizing symptoms and start treatment earlier for those who may be suffering from anxiety or depression symptoms.

Hopefully these findings can aid parents, teachers, and clinicians alike in delivering more effective services to children with ADHD. In the future, it would be beneficial for other studies to expand upon the research of the current study to continue exploring the relations among ADHD symptoms, social impairment, and anxiety and depression symptoms, in an effort to continually strive for more effective identification and treatment interventions for children experiencing these issues.

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