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Comorbid Anxiety and ADHD in Children With ASD: Prevalence, Presentation, and School Placement

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Comorbid Anxiety and ADHD in Children With ASD: Prevalence, Presentation, and School Placement

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Master of Arts

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Education

by

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March 2017

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According to the Center for Disease Control (CDC; 2014), the prevalence rate of autism spectrum disorders (ASD) is now 1 in 68. Among children with ASD, 50-80% meet criteria for ADHD (van der Meer, 2014) and about 40-50% experience clinical levels of anxiety (White et al., 2009). This study examined the prevalence of ADHD and anxiety, the ways in which ADHD and anxiety manifest (as reported by parents and teachers), and the special education placement of a sample of young children on the spectrum transition to school. Participants in this study included 180 children with ASD ages 4 to 7 years old and their parents and teachers. Behavior problems were measured using parent and teacher report on the Child Behavior Checklist – Parent Report and the Teacher Report Form (CBCL and C-TRF; Achenbach & Rescorla, 2001). Clinically significant symptoms of anxiety were reported by parents for 31% for preschool children (ages 4-5) and 50% for school-aged children (ages 6-7). Clinically significant symptoms of ADHD were reported by parents for 22% for preschool children and 45% for school-aged children. There was a disparity between parent- and teacher-reported anxiety and ADHD.
problems, with teachers reporting fewer problem behaviors overall. Specific behaviors endorsed more and less frequently by parents and teachers are discussed. Finally, this study found that children whose teachers reported clinically elevated ADHD symptoms were less likely to be placed in general education settings. Implications of these findings in the schools are discussed.
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Comorbid Anxiety and ADHD in Children With ASD: Prevalence, Presentation, and School Placement

According to the Center for Disease Control (CDC, 2014), the prevalence rate of autism spectrum disorders (ASD) is now 1 in 68 among children aged 8 years old. The increasing rate of ASD in the community means that schools must rise to the challenge of meeting the diverse educational needs of these children, which is complicated by their other co-occurring disorders. For example, individuals with ASD are more likely to have comorbid psychiatric disorders compared to typically developing (TD) peers and even peers with intellectual disabilities (Brereton, Tonge, & Einfeld, 2006). Simonoff et al. (2008) found 70% of ASD youth had a comorbid psychiatric disorder and that 41% had two or more co-occurring disorders. The most common psychiatric disorders affecting children with autism were attention-deficit/hyperactivity disorder (ADHD) and social anxiety disorder (Simonoff et al., 2008).

Prevalence and Presentation of ADHD

While ADHD was, at one point, an exclusionary factor for diagnosing ASD and other pervasive developmental disorders (PDDs), it is now recognized as a one of the most common comorbid diagnoses associated with autism (American Psychiatric Association, 2013; Simonoff et al., 2008). According to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM, 2013), an individual can present with one of three types of ADHD: the inattentive type, the hyperactive type, or the combined type (meeting criteria for both inattention and hyperactivity). The inattentive type is characterized by difficulty with sustained attention, following directions, organizing activities, and other tasks that require the individual to pay attention to his or her
environment. The hyperactive type is characterized by impulsive actions, fidgeting, difficulty remaining quiet or waiting for one’s turn, or other impulsive behaviors. Individuals who are diagnosed with the combined type meet criteria for both inattention and hyperactivity.

Individuals with ASD often present with increased levels of inattention, hyperactivity, and impulsivity that are characteristic of ADHD. In fact, research has found that anywhere from 50-80% of youth with ASD also met clinical criteria for ADHD (Baker & Blacher, 2015; Simonoff et al., 2008; van der Meer et al., 2012). Sinzig, Walter, and Doepfner (2009) found that among ASD youth who had a co-occurring ADHD diagnosis, 46% met criteria for the inattentive subtype, 22% for the hyperactive subtype, and 32% for the combined type. In addition, Sinzig and colleagues found a developmental change in ADHD symptomatology. They noted that the younger children (between the ages of 5 and 7) were more likely to be diagnosed with the hyperactive subtype. In contrast, they found that inattentive symptom scores did not change with age. This suggested that, as the children aged, they exhibited fewer hyperactive behaviors while their inattentive behavior remains stable.

In their study, Sinzig et al. (2009) pointed out possible overlaps between ADHD and autistic symptoms, measured using the Diagnostic Checklist for Attention Deficit/Hyperactivity Disorder (DCL-ADHD), the Diagnostic Checklist for Pervasive Developmental Disorders (DCL-TES), and the PDD-rating scale for teachers and for parents (FBB-TES). These checklists are taken from the Diagnostic System for Mental Disorders in Childhood and Adolescence (DISYPS-2; Doepfner et al., 2007). Sinzig et al.
found that hyperactivity seemed to be predominant in children with language delay, a characteristic of many children with ASD. In other words, children who had difficulty communicating their needs resorted to hyperactive behaviors to attract adult attention. On the other hand, inattention items were highly associated with stereotyped behavior for children with ASD. It may be that autistic children were inattentive because their stereotyped behaviors prevented them from paying attention to their environment. In fact, Pliszka, Carlson, and Swanson (2003) stated that it was not adequate to simply give an autistic child the diagnosis of ADHD inattentive type without looking at the cause of his inattentive behavior. If the inattention was due to the restrictive, repetitive behaviors that are a hallmark symptom of ASD, then it was unlikely that the child had true ADHD; rather, his ASD symptoms were impacting his ability to pay attention.

Sinzig et al. (2009) proposed a five-group model for integrating ADHD and ASD. They posited that the five groups were (1) those with pure ADHD, (2) those with pure ASD, (3) those with ASD and “true” ADHD, (4) those with ADHD and some sub-clinical autistic symptoms, and (5) those with ASD and sub-clinical ADHD symptoms. Van der Meer et al. (2012) found evidence for some of the groups in the Sinzig et al. model using latent class analysis on a sample of both typically developing and ASD youth. This group of researchers found three patient classes: an ADHD only subgroup, an ASD group with clinically-elevated ADHD symptoms, and an ADHD group with clinically-elevated ASD symptoms. However, they did not find evidence for an ASD only subgroup because all children who presented with ASD also exhibited some ADHD behavior. This may indicate that ADHD is a milder, less severe subtype within the autism spectrum. Genetic
research may provide further evidence for this link between ADHD and ASD. Rommelse, Franke, Geurts, Hartman, and Buitelaar (2010) found support for the hypothesis that ADHD and ASD originate from similar family and genetic factors. Therefore, these disorders, whose symptoms seem to overlap a great deal, may be more interconnected than distinct, unrelated disorders.

In order to examine common clinical features between ASD and ADHD, Craig et al. (2015) conducted a study comparing children with pure ASD, pure ADHD, and ASD with ADHD (ASD + ADHD). Overall, the ASD + ADHD group had a lower mean IQ level (ASD: M = 72.09, SD = 36.7; ADHD: M = 85.17, SD = 19.7, ASD + ADHD: M = 59.03, SD = 34.5) and more severe autistic symptoms, as measured by the Social Communication Questionnaire (SCQ; Rutter et al., 2003) than the pure ASD and pure ADHD groups. The ASD + ADHD group was also found to share the inattention and hyperactivity deficits, measured by the Connors Rating Scale-Revised (CRS-R; Conners, 1997), as well as some of the emotional and behavior problems characteristic of the ADHD group, as measured by the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001). In addition, they also exhibited the adaptive behavior impairments found in the ASD group, as measured by the Vineland Adaptive Behavior Scales (VABS; Sparrow et al., 1984). These findings may help clinicians to better understand the ASD + ADHD phenotype, but they also revealed that these children were impacted across social, emotional, and adaptive domains.

The literature is clear that ASD youth with lower IQ likely exhibit disruptive behaviors, including ADHD symptoms. Baker and Blacher (2015) found that while IQ
was a protective factor against the development of disruptive behavior disorders (including ADHD) in youth who were typically developing (TD), it was not protective for individuals with ASD. Youth with ASD -- regardless of IQ level -- seemed to experience high levels of disruptive behaviors which were likely to impact their school and social functioning. In addition, children with ASD and ADHD were also more likely to have other comorbid psychiatric disorders, further impacting their ability to function in a school environment. Simonoff et al. (2008) found that 84% of ASD individuals with ADHD also met criteria for a second comorbid diagnosis. Another disorder that commonly co-occurs in youth with ASD is anxiety.

**Prevalence and Presentation of Anxiety Disorders**

In addition to being at risk for ADHD and externalizing behavior problems, children with ASD also experience high levels of internalizing behavior problems, such as anxiety. Symptoms of anxious behavior experienced by individuals with ASD include fear of separation from parents or caregivers, resistance to change, crying easily over minor problems, tenseness, shyness, and irritability (Brereton et al., 2006). Often, these symptoms of anxiety are severe enough that they impact daily functioning for children with ASD and can be diagnosed as an anxiety disorder. Van Steensel, Bogels, and Perrin (2011) conducted a meta-analysis looking at anxiety in children with ASD and found that across studies, 40% of children had at least one comorbid anxiety disorder. Similarly, using the Child and Adolescent Psychiatric Assessment – parent version (CAPA; Angold & Costello, 2000), Simonoff et al. (2008) found that in their epidemiological, population-derived sample, anxiety was the most common comorbid disorder among those with
ASD, with 42% of participants meeting clinical criteria for at least one type of anxiety disorder. Social anxiety, specifically, affected 29% of the sample. However, social avoidance is a hallmark characteristic of ASD and can be often confused for social anxiety. Leyfer et al. (2006) created the Autism Comorbidity Interview – Present and Lifetime Version (ACI-PL) and modified their definition of social anxiety to exclude social avoidance. They reported that only 7% of their sample suffered clinical levels of social anxiety. However, they found high levels of specific phobias (44%) and obsessive compulsive disorder (OCD; 37%). The metanalysis conducted by van Steensel and colleagues revealed similar prevalence rates across studies, with 30% of children meeting clinical criteria for specific phobia, 17% for OCD, and 17% for social anxiety. Since these anxiety disorders have different symptoms and are treated differently, it is important to look at the factors that impact a child’s likelihood of having a particular comorbid anxiety.

**Moderators of anxiety.** The literature has identified different moderators that impact the risk that a child with ASD will develop a particular anxiety disorder. They include factors such as age, communication skills, and social skills.

**Age.** A review of comorbid anxiety and ASD literature by White, Oswald, Ollendick, and Scahill (2009) found that age was a moderator of anxiety risk, with adolescents reporting more severe anxiety due their increasing awareness of their interpersonal difficulties. Van Steensel et al. (2011) also found that rates of anxiety disorders generally increased with age, especially rates of generalized anxiety disorder. They also found that rates of separation anxiety disorder were associated with a lower
mean age. These results are consistent with what would be expected in typically
developing samples (Ford, Goodman, & Meltzer, 2003; Frala, Leen-Feldner, Blumenthal,
& Baretto, 2010; Kearney, Sims, Pursell, & Tillotson, 2003). However contrary to what
is seen in typically developing children, van Steensel and colleagues found that younger
children with ASD had higher prevalence rates of OCD than older children. This result
may be due to the fact OCD shares symptom overlap with the restricted, repetitive
behaviors (RRB’s) characteristic of children with ASD. Younger children with ASD have
been shown to have more RRB’s than older children (Esbensen, Seltzer, Lam, & Bodfish,
2008).

Communication skills and IQ. Communication skills may also moderate the
relationship between ASD and anxiety. Davis et al. (2011) found that for children with
autism, anxiety decreased as communication deficits increased. This could be because the
communication deficits are a sign of more global impairment, such as low IQ. Children
with poor or no communication may not be socially aware enough of their environment
to experience anxiety. IQ, too, has been shown to be a moderator of anxiety disorder risk
for children with ASD. Van Steensel et al. found that children with an IQ between 70 and
87 (the cross-study mean) were more likely to have social anxiety disorder. Although
more research is needed, van Steensel and colleagues argued that this finding makes
intuitive sense. Children with ASD who were on the border of intellectual disability (ID)
had more difficulty adapting to social situations than did their ASD peers with higher IQ.
However, the more cognitively able children were also more aware of their own failures
in social situations, as opposed to lower functioning peers (i.e., those with ASD and ID).
Therefore, they were at particular risk for developing anxiety around social situations. Other research indicated that children and adolescents with higher IQ tended to experience more anxiety (White et al., 2009), suggesting that higher IQ puts at risk for anxiety disorders. Clearly, the role of IQ in the development of anxiety in young children with ASD is still an issue and requires more research.

**Social skills.** Gillott, Furniss, and Walter (2001) attempted to determine how school aged children with ASD, but no intellectual disability (ID), experienced anxiety, as measured by the Spence Children’s Anxiety Scale (SCAS; Spence, 1997) and the Social Worries Questionnaires (SWQ; Spence, 1995). About half of the group with no ID had elevated OCD and separation anxiety scores. These youth also self-reported more covert (e.g., ruminating) and overt (e.g., actively avoiding social interactions with others) social worries than the TD groups. Bellini (2004) also examined a group of adolescents with autism and typical intellectual functioning and found a link between their self-reported social skills deficits on the Social Skills Rating System (SSRS; Gresham & Elliot, 1990) and social anxiety, as measured by the Social Anxiety Scale for Adolescents (SAS-A; La Greca, 1999) and the Multidimensional Anxiety Scale for Children (MASC; March, 1999). Specifically, Bellini found a low negative correlation between assertive social skills and social anxiety, which means that as assertion skills decreased, social anxiety increased. Empathy, as measured by the SSIS Empathy subscale, was also related to social anxiety. Adolescents with low empathy had less social anxiety, likely because they are unconcerned with how or whether people perceived them socially. Likewise, the adolescents with very high empathy had little social anxiety, possibly because they were
able to adapt their behavior based on social cues. However, students with empathy in the average range had higher levels of social anxiety. These findings suggest that social skills interventions for students with ASD should focus on building assertiveness and empathy. The Gillott et al. and Bellini studies highlight the need for school-based social skills interventions that give ASD youth the strategies and support they need to feel more confident in social situations. Early social skills intervention may even prevent social anxiety from developing in the first place by minimizing the frequency of aversive social interactions. Without these interventions, children with ASD might continue to simply avoid unpleasant social situations and may not gain the practice and skills to improve in the social domain.

The Impact of Comorbidity on School Functioning in Children with ASD

Children with ASD and comorbid mental health disorders face numerous behavioral and emotional challenges which may impact their ability to function at school. Those with ASD who are in integrated, or general education, settings may experience additional difficulties. According to Ashburner, Ziviani, and Rodger (2010), teachers reported that ASD youth who were higher functioning had more attention difficulties and anxiety than their TD peers. These difficulties were impacting their school functioning. Ashburner et al. found that 54% of students with ASD were rated as under-achieving academically, compared to only 8% of their TD peers. Per teacher report, this seemed to be due to their difficulty maintaining attention and regulating their emotions in general education classrooms, despite receiving a range of specialist support services. The support services these children received were not adequately meeting their needs; poor
academic achievement and frequent reprimands for inappropriate behavior likely
damaged their self-esteem and decreased motivation over time.

Another difficulty that students with ASD may face at school concerns the
teacher. For example, students with ASD tend to have more student-teacher relationship
difficulties than do students with ID or TD (Blacher, Howell, Lauderdale-Littin, 
Digennaro, & Laugeson, 2014). This is an important component of school functioning
because the student-teacher relationship has been shown to be critical for student success
and predictive of later academic outcomes (Hamre & Pianta, 2004). For students with
comorbid ASD and ADHD who demonstrate higher levels of disruptive behavior,
student-teacher conflict is more likely (Blacher, Baker, & Eisenhower, 2009; Robertson,
Chamberlain, & Kasari, 2003). Thus, students with ASD who experience disruptive
behavior problems due to comorbid ADHD are at an increased risk for academic and
social problems, as well as poorer student-teacher relationships. Poor student-teacher
relationships have also been associated with lower levels of social inclusion for students
with ASD in mainstream classrooms (Robertson et al., 2003).

In addition to experiencing student-teacher relationship problems, students with
ASD and comorbid ADHD are also at a greater risk for peer difficulties, such as bullying. 
Montes and Halterman (2007) found that, among their population-based sample, ADHD
moderated the relationship between bullying behavior and autism. Children with ASD
who did not have ADHD had the same risk for bullying perpetration than did children in
the general population. However, children with ASD and comorbid ADHD were 4.6
times more likely to bully others, even after controlling for SES, age, and gender. This is
likely due to these children’s’ impulsive and hyperactive behaviors coupled with their deficits in reading social cues. Montes and Halterman only looked at bullying perpetration, but it has also been established that children with ASD are also frequently targets of bullying. Zeedyk, Rodriguez, Tipton, Baker, & Blacher (2014) found that youth with ASD were victimized more frequently than their TD or ID peers and experienced more physical bullying, in particular. They also discovered that internalizing problems and conflict with friends significantly predicted victimization. These findings suggest that children with ASD and anxiety are at a greater risk of victimization.

The effects of comorbid anxiety and ASD on school functioning is an under-researched area, particularly in young children. This may be due to the fact that internalizing problems, such as anxiety, often go unseen in school settings and may have a silent impact on school performance (Jepsen, Gray, & Taffe, 2012). However, the impact of anxiety on social skills and friendships of children with ASD has been documented in the literature. For instance, Bellini (2007) found that social anxiety leads to social withdrawal and avoidance in adolescents with ASD but no ID. By avoiding social interactions, these children have fewer opportunities to use social skills and therefore will continue to have social deficits that impact friendships and other peer relationships. Zeedyk, Cohen, Eisenhower, and Blacher (2016) reported that nearly 40% of their sample of young children with ASD reported having difficulties making friends and 25% reported feeling lonely. The social difficulties these students experienced as the result of having ASD may lead them to become socially isolated, which can lead to depression or anxiety in adolescence (Mazurek & Kanne, 2010).
Children with ASD and anxiety may also experience greater distress when confronted stressful events. Humphrey and Lewis (2008) conducted a qualitative study analyzing the integrated school experiences of 20 students with or without ASD. They found that lack of order and predictability in the school environment caused these students a lot of stress (Humphrey & Lewis, 2008). It is unclear whether such stress would be exacerbated in a student with a comorbid anxiety disorder, or whether such stress can lead to an anxiety disorder. In addition, sensory stimuli in the classroom can also be distracting and overwhelming for individuals with ASD. Ashburner, Ziviani, and Rodger (2008) found that sensory sensitivity was associated with underachievement for students with ASD in mainstream classrooms. This literature reveals that schools need to be more attuned to the needs and experiences of children with ASD by providing them with structured, stable school environments and reducing sensory stimulation in the classroom.

**School Placement for Children with ASD**

The number of children who are receiving special education services under the classification of autism has increased considerably in the last several decades. Newschaffer, Falb, and Gurney (2005) found that the prevalence of the autism classification for six-year-olds increased from 4.6 cases in 10,000 in 1986 to 24.1 cases in 10,000 in 1994. The California Department of Education (2013) reported that, of the students who received special education services, 10.4% of them qualified under the classification of autism. The increase in autism classifications in the schools has not been found with other special education categories; prevalence trends for the intellectual
disability and speech and language categories have not changed over time (Newschaffer et al., 2005). This increase means that schools must increasingly provide services tailored to the needs of students with autism in both more restrictive environments (i.e. special day classes) and less restrictive environments (i.e. general education settings).

The specific types of services schools offer students with ASD can vary greatly. In 2006, 32.3% of students with ASD in the U.S. spent 80% or more of their day in general education settings, 38.7% spent less than 40% of their day in general education, and only 9% were educated in a separate school (Individuals with Disabilities Education Act (IDEA) Data, 2006). This is an increase from the inclusion rates reported by Eaves and Ho (1997) two decades ago, when 35% of students with autism were in separate classes, 39% were in regular classes with an aide, and 16% were in general education classes without an aide. Although the metrics from these two studies are not comparable, the overall message is that schools are providing more inclusive environments for students with ASD.

Yet, the question remains – how do schools determine placement for students with ASD? Eaves and Ho (1997) found that age, IQ, and severity of autism, as measured by the Childhood Autism Rating Scale (CARS, 1986), were related to degree of inclusion of their special education placement. Older children with lower IQ and students with more autistic symptoms were more likely to be in special classes. Similarly, White, Scahill, Klin, Koenig, and Volkmar (2007) found that among their sample of children with high-functioning autism (HFA), cognitive ability, communication skills, and autism severity as measured by the ADOS were associated with placement in special education.
They also found that students who begin first grade in either regular education or special education tend to stay in the same placement. Their findings suggest that schools appear to emphasize cognitive ability and do not take into account degree of social deficits and other factors which may impact success in a particular placement.

The type of placement a child receives during the school years is important because it is in this setting that the child will learn the skills necessary to function throughout the lifespan. Reed, Osborne, and Waddington (2012) conducted a study in the U.K. comparing the benefits of youth with ASD in mainstream settings versus more restrictive, special settings. Their sample included 97 children with a mean age of 8.8 in the general education settings and 8.2 in the special schools. These students were given the Strengths and Difficulties Questionnaire (SDQ) and the Vineland Adaptive Behavior Scale (VABS) at the beginning of the school year and then at the end of the year. They found that children made improvements in both placements; however, those in special schools made greater improvements in behavior and social skills. This seems to contradict research by Boutot and Bryant (2005) and Knight, Petrie, Zuurmond, and Potts (2009), which advocated placing students in mainstream settings so that they could benefit from seeing appropriate social behaviors modeled by their peers. Reed et al. hypothesized that the smaller class sizes and better staff and teacher training at special schools versus mainstream schools may benefit students with ASD.

Placing children with ASD into general education or mainstream settings raises complicated issues. For example, Rowley et al. (2012) explored the interaction between experiences of victimization, levels of social impairment, and school placement. They
found that children with ASD who were less socially impaired but placed into a mainstream or general education environment experienced a higher degree of victimization than those in more restrictive settings, such as special schools or classrooms. However, children who were more socially impaired experienced lower levels of victimization, regardless of placement. Rowley and colleagues suggested that this result may be due to the fact that children who were less socially impaired may have had more interest in social interactions, thus opening themselves up to rejection or ridicule when they tried to approach typically developing peers.

Despite the research comparing mainstream and more restrictive settings for children with ASD, little research has focused on the types of placements that are more appropriate for children who have comorbid psychiatric conditions, such as ADHD and anxiety.

**Research Questions**

The aims of the current study were to address the gaps in the current literature by focusing on the prevalence and presentation of ADHD and anxiety in a sample of young children with ASD. Prior research focused on youth with ASD in general and included wide age ranges (i.e. 4-18 or 10-14; Brereton et al., 2006; Simonoff et al., 2008). This sample was drawn from a larger study, looking at the transition to school for young children on the spectrum. Therefore, this study will add to the literature by also looking at the special education placement of these children as they begin to experience the demands of school. In particular, placement for children with comorbid anxiety and ADHD will be discussed. This study poses the following research questions:
1. What is the prevalence of clinically elevated anxiety and ADHD symptoms in a sample of young children with ASD?

2. How do anxiety and ADHD symptoms manifest in early childhood (children ages 4-5) and in the early school grades (children in K, 1, 2) as reported separately by parents and teachers?

3. Are children with clinically significant ADHD and anxiety symptoms also characterized by higher levels of autistic mannerisms and restricted and repetitive behaviors (RRBs)?

4. Are there differences in general and special education placement for young school-aged children with ASD and comorbid symptoms of anxiety and/or ADHD versus children without these comorbid conditions?

**Methods**

**Participants**

Participants in this study included 180 children ages 4 to 7 years old (147 boys, 33 girls), and their parents and teachers, who were participating in a longitudinal study across two sites in Southern California and Massachusetts. The purpose of the larger study was to examine factors that lead to a successful school transition for young children with ASD. Participants were referred to the study by local service agencies, schools, and state regional centers. Three cohorts of students were recruited, and all participations were subject to the same recruitment, eligibility and study procedures.

In order to meet enrollment criteria for the larger study, participants were required to have a previous clinical or school diagnosis of an autism spectrum disorder and an
intelligence quotient (IQ) on the Wechsler Preschool and Primary Scales of Intelligence (WPPSI-III; Wechsler, 2002) of 50 or above. All children were screened as part of the study with the Autism Diagnostic Observation Schedule for Children (ADOS-2, Lord et al., 2008). Children were classified under autism or autism spectrum if they met ADOS score cut off criteria. Participant scores on the WPPSI-III had a mean FSIQ score within average levels of cognitive functioning ($M = 87.71$, $SD = 17.73$) with 17.8% below IQ 70, or with comorbid intellectual disability.

Table 1 shows participant demographics. The children were predominantly male (81.7%) and primarily caucasian (62.8%). Only 40.3% of parents reported household incomes under $65,000. Mother education in this sample was defined by years of completed schooling. Overall, most mothers in our sample completed high school (97.2%), with more than half of mothers reporting completion of a college degree or higher (63.9%). The majority of participants were enrolled in public elementary schools (59.2%) and public preschool programs (10.1%), with only a small percentage (3.3%) enrolled in private schools.

**Procedure**

The Institutional Review Boards of the participating universities approved study procedures. Informed consent forms were mailed home, reviewed with parents and collected on the day of the child’s first assessment, after reviewing the form again. In nearly all cases (88.3%), the participating parent was mother. The parents completed measures of social skills and child behavior problems prior to each visit. Once deemed eligible, children were assessed during the fall (Time 1) and spring (Time 2) of the same
school year, and the winter (Time 3) of the following school year. During the visits, parents were also asked to give consent to their child’s teacher to provide information about the child and his or her school environment. Once consent and contact information were obtained, teachers were mailed various measures to complete.

During the on-site assessment, graduate student researchers trained in study procedures met separately with the child and mother to complete a variety of tasks. Activities with the mother included an interview on topics related to the child’s behavior, relationships with his or her teacher and peers, school experiences, and overall transition to school. Assessment of child behavior problems were obtained via mother-completed questionnaires.

**Measures**

Background information from the parent and child were obtained via a parent completed demographic questionnaire completed at the eligibility visit. Behavioral information was collected from parents and teachers at Time 2 and Time 3.

**Eligibility: Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, DiLavor, & Risi, 2008).** The ADOS is a standardized, semi-structured play-based observation of child behavior in situations that elicit autistic tendencies. There are four modules that can be administered, dependent on the child’s verbal ability. The observation yields scores in four domains: Social Interaction, Communication, Stereotyped Behaviors and Restricted Interests, and Play. Of these domains, only two, Social Interaction and Communication, are included in the algorithm for determining the child’s overall ADOS score. Individuals can fall into one of three categories resulting
from this score: autism, autism spectrum, or not on the autism spectrum. These categories are predetermined cut-off points provided in the ADOS manual based on the specific module that is being administered. The ADOS has established reliability and validity from research on a sample of children with a diagnosis of autism (Lord et al., 2008). The ADOS has high discriminative validity with high sensitivity (97%, 95%, and 90% across Modules 1 to 3, respectively) and specificity (94%, 87%, and 94%, across Modules 1 to 3, respectively) in discriminating between children with ASD and children without a spectrum disorder.

**Eligibility: Wechsler Preschool and Primary Scale of Intelligence, Second Edition (WPPSI-III; Wechsler, 2002).** Children’s cognitive skills were measured with the WPPSI-III. The WPPSI-III is composed of 14 subtests and yields an IQ score with M=100 and SD=15. For this study, a calculated Full Scale IQ (FSIQ) score was computed from an abbreviated measure of cognitive functioning, which included three subtests: block design, matrix reasoning and vocabulary subscales. This instrument is intended for use with children between the ages of 2:6 and 7:3 years of age. The selection of these three subtests was based on their established reliability (r = .95) and high predictive validity in gaining an estimate of cognitive ability (Sattler & Dumont, 2004).

**Child Behavior Checklist – Parent and Teacher Reports (CBCL and C-TRF).** Behavior problems were measured using parent and teacher report on the Child Behavior Checklist – Parent Report and the Teacher Report Form (CBCL and C-TRF; Achenbach & Rescorla, 2001). Parents and teachers were asked to complete the items
describing specific child behaviors on a three point Likert scale (0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true). Higher scores on subscales indicate greater levels of problematic behaviors. Depending on the child’s age, parents were either administered the CBCL for ages 1.5 to 5, or for ages 6 to 18. Teachers were administered the C-TRF for 1.5 to 5, or for ages 6 to 18. For the purposes of this study, only the Attention Deficit/Hyperactivity problems and Anxiety problems clinical scales obtained from parents and teachers at Time 2 were used. The Attention Deficit/Hyperactivity problems scale combines both the DSM diagnostic criteria for hyperactive-impulsive and inattentive types of ADHD. The Anxiety problems scale combines general anxiety disorder (GAD), social anxiety disorder (SAD), and specific phobia diagnostic criteria. A t-score between 65 and 69 indicates that the child is in the borderline range for the Attention Deficit/Hyperactivity problems and Anxiety problems clinical scales. A t-score of 70 or above indicates that the child is showing clinically elevated levels of ADHD and anxiety symptoms. For the purposes of this study, children scoring 65 or above on the Attention Deficit/Hyperactivity problems and/or Anxiety problems clinical scales were considered to have elevated levels of ADHD and/or anxiety symptoms.

The Attention Deficit/Hyperactivity problems scale for the CBCL and C-TRF has good test-retest reliability for the 1.5 to 5 versions (CBCL: $r = .74, p < .05$; C-TRF: $r = .79, p$ not significant) and for the 6 to 18 versions (CBCL: $r = .93, p < .05$; C-TRF: $r = .95, p < .05$). The Anxiety problems scale for the CBCL has good test-retest reliability for the 1.5 to 5 version ($r = .85, p$ not significant) and the 6 to 18 version ($r = .80, p < .05$).
However, the C-TRF has lower test-retest reliability for the Anxiety problems scale for both the 1.5 to 5 version ($r = .57$, $p < .05$) and the 6 to 18 version ($r = .73$, $p < .05$).

Reported correlations between parent and teacher reports for Attention Deficit/Hyperactivity problems scale are moderate (ages 1.5 to 5: .52; ages 6 to 18: .44; all $p's < .05$). For the Anxiety problems scale, reported correlations between parent and teacher reports are low (ages 1.5 to 5: .26; ages 6 to 18: .23; all $p's < .05$). There is strong evidence of discriminative, convergent and predictive validity. The Attention Deficit/Hyperactivity problems scale demonstrates construct validity with the Conners (1997) Parent Rating Scale-Revised (CPRS-R) and the Conners (1997) Teacher Rating Scale-Revised (CTRS-R), with correlations ranging from .71 to .85. The Anxiety problems scale demonstrates construct validity with the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992), with correlations ranging from .52 to .85.

**School Placement.** Parents were asked at Time 3 to report the child’s current school placement as stated in their IEP. They could select one of four options: (1) entire school day in special education, (2) most of the day in special education, (3) some of the day in special education but most of the day in general education, or (4) entire day in general education. These four placement categories were regrouped into two placements: (1) some, most, or all day in special education, or (2) all day in general education.

**Social Responsiveness Scale (SRS-2).** Autistic symptoms were measured using the Social Responsiveness Scale (SRS-2; Constantino & Gruber, 2005) at Time 1. The SRS-2 is a questionnaire that contains 65 items reflecting interpersonal behavior,
communication, and repetitive/stereotypic behaviors of children with ASD ages 4 to 18. Parents/caregivers report whether a statement about their child’s behavior is (1) not true, (2) sometimes true, (3) often true, or (4) always true. The SRS-2 yields a total score and five subscales: Social Awareness, Social Cognition, Social Communication, Social Motivation, and Autistic Mannerisms. A t-score of 60 or higher on any given subscale indicates that there is a deficit significant enough to warrant treatment. For this study, only the Autistic Mannerisms scale, which measures the severity of stereotypical behaviors and highly restricted interests, was used. The Autistic Mannerisms Scale has good internal reliability, measuring using Cronbach’s $\alpha$ ($\alpha = .90$). The higher the score, the greater the symptom presentation. There is strong evidence of discriminative, convergent and predictive validity. The SRS-2 demonstrates construct validity with the Autism Diagnostic Interview-Revised (ADI-R; Rutter et al., 2003), with correlations ranging from .52 to .79.

Results

Prevalence of ADHD and Anxiety

Parent-Reported Prevalence Rates. The first goal of the study was to determine the prevalence of ADHD and anxiety among a sample of young children using the parent reports on the Child Behavior Checklist (CBCL). Parent-reported rates are summarized in Tables 2 and 4. Among pre-school aged children (ages 4 to 5), only about 7% reported that their child was experiencing ADHD, but 16% reported that their child was experiencing anxiety. However, 15% reported that their child demonstrated behaviors reflective of clinical levels of both ADHD and anxiety. Despite this, the majority of
parents of preschool children with ASD (62%) reported that their child did not
demonstrate symptoms of ADHD or anxiety in the borderline or clinical range.

For slightly older children at the beginning of school (ages 6 to 7), the data looked
a bit different. Parent reports of ADHD increased, with 13% reporting symptom levels in
the borderline or clinically significant range; 18% reporting that their child was
experiencing significant levels of anxiety symptoms. The percentage of parents who
reported that their children had clinically elevated levels of both ADHD and anxiety
jumped to 32%, with only 37% of parents reporting that their child was not experiencing
significant levels of symptoms for either disorder. Taken together, the majority (63%) of
parents of young children with ASD (ages 4 to 7) reported that their child had at least one
comorbid mental health problem – clinically elevated ADHD and/or anxiety.

**Teacher-Reported Prevalence Rates.** Using the Child Behavior Checklist –
Teacher Report Form (C-TRF), teachers also reported the prevalence of ADHD and
anxiety symptoms in children with ASD. Teacher reported prevalence rates are
summarized in Tables 3 and 5. Among children pre-school aged children (ages 4-5; N =
64), 20.31% of teachers reported that the child was experiencing clinically elevated
ADHD and 4.69% reported that the child was experiencing clinically elevated anxiety
symptoms. No teachers reported that any of the preschool children in the sample were
experiencing clinical levels of both ADHD and anxiety. The vast majority of teachers
(75%) of these young children reported that the child in question did not have clinically
elevated symptoms of anxiety or ADHD.
Among children who were in their early school years (ages 6-7; \( N = 78 \)), 15.38% of teachers reported that their student had clinically elevated levels of both ADHD and anxiety symptoms, 8.97% reported that their student had clinically elevated ADHD but not anxiety, and 15.38% reported that their student had clinically elevated anxiety but not ADHD. Most teachers (60.26%) reported that their student had no ADHD or anxiety concerns.

Of note, there was a disparity between the parent- and teacher-reported rates of ADHD and anxiety problems. Of the 66 children across age groups that parents identified as having elevated ADHD symptoms (with or without anxiety), 51 of them had teacher-report data. Of those 51, teachers only identified 15 children with elevated levels of ADHD symptoms. This means that, when reporting ADHD problems, parents and teachers agreed only 29% of the time. In addition, of the 74 children across age groups that parents identified as having elevated anxiety symptoms (with or without ADHD), 57 of them had teacher-report data. Of those 57 children, teachers identified 11 with anxiety problems. Thus, when reporting anxiety problems, parents and teachers only agreed 19% of the time. Correlations between parent- and teacher-reported ADHD symptoms were quite modest for preschool children (\( r = .31; p = .02 \)); they uncorrelated for school-children (\( r = .19; p = .10 \)). Parent- and teacher-reported clinicially significant anxiety symptoms were also uncorrelated (preschool children: \( r = -.11, p = .40 \); school-aged children: \( r = .15, p = .20 \)).
All of the following analyses, unless specified otherwise, were conducted with children with clinically significant symptoms of anxiety and/or ADHD, i.e., borderline or above the t-score cut-off.

Presentation of ADHD and Anxiety

Next, this study sought to explore how anxiety and ADHD manifest in preschool and in the early school grades as reported by both parents and teachers. To examine this question, the sample was limited to preschool and school-aged children identified by their parents or teachers with clinically elevated anxiety or ADHD symptoms using the CBCL and C-TRF Attention Deficit/Hyperactivity problems scale and Anxiety problems scale. Then the individual items that made up the scales were examined in several different ways. First, a rank ordering of each of the items was performed. On the CBCL and C-TRF, parents and teachers rated particular items (behaviors) as either “0 – not true,” “1 – sometimes true,” and “2 – very true” for the child in question. However, to determine the rank order of the items on each scale, each item was dichotomized: “0 – not true” or “1 – sometimes or very true.” Each item was ranked from the most frequently reported to the least frequently reported. If two or more items were reported with the same frequency, then they were ranked according to which item was rated most frequently at the “2 – very true” level before the items were dichotomized. In addition to simply ranking the items in each scale, Spearman’s rank order correlation was performed comparing the common parent and teacher items to determine if parents and teachers were consistent with each other in rating some items more frequently than others. Consensus in the ranking of items between parents and teachers would mean that, across settings, children with ASD with
comorbid ADHD or anxiety tend to exhibit some ADHD- or anxiety-related behaviors more frequently than other behaviors.

Next, within each scale, item by item chi-square difference comparisons were made in order to determine if there were statistically significant differences between the distribution of responses on items reported by parents and teachers. Parent and teacher responses on common items were also compared for school-aged children using a chi-square difference test to identify whether there were significant differences in the distribution of parent- and teacher-reported responses to the ADHD or anxiety scale items. Parent- and teacher-report differences were not analyzed for preschool children since preschool teachers did not identify enough students with clinically significant symptoms of ADHD and anxiety.

**Parent-reported ADHD Items.** Based on the rank ordering of the ADHD items, parents of preschool children with ADHD (N = 19) most frequently reported poor concentration, hyperactivity, and difficulty waiting. Similarly, when the ADHD scale items rated by parents of school-aged children with ADHD (N = 42) were ranked, parents reported poor concentration, hyperactivity, and impulsivity more frequently. They were less likely to rate behaviors such as being unusually loud or talking too much. This may be because these behaviors are more socially motivated and, therefore, are less likely to be seen in children with ASD. Tables 6 and 7 display the rank ordering of the CBCL scales for preschool and school-aged children.

Comparing individual items, parents of preschool children reported specific ADHD behaviors more frequently than others. For instance, when rating preschool
children who were identified as having clinically significant symptoms of ADHD, all parents reported that their child had poor concentration (inattention), difficulty sitting still (hyperactivity), and difficulty waiting (impulsivity). In fact, chi square difference tests reveal that parents reported these behaviors significantly more frequently than they reported that their child shifts quickly from activities or that their child’s demands must be met (see Table 10 and Figures 1-6). However, there were no significant differences between parent-reported items on the ADHD scale for school-aged children.

**Teacher-reported ADHD Items.** Teacher-reported ADHD behaviors in preschool children with ADHD (N = 13) displayed a similar rank-order to parent-reported items. Teachers were more likely to report poor concentration, difficulty waiting, and difficulty following directions. They were less likely to report that students shifted quickly or got into everything (see Table 6). A rank ordering of items from teachers reports of school-aged children with ADHD (N = 19) reveal the three most commonly reported items are difficulty following directions, inattention, and difficulty concentrating. Teachers of school-aged children with ADHD were less likely to report that students were unusually loud or that students talked too much. These items were also the items that were least likely to be reported by parents of school-aged children with ADHD (see Table 7).

When conducting an item-by-item chi-square comparison of the teacher-reported ADHD items, there was no statistically significant difference between the items for either preschool or school-aged children. This means that there were no significant
differences between the distribution of teacher responses to the C-TRF ADHD items for either age group.

**Parent-reported Anxiety Items.** Based on the rank ordering of the Anxiety clinical scale items, parents reported that their preschool children with clinically elevated anxiety problems (N = 27) exhibited certain behaviors frequently, such as being too fearful, being too dependent, fearing certain animals, situations, or places, and being nervous. However, they were less likely to report that their preschool children with anxiety worried, did not want to leave the home, or experienced separation anxiety. Similarly, a rank ordering of the Anxiety scale items completed by parents of school-aged children with anxiety (N = 47) revealed that the same four items were the most frequently reported, albeit with slight differences in the rank ordering of the four items. Therefore, across age groups, fearfulness, phobic reactions, nervousness, and dependence seems to be common behaviors in children with ASD and comorbid anxiety problems, per parent report. Also, similar to reports of anxiety behaviors in preschool children, parents of school-aged children were less likely to report that their child experienced worry or fears of going to school.

Item by item chi-square difference comparisons of parent-reported Anxiety scale items revealed no significant differences between parent responses to items for preschool children with anxiety. For school-aged children with clinically elevated anxiety, worrying was reported significantly less frequently than fears ($\chi^2 = 9.39, p = .05$) and nervousness ($\chi^2 = 9.39, p = .05$). This suggests that anxiety symptoms in school-aged children with
ASD, as reported by parents, may be more characterized by nervousness and fears of certain persons, animals, and places rather than worrying.

**Teacher-reported Anxiety Items.** Teachers only identified three preschool children with clinically elevated anxiety, none of whom overlapped with parent-identified children with comorbid anxiety. This means that parents and teachers did not agree on their ratings of a single preschool child in our sample.

In examining the rank order of the anxiety items for children whom they did rate as having clinically elevated anxiety (N = 3), teachers still reported that the same four items that were most frequently reported by parents of preschool and school-aged children with anxiety: dependence, nervousness, fearfulness, and fears of certain animals, situations, and places. The rank order of anxiety items reported by teachers of school-aged children with anxiety (N = 24) revealed that nervousness was the most common behavior reported by teachers. The rank order also revealed that worries was also one of the items most likely to be reported by teachers, even though it was less frequently reported by parents of school-aged children with anxiety. Teachers were less likely to report that school-aged children with anxiety had fears of animals, situations, or places or feared going to school.

Teachers of school-aged children with elevated anxiety reported anxiety-related behaviors much less frequently than parents. However, there were no statistically significant differences between the distribution of teacher responses when conducting item by item chi-square difference comparisons between the Anxiety clinical scale items for either preschool or school-aged children.
**Parent- and Teacher-report Differences.** The most striking difference between parent and teachers reports of ADHD and anxiety behaviors is the fact that teachers are far less likely to report problem behaviors than parents, particularly in preschool children. We can see this in the percentage of children identified by parents and teachers as having clinically significant symptoms of ADHD (Parents: 33.9%; Teachers: 25%) or anxiety (Parents: N = 41.1%; Teachers: N = 19%). But we can also see it in the fact that, even among children they identified as having clinically significant ADHD or anxiety symptoms, teachers were much more likely to report that ADHD- or anxiety-related behaviors were “1 – sometimes true” rather than “2 – very true.”

To further analyze differences between parent- and teacher-reported ADHD and anxiety behaviors, a rank-order correlation was used to compare the rank order of common parent and teacher items on the ADHD and anxiety clinical scales for preschool and school-aged children. Spearman’s rank-order correlation measures the strength and direction of the monotonic relationship between ranked variables. Consensus in the ranking of common items between parents and teachers would mean that, across settings, children with ASD with comorbid ADHD or anxiety tended to exhibit some behaviors more frequently than others. Among preschool and school-aged children identified with ADHD, parent and teacher ranking of behaviors were highly correlated (Preschool: $\rho = .94$, $p = .005$; School-aged: $\rho = .79$, $p = .03$). This indicates that across home and school, parents and teachers were identifying similar behaviors in children with ASD and comorbid ADHD. However, parent and teacher rankings of anxiety-related behaviors were uncorrelated for both preschool and school-aged children (Preschool: $\rho = .67$, $p =$
.15; School-aged: $\rho = .46, p = .35$). This would indicate that there was not consensus among parents and teachers about the types of anxiety-related behaviors in children with ASD and comorbid anxiety. This may be due to the fact that anxiety behaviors, which are internal in nature and more covert than externalizing behaviors, are more difficult for parents and teachers to identify.

In addition, chi-square difference tests were used to compare common items on the parent and teacher versions of the ADHD and anxiety clinical scales for students whom both parents and teachers identified as falling in the clinically significant range on either scale. However, because parents and teachers seldom agreed on the identification of preschool children with clinically elevated ADHD or anxiety, only differences between parent- and teacher-report of school-aged child behavior were analyzed.

Among school-aged children that both parents and teachers identified with clinically significant ADHD symptoms ($N = 9$), parents were significantly more likely than teachers to report that their child talked too much ($\chi^2 = 9.56, p = .05$) or was too loud ($\chi^2 = 6.30, p = .04$). It may be that teachers are more accustomed to children talking too much or too loudly in the classroom or, perhaps, children with ASD and comorbid ADHD are more comfortable talking to the parents than they are to their peers and teachers. There were no significant differences in comparing parent and teacher responses to anxiety items for school-aged children.

**Comorbidity and Autistic Mannerisms**

The third question this study addressed was whether children with clinically significant ADHD and anxiety symptoms also experienced greater autistic mannerisms
and restricted and repetitive behaviors (RRBs). To examine this question a bivariate Pearson correlation was used, which produces a sample correlation coefficient, $r$, that measures the strength and direction of linear relationships between continuous variables. Parent-reported CBCL Anxiety Problems and Attention Deficit/Hyperactivity problems clinical scale t-scores were correlated with the parent-reported SRS Autistic Mannerism subscale t-scores and the ADOS Restricted and Repetitive Behaviors (RRBs) domain score. Among pre-school children, ages five and under, autistic mannerisms were moderately correlated with anxiety problems ($r = .46$, $p < .001$) and strongly correlated with ADHD ($r = .57$, $p < .001$). There was no significant relationship between parent-reported anxiety and ADHD symptoms and observed RRBs during the ADOS assessment among preschool children (Anxiety: $r = -.19, p = .08$; ADHD: $r = -.03, p = .77$). Among school-aged children, ages 6-7 years, autistic mannerisms were moderately correlated with anxiety and ADHD problems (Anxiety: $r = .36, p = .001$; ADHD: $r = .39, p < .001$). There was no significant relationship between parent-reported anxiety and ADHD symptoms and observed RRBs during the ADOS assessment among young school-aged children (Anxiety: $r = -.03, p = .77$; ADHD: $r = -.11, p = .32$). These results indicate that preschool and school-aged children who experienced more anxiety and ADHD symptoms, per parent-report, also tended to display more parent-reported stereotypical behaviors and highly restricted interests characteristic of autistic mannerisms. However, when parent-reported anxiety and ADHD symptoms were correlated with observational data obtained during evaluation using the ADOS, there was no significant relationship between anxiety or ADHD and observed restricted and repetitive interests and behaviors.
School Placement

The final question addressed by this study is whether there are differences in class placement (either general or special education), as measured the following school year, for children with ASD and comorbid anxiety and/or ADHD versus children without these symptoms. Children were classified into one of four groups: those with anxiety only, those with ADHD only, those with both anxiety and ADHD, and those with neither anxiety nor ADHD. Using a chi-square test of independence, the special education placement of those who either had any clinically significant symptoms (i.e., anxiety, ADHD, or both) were compared to the special education placement of children without any significant comorbid conditions. A chi-square test could be used because the groups being compared were independent. Special education placement was defined as spending some, most or all of the day in a special education class or spending the entire day in a general education setting. Children were not separated into age groups (pre-school vs. school-aged) in order to increase statistical power.

First, all children whose parents reported clinically elevated levels of both ADHD and anxiety (N = 43) and those whose parents did not report clinical levels of these comorbid conditions (N = 88) were compared. There was no difference in the special education placement of these two groups ($\chi^2 = .00, p = .99, df = 1$). However, in comparing those children whose teachers had reported clinical levels of both ADHD and anxiety (N = 12) against those whose teachers reported no concerns (N = 95), there was a difference in special education placement. Children with teacher-reported ADHD and anxiety were less likely to be in a general education setting ($\chi^2 = 5.61, p = .02, df = 1$).
The difference in special education placement between the groups is displayed in Table 11 and Figure 9.

Next, the special education placement of children whose parents reported clinically elevated ADHD (N = 18) and those whose parents reported no clinical concerns (i.e., no ADHD or anxiety concerns, N = 88) were compared. There was no significant difference in the special education placement of these two groups ($\chi^2 = 3.64, p = .06, df = 1$). In addition, when comparing the special education placement of children with teacher-reported ADHD (N = 20) versus those with no teacher-reported ADHD or anxiety concerns (N = 95), we see a significant difference ($\chi^2 = 4.88, p = .03, df = 1$). Children with teacher-reported ADHD are less likely to be placed in general education settings for the whole day. The difference in special education placement between the groups is displayed in Table 12 and Figure 10.

Finally, the special education placement of children whose parents reported clinically elevated anxiety (N = 31) and those whose parents reported no ADHD or anxiety concerns (N = 88) were compared. There was no difference in the special education placement of these two groups ($\chi^2 = .31, p = .58, df = 1$). Likewise, when comparing children with teacher-reported anxiety (N = 15) versus those with no teacher-reported concerns (N = 95), we do not see a significant difference in special education placement ($\chi^2 = 2.40, p = .12, df = 1$).

**Discussion**

Children with ASD frequently experience comorbid ADHD and anxiety disorders, leading them to have numerous behavioral and emotional challenges which may impact
their ability to function at school. The early school transition years can be particularly difficult for these children, who are experiencing new, challenging task demands in addition to having additive risk factors (e.g., behavior problems, social and emotional difficulties) that increase the likelihood of academic problems. Unfortunately, most studies that look at psychiatric comorbidity in children with ASD have used samples of children from a wide variety of ages or samples of adolescents (i.e. 4-18 or 10-14; Brereton et al., 2006; Simonoff et al., 2008). This study contributed to the literature by examining the prevalence and presentation of the two most common comorbid psychiatric conditions – ADHD and anxiety – in a sample of young children with ASD (ages 4-7 years). In addition, this study also examined the special education placement of these children as they begin to experience the demands of school, particularly when they have the added challenges of comorbid ADHD or anxiety symptoms.

The first aim of this study was to determine the prevalence of parent- and teacher-reported ADHD and anxiety disorders using the CBCL and C-TRF, respectively. As expected based on previous research (Brereton et al., 2006; Simonoff et al., 2008), a large proportion of children in this study experienced emotional and behavioral difficulties. Both parents and teachers reported that anxiety and ADHD problems were more prevalent for school-aged children than for pre-school children, which may be due to increased task demands placed on students as they enter school. Greater and more challenging task demands may lead these children to exhibit more problem behaviors. Despite their wide usage and psychometric strengths, it is also possible that the CBCL and C-TRF are less sensitive to identifying these disorders in younger children.
This study also found a large disparity between parent and teacher report, with teachers endorsing fewer problem behaviors. This is consistent with previous research that found a disparity between parent- and teacher-report of problem behaviors in children with ASD on the CBCL and C-TRF (Kanne, Abbacchi, & Constantino, 2009). A meta-analysis by Stratis and Lecavalier (2015) also examined the informant agreement for youth with ASD or intellectual disability (ID) and typically developing (TD) youth. They found that, for all groups, ASD, ID and the TD, parents and teachers demonstrated low levels of informant agreement and that agreement was higher for externalizing problem behaviors than for internalizing behaviors. The findings of the current study are congruent with the Stratis and Lecavalier meta-analysis, since the percentage of parents versus teachers identifying students with ADHD concerns (which include more externalizing behaviors) was not as disparate as the percentage of parents versus teachers identifying students with anxiety concerns (which include more internalizing behaviors). In fact, among the 64 teachers who rated the behaviors of their preschool students with ASD, only three reported anxiety concerns. This finding is congruent with the extensive research literature that shows teachers have more difficulty identifying students who are at-risk for internalizing behavior problems than those at-risk for externalizing behavior problems (Pearcy et al., 1993; Stanger & Lewis, 1995; Jepsen et al., 2012).

The informant discrepancies between parents and teachers could be due to multiple factors. Kanne et al. (2009) at first hypothesized that parents and teachers may be observing the same behaviors, but rating them at different levels of severity; however, their own analysis indicated that this was not the case. They were also able to rule out
rater-bias by comparing the inter-rater agreement between parents and teachers when rating the behaviors of youth with ASD versus their typically developing siblings. Interrater agreement was much higher when parents and teachers were rating the TD siblings, suggesting that rater-bias did not account for the discrepancy in the rating of youth with ASD. Kanne et al. believe that these findings provide evidence that, for youth with ASD, problem behaviors are manifested differently across environmental contexts. Applied to the current study, the Kanne et al. finding suggests that the informant discrepancies are a result of the observation of different behaviors at home and at school. It might also be that typically developing children are easier to rate than children with ASD, leading to discrepancies between parent and teacher ratings for children on the spectrum. Therefore, the use of multiple informants is especially important when describing or assessing young children with ASD.

The second aim of the study was determine how ADHD and anxiety manifest, per parent- and teacher-report, for preschool and young school-aged children. When looking at students who had elevated scores on the ADHD clinical scales, parents and teachers both reported inattention, hyperactivity, and impulsivity frequently. However, in preschool children, they were significantly less likely to report that students shift quickly from activities and or that their demands must be met. In school-aged children, parents and teachers tended to report behaviors that occur in a social context, such as talking too much, being too loud, disturbing others, and disrupting the classroom, less frequently than other problem behaviors. This is likely due to the lack of interest in social situations
that is characteristic of children with ASD, which reduces the opportunity for these socially motivated disruptive behaviors.

Symptoms of clinically significant anxiety, when reported by parents and teachers, included nervousness and fears of certain animals, situations, or places. These findings are in accord with previous research which showed high rates of specific phobias among children with ASD (Leyfer et al., 2006; van Steensel et al., 2001), and is age-appropriate (Biederman et al., 1990). In addition, this study found developmentally appropriate differences in specific anxiety symptoms, such as dependence, which was reported as a frequent behavior by parents of preschool children but was not reported as frequently by parents of school-aged children. Some behaviors were reported less frequently for both age groups, such as worrying. Somewhat surprisingly, separation anxiety was not as frequently reported as other behaviors, such as fears and dependence, in preschool children.

When comparing parent and teacher reports of child anxiety- and ADHD-related behaviors, teachers were considerably less likely to report behavior problems than parents, particularly in preschool children with anxiety. Out of all the preschool children who had teacher report data (N = 64), teachers only identified three preschool children with clinically elevated anxiety problems. None of the preschool children whose parents identified with anxiety were identified by teachers. Across the age groups, teachers identified children with ADHD and anxiety at about half the rate that parents identified children.
Differences in the rank order of parent and teacher reports of specific symptoms revealed that they were identifying similar behaviors in children with ASD and comorbid ADHD across the home and school environments. However, the rank order correlations revealed that there was no consensus among parents and teachers about the types of anxiety-related behaviors that are more or less frequent in children with ASD and comorbid anxiety. This is likely due to the fact that internalizing behaviors, such as symptoms of anxiety, are more difficult for parents and teachers to identify because they are more covert in nature than externalizing behaviors. In particular, prior research has shown that teachers are less sensitive to child anxiety symptoms in the classroom, where internalizing behaviors frequently go unnoticed. (Jepsen et al., 2012).

The third aim of the study attempted to determine whether children with ADHD and anxiety also demonstrated greater levels of autistic mannerisms and restricted and repetitive behaviors (RRBs). Among preschool and school-aged children, the SRS Autistic Mannerisms scale, which measures symptoms of RRBs in children with ASD, was moderately correlated with parent-reported anxiety and ADHD symptoms. These results are in accord with a recent study conducted by Stratis and Lecavalier (2013) which found that RRBs are predictive of many comorbid psychiatric disorders. Specifically, they found that ritualistic and rigid behaviors are predictive of anxiety while stereotypic movements are more predictive of ADHD. In addition, Wood and Gadow (2010) theorized that the repetition and pattern of perseverative interests in ASD may be indicative of underlying cognitive dispositions which increase the risk that these children will become “stuck” on thoughts related to threat, safety, loss, or low self-worth.
Overtime, these thoughts may contribute to an anxiety disorder or other internalizing problems. Understanding that RRBs are related to comorbid psychiatric disorders, particularly anxiety and ADHD, will help to clarify the presentation of these disorders in children with ASD, and may eventually aid in the identification of these comorbid conditions.

Finally, the fourth aim of the study was to examine the role that symptoms of anxiety and ADHD played in the child’s school placement setting. Children with teacher-reported ADHD and anxiety, or just ADHD, were less likely to be in a general education setting than children with no teacher-reported concerns. There was no significant difference in placement between children with parent- or teacher-reported comorbid anxiety and those with no parent- or teacher-reported comorbid concerns. These results suggest that teacher perception of the child’s ADHD-related problem behaviors is strongly associated with school placement. Those students who are identified by teachers in the clinically significant range on the C-TRF ADHD scale are less likely to spend all day in the general education setting, suggesting that parent concerns may not be as important in the determination of special education placement for students. This may explain why so many parents are unhappy with the services they are receiving in the schools and with the level of inclusion that their children experience (Bitterman, Daley, Misra, Carlson, & Markowitz, 2008; Kohler, 1999).

Limitations and Future Directions

There are several limitations that prevented a more comprehensive assessment of anxiety and ADHD in our sample. First, the study utilized only one measure of ADHD
and anxiety, the narrow-band clinical scales included in the Child Behavior Checklist (CBCL) and corresponding Teacher Report Form (C-TRF). Although the test-retest reliability of these scales is highly acceptable, and we had both a parent- and teacher-report of these clinical scales, a more comprehensive rating scale and a parent and teacher interview, such as the Diagnostic Interview Schedule for Children (DISC-IV), would have provided additional information. Nevertheless, by having both parent and teacher ratings, the problem of shared method variance was avoided. Second, the CBCL and corresponding C-TRF do not break down the Anxiety Problems clinical scale into specific anxiety disorders, such as specific phobias, obsessive compulsive disorder, social anxiety, or separation anxiety. While not of interest in this study, future researchers focusing on specific anxiety disorders will want to add an additional measure. Third, the Attention Deficit/Hyperactivity problems scale does not specify whether children have the inattentive, hyperactive, or combined types of ADHD, although the examination at the item-level was certainly instructive.

Finally, because the study included a sample of young children with relatively high functioning (mean IQ = 88), these findings do not apply to all children on the autism spectrum. However, due to the increasing prevalence of ASD, general education teachers are more likely to encounter students with autism spectrum disorder in their classrooms who have IQs in the typical range, as well as comorbid anxiety and/or ADHD disorders. Future work should continue to examine the presentation of these comorbid disorders in young children with autism toward developing and providing the appropriate services to help them succeed in the early school years.
References


Table 1

Participant Demographics

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<tr>
<td>SRS Autistic Mannerisms</td>
<td>79.97 (11.63)</td>
</tr>
<tr>
<td>ADOS RRB Score</td>
<td>4.13 (2.031)</td>
</tr>
<tr>
<td>CBCL 1.5-5 years Anxiety Clinical Scale</td>
<td>60.73 (11.33)</td>
</tr>
<tr>
<td>CBCL 1.5-5 years ADHD Clinical Scale</td>
<td>59.06 (8.17)</td>
</tr>
<tr>
<td>CBCL 6-18 years Anxiety Clinical Scale</td>
<td>62.69 (8.72)</td>
</tr>
<tr>
<td>CBCL 6-18 years ADHD Clinical Scale</td>
<td>63.34 (8.44)</td>
</tr>
<tr>
<td><strong>Special Education Placement</strong></td>
<td></td>
</tr>
<tr>
<td>General Education All Day</td>
<td>39.9%</td>
</tr>
<tr>
<td>All or Most of the Day in Special Education</td>
<td>46.2%</td>
</tr>
<tr>
<td>Special Education All Day</td>
<td>13.9%</td>
</tr>
<tr>
<td><strong>Mothers</strong></td>
<td></td>
</tr>
<tr>
<td>Income (% &gt;$65,000)</td>
<td>40.3%</td>
</tr>
<tr>
<td>Mother’s Education (% college degree or higher)</td>
<td>63.9%</td>
</tr>
</tbody>
</table>

*Notes.* 9.4% Latino, 7.7% Asian, 4.1% African American, and 1.7% Alaskan Native/Native American/ or Indigenous, .6% Pacific Islander/Native Hawaiian, 4.4% Multiracial.
Table 2

*Parent-reported Prevalence of Anxiety and ADHD*

<table>
<thead>
<tr>
<th></th>
<th>Both ADHD and Anxiety n (%)</th>
<th>ADHD n (%)</th>
<th>Anxiety n (%)</th>
<th>Neither n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children ages 5 and under (Total N = 86)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13 (15.1%)</td>
<td>6 (6.9%)</td>
<td>14 (16.3%)</td>
<td>53 (61.6%)</td>
</tr>
<tr>
<td><strong>Children ages 6 and over (Total N = 94)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 (31.9%)</td>
<td>12 (12.8%)</td>
<td>17 (18.1%)</td>
<td>35 (37.2%)</td>
</tr>
<tr>
<td><strong>All Children (Total N = 180)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>43 (23.9%)</td>
<td>18 (10%)</td>
<td>31 (17%)</td>
<td>88 (48.9%)</td>
</tr>
</tbody>
</table>

*Notes.* Clinically elevated levels of ADHD and/or anxiety were defined as T-scores of 65 or above on the CBCL Attention Deficit/Hyperactivity problems and/or Anxiety problems clinical scales.
Table 3

Teacher-reported Prevalence of Anxiety and ADHD

<table>
<thead>
<tr>
<th></th>
<th>Both ADHD and Anxiety n (%)</th>
<th>ADHD n (%)</th>
<th>Anxiety n (%)</th>
<th>Neither n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children ages 5 and under (Total N = 64)</strong></td>
<td>0 (0%)</td>
<td>13 (20.3%)</td>
<td>3 (4.7%)</td>
<td>48 (75.0%)</td>
</tr>
<tr>
<td><strong>Children ages 6 and over (Total N = 78)</strong></td>
<td>12 (15.4%)</td>
<td>7 (8.9%)</td>
<td>12 (15.4%)</td>
<td>47 (60.3%)</td>
</tr>
<tr>
<td><strong>All Children (Total N = 180)</strong></td>
<td>12 (8.5%)</td>
<td>20 (14.1%)</td>
<td>15 (10.6%)</td>
<td>95 (66.9%)</td>
</tr>
</tbody>
</table>

Notes. Clinically elevated levels of ADHD and/or anxiety were defined as T-scores of 65 or above on the C-TRF Attention Deficit/Hyperactivity problems and/or Anxiety problems clinical scales.
Table 4

*Parent-reported Prevalence Rates of Borderline- and Clinically-Elevated Anxiety and ADHD*

<table>
<thead>
<tr>
<th></th>
<th>ADHD n (%)</th>
<th>Anxiety n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children ages 5 and under (N = 86)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borderline</td>
<td>5 (5.8%)</td>
<td>7 (8.1%)</td>
</tr>
<tr>
<td>Clinical</td>
<td>14 (16.3%)</td>
<td>20 (23.3%)</td>
</tr>
<tr>
<td><strong>Children ages 6 and over (N = 94)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borderline</td>
<td>19 (20.2%)</td>
<td>19 (20.2%)</td>
</tr>
<tr>
<td>Clinical</td>
<td>23 (24.5%)</td>
<td>28 (29.8%)</td>
</tr>
</tbody>
</table>

*Notes.* Clinically elevated levels of ADHD and/or anxiety were defined as T-scores of 65 or above on the C-TRF Attention Deficit/Hyperactivity problems and/or Anxiety problems clinical scales.
Table 5

Teacher-reported Prevalence Rates of Borderline- and Clinically-Elevated Anxiety and ADHD

<table>
<thead>
<tr>
<th></th>
<th>ADHD n (%)</th>
<th>Anxiety n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children ages 5 and under (Total N = 64)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borderline</td>
<td>7 (10.9%)</td>
<td>2 (3.1%)</td>
</tr>
<tr>
<td>Clinical</td>
<td>6 (9.4%)</td>
<td>1 (1.6%)</td>
</tr>
<tr>
<td><strong>Children ages 6 and over (Total N = 78)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borderline</td>
<td>16 (20.5%)</td>
<td>15 (19.2%)</td>
</tr>
<tr>
<td>Clinical</td>
<td>3 (3.8%)</td>
<td>9 (11.5%)</td>
</tr>
</tbody>
</table>

*Notes.* Clinically elevated levels of ADHD and/or anxiety were defined as T-scores of 65 or above on the C-TRF Attention Deficit/Hyperactivity problems and/or Anxiety problems clinical scales.
Table 6

*Rank Order of Items on the CBCL and C-TRF Attention Deficit/Hyperactivity Clinical Scales for Preschool Children with Elevated ADHD*

<table>
<thead>
<tr>
<th>Rank Order of CBCL ADHD Items (1.5-5 years)</th>
<th>% Parents Reporting Sometimes/ Very True</th>
<th>Rank Order of C-TRF ADHD Items (1.5-5 years)</th>
<th>% Teachers Reporting Sometimes/ Very True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. #5 Can’t concentrate</td>
<td>100%</td>
<td>1. #5 Can’t concentrate</td>
<td>100%</td>
</tr>
<tr>
<td>1. #6 Can’t sit still</td>
<td>100%</td>
<td>2. #8 Can’t stand waiting</td>
<td>100%</td>
</tr>
<tr>
<td>1. #8 Can’t stand waiting</td>
<td>100%</td>
<td>2. #23 Difficulty following directions</td>
<td>100%</td>
</tr>
<tr>
<td>2. #16 Demands must be met immediately</td>
<td>94.7%</td>
<td>3. #6 Can’t sit still</td>
<td>92.3%</td>
</tr>
<tr>
<td>3. #59 Quickly shifts</td>
<td>89.5%</td>
<td>4. #16 Demands must be met immediately</td>
<td>92.3%</td>
</tr>
<tr>
<td>4. #36 Gets into everything</td>
<td>84.2%</td>
<td>5. #19 Daydreams</td>
<td>84.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. #28 Disturbs other children</td>
<td>84.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. #59 Quickly shifts</td>
<td>76.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. #36 Gets into everything</td>
<td>69.2%</td>
</tr>
</tbody>
</table>

*Notes.* Common parent and teacher items are bolded.
Table 7

*Rank Order of Items on the CBCL and C-TRF Attention Deficit/Hyperactivity Clinical Scales for School-aged Children with Elevated ADHD*

<table>
<thead>
<tr>
<th>Rank Order of CBCL ADHD Items (6-18 years)</th>
<th>% Parents Reporting Sometimes/Very True</th>
<th>Rank Order of C-TRF ADHD Items (6-18 years)</th>
<th>% Teachers Reporting Sometimes/Very True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. #8 Can’t concentrate</td>
<td>100%</td>
<td>1. #22 Difficulty following directions</td>
<td>100%</td>
</tr>
<tr>
<td>2. #10 Can’t sit still</td>
<td>100%</td>
<td>2. #78 Inattentive</td>
<td>93.4%</td>
</tr>
<tr>
<td>3. #41 Impulsive</td>
<td>100%</td>
<td>3. #8 Can’t concentrate</td>
<td>93.3%</td>
</tr>
<tr>
<td>4. #78 Inattentive</td>
<td>97.6%</td>
<td>4. #15 Fidgets</td>
<td>93.3%</td>
</tr>
<tr>
<td>5. #4 Fails to finish</td>
<td>95.2%</td>
<td>5. #10 Can’t sit still</td>
<td>93.3%</td>
</tr>
<tr>
<td>6. #104 Unusually loud</td>
<td>88.1%</td>
<td>6. #41 Impulsive</td>
<td>93.3%</td>
</tr>
<tr>
<td>7. #93 Talks too much</td>
<td>69%</td>
<td>7. #53 Talks out</td>
<td>86.7%</td>
</tr>
<tr>
<td>8. #4 Fails to finish</td>
<td></td>
<td></td>
<td>86.6%</td>
</tr>
<tr>
<td>9. #100 Fails to carry out assigned work</td>
<td></td>
<td></td>
<td>73.3%</td>
</tr>
<tr>
<td>10. #24 Disturbs other children</td>
<td></td>
<td></td>
<td>66.7%</td>
</tr>
<tr>
<td>11. #67 Disrupts class discipline</td>
<td></td>
<td></td>
<td>66.7%</td>
</tr>
<tr>
<td>12. #104 Unusually loud</td>
<td></td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>13. #93 Talks too much</td>
<td></td>
<td></td>
<td>60%</td>
</tr>
</tbody>
</table>

*Notes.* Common parent and teacher items are bolded.
Table 8

*Rank Order of Items on the CBCL and C-TRF Anxiety Clinical Scales for Preschool Children with Elevated Anxiety*

<table>
<thead>
<tr>
<th>Rank Order of CBCL Anxiety Items (1.5-5 years)</th>
<th>% Parents Reporting Sometimes/Very True</th>
<th>Rank Order of C-TRF Anxiety Items (1.5-5 years)</th>
<th>% Teachers Reporting Sometimes/Very True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. #87 Too fearful</td>
<td>96.3%</td>
<td>1. #10 Too dependent</td>
<td>100%</td>
</tr>
<tr>
<td>2. #10 Too dependent</td>
<td>92.6%</td>
<td>1. #47 Nervous</td>
<td>100%</td>
</tr>
<tr>
<td>3. #32 Fears of animals, situations, or places</td>
<td>88.9%</td>
<td>2. #87 Too fearful</td>
<td>66.7%</td>
</tr>
<tr>
<td>4. #47 Nervous</td>
<td>88.9%</td>
<td>3. #32 Fears of animals, situations, or places</td>
<td>66.7%</td>
</tr>
<tr>
<td>5. #22 Doesn’t want to sleep alone</td>
<td>81.5%</td>
<td>4. #99 Worries</td>
<td>66.7%</td>
</tr>
<tr>
<td>6. #51 Panic</td>
<td>66.7%</td>
<td>5. #37 Gets upset when separated from parents</td>
<td>33.3%</td>
</tr>
<tr>
<td>7. #48 Nightmares</td>
<td>66.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. #99 Worries</td>
<td>66.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. #28 Doesn’t want to go out of the home</td>
<td>55.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. #37 Gets upset when separated from parents</td>
<td>55.6%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Notes.* Common parent and teacher items are bolded.
Table 9

*Rank Order of Items on the CBCL and C-TRF Anxiety Clinical Scales for School-aged Children with Elevated Anxiety*

<table>
<thead>
<tr>
<th>Rank Order of CBCL Anxiety Items (6-18 years)</th>
<th>% Parents Reporting Sometimes/Very True</th>
<th>Rank Order of C-TRF Anxiety Items (6-18 years)</th>
<th>% Teachers Reporting Sometimes/Very True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. #45 Nervous</td>
<td>91.5%</td>
<td>1. #45 Nervous</td>
<td>94.4%</td>
</tr>
<tr>
<td>2. #29 Fears of animals, situations, or places</td>
<td>85.1%</td>
<td>2. #112 Worries</td>
<td>77.8%</td>
</tr>
<tr>
<td>3. #50 Too fearful</td>
<td>83%</td>
<td>3. #50 Too fearful</td>
<td>72.2%</td>
</tr>
<tr>
<td>4. #11 Too dependent</td>
<td>88.9%</td>
<td>3. #11 Too dependent</td>
<td>72.2%</td>
</tr>
<tr>
<td>5. #112 Worries</td>
<td>81.5%</td>
<td>4. #29 Fears of animals, situations, or places</td>
<td>33.3%</td>
</tr>
<tr>
<td>6. #30 Fears school</td>
<td>66.7%</td>
<td>5. #30 Fears school</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

*Notes.* Common parent and teacher items are bolded.
Table 10

*Chi-Square Test of Independence Comparing Parent-reported Items on the CBCL Attention Deficit/Hyperactivity Clinical Scale for Preschool Children*

<table>
<thead>
<tr>
<th>Items</th>
<th>N</th>
<th>( \chi^2 )</th>
<th>p</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Can’t concentrate vs. 59. Shifts quickly</td>
<td>19</td>
<td>9.0*</td>
<td>.01</td>
<td>4</td>
</tr>
<tr>
<td>5. Can’t concentrate vs. 16. Demands Must be Met</td>
<td>19</td>
<td>19.0***</td>
<td>&lt;.001</td>
<td>4</td>
</tr>
<tr>
<td>6. Can’t sit still vs. 59. Shifts quickly</td>
<td>19</td>
<td>9.0*</td>
<td>.01</td>
<td>4</td>
</tr>
<tr>
<td>6. Can’t sit still vs. 16. Demands Must be Met</td>
<td>19</td>
<td>19.0***</td>
<td>&lt;.001</td>
<td>4</td>
</tr>
<tr>
<td>8. Can’t wait vs. 59. Shifts quickly</td>
<td>19</td>
<td>9.0*</td>
<td>.01</td>
<td>4</td>
</tr>
<tr>
<td>8. Can’t wait vs. 16. Demands Must be Met</td>
<td>19</td>
<td>19.0***</td>
<td>&lt;.001</td>
<td>4</td>
</tr>
</tbody>
</table>

*Notes. * *p < .05, **p < .01, ***p < .001*
Table 11

Chi-Square Test of Independence Comparing the Special Education Placement of Children with BOTH ADHD and Anxiety versus Children with No ADHD or Anxiety

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>( \chi^2 )</th>
<th>( p )</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parent</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sped Placement of Students with ADHD &amp; Anx vs. No Concerns</td>
<td>115</td>
<td>.00</td>
<td>.99</td>
<td>1</td>
</tr>
<tr>
<td><strong>Teacher</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sped Placement of Students with ADHD &amp; Anx vs. No Concerns</td>
<td>88</td>
<td>5.61*</td>
<td>.02</td>
<td>1</td>
</tr>
</tbody>
</table>

*Notes. * \( p < .05 \), ** \( p < .01 \), *** \( p < .001 \)
Table 12

Chi-Square Test of Independence Comparing the Special Education Placement of Children with ADHD versus Children with No ADHD or Anxiety

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>$\chi^2$</th>
<th>$p$</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parent</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sped Placement of Students with ADHD vs. No Concerns</td>
<td>96</td>
<td>3.64</td>
<td>.06</td>
<td>1</td>
</tr>
<tr>
<td><strong>Teacher</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sped Placement of Students with ADHD vs. No Concerns</td>
<td>95</td>
<td>4.88*</td>
<td>.03</td>
<td>1</td>
</tr>
</tbody>
</table>

*Notes.* *p* < .05, **p** < .01, ***p*** < .001
Figure 1

Distribution of Parent Responses on Items #5 and #16 on the CBCL Attention Deficit/Hyperactivity Clinical Scale for Preschool Children with Clinically Elevated ADHD (N=19)

$\chi^2 = 19.0$, $p < .001$, $df = 4$
Figure 2

Distribution of Parent Responses on Items #5 and #59 on the CBCL Attention Deficit/Hyperactivity Clinical Scale for Preschool Children with Clinically Elevated ADHD (N=19)

\[ \chi^2 = 9.0, \ p = .01, \ df = 4 \]
Figure 3

Distribution of Parent Responses on Items #6 and #16 on the CBCL Attention Deficit/Hyperactivity Clinical Scale for Preschool Children with Clinically Elevated ADHD (N=19)

χ² = 19.0, p < .001, df = 4
Figure 4

Distribution of Parent Responses on Items #6 and #59 on the CBCL Attention Deficit/Hyperactivity Clinical Scale for Preschool Children with Clinically Elevated ADHD (N=19)

$\chi^2 = 9.0, p = .01, df = 4$
Figure 5

Distribution of Parent Responses on Items #8 and #16 on the CBCL Attention Deficit/Hyperactivity Clinical Scale for Preschool Children with Clinically Elevated ADHD (N=19)

$\chi^2 = 19.0, p < .001, df = 4$
Figure 6

*Distribution of Parent Responses on Items #8 and #59 on the CBCL Attention Deficit/Hyperactivity Clinical Scale for Preschool Children with Clinically Elevated ADHD (N=19)*

\[ \chi^2 = 9.0, \ p = .01, \ df = 4 \]
Figure 7

Distribution of Parent Responses on Items #29 and #112 on the CBCL Anxiety Clinical Scale for School-aged Children with Clinically Elevated Anxiety (N=47)

χ² = 9.4, p = .05, df = 4
Figure 8

*Distribution of Parent Responses on Items #45 and #112 on the CBCL Anxiety Clinical Scale for School-aged Children with Clinically Elevated Anxiety (N = 47)*

\[ \chi^2 = 9.5, \ p = .05, \ df = 4 \]
Figure 9

*Special Education Placement of Children whose Teachers Reported BOTH ADHD and Anxiety versus Children with No Teacher-Reported ADHD or Anxiety Concerns*

![Bar Chart](Image)
Figure 10

*Special Education Placement of Children with Teacher-Reported ADHD versus Children with No Teacher-Reported ADHD or Anxiety*

Bar Chart

**Clinical Groups:** ADHD & Anx, ADHD, Anx, or No Concerns (Teacher)