A BEHAVIORAL PROFILE OF PRESCHOOL-AGED CHILDREN WITH AUTISM SPECTRUM DISORDERS

by

KATHRYN FOUNTAIN MOON

(Under the Direction of Jonathan M. Campbell)

ABSTRACT

The purpose of the current study was to determine if a behavioral profile for preschool-aged children with autism spectrum disorders could be detected using the Parent Rating Scale, Preschool form of the Behavior Assessment System for Children (BASC PRS-P; Reynolds & Kamphaus, 1992). Subjects included103 preschool-aged children diagnosed with autism spectrum disorders, 30 children diagnosed with language disorders, and 535 children from the normative sample of the BASC PRS-P.

As hypothesized, at-risk scores were obtained for children with autism spectrum disorders on the Atypicality, Withdrawal, Attention Problems, Adaptability, and Social Skills scales. Significant differences were observed between the autism spectrum disorders group and the normative sample group on all BASC scales but Somatization. A statistically significant result was also obtained when comparing the Social Skills of children with autism spectrum disorders and children with language disorders.

Parent and teacher scores indicated at-risk concerns associated with Atypicality, Withdrawal, Attention Problems, Adaptability, and Social Skills. Interrater analysis suggested significant differences between parents and teachers on the Social Skills, Aggression,

Depression, and Withdrawal scales. Except for Social Skills, teachers rated these behaviors as more problematic than was indicated by parents.

Logistic regression produced a nine-item screener that distinguished children with autism spectrum disorders from children in the BASC PRS-P normative sample in 96.77% of cases. The same screener was used in an attempt to distinguish children with autism spectrum disorders from children with language disorders. Although the screener continued to be successful in classifying children with autism spectrum disorders (96.74%), only 55.17% of children with language disorders were correctly classified. Findings, limitations, and future directions were discussed.

INDEX WORDS: Autism spectrum disorders, Children, Preschool, Behavior Assessment System for Children (BASC)

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B.A., Emory University, 2000

M.Ed., The University of Georgia, 2002

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2008

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August 2008

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CHAPTER 1

INTRODUCTION

In the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV-TR; APA, 2000), autism is classified as a "pervasive developmental disorder." For the purposes of this paper, this term is used interchangeably with "autism spectrum disorders." According to Tager-Flusberg, Joseph, and Folstein (2001), the use of the word "spectrum" indicates conceptual and etiological unity but different levels of severity. The disorders within the autism spectrum are linked by impairment in social interactions and communication as well as stereotyped or restricted interests.

A diagnosis of an autism spectrum disorder is often made via behavioral observations in early childhood. Assessment of behavior problems in early childhood is important because age at diagnosis frequently determines age of treatment onset, which is related to prognosis. Because young children often cannot provide information on their own behavior, clinicians must rely on the observations and knowledge of adults in their lives. For preschool-aged children, these adults often include parents and teachers. However, research begun by Achenbach, McConaughy, and Howell (1987) indicates that parents and teachers often offer different viewpoints of the same child.

To date, there are few studies that describe the behavioral characteristics of preschool-aged children with autism spectrum disorders. Studies have generally used small sample sizes, wide age ranges, or nonstandardized measures. The current study features a large sample of children within a small age range. It also utilizes a measure with national norms for preschool-

aged children, and clinical norms for school-aged children with autism spectrum disorders. The current study will add to the literature by providing a set of clinical norms for preschool-aged children with autism spectrum disorders on a popular standardized measure of behavioral characteristics. A screener for autism spectrum disorders will be created based on the item responses of parents in the sample, providing further clarification on how autism spectrum disorders are manifested in young children and improving diagnostic utility. Additionally, the current study will offer a statistical comparison of parent and teacher ratings for these children and may help in understanding behavioral similarities and differences across environments.

To elucidate the behavioral profile of children with autism spectrum disorders, the current study also seeks to compare their behavioral profile to that of children with language impairment. Children with both of these disorders generally exhibit behavioral difficulties, often related to their lack of language development. In the literature, some effort has been made to differentiate these two groups on the basis of clinical observation measures, such as the Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, DiLavore, & Risi, 2002), or structured interviews, such as the Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1984). However, clinicians may not have the opportunity or background to administer these scales. Rating scales may provide similar information on behavior and adaptive skills, and they are simpler to administer and score than the ADOS or VABS. To date, no studies have focused on direct comparisons of children with autism spectrum disorders and children with language disorders on the basis of nationally-normed behavioral rating scales.

The current study will examine whether a behavioral profile of preschool-aged children with autism spectrum disorders can be detected using the mean level scores for the subscales of the Behavior Assessment System for Children (BASC). In the BASC (Reynolds & Kamphaus,

1992) and BASC-2 (Reynolds & Kamphaus, 2004) clinical norms for school-aged children with autism spectrum disorders, ratings consistently indicated problem behaviors associated with Atypicality, Attention Problems, Hyperactivity, Withdrawal, and poor adaptive skills in the areas of Social Skills and Adaptability. Due to the lifelong course of autism spectrum disorders, the pattern found by Reynolds and Kamphaus (1992, 2004) is hypothesized to occur in the current study. It should be noted that the sample in the current study is much larger than that of the clinical normative studies published by Reynolds and Kamphaus (1992, 2004).

The behavioral profile of children with autism spectrum disorders will also be compared to the profile of children with language impairment. Research suggests that children with autism spectrum disorders have more significant difficulties with socialization than children with language impairment (Noterdaeme, Mildenberger, Sitter, & Amorosa, 2002; Noterdaeme, Sitter, Mildenberger, & Amorosa, 2000; Stone, Ousley, Hepburn, Hogan, & Brown, 1999; Volkmar et al., 1987). Therefore, it is hypothesized that a significant difference will be observed on the Social Skills scale of the BASC between children with autism spectrum disorders and children with language impairment.

Both parent and teacher ratings from the BASC will be utilized in the examination of the behavioral profile of children with autism spectrum disorders. Previous studies of school-aged children and adolescents with autism spectrum disorders suggest that parents view their children as exhibiting more problem behaviors on the Attention Problems, Adaptability, and Hyperactivity scales than are reported by teachers (Barnhill et al., 2000; Reynolds & Kamphaus, 1992, 2004). It is hypothesized that similar results will be found in the current study.

Finally, the behavioral profile of children with autism spectrum disorders will be compared to a subsample of the BASC normative data collected for preschool-aged children by Reynolds & Kamphaus (1992). Item-level data will be used to create a screener for autism spectrum disorders.

CHAPTER 2

REVIEW OF THE LITERATURE

According to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR; APA, 2000), children with autism spectrum disorders demonstrate impairments in three areas: social interaction, language and communication, and repetitive and restrictive activities and interests. Males are four to five times more likely than females to be diagnosed with autism; however, females with autism are thought to be more impaired than males (APA, 2000; Stone, MacLean, & Hogan, 1995). It is estimated that approximately 5 in 10,000 individuals will receive a diagnosis of autism; however, research studies have reported anywhere from 2 to 20 cases per 10,000 (APA, 2000; Stone et al., 1995).

Social impairment is the hallmark of autism spectrum disorders. Social problems are often apparent very early in life and cause a multitude of problems for children with autism. Social problems might include inappropriate eye contact or lack of interest in other people (Stone et al., 1995). Poor attachment and failure to develop relationships are characteristic of children with autism spectrum disorders (Goin & Myers, 2004). Affect and social perspective-taking are also affected in children with autism (APA, 2000).

Language and communication are generally severely affected in children with autism. Watson, Baranek, and DiLavore (2003) noted that language deficits impede social interaction, communication skills, and often contribute to the development of behavior problems. Over half of children with autism fail to develop meaningful speech, and when speech is present, it is typically delayed or disordered (APA, 2000; Stone et al., 1995). Common language impairments

include immediate and delayed echolalia (mimicking phrases), neologisms (creating novel words), pronoun reversals (e.g., interchanging "I" and "you"), pitch abnormalities (high pitch or improperly stressed syllables), and pragmatic (social, conversational language) deficits (APA, 2000). Children with autism spectrum disorders frequently have difficulty initiating and sustaining conversations (Charman & Baird, 2002). Individuals who do not acquire speech often have communication deficits, such as impaired joint attention (Stone et al., 1995). Many children with autism also lack the skills to engage in pretend play (Mesibov, Adams, & Klinger, 1997).

The final area of impairment is repetitive and restrictive activities and interests, which includes stereotyped movements, odd and intense interests, and complex routines. Stone et al. (1995) noted that lower-functioning individuals are more likely to demonstrate stereotyped movements, while higher-functioning individuals are more likely to exhibit complex routines or intense interests. Because of preference for routine, children with autism spectrum disorders frequently show aversive responses to change (Goin & Myers, 2004). Inflexibility is further demonstrated by the restricted and repetitive play typical of children with autism spectrum disorders (Stone, et al., 1995). While playing, these children may show an interest for parts of objects rather than whole objects (Charman & Baird, 2002).

Additional criteria include onset prior to the age of three years and absence of the developmental regression following normal development found in Childhood Disintegrative Disorder or Rett's Syndrome (APA, 2000). Abnormalities in eating and sleeping and self-injurious behaviors are often seen in children with autism (APA, 2000), as are unusual responses to sensory stimuli (Charman & Baird, 2004). Associated behavioral difficulties include hyperactivity, attention problems, impulsivity, aggression, and temper tantrums (Mesibov et al., 1997). Mental retardation or scattered cognitive skills are also common (Mesibov et al., 1997).

Medical conditions such as fragile X or tuberous sclerosis sometimes co-occur with autism, and approximately 25% of individuals with autism develop seizures (APA, 2000).

History of the Diagnosis of Autism

Throughout its 60-year history, the core triadic impairments that define autism have remained fairly unchanged. Infantile autism was first described by Leo Kanner (1943), who wrote a case history of 11 patients with an innate "extreme autistic aloneness." He described the children's language impairments, such as pronoun reversal, literal understanding of language, echolalia, and delayed acquisition. Kanner (1943) also noted that children with infantile autism displayed a desire for sameness and inability to relate to others.

Despite Kanner's (1943) early clinical description, autism was not included in the DSM until the third revision (DSM-III; APA, 1980). The criteria for the disorder (then termed Infantile Autism) blended Kanner's early findings with current research (Volkmar, Klin, & Cohen, 1997). Areas included onset by age 2 1/2, impaired and distinctive social development, impaired and distinctive communication, and unusual behaviors consistent with Kanner's (1943) description of insistence on sameness. In addition to Infantile Autism, DSM-III included criteria for Residual Infantile Autism, Childhood Onset Pervasive Developmental Disorder (COPDD), Residual Childhood Onset Pervasive Developmental Disorder, and Atypical Pervasive Developmental Disorder (Volkmar et al., 1997). The residual categories suggested that the disorder had an intermittent nature. Placement in a childhood onset category implied that onset was later than age 2 1/2, which was required for a diagnosis of Infantile Autism. Finally, Atypical PDD was used for children who had symptoms of the other disorders, but did not meet full criteria for Infantile Autism.

The criteria for autism were revised and developed with subsequent versions of the DSM, most notably with the introduction of DSM-III-R (1987). DSM-III-R was an attempt to capture the changing nature of autism across development (Volkmar et al., 1997). In fact, the names of the disorders were changed to reflect the importance of development. Infantile Autism became Autistic Disorder to emphasize its lifelong course. Atypical PDD was changed to Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) to emphasize its subthreshold nature. As research determined that one does not outgrow or experience episodes of autism, Residual Infantile Autism and COPDD were eliminated from DSM-III-R (Volkmar et al., 1997). The criteria for Autistic Disorder were also changed for DSM-III-R (1987). They were organized under the "triad of impairment" (Wing & Gould, 1979): social impairments, communication impairments, and restricted interests and repetitive behaviors. Age of onset was no longer part of the criteria. Although only six symptoms were listed in the DSM-III criteria, 16 were listed in DSM-III-R. This was an attempt to cover symptoms at all developmental levels; however, it led to many false positive diagnoses (Mesibov et al., 1997).

To increase the comparability of the diagnosis of Autistic Disorder, the criteria in DSM-IV (APA, 1994) were based on those in the tenth edition of the International Classification of Diseases (ICD-10; World Health Organization, 1992). The number of criteria in DSM-IV was reduced from 16 to 12, and age of onset was reintroduced into the criteria (Volkmar et al., 1997). Additionally, three new PDD categories were created to match the categories of ICD-10: Rett's Disorder, Childhood Disintegrative Disorder, and Asperger's Disorder (Mesibov et al., 1997). The disorders and criteria remain unchanged in the text revision version of the DSM-IV (DSM-IV-TR; APA, 2000).

Diagnostic Issues and Differential Diagnoses

Although some consider autism the most validated childhood psychiatric disorder (Rutter & Schopler, 1988), its complexity creates diagnostic difficulties. Because there are no biological tests for autism spectrum disorders, diagnosis is completely dependent upon observations and interviews. Diagnosis is complicated further by the nature of autism, which can change with age and developmental level (Stone et al., 1995). Stereotypes and erroneous beliefs about autism (e.g., "refrigerator moms" and the prevalence of savant skills) contribute to further confusion about the disorder. Finally, symptom overlap with other disorders creates difficulty in differential diagnosis (Stone et al., 1995).

The differential diagnosis of schizophrenia and autism was made difficult because of Kanner's (1943) original description of autism. Kanner borrowed the term "autism" from Bleuler's description of the separation from reality that occurs in schizophrenia (Mesibov et al., 1997). The disorders share some symptoms in that both are characterized by social and communicative problems. However, unlike individuals with schizophrenia, children with autism do not experience a period of normal development prior to the onset of psychosis (Mesibov et al., 1997; Phelps & Grabowski, 1991). Further, children with autism do not suffer from the hallucinations that are typically experienced by individuals with schizophrenia (Mesibov et al., 1997; Phelps & Grabowski, 1991).

Like children with Attention-Deficit/Hyperactivity Disorder (AD/HD), children with autism generally demonstrate shorter attention spans than their agemates. However, Mesibov et al. (1997) pointed out that this problem is largely due to co-morbid mental retardation, and the attention span of children with autism spectrum disorders might be appropriate for their mental

age. The aloofness, sensory stimulation, and language difficulties associated with autism may also account for attentional problems (Mesibov et al., 1997).

Children with autism often exhibit stereotypic behaviors that seem similar to the rituals observed in Obsessive-Compulsive Disorder (OCD). The restricted interests associated with autism may also appear similar to the obsessions found in OCD. However, the stereotypic behaviors found in children with autism are generally simpler than the rituals of individuals with OCD (Mesibov et al., 1997). Additionally, individuals with OCD frequently are aware of the life difficulties caused by their obsessions and compulsions, but this may not be true for individuals with autism (Mesibov et al., 1997).

On the surface, autism and learning disabilities share some similarities that could cause diagnostic difficulty. Both disorders are often characterized by uneven cognitive and academic skills and language problems (Mesibov et al., 1997). However, the cognitive and language deficits of children with autism spectrum disorders are more unusual, severe, and pervasive than the deficits exhibited in children with learning disabilities. Mesibov et al. (1997) noted that the impairments in autism are said to be qualitative, while those associated with learning disabilities are quantitative, according to the DSM-IV. This difference in terminology highlights the deviance in autism as opposed to delay in learning disorders.

Approximately 75% of children with autism demonstrate significant cognitive impairments (Tager-Flusberg et al., 2001). Due to symptom overlap, such as attention problems, self-stimulation, echolalia, and little to no play skills, differentiating between autism and mental retardation can be difficult (Mesibov et al., 1997; Phelps & Grabowski, 1991). However, while the social and communicative skills of children with mental retardation are generally limited only by their cognitive level, social skills and communication represent specific weaknesses for

children with autism (Mesibov et al., 1997; Phelps & Grabowski, 1991). While children with cognitive impairment demonstrate low cognitive skills across areas of testing, children with autism frequently demonstrate scatter among skills. Typically, children with autism show strengths on nonverbal and memory tasks and weaknesses on tests requiring verbal or abstract reasoning (Phelps & Grabowski, 1991). Finally, children with autism do not usually exhibit the delayed motor development typical of children with cognitive impairment (Mesibov et al., 1997; Phelps & Grabowski, 1991).

The diagnosis of Pervasive Developmental Disorders (PDDs) requires the presence of social dysfunction. However, autism differs from the other PDDs in several important ways. Rett's Disorder, which is seen only in females, is characterized by five months of normal development followed by loss of physical, cognitive, and communicative abilities (APA, 2000). Similarly, children with Childhood Disintegrative Disorder begin developing normally but demonstrate regression in language, social, play, motor, or toileting skills before the age of 10 (APA, 2000). These disorders can be distinguished from autism because they are preceded by a period of typical development, whereas children with autism generally show impairments beginning in infancy.

It is more difficult to distinguish between autism and Asperger's Disorder or Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS). Generally, PDD-NOS is an appropriate diagnosis for children who demonstrate social and communicative impairments but do not meet the age of onset or number of criteria required for a diagnosis of autism. According to DSM-IV-TR (APA, 2000), individuals with Asperger's Disorder do not demonstrate the language delays required for a diagnosis of autism. However, this is not to say that their language

is typical; individuals with Asperger's Disorder often exhibit pedantic speech and have difficulty beginning and maintaining conversations that are of interest to others (Mesibov et al., 1997).

Because language is one of the three deficient areas in individuals with autism, there is a great deal of symptom overlap between autism and language disorders. However, Mesibov et al. (1997) note that the specific problems are often different between children with autism versus those with language disorders. For example, while children with autism typically demonstrate echolalia, pronoun reversal, or lack language altogether, some children with language disorders exhibit articulation errors or word omissions (Mesibov et al., 1997).

Children with language disorders may also demonstrate social skills deficits, particularly in areas where language skills are important, such as conversation. However, children with language disorders do not typically show the specific social impairments of autism, such as limited eye contact, inappropriate emotional responses, or impaired use of gestures. The social skills of children with autism and children with language impairments were assessed by Noterdaeme and colleagues (Noterdaeme, Mildenberger, Sitter, & Amorosa, 2002; Noterdaeme, Sitter, Mildenberger, and Amorosa, 2000) using the "gold standard" of autism assessment, the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2002). Noterdaeme, Mildenberger, et al. (2002) and Noterdaeme, Sitter, et al. (2000) found a significant difference between children with autism and children with language impairment on all sections of the ADOS; however, the difference was most pronounced in the area of reciprocal social interaction.

Screenings Used in the Assessment of Autism Spectrum Disorders

According to Gillberg (1990), children with autism are rarely diagnosed before the age of 3 years. However, parents are generally concerned long before that time (Siegel, Pliner, Eschler, & Elliot, 1988). DeGiacamo and Fombonne (1998) report that parental concerns usually begin

between 15 and 22 months, but the child is often not seen by a specialist until 20-27 months. There is often further delay between the first visit to a specialist and a definitive diagnosis (Siegel et al., 1988). This delay in diagnosis causes additional distress to parents and wastes valuable intervention time, indicating the need for new and better instruments to aid in the detection of autism in very young children. Before being diagnosed, children often see at least three professionals, causing much frustration to their parents (Bryson, Rogers, & Fombonne, 2003). Goin and Myers (2004) suggest that earlier detection might lessen long term stress within the family and help parents make educated decisions about their child's treatment. To assist with early detection, a number of screening instruments specific to autism have been created.

Early screening allows for more time for intervention. However, Dumont-Mathieu and Fein (2005) suggest that children with milder forms of autism or those whose skills regress might be missed by early screening. Additionally, early screening might cause significant parental anxiety (Dumont-Mathieu & Fein, 2005). Several studies have found that parents have concerns about their child's development but may not share them unless asked directly (Young et al., 1998; King & Glascoe, 2003; Bethell et al., 2004). Repeated screening may also be helpful in the situation where health care providers see a problem but parents do not (Dumont-Mathieu & Fein, 2005).

Charman (2003) identified three statistics important when assessing the validity of screenings. The first is sensitivity, which refers to the proportion of children with a disorder who are identified by the screen. When sensitivity is high, the screen misses few cases of the disorder. Specificity is the proportion of children who do not have the disorder and are identified as normal by the screen. High specificity results in few false positives. Goin and Myers (2004) suggest that the best screening instruments are both sensitive and specific. The final statistic

reported by Charman (2003) is positive predictive value, or the proportion of children who have a positive screen and will be diagnosed with the disorder. Glascoe (in Charman, 2003) estimated that acceptable sensitivity and specificity for developmental screening tests are 70-80%.

The Checklist for Autism in Toddlers (CHAT; Baron-Cohen et al., 1992) is the most well-known screening instrument for autism (Kabot, Masi, & Segal, 2003). Baron-Cohen's research suggested that social orienting impairments, such as lack of joint attention and pretend play, distinguished young children with autism from other developmentally delayed children (Baron-Cohen, 1987). In typical children, joint attention and pretend play emerge at approximately 18 months of age; therefore, the CHAT is to be used with 18-month-old children (Charman, 2003). The CHAT utilizes nine parent report items and five clinical observation items. Five of these fourteen items have been found to be key indicators of possible autism according to DSM criteria, including gaze monitoring, protodeclarative pointing, and pretend play (Dumont-Mathieu & Fein, 2005).

The CHAT was first tested in a sample of 41 18-month-old siblings of children previously diagnosed with an autism spectrum disorder and 50 unselected 18-month-olds (Baron-Cohen, Allen, & Gillberg, 1992). Four of the children in the sibling group failed all key items, and none of the children in the unselected group failed all five items. Charman (2003) reported that, in a follow-up study at 30 months, the four children who had failed all five items were the only ones who had received a diagnosis of autism.

The CHAT has also been tested in a population sample as part of routine health care in the United Kingdom (Baird, Charman, Baron-Cohen, Cox, Swettenham, Wheelwright, & Drew, 2000). Physicians administered the CHAT to 16,235 18-month-old children. Baird et al. (2000) hypothesized that the children who failed the five key items would be at high risk of a later

diagnosis of an autism spectrum disorder. Those who failed the two items related to protodeclarative pointing were predicted to be at medium risk for autism, and all other children were considered low risk. Those who failed the screening were retested one month later. Baird et al. (2000) reported that although the positive predictive value was high (83%), the sensitivity was poor (18%), indicating that most children later identified as having an autism spectrum disorder were not detected via the CHAT. An attempt at modifying the cut-off criteria to increase specificity resulted in only 5% positive predictive value (Bryson et al., 2003). Therefore, Baird et al. (2000) did not support using the CHAT for general population screenings.

Scambler, Rogers, and Wehner (in Charman, 2003) used the CHAT with 44 2-year-old and 3-year-old children referred to a diagnostic clinic for developmental disorders. Using the Baird et al. (2000) high and medium risk criteria presented previously, 65% of the 26 cases of ASD were correctly identified, and no false positives were reported.

Bryson et al. (2003) reported that over 80% of children diagnosed by the age of 7 were missed by the CHAT at 18 months. Filipek et al. (1999) suggested that most of those not detected by the CHAT were diagnosed with milder forms of autism, such as Asperger's Disorder or PDD-NOS.

Robins, Fein, Barton, and Green (2001) developed a modified version of the CHAT (M-CHAT). The M-CHAT includes the nine parental report items of the CHAT as well as additional items measuring other areas of impairment, such as sensory abnormalities and imitation (Bryson et al., 2003). Unlike the CHAT, which utilizes both clinical observation and parent report, the M-CHAT is a parent report instrument only. The M-CHAT was designed for use at 24 months of age, and Bryson et al. (2003) report that this allows for it to identify children who regress after 18 months of age and are therefore missed by the CHAT.

The M-CHAT has been used in a sample of 1122 children as part of routine pediatric appointments and in a sample of 171 children referred for early intervention services due to language or other delays (Bryson et al., 2003). The children were assessed at 18 months of age, and those who failed the initial screening were reassessed at 24 months (Charman, 2003). A total of 58 children failed both screenings, and 39 of those were later diagnosed with an autism spectrum disorder. Thirty-six of those children were from the intervention group. According to Robins et al. (2001), the items that best predicted a diagnosis of ASD were those measuring joint attention and communication.

Unlike the CHAT and M-CHAT, the Screening Tool for Autism in Two-year-olds (STAT; Stone & Ousley, 1997) is a second-level screening (Kabot, Masi, & Segal, 2003). Its administration consists of short, semistructured playful interactions in an attempt to distinguish those with autism from those with other developmental disabilities (Bryson et al., 2003). The STAT focuses on play, imitation, and joint attention. The validity of the STAT was assessed with a sample of 33 children (12 with autism, 21 without) with an age range of 24 to 35 months. This sample was further reduced to 12 children with autism and 12 without who were matched for developmental age (Dumont-Mathieu & Fein, 2005). Diagnoses of autism were made based on the CARS (Schopler et al., 1988) and DSM-IV (APA, 1994) criteria. Among the subsample, Stone and Ousley (1997) reported excellent sensitivity (.83) and specificity (.89). However, these data are based on small sample sizes and may have been inflated by the overrepresentation of autism in the sample (Bryson et al., 2003).

The Pervasive Developmental Disorders Screening Test (PDDST-II; Siegel, 2004) is a three-stage instrument. Stage 1 is a 22-item yes/no rating scale to be completed by the parents of 12 to 48-month-olds in the pediatrician's office. The cut-off is five answers of yes. In a sample

of 681 children "at risk for ASD" and 256 children with "mild to moderate other developmental disorders," Siegel (2004) reported a sensitivity of .92 and specificity of .91. Stage 2, developed for parents whose children failed the Stage 1 screening, consists of 14 items and was designed for use in developmental clinics. Siegel (2004) tested Stage 2 in a sample of 490 children with ASD and 194 evaluated but not diagnosed with ASD. In this sample, reported sensitivity was .73 and specificity was .49. Stage 3 is a 12-item screening tool designed to be used in autism clinics. Its reported sensitivity and specificity are .58 and .60, respectively (Siegel, 2004). Dumont-Mathieu and Fein (2005) reported that the sensitivity and specificity of the PDDST-II are questionable, and the lack of data for an unselected sample makes it difficult to generalize results.

Psychiatric Classification of Preschool-Aged Children

It is difficult to diagnose young children with psychiatric disorders because the behaviors of clinical interest are often normative behaviors during development. Although behaviors such as tantrums, noncompliance, and aggression toward peers might be indicative of a psychiatric disorder, they are often typical behaviors for preschool-aged children (Keenan & Wakschlag, 2000). For example, in a community sample, Rose, Rose, and Feldman (1989) found that 26% of two-year-olds and 34% of four-year-olds exhibited significant behavior problems. Challenging yet transient behaviors create diagnostic controversy because of the potential for misidentification and labeling (Gross, Sambrook, & Fogg, 1999).

Despite the difficulties of early diagnosis, an emerging body of literature on clinic-referred preschoolers indicates that clinically significant behavior problems begin in or before preschool and persist throughout the lifetime. Up to one-third of toddler and preschool-aged children demonstrate high rates of behavior problems, and these problems tend to be stable over

time (Gross, Fogg, Garvey, & Julion, 2004). Temperament and externalizing behavior problems exhibited as early as two years of age are predictive of continued problematic behavior (Keenan & Wakschlag, 2000). Campbell and Ewing (1990) reported that the majority of children identified by parents as persistently hard to manage at age three met criteria for a DSM-III externalizing disorder at age nine.

According to DeMeyer (1979), parents of children with autism find the preschool years to be the most difficult time for their families. Diagnoses often occur during the preschool period; therefore, parental anxieties and fears may be at their pinnacle during this time. Additionally, the rapid development of typical preschool children offers a stark contrast to the slow development of preschoolers with autism, highlighting the differences between the two groups.

The Challenge of Low Interrater Agreement in Preschool-Aged Children

Comprehensive assessments often include clinical observations and rating scales. Although observations allow the clinician to create some hypotheses about a child's behavior, they are typically limited to one context, and low frequency behaviors may not occur during the specified time period (Martin, 1991). Rating scales are a popular complementary method of assessment because they are inexpensive as well as easy to administer and score (Martin, 1991). Because young children are often unable to articulate information about their own behavior, parents and teachers generally serve as reporters on rating scales. Parents and teachers interact with children in different settings and play different roles in children's lives. While parents spend a great deal of time with their preschoolers in a variety of settings and can provide historical information, teachers observe children in a structured environment among their classmates.

Although both parents and teachers are knowledgeable about the lives of young children, it is widely documented that they show little agreement on measures of children's behavior

(Achenbach, McConaughy, & Howell, 1987). In a seminal meta-analysis, Achenbach et al. (1987) found poor correlations between parents' and teachers' observations of children's behavior (r = .28). Achenbach et al. (1987) reported that parents and teachers showed more agreement on externalizing than internalizing behaviors, and interrater agreement was also better for children than for adolescents.

Achenbach et al. (1987) suggested that the differences between the observations of parents and teachers might be informative, as each observer offers a unique perspective on the child's behavior. Therefore, Achenbach el al. (1987) proposed that evaluators should consider situational differences as well as differences between informants when interpreting cross-informant correlations. The work of Achenbach et al. (1987) was followed by other parent-teacher reliability studies focused on the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983), Caregiver-Teacher's Report Form (CBCL-TRF; Achenbach & Edelbrock, 1986), and revisions of these scales.

Verhulst and colleagues (Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991) compared parents' ratings on the CBCL (Achenbach & Edelbrock, 1983) and teachers' ratings on the CBCL-TRF (Achenbach & Edelbrock, 1986). Verhulst and Akkerhuis (1989) as well as Verhulst and van der Ende (1991) found that parent-teacher agreement was better for externalizing rather than internalizing behaviors, and parents detected more behavioral problems than teachers. Verhulst and Akkerhuis (1989) also found age-related differences in interrater reliability, as they reported that agreement was better for older (r = .35 for ages 6 to 12) than for younger (r = .27 for ages 4 and 5) children. The magnitude of the correlations reported by Verhulst and Akkerhuis (1989) is similar to the correlation produced by Achenbach et al. (1987), suggesting that parents and teachers have different views of children's behavior.

Results of interrater reliability between parents and teachers in preschool samples are similar to those reported by Achenbach et al. (1987), Verhulst and van der Ende (1991), and Verhulst and Akkerhuis (1989) for the school-aged population. In one study of preschool behavior problems, Gross et al. (2004) used a low-income, ethnically diverse sample of 241 children in day care. Parents were given the Eyberg Child Behavior Inventory (ECBI; Robinson, Eyberg, & Ross, 1980), and teachers completed the CBCL-TRF (Achenbach & Edelbrock, 1986). The overall correlation between parents and teachers was extremely low (r = .17). As reported in prior studies (Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991), Gross et al. (2004) found that parents' ratings reflected more behavior problems than were observed by teachers.

In a study of 45 preschool-aged children, Hinshaw, Han, Erhardt, and Huber (1992) found that the correlation between parent and teacher ratings for preschool-aged children was dependent on the type of behavior observed. Hinshaw et al. (1992) utilized the CBCL (Achenbach & Edelbrock, 1983) and the Preschool Behavior Questionnaire (PBQ; Behar, 1977). Consistent with past research, (Achenbach et al., 1987; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991), Hinshaw et al. (1992) reported that behaviors within the internalizing domain were virtually uncorrelated (r = .13); however, behaviors in the externalizing domain were modestly correlated (r = .32).

Cai, Kaiser, and Hancock (2004) conducted a study of parent-teacher agreement on the preschool version of the CBCL (Achenbach & Rescorla, 2000) and the preschool CBCL-TRF (Achenbach & Rescorla, 2000). Parents and teachers of 505 preschool-aged children from low-income families completed the scale. Unlike previous studies, Cai et al. (2004) focused on the items of the CBCL and CBCL-TRF in order to measure the magnitude of agreement and

prevalence of specific behavior problems. Cai et al. (2004) found significant differences between parent and teacher reports on 51 of 82 common items. As noted in past research (Gross et al., 2004; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991), Cai et al. (2004) found that parents reported more extreme levels of problematic behavior than were reported by teachers. Cai et al. (2004) also analyzed the five most prevalent teacher and parent problems, and only one item (quickly shifts) appeared on both parent and teacher lists, further indicating that parents and teachers view children's behavior differently.

These studies demonstrate the differences between parents and teachers as raters of children's behavior for both preschool and school-aged children. In general, parents view children's behavior as being more problematic than the perceptions reported by teachers (Cai et al., 2004; Gross et al., 2004; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991). This finding is consistent with Achenbach and Rescorla's (2000) suggestion that the base rate of problem behaviors is 10-15% or lower in teacher reports than parent reports. Across age groups and measures, parents and teachers tend to agree more on their ratings of externalizing behavior than on ratings of internalizing behavior (Achenbach et al., 1987; Hinshaw et al., 1992; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991).

Although parents and teachers seem to view problem behaviors differently, there is no consensus on why these differences exist. Touliatos and Lindholm (1981) hypothesized that parents have higher expectations than teachers and are less tolerant of problem behaviors. Touliatos and Lindholm (1981) stated that parents spend more time with preschool-aged children than teachers do; therefore, parents may see more behavior problems than teachers observe. Cai et al. (2004) suggested that children might behave differently at home and school due to different interactions with adults. Gross et al. (2004) proposed that differences might be based on the

adult's knowledge about children, or values about how children should behave. Alternatively, Gross et al. (2004) suggested that children might actually behave differently at home and at school. Compared to the home, classrooms are highly structured, have set schedules, and require young children to compete with other children for attention (Gross et al., 2004).

Parent and Teacher Agreement on Scales of Autism Symptomatology

The interrater agreement between parents and teachers has also been assessed for a number of scales specific to autism symptomology. One such scale is the Pervasive Developmental Disorder Rating Scale (PDDBI; Cohen, Schmidt-Lackner, & Sudhalter, 2003). The PDDBI was developed to be completed by parent or teacher as an assessment of a child's response to intervention. The PDDBI includes maladaptive behaviors, such as social interaction deficits, aggression, language difficulties, and fears. The scale also includes items related to adaptive functioning, such as joint attention and pretend play.

In a sample of 270 children ranging in age from 1 to 17, Cohen, Schmidt-Lackner, Romanczyk, and Sudhalter (2003) found that correlations between parent and teacher ratings on the PDDBI were moderate to excellent (r = .61 to .93). Differences in agreement between parents and teachers were most notable on Sensory/Perceptual Approach Behaviors, Aggressiveness, and Social Approach Behaviors. Cohen et al. (2003) found that parents and teachers tended to agree on language-based scales, such as the Phonological Skills, Semantic/Pragmatic Ability, and the Learning, Memory, and Receptive Language scales.

The Gilliam Autism Rating Scale is a behavioral checklist developed for use by parents, teachers, and professionals to identify individuals ages 3 to 22 with autism spectrum disorders (Gilliam, 1995). The GARS contains 56 items divided into four scales: Social Interaction,

Communication, Stereotyped Behaviors, and Developmental Disturbances. The GARS yields scores for each of these scales as well as a general score called the Autism Quotient.

Gilliam (1995) conducted an interrater reliability analysis as part of the standardization of the GARS. Estimates of interrater reliability ranged from .85 (Social Interaction) to .99 (Stereotyped Behaviors); however, Gilliam (1995) utilized an extremely small sample of 11 individuals. In a clinical study with a larger sample size, the strong interrater reliability results presented by Gilliam (1995) were not replicated. Lecavalier (2005) included 63 school-aged students in his assessment of interrater reliability of the GARS. The interrater reliability of parents and teachers ranged from .31 (Stereotyped Behaviors) to .48 (Communication).

The Autism Behavior Checklist (ABC) is one of five parts of the Autism Screening Instrument for Educational Planning (ASIEP; Krug, Arick, & Almond, 1993). The ABC is a screening checklist of 57 maladaptive behaviors that may be indicative of autism. It was designed to help teachers determine educational placements for children with autism; however, authors report that it is helpful to have both parent and teacher complete the scale (Krug et al., 1993). The ABC yields a Total score and five scale scores, including Sensory, Relating, Body and Object Use, Language, and Social and Self-Help.

Szatmari, Archer, Fisman, and Streiner (1994) assessed 83 high-functioning children aged 4 to 6 with a diagnosis of an autism spectrum disorder using the Autism Behavior Checklist (ABC). Szatmari et al. (1994) found that parent and teacher ratings on the ABC were virtually uncorrelated, with values ranging from .09 (Body and Object Use) to .33 (Language). Teachers reported more problematic behavior than parents on the Relating scale, while parents reported more difficulty than teachers on the Body and Object Use scale.

Volkmar et al. (1988) also studied the interrater reliability of the ABC. Their sample included parent and teacher ratings for 33 individuals with autism spectrum disorders. Significant differences were reported for the Relating, Body and Object Use, Social and Self-Help, and total scores of the ABC. Consistent with other research (Cai et al., 2004; Gross et al., 2004; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991), parents reported more pathology than teachers across scales.

In summary, the literature on interrater agreement between parents and teachers of children with autism spectrum disorders is consistent with the body of research on interrater agreement for other populations. Interrater agreement tends to be low, and parents generally view their children as experiencing more problematic behaviors than are reported by teachers (Cai et al., 2004; Gross et al., 2004; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991; Volkmar et al., 1988). For children with autism spectrum disorders, interrater agreement appears to be better for communication skills than for other behaviors (Cohen et al., 2003; Lecavalier, 2005; Szatmari et al., 1994).

Parent and Teacher Ratings of Behavioral Indicators of Autism Using General Behavioral Scales

Children with developmental disabilities are at equal or greater risk of developing problem behaviors when compared to typically developing children (Borthwick-Duffy, 1994). Barnhill et al. (2000) stated that individuals with autism spectrum disorders have greater social and behavioral difficulties as well as co-morbid psychiatric disorders than typically-developing individuals. Therefore, it is imperative that the behaviors of these children are assessed in addition to the symptoms associated with autism.

In the late 1970s and early 1980s, the study of behaviors associated with autism spectrum disorders focused primarily on the retrospective reports of parents (e.g., Ohta, Nagai, Hara, &

Sasaki, 1987; Ornitz, Guthrie, & Farley, 1977). Although the methodology was initially called into question, more recent research indicates that parental reflections may have been more accurate than initially assumed. Subsequent studies focusing on parent and teacher views offer a picture of the behavioral characteristics of autism. The results of these studies are summarized in Table 1.

Atypical behaviors. The atypical behaviors of children with autism spectrum disorders have been documented via the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983.) Rescorla (1988) included 79 children with autism or autistic features in a factor analysis of 204 preschool-aged boys using the CBCL. The first factor to emerge was labeled Autistic/Bizarre, and its appearance was attributed to the large number of children with autism in the sample (Rescorla, 1988). Items on this factor included confused/in a fog, strange behavior, stereotyped behaviors, withdrawn, and strange ideas.

Duarte, Bordin, de Oliveira, and Bird (2003) also studied behaviors indicative of autism spectrum disorders on the CBCL (Achenbach & Edelbrock, 1983). Duarte et al. (2003) compared 36 school-aged children with autism, 31 with other psychiatric disorders, and 34 typical children. Children with autism were distinguished from other groups on the Thought Problems scale and the Autistic/Bizarre factor (Rescorla, 1988), which are highly correlated and share three items (repeats acts, strange behavior, and strange ideas). Additional items from the Thought Problems scale that were indicative of autism include mind off, hear things, sees things, and stares.

Gadow and DeVincent (2005) researched the co-morbidity of tics in children with autism spectrum disorders. In this study, parents and teachers completed the Early Childhood Inventory-4 (ECI-4; Sprafkin, Volpe, Gadow, Nolan, & Kelly, 2002) for 182 preschool-aged children with autism spectrum disorders. Twenty-five percent of parents and 44% of teachers of children with

autism spectrum disorders reported tic displays. Gadow and DeVincent (2005) suggested that these results might reflect the stereotypic behaviors often found in children with autism spectrum disorders rather than tic displays.

Attention problems, hyperactivity, and executive functions. In DSM-III-R and following, co-morbid diagnoses of autism and Attention-Deficit/Hyperactivity Disorder (AD/HD) cannot be given (Volkmar et al, 1997). According to Volkmar et al. (1997), the symptoms of AD/HD are so frequently present in individuals with autism spectrum disorders that they are considered to be characteristics of the spectrum. Although the diagnoses of autism spectrum disorders and AD/HD are considered mutually exclusive, several authors have studied the prevalence of the symptoms of AD/HD in samples of children with autism.

Yoshida and Uchiyama (2004) found that 36 of 52 school-aged children with high-functioning autism spectrum disorders also met DSM-IV criteria for AD/HD on the ADHD-Rating Scale (DuPaul, Power, Anastopoulos, & Reid, 1998) completed by parents. Co-morbidity was higher for individuals with autism than for individuals with Asperger's Disorder or PDD-NOS. Additionally, the age of the children was associated with the presence of different subtypes of AD/HD. Of the 33 children under the age of 10, 26 met criteria for AD/HD. Eleven children met the criteria for the combined subtype of AD/HD, while 12 met criteria for the inattentive subtype and 3 children met criteria for the hyperactive/impulsive subtype. Yoshida and Uchiyama (2004) also found that half of children over the age of 10 met criteria for AD/HD. Of the total, four children met criteria for the inattentive subtype, three children met criteria for the combined subtype, and eight others met criteria for the hyperactive/impulsive subtype of AD/HD.

Gadow, DeVincent, Pomeroy, and Azizian (2004) collected ratings of parents and teachers on the ECI-4 (Sprafkin et al., 2002) for preschool-aged children with autism spectrum disorders. These ratings were compared to those collected for children with AD/HD, Oppositional Defiant Disorder (ODD), mood disorders, and typical children. Gadow et al. (2004) found that 50% of 160 children with autism spectrum disorders also met DSM-IV criteria for AD/HD based on parent and teacher ratings, with the inattentive subtype being more prominent than the hyperactive/impulsive subtype. Parents and teachers also rated children with autism spectrum disorders as displaying more severe social deficits, language deficits, atypical behaviors, social phobia, compulsion, and motor tic symptoms than children in other groups.

Children with autism spectrum disorders also display difficulties with executive function. Noterdaeme, Amorosa, Mildenberger, Sitter, and Minow (2001) studied 19 school-aged children and adolescents with autism, 17 with a language disorder, and 19 control subjects. Noterdaeme et al. (2001) administered the "Testbatterie zur Aufmerksamkeitsprufung," a measure of attention and executive function, to all subjects. Subjects with autism displayed deficits in executive function, while the language-disordered subjects showed difficulties in auditory attention and executive function. Subjects with autism showed deficits on tasks requiring flexibility and planning.

In a sample of 35 children with high-functioning autism and Asperger's Disorder, Gilotty, Kenworthy, Sirian, Black and Wagner (2002) found negative correlations between the Communication and Socialization scales of the Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1984) and the Working Memory and Initiate scales of the Behavior Rating Inventory of Executive Function (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000).

Results from Noterdaeme et al. (2001) and Gilotty et al. (2002) indicate that children with autism spectrum disorders appear to demonstrate impairments in multiple areas of executive function.

Attention problems and social skills. Recent studies indicate that a relationship may exist between some of the attention problems and social skills deficits of children with autism spectrum disorders. Maestro et al. (2002) as well as Baron-Cohen et al. (1996) proposed that problems with initiating and responding to joint attention are early signs of social deficit, as joint attention requires coordinating eye contact, gesture, and interaction. Adrien et al. (1993) demonstrated that infants later diagnosed with autism demonstrated unstable attention, impairments in social interaction, lack of social smile, and lack of appropriate facial expression. Baranek (1999) observed that infants with autism required more prompts to respond to name and demonstrated social touch aversion when compared to children with mental retardation alone. In their retrospective video study, Osterling and Dawson (1994) found that the frequency and duration of looking at other persons was the single best predictor of a later diagnosis of autism and differentiated between autism and mental retardation in young children.

Dawson et al. (2004) propose that a social orienting impairment may be responsible for the inattentive symptoms often present in children with autism spectrum disorders. These authors suggest that social exchanges require rapid shifts of attention between complex stimuli, such as speech and gestures. Dawson et al. (2004) found that preschool-aged children with autism spectrum disorders performed more poorly than developmentally delayed or typically developing children on measures of joint attention, social orienting, and attention to another's distress.

Social skills. Much of the research on the social skills deficits of children with autism spectrum disorders has been conducted using the Vineland Adaptive Behavior Scales (VABS; Sparrow et al., 1984). Carpentieri and Morgan (1996) found that children with autism earned lower scores on the

Socialization and Communication domains of the VABS than an age-matched group with mental retardation, with scores on the Socialization domain providing the largest discrepancy. Stone, Ousley, Hepburn, Hogan, and Brown (1999) observed the same pattern of scores in their study of 60 preschool-aged children with autism and language impairments.

VanMeter, Fein, Morris, Waterhouse, and Allen (1997) found that parents of preschool-aged children with autism indicated more scatter among the VABS (Sparrow et al., 1984) Communication and Socialization item responses than was reported by parents of children with mental retardation or normal children. Compared to children with mental retardation or normal children, children with autism demonstrated weaknesses on items pertaining to pragmatic use of language, play skills, and social interaction but showed strengths on written language and rule-governed social behavior.

Volkmar et al. (1987) studied children with autism and a control group of children with mental retardation or a language disorder using the VABS (Sparrow et al., 1984). When compared with the control group, children with autism demonstrated significantly greater deficits in social skills. Volkmar et al. (1987) found that diagnosis accounted for 22% of the variance in interpersonal relationship scores, 11% of the variance for coping, and less than 5% of the variance for receptive communication, expressive communication, and play and leisure skills. Subjects with autism scored lower almost four years below their mental age on all of these areas.

Adaptability. Child temperament may be an important factor in the behavioral variability observed in children with autism spectrum disorders (Eaves, Ho, & Eaves, 1994; Kasari & Sigman, 1997), particularly in the area of adaptability. Hepburn (2003) reported that two-year-old children with autism were significantly less adaptable than age-matched peers with other developmental disabilities. In a longitudinal study of 38 preschoolers with autism, Hepburn (2003) found that mothers' ratings of low adaptability were associated with child behavior

problems during the preschool years as well as the age of school entry. Kasari and Sigman (1997) reported that children with autism who presented with a more difficult temperament style were less responsive to their parents in social interactions. Additionally, low ratings of adaptability, persistence, and distractibility were strongly related to increased parenting stress (Hepburn, 2003; Kasari & Sigman, 1997).

Interrater Agreement in Children with Autism Spectrum Disorders Using General Behavioral Scales

The interrater agreement between parents and teachers of children with autism spectrum disorders has been studied with a variety of clinical instruments. Szatmari, Archer, Fisman, and Streiner (1994) found that correlations between the scores of parents and teachers for 83 preschool children with autism on the Vineland Adaptive Behavior Scales (VABS; Sparrow et al., 1984) ranged from .42 (Motor Skills) to .83 (Communication). Similar to results presented previously (Cai et al., 2004; Gross et al., 2004; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991; Volkmar et al., 1988), teachers' ratings indicated less impairment than did the ratings of parents. Rapin, Steinberg, and Waterhouse (1999) also studied VABS scores in 194 children with autism, and the overall correlation between parents and teachers was .34. As observed in previous studies (Cai et al., 2004; Gross et al., 2004; Szatmari et al., 1994; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991; Volkmar et al., 1988), Rapin et al. (1999) found that teachers generally viewed children as less impaired than parents.

Rapin et al. (1999) also analyzed 20 items with identical or very similar words on the parent and teacher scales in an attempt to enhance interrater agreement. Like Cai et al. (2004), Rapin et al. (1999) found low correlations between specific behaviors, as interrater reliability ranged from .04 to .52. Moderate correlations were yielded for items relating to stereotypic or

motor abnormalities and attentional abnormalities. Emotional and play abnormalities yielded low to moderate correlations.

Several general behavior rating scales include scales that may be indicative of an autism spectrum disorder. As part of the preschool version of the CBCL, Achenbach and Rescorla (2000) created DSM-oriented scales based upon diagnostic criteria for a number of disorders, including those on the autism spectrum. The authors suggest that an elevated score on the scale of interest, Pervasive Developmental Problems (PDP), may be indicative of an autism spectrum disorder. The PDP scale includes 13 items rated by experienced psychologists and psychiatrists as "very consistent" with DSM criteria for autism spectrum disorders (Achenbach & Rescorla, 2000). Items on the scale include: afraid to try new things, avoids eye contact, can't stand things out of place, disturbed by change, doesn't answer, doesn't get along with peers, rocks head/body, unresponsive to affection, little affection, speech problem, strange behavior, upset by new things, and withdrawn (Achenbach & Rescorla, 2000). To date, no research has been conducted on the ratings of children with autism spectrum disorders on this scale.

The Clinical Assessment of Behavior (CAB; Bracken & Keith, 2004) is a global behavioral rating scale designed to be used by parents (CAB-P) and teachers (CAB-T) of children and adolescents aged 2 to 18. Bracken and Keith (2004) included 33 school-aged children with autism in their normative sample. These children were rated as having mild clinical difficulties on the Autism Spectrum Behaviors, Mental Retardation, Learning Disabilities, and Attention-Deficit/Hyperactivity scales of the CAB-P. All CAB-T scales were within the average range, indicating that parents report more problematic behaviors than teachers report, consistent with previous research (Achenbach et al., 1987; Cai et al., 2004; Gross et al., 2004; Szatmari et al., 1994; Rapin et al., 1999).

The CAB (Bracken & Keith, 2004) has 10 specific clinical clusters of behavior, including one cluster called Autism Spectrum Behaviors (ASB). This cluster includes social impairments, withdrawal, communication difficulties, idiosyncratic behaviors, and developmental delays (Bracken & Keith, 2004). Bracken and Keith (2004) report that data from the clinical normative samples indicate strong positive correlations ($r>.6$) between the ASB scale of the CAB-P and the Hyperactivity, Attention Problems, and Atypicality scales of the Behavior Assessment System for Children, Parent Rating Scales (BASC PRS.) Strong negative correlations ($r>-.6$) were observed between the ASB and the Social Skills and Adaptability scales of the BASC PRS. As documented by previous research (Cai et al., 2004; Gross et al., 2004; Rapin et al., 1999; Szatmari et al., 1994; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991; Volkmar et al., 1988), Bracken and Keith (2004) found that teachers reported less pathology than parents. However, teachers did report some problem behaviors, as significant correlations were observed between CAB-T ASB and the Attention Problems and Adaptive Skills scales of the Behavior Assessment System for Children, Teacher Rating Scales (BASC TRS).

The Devereux Scales of Mental Disorder (DSMD; Naglieri, LeBuffe, & Pfeiffer, 1999) is a behavioral rating scale designed for use by parents and teachers. The items of the DSMD are related to specific DSM criteria for 35 disorders, and DSMD scales include Conduct, Delinquency (Attention for the Child form), Depression, Anxiety, Autism, and Acute Problems. Smith and Reddy (2002) assessed the concurrent validity of the DSMD with the BASC PRS and the 1991 version of the Teacher Report Form (CBCL-TRF; Achenbach & Edelbrock, 1991) in a sample of 64 parents and 74 teachers of children and adolescents in inpatient settings. Primary diagnoses of the individuals in the sample included major depressive disorder, attention-

deficit/hyperactivity disorder, oppositional defiant disorder, and dysthmia. None of the individuals in the sample were diagnosed with an autism spectrum disorder.

Smith and Reddy (2004) reported significant correlations between the Autism scale of the DSMD and the Hyperactivity (r = .52) and Atypicality (r = .71) scales of the BASC PRS. Teachers' ratings from the DSMD were significantly correlated with the Aggressive Behavior (r = .53), Attention Problems (r = .60), Anxious/Depressed (r = .62), Thought Problems (r = .72), and Social Problems (r = .57) scales of the CBCL-TRF.

In summary, interrater agreement between the parents and teachers of children with autism spectrum disorders on general behavioral rating scales is similar to that reported in studies of typical children (e.g., Achenbach et al., 1987; Gross et al., 2004; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991). Additionally, as was reported for scales of autism symptomology (Cohen et al., 2003; Lecavalier, 2005; Szatmari et al., 1994), interrater agreement for communication skills exceeded the interrater agreement of other behaviors. Scales specific to autism on general behavioral measures such as the CAB (Bracken & Keith, 2004) and DSMD (Naglieri et al., 1999) were found to be strongly correlated with the Hyperactivity, Attention Problems, Atypicality, Adaptability, and Social Skills scales of the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992).

Behavioral Profiles Associated with Autism Spectrum Disorders as Measured by the Behavior Assessment System for Children (BASC)

The Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992) is a behavioral checklist in a Likert format. The BASC includes a Parent Rating Scale (PRS), Teacher Rating Scale (TRS), and Self-Report of Personality (SRP). Rating scales are available for preschoolers (ages 2 ½ to 5), children (ages 6-11), and adolescents (ages 12 to 18). All

versions contain clinical scales, which measure maladaptive behaviors, and adaptive scales, which measure positive or desirable characteristics. The BASC yields average, at-risk, and clinically significant T Scores. At-risk scores are defined as those above one standard deviation from the mean, but below two standard deviations. Clinically significant scores are those above two standard deviations from the mean. BASC data presented in this section can also be found in Figures 1-4.

When creating clinical norms for the BASC, Reynolds and Kamphaus (1992) included 16 children and adolescents with autism spectrum disorders. Although interrater reliability was not calculated, mean level data will be reported here. Parent scales indicated at-risk concerns on the Hyperactivity, Atypicality, and Attention Problems scales. In the area of adaptive skills, Adaptability, Social Skills, and Leadership also emerged as at-risk areas of behavior, according to parents (Reynolds & Kamphaus, 1992). Teachers rated children with autism spectrum disorders as experiencing clinically significant difficulties on the Withdrawal scale. Additionally, teachers' ratings on the Attention Problems, Atypicality, Social Skills, Leadership, and Study Skills scales fell within the at-risk range (Reynolds & Kamphaus, 1992).

More recently, the second edition of the BASC (BASC-2; Reynolds & Kamphaus, 2004) included updated clinical norms for children and adolescents with autism spectrum disorders. The BASC-2 clinical norms utilized a larger sample size of individuals with autism spectrum disorders. Additionally, children and adolescents with autism spectrum disorders were separated so that clinical norms could be established for the Child and Adolescent forms. Thirty-three children and 17 adolescents were included in the BASC-2 PRS clinical norm samples, while 17 children and 13 adolescents with autism spectrum disorders were included in the BASC-2 TRS samples (Reynolds & Kamphaus, 2004).

Parents' ratings on the BASC-2 PRS yielded clinically significant scores on the Atypicality and Withdrawal scales. At-risk scores were noted on the Hyperactivity, Attention Problems, Adaptability, Social Skills, and Leadership scales (Reynolds & Kamphaus, 2004). Two new scales, Activities of Daily Living and Functional Communication, were at-risk and clinically significant, respectively. On the BASC-2 TRS, Reynolds and Kamphaus (2004) reported that teachers rated Atypicality and Withdrawal as areas of clinically significant difficulty on the Child form of the measure. These scales were within the at-risk range for adolescents. Adaptability and Functional Communication were also within the at-risk range on the Child and Adolescent forms of the BASC-2 TRS. Additional at-risk scales on the Child version include Aggression, Depression, Social Skills, and Leadership (Reynolds & Kamphaus, 2004).

Mean scores from the BASC PRS and BASC-2 PRS indicated at-risk to clinically significant difficulties on the Hyperactivity scale relative to teachers' average ratings on that scale (Reynolds & Kamphaus, 1992, 2004). A similar result was observed for the Attention Problems scale of the BASC-2, as Reynolds and Kamphaus (2004) reported that parent ratings indicated more problem behaviors than were suggested by teacher ratings. One possibility for these differences is that the structured and predictable school environment allowed children with autism spectrum disorders to appear more age-appropriate. Alternatively, parents may have based their ratings on their cumulative experience with their child, including unstructured times such as weekends or school holidays.

On the BASC-2 (Reynolds & Kamphaus, 2004), both parents and teachers noted at-risk to clinically significant concerns on the Withdrawal scale. However, only teachers indicated this as a problem area on the BASC (Reynolds & Kamphaus, 1992). The increased sample size and

homogeneity of age may have contributed to the interrater agreement on the BASC-2 relative to the BASC. Aggression and Depression also emerged as at-risk areas on the Child form of the BASC-2 TRS but not on the other forms. Because teachers have the opportunity to view children with autism spectrum disorders interacting with other children, teachers might have observed signs of aggressive behaviors or the withdrawal symptoms of depression that parents were unable to observe.

To date, only one published study has examined the problem and adaptive behaviors of children with autism spectrum disorders using the BASC. Barnhill et al. (2000) asked 20 children and adolescents with Asperger's Disorder, as well as their parents and teachers, to complete the BASC rating scales. In general, parents reported more problem behaviors than did teachers, as found in previous studies (Cai et al., 2004; Gross et al., 2004; Rapin et al., 1999; Reynolds & Kamphaus, 1992, 2004; Szatmari et al., 1994; Verhulst & Akkerhuis, 1989; Verhulst & van der Ende, 1991; Volkmar et al., 1988).

In the Barnhill et al. (2000) study, parents reported clinically significant behaviors on the Hyperactivity and Atypicality scales. Parents' ratings revealed scores in the at-risk range on the Aggression, Depression, Attention Problems, and Withdrawal scales (Barnhill et al., 2000). On the adaptive scales of the BASC PRS, Adaptability, Leadership, and Social Skills emerged as at-risk areas. Barnhill et al. (2000) also found that teachers reported a number of problem behaviors. The Anxiety, Depression, Attention Problems, Atypicality, and Withdrawal scales of the BASC TRS fell within the at-risk range of scores.

Like Reynolds and Kamphaus (1992, 2004) Barnhill et al. (2000) found elevated scores on a number of scales of the BASC PRS and BASC TRS. Most notably, the Withdrawal, Attention Problems, and Atypicality scales of both the BASC PRS and BASC TRS fell within

the at-risk or clinically significant range in the Barnhill et al. (2000) study. Additionally, consistent with the results of Reynolds and Kamphaus (1992, 2004), parents in the Barnhill et al (2000) study observed behavioral difficulties on the Hyperactivity, Adaptability, and Social Skills scales of the BASC PRS.

In addition to the scales presented above, Barnhill et al. (2000) noted at-risk difficulties on the Aggression and Depression scales of the BASC PRS and the Anxiety and Depression scales of the BASC TRS. An item analysis conducted by Barnhill et al. (2000) suggested that many of the items contributing to these at-risk scale scores require language skills. When interpreting these results, it is important to note that Barnhill et al.'s (2000) sample consisted of adolescents with Asperger's disorder, while the samples of Reynolds and Kamphaus (1992, 2004) included children and adolescents with diagnoses across the autism spectrum. Because individuals with Asperger's disorder do not generally exhibit the language delays of children with autism (APA, 2000), it is likely that the individuals in Barnhill et al.'s (2000) sample exhibit more language skills than those individuals in the samples of Reynolds and Kamphaus (1992, 2004). Additionally, Barnhill et al. (2000) reported that the mean full scale intelligence quotient (FSIQ) of individuals in their study was 97.94, which is within the average range. Although there data were not available for individuals in the BASC clinical samples, it is unlikely that the mean FSIQ was within the average range due to the co-morbidity rate of mental retardation and autism. These factors might have contributed to the differences between the findings of Reynolds and Kamphaus (1992, 2004) and Barnhill et al. (2000).

The Purposes of the Current Study

The first purpose is to determine if a behavioral profile for preschool-aged children with autism spectrum disorders can be detected with the Parent Rating Scale, Preschool form of the

BASC (BASC PRS-P; Reynolds & Kamphaus, 1992). The mean level for all scales of the BASC PRS-P will be calculated for a sample of children with autism spectrum disorders and will be compared data from the normative sample as well as the findings of other researchers who have used the BASC PRS with samples of children and adolescents with autism. Specifically, it is hypothesized that a behavioral profile of preschool-aged children with autism spectrum disorders will emerge, and that findings will be similar to those of Barnhill et al. (2000) and Reynolds and Kamphaus (1992, 2004). When compared to the normative subsample, school-aged children and adolescents with autism spectrum disorders consistently were rated as having at-risk to clinically significant difficulties on measures of Atypicality, Attention Problems, Hyperactivity, Withdrawal, Social Skills and Adaptability. On other dimensions of the BASC PRS, children with autism spectrum disorders were not consistently distinguished from normally developing children (Barnhill et al., 2000; Reynolds & Kamphaus, 1992, 2000); therefore, it is hypothesized that ratings of children with autism spectrum disorders will not be significantly different from those of the normative sample in these areas.

Second, the behavioral profile of children with autism spectrum disorders will be compared to the profile of children with language impairment utilizing scores from the BASC PRS-P. Studies comparing children with autism spectrum disorders and children with language impairments (Noterdaeme, Mildenberger, et al., 2002; Noterdaeme, Sitter, et al., 2000; Stone et al., 1999; Volkmar et al., 1987) found significant differences on the ADOS (Lord et al., 2002) and VABS (Sparrow et al., 1984) in the area of socialization between children with autism spectrum disorders and those with language impairment. Therefore, it is hypothesized that a significant difference will be found between children with autism spectrum disorders and children with language disorders on the Socialization scale of the BASC PRS-P.

The third aim of the study is to determine the relationship between teacher and parent ratings of children with autism spectrum disorders. Parent and teacher ratings will be compared to obtain an indicator of interrater reliability, both in the traditional correlational method and through comparison of mean levels. In general, previous studies (Reynolds & Kamphaus, 1992, 2000) found that parents rated their children as having more difficulties with Hyperactivity, Attention Problems, and Adaptability than were observed by teachers. Therefore, it is hypothesized that a similar pattern of differences will emerge for preschool-aged children with autism.

Finally, the item responses of parents will be analyzed to create a screener for autism spectrum disorders. Data will be entered into a logistic regression to determine which items are most predictive of a diagnosis of autism spectrum disorder.

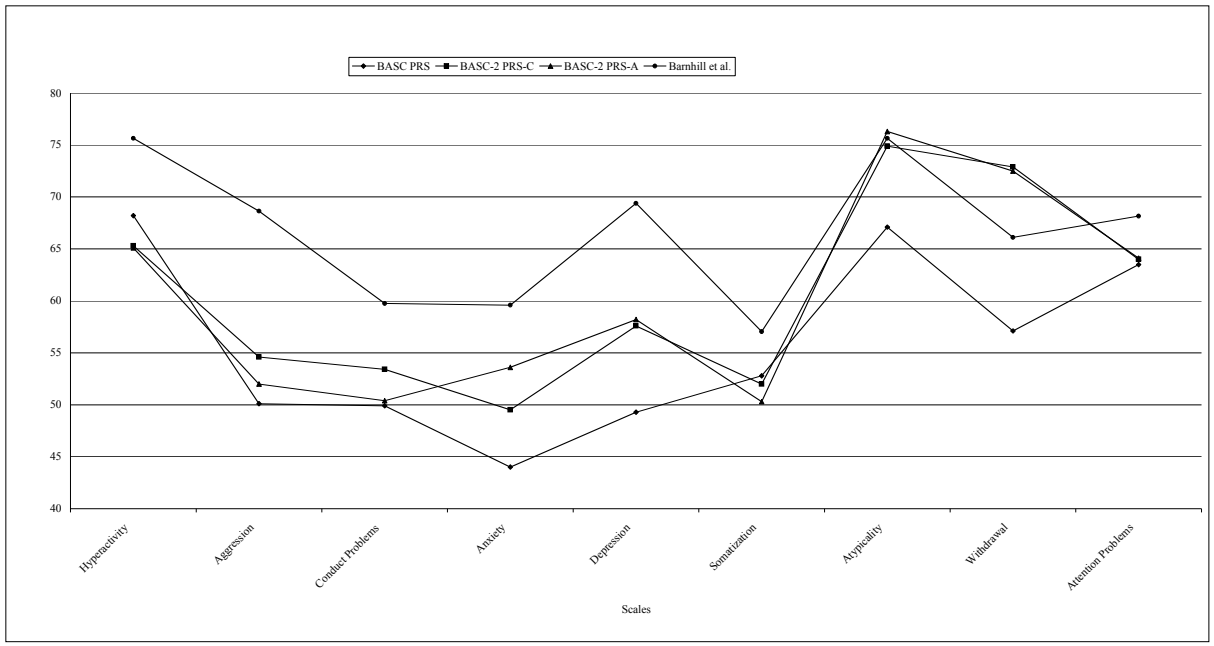
Table 1

Behavioral Indicators of Autism Spectrum Disorders

Clinical Findings	Associated BASC Scale	Previous BASC Findings
Desire for sameness (Kanner, 1943)	Adaptability	PRS at-risk (Barnhill et al, 2000; Reynolds & Kamphaus, 1992, 2004)
Inflexible (Noterdaeme et al., 2001) Poor adaptability (Hepburn, 2003; Kasari & Sigman, 1997)		TRS at-risk (Reynolds & Kamphaus, 2004)
Adherence to routines (DSM-IV-TR, 2000)		TRS average (Barnhill et al., 2000; Reynolds & Kamphaus, 1992)
16/52 met criteria for AD/HD Inattentive subtype; 14/52 for Combined (Yoshida & Uchiyama, 2004)	Attention Problems	PRS at risk (Barnhill et al., 2000; Reynolds & Kamphaus, 1992, 2004)
80 of 160 met criteria for AD/HD (Gadow et al., 2004)		TRS at risk (Barnhill et al., 2000; Reynolds & Kamphaus, 1992)
Joint attention (Dawson et al., 2004; Maestro et al., 2002; Baron-Cohen et al., 1996) Impaired executive functions (Gilotty et al., 2002; Noterdaeme et al., 2001) Poor attention (Baranek, 1999; Adrien et al, 1993) Requires multiple prompts to name (Baranek, 1999) Poor social attention (Osterling & Dawson, 1994) Social orienting impairment (Dawson et al., 2004) Poor attention to distress in another (Dawson et al., 2004) Mild clinical difficulties on Attention-Deficit/Hyperactivity scale of the CAB-P (Bracken & Keith, 2004)		TRS average (Reynolds & Kamphaus, 2004)

Repeats acts (Duarte et al, 2003)	Atypicality	PRS clinically significant (Barnhill et al., 2000; Reynolds & Kamphaus, 2004)
Strange behavior (Duarte et al., 2003; Rescorla, 1988) Strange ideas (Duarte et al., 2003; Rescorla, 1988)		PRS at-risk (Reynolds & Kamphaus, 1992)
Hears things (Duarte et al., 2003)		TRS clinically significant (child - Reynolds & Kamphaus, 2004)
Sees things (Duarte et al., 2003)		TRS at-risk (Barnhill et al., 2000; Reynolds & Kamphaus, adolescent – 1992, 2004)
Stares (Duarte et al., 2003) Odd/intense interests (DSM-IV-TR, 2000) Aloof (Mesibov et al., 1997) Stereotypic behaviors (Rescorla, 1988)		
11/52 met criteria for AD/HD Hyperactive/Impulsive subtype (Yoshida & Uchiyama, 2004)	Hyperactivity	PRS clinically significant (Barnhill et al., 2000)
14/52 met criteria for AD/HD Combined subtype (Yoshida & Uchiyama, 2004) 80 of 160 met criteria for AD/HD (Gadow et al., 2004)		PRS at-risk (Reynolds & Kamphaus, 1992, 2004)
Mild clinical difficulties on Attention-Deficit/Hyperactivity scale of the CAB-P (Bracken & Keith, 2004)		TRS average (Barnhill et al., 2000; Reynolds & Kamphaus, 1992, 2004)
Impairments on VABS Socialization (Stone et al., 1999; VanMeter et al., 1997; Carpentieri & Morgan, 1996; Volkmar et al., 1987)	Social Skills	PRS at-risk (Barnhill et al., 2000; Reynolds & Kamphaus, 1992, 2004)
Impairments on ADOS Social Interaction (Noterdaeme et al., 2002; 2000)		TRS at-risk (child – Reynolds & Kamphaus, 1992, 2004)
Poor eye contact (DSM-IV-TR, 2000)		TRS average (Barnhill et al., 2000; adolescent - Reynolds & Kamphaus, 2004)

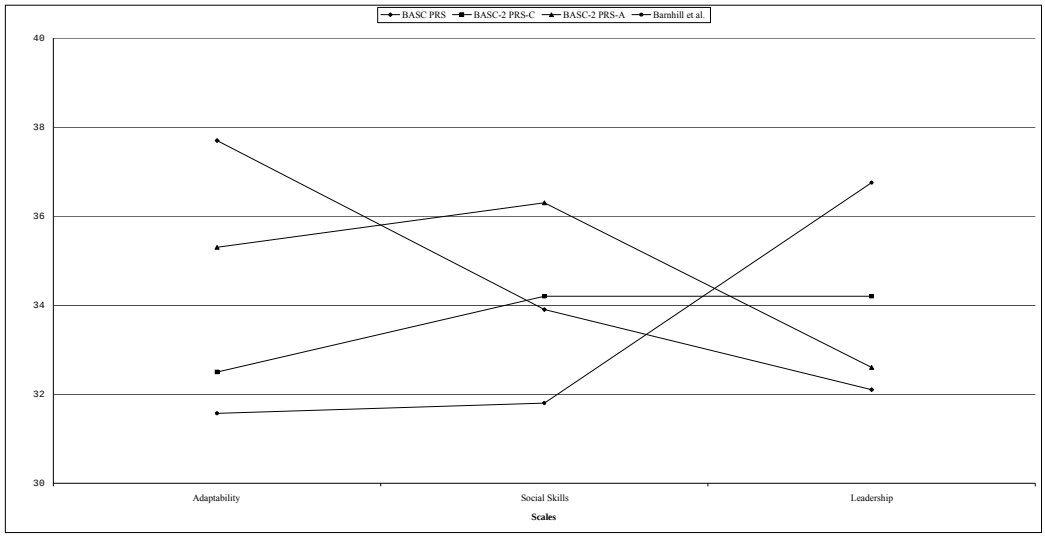
Poor play skills (DSM-TR-IV, 2000) Joint attention (Dawson et al., 2004; Maestro et al., 2002; Baron-Cohen et al., 1996) Poor social interaction (Adrien et al., 1993) Lack of social smile (Adrien et al., 1993) Lack of appropriate facial expressions (Adrien et al., 1993) Social touch aversion (Baranek, 1999) Requires multiple prompts to name (Baranek, 1999) Poor social attention (Osterling & Dawson, 1994) Social orienting impairment (Dawson et al., 2004)		
Lack of interest in others (DSM-IV-TR, 2000)	Withdrawal	PRS clinically significant (Reynolds & Kamphaus, 2004)
Failure to develop relationships (DSM-IV-TR, 2000)		PRS at-risk (Barnhill et al., 2000)
Inability to relate to others (Kanner, 1943)		PRS average (Reynolds & Kamphaus, 1992)
Not aggressive (Gadow et al., 2004)		TRS clinically significant (child – Reynolds & Kamphaus, 1992, 2004)
		TRS at-risk (Barnhill et al., 2000; adolescent – Reynolds & Kamphaus, 2004)
More social phobia than other children (Gadow et al., 2004)		



Note. Normative sample mean = 50; standard deviation = 10. Scores between 60 and 69 are within the "at risk" range. Scores of 70 and above are considered to be "clinically significant."

Figure 1

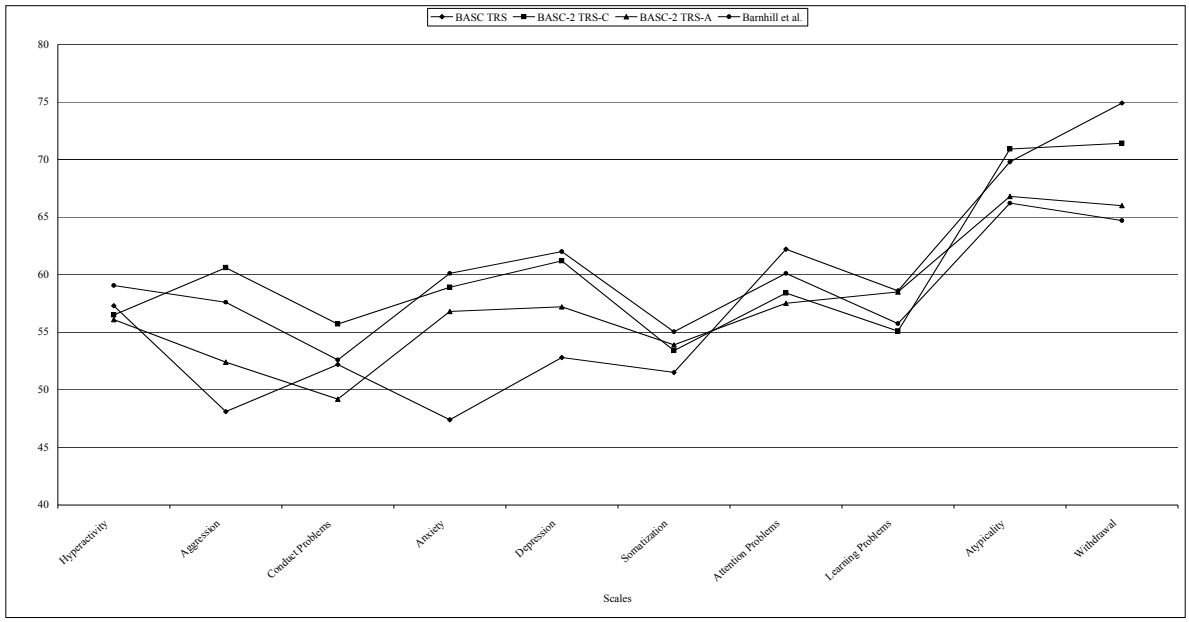
Behavior Assessment System for Children, Parent Rating Scales (BASC PRS) Results for Individuals with Autism Spectrum Disorders (ASD) – Clinical Scales



Note. Normative sample mean = 50; standard deviation = 10. Scores between 31 and 40 are within the "at risk" range. Scores of 30 and below are considered to be "clinically significant."

Figure 2

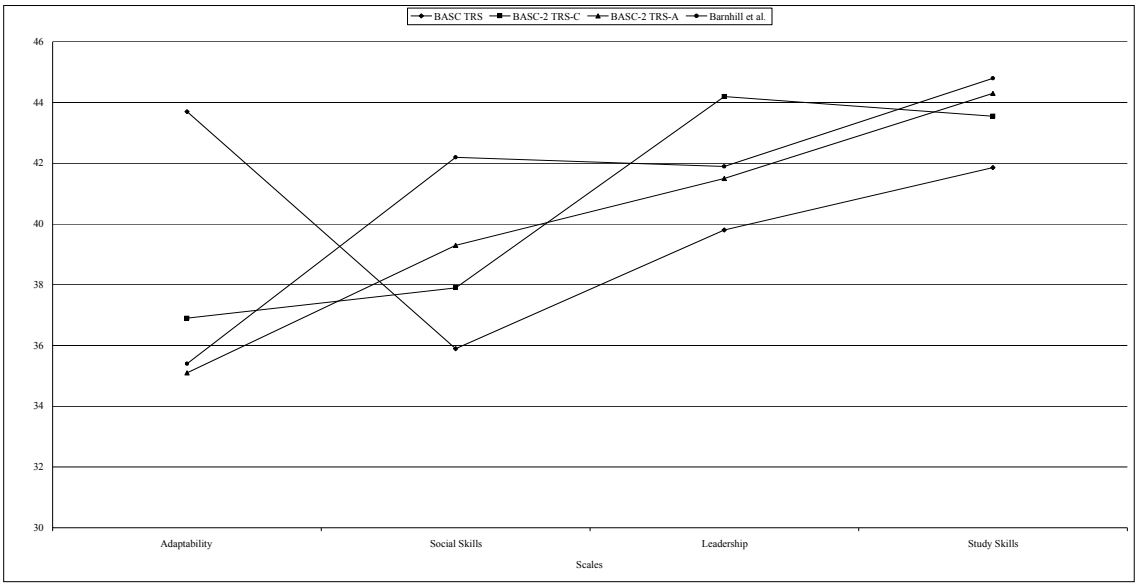
Behavior Assessment System for Children, Parent Rating Scales (BASC PRS) Results for Individuals with Autism Spectrum Disorders (ASD) – Adaptive Scales



Note. Normative sample mean = 50; standard deviation = 10. Scores between 60 and 69 are within the "at risk" range. Scores of 70 and above are considered to be "clinically significant."

Figure 3

Behavior Assessment System for Children, Teacher Rating Scales (BASC TRS) Results for Individuals with Autism Spectrum Disorders (ASD) – Clinical Scales



Note. Normative sample mean = 50; standard deviation = 10. Scores between 31 and 40 are within the "at risk" range. Scores of 30 and below are considered to be "clinically significant."

Figure 4

Behavior Assessment System for Children, Teacher Rating Scales (BASC TRS) Results for Individuals with Autism Spectrum Disorders (ASD) – Adaptive Scales

CHAPTER 3

METHODS

Data for this project were collected from two data sources. One source was an autism assessment clinic located in the southeastern United States. The second sample was a subset of the normative sample for a popular behavior rating scale, the Behavior Assessment System for Children (BASC).

Participants

Clinical sample. Data were obtained retrospectively from a southeastern United States medical school with a state-funded autism assessment clinic. The charts of 318 individuals referred to this clinic for a diagnostic assessment between the years of 1998 and 2003 were examined. The assessment team included masters and doctoral level psychologists, developmental pediatricians, and speech-language pathologists. Available data included past and present assessment reports, protocols, demographic information, and structured developmental interview data. All data were entered into a database by the author and another researcher. Each researcher checked the accuracy of data entry and approximately 10% of the other researcher's data to ensure reliable data entry.

Although the charts of 318 individuals were examined, only 202 were diagnosed with an autism spectrum disorder based on established Autism Diagnostic Observation Schedule diagnostic algorithms (ADOS; Lord, Rutter, DiLavore, & Risi, 2002). For the purposes of the present study, the subject pool was further narrowed to the number of individuals diagnosed with PDD whose parents had completed the Behavior Assessment System for Children (n = 151).

Finally, the age range was restricted, and only individuals between the ages of 2 ½ and 5 at the time of testing were retained for analysis, as that is the age range for the preschool scale of the BASC. The final sample consisted of 103 children diagnosed with an autism spectrum disorder (78 with autism and 23 diagnosed with PDD-NOS). The number of participants varied for each analysis. Specific sample characteristics for each analysis are reported in Table 2.

Subset of the BASC normative sample. Data for the BASC were collected at 116 testing sites across the United States. Students at those sites were randomly selected for participation, and data were collected for 966 children ages 2 ½ to 5. For the purposes of this project, a subset of the normative data was provided to the investigator by Dr. Randy Kamphaus, co-author of the BASC. The sample provided to the investigator included 535 children aged 2 ½ to 5. Gender distribution was 44% male and 56% female. The representation of ethnic groups matched the United States population according to data collected for the 1990 census (Reynolds & Kamphaus, 1992).

Instrumentation

Behavior Assessment System for Children (BASC). Two instruments used in this study were the Behavior Assessment System for Children, Parent Rating Scale for Preschool (BASC PRS-P) and the Behavior Assessment System for Children, Teacher Rating Scale for Preschool (BASC TRS-P). The scales were designed to be used by parents and teachers of children ages 2 ½ to 5.

The BASC uses a Likert scale format whereby respondents rate adaptive and maladaptive behaviors on a four-point scale ranging from 1 (Never) to 4 (Almost Always). Following two item tryouts and a series of empirical studies, 131 items comprising 10 scales were chosen for

the PRS-P (Reynolds & Kamphaus, 1992). Although it consists of the same 10 scales as the PRS-P, the TRS-P has only 109 items. For a descriptive listing of the scales, see Table 3.

Three types of reliability are reported in the BASC manual: internal consistency, test-retest reliability, and interrater reliability. For the preschool forms of the BASC, internal consistency reliabilities range from the .80s to the .90s, indicating that items on each scale are measuring the same construct. Test-retest correlations have median values of .85 for PRS-P and .89 for TRS-P for intervals of 2 to 8 weeks. Finally, interrater correlations for the preschool scales are moderate, with median values of .46 between parents and .63 between teachers.

Reynolds and Kamphaus (1992) also report information on factor structure and concurrent validity. The structural validity of the BASC is supported by covariance structure analyses and principal axis factoring methods. For example, variance-covariance structure analyses indicated that, although depression and withdrawal are highly correlated, they are theoretically different concepts (Reynolds & Kamphaus). With respect to concurrent validity support, the BASC is moderately to highly correlated with other rating scales of behavior, such as the Child Behavior Checklist (CBCL) and Teacher's Report Form as well as the Conners' Parent and Teacher Rating Scales (Reynolds & Kamphaus). For example, correlations between the BASC PRS and the CBCL range from .65 to .84, with most scores in the .70s (Reynolds & Kamphaus).

Reynolds and Kamphaus (1992) compiled clinical profiles of diagnostic groups as part of the standardization of the measure. The clinical groups of most relevance to this study are autism and pervasive developmental disorder. Children and adolescents with DSM-III-R diagnoses of Autistic Disorder (299.00) and Pervasive Developmental Disorder NOS (299.80) were included in this clinical group. Sixteen school-aged children and adolescents were rated using the PRS.

Mean scores indicated at-risk scores in the areas of Atypicality, Hyperactivity, and Attention Problems. Scores indicating at-risk problems with adaptive behaviors were obtained for the Leadership, Social Skills, and Adaptability scales (Reynolds & Kamphaus).

Nineteen school-aged children and adolescents with either DSM-III-R defined autism or PDD-NOS were rated in the standardization of the TRS. The Withdrawal scale emerged as the area of greatest concern and was within the clinically significant range. Attention Problems and Atypicality were at-risk, according to teachers. Among the adaptive scales, teachers indicated that Social Skills, Leadership, and Study Skills were also at-risk for these children with autism spectrum disorders. Scores from the autism clinical group of the BASC normative sample are presented in Table 4.

Review of the literature suggests that the behavioral profile of children and adolescents with autism spectrum disorders includes deficiencies in adaptive skills and excesses in maladaptive behaviors. Both the PRS and TRS yielded high mean scores for the Atypicality, Hyperactivity, and Attention Problems scales. Social Skills and Leadership also emerged as problem areas on both scales. Parents indicated additional difficulties on the Adaptability and Hyperactivity scales. The BASC behavioral profile (see Table 4) is consistent with research findings on the behavioral characteristics of children with autism (see Table 1).

Autism Diagnostic Observation Schedule. The final instrument of interest for this study is the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2002), which is considered a "gold standard" instrument for the diagnosis of autism and related disorders. The ADOS is a standardized protocol for the assessment of social and communicative skills. It consists of a series of semi-structured activities that permit an examiner to elicit and observe social and communicative deficits associated with a diagnosis of autism or an autism spectrum disorder.

The ADOS was used in the diagnostic decision-making process for the children in the sample identified with an autism spectrum disorder.

The original ADOS was created in 1989 as a way to observe the behaviors of children with autism aged 5 to 12 with expressive language skills at or above three years of age. It was designed as a companion to the Autism Diagnostic Interview (ADI; LeCouteur et al., 1989), a semi-structured parental interview focusing on developmental history and current functioning. Following several revisions, the current version of the ADOS has four modules, and the examiner determines the most appropriate module based on the individual's level of expressive language development. Each module features a protocol of activities appropriate for the child's developmental level. Although the format of the test is designed for natural interactions, planned "presses" are used to elicit particular behaviors thought to indicate the presence of an ASD (Lord et al., 2002).

The ADOS yields total scores for Communication, Reciprocal Social Interaction, Play (Module 1 only), Imagination/Creativity (Modules 2-4), and Stereotyped Behaviors and Restricted Interests. The items that best discriminate autism spectrum disorders from intellectual disabilities and language disorders are included in an algorithm that yields domain scores and a total score. Only items from Communication and Reciprocal Social Interaction domain scores contribute to the diagnostic algorithm (Lord et al.). The ADOS yields cut-off scores for both autism and autism spectrum disorders.

The four ADOS modules represent a variety of social and communicative skills at different developmental levels. Module 1 is used with nonverbal children, or children lacking phrase speech (Lord et al., 2002). Module 2 is intended for children with some phrase speech and an overall expressive language level of 4 years or less. Modules 1 and 2 use play materials

appropriate for young children. Module 3 is intended for verbally fluent children, or individuals with fluent speech (Lord et al.). It relies both on toy play and conversational skills. Module 4 was created for adolescents and adults and consists of conversations about daily living and social relationships with few play activities.

Interrater reliability for the ADOS ranges from the .80s to the .90s. In general, interrater reliability is highest for items in the Social Interaction domain and lowest for those in the Stereotyped Behavior and Restricted Interests domains. Test-retest reliability across modules is quite variable and ranges from .59 for Stereotyped Behaviors and Restricted Interests to .82 for the Total Score (Lord et al., 2002). The Communication and Social Interaction domains correlate .82 to .89 across all modules (Lord et al.) Correlations between ADOS symptom domain scores and age and verbal level were not significant, suggesting that domain scores are independent from autism symptomatology as measured by the ADOS. Internal consistency was highest for the Social Interaction domain (.86-.91), somewhat lower for Communication (.74-.84), and lowest for Stereotyped Behaviors and Restricted Interests (.63-.65 for Modules 1 and 2). For the Communication-Social Interaction total scores, Cronbach's alpha ranged from .91 to .94 for all modules (Lord et al.).

Research Questions, Hypotheses, and Data Analytic Procedures

The current study aims to answer several questions. Data from parents and teachers on children with autism spectrum disorders as well as data collected from parents about children with language impairments were utilized in these analyses.

Question 1: Can a behavioral profile of preschool-aged children with autism spectrum disorders be established using the BASC? Although many children with autism spectrum disorders are identified at an early age, preschool-aged children with autism spectrum disorders

were not included as a clinical group in the standardization of the BASC or BASC-2. The 103 children with autism spectrum disorders for whom BASC PRS-P data were collected will be compared to the 535 children in the subset of the BASC PRS-P normative sample. Descriptive statistics (e.g., means, standard deviation, skewness, and kurtosis) for the BASC scales were examined to establish a behavioral profile for preschool-aged children with autism spectrum disorders. For the purposes of comparing children with autism spectrum disorders to children with typical development, the author contacted BASC co-author Dr. Randy Kamphaus and received permission to use the normative data set for preschool children. Mean scores of children with autism spectrum disorders were then compared to the mean scores of the subset of the normative sample using multivariate analysis of variance (MANOVA.)

Barnhill et al. (2000) and Reynolds and Kamphaus (1992, 2004) found that school-aged children and adolescents with autism spectrum disorders received at-risk to clinically significant scores on parent-rated measures of Atypicality, Attention Problems, Hyperactivity, Withdrawal, Social Skills and Adaptability. Due to the chronic and lifelong nature of autism spectrum disorders, it is hypothesized that a similar pattern of results will emerge for preschool-aged children with autism spectrum disorders.

Question 2: Are the children with teacher data different from the children with no teacher data? Question 2 addresses the potential for ascertainment bias for those students for whom teacher data are available when compared to those for whom teacher data are not available. Mean scores of the children with both parent and teacher data ($N = 52$) will be compared to the children with parent data only ($N = 48$) using MANOVA. If significant differences exist, they will be investigated using post-hoc tests. It is hypothesized that there will be no difference between these two samples.

Question 3: What is the relationship between teacher and parent ratings of children with autism spectrum disorders? Data from the 52 children with autism spectrum disorders for whom parent and teacher ratings are available will be utilized. Ratings from the two sources were correlated for each of the 10 scales of the BASC. In addition, mean level differences were examined. A MANOVA was calculated in which the independent variables were identified as raters (i.e., teacher or parent) and the dependent variables were identified as the 10 BASC scores. In the presence of significant differences, post-hoc univariate ANOVAs were performed to determine which scales were significantly different. The BASC and BASC-2 clinical norms for children and adolescents with autism spectrum disorders demonstrated that parents reported more problems than teachers in the areas of Hyperactivity, Attention Problems, and Adaptability. Therefore, it is hypothesized that a similar pattern of differences will emerge for preschool-aged children with autism.

Question 4: Which BASC PRS-P items are most predictive of an autism spectrum disorder, if any? A logistic regression analysis was conducted between the item responses included in the normative data and those within the autism spectrum disorder sample. The items that were found to be most indicative of an autism spectrum disorder were compiled to create a screener that could be used in schools or in private clinics. Based on the data collected by Barnhill et al. (2000) and Reynolds and Kamphaus (1992; 2004), it is hypothesized that BASC items will discriminate between the autism spectrum disorder group and the normative sample. Further, it is hypothesized that discriminative items will be identified from the Atypicality, Attention Problems, Hyperactivity, Withdrawal, Social Skills and Adaptability scales.

Question 5: Can children with autism spectrum disorders be distinguished from children with language disorders? A MANOVA will be conducted using the mean scores of the BASC

PRS scales. As observed by Stone, Ousley, Hepburn, Hogan, and Brown (1999) and Volkmar et al. (1987), it is hypothesized that the Social Skills scale will distinguish between these two groups. Additionally, the screener created as a part of Question 4 was used to distinguish these groups further.

Table 2

Participant Characteristics for the Total Autism Spectrum Disorders Sample

Characteristic	N	M	SD	Percentage of Sample
Children with Autism	78			76
Children with PDD-NOS	25			24
Total Sample	103			100
Males	88			85
Females	15			15
Age in months		47.6	13.2	
Caucasian	59			57
African-American	36			35
ADOS Communication		5.01	1.89	
ADOS Socialization		9.44	3.95	
ADOS Stereotyped Behaviors		3.11	1.70	
ADOS Total		14.40	5.36	
Nonverbal IQ	61	62.02	15.98	
VABS Communication	59	59.98	9.02	
VABS Daily Living Skills	57	62.30	10.18	
VABS Socialization	57	62.07	8.12	
VABS Motor Skills	51	67.15	15.43	
VABS Adaptive Behavior Composite	57	57.60	7.96	

Note. ADOS = Autism Diagnostic Observation Schedule; VABS = Vineland Adaptive Behavior Scale; PRS-P = Parent Rating Scale – Preschool; TRS-P = Teacher Rating Scale – Preschool; PDD-NOS = Pervasive Developmental Disorder, Not Otherwise Specified.

Table 3

Behavior Assessment System for Children (BASC) Scale Definitions

Scale	Description
Adaptability	The ability to adapt readily to changes in the environment
Aggression	Tendency to act in a hostile manner (either verbal or physical) that is threatening to others
Anxiety	The tendency to be nervous, fearful, or worried about real or imagined problems
Attention Problems	The tendency to be easily distracted and unable to concentrate more than momentarily
Atypicality	The tendency to behave in ways that are immature, considered "odd," or commonly associated with psychosis (such as experiencing visual or auditory hallucinations)
Depression	Feelings of unhappiness, sadness, and stress that may result in an inability to carry out everyday activities (neurovegetative symptoms) or may bring on thoughts of suicide
Hyperactivity	The tendency to be overly active, rush through work or activities, and act without thinking
Social Skills	The skills necessary for interacting successfully with peers and adults in home, school, and community settings
Somatization	The tendency to be overly sensitive to and complain about relatively minor physical problems and discomforts
Withdrawal	The tendency to evade others and avoid social contact

Note. From Reynolds and Kamphaus (1992). Reprinted with permission.

Table 4

Mean T-Scores of the Autism Clinical Group of the BASC Normative Sample

BASC PRS Scale	Parent M (SD)	Teacher M (SD)
Hyperactivity	68.2* (15.5)	57.3 (8.9)
Aggression	50.1 (14.0)	48.1 (7.4)
Conduct Problems	49.9 (12.1)	52.2 (7.9)
Anxiety	44.0 (11.0)	47.4 (9.7)
Depression	49.3 (7.0)	52.8 (9.2)
Somatization	52.8 (14.3)	51.5 (8.7)
Atypicality	67.1* (10.6)	69.8* (18.2)
Withdrawal	57.1 (18.4)	74.9** (15.8)
Attention Problems	63.5* (10.0)	62.2* (6.6)
Adaptability	37.7* (9.6)	43.7 (11.0)
Social Skills	33.9* (11.4)	36.9* (8.0)
Leadership	32.1* (9.0)	35.1* (4.3)
Mean Age	10.1 (3.9)	10.8 (7.6)
Gender	F0/M16	F1/M18
N	16	19

Note. BASC PRS = Behavior Assessment System for Children, Parent Rating Scale
*Indicates scores which are "at-risk" and **indicates scores which are "clinically significant" as suggested by Reynolds and Kamphaus (1992)

CHAPTER 4

RESULTS

The first research question sought to determine whether or not a behavioral profile of preschool-aged children with autism spectrum disorders could be established using the BASC PRS-P. This analysis required descriptive statistics for both the normative sample (Table 5) and the autism spectrum disorder sample (Table 6). It was hypothesized that at-risk to clinically significant scores would be obtained for the children with autism spectrum disorders on the Hyperactivity, Atypicality, Withdrawal, Attention Problems, Adaptability, and Social Skills scales.

Consistent with the hypotheses, descriptive statistics indicated at-risk scores for the Atypicality, Withdrawal, Attention Problems, and Adaptability scales. As suggested by previous research (Barnhill et al., 2000; Reynolds & Kamphaus, 1992, 2004), the Social Skills scale fell within the clinically significant range. All other scales, including Hyperactivity, were within the average range. Research (Gadow et al., 2004; Yoshida & Uchiyama, 2004) suggests that approximately half of children with autism spectrum disorders have co-morbid symptoms of AD/HD. Therefore, while some of the children in the sample might exhibit hyperactive behaviors, approximately half may exhibit hypoactive behaviors instead.

Elevated skewness and kurtosis scores were obtained for the Anxiety scale. Based upon the boxplots, the scores indicate that the distribution is positively skewed, or that the majority of scores fell at the low end of the scale (Green & Salkind, 2005). The results suggest that the children in the autism spectrum disorders sample exhibited fewer symptoms of anxiety than the

children in the normative sample. The lower endorsement of anxiety symptoms may be due to language delays in the autism group, as several BASC Anxiety items appear to require expressive language skills for endorsement. For example, one Anxiety item requires the child to state, "I'm not very good at this." Therefore, children with autism spectrum disorders may exhibit symptoms of anxiety, but their language delays might cause them to be unable to express these feelings.

A one-way MANOVA was conducted to evaluate the relationship between the mean T-scores of the autism spectrum disorders group and the mean T-scores of the normative sample. The independent variable included two levels (i.e., autism spectrum disorder vs. normative sample), and the dependent variables were each of the 10 BASC scales. A statistically significant difference was observed between the two groups, Wilks' $\Lambda = .465$, $F(10, 627) = 79.29$, $p < .001$. A large effect size was observed (partial eta squared = .535). Levene's test of equality of error variances was conducted, and a significant result was obtained, $F(1, 626) = 27.68$. Variances for four scales (Hyperactivity, Atypicality, Withdrawal, and Attention Problems) were significant, $p = .000$. Despite these heterogeneous variances, a number of differences were observed via post-hoc analyses on specific scales. These results are presented in Table 7.

There was no difference between the groups on the Somatization scale. The ANOVA for the Depression scale was significant, $F(1, 627) = 4.60$, $p = .01$. The difference between the autism spectrum disorders sample and the normative sample was significant at the $p < .001$ level for all other scales. Consistent with the results of Barnhill et al. (2000) and Reynolds and Kamphaus (1992, 2004), elevated scales for the children with autism spectrum disorders included Hyperactivity, Atypicality, Withdrawal, Attention Problems, Adaptability, and Social Skills scales. All other scales (Anxiety, Depression, Somatization, and Aggression) were

significantly below the normative sample scores. As previously noted, several of these scales (Anxiety, Depression, Somatization) require language skills on the part of the child. Therefore, these scales may have been lower than average due to the poor language skills of the children in the sample. The finding that Aggression was lower than the normative sample may be indicative of the Withdrawal behaviors of children with autism spectrum disorders. Rather than exhibit aggressive behaviors toward others, the children in the sample may be passive in nature.

Due to the elevated skewness and kurtosis values of the Anxiety scale (see Table 6), the MANOVA analysis was repeated without it. Similar results were obtained, Wilks' $\Lambda = .465$, $F(9, 627) = 72.29$, $p = .000$.

Comparisons of Children with Teacher Data and Those with No Teacher Data

The second question approached potential ascertainment bias. Because several of the remaining statistical analyses used only the children for whom both parent and teacher data were available, it was important to establish that the children with teacher data were similar to the children with no teacher data. Participant characteristics appear in Table 9.

The mean scores of the children with teacher data were compared to the scores of children with no teacher data using MANOVA. There was not a significant difference between these groups, Wilks' $\Lambda = .864$, $F(10, 80) = 1.26$, $p = .265$. To further establish similarity between groups, post-hoc analyses were performed for each BASC subscale and may be found in Table 10. No significant differences were observed.

Additional contrasts were performed to test the similarity of the children with teacher data and those with no teacher data on measures other than the BASC. These contrasts included comparisons of age, gender, nonverbal intelligence (NIQ), Vineland Adaptive Behavior Scale

composite scores (VABS ABC), and Autism Diagnostic Observation Schedule composite scores (ADOS Total). Results are presented in Table 11.

Significant differences were observed between the groups for age, $F(1, 89)= 25.17$, $p = .000$, and VABS ABC, $F(1, 54)=4.33$, $p = .042$. The mean age of children with teacher data was greater than the mean age of children with no teacher data, and the opposite effect was true for VABS ABC scores. Due to these differences, the MANOVA was repeated with age and VABS ABC scores co-varied (see Table 12).

No significant scale differences were observed, and the overall difference between the two groups was not statistically significant, Wilks' $\Lambda = .693$, $F(10, 89)$ 1.638, $p = .134$. Therefore, the groups may be considered comparable, and results obtained in the remaining analyses are considered generalizable to the larger data set.

The Relationship Between Parent and Teacher Ratings

The third question addressed the relationship between teacher and parent ratings of children with autism spectrum disorders. Correlation coefficients were calculated between like scales of the BASC. Using the Bonferroni approach to control for Type I error across the 10 correlations, a *p*-value of less than .005 (.05/10 = .005) was required for significance. Results may be found in Table 13.

In general, the correlations obtained were consistent with those reported by previous researchers, such as Achenbach et al. (1987). Interrater reliability tended to be very low, with the exception of two scales, Somatization and Social Skills.

Correlation coefficients suggested a significant correlation between the Somatization ratings of parents and teachers on the BASC. Mean scores for both parents and teachers were

within the average range, indicating very few somatic complaints among children with autism spectrum disorders at home or at school.

A second significant correlation was observed between the Social Skills ratings of parents and teachers. For both sets of raters, the mean score fell within the at-risk range, indicating that significant social skills deficits were observed across environments. Because poor social skills are a core feature of autism spectrum disorders, this result was anticipated.

Reynolds and Kamphaus (1992, 2004) found that parents of children with autism spectrum disorders endorsed more difficulties on the Hyperactivity, Attention Problems, and Adaptability scales when compared to teachers. Therefore, it was hypothesized that a similar pattern of results would emerge for preschool-aged children. A series of within-subjects t-tests was performed to evaluate these scores. Using the Bonferroni approach to control for Type I error across the 10 contrasts, a p value of less than .005 (.05/10 = .005) was required for significance. Results are presented in Table 14.

Mean scores for both parents and teachers fell within the average range on the Aggression scale; however, the difference between these mean scores was statistically significant, $t(45) = -4.03$, $p = .000$. The same result was observed for the Depression scale, $t(47) = -3.25$, $p = .002$. Finally, a significant difference was observed for the Social Skills scale, $t(45) = -3.75$, $p = .001$. Although both parents and teachers viewed these children as having significant social difficulties, these difficulties appear to be more pronounced from the viewpoint of parents.

Item Analysis

For the fourth question, binary logistic regression was performed using the SAS LOGIT program. The analysis utilized item level data. Children with autism spectrum disorders were compared to the children from the normative sample. A total of 622 children were included in

this analysis. Ninety-two were from the autism spectrum disorders group and 530 were from the normative sample group. Fisher's scoring method was the chosen optimization technique, and the convergence criterion was satisfied. Both the Likelihood Ratio Chi-Square test, χ^2 (1, N = 620) = 438.73, $p < .0001$, and the Score Chi-Square test, χ^2(1, N = 620) = 352.88, $p < .0001$, indicated that at least one of the predictors' regression coefficients was not equal to zero.

The logistic regression analysis identified nine items from the BASC PRS that distinguished between children with autism spectrum disorders and children in the normative sample at a statistically significant level. For a list of items on each scale, see Table 15.

The analysis of maximum likelihood estimates revealed a number of items significant at the $p < .0001$ level. These are presented in Table 16. The majority of these items came from the Atypicality, Hyperactivity, and Social Skills scales, as hypothesized.

Odds ratio estimates (see Table 17) were also calculated. Odds ratios provide a way of comparing whether or not the probability of a certain event is the same for two different groups. An odds ratio estimate of one indicates equal likelihood, while estimates greater than one suggest that the event is more likely in the autism spectrum disorder group. The screener suggested that three items from the BASC PRS have high predictive value for discriminating between children with an autism spectrum disorder and children from the normative sample. The item with the highest odds ratio estimate was "Babbles to self" (Atypicality; 4.393:1), indicating that for every unit increase, a child is four times more likely to have an autism spectrum disorder. The other items which were predictive of autism spectrum disorders were "Argues when denied own way" (Aggression; 2.640:1) and "Cannot wait to take turn" (Hyperactivity; 3.843:1).

The SAS FREQ procedure (see Table 18) derived a rule for predicting group membership to assess the efficacy of the chosen BASC items as predictors. Using this rule, 62 children with

autism spectrum disorders could be classified using the nine-item scale. Of those children, 60 (96.77%) were correctly classified and placed with the autism spectrum disorders group. Correlation coefficients indicate strong concordance between pairs (Somers' D = .989; *gamma* = .989; *Tau-c* = .995; N (pairs) = 48760).

Distinguishing Autism Spectrum Disorders from Language Disorders

The final question compared children with autism spectrum disorders and children with language disorders. For a comparison of participant characteristics between these two groups, please see Table 19.

A MANOVA, Wilks' Λ = .822, $F(1, 131) = 2.36$, p = .015, revealed a significant difference between these groups. As predicted, post-hoc univariate ANOVAs (see Table 20) revealed a significant difference between the Social Skills scores of these two groups, $F(1, 131) = 13.15$, p = .000).

The nine-item screener developed for discriminating autism spectrum disorders from normal development was evaluated to determine its capacity to distinguish children with autism spectrum disorders from children with language disorders. A total of 122 children were used for this analysis. Of these, 93 were from the autism spectrum disorders group and 29 were from the language-disordered group. Fisher's scoring method was the chosen optimization technique. The convergence criterion was satisfied. Both the Likelihood Ratio Chi-Square test, $\chi^2(1, N = 120) = 34.199$, $p < .0001$, and the Score Chi-Square test $\chi^2(1, N = 120) = 31.069$, $p = .0003$) indicated that at least one of the nine predictors' regression coefficients was not equal to zero.

The analysis of maximum likelihood estimates (see Table 21) revealed that one item, "Touches everything when shopping," was significant at the $p < .001$ level. While children with

autism spectrum disorders might exhibit this behavior frequently, children with language disorders demonstrate it at the same rate as typically developing children.

Odds ratio estimates (see Table 22) suggested that six of the items from the newly developed screener have high predictive value for an autism spectrum disorder as opposed to a language disorder. These included, "Teases others" (7.035:1), "Volunteers to help with things" (2.027:1), "Encourages others to do their best" (2.298:1), "Says, 'I am not very good at this" (3.864:1), "Has good eye contact" (1.926:1), and "Touches everything when shopping" (2.499:1). Only one of these items, "Says, 'I am not very good at this," also had a high odds ratio when comparing children with autism spectrum disorders to children in the normative sample. As hypothesized, the majority of the highly predictive items were from the Social Skills scale.

The SAS FREQ procedure (see Table 23) revealed that 92 children with autism spectrum disorders and 29 with language disorders could be classified using the nine-item screener. Of those children, 89 children with autism spectrum disorders (96.74%) and 16 with language disorders (55.17%) were correctly classified. Correlation coefficients indicate moderate to strong concordance between pairs (Somers' D = .608; *gamma* = .611; *Tau-c* = .804; N (pairs) = 2668).

Table 5

Descriptive Data for the Normative Data Sample

BASC PRS Scale	*N*	*M* (*SD*)	Range	Skewness	Kurtosis
Hyperactivity	534	50.50 (10.12)	28-93	.91	1.36
Aggression	534	49.99 (10.12)	30-92	.77	.99
Anxiety	534	50.66 (9.69)	32-83	.31	-.17
Depression	534	50.67 (9.24)	26-79	.41	.24
Somatization	534	49.69 (10.37)	31-103	.46	.70
Atypicality	534	50.57 (11.46)	37-113	1.86	5.72+
Withdrawal	534	49.58 (10.11)	29-87	.53	.37
Attention Problems	534	51.58 (11.11)	28-99	.48	1.10
Adaptability	534	49.05 (10.22)	19-73	-.11	-.31
Social Skills	534	50.03 (10.38)	21-74	-.12	-.21

Note. BASC PRS = Behavior Assessment System for Children, Parent Rating Scale; * = At-risk; **Clinically Significant" as determined by Reynolds and Kamphaus (1992); + = elevated kurtosis score

Table 6

Descriptive Data for the Autism Spectrum Disorders (ASD) Sample

BASC PRS Scale	*N*	*M (SD)*	Range	Skewness	Kurtosis
Hyperactivity	93	55.10 (14.43)	30-93	.40	-.32
Aggression	93	41.77 (9.53)	29-75	.87	.76
Anxiety	93	44.31 (10.43)	32-101	2.28+	8.71+
Depression	93	46.88 (11.46)	28-82	.86	.66
Somatization	93	47.99 (9.70)	31-83	.91	1.21
Atypicality	93	65.41* (16.88)	37-120	.83	.41
Withdrawal	93	60.66* (15.03)	33-104	.56	-.37
Attention Problems	93	66.12* (15.32)	35-104	.43	-.14
Adaptability	93	35.22* (13.52)	10-63	-.02	-.79
Social Skills	93	26.60** (9.89)	10-55	.50	-.37

Note. BASC PRS = Behavior Assessment System for Children, Parent Rating Scale; * = At-risk; **Clinically Significant" as determined by Reynolds and Kamphaus (1992); + = elevated skewness and kurtosis scores

Table 7

Comparison of ASD Sample with Normative Data Sample for Parent Ratings

BASC PRS Scale	ASD Sample *n* = 93 *M (SD)*	Norm Sample *n* = 530 *M (SD)*	*F* Value	Sig. Level
Hyperactivity	55.10 (14.43)	50.54 (10.13)	6.92	.001**
Aggression	41.77 (9.53)	50.04 (10.13)	26.76	.000**
Anxiety	44.31 (10.43)	50.63 (9.69)	18.01	.000**
Depression	46.88 (11.46)	50.08 (9.23)	4.60	.010*
Somatization	47.99 (9.70)	49.64 (10.35)	1.02	.360
Atypicality	65.41 (16.88)+	50.52 (11.48)	56.73	.000**
Withdrawal	60.66 (15.03)+	49.52 (10.11)	42.00	.000**
Attention Problems	66.12 (15.32)+	51.59 (11.11)	60.14	.000**
Adaptability	35.22 (13.52)+	49.07 (10.25)	65.01	.000**
Social Skills	26.60 (9.89)++	50.63 (10.43)	216.86	.000**

Note. ** = Significant at $p < .005$; * = Significant at $p < .01$; + = At-risk score; ++ = Clinically significant score

Table 8

Comparison of ASD Sample with Normative Data Sample for Parent Ratings – Anxiety Scale Removed

BASC PRS Scale	ASD Sample *n* = 95 *M (SD)*	Norm Sample *n* = 530 *M (SD)*	*F* Value	Sig. Level
Hyperactivity	54.84 (14.38)	50.54 (10.13)	6.29	.001*
Aggression	41.74 (9.44)	50.04 (10.13)	27.58	.000*
Depression	46.85 (11.34)	50.08 (9.23)	4.75	.006
Somatization	47.94 (9.64)	49.64 (10.35)	1.11	.154
Atypicality	65.33 (16.90)+	50.52 (11.48)	56.96	.000*
Withdrawal	60.58 (14.96)+	49.52 (10.11)	42.27	.000*
Attention Problems	65.91 (15.23)+	51.59 (11.11)	59.34	.000*
Adaptability	35.28 (13.39)+	49.07 (10.25)	65.73	.000*
Social Skills	26.88 (10.21)++	50.03 (10.40)	215.18	.000*

Note. *Significant at $p < .005$; + = At-risk score; ++ = Clinically significant score.

Table 9

Participant Characteristics for the Children With and Without Teacher Data

Characteristic	Teacher	No Teacher
Children with Autism (*N*)	46	41
Children with PDD-NOS (*N*)	6	7
Total Sample (*N*)	52	48
Males (*N*)	42	43
Females (*N*)	10	5
Age in Months (*M, SD*)	53.0 (12.4)	41.52 (11.32)
Caucasian (*N*)	32	35
African-American (*N*)	14	13
ADOS Scores (*N*)	52	48
Communication (*M, SD*)	5.02 (1.87)	5.0 (1.98)
Socialization (*M, SD*)	9.29 (3.61)	9.57 (4.31)
Play (*M, SD*)	2.29 (1.20)	2.87 (1.24)
Stereotyped Behaviors (*M, SD*)	2.94 (1.71)	3.33 (1.74)
ADOS Total (*M, SD*)	14.31 (5.02)	14.57 (5.81)
Nonverbal IQ (*N*)	33	28
IQ Score (*M, SD*)	63.12 (17.42)	59.29 (17.81)
VABS Scores (*N*)	26	24
Communication (*M, SD*)	60.10 (10.89)	60.11 (6.94)
Daily Living Skills (*M, SD*)	59.31 (10.57)	64.85 (8.19)
Socialization (*M, SD*)	61.59 (9.46)	67.77 (6.72)
Motor Skills (*M, SD*)	63.23 (13.49)	71.75(16.65)
Adaptive Behavior Composite (*M, SD*)	55.50 (7.42)	59.89 (8.21)

Note. ADOS = Autism Diagnostic Observation Schedule; VABS = Vineland Adaptive Behavior Scale; PRS-P = Parent Rating Scale – Preschool; TRS-P = Teacher Rating Scale – Preschool; PDD-NOS = Pervasive Developmental Disorder, Not Otherwise Specified.

Table 10

Comparison of BASC PRS Ratings of Children With and Without Teacher Data

BASC PRS Scale	Teacher *n* = 48 *M (SD)*	No Teacher *n* = 43 *M (SD)*	*F* Value	Sig. Level
Hyperactivity	54.27 (14.68)	55.58 (14.41)	.18	.669
Aggression	40.13 (8.48)	43.58 (10.42)	3.04	.085
Anxiety	44.48 (11.14)	44.05 (9.87)	.04	.846
Depression	47.15 (11.45)	46.70 (11.74)	.03	.854
Somatization	47.19 (10.58)	48.35 (8.45)	.329	.567
Atypicality	65.56 (17.95)	64.79 (15.53)	.05	.828
Withdrawal	60.71 (15.32)	61.00 (15.10)	.01	.927
Attention Problems	67.33 (15.51)	64.07 (15.06)	1.03	.312
Adaptability	35.27 (12.75)	34.91 (14.52)	.02	.899
Social Skills	27.94 (10.72)	24.74 (8.66)	2.41	.124

Note. *Significant at $p < .005$

Table 11

Comparison of Teacher/No Teacher Groups on Other Data Points

Area	Teacher *M (SD)*	No Teacher *M (SD)*	*F* Value	Sig. Level
Age	53.44 (12.36)	41.52 (11.32)	25.17	.000**
	n = 52	*n* = 48		
NIQ	61.32 (20.11)	59.29 (17.81)	.175	.677
	n = 34	*n* = 28		
VABS ABC	55.50 (7.42)	59.89 (8.21)	4.33	.042*
	n = 28	*n* = 27		
ADOS Total	14.31 (5.02)	14.57 (5.81)	.055	.815
	n = 48	*n*=47		
Gender (male:female) [a]	42:10	43:5		

Note. **Significant at $p < .005$; *Significant at $p < .05$; [a] = Gender represented equally across groups, $\chi 2$ (1, $N = 100$) = 1.52, n.s.

Table 12

Comparison of BASC PRS Ratings of Children With/Without Teacher Data – Age and VABS Co-Varied

BASC PRS Scale	Teacher *n* = 26 *M (SD)*	No Teacher *n* = 24 *M (SD)*	*F* Value	Sig. Level
Hyperactivity	53.81 (14.17)	56.13 (15.92)	2.63	.111
Aggression	40.19 (9.42)	42.71 (8.94)	2.16	.148
Anxiety	43.73 (13.19)	41.21 (9.03)	.79	.378
Depression	46.38 (11.47)	45.04 (12.16)	.06	.803
Somatization	48.12 (9.84)	48.00 (9.40)	.01	.905
Atypicality	65.27 (19.15)	63.17 (17.58)	.00	.999
Withdrawal	59.04 (13.67)	57.13 (13.20)	.23	.634
Attention Problems	67.81 (17.42)	60.96 (13.58)	1.15	.290
Adaptability	35.92 (10.01)	38.71 (14.05)	.12	.730
Social Skills	28.54 (11.20)	26.67 (8.79)	.80	.376

Note. *Significant at $p < .05$

Table 13

Correlations Between BASC PRS and BASC TRS Scores for ASD Sample

Scale	Parent *M (SD)*	Teacher *M (SD)*	*N*	Correlation	Sig. Level
Hyperactivity	54.59 (15.01)	56.80 (10.71)	51	.199	.161
Aggression	41.49 (8.70)	47.63 (8.36)	46	.262 [a]	.077
Anxiety	45.24 (11.51)	49.09 (10.23)	45	.298	.046
Depression	47.83 (11.15)	53.90 (11.06)	48	.321	.026
Somatization	47.75 (10.39)	46.91 (6.78)	44	.374 [a]	.000**
Atypicality	66.29 (17.86)	68.76 (12.22)	45	.194	.202
Withdrawal	61.72 (15.01)	67.17 (14.39)	47	.296	.043
Attention Problems	67.86 (15.36)	64.76 (9.89)	50	.047	.744
Adaptability	34.52 (12.75)	33.94 (10.43)	50	.078	.592
Social Skills	28.24 (10.80)	33.80 (6.56)	46	.411 [a]	.004**

Note. **Significant at $p < .005$; [a] = correlation corrected for range restriction using Bryant and Gokhale (1972).

Table 14

Comparison of BASC PRS and BASC TRS Scores for ASD Sample

Scale	Parent *M (SD)*	Teacher *M (SD)*	*N*	*T*	Sig. Level
Hyperactivity	54.59 (15.01)	56.80 (10.71)	51	-.95	.346
Aggression	41.49 (8.70)	47.63 (8.36)	46	-4.03	.000*
Anxiety	45.24 (11.51)	49.09 (10.23)	45	-2.00	.052
Depression	47.83 (11.15)	53.90 (11.06)	48	-3.25	.002*
Somatization	47.75 (10.39)	46.91 (6.78)	44	.63	.534
Atypicality	66.29 (17.86)	68.76 (12.22)	45	-.85	.403
Withdrawal	61.72 (15.01)	67.17 (14.39)	47	-2.14	.038
Attention Problems	67.86 (15.36)	64.76 (9.89)	50	1.23	.226
Adaptability	34.52 (12.75)	33.94 (10.43)	50	.259	.797
Social Skills	28.24 (10.80)	33.80 (6.56)	46	-3.75	.001*

Note. *Significant at $p < .005$

Table 15

Items Chosen for ASD Screener According to BASC PRS Number and Scale

PRS Item Number	Item	Scale	ASD *M (SD)*	Normal *M (SD)*
38	Babbles to self.	Atypicality	2.85 (.959)	1.60 (.681)
112	Teases others.	Aggression	1.08 (.271)	1.74 (.638)
85	Volunteers to help with things.	Social Skills	1.60 (.743)	2.80 (.768)
118	Encourages others to do their best.	Social Skills	1.20 (.589)	2.36 (.845)
36	Says, “I am not very good at this.”	Anxiety	1.11 (.403)	1.66 (.568)
23	Argues when denied own way.	Aggression	2.63 (1.08)	2.33 (.815)
8	Has good eye contact.	Social Skills	2.28 (.817)	3.40 (.754)
106	Touches everything when shopping.	Hyperactivity	2.36 (1.11)	2.11 (.833)
51	Cannot wait to take turn.	Hyperactivity	2.61 (1.02)	2.01 (.695)

Table 16

Analysis of Maximum Likelihood Estimates for ASD and Normative Samples

Item	DF	Wald Chi-Square	Pr>ChiSq
Intercept	1	27.385	<.0001*
Teases others.	1	25.681	<.0001*
Volunteers to help with things.	1	20.826	<.0001*
Encourages others to do their best.	1	18.196	<.0001*
Babbles to self.	1	16.225	<.0001*
Has good eye contact.	1	15.242	<.0001*
Touches everything when shopping.	1	12.665	.0004*
Says, “I am not very good at this.”	1	17.708	.0011*
Cannot wait to take turn.	1	9.814	.0017*
Argues when denied own way.	1	6.577	.0103

Note. *Significant at $p < .005$

Table 17

Odds Ratio Estimates for ASD Sample and Normative Sample

Item	Point Estimate	95% Wald Confidence Limits
Babbles to self.	4.393	2.139-9.036
Cannot wait to take turn.	3.843	1.655-8.924
Argues when denied own way.	2.640	1.257-5.544
Touches everything when shopping.	.264	.127-.550
Has good eye contact.	.166	.067-.408
Volunteers to help with things.	.141	.061-.327
Encourages others to do their best.	.085	.027-.263
Says, “I am not very good at this.”	.073	.015-.349
Teases others.	.003	<.001-.031

Table 18

Predicted and Actual Group Membership for ASD Sample and Normative Sample, *N (%)*

	Actual Norm	Actual ASD	Actual Total
Predicted Norm	409 (99.51*)	2 (.49**)	411
Predicted ASD	1 (1.64)	60 (98.36)	61
Predicted Total	410	62	472

Note. *Percent concordant; **percent discordant.

Table 19

Participant Characteristics of ASD and Language Disorders Samples

Characteristic	ASD	Language
N	103	30
Males	88	25
Females	15	5
Age in months (*M, SD*)	47.6 (13.20)	55.67 (11.68)
Caucasian	59	20
African-American	36	10
ADOS Communication (*M, SD*)	5.01 (1.89)	2.00 (1.34)
ADOS Socialization (*M, SD*)	9.44 (3.95)	2.93 (3.29)
ADOS Stereotyped Behaviors (*M, SD*)	3.11 (1.70)	1.30 (1.29)
ADOS Total (*M, SD*)	14.40 (5.36)	5.03 (4.30)
Nonverbal IQ (*M, SD*)	62.02 (15.98)	64.62 (20.30)
VABS Communication (*M, SD*)	59.98 (9.02)	62.00 (10.10)
VABS Daily Living Skills (*M, SD*)	62.30 (10.18)	65.00 (14.66)
VABS Socialization (*M, SD*)	62.07 (8.12)	67.29 (10.87)
VABS Motor Skills (*M, SD*)	67.15 (15.43)	75.86 (22.71)
VABS Adaptive Behavior Composite (*M, SD*)	57.60 (7.96)	60.78 (10.12)

Note. ADOS = Autism Diagnostic Observation Schedule; VABS = Vineland Adaptive Behavior Scale; PRS-P = Parent Rating Scale – Preschool; TRS-P = Teacher Rating Scale – Preschool; PDD-NOS = Pervasive Developmental Disorder, Not Otherwise Specified.

Table 20

Comparison of ASD and Language Disorders Samples

BASC PRS Scale	ASD group $n = 93$	Language group $n = 29$	*F*	*Sig.*
Hyperactivity	55.10 (14.43)	58.26 (14.55)	1.00	.319
Aggression	41.97 (9.65)	47.47 (14.51)	4.32	.040
Anxiety	44.31 (9.70)	49.26 (12.04)	4.38	.038
Depression	46.88 (11.46)	50.67 (14.57)	2.01	.159
Somatization	47.99 (9.70)	52.81 (12.34)	4.56	.035
Atypicality	65.41 (16.88)	63.37 (14.40)	.325	.570
Withdrawal	60.65 (15.03)	60.30 (13.97)	.012	.912
Attention Problems	66.12 (15.32)	64.07 (15.74)	.368	.545
Adaptability	35.22 (13.52)	34.56 (11.87)	.052	.819
Social Skills	26.60 (9.89)	35.07 (13.14)	13.15	.000*

Note. *Significant at $p < .05$

Table 21

Analysis of Maximum Likelihood Estimates for ASD and Language Disorders Samples

Item	DF	Wald Chi-Square	Pr>ChiSq
Intercept	1	12.524	.0004
Touches everything when shopping.	1	8.3545	.0038**
Says, “I am not very good at this.”	1	4.6298	.0314*
Teases others.	1	4.621	.0316*
Volunteers to help with things.	1	4.503	.0338*
Has good eye contact.	1	3.6967	.0545
Cannot wait to take turn.	1	2.6771	.1018
Argues when denied own way.	1	2.6572	.1031
Encourages others to do their best.	1	2.5072	.1133
Babbles to self.	1	2.368	.1239

Note. **Significant at $p < .005$; *significant at $p < .01$

Table 22

Odds Ratio Estimates for ASD and Language Disorders Samples

Item	Point Estimate	95% Wald Confidence Limits	ASD *M (SD)*	Language *M (SD)*
Teases others.	7.035	1.188-41.669	2.85 (.959)	2.63 (.928)
Says, "I am not very good at this."	3.864	1.128-13.233	1.08 (.271)	1.23 (.504)
Touches everything when shopping.	2.499	1.343-4.649	1.60 (.743)	2.10 (.939)
Encourages others to do their best.	2.298	.820-6.439	1.20 (.589)	1.41 (.628)
Volunteers to help with things.	2.027	1.055-3.891	1.11 (.403)	1.34 (.670)
Has good eye contact.	1.926	.987-3.759	2.63 (1.084)	2.47 (1.106)
Babbles to self.	.648	.373-1.126	2.28 (.817)	2.57 (1.006)
Argues when denied own way.	.609	.335-1.106	2.36 (1.106)	2.70 (1.088)
Cannot wait to take turn.	.588	.312-1.111	2.61 (1.020)	2.40 (.894)

Table 23

Predicted and Actual Group Membership for ASD and Language Disorders Samples, *N (%)*

	Predicted ASD	Predicted Language	Total
Actual ASD	89 (96.74*)	3 (3.26)	92
Actual Language	16 (55.17**)	13 (44.83)	29
Total	105	16	121

Note. *Percent concordant; **percent discordant.

CHAPTER 5

DISCUSSION

The initial purpose of this study was to determine if a behavioral profile for preschool-aged children with autism spectrum disorders could be detected using the Parent Rating Scale, Preschool form of the Behavior Assessment System for Children (BASC PRS-P; Reynolds & Kamphaus, 1992). Once detected, this profile was compared to the profile of children with language impairment utilizing scores from the BASC PRS-P. The relationship between teacher and parent ratings of children with autism spectrum disorders was examined. Finally, the item responses of parents were analyzed to create a screener for autism spectrum disorders. This screener was tested against a subgroup of the normative sample of the BASC, and against a sample of language-impaired preschool children.

Summary of Findings

Using the BASC PRS-P, a behavioral profile for preschool-aged children with autism spectrum disorders was established. As hypothesized, this profile included at-risk scores on the Atypicality, Withdrawal, Attention Problems, Adaptability, and Social Skills scales. All other scales fell within the average range. Based upon research documenting the presence of hyperactivity in children with autism spectrum disorders (Barnhill et al., 2000; Reynolds & Kamphaus, 1992, 2004; Yoshida & Uchiyama, 2004), the finding that the Hyperactivity scale fell within the average range was unexpected. Perhaps this finding is related to the young age of the children in this sample relative to those in the other studies. Parents of preschool-aged children might expect their children to exhibit hyperactive behavior due to their young age;

therefore, the parents could have rated children with autism spectrum disorders as being similar to their age-mates on this aspect of behavior. Significant differences were observed between the autism spectrum disorders group and the normative sample group on all scales with the exception of the Somatization subscale. This finding suggests that children with autism spectrum disorders demonstrate a number of behavioral difficulties when compared to "normal" children.

Before proceeding with additional analyses, the children with teacher data and those with no teacher data were compared. The children with no teacher data were older and less able adaptively than children with no teacher data; however, the groups did not differ on clinical characteristics.

In the interrater analysis, teacher scores indicated at-risk concerns associated with Atypicality, Withdrawal, Attention Problems, Adaptability, and Social Skills. These were the same areas identified by parents as at-risk or clinically significant. Therefore, when comparing mean scores, parents and teachers view the behavior of children with autism spectrum disorders as somewhat consistent across environments.

Both parents and teachers indicated significant difficulties on the Social Skills scale; however, parents' ratings of Social Skills were indicative of more problems than teachers' ratings ($p = .001$). Contrary to previous studies, teachers observed more difficulties than parents in two areas: Aggression ($p = .000$) and Depression ($p = .002$). However, for both scales, mean ratings for parents and teachers fell within the average range and were not indicative of significant difficulty. Because teachers have the opportunity to view children with autism spectrum disorders interacting with other children, teachers might have observed signs of aggressive behaviors or the withdrawal symptoms of depression that parents were unable to

observe in the home environment. Parent and teacher ratings on the Withdrawal scale were within the at-risk range, suggesting that this area is problematic in both environments.

Studies comparing children with autism spectrum disorders and children with language impairments (Noterdaeme, Mildenberger, et al., 2002; Noterdaeme, Sitter, et al., 2000; Stone et al., 1999; Volkmar et al., 1987) have found significant differences on the ADOS (Lord et al., 2002) and VABS (Sparrow et al., 1984) in the area of socialization between children with autism spectrum disorders and those with language impairment. A similar result was obtained in this study. Although the mean scores for both groups were indicative of Social Skills problems, the difficulties were more pronounced in the autism spectrum disorders group ($t = 26.60$, clinically significant) than in the language disorders group ($t = 35.07$, at-risk). The difference between the two groups was statistically significant ($p = .000$), further highlighting the social impairments that are typical of children with autism spectrum disorders.

Logistic regression produced a nine-item screener that distinguished children with autism spectrum disorders from children in the BASC PRS-P normative sample in 96.77% of cases. Some of these items were from two of the scales on which children with autism spectrum disorders were significantly different from children in the normative sample (Atypicality and Social Skills). The other items were from the Aggression, Anxiety, and Hyperactivity scales, and no significant differences were found between the two groups in these areas. Two of these items were significantly negatively skewed. For example, 88% of raters chose “Never” for Item 36 (Says, “I am not very good at this”), and 92% chose “Never” for Item 112 (Teases others).

The same screener was used in an attempt to distinguish children with autism spectrum disorders from children with language disorders. Although the screener continued to be successful in classifying children with autism spectrum disorders (96.74%), only 55.17% of

children with language disorders were correctly classified. This may have been due to the small sample size (n = 30) of children with language disorders. Alternatively, the relatively poor performance of the screener in this situation may be due to the symptom overlap between children with autism spectrum disorders and those with language impairment. ADOS and VABS scores indicate that children in both groups demonstrate social, communicative, and behavioral problems; however, scores indicate significantly greater impairment in children with autism spectrum disorders. It may be the case that the BASC is sensitive to detecting general impairments in the area of social and communication difficulties but lacks adequate specificity in distinguishing between autism spectrum disorders and language impairment. .

Clinical and Educational Implications

The current study adds to the literature by providing a set of clinical norms for preschool-aged children with autism spectrum disorders on a popular standardized measure of behavioral characteristics. While most studies focus on the specific diagnostic criteria for autism, the current study offers complementary behavioral information. Additionally, although clinical norms were provided in the BASC manuals (Reynolds & Kamphaus, 1992, 2004) for school-aged children, no such information was provided for preschool-aged children. Therefore, the current study extends the BASC clinical norms down to the preschool level.

The normative information presented here could be of real utility in a clinical setting. The clinical norms provide parents, teachers, and clinicians with a measure of how the child is progressing relative to other children with autism spectrum disorders. Clearly, there are significant behavioral differences between these children and typically-developing children. Comparing the child with an autism spectrum disorder to his or her peers rather than to the

normative sample would offer information on progress, treatment outcomes, and the severity of the disorder.

Secondly, the current study established a screener for autism spectrum disorders that provides specific information on how autism spectrum disorders may manifest in young children. In a clinical setting, this information might be given as a checklist, used as an observation guide, or incorporated into an interview with parents. Although there are some screeners designed for this purpose (i.e., CHAT, M-CHAT), the BASC offers additional, complementary information about behavior that may not be obtained on an autism-specific screener. Therefore, the nine-item screener developed in this study may be used to obtain additional behavioral information.

Limitations

One major limitation of this study is the fact that only a subsample of the BASC PRS-P normative data sample was used in the investigation. Although the subsample is quite large, its makeup is somewhat unclear, and gender and one BASC scale were not normally distributed. It is difficult to determine how children with autism spectrum disorders might have compared to the full normative sample, or if the same items would have been chosen for the screener.

A second limitation of the current study is the small sample size of some of the comparison groups. The interrater comparisons between parents and teachers were based on groups of approximately 50 each. Therefore, the generalizability of the results to a larger sample is somewhat questionable. The language disorder group was also very small and was not evenly matched with the autism spectrum disorders group on a few key variables, such as age. A larger language-impaired sample size might have produced more significant results on the screener.

The autism spectrum disorder sample size was quite large, particularly for this diagnosis and age range. However, to increase the sample size, the author included children diagnosed with

autism and those diagnosed with PDD-NOS in the sample. In the DSM-IV, these are listed as separate disorders with different diagnostic criteria. The severity and intensity of social and communicative symptoms likely differs between the two groups. Therefore, it is possible that the behavioral symptoms of these two groups might also be very different.

Finally, since the inception of this study, the authors of the BASC have revised their measure (Reynolds & Kamphaus, 2004). It is unknown how well the findings from the current study might apply to the BASC-2, which is now the accepted measure for practice.

Recommendations for Future Studies

Future studies may improve upon the limitations previously mentioned. If the full normative data set can be located, it would be interesting to attempt to replicate the current findings using the full data set as a comparison group. Collaboration between several different clinics around the country would increase the sample size, which would increase the generalizability of the results. Due to the comorbidity of autism and mental retardation, it would also be worthwhile to see how the screener would perform when attempting to distinguish children with autism spectrum disorders from children with mental retardation.

Finally, it would be interesting to replicate this study using the BASC-2 (Reynolds & Kamphaus, 2004). The BASC-2 is an improvement over the BASC (Reynolds & Kamphaus, 1992) in that it has additional adaptive scales, including Functional Communication. Based upon the documented language impairments of children with autism spectrum disorders, (Noterdaeme, Mildenberger, et al., 2002; Noterdaeme, Sitter, et al., 2000; Stone et al., 1999; Volkmar et al., 1987), this study might provide additional information on how children with autism spectrum disorders differ from children in the normative sample. Additionally, the authors of the BASC-2 recently released clinical scales that might be of interest in this situation. Most notably, the new

BASC-2 ASSIST Plus software now includes a Developmental Social Disorders scale that may also function as a screener for autism spectrum disorders. Therefore, it would be important to understand the relationship between the screener developed in the current study and the Developmental Social Disorders scale.

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