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Abstract

Accurate diagnosis and treatment planning for children with autism are a growing concern. This study sought to address two questions: (a) Which domains of the of the *Behavior Assessment System for Children* (2nd ed.) Teacher Rating Scales (BASC-TRS) are most effective in discriminating students diagnosed with higher functioning autism from children and youth who do not have a disability or psychiatric diagnosis? and (b) Are there noteworthy differences in BASC-TRS domain scores between children and adolescents with autism? The results indicated that children and adolescents with an educational diagnosis of autism were given significantly higher ratings in the domains of Developmental Social Disorders and Withdrawal and significantly lower ratings in Functional Communication. These scales appear to discriminate best between those students with autism and their nondisabled peers. In addition, the results suggest that the differences between students with autism and students without clinical problems may become less pronounced as they grow into adolescence.

Keywords

identification, assessment, behavior, autism

The concept of autism is now generally accepted as a “spectrum” of related disorders (Safran, 2008). There has been an estimated threefold to fourfold increase in the diagnosis of autism and related disorders, and estimates are that it affects as many as 1 in 91 children between the ages of 3 and 17 (Kogan et al., 2009). Estimates from meta-analyses of data suggest boys outnumber girls by a ratio of 4 to 1 (Fombonne, 2003). According to the fourth edition text revision of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)*; American Psychiatric Association [APA], 2000), autism is first evident in early childhood and is characterized by impairments in social relationships (i.e., failure to develop peer relationships), by impairments in communication (i.e., delay or lack of expressive language skills), and by restricted, repetitive, and stereotyped patterns of behavior (i.e., preoccupation with objects). These aspects of the disorder are evident before age 3.

The diagnostic guidelines specified in *DSM-IV-TR* (APA, 2000) for autism are widely used by physicians, psychiatrists, and psychologists who work in clinic or community settings. However, school-based practitioners make use of

the descriptions found in federal education law (Individuals with Disabilities Education Improvement Act [IDEIA], 2004) to make decisions about the presence of a disability. Within the educational system, a medical diagnosis (i.e., *DSM-IV-TR*) is not required, but a child must meet certain criteria to be considered for special education services under the special education category of autism.

The federal definition of autism as it relates to special education is as follows:

Autism means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three that adversely affects a child's educational

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performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. (IDEIA, 2004)

Both the *DSM-IV-TR* and IDEIA definitions include deficits in social interaction and verbal and nonverbal communication skills (Dahl, 2003). The IDEIA definition of autism is broad and can encompass children across the entire spectrum of autism and related disorders, including those who, in clinical or community settings, would be classified as having high-functioning autism (HFA) or Asperger syndrome. In practice, an educational diagnosis of autism is more keeping with the spirit of autism spectrum disorder as defined in the proposed *DSM-V* (APA, n.d.).

The term *autism* is used here to describe those children and adolescents who fit an IDEIA definition of autism, regardless of their medical diagnosis as defined by the *DSM-IV-TR*. Assessment of children with autism as defined by IDEIA is multifaceted and typically includes a review of a student's health and developmental and educational histories, observations, psychoeducational testing, and behavioral rating scales. In a school setting, practitioners have the additional charge of not only making a diagnosis of autism as defined by IDEIA but also helping school personnel determine whether children with autism need special education services (Brock, 2006).

Children with autism benefit from early intervention programs and often require ongoing special education services to maximize their cognitive, social, and educational functioning (Newsom & Hovanitz, 2006). Because the major impairments in the condition relate to social interaction, when students are experiencing difficulties in the development of appropriate social skills, there is a need to evaluate their social and emotional functioning and to identify accurately their strengths and needs.

Behavioral Assessments

Rating scales are an important and widely used component of behavioral assessments. They provide summary observations of individuals based on observations of an individual across time and in different settings. Rating scales can be used for diagnosis and classification and as part of the problem-solving process. Specifically, normative data, such as those provided by standard scores, are useful for problem identification or making diagnostic decisions. Rating scales also can play an important role in developing interventions because they point practitioners to problems or areas of strength that need further investigation and clarification. This information can be helpful in assisting practitioners in developing specific goals for students. Such scales often come in different versions designed to gather data from different

sources, for example, self-report, parent report, or teacher report. Notably, different raters, such as parents and teachers, have only moderate correlations in their judgments about behavior because they use different standards for judging behaviors and behaviors can vary significantly from one environment to another (Busse, 2005).

Behavior rating scales are often described as falling into two categories, discrete or behavior specific and broad-based or omnibus. A discrete instrument provides information on a particular domain of behavior or a narrow range of behaviors associated with a specific diagnosis. Such an instrument would include scales specifically designed to assess the signs and symptoms of disorders such as attention-deficit/hyperactivity disorders, anxiety disorders, and autism (Busse, 2005).

Several discrete instruments have been developed to assist in the diagnosis of autism of child. Among these, the *Autism Diagnostic Observation Schedule* (ADOS; Lord, Rutter, DiLavore, & Risi, 1999) and the *Autism Diagnostic Interview-Revised* (ADI-R; Lord et al., 1999) require extensive training and are time-consuming, which limits their practicality unless there is a high level of concern for a diagnosis of autism. Other instruments, such as the *Childhood Autism Rating Scale* (CARS; Schopler, Reichler, & Renner, 1988), the second edition of the *Gilliam Autistic Rating Scale* (GARS-2; Gilliam, 2006), and *Gilliam Asperger's Disorder Scale* (GADS; Gilliam, 2001), are brief and require less training to administer but are narrowly focused on the specific signs and symptoms of autism or Asperger syndrome. In addition, given the titles of these instruments, they are typically used when there is already a strong suspicion of autism.

Broad-based or omnibus instruments measure several domains or clusters of behavior and provide information on a wide range of behaviors. Omnibus instruments include the *Child Behavior Checklist* (Achenbach, 2001) and *Conners Rating Scales-Revised* (Conners, 1997). Omnibus instruments have the advantage of looking at a broad range of behaviors, which allows practitioners to distinguish between problems that have similar characteristics and to account for the comorbidity of problems (Ramsay, Reynolds, & Kamphaus, 2002).

The *Behavior Assessment System for Children* (2nd edition; BASC-2) is the most common broad-based rating scale used by school-based practitioners. An omnibus instrument such as the BASC-2 has the potential advantage of being able to identify children in need of more extensive evaluation as well as to identify strengths and needs not strictly associated with the diagnostic criteria for autism. In addition, it can potentially help differentiate students who have comorbid problems (Brock, 2006).

The BASC-2 manual reports that the BASC is used in 45% of behavioral assessments. As of 2003, the BASC was used in the evaluation of more than one million students.

Nevertheless, there appears to be limited data for children with autism. For example, the BASC-2 manual reports clinical profiles for the Teacher Rating Scales (TRS) of the BASC-2 based on data from only 30 children and adolescents identified as having autism, Asperger syndrome, or a pervasive developmental disorder (PDD; Reynolds & Kamphaus, 2004).

A review of the literature using several electronic databases, including ProQuest Psychology Journals, PsycARTICLES, PsycINFO, and Social Sciences Full Text and the search terms *autism*, *Asperger syndrome*, *autism spectrum disorders*, *behavioral assessment system and children*, *BASC*, and *BASC-2* revealed only one study that specifically evaluated the performance of students with autism on the BASC Parent Rating Scale (PRS). That study (Waggoner, 2005) was a convergent validity study that compared the BASC and BASC-2 scores of a set of children with HFA, Asperger syndrome, and Pervasive Developmental Disorder Not Otherwise Specified. Waggoner (2005) found that the PDD group appeared to have fewer overall behavioral symptoms and higher adaptive functioning than did the HFA or Asperger syndrome groups and the Asperger syndrome group appeared to have a greater number of internalizing symptoms than did the other groups. Based on the paucity of research on the performance of children with autism on the BASC, this study makes an important contribution to this area of the literature.

Purpose

The purpose of this study was to examine the utility of the BASC-TRS for the assessment of higher functioning children with an educational diagnosis of autism. Specifically, the study sought to address two questions: (a) Which BASC-TRS domains are most effective in discriminating students who have an educational diagnosis of autism from children and youth who do not have a disability or psychiatric diagnosis? and (b) Are there noteworthy differences in BASC-TRS domain scores between children and adolescents with an educational diagnosis of autism? The latter question is concerned with whether there are significant changes in scores as students mature and move into the more complex environments of middle and high school.

Method

Participants and Setting

Participants in this were 67 teachers who completed the BASC-TRS on 60 students identified with an educational diagnosis of autism. Of these 67 teachers, 26 returned BASC-TRS protocols, for a return rate of 38.81%. Of these 26 teachers, 12 taught at the elementary level and 14 taught at the

middle and high school levels. Furthermore, 18 were teachers in part-time special education resource programs (RSP) and 8 taught in self-contained special day classes (SDC). As noted above, these teachers completed the BASC-TRS on 60 students who received special education services under the category of autism. Of these 60 students, 52 (86.67%) were male and 8 (13.33%) were female; 45 (75%) were White, 9 (15%) were Latino, and 6 (10%) were Asian. Among the 30 students whose teachers completed the adolescent version of the BASC-TRS, 21 were enrolled in part-time pull-out RSP and 9 received special education services primarily in full-time self-contained SDC. Of the 30 students whose teachers completed the BASC-TRS child version, 23 were in RSP and 7 received special education services, primarily in SDC.

The study was conducted in a mid-sized (27,000 students) suburban K–12 school district in Southern California. Nearly 60% of the district's students are classified as White, whereas approximately one third are designated as Latino or Hispanic. The remaining students, a little more than 10%, are classified as African American, Filipino, American Indian, or Pacific Islander.

Procedures

School district personnel familiar with the district program that serves children with autism, including the director of special education and the district autism specialist, generated a list from district databases of all elementary, middle school, and high school students who received special education services under the educational category of autism in either part-time resource RSP or SDC for children with mild or moderate disabilities. These students were further screened to eliminate those whose records (e.g., prior individualized education programs, district databases, placement in program for students with severe disabilities) had been identified with comorbid cognitive or intellectual disabilities. Safran (2008) has argued that students with autism who are on the lower end of cognitive and adaptive functioning have symptoms that are more obvious to adults and that higher functioning students on the autism spectrum are underidentified for special education services, despite having significant life challenges. For this reason, this study focused on students thought to present a more difficult diagnostic challenge.

As noted above, 67 teachers were sent a letter explaining the research project as well as noting that it had been approved by the university's Human Subjects Internal Review Board and the district's special education department. An approved consent form was included. Participating teachers were asked to return the consent form along with all completed protocols to the special education department at the district office in an envelope addressed to the first author. They also were sent the appropriate BASC-TRS test records for the specific students in their caseloads who were identified as appropriate for the study.

Of these 67 teachers, 26 returned BASC-TRS protocols, for a return rate of 38.81%. The returned protocols were scored using the BASC ASSIST scoring software (Pearson, 2004). For each protocol, item responses were entered and then verified by entering them a second time and then noting and correcting inconsistencies. The derived *T*-scores for the BASC PRS domains were then entered into an Excel spreadsheet, which was later transferred to a Statistical Package for the Social Sciences file for analysis.

Instruments

Since its publication in 1992, the BASC has become one of the most widely used tools for assessing behavior and emotions in children, adolescents, and young adults, ranging in age from 2 to 25 years old (Reynolds & Kamphaus, 2004). The BASC-2 is the recently updated version (2nd edition) of the original BASC and provides a set of tools that use a multidimensional approach to gathering information in different domains (behavioral, personality, and developmental), in different ways (rating scales, history taking, and direct observation), and from different sources (parents, teachers, clinicians, and children themselves; Reynolds & Kamphaus, 2004).

The BASC-2 consists of a Structured Developmental History, an Observation System, a Parent Rating Scale, a Self-Report of Personality Scale (SRP), and a Teacher Rating Scale. The PRS, SRP, and TRS provide information on several domains of adaptive and problem or clinical behaviors. Raters' perceptions are standardized in the form of *T*-scores and percentile rankings, which allow comparison of performance in different domains relative to a national norm group and for an analysis of individual strengths and weaknesses (Reynolds & Kamphaus, 2004).

The BASC-TRS has three versions, the TRS-P for ages 2 to 5, the TRS-C for ages 6 to 11, and the TRS-A for ages 12 to 21. For this study, the TRS-C and TRS-A were used, depending on the age of the student. The TRS-C and TRS-A both have 139 items. Teachers respond to these items by responding *never*, *sometimes*, *often*, or *almost always*. The period for these ratings of the child's behavior is the prior 6 months (Reynolds & Kamphaus, 2004).

The BASC-TRS yields 5 composite scales, 10 clinical scales, 5 adaptive scales, and, when the TRS is scored with the BASC-2 ASSIST Plus software, 7 content scales. The broad composite scales include Externalizing Problems, Internalizing Problems, School Problems, Adaptive Skills, and the Behavioral Symptoms Index (BSI). The adaptive scales are Adaptability, Functional Communication, Leadership, Social Skills, and Study Skills. The clinical scales include Aggression, Anxiety, Attention Problems, Atypicality, Conduct Problems, Depression, Hyperactivity, Learning Problems, Somatization, and Withdrawal. The 7 content scales are Anger Control, Bullying, Developmental Social

Disorders, Emotional Self-Control, Executive Functioning, Negative Emotionality, and Resiliency (Reynolds & Kamphaus, 2004).

The composite scales provide measures of a student's overall functioning in five broad areas. Each is composed of a set of clinical or adaptive scales. These smaller scales have between 6 and 11 items each. The larger composite scales range from 15 to 56 items. The BSI, which provides a broad estimate of a student's overall level of problem behavior, is composed of the Hyperactivity, Aggression, Depression, Attention Problems, Atypicality, and Withdrawal scales. The Externalizing Problems composite scale is made up of the Hyperactivity, Aggression, and Conduct Problems scales. The Internalizing Problems scale includes the Anxiety, Depression, and Somatization scales. The Adaptive Skills scale is composed of the Adaptability, Functional Communication, Social Skills, Leadership, and Study Skills scales. Finally, the School Problems composite scale consists of the Attention Problems and Learning Problems scales (Reynolds & Kamphaus, 2004).

The BASC-TRS yields *T*-scores, which have a mean of 50 and a standard deviation of 10. On the BSI and the Externalizing Problems, Internalizing Problems, School Problems, clinical, and content scales, scores above 69 are considered clinically significant and scores between 60 and 69 are seen as "at risk." The Adaptive Behavior Skills composite and the adaptive scales are reverse scored, with scores below 31 considered clinically significant and scores between 31 and 40 indicative of being "at risk." A score of 70 on the adaptive scales is considered "very high" and suggests a higher than usual level of skill in that area (Reynolds & Kamphaus, 2004).

The BASC manual reports internal consistency reliabilities for the TRS-C and TRS-A in the mid-.90s for the BSI and Externalizing Problems composites, in the low to mid-.90s for the School Problems and Adaptive Skills composites, and the high .80s to low .90s for the Internalizing Problems composite. The reliabilities of individual scales generally range in the mid- to high .80s. At certain ages, the Anxiety and Atypicality scales are in the high .70s (Reynolds & Kamphaus, 2004).

Test-retest reliabilities for the composite scales are reported to be in the mid-.80s to low .90s, with the exception of the Internalizing Problems scale at the adolescent level, which is .78. The manual also reports median test-retest reliabilities for the individual scales at .86 for the TRS-C and .81 for the TRS-A. Interrater reliabilities on the TRS-C range from .23 on Anxiety to .74 on Somatization, with a median of .56. On the TRS-A, interrater reliabilities range from .19 on Withdrawal and Somatization to .82 on Social Skills. The median reliability for the TRS-A is .53 (Reynolds & Kamphaus, 2004).

There is a great deal of evidence for the validity of the BASC-TRS. Three types of validity evidence are presented in the BASC-2 manual. These include scale intercorrelations

and factor structure, correlations with other measures of behavior that claim to assess similar constructs, and profiles of groups of children with specific clinical diagnoses or special education classifications (Reynolds & Kamphaus, 2004). The BASC-2 manual presents studies that correlate the BASC-TRS with the *Achenbach System of Empirically Based Assessment* (ASEBA) Teacher's Report Form for ages 6 to 18 (Achenbach & Rescorla, as cited in Reynolds & Kamphaus, 2004) and the *Conners Teacher Rating Scale-Revised* (CTRS-R; Conners, 1997). For the ASEBA Teacher's Report Form, correlations with the Externalizing Problems scores range from .78 to .81. Correlations with the Internalizing Problems scores were somewhat lower, ranging from .64 to .80. Correlations between the BASC-TRS and the CTRS-R are described as moderate to high, with the exception of the BASC-2 Anxiety scale and the CTRS-R Anxious-Shy scale, which are .35 for the child version and .26 for the adolescent version. Reynolds and Kamphaus explained this discrepancy by noting that these two scales tap into different aspects of anxiety, with the BASC-2 more focused on general fear or worry and the CTRS-R focused on emotionality, withdrawal, and timidity. The BASC-2 manual also presents several profiles of groups of children with diagnoses such as attention-deficit/hyperactivity disorder, bipolar disorder, depression, and PDD, among others. Inasmuch as these profiles match the defining features of the diagnosis, they lend support to the use of the BASC-2 in identifying children and youth who suffer from these conditions. For instance, in the group of children identified as having PDDs, which include Asperger syndrome and autism, the highest scales for both children and adolescents were Atypicality, Withdrawal, Adaptability, Social Skills, and Functional Communication, all areas that fit the definitions of autism provided in the *DSM-IV-TR* and special education regulations (Reynolds & Kamphaus, 2004).

Data Analysis

The domain scores of these students were compared to a nonclinical sample randomly drawn from the norms for the BASC-2, matched for gender, age, and ethnicity. Our analyses consisted of (a) estimating scale reliabilities for the study sample (children and adolescents with autism) to see how reliable the scales were for these students, (b) providing descriptive statistics for each scale for students with autism and control children and adolescents, (c) comparing mean scale scores across both student samples to identify scales that differentiated between the two groups for both children and adolescents, (d) comparing the effect size differences between children with autism and children without autism and between adolescents with autism and those without autism to evaluate the stability of the scale differentiation between the two groups, and (e) conducting a discriminant function analysis to see how well the BASC-TRS scales

Table 1. Scale Reliabilities of the Behavior Assessment System for Children Teacher Rating Scales (Cronbach's α)

Scale	Group			
	Children		Adolescents	
	α	n of items	α	n of items
Clinical				
Aggression	.80	10	.78	10
Anxiety	.88	7	.81	7
Attention Problems	.85	7	.66	7
Atypicality	.78	10	.88	9
Conduct Problems	.90	9	.75	12
Depression	.87	11	.82	11
Hyperactivity	.90	11	.81	11
Learning Problems	.68	8	.83	8
Somatization	.90	9	.84	8
Withdrawal	.88	8	.90	8
Adaptive				
Adaptability	.90	8	.85	8
Functional Communication	.87	10	.90	8
Leadership	.76	6	.77	6
Social Skills	.91	8	.90	8
Study Skills	.86	7	.95	9
Content				
Anger Control	.75	11	.72	10
Bullying	.79	12	.78	10
Developmental Social Disorders	.89	14	.90	14
Emotional Self-Control	.86	6	.83	6
Executive Functioning	.76	7	.68	8
Negative Emotionality	.79	4	.77	4
Resiliency	.88	12	.80	11

differentiated between the autistic and control samples and the relative influence of each scale on the discriminant function for children and adolescents.

Results

Scale Reliabilities

Internal consistency reliabilities were calculated using Cronbach's alpha coefficients for each of the clinical, adaptive, and content scales for both the child and the adolescent samples used in the study. This was not a primary purpose of the study but was done, in part, to replicate the estimates provided in the BASC-TRS manual, as those estimates appear to have been derived from relatively small samples. In addition, this provided more certainty about whether the scales used to make later comparisons were measuring comparably between the groups. As seen in Table 1, most of the scales

Table 2. Means and Standard Deviations for the Scales for Children of the Behavior Assessment System for Children Teacher Rating Scales

Scale	Group			
	Control (n = 28)		Autism (n = 30)	
	M	SD	M	SD
Clinical				
Aggression	48.21	8.56	52.82	8.52
Anxiety	50.21	10.53	63.14	17.65 ^a
Attention Problems	48.29	8.39	58.18	5.86
Atypicality	48.75	8.51	67.07	14.62 ^a
Conduct Problems	48.54	7.83	52.38	8.52
Depression	50.70	12.60	66.29	15.59 ^a
Hyperactivity	49.27	8.56	57.11	9.35
Learning Problems	47.00	7.23	57.36	8.17
Somatization	51.57	10.64	58.61	18.98
Withdrawal	50.82	11.62	66.86	11.49 ^a
Adaptive				
Adaptability	51.25	9.06	34.39	8.69 ^a
Functional Communication	53.25	6.19	39.54	7.39 ^a
Leadership	52.36	8.20	39.64	6.57 ^a
Social Skills	53.75	11.34	37.21	7.41 ^a
Study Skills	52.71	8.04	42.07	7.51
Content				
Anger Control	48.14	7.90	63.11	8.17 ^a
Bullying	49.64	8.94	54.04	7.36
Developmental Social Disorders	47.36	9.46	66.89	8.59 ^a
Emotional Self-Control	48.38	8.17	64.18	10.93 ^a
Executive Functioning	48.97	8.97	60.71	9.58 ^a
Negative Emotionality	49.36	9.69	65.04	10.12 ^a
Resiliency	51.50	9.57	33.57	8.71
Composite				
Externalizing Problems	48.54	7.82	54.38	8.64
Internalizing Problems	51.11	10.71	65.75	16.95 ^a
School Problems	47.46	7.36	58.50	6.93
Behavioral Symptoms Index	49.18	8.74	64.29	10.04 ^a
Adaptive Skills	53.04	8.23	37.07	7.44 ^a

a. Indicates the at-risk range; no scores were in the clinically significant range.

had strong internal consistency, with many of the reliability coefficients in excess of .80. Some scales (e.g., Learning Problems for the child sample and Attention Problems and Executive Functioning for the adolescent sample) showed modest reliability, in the .60 to .70 range.

Descriptive Statistics for the Scales

For each scale, descriptive statistics for the control and autism groups are provided in Tables 2 and 3 for the child and adolescent samples, respectively. In addressing our first research question, the tables provide an indication of which scales generate unusual score responses for the autism group, thereby distinguishing them from the control sample. As can be seen in Table 2 (child sample), although none of the scales showed mean scores in the clinically significant range, 16 of the 27 scales indicated mean scale values in the at-risk range. For the clinical scales, these included Anxiety, Atypicality, Depression, and Withdrawal. All of the adaptive scales, except Study Skills, indicated mean scores for the autism sample in the at-risk range. For the content scales, Anger Control, Developmental Social Disorders, Emotional Self-Control, Executive Functioning, and Negative Emotionality all showed mean scores for the autism group in the at-risk range. Similarly, the group of children with autism had mean scores in the at-risk range for the composite scales of Internalizing Problems and Adaptive Skills and the BSI.

As seen in Table 3, for the sample of adolescents with autism, fewer scales (nine) showed mean scores in the at-risk range. For the clinical scales, only Atypicality and Withdrawal had mean scores in the at-risk range for the autism sample. The scales of Anxiety and Depression, which showed mean score values in the at-risk range for children with autism, did not result in scores in the at-risk range for adolescents with autism. Similar results were observed for the content and composite scales. Only Developmental Social Disorders and Negative Emotionality, among the content scales, resulted in mean scores in the at-risk range for adolescents with autism, and on the composite scales, only the Adaptive Skills scale produced mean scores in the at-risk range. Thus, the scales of Anger Control, Emotional Self-Control, Executive Functioning, Internalizing Problems, and the BSI, which resulted in mean scores in the at-risk range for children with autism, did not exhibit mean scores in the at-risk range for adolescents. However, the differentiating effect of the adaptive scales proved consistent across age ranges. As with the sample of children with autism, the scales of Adaptability, Functional Communication, Leadership, and Social Skills showed mean scores in the at-risk range for the group of adolescents with autism.

Group Comparisons

In addition to examining the mean scores of each group for values in the clinically significant or at-risk ranges, the scores on each scale for the autism group in each age range were compared to scores for a matched sample of control participants. These participants were matched to the autism sample

Table 3. Means and Standard Deviations for the Scales for Adolescents of the Behavior Assessment System for Children Teacher Rating Scales

Scale	Group			
	Control (<i>n</i> = 28)		Autism (<i>n</i> = 30)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Clinical				
Aggression	47.60	5.76	50.27	6.50
Anxiety	47.70	11.07	57.30	13.80
Attention Problems	48.47	8.46	58.13	10.77
Atypicality	49.30	6.74	62.83	16.54 ^a
Conduct Problems	46.63	3.94	47.63	4.93
Depression	49.07	11.74	57.50	12.66
Hyperactivity	47.07	5.44	51.50	7.20
Learning Problems	49.83	10.52	58.03	12.31
Somatization	48.80	9.92	52.13	12.22
Withdrawal	48.00	8.33	67.30	13.11 ^a
Adaptive				
Adaptability	52.60	9.53	39.57	8.19 ^a
Functional Communication	50.73	10.02	39.87	10.03 ^a
Leadership	49.43	11.63	38.70	6.58 ^a
Social Skills	48.60	10.00	38.57	8.72 ^a
Study Skills	49.63	10.87	44.30	10.72
Content				
Anger Control	46.67	7.32	57.27	8.79
Bullying	47.37	5.35	49.57	5.78
Developmental Social Disorders	49.14	9.38	66.30	11.11 ^a
Emotional Self-Control	46.53	7.32	59.73	11.42
Executive Functioning	46.97	6.42	54.27	7.74
Negative Emotionality	47.17	8.36	60.00	11.08 ^a
Resiliency	52.53	9.97	38.37	8.76
Composite				
Externalizing Problems	46.93	4.64	50.07	5.90
Internalizing Problems	48.23	10.50	56.90	12.58
School Problems Behavioral	49.07	9.76	58.70	11.74
Symptoms Index	47.83	7.29	59.73	9.99
Adaptive Skills	50.23	10.48	39.00	8.20 ^a

a. Indicates the at-risk range; no scores were in the clinically significant range.

on gender, ethnicity, and age. A two-group independent samples *t* test was used to compare the scale scores of the autism and control samples for each age range. Statistically significant group differences ($p \leq .05$) were then converted to Cohen (1988) effect size estimates by dividing the mean group difference by the standard deviation of the control sample.

Table 4. Cohen Effect Size Differences for Group Comparisons on Clinical Scales

Clinical scale	Group	
	Children	Adolescents
Aggression	0.58	<i>ns</i>
Anxiety	1.23	0.87
Attention Problems	1.18	1.14
Atypicality	2.18	2.01
Conduct Problems	<i>ns</i>	<i>ns</i>
Depression	1.24	0.72
Hyperactivity	0.91	0.82
Learning Problems	1.24	0.78
Somatization	<i>ns</i>	<i>ns</i>
Withdrawal	1.38	2.32

As seen in Table 4, the control and autism samples scored as significantly different from each other on most of the clinical scales, with effect sizes ranging from 0.58 for Aggression to 2.18 for Atypicality for children and from 0.72 for Depression to 2.32 for Withdrawal for adolescents. Interestingly, in most cases of significant differences between the autism and control samples, the effect size was greater in the child sample than it was in the adolescent sample. The only exception among the clinical scales was seen in the Withdrawal scale, where the effect was greater for the adolescent sample than for the child sample. Given the large number of univariate *t* tests, it is possible that some significant differences between the autistic and control participants will manifest purely by chance. Therefore, we conducted a 2 (type of student: autistic or control) \times 2 (age: child or adolescent) analysis of variance test for each of the scales, thereby reducing the number of statistical tests conducted. These analyses confirmed the findings from the univariate *t* tests as all of the subscales with the single exception of Conduct Problems ($p < .069$) showed statistically significant differences between the autistic and control participants.

A similar trend was identified in the adaptive scales (Table 5). In all the comparisons between the autistic and control samples, the effect size was greater for the child sample than for the adolescent sample. For Study Skills, the comparison between the autism and control samples did not result in a significant difference in the adolescent sample, although one was evident in the child sample.

Comparable results were seen for the content and composite scales (Tables 6 and 7). For all the scales in these two categories, effect sizes reflecting the magnitude of scale score differences between the autism and control samples were larger in the child sample than in the adolescent sample. This trend suggests that although the BASC-TRS can effectively differentiate between autism and control samples for child and adolescent populations, these differences may become less pronounced as children grow into adolescence.

Table 5. Cohen Effect Size Differences for Group Comparisons on Adaptive Scales

Adaptive scale	Group	
	Children	Adolescents
Adaptability	1.86	1.37
Functional Communication	2.21	1.08
Leadership	1.55	0.92
Social Skills	1.46	1.00
Study Skills	1.32	ns

Table 6. Cohen Effect Size Differences for Group Comparisons on Content Scales

Content scale	Group	
	Children	Adolescents
Anger Control	1.89	1.45
Bullying	0.49	ns
Developmental Social Disorders	2.07	1.83
Emotional Self-Control	1.94	1.80
Executive Functioning	1.31	1.14
Negative Emotionality	1.62	1.54
Resiliency	1.88	1.42

Table 7. Cohen Effect Size Differences for Group Comparisons on Composite Scales

Composite scale	Group	
	Children	Adolescents
Externalizing Problems	0.75	0.67
Internalizing Problems	1.37	0.83
School Problems	1.50	0.98
Behavioral Symptoms Index	1.73	1.63
Adaptive Skills	1.94	1.07

Discriminant Function Analysis

A stepwise discriminant function analysis was used to determine the extent to which the BASC-TRS scales collectively discriminate between students with autism and control students at both the child and adolescent levels and which scales contributed to the discrimination in each of these groups. In this analysis, the criterion variable was inclusion in the autistic group and the predictor variables were scores on each of the BASC-TRS scales. A stepwise discriminant function analysis was chosen for this exploratory investigation because it is best suited for this investigation. Other approaches to discriminant analysis, such as forward entry, require an a priori order of entry for each scale of the BASC-TRS into the analysis. Since no a priori order of scales of the

BASC-TRS exists, the stepwise approach was selected. It is recommended that given the nature of this exploratory investigation, in addition to the limited sample size, care should be taken in the interpretation of these findings, as stepwise procedures capitalize on sample-specific relationships among the variables. Replication of these analyses with larger samples is therefore recommended.

Results of the discriminant function analyses indicate that, for both the child and adolescent samples, the BASC-TRS scales significantly discriminate between autistic and control students but do so differently across the age spans (Table 8). For the child sample, the discriminant function analysis resulted in a solution that included only two of the BASC-TRS scales: the content scale of Developmental Social Disorders and the adaptive scale of Functional Communication. No clinical scales significantly contributed to the discriminant function. Once these two scales were considered, no other scales met the inclusion criterion (maximum significance for F to enter = .05) for the stepwise discriminant function. That is, once differences in Developmental Social Disorders and Functional Communication were considered, no other scales significantly contributed to discriminating between autistic and control children. This finding is consistent with the group difference effect sizes presented in Tables 4 to 7, as these scales registered two of the largest effect sizes between the groups.

The discriminant analyses yielded a somewhat different solution for adolescents. The only BASC-TRS scale that significantly contributed to the discriminant function for this group was the clinical scale of Withdrawal. This too is consistent with the effect size analyses presented earlier, as the Withdrawal scale indicated the largest effect size difference between the two groups of adolescents. Thus, it appears that although the BASC-TRS is useful in discriminating between autistic and control children and adolescents, different scales contribute to this discrimination for the different age groups.

Furthermore, investigation of age group differences among autistic students revealed significant differences between the age groups on 10 of the 27 scales. Hyperactivity, $F(1, 56) = 6.60, p = .01$, Conduct Problems, $F(1, 56) = 5.41, p = .02$, Depression, $F(1, 56) = 5.59, p = .02$, Adaptability, $F(1, 56) = 5.45, p = .02$, Anger Control, $F(1, 56) = 6.84, p = .01$, Bullying, $F(1, 56) = 6.67, p = .01$, Executive Functioning, $F(1, 56) = 7.80, p = .01$, Resiliency, $F(1, 56) = 4.43, p = .04$, Externalizing Problems, $F(1, 56) = 4.94, p = .03$, and Internalizing Problems, $F(1, 56) = 5.14, p = .03$, all showed significant differences between children with autism and adolescents with autism. This finding suggests that there are noteworthy differences in BASC-TRS domain scores between children and adolescents with an educational diagnosis of autism.

Table 8. Summary of Discriminant Function Analyses

Group	Contributing scales	Wilks's Lambda	χ^2	df	Sig.	Canonical correlation
Children	Developmental Social Disorders, Functional Communication	.418	46.28	2	.000	.763
Adolescents	Withdrawal	.548	33.99	1	.000	.672

Discussion

The results suggest that the BASC-TRS discriminates between those students with an educational diagnosis of autism and their nondisabled peers. For example, the two samples differed significantly from one another on almost all of the clinical, content, and adaptive scales of the BASC-TRS. Although there were significant differences between the two groups, it is interesting to note that none of the *T*-score means fell in the range considered clinically significant but rather tended to be in the range of scores described as “at risk.”

Although the *T*-scores for the group of students with autism did not reach the level considered “clinically significant” (70 and above), this does not mean that these scores do not represent significant functional impairments. The BASC manual describes at-risk scores as suggesting that the symptoms in the domain in question are severe enough to impair daily functioning but may not be severe enough to support a formal clinical diagnosis. This suggests that, in several areas, including Atypicality, Withdrawal, Developmental Social Disorders, and Negative Emotionality, teachers see students with autism as having significant difficulties. The picture is similar for the adaptive scales. With the exception of mean scores on Study Skills, all of the adaptive scales fell in the at-risk range, suggesting that students with autism have fewer resources to fall back on when coping with stress and adversity.

Another finding is that, for most scales for which there were significant differences, the effect sizes were greater in the child sample than in the adolescent sample. As noted above, this trend suggests that the differences between students with autism and students without clinical problems may become less pronounced as they grow into adolescence. An interesting exception to this trend was the Withdrawal scale. In the case of the Withdrawal scale, the effect size or difference between students with autism and those without diagnoses was greater in the adolescent sample than in the child sample.

The results of the stepwise discriminant function analysis provide further evidence that the BASC-TRS discriminates between children and adolescents with autism and a control

group. For children, the content scale of Developmental Social Disorders and the adaptive scale of Functional Communication were the best predictors of autism. Once these two scales were considered, no other scales, including all of the clinical scales, significantly contributed to discriminating between students with autism and nondisabled students. These scales also produced two of the largest effect sizes between the groups, suggesting that they provide the best options for distinguishing children with autism from those without autism, based on the BASC-TRS.

For adolescents, the stepwise discriminant function analysis demonstrated that the BASC-TRS clinical scale of Withdrawal contributed the most to discriminating between adolescents with autism and those without. This scale also produced a large effect size, again suggesting that it provides the best option for distinguishing adolescents with autism from those without autism, based on the BASC-TRS.

The Withdrawal scale is described in the BASC manual as “a child’s tendency to evade others to avoid social contact and to lack interest in making contact in social setting” (Reynolds & Kamphaus, 2004, p. 63). Reynolds and Kamphaus (2004) added that the Withdrawal scale measures a core symptom of autism and recommended that a diagnosis of autism should be considered whenever an at-risk or clinically significant score is found in this area. It may be that although other areas improve with age and treatment, this core area of autism remains and perhaps becomes a more robust distinguisher between students with autism and their nondisabled peers.

Implications for Practice

Although the results of this study add significantly to the current research available for the use of the BASC-2 with children with autism, they are limited by the relatively small sample size. In addition, these students were identified using IDEIA (2004) rather than *DSM-IV-TR* standards. Given that IDEIA does not distinguish among HFA, Asperger syndrome, and autism disorder, the results do not provide information about how these specific populations might differ in their profiles on the BASC-TRS. Nevertheless, it is important to note that the students in this study likely fit into the broad

category of HFA, given that they do not have comorbid intellectual disabilities. It is also possible that other clinical populations, such as children with depression or attention-deficit/hyperactivity disorder, will exhibit similar characteristics. Despite these limitations, the results of this study provide useful information for the many educators and clinicians who use the BASC-TRS and are involved in the assessment of children with autism.

These results also suggest that the BASC-TRS has a valid and useful role in the assessment of children with autism. It appears to distinguish effectively students with autism from those without autism in those domains that have face validity, for example, Developmental Social Disorders, Functional Communication, Withdrawal, and so forth. Not only does it effectively distinguish students with autism from those without autism in these domains, but also because the BASC-TRS is a broad-based or omnibus instrument, it has several advantages over more narrowly focused instruments used in the assessment of students suspected of having autism.

The BASC-TRS is part of a linked multidimensional assessment system that gathers different kinds of information from different sources. It provides information about several domains, including history and context, observational data, problem behaviors, and adaptive behaviors, thus allowing clinicians to gather not only information specific to a particular diagnosis but also information related to comorbid problems as well as strengths or resources. The BASC-2 might be used as an initial assessment of behavior and social emotional functioning, which, if needed, could be followed up with more narrowly focused instruments such as the ADOS (Lord et al., 1999), ADI-R (Lord et al., 1949), CARS (Schopler et al., 1988), GARS-2 (Gilliam, 1996), or GADS (Gilliam, 2001). Beyond diagnosis, the BASC-TRS can play an important role in understanding the challenges that children and adolescents with autism face and help identify specific domains, such as social withdrawal, where the student is in need of support or intervention.

Although potentially an important source of information, the BASC-TRS and any other behavior rating scale should be considered as only one part of a comprehensive assessment of autism. A high score on any of the domains of the BASC is not sufficient to make a diagnosis of autism. However, high scores in the areas discussed can suggest children who might benefit from further evaluation or, as noted above, help evaluators to understand problems or strengths not specific to a diagnosis of autism. It is also important for future studies to examine the validity of other components of the BASC in the assessment of autism.

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