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The Identification of Autism Spectrum Disorders: A Primer for the School Psychologist

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Recent epidemiological studies have clearly demonstrated that the incidence of autism is increasing. While early research suggested classic autism to be relatively rare (4 to 6 per 10,000; Lotter, 1967), more recent findings suggest that when viewed as a spectrum of disorders and including children at the milder end of the spectrum (i.e., Asperger's Disorder and Pervasive Developmental Disorder – Not Otherwise Specified) autism is much more prevalent than previously thought (62.6 per 10,000 or 1 in 160; Chakrabarti & Fombonne, 2001). Ninety-five percent (95%) of the school psychologists who responded to a recent electronic survey reported an increase in the number of students with autism being referred for assessment. An average the respondents reported seeing 8 students with autism per year (Kohrt, 2004). While improved diagnostic practices and expanded classification systems account for a portion of this increase, it is now believed that yet to be identified factors may have emerged in the last few decades that “place infants and young children at greater risk for developing autism” (Ozonoff & Rogers, 2003, p. 17). Regardless of the cause (or causes) of this increased rate of autism spectrum disorders (ASD), there is no argument that today's school psychologists are more likely to assess students with autism than in years past. Given this new reality it is essential that school psychology clearly define its roles, responsibilities, and limitations when it comes to the identification of these disorders. Facilitating such a dialogue is an important goal of this paper.

A second reason for devoting increased attention to the identification autism is the fact that early ASD identification is not only feasible, but is also an important determinant of its course. Research suggests that 75 to 88 percent of children with Autistic Disorder show signs of this condition in the first two years of life, with 31 to 55 percent displaying symptoms in their first year (Young & Brewer, 2002). These data combined with additional research suggesting relatively substantial cortical plasticity during early development and findings that intensive early intervention results in improved outcomes for children with ASD (Ozonoff & Rogers, 2003; Rogers, 2001; Rogers, 1998), have lead to a consensus that such early intensive intervention is essential (Mastergeorge, Rogers, Corbett, & Solomon, 2003). Thus, it is critical for school psychologists to help ensure that students with ASD are identified as soon as possible

A third reason for increased school psychologist attention to the identification of ASD is the fact that not all cases of these disorders will be identified before children enter school. While it should be expected that most of the more severe cases of autism will be identified before children reach school age, it needs to be acknowledged that many students will “slip through the cracks” and may go undiagnosed until after they enter kindergarten. For example, data from a survey conducted in the United Kingdom reveals that the average age of diagnosis for children with Autistic Disorder was about 5.5 years of age (Howlin & Asgharian, 1999). In particular, it is not unusual for students with milder forms of ASD (i.e., Asperger's Disorder) to go undiagnosed until after school entry. Among this group the average age of diagnosis has been reported to be 11 years of age. Only rarely is it given to children under the age of 5 years (Howlin & Asgharian, 1999). Thus, it is critical for all school psychologists (not just those working in infant and preschool settings) to understand ASD and be vigilant for these disorders.

The importance of increasing the attention school psychologists direct toward ASD identification is further highlighted by the observation that many are unprepared to engage in identification tasks. Recent research has suggested that school psychologists (especially those working in rural settings) have difficulty recognizing autism and distinguishing it from other exceptionalities (Spears, Tollefosn, & Simpson, 2001). Obviously, such findings serve to emphasize the importance of this paper.

To facilitate examination of school psychologist ASD identification roles and responsibilities, this paper begins with an overview of ASD and provides a general discussion of diagnostic and special education eligibility classifications. Next, it specifically identifies potential school psychologist ASD identification roles, responsibilities, and limitations. Finally, the paper provides a detailed discussion of the identified roles and responsibilities. From prior papers by Filipek et al. (1999, 2000) these roles and responsibilities are identified as follows: a) case finding, b) screening and referral, c) diagnostic assessment, and e) psycho-educational assessment.

AN OVERVIEW OF AUTISM SPECTRUM DISORDER CLASSIFICATIONS

The diagnostic criteria for ASD are found in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM IV-TR) published by the American Psychiatric Association (APA, 2000). In *DSM IV-TR* these disorders are placed within the subclass of *Disorders Usually First Diagnosed in Infancy, Childhood, or Adolescence* known as *Pervasive Developmental Disorders* (PDD). In this paper the terms ASD or autism will be used as synonyms for PDD.

DSM IV-TR Diagnostic Classifications

The specific ASD classifications provided in *DSM IV-TR* (APA, 2000) are Autistic Disorder, Asperger's Disorder, Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS), Rett's Disorder, and Childhood Disintegrative Disorder. A general description of each of these disorders is provided in the following paragraphs. A more detailed discussion of ASD diagnostic criteria is provided later in this paper's examination of the diagnostic assessment.

Autistic Disorder

The primary symptoms of Autistic Disorder are "markedly abnormal or impaired development in social interaction and communication and a markedly restricted repertoire of activity and interests" (APA, 2000, p. 70). Diagnosis requires the presence of 6 or more of 12 symptoms, with at least two being symptoms of impaired social interactions, at least one being a symptom of impaired communication, and at least one being a symptom of restricted repertoire of activities and interests. Students with Autistic Disorder typically have some degree of mental retardation. Given this fact, it is not surprising that it has been suggested that children assigned this diagnostic classification would also be eligible for special education under *IDEA* (Fogt, Miller, & Zirkel, 2003).

Asperger's Disorder

The primary symptoms of Asperger's Disorder are "severe and sustained impairment in social interaction ... and the development of restricted, repetitive patterns of behaviors, interests, and activities" (APA, 2000, p. 80). With the exception of not requiring symptoms of impaired communication [in fact Asperger's Disorder criteria require "no clinically significant general delay in language" (p. 84)] the diagnostic criteria for Asperger's and Autistic Disorders are essentially the same. However, diagnosis requires that Autistic Disorder be ruled out before Asperger's Disorder is considered. In addition, the cognitive functioning of individuals with Asperger's Disorder is much more homogeneous. While individuals with Autistic Disorder are often cognitively impaired, the intellectual functioning of individuals with Asperger's Disorder is typically within normal limits. Given this fact, students with Asperger's Disorder will require careful examination by an IEP team to determine if their learning needs necessitate special education assistance.

PDD-NOS

This classification is reserved for individuals who experience difficulty in at least two of the three Autistic Disorder symptom clusters, but who do not meet the complete diagnostic criteria for any other ASD (APA, 2000). According to Filipek et al. (1999), PDD-NOS is not a distinct clinical entity. However, individuals with this diagnosis are typically viewed as having milder symptoms. Given this fact, students with PDD-NOS will require careful examination by an IEP team to determine if their learning needs necessitate special education assistance. At the same time, however, it is important to acknowledge that this diagnostic classification is sometimes employed when a diagnostician is simply reluctant to use the Autistic Disorder label. In fact, in one study 176 children with Autistic Disorder were judged to not be significantly different from 18 children with PDD-NOS on any neuropsychological or behavioral measure (when nonverbal IQ was controlled; Rapin et al., 1996; cited in Filipek et al., 1999).

Childhood Disintegrative and Rett's Disorders

Childhood Disintegrative Disorder is a very rare condition. Like Autistic Disorder it involves impaired development of social interaction and communication; and restricted, repetitive, and stereotyped patterns of behaviors, interests, and mannerisms. However, a distinct pattern of regression following at least two years of normal development distinguishes it from Autistic Disorder (APA, 2000). Given the severe cognitive deficits typically associated with Rett's Disorder, it is expected that IEP teams will certify these students as eligible for special education assistance.

Examination of diagnostic criteria reveals that Rett's Disorder (which occurs only among females) is relatively distinct. In this Disorder a pattern of head growth deceleration, a loss of purposeful hand skills, and the presence of awkward gait and trunk movement distinguish it from the other PDDs. While social difficulties characteristic of Autistic and Asperger's Disorders may be observed, they are not as pervasive and tend to be transient. In addition, while the severe impairment of language development that accompanies Autistic Disorder is observed, in Rett's Disorder such is also accompanied by severe psychomotor retardation (APA, 2000). Given the

severe to profound cognitive deficits typically associated with Rett's Disorder, it is expected that IEP teams will certify these students as eligible for special education assistance.

Regarding these latter two classifications (Childhood Disintegrative and Rett's Disorders), it is important to acknowledge that as researchers have come to understand more about them and their respective etiologies (particularly of Rett's disorder), their relationship with autism has been called into question (Szatmari, 2004). In fact, Ozonoff and Rogers (2003) have speculated: "It is likely that these conditions will not be so closely associated with autism in the future and will be considered distinct neurodegenerative disorders" (p. 11).

Special Education Eligibility Classifications

It is needs to be recognized that *DSM IV-TR* diagnoses are not synonymous with special education eligibility (Fogt et al., 2003; Department of Education, 2000). Thus, it is also important to consider the special education eligibility classification for these disorders. Specifically, according to *IDEA* regulations [1999 (c)(1)(i)]:

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 education performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotypical movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. The term does not apply if a child's educational performance is adversely affected primarily because the child has an emotional disturbance. (34 C.F.R. § 300.7)

In California this eligibility classification is defined in education code as follows:

A pupil exhibits any combination of the following autistic-like behaviors, to include but not limited to: (1) an inability to use oral language for appropriate communication; (2) a history of extreme withdrawal or relating to people inappropriately and continued impairment in social interaction from infancy through early childhood; (3) an obsession to maintain sameness; (4) extreme preoccupation with objects or inappropriate use of objects or both (5) extreme resistance to controls (6) displays peculiar motoric mannerisms and motility patterns; and (7) self-stimulating, ritualistic behavior. [Title 5, CCR 3030(g)]

It has been argued that given these eligibility classification statements, distinctions among the various ASDs may not be all that relevant. Specifically, Shriver, Allen, and Mathews (1999) suggest that for special education eligibility purposes "the federal definition of 'autism' was written sufficiently broad to encompass children who exhibit a range of characteristics of autism such as PDD-NOS and Asperger's disorder" (p. 539). However, Fogt et al. (2003) suggest that it is less clear if students with these milder forms of ASD would be eligible. In their review of published case law addressing the eligibility of students with ASD for special education, Fogt and her colleagues observe that "adjudicative decision makers almost never use the *DSM IV-TR* criteria exclusively or primarily for determining whether the child is eligible as

autistic” (p. 211). While *DSM IV-TR* criteria were considered in just over half of the cases reviewed, all but one case acknowledged *IDEA* at the “controlling authority” (p. 211). In other words, when it comes to special education, it is state and federal education codes and regulations (not *DSM IV-TR*) that drive eligibility decisions. School psychologists involved in making eligibility decisions for students with ASD are advised by Fogg and her colleagues “to become thoroughly familiar with the diagnostic criteria for autism specified in the *IDEA* and to bear clearly in mind that the DSM definition is not legally controlling” (p. 211).

SCHOOL PSYCHOLOGIST ROLES, RESPONSIBILITIES, AND LIMITATIONS IN THE IDENTIFICATION OF AUTISM

From the findings mentioned in this paper's introduction, it is clear that school psychologists need to be more vigilant for symptoms of ASD among the students they serve, and better prepared to identify these disorders. All school psychologists need to be willing and able to engage in case finding, screening, and referral for diagnostic assessments. While it is anticipated that not all school psychologists will have had the supervised training experiences required to diagnose ASD, it is expected that all school psychologists should know how to assist in the process of diagnosing ASD. This will include the administration of psycho-educational assessments to determine learning strengths and challenges, as well as to help determine special education eligibility and develop IEP goals and objectives (Shriver et al., 1999). Relationships among these identification steps are summarized in Figure 1, which presents an adaptation of Filipek and her colleague's (1999) algorithm for the process of diagnosing ASD. In the subsequent paragraphs each of these identification steps are further defined.

Case Finding

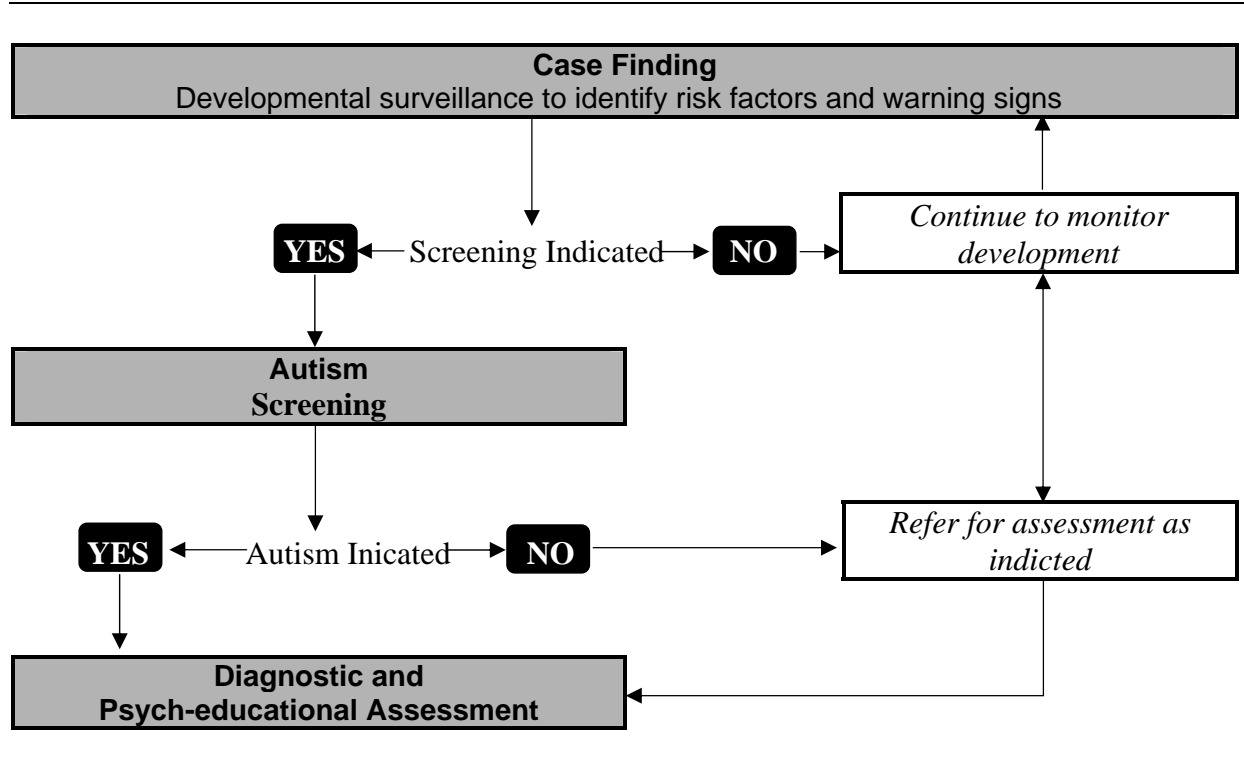
Case finding refers to routine developmental surveillance of all students in the general population to identify atypical developmental patterns. Case finding efforts do not diagnose autism or other developmental disorders, but rather are designed to recognize the presence of risk factors and/or warning signs, and the need for further screening and evaluation. Ideally provided by primary care providers at well baby check-ups, school personnel involved in infant and preschool programs also play an important role in case finding (as mandated by Child Find regulations) and given the fact that not all instances of ASD will be identified before children enter school, ***all school psychologists should be expected to engage in case finding.*** This would include training general educators to identify the risk factors for and warning signs of ASD.

Screening

All students at-risk for autism (as identified by case finding efforts) should be screened for this disorder. Such screening is designed to help determine the need for additional diagnostic assessments. Because these screenings are relatively quick and easy it has been suggested that screening referral decisions be rather liberal. According to Filipek et al. (1999), autism screenings should include lead screening, audiological evaluations, and behavioral screenings. ***All school psychologists should be prepared to participate in the behavioral screening of the student who has risk factors and/or displays warning signs of autism.*** It is important to

reiterate that the purpose of screening is not to diagnosis ASD, but rather to determine if such diagnostic assessments are warranted. *All school psychologists should be able to distinguish between screening and diagnosis.*

Figure 1
Adaptation of Filipek et al.'s (1999) Algorithm for the Process of Diagnosing Autism



Diagnostic Assessment

When approaching the diagnosis of an ASD it is important to keep in mind that no single test will reliably identify this disorder (Neuwirth & Segal, 1997). As a result diagnostic assessment requires multiple methods employed across multiple settings. Also, it is important to acknowledge that the ability to determine if a student has a specific ASD, as defined by *DSM IV-TR*, requires special clinical training and supervised practice. *Only those school psychologists with appropriate training and supervision should diagnose autism.* In fact, according to the National Research Council (2001): “The level of expertise required for effective diagnosis and assessment may require the services of individuals, or a team of individuals, other than those usually available in a school setting” (p. 26). The minimal professional requirements needed to diagnosis an ASD, as defined by the California Department of Developmental Services are provided in Table 1.

Table 1

California Department of Developmental Services (2002, pp. 6-7) Guidelines for the Minimal Professional Development Required to Diagnosis ASD

1. Qualification to render a diagnosis of autistic spectrum disorder (ASD) under the provision of California state licensure.
 2. Documented appropriate and specific supervision and training in ASD as well as experience in the diagnosis of ASD. This would include the following:
 - a. Graduate and/or postgraduate studies in a psychology, education and/or child development program with particular emphasis in developmental disabilities, including autism and related neurodevelopmental disorders
AND
 - b. Supervised experience in a graduate training program (e. g. predoctoral, postdoctoral) in a clinic and/or treatment setting serving children with ASD. Specific residency or fellowship training should have specific didactic training and clinical experience in the diagnosis and treatment of ASD. This would necessarily include training in the diagnosis of ASD as well as the administration of measurement tools specific to ASD.
OR
Documented fellowship in a credentialed medical training program in pediatrics, child neurology or child psychiatry. This would extend beyond the typical four week rotation through developmental/pediatrics in general pediatric training, which encompasses a broad range of developmental difficulties in addition to autism. Specific residency or fellowship training should have specific didactic training and clinical experience in the diagnosis and treatment of ASD.
 3. Clinical experience with the variability within the ASD population as well as extensive knowledge of typical child development.
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Psycho-educational Assessments

While many school psychologists will not meet the above listed qualifications, and be the primary diagnostician of a specific ASD (as defined by *DSM IV-TR*), ***all school psychologists should be expected to conduct the psycho-educational evaluation that is a part of the diagnostic process and that determines educational needs.*** From such evaluations student strengths and challenges are identified, and important program planning data obtained (including documentation of possible special education eligibility). Again, as was mentioned earlier, *DSM IV-TR* diagnostic criteria are not synonymous with *IDEA* eligibility criteria. While suggestive of the need for supportive services, a specific ASD diagnosis is clearly not sufficient when determining special education eligibility. Thus, school psychologists will need to conduct psycho-educational assessments to assist IEP teams in determining if a student with an ASD requires special education assistance. ***The ability to conduct such assessments will require school psychologists to be knowledgeable of the accommodations necessary to obtain valid test results when working with the child who has an ASD.***

IDENTIFICATION STRATEGIES

Having clarified school psychologist roles, responsibilities, and limitations, the focus of this paper now shifts to an examination of specific ASD identification strategies. Specific case

finding, screening and referral, diagnostic assessment, and psycho-educational assessment strategies are now discussed. It is important to preface this discussion with an acknowledgement that there is no signal diagnostic test that will reliably identify ASD. Thus, it is critical that multiple methods be employed.

Case Finding

Case finding involves *looking, listening, and questioning*. First, school psychologists need to look for and be able to recognize ASD risk factors and warning signs. Such “looking” may include school wide developmental screening and staff development. Second, school psychologists need to be good listeners and able to recognize caregiver concerns that signal the possible presence of ASD symptoms. Finally, they need to know how to question caregivers so as to further identify possible ASD symptoms.

Looking

Risk factors. According to Newschaffer, Fallin, & Lee (2002): “The only identifiable group known for certain to have a substantively elevated ASD risk is siblings of affected individuals” (p. 139). Thus, special attention needs to be directed toward the siblings of individuals diagnosed with ASD. Those who display any ASD symptom should be immediately screened for these disorders. Other risk factors that might be classified as having some association with ADS, and might be considered moderate risk factors, include a prior diagnosis of tuberous sclerosis, fragile X, or epilepsy, and/or the presence of a family history of autism or autistic-like behaviors (Filipek et al., 1999).

Currently there is no substantive evidence supporting any one non-genetic risk factor for ASD. However, given that there are likely different causes of ASD, it is possible that yet to be identified non-heritable risk factors may prove to be important in certain subgroups of individuals with this disorder. In other words, there may be an interaction between the presence of specific genetic defects and specific environmental factors. Individuals with a particular genetic predisposition for ASD may have a greater risk of developing this disorder subsequent to exposure to certain non-genetic risk factors. In particular, it has been suggested that prenatal factors such as maternal infection and drug exposure deserve further examination (Newschaffer et al., 2002).

Warning signs. While the presence of risk factors signal the need to be vigilant for ASD, observation of warning signs provides concrete evidence suggestive of these disorders. From several different sources (Filipek et al., 2000; Greenspan, 1999; Ozonoff, 2003), Table 2 provides a list of warning signs that are considered *absolute indicators* of the need for an ASD screening.

Developmental screening. In addition to being able to recognize and respond to the just mentioned warning signs, case finding may also include more proactive strategies such as school based developmental screenings. These activities would help not only to identify developmental variations that are consistent with ASD, but will also help to identify other developmental disorders. As such, these screenings would be consistent with the federal

regulations known as “Child Find.” In California these regulations require Local Education Agencies to “conduct child find activities to locate all infants and toddlers who may be eligible for early intervention services” [17 CCR 52040(a)]. Developmental screening techniques suggested by Filipek et al. (1999) as having “acceptable psychometric properties” (p. 451) include *The Ages and Stages Questionnaire* (Bricker & Squires, 1994); *The BIRCANCE® Screens* (Birgance, 1986); *The Child Development Inventories* (Ireton, 1992); and *The Parents’ Evaluation of Developmental Status* (Glascoe, 1997). Recently, Brereton, Tonge, MacKinnon, and Einfeld (2002) reported that the *Developmental Behavior Checklist* (Einfeld & Tonge, 1995) is also an effective autism screening instrument for individuals ages 4 to 17 years of age.

Table 2
Warning Signs of ASD

-
- No big smiles or other joyful expressions by 6 months.^b
 - No back-and-forth sharing of sounds, smiles, or facial expressions by 9 months.^b
 - No back-and-forth gestures, such as pointing, showing, reaching or waving bye-bye by 12 months.^{a,b}
 - No babbling at 12 months.^{a,b}
 - No single words at 16 months.^{a,b}
 - No 2-word spontaneous (nonecholalic) phrases by 24 months.^{a,b}
 - Failure to attend to human voice by 24 months.^c
 - Failure to look at face and eyes of others by 24 months.^c
 - Failure to orient to name by 24 months.^c
 - Failure to demonstrate interest in other children by 24 months.^c
 - Failure to imitate by 24 months.^c
 - Any loss of any language or social skill at any age.^{a,b}

Note: Sources ^aFilipek et al., 1999; ^bGreenspan, 1999; and ^cOzonoff, 2003.

Staff development. School psychologist efforts to educate teachers about the risk factors and warning signs of ASD would also be consistent with Child Find regulations [see 17 CCR 52040(b)(7)]. Giving teachers the information they need to look for ASD (such as is presented in this section) will facilitate case finding efforts.

Listening

When parents have concerns about their child’s development they are usually correct (Filipek et al., 1999; Galscoe, 1997). Especially in light of reports that parents of children with ASD typically have concerns about their children by 18 to 19 months of age (De Giacomo & Fombonne, 1998; Rogers, 2001), it is critical for school psychologists to listen, REALLY LISTEN, to parents when they express such concerns. Table 3 provides the Filipek et al. (1999) list of parental concerns that are considered “Red Flags” for ASD. The greater the number of these concerns expressed the greater the need for an immediate ASD screening. While isolated communication concerns may be indicative of expressive language delays (and not necessarily ASD), social concerns (especially when combined with co-existing communication and

behavioral concerns) are particularly important ASD red flags (Filipek et al., 1999).

Table 3

Filipek et al. (1999, p. 452) List of Parental Concerns That Are “Red Flags” for Autism

Social Concerns	Communication Concerns	Behavioral Concerns
<ul style="list-style-type: none"> • Does not smile socially • Seems to prefer to play alone • Is very independent • Has poor eye contact • Is in his/her own world • Tunes us out • Is not interested in other children 	<ul style="list-style-type: none"> • Does not respond to his/her name • Cannot tell me what s/he wants • Does not follow directions • Appears deaf at times • Seems to hear sometimes but not others • Does not point or wave bye-bye 	<ul style="list-style-type: none"> • Tantrums • Is hyperactive/uncooperative or oppositional • Doesn't know how to play with toys • Does the same thing over and over • Toe walks • Has unusual attachments to toys (e.g., always holding a certain object) • Lines things up • Is oversensitive to certain textures or sounds • Has odd finger and/or body movement patterns

Questioning

While parental concerns about atypical development are powerful indicators of the need for screenings, the absence of such does not necessarily mean that a student does not currently display ASD behaviors. Further, as was mentioned above isolated communication concerns may be indicative of expressive language delays (not ASD), and consequently it will be important for those engaged in case finding efforts to be prepared to ask questions about social and behavioral concerns. Thus, it is critical that for school psychologists to be able to ask questions that will facilitate the identification of ASD behaviors. Filipek et al.’s (1999) list of such questions is provided in Table 4.

Table 4

Filipek et al. (1999, p. 453) ASD Behavior Identification Questions

Socialization (“Does s/he...” or “Is there...”)

- cuddle like other children?
- look at you when you are talking or playing?
- smile in response to a smile from others?
- engage in reciprocal, back-and-forth play?
- play simple imitation games, such as pat-a-cake or peek-a-boo?
- show interest in other children?

Communication (“Does s/he...” or “Is there...”)

- point with his/her finger?
- gesture? Nod yes and no?
- direct your attention by holding up objects for you to see?
- anything odd about his/her speech?
- show things to people?
- lead an adult by the hand?
- give inconsistent response to his/her name? ... to commands?
- use rote, repetitive, or echolalic speech?
- memorize strings of words or scripts?

Behavior (“Does s/he...” or “Is there...”)

- have repetitive, stereotyped, or odd motor behavior?
- have preoccupations or a narrow range of interests?
- attend more to parts of objects (e.g., the wheels of a toy car)?
- have limited or absent pretend play?
- imitate other people’s actions?
- play with toys in the same exact way each time?
- strongly attached to a specific unusual object(s)?

Screening and Referral

According to Filipek et al. (1999, 2000) screening should include both laboratory and behavioral assessments. Laboratory studies include both lead screenings and audiological evaluations. Behavioral screenings employ behavioral observations and/or checklists. From the results of these screenings decisions regarding the need for additional diagnostic assessments are made. As was mentioned earlier, because these screenings are relatively quick and easy it has been suggested that the decision to conduct such investigations be rather liberal.

Lead Screening

From research suggesting that individuals with autism have higher blood lead concentrations, and the hypothesis that lead poisoning may contribute to the onset or acceleration of the development of ASD symptoms, lead screening is recommended for all children referred for an autism screening (Deisinger, 2001). Such testing would be especially critical if there are reports of the student displaying pica and/or those who live in environments with an increased risk for lead exposure (Filipek et al., 1999; 2000). While school psychologists are not expected to conduct this type of testing, it is important for them to know about the lead screening’s role in ASD identification.

Audiological Assessment

The hearing tests conducted as part of any autism screening must be comprehensive in nature. Typically the standard school hearing screening is not sufficient. To the extent that hearing loss explains autistic-like behaviors, referrals to the appropriate audiologist, speech-language pathologist, and/or medical practitioner should be made. However, to the extent that there are other warning signs of an ASD that are not explained by a hearing loss (i.e., social and behavioral concerns), additional screening and evaluation should take place. In addition, it is important to keep in mind that autism can co-occur with hearing loss. Thus, while a hearing loss

would argue against the need for additional ASD diagnostic evaluations, educators working with these students should continue to be vigilant for indicators of autism and make additional diagnostic referrals as indicated (Filipek et al., 1999; 2000). Here again, school psychologists are not expected to conduct this type of testing, however, it is important for them to know about the audiological assessment's role in ASD identification.

Behavioral Screening

Given their training in behavioral observation and knowledge of the appropriate use of behavior rating scales, school psychologists are exceptionally well qualified to conduct the behavioral screening of students suspected to have an ASD. Several screening tools are available to assist in this process. Initially, most of these available screening tools focused on the identification of ASD among infants and preschool age children. More recently, however, screening tools useful for the identification of school aged children who have high functioning autism or Asperger's Disorder have been developed.

Screening tools for infants and preschoolers. One of the first tools to shown promise in the very early screening for ASD is the *CHecklist for Autism in Toddlers* (CHAT; Baird et al., 2000; Baron-Cohen, Allen, & Gillberg, 1992; Baron-Cohen et al., 1996; Baron-Cohen et al., 2000; Scambler, Rogers, & Wehner, 2001). Designed to identify risk of autism among 18-month-old children, the *CHAT* takes 5 to 10 minutes to administer, and would be useful to the school psychologist working in infant and preschool programs. A sample of this screening tool is provided in Table 5. The *CHAT* consists of nine questions asked of the parent, and five items that are completed by the screener and require direct observation of the child. Of the 14 *CHAT* items, 5 are considered to be "key items" (Items A5, A7, Bii, Biii, Biv in Table 5). These key items, which assess joint attention and pretend play, have been found to be powerful predictors of the diagnosis of Autistic Disorder. If a student fails all five of these items they are considered to be at high risk for developing autism. If a student fails items A7 and Biv they are considered to have a medium risk for developing this disorder. A re-screening one-month after the first is recommend for all children who fail the *CHAT*, and any child who fails it for a second time should be referred for a diagnostic assessment (Baron-Cohen et al., 2000; Wheelwright, 1995). The other *CHAT* items provide additional information designed to allow the screener to differentiate an autistic-like profile from that of a student with a more global developmental delay.

Support for the use of this screening tool comes from research suggesting that 83% of 18-month-old children within one sample ($n = 16,000$), who failed the five key items administered twice one month apart, were subsequently diagnosed with autistic disorder at 42 months of age. Conversely, none of the children in the low risk group could be assigned this diagnosis at 42 months (Baron-Cohen et al., 1996). While the *CHAT* appears to have promise for the identification of Autistic Disorder among a subset of very young children (i.e., those with more severe symptoms of this disorder), it is important to note that this measure appears less sensitive to the less severe symptoms of ASD (Kabot, Masi, & Segal, 2003).

Children with milder symptoms of autism, such as those displayed by children who were later diagnosed with Asperger's Disorder or high functioning autism, did not routinely fail the

CHAT at 18 months. A six-year follow-up of a community sample of 16,235 children, screened with the 2-stage *CHAT* found that higher functioning children (those with higher IQs) were missed by this screening (Baird et al., 2000). At the same time, however, this study revealed extremely low false positive rate. In other words, children who fail the *CHAT* will likely go on the later be diagnosed with an ASD. Specifically, the 2-stage *CHAT* had a positive predictive value of 75% (among those who failed the *CHAT*, the percentage who have ASD), a sensitivity of 20% (among those with ASD, the percentage who failed the *CHAT*), and a specificity of 98% (among those without ASD, the percentage who pass the *CHAT*).

Another screening tool for use with very young children, the *Modified Checklist of Autism in Toddlers* (*M-CHAT*; Robins, Fein, Barton, & Green, 2001), is purported to be more sensitive to the broader autism spectrum. Using the 9 items from the original *CHAT* as its basis, the 23-item *M-CHAT* is designed to screen for autism at 24 months of age. A sample of the *M-CHAT* is provided in Table 6. Unlike the *CHAT*, however, the *M-CHAT* does not require the screener to directly observe the child. This questionnaire makes use of a “Yes/No” format and can be completed by a caregiver before a screening appointment. Answers are converted to pass/fail responses by the screener and a child fails the checklist when 2 or more of 6 critical items are failed or when any three items are failed. Among 1,293 10- to 30-month-old children screened for ASD with the *M-CHAT*, 58 were referred for a diagnostic/developmental evaluation. Of these 58, 39 (67%) were subsequently diagnosed with an autism spectrum disorder (Robins et al., 2001). The rate of false negatives is currently not available as the follow-up research needed to determine this rate is currently in progress.

Table 5
Checklist of Autism in Toddlers (CHAT)

SECTION A: History: Ask parent...		
1.	Does your child enjoy being swung, bounced on your knee, etc.?	YES NO
2.	Does your child take an interest in other children?	YES NO
3.	Does your child like climbing on things, such as up stairs?	YES NO
4.	Does your child enjoy playing peek-a-boo/hide-and-seek?	YES NO
5.	Does your child ever PRETEND, for example to make a cup of tea using a toy cup and teapot, or pretend other things?	YES NO
6.	Does your child ever use his/her index finger to point to ASK for something?	YES NO
7.	Does your child ever use his/her index finger to point to indicate INTEREST in something?	YES NO
8.	Can your child play properly with small toys (e.g., cars or bricks) without just mouthing, fiddling or dropping them?	YES NO
9.	Does your child ever bring objects over to you (parent) to SHOW your something?	YES NO
Section B: general practitioner or health visitor observation		
i.	During the appointment, has the child made eye contact with you?	YES NO
ii.	Get child's attention, then point across the room at an interesting object and say 'Oh look! There's a [name of toy]'. Watch child's face. Does the child look across to see what you are point at?	YES NO*
iii.	Get the child's attention, then give child a miniature toy cup and teapot and say 'Can you make a cup of tea?' Does the child pretend to pour out tea, drink it, etc.?	YES NO [†]
iv.	Say to the child 'Where is the light?', or 'Show me the light'. Does the child POINT with his/her index finger at the light?	YES NO [‡]
v.	Can the child build a tower of bricks? (if so how many?) (No. of bricks _____)	YES NO

* To record Yes on this item, ensure the child has not simply looked at your hand, but has actually looked at the object you are point at.
 † If you can elicit an example of pretending in some other game, score a Yes on this item.
 ‡ Repeat this with ‘Where’s the teddy?’ or some other unreachable object, if child does not understand the word light. To record Yes on this item, the child must have looked up at your face around the time of pointing.

Scoring: High risk for autism: Fails A5, A7, Bii, Biii, and Biv
 Medium risk for autism: Fails A7, Biv (but not in maximum risk group)
 Low risk for autism (not in other two risk groups)

NOTE. From Baron-Cohen et al. (1992).

A final screening tool designed for very young children, and developed for use within both general and clinical populations is the *Pervasive Developmental Disorders Screening Test – II* (PDDST-II; Siegel, 2001; soon to be published by The Psychological Corporation). This measure has three stages, with the *PDDST-II: Stage I* designed to help determine if a given child should be evaluated for an ASD and is the one that the school psychologist working in general education settings would find helpful. It is designed to be completed by parents and should take no more than 5 minutes. The odd numbered items are the critical questions used for autism screening. If three or more of the odd numbered items are checked as being “YES, Usually True,” then the result is considered a positive finding for possible ASD and a diagnostic evaluation indicted. The odd numbered critical questions are ordered by age in order from highest predictive validity. This means the more odd numbered items scored positive, and the more odd numbered items scored positive on the upper half of each section, the more strongly positive the screen. Even numbered items significantly differentiate ASD-referred children from those with mild developmental disorders. These items are also ordered by age in order from highest to lowest predictive validity.

Table 6
Modified Checklist for Autism in Toddlers (M-CHAT)

Please fill out the following about how your child **usually** is. Please try to answer every question. If the behavior is rare (e.g., you’ve seen it once or twice), please answer as if the child does not do it.

1.	Does your child enjoy being swung, bounced on your knee, etc.?	Yes	No
2.	Does your child take an interest in other children?	Yes	No
3.	Does your child like climbing on things, such as up stairs?	Yes	No
4.	Does your child enjoy playing peek-a-boo/hide-and-seek?	Yes	No
5.	Does your child ever pretend, for example, to talk on the phone or take care of dolls, or pretend other things?	Yes	No
6.	Does your child ever use his/her index finger to point, to ask for something?	Yes	No
7.	Does your child ever use his/her index finger to point, to indicate interest in something?	Yes	No
8.	Can your child play properly with small toys (e.g. cars or bricks) without just mouthing, fiddling, or dropping them?	Yes	No
9.	Does your child ever bring objects over to you (parent) to show you something?	Yes	No
10.	Does your child look you in the eye for more than a second or two?	Yes	No
11.	Does your child ever seem oversensitive to noise? (e.g., plugging ears)	Yes	No
12.	Does your child smile in response to your face or your smile?	Yes	No
13.	Does your child imitate you? (e.g., you make a face-will your child imitate it?)	Yes	No
14.	Does your child respond to his/her name when you call?	Yes	No
15.	If you point at a toy across the room, does your child look at it?	Yes	No
16.	Does your child walk?	Yes	No

- | | | | |
|-----|--|-----|----|
| 17. | Does your child look at things you are looking at? | Yes | No |
| 18. | Does your child make unusual finger movements near his/her face? | Yes | No |
| 19. | Does your child try to attract your attention to his/her own activity? | Yes | No |
| 20. | Have you ever wondered if your child is deaf? | Yes | No |
| 21. | Does your child understand what people say? | Yes | No |
| 22. | Does your child sometimes stare at nothing or wander with no purpose? | Yes | No |
| 23. | Does your child look at your face to check your reaction when faced with something unfamiliar? | Yes | No |

M-CHAT Scoring Instructions

A child fails the checklist when 2 or more critical items are failed OR when any three items are failed. Yes/no answers convert to pass/fail responses. Below are listed the failed responses for each item on the M-CHAT. Bold capitalized items are CRITICAL items. Not all children who fail the checklist will meet criteria for a diagnosis on the autism spectrum. However, children who fail the checklist should be evaluated in more depth by the physician or referred for a developmental evaluation with a specialist.

1. No	6. No	11. Yes	16. No	21. No
2. NO	7. NO	12. No	17. No	22. Yes
3. No	8. No	13. NO	18. Yes	23. No
4. No	9. NO	14. NO	19. No	
5. No	10. No	15. NO	20. Yes	

NOTE. From Robins et al. (2001).

Screening tools for school age children. Developed by Ehlers and Gillberg (1993), the high functioning *Autism Spectrum Screening Questionnaire* (ASSQ) is a checklist designed to be completed by parents and/or teachers. A sample of this questionnaire is provided in Table 7. The 27 ASSQ items are rated on a 3-point scale (with 0 indicating normality, 1 some abnormality, and 2 definite abnormality), and has a total score range from 0 to 54. Questionnaire content includes 11 social interaction items, 6 communication items, 5 restricted/repetitive behavior items, and 5 motor clumsiness and other associated symptom items.

The initial epidemiological study that employed this questionnaire included 1,401 7- to 16-year-olds. The mean score for this sample was 0.7 (*SD*, 2.6). Among the five participants who were “definite Asperger syndrome cases” (p. 139), the mean score was 26.2 (*SD*, 10.3). A subsequent validation study with a smaller clinical group ($n = 110$) suggested this measure to be “a reliable and valid parent and teacher screening instrument of high-functioning autism spectrum disorders in a clinical setting” (Ehlers, Gillberg, & Wing, 1999, p. 139).

From data provided by Ehlers et al. (1999) two separate sets of cutoff scores are suggested. The first set of scores (parents, 13 and teachers, 11) is suggested to be indicative of “socially impaired children” (p. 139), but not necessarily those with ASD. While minimizing the risk of false negatives (especially for milder cases of ASD), this set of scores is associated with a high rate of false positives (23% for parents and 42% for teachers). In the standardization study it was not unusual for children with other disorders (e.g., ADHD and other disruptive behavior disorders) to obtain scores ASSQ scores at this level. This first set of cutoff scores might be used to suggest that a referral for an ASD diagnostic assessment, while not immediately indicated, should not be ruled out. In other words, a school psychologist could proceed with a traditional psycho-education evaluation and make an ASD diagnostic referral only if additional data suggests it to be necessary.

The second set of cutoff scores (parents, 19 and teachers, 22) were suggested to be the level required to determine the need for an immediate ASD diagnostic evaluation among school aged children in a clinical setting. This set of scores was associated with a false positive rate for parents and teachers of 10% and 9 % respectively. In other words, the chances are low that the student who attains this level of ASSQ cutoff scores will not have an ASD. Of course, on the other hand, this higher cut off level will increase the risk of false negatives.

The *Childhood Asperger Syndrome Test* (CAST; Scott, Baron-Cohen, Bolton, & Brayne, 2002) is currently being developed as a screening tool for use with mainstream primary grade children (ages 4 through 11 years). A sample of this questionnaire is provided in Table 8. This screening has 37 items, with 31 key items contributing to the total score. The six control items, which assess general development, are numbers 3, 4, 12, 22, 26, and 33. A cut off score of 15 (out of 31) positive responses to the key items correctly identified 87.5 (7 out of 8) of the cases of autistic spectrum disorders. However, the rate of false positives is rather high (36.4%). This finding emphasizes the fact that screening tools should not be used diagnostically. Rather they should be considered as tools to assess the need for additional diagnostic assessment. The false negative rate for this tool has not yet been identified. A more refined scoring system; “with an algorithm for different key difficulties and presentations” is currently being worked on (F. J. Scott, personal communication, February 9, 2004).

Table 7
The High-Functioning Autism Spectrum Screening Questionnaire

This child stands out as different from other children of his/her age in the following ways:

	No	Somewhat	Yes
1. is old-fashioned or precocious	[]	[]	[]
2. is regarded as an “eccentric professor” by the other children	[]	[]	[]
3. lives somewhat in a world of his/her own with restricted idiosyncratic intellectual interests	[]	[]	[]
4. accumulates facts on certain subjects (good rote memory), but does not really understand the meaning	[]	[]	[]
5. has a literal understanding of ambiguous and metaphorical language	[]	[]	[]
6. has a deviant style of communication with a formal, fussy, old-fashioned or “robot like” language	[]	[]	[]
7. invents idiosyncratic words and expressions	[]	[]	[]
8. has a different voice or speech	[]	[]	[]
9. expresses sounds involuntarily; clears throat, grunts, smacks, cries or screams	[]	[]	[]
10. is surprisingly good at some thing and surprisingly poor at others	[]	[]	[]
11. uses language freely but fails to make adjustment to fit social contexts or the needs of different listeners	[]	[]	[]
12. lacks empathy	[]	[]	[]
13. makes naïve and embarrassing remarks	[]	[]	[]
14. has a deviant style of gaze	[]	[]	[]
15. wishes to be sociable but fails to make relationships with peers	[]	[]	[]
16. can be with other children but only on his/her terms	[]	[]	[]
17. lacks best friend	[]	[]	[]
18. lacks commonsense	[]	[]	[]
19. is poor at games: no idea of cooperating in a team, scores “own goals”	[]	[]	[]
20. has clumsy, ill coordinated, ungainly, awkward movements or gestures	[]	[]	[]
21. has involuntary face or body movements	[]	[]	[]
22. has difficulties in completing simple daily activities because of compulsory repetition of certain actions or thoughts	[]	[]	[]
23. has special routines: insists on no change	[]	[]	[]
24. shows idiosyncratic attachment to objects	[]	[]	[]
25. is bullied by other children	[]	[]	[]
26. has markedly unusual facial expression	[]	[]	[]
27. has markedly unusual posture	[]	[]	[]

NOTE. From Ehlers and Gillberg (1993).

Table 8
Childhood Asperger Syndrome Test (CAST)

1. Does s/he join in playing games with other children easily?	YES	NO
2. Does s/he come up to you spontaneously for a chat?	YES	NO
3. Was s/he speaking by 2 years old?	YES	NO
4. Does s/he enjoy sports?	YES	NO
5. Is it important to him/her to fit in with the peer group?	YES	NO
6. Does s/he appear to notice unusual details that others miss?	YES	NO
7. Does s/he tend to take things literally?	YES	NO
8. When s/he was 3 years old, did s/he spend a lot of time pretending (e.g. play-acting begin a superhero, or holding a teddy's tea parties)?	YES	NO
9. Does s/he like to do things over and over again, in the same way all the time?	YES	NO
10. Does s/he find it easy to interact with other children?	YES	NO
11. Can s/he keep a two-way conversation going?	YES	NO
12. Can s/he read appropriately for his/her age?	YES	NO
13. Does s/he mostly have the same interest as his/her peers?	YES	NO
14. Does s/he have an interest, which takes up so much time that s/he does little else?	YES	NO
15. Does s/he have friends, rather than just acquaintances?	YES	NO
16. Does s/he often bring you things s/he is interested in to show you?	YES	NO
17. Does s/he enjoy joking around?	YES	NO
18. Does s/he have difficulty understanding the rules for polite behavior?	YES	NO
19. Does s/he appear to have an unusual memory for details?	YES	NO
20. Is his/her voice unusual (e.g., overly adult, flat, or very monotonous)?	YES	NO
21. Are people important to him/her?	YES	NO
22. Can s/he dress him/herself?	YES	NO
23. Is s/he good at turn taking in conversation?	YES	NO
24. Does s/he play imaginatively with other children, and engage in role-play?	YES	NO
25. Does s/he often do or say things that are tactless or socially inappropriate?	YES	NO
26. Can s/he count to 50 without leaving out any numbers?	YES	NO
27. Does s/he make normal eye-contact?	YES	NO
28. Does s/he have any unusual and repetitive movements?	YES	NO
29. Is his/her social behaviour very one-sided and always on his/her own terms?	YES	NO
30. Does s/he sometimes say 'you' or 's/he' when s/he means 'I'?	YES	NO
31. Does s/he prefer imaginative activities such as play-acting or story-telling, rather than numbers or lists of facts?	YES	NO
32. Does s/he sometimes lose the listener because of not explaining what s/he is talking about?	YES	NO
33. Can s/he ride a bicycle (even if with stabilizers)?	YES	NO
34. Does s/he try to impose routines on him/herself, or on others, in such a way that is causes problems?	YES	NO
35. Does s/he care how s/he is perceived by the rest of the group?	YES	NO
36. Does s/he often turn the conversations to his/her favorite subject rather than following what the other person wants to talk about?	YES	NO
37. Does s/he have odd or unusual phrases?	YES	NO

NOTE: From Scott et al. (2002).

CAST Scoring Instructions: A child fails the CAST when 15 or more of 31 "key" items are "positive" for ASD. Yes/No answers convert to positive/negative responses. Below are listed the positive responses for each item on the CAST. Control items 3, 4, 12, 22, 26, and 33 are used only to assess general development.

1. No	6. Yes	11. No	16. No	21. No	26.	31. No	36. Yes
2. No	7. Yes	12.	17. No	22.	27. No	32. Yes	37. Yes
3.	8. No	13. No	18. Yes	23. No	28. Yes	33.	
4.	9. Yes	14. Yes	19. Yes	24. No	29. Yes	34. Yes	
5. No	10. No	15. No	20. Yes	25. Yes	30. Yes	35. No	

The *Australian Scale for Asperger’s Syndrome (A.S.A.S.)* is a parent and teacher rating scale found in the book “Asperger’s Syndrome: A Guide for Parents and Professionals,” by Tony Attwood (1998). A copy of this questionnaire is provided in Table 9. It includes 24 items that are rated on a scale of 0 to 5. In addition, it includes 10 behavioral characteristics to be identified as present with a checkmark. According to Attwood (1998): “If the answer is yes to the majority of the questions in the scale, and the rating was between two and six (i.e., conspicuously above the normal range), it does not automatically imply the child has Asperger’s Syndrome. However, it is a possibility and a referral for a diagnostic assessment is warranted” (p. 20).

Table 9
Australian Scale for Asperger’s Syndrome (A.S.A.S)

A. SOCIAL AND EMOTIONAL ABILITIES

1.	Does the child lack an understanding of how to play with other children? For example, unaware of the unwritten rules of social play.	0	1	2	3	4	5	6
		Rarely			Frequently			
2.	When free to play with other children, such as school lunchtime, does the child avoid social contact with them? For example, finds a secluded place or goes to the library	0	1	2	3	4	5	6
		Rarely			Frequently			
3.	Does the child appear unaware of social conventions or codes of conduct and make inappropriate actions and comments? For example, making a personal comment to someone but the child seems unaware how the comment could offend.	0	1	2	3	4	5	6
		Rarely			Frequently			
4.	Does the child lack empathy, i.e., The intuitive understanding of another person’s feelings? For example, not realizing an apology would help the other person feel better.	0	1	2	3	4	5	6
		Rarely			Frequently			
5.	Does the child seem to expect other people to know their thoughts, experiences and opinions? For example, not realizing you could not know about something because you were not with the child at the time.	0	1	2	3	4	5	6
		Rarely			Frequently			
6.	Does the child need an excessive amount of reassurance, especially if things are changed or go wrong?	0	1	2	3	4	5	6
		Rarely			Frequently			
7.	Does the child lack subtlety in their expression of emotion? For example, the child shows distress of affection out of proportion to the situation.	0	1	2	3	4	5	6
		Rarely			Frequently			
8.	Does the child lack precision in their expression of emotion? For example, not understanding the levels of emotional expression appropriate for different people	0	1	2	3	4	5	6
		Rarely			Frequently			

9. Is the child not interested in participating in competitive sports, games and activities?
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |
10. Is the child *indifferent* to peer pressure? For example, does *not* follow the latest craze in toys or clothes.
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |

B. COMMUNICATION ABILITIES

11. Does the child take a literal interpretation of comments? For example, is confused by phrases such as ‘pull your socks up’, ‘looks can kill’, or ‘hop on the scales’.
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |
12. Does the child have an unusual tone of voice? For example, the child seems to have a ‘foreign’ accent or monotone that lacks emphasis on key words.
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |
13. When talking to the child does he or she appear uninterested in your side of the conversation? For example, not asking about or commenting on your thoughts or opinions on the topic.
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |
14. When in a conversation, does the child tend to use less eye contact than you would expect?
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |
15. Is the child’s speech over-precise or pedantic? For example, talks in a formal way or like a walking dictionary
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |
16. Does the child have problems repairing a conversation? For example, when the child is confused, he or she does not ask for clarification but simply switches to a familiar topic, or takes ages to think of a reply.
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |

C. COGNITIVE SKILLS

17. Does the child read books primarily for information, not seeming to be interested in fictional works? For example, being an avid reader of encyclopedias and science books but not keen on adventure stories.
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |
18. Does the child have an exceptional long-term memory for events and facts? For example, remembering the neighbour’s car registration of several years ago, or clearly recalling scenes that happened many years ago.
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |
19. Does the child lack social imaginative play? For example, other children are not
- | | | | | | | |
|--------|---|---|------------|---|---|---|
| Rarely | | | Frequently | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Rarely | | | Frequently | | | |

included in the child's imaginary games or the child is confused by pretend games of other children.

Rarely			Frequently			

D. SPECIFIC INTERESTS

20. Is the child fascinated by a particular topic and avidly collects information or statistics on that interest? For example, the child becomes a walking encyclopedia of knowledge on vehicles, maps or league tables.

0	1	2	3	4	5	6
Rarely			Frequently			

21. Does the child become unduly upset by changes in routine or expectation? For example, is distressed by going to school by a different route.

0	1	2	3	4	5	6
Rarely			Frequently			

22. Does the child develop elaborate routines or rituals that must be completed? For example, lining up toys before going to bed.

0	1	2	3	4	5	6
Rarely			Frequently			

E. MOVEMENT SKILLS

23. Does the child have poor motor coordination? For example, is not skilled at catching a ball.

0	1	2	3	4	5	6
Rarely			Frequently			

24. Does the child have an odd gait when running?

0	1	2	3	4	5	6
Rarely			Frequently			

F. Other Characteristics

For this section, tick whether the child has shown any of the following characteristics.

- (a) Unusual fear or distress due to
 - o ordinary sounds, e.g. electrical appliances
 - o light touch on skin or scalp
 - o wearing particular in terms of clothing
 - o unexpected noises
 - o seeing certain objects
 - o noisy, crowded places, e.g. supermarkets
- (b) A tendency to flap or rock when excited or distressed
- (c) A lack of sensitivity to low levels of pain
- (d) Late in acquiring speech
- (e) Unusual facial grimaces or tics

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

NOTE. From Attwood (1998).

A final screening tool with some promise for use within clinical populations of children age 4 years and older (with mental ages above 2 years of age) is the *Social Communication*

Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003; formally known as the *Autism Screening Questionnaire*; Berument, Rutter, Lord, Pickles, & Bailey, 1999). There are two forms of the SCQ: a *Lifetime* and a *Current* form. The latter asks questions about the child's behavior in the past 3-months, and is suggested to provide data helpful in understanding a child's "everyday living experiences and evaluating treatment and educational plans" (p. 1). The former (*Lifetime*), asks questions about the child's entire developmental history and provides the screening data to be used when determining if a diagnostic assessment is needed.

The SCQ consists of 40 Yes/No questions asked of the parent. The first item of this questionnaire documents the child's ability to speak and is used to determine which items will be used in calculating the total score (i.e., if the child has speech SCQ items 2 through 40 are used, and if the child does not items 8 through 40 are used). An "AutoScore" protocol converts the parents' Yes/No responses to scores of 1 or 0. The manual reports that in the standardization sample the mean SCQ score of children with autism was 24.2, whereas the general population mean was 5.2. To minimize the rate of false negatives, the authors selected a score of 15 or higher as the threshold reflecting the need for diagnostic assessment. However, they caution that a slightly lower threshold might be appropriate if other risk factors (e.g., the child being screened is the sibling of a person with ASD) are present. In addition, it is important to note that the authors of this measure acknowledge that more data is needed to determine the frequency of false negatives (Rutter et al., 2003).

While it is not particularly effective at distinguishing among various ASD, the SCQ has been found to have good discriminative validity between autism and other disorders including non-autistic mild or moderate mental retardation. Thus, this tool would appear useful for the school psychologist working with primary grade special needs students (i.e., young school aged clinical populations) (Rutter et al., 2003).

DSM IV-TR Diagnostic Assessment

As indicated by screening results, an assessment should be undertaken to diagnose autism. While the diagnostic assessment process should include a variety of specialists from a variety of disciplines [e.g., psychiatry, neurology, pediatrics, occupational therapy, speech pathology, and special education (Filipek et al., 1999)], one treatment provider (often a psychologist) should be designated to coordinate the assessment (Deisinger, 2001). When a specific *DSM IV-TR* ASD diagnosis is being sought, whether or not a school psychologist takes on this coordination role should be determined by the individual's prior training and supervised practice (as was mentioned earlier, the ability to diagnose ASD requires specialized training and supervised practice). However, regardless of whether a school psychologist meets these standards, it will be important for him or her to know the elements of ASD diagnosis so as to be better able to support this process. In addition, while it is *IDEA* and not *DSM IV-TR* that drive special education eligibility determinations, published case law does reveal hearing officers and judges to consider *DSM IV-TR* diagnostic criteria in just over half of their rulings addressing special education eligibility decisions (Fogt et al., 2003). Thus, knowledge of how to make a *DSM IV-TR* ASD diagnosis is essential. Providing such information is the goal of this section. To obtain this goal, discussion will first provide a more detailed review of diagnostic criteria.

Then, the developmental, health, and family history elements of diagnosis are reviewed. Next indirect assessment methods (i.e., rating scales and interview) are examined, and finally, direct behavioral observation assessment strategies are reviewed.

Diagnostic Criteria

As was mentioned earlier in this paper, ASD includes several diagnostic categories found in the *DSM IV-TR* (APA, 2000). The diagnostic criteria for Autistic Disorder are provided in Table 10. For a detailed discussion of these criteria refer to Filipek et al. (1999). When considering these symptoms it is important to acknowledge that they exist on a continuum. Figure 2 illustrates this fact. As movement occurs along this continuum from most to least severe there degree of mental retardation typically associated with ASD lessens, and the prognosis of a positive adult outcome increases.

Table 10
DSM IV-TR Diagnostic Criteria for Autistic Disorder

-
- A. A total of six (or more) items for (1), (2), and (3), with at least two from (1), and one each for (2) and (3):
- (1) qualitative impairment in social interaction, as manifested by at least two of the following:
 - (a) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
 - (b) failure to develop peer relationships appropriate to developmental level
 - (c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by lack of showing, bringing, or pointing out objects of interest)
 - (d) lack of social or emotional reciprocity
 - (2) qualitative impairments in communication as manifested by at least one of the following:
 - (a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
 - (b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
 - (c) stereotyped and repetitive use of language or idiosyncratic language
 - (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level
 - (3) restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:
 - (a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
 - (b) apparently inflexible adherence to specific, nonfunctional routines or rituals
 - (c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
 - (d) persistent preoccupation with parts of objects
- B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.
- C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.
-

NOTE. From APA (2000, p.75).

The criteria for Asperger’s Disorder (Table 11) are essentially the same as Autistic Disorder with the exception that there are no criteria for a qualitative impairment in communication. In fact Asperger’s criteria require “... no clinically significant general delay in language (e.g., single words used by 2 years, communicative phrases used by 3 years;” APA, 2000, p. 84). The criteria for Childhood Disintegrative Disorder (Table 12) are also essentially the same as Autistic Disorder. Differences between criteria include that in the former there has been (a) “Apparently normal development for at least the first 2 years after birth as manifested by the presence of age-appropriate verbal and nonverbal communication, social relationships, play, and adaptive behavior” (p. 79); and that there is (b) “Clinically significant loss of previously acquired skills (before age 10 years) in at least two of the following areas: (1) expressive or receptive language; (2) social skills or adaptive behavior; (3) bowel or bladder control; (4) play; (5) motor-skills” (p. 79).

Figure 2
The symptoms that comprise ASD occur on a continuum. These symptoms change over time, with IQ and language being the best predictors of movement from most to least severe.

Social Interaction Skills			
Socially Unaware	Limited Social Interaction	Tolerates Social Interactions	Interested in Social Interactions
Aloof Indifferent Interactions are aversive Solitary play	One-way interactions To meet own needs Others viewed as tools Prefers solitary play	Two-way interactions Accepts approaches Replies if approached Parallel play	Two-way & spontaneous One-sided Awkward Associative play
Communication Skills			
No Language System	Limited Language System	Idiosyncratic Language System	Grammatical Language System
Nonverbal Non-communicative	Mostly echolalic One-way Used to meet needs	Replies if approached Incorrect pronoun/preposition use Odd constructions	Spontaneous & two way Tends to be one sided
Restricted Repertoire of Behaviors, Activities, and Interests			
Simple & Body Directed	Simple & Object Directed	Complex Routines, Manipulations, & Movements	Verbal/Abstract Behavior & Interests
Internal Very restricted range Very marked, stereotyped, repetitive	External Restricted range Marked, stereotyped, repetitive behavior	External Restricted ranged Occasional, repetitive behavior	External Restricted range Minimal, stereotyped, repetitive
Most Severe		Least Severe	

Adapted from Wing, L. (1995). The relationship between Asperger’s syndrome and Kanner’s autism. In U. Firth (Ed.), *Autism and Asperger syndrome* (pp. 93-121). Cambridge, MA: Cambridge University Press.

Table 11
DSM IV-TR Diagnostic Criteria for Asperger's Disorder

-
- A. Qualitative impairment in social interaction, as manifested by at least two of the following
- (1) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
 - (2) failure to develop peer relationships appropriate to developmental level
 - (3) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by lack of showing, bringing, or pointing out objects of interest)
 - (4) lack of social or emotional reciprocity
- B. Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:
- (1) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
 - (2) apparently inflexible adherence to specific, nonfunctional routines or rituals
 - (3) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
 - (4) persistent preoccupation with parts of objects
- C. The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.
- D. There is no clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior (other than in social interaction), and curiosity about the environment in childhood.
- F. Criteria are not met for another Pervasive Developmental Disorder or Schizophrenia.
-

NOTE. From APA (2000, p. 84).

As was mentioned earlier, the diagnostic criteria for Rett's Disorder, which occurs only among females, are relatively distinct. These criteria are provided in Table 13. Comparison of Autistic Disorder and Rett's Disorder criteria (Tables 10 and 13) reveals that both include delays in expressive and receptive language development and social engagement (although as was mentioned earlier the social difficulties may not be as pervasive). However, unlike Autistic Disorder, Rett's also includes (a) head growth deceleration between the ages of five months and four years, (b) loss of fine motor skill, (c) poorly coordinated gross motor skill, and (d) severe psychomotor retardation (APA, 2000; Deisinger, 2001).

Symptom onset. Autistic Disorder diagnostic criteria require symptom onset before the age of three years. Onset may be somewhat later for Asperger's Disorder, with no specific age specified. In fact, *DSM IV-TR* (APA, 2000) report that parents of children later diagnosed with Asperger's Disorder may not be concerned about their child's early development. Autistic Disorder criteria specify that before age three years, there must be "delays or abnormal functioning" in at least one of the following areas: (a) social interaction, (b) social communicative language, and/or (c) symbolic or imaginative play (APA, 2000, p. 75). Early social interaction difficulties may include: acting as if unaware of the coming and going of others (vs. crying when the mother leaves the room or becoming anxious with strangers); and appearing inaccessible, as if in a shell (vs. recognizing and smiling at familiar faces); begin indifferent or finding aversive physical contact (vs. enjoying being held and cuddled; APA, 2000; Neuwirth & Segal, 1997). Early social communicative language difficulties may include: avoiding eye

contact (vs. studying the mother's face); not responding to parents voice and appearing to be deaf (vs. being easily stimulated by and appearing to recognize sounds); lack of facial responsivity and socially directed smiling (vs. responding with a range of affect to pleasant social stimuli); starting to develop language and then abruptly stopping (vs. continuous growth in vocabulary and grammar); and not being able to ask for something or indicate an interest (vs. being able to point to ask for a desired object or to indicate an interest (APA, 2000; Baron-Cohen et al., 2000; Neuwirth & Segal, 1997). Finally, early symbolic or imaginative play difficulties may include the failure to engage in pretend games (vs., for example, being able to pretend to make a cup of tea with a toy cup and teapot) (Baron-Cohen et al., 2000).

Table 12
DSM IV-TR Diagnostic Criteria for Childhood Disintegrative Disorder

-
- A. Apparently normal development for at least the first 2 years after birth as manifested by the presence of age-appropriate verbal and nonverbal communication, social relationships, play, and adaptive behavior.
 - B. Clinically significant loss of previously acquired skills (before 10 years) in at least two of the following areas:
 - (1) expressive or receptive language
 - (2) social skills or adaptive behavior
 - (3) bowel or bladder control
 - (4) play
 - (5) motor skills
 - C. Abnormalities of functions in at least two of the following areas:
 - (1) qualitative impairment in social interaction (e.g., impairment in nonverbal behaviors, failure to develop peer relationships, lack of social or emotional reciprocity)
 - (2) qualitative impairments in communication (e.g., delay or lack of spoken language, inability to initiate or sustain a conversation, stereotyped and repetitive use of language, lack of varied make-believe play)
 - (3) restricted, repetitive, and stereotyped patterns of behavior, interests, and activities, including motor stereotypes and movements
 - D. The disturbance is not better accounted for by another specific Pervasive Developmental Disorder or by Schizophrenia.
-

NOTE. From APA (2000, p. 79).

Onset criteria for Childhood Disintegrative Disorder requires symptom onset before the age of 10 years (preceded by at least two years of normal development), while Rett's Disorder requires symptom onset before the age of 4 years (although symptoms are usually seen by the second year of life).

Developmental course. *DSM IV-TR* (APA, 2000) criteria for Autistic Disorder states: "In some instances, parents will report that they have been worried about the child since birth or shortly afterward because of the child's lack of interest in social interaction" (p. 73). However, this manual also indicates that while there is typically no period of "normal development," in a few cases it is reported that the child initially developed normally before Autistic Disorder symptom onset. However, for this diagnosis to be made, such periods of normal development

must not extend past age three. This requirement does not mean that the diagnosis must be made before the age of three. It can even be made in much later in life if the diagnostician is able to verify that symptoms were present before the cut-off age. The duration of Autistic Disorder is typically life long, with only a small percentage being able to live and work independently. However, in about one-third of the cases the individual with Autistic Disorder is able to achieve a partial degree of independence. Even among the highest functioning adults with Autistic Disorder, symptoms typically continue to cause challenges.

Table 13
DSM IV-TR Diagnostic Criteria for Rett's Disorder

-
- A. All of the following:
- (1) apparently normal prenatal and perinatal development
 - (2) apparently normal psychomotor development
 - (3) normal head circumference at birth
- B. Onset of all of the following after the period of normal development:
- (1) deceleration of head growth between ages 5 and 48 months
 - (2) loss of previously acquired purposeful hand skills between ages 5 and 30 months
 - (3) loss of social engagement early in the course (although often social interaction develops later)
 - (4) appearance of poorly coordinated gait or trunk movements
 - (5) severely impaired expressive and receptive language development with severe psychomotor retardation
-

NOTE. From APA (2000).

Criteria for Asperger's Disorder suggest that motor delays or clumsiness may be some of the first symptoms noted during the preschool years, with difficulties in social interactions becoming apparent as the child enters the school setting. Also noted at about the time of school entry are symptoms associated with unique and unusually circumscribed interests. As is the case for Autistic Disorder, the duration of Asperger's Disorder is typically lifelong with difficulties empathizing and modulating social interactions being characteristic of this Disorder in adulthood (APA, 2000).

Both Rett's and Childhood Disintegrative Disorders are lifelong conditions. Rett's distinctive pattern of developmental regression is generally persistent and progressive. However, some interest in social interaction may be noted during later childhood and adolescence. The "insidious or abrupt" (APA, 2000, p. 78) loss of skills associated with Childhood Disintegrative Disorder usually reaches a plateau after which some limited improvement may occur. Warning signs of symptoms onset may include "increased activity levels, irritability, and anxiety followed by a loss of speech and other skills" (APA, 2000, p. 78).

Associated features. Asperger's Disorder is the only ASD that is not typically associated with some degree of mental retardation. Autistic Disorder is commonly associated with moderate mental retardation and Childhood Disintegrative Disorder is usually associated with severe mental retardation. Children with Rett's Disorder are as a rule the most cognitively impaired with severe to profound mental retardation being typical. Other features associated with Autistic Disorder include a range of ADHD-like behavioral symptoms, unusual sensory sensitivities (e.g., being over sensitive to some stimuli and being unusually interested in others),

abnormal eating or sleeping habits, unusual fearfulness of harmless object or lack of fear for real dangers, and self-injurious behaviors (APA, 2000).

Age specific features. The chronological age and developmental level of the child will influence the expression of Autistic Disorder. Thus, assessment must be developmentally sensitive. For example, the *DSM IV-TR* specifies that among infants “there may be a failure to cuddle; an indifference or aversion to affection or physical contact; a lack of eye contact, facial responsiveness, or socially directed smiles; and a failure to respond to their parents’ voices” (APA, 2000, p. 72). On the other hand, among young children, adults may be treated as interchangeable or alternatively the young child may “cling mechanically to a specific person” (APA, 2000, p. 73).

Gender related features. With the exception of Rett’s Disorder, which occurs only among females, all other ASD appear to be more common among males than females. The rate of Autistic Disorder is four to five times higher in males than in females. However, it is noted that females with Autistic Disorder are more likely to exhibit more severe Mental Retardation (APA, 2000). According to Attwood (1998), the male to female ratio for Asperger’s Disorder is the same as that for Autistic disorder.

Differential diagnosis. Finally, the ASD diagnostic requirements require that other conditions with similar symptoms be ruled out before an ASD diagnosis is made (Neuwirth & Segal, 1997). The diagnostic differences between other disorders (including the other ASD) and Autistic Disorder, that need to be considered and ruled out when making the diagnosis of Autistic Disorder, are summarized in Table 14. Recent research has also identified negative symptoms or deficits that differentiate autism from other developmental disorders. The symptoms which are apparent in the 20- to 36-month age range include deficits in a) eye contact, b) orienting to name, c) joint attention (e.g., sharing or bringing something to someone else attention), d) pretend play, e) imitation, and f) verbal and nonverbal language development (Filipek et al., 1999).

Developmental, Health, and Family History

The first step of the diagnostic assessment process is to review with parents their child’s developmental and health history (Deisinger, 2001; Goodwin-Jones & Solomon, 2003; Shriver et al., 1999). The following discussion highlights factors that would support an ASD diagnosis. Given that a developmental and health history is typically a part of any psycho-educational evaluation, it is important for all school psychologists to be aware of these factors.

Pre-, peri-, and post-natal risk factors. While the available data has not provided conclusive evidence regarding the causal role for these factors in the development of ASD, they at the very least represent additive brain trauma to children already vulnerable for ASD and as such are important to consider and understand (Hansen & Hagerman, 2003). Pre- and peri-natal factors implicated in an increased risk for autism include greater maternal age at the time of pregnancy, maternal infections (such as measles, mumps, rubella, influenza, cytomegalovirus, herpes, syphilis, and HIV), and drug exposure (Newschaffer et al., 2002). For example, the drugs Thalidomide and Valproate (an anti-convulsant) when taken early in pregnancy have been

reported to be associated with autism (Hansen & Hagerman, 2003; Newschaffer et al., 2002). In particular, Thalidomide when taken at 20 to 24 weeks gestation is correlated ASD risk (Newschaffer et al., 2002). Given the suggestion that there is some prenatal initiation of the pathophysiologic changes associated with ASD development, and that there is not a strong relationship between any specific factor and ASD, one approach has been to look at summary measures of “optimality” of the pregnancy and delivery, and to consider “suboptimality” as supportive of a possible ASD diagnosis (Newschaffer et al., 2002).

Table 14
Differential Diagnosis of Autistic Disorder

<i>Disorder</i>	<i>Differentiating Features from Autistic Disorder</i>
Rett’s Disorder	<ul style="list-style-type: none"> • Affects only girls. • Head growth deceleration. • Loss of fine motor skill. • Awkward gait and trunk movement. • Mutations in the MECP2 gene.
Childhood Disintegrative Disorder	<ul style="list-style-type: none"> • Regression following at least two years of normal development.
Asperger’s Disorder	<ul style="list-style-type: none"> • Language development is not delayed. • Normal intelligence. • Later symptom onset.
Schizophrenia	<ul style="list-style-type: none"> • Years of normal or near normal development. • Symptoms of hallucinations and delusions.
Selective Mutism	<ul style="list-style-type: none"> • Normal language in certain situations/settings. • No restricted patterns of behavior.
Language Disorders	<ul style="list-style-type: none"> • No severe impairment of social interactions. • No restricted patterns of behavior.
Attention-deficit/Hyperactivity Disorder	<ul style="list-style-type: none"> • Distractible inattention related to external (not internal) stimuli. • Deterioration in attention and vigilance over time.
Mental Retardation	<ul style="list-style-type: none"> • Relative to developmental level, social interactions are not severely impaired. • No restricted patterns of behavior.
Obsessive Compulsive Disorder	<ul style="list-style-type: none"> • Normal language and communication skills. • Normal social skills.
Reactive Attachment Disorder	<ul style="list-style-type: none"> • History of severe neglect and/or abuse. • Social deficits dramatically remit in response to environmental change.

Note. Adapted from APA (2000), Filipek et al. (1999), Hendren (2003), and National Research Council (2001).

Postnatal risk factors include infections. For example, Newschaffer et al. (2002) report that several case studies have documented sudden onset of ASD symptoms in older children after herpes encephalitis. Other infections that can result in secondary hydrocephalus, such as meningitis, have also been implicated in the etiology of ASD. In addition, common viral

illnesses in the first 18 months of life (e.g., mumps, chickenpox, fever of unknown origin, and ear infection) have all been associated with ASD risk (Newschaffer et al., 2002).

Recently the postnatal risk factors of chemical exposure and MMR vaccination have received some attention. However, in both cases the available data does not support the hypothesis that these factors are associated with ASD and thus should not be given great diagnostic significance. In particular, regarding MMR vaccinations Madsen et al. (2002) report the results of an epidemiological study, which they suggest, “provides strong evidence against the hypothesis that MMR vaccination causes autism” (p. 1477).

Developmental milestones. The diagnostic evaluation should also collect information regarding early development. In particular, questions should be asked regarding attainment of major language and social developmental milestones (Deisinger, 2001). Given the lack of response to speech, it is not surprising for this history to include initial concerns that the child may have a hearing deficit. Any indication of developmental regression in these areas would be of particular concern. Other behaviors that are characteristic of ASD (e.g., atypical play, lack of social interest, repetitive behaviors) typically emerge as somewhat later concerns (Hansen & Hagerman, 2003).

Medical history. According to Hansen and Hagerman (2003): “A complete medical history and review of systems is important, with an emphasis on symptoms relevant to medical conditions known to be related to autism or to proposed etiologies” (p. 100). This might include questions concerning current vision and hearing status, the occurrence of chronic ear infections (and tube placement), immune dysfunction (e.g., frequent infections), autoimmune disorders (e.g., thyroid problems, arthritis, rashes), allergy history (e.g., to foods or environmental triggers) and gastrointestinal symptoms (e.g., diarrhea, constipation, bloating, abdominal pain).

Diagnostic history. A diagnostic history should be gathered as ASD is sometimes observed in association other neurological or general medical conditions (Deisinger, 2001). According to the APA (2000) these conditions include encephalitis, phenylketonuria, tuberous sclerosis, and fragile X syndrome. Tharp (2003) reports that 10 to 20 percent of children with an ASD have a neurodevelopmental genetic syndrome. Specifically, mental retardation is found in up to 80%, tuberous sclerosis is in 2 to 4 percent, and fragile X syndrome in 2 to 8 percent of children with ASD. In particular epilepsy is found in 3 to 30 percent of children with ASD, with EEG abnormalities being common even in the absence of seizure disorders. It is also significant to note that seizures may develop (particularly in adolescence) in as many as 25% of children with ASD (APA, 2000; Hansen & Hagerman, 2003).

Family history. Finally, family history of ASD would support an ASD diagnosis. According to Newschaffer (2002): “Evidence from twin studies, familial aggregation, and rare chromosomal abnormalities provide a compelling argument for some substantive heritable component in ASD etiology. However, no specific genes have been implicated” (p. 143). A family history of other conditions associated with ASD might also provide some support for an ASD diagnosis. These conditions include inquired epilepsy, mental retardation, and conditions with a genetic basis (e.g., Tuberous Sclerosis Complex, Fragile X Syndrome, Schizophrenia, Anxiety, Depression, Bipolar disorder; Hansen & Hagerman, 2003).

Indirect Assessment

Indirect assessment involves obtaining data from caregivers (e.g., parents and teachers) about the student being assessed. It has the advantage of tapping into the significant amount of experiences working with and observing the student typically possessed by caregivers. However, it is important to acknowledge the subjective nature indirect assessment. On some occasions caregivers have biased and/or inaccurate views of a student's behavior. Thus, direct assessment (to be discussed next) is also an important element of any diagnostic assessment. From the author's applied school psychology experiences; the following rating scales and interview are offered as potentially valuable tools for use by the school psychologist who is attempting to diagnose an ASD.

Rating scales. The *Gilliam Autism Rating Scale* (GARS; Gilliam, 1995) is a behavioral checklist designed to assist in the diagnosis of autism among individuals 3 through 22 years of age. It includes three core subtests (i.e., Stereotyped Behaviors, Communication, and Social Interaction) and a fourth optional subtest (i.e., Developmental) that collects developmental history data for the first three years of life. Each subtest is comprised of 14-items. GARS items are scored on a 4-point scale (with "0" corresponding to "Never Observed" and "3" corresponding to "Frequently Observed"). Designed to be completed by a parent, teacher, or other caregiver who knows the individual well [i.e., someone who has "...had regular, sustained contact with the subject for at least 2 weeks" (Gilliam, 1995, p. 9)]. No special training is required to administer or score the GARS, and it is suggested most raters will be able to complete it in 5 to 10 minutes.

GARS subtest raw scores are converted into standard scores, which are then summed and in turn converted to an Autism Quotient (AQ). Subtest standard scores of 8 and above, and AQs of 90 and above, are associated with "Average" and above probabilities of the subject being a person with an ASD. Conversely, subtest standard scores below 8, and AQs below 90 are associated with "Below Average" probabilities of an ASD. However, when considering GARS scores, it is important to keep in mind recent research suggesting that the GARS underestimates the likelihood of autism. In a study by South et al. (2002) the mean GARS AQ of a sample comprised of children already diagnosed by expert clinicians with autism, was significantly lower than the reference mean. While the GARS mean is 100, the mean in this sample of 119 children with strict *DSM IV* (APA, 1994) diagnoses of autism was 90.10. Given its high false negative rate (52% in the South et al. study), the GARS would not appear to be appropriate for use as a screening tool. Diagnosticians using this tool should take into account that its scores may underestimate the likelihood of autism and the results of this (or any rating scale) should never be used to make a diagnosis.

Psychometrically, reliability among GARS subtests is good. However, as was mentioned above convergence "with similar scales from gold-standard research diagnostic measures was quite poor" (South et al., p. 596). In addition, it is important to note that the Developmental Disturbances scale is generally unrelated to the other scales" (South et al., p. 596).

The *Asperger Syndrome Diagnostic Scale* (ASDS; Myles, Bock, & Simpson, 2001) is a behavioral checklist designed to assist in the diagnosis of Asperger's Disorder among individuals

5 through 18 years of age. Its 50 items are divided among five subtests (i.e., Language, Social, Maladaptive, Cognitive, and Sensorimotor), and are scored on a 2-point scale (with “0” corresponding to “Not Observed” and “1” corresponding to “Observed”). It is intended to be completed by a parent, teacher, or other caregiver who knows the individual well [i.e., someone who has “...had regular, sustained contact with the examinee for at least 2 weeks” (Myles et al., 2001, p. 9)]. Beyond having familiarity with the *ASDS*, no special training is required to administer or score this measure, and it is suggested most raters will be able to complete all subtests in 10 to 15 minutes.

Subtest raw scores are converted into standard scores, which are then summed and in turn converted to an Asperger Syndrome Quotient (ASQ). It is this score, the ASQ, which is recommended for use in helping to diagnose Asperger’s Disorder. Subtest standard scores are not recommended for this use. ASQs of 90 and above are associated with “Likely” to “Very Likely” probabilities of the student being a person with an Asperger’s Disorder (the higher the score the greater the probability). Conversely, ASQs below 80 are associated with an “Unlikely” probability of this disorder.

The *ASDS* is considered to be psychometrically sound (Mirenda, 2003). It has been suggested to have “moderate to good reliability estimates.” However, some questions have been raised about the construction of the standardization sample (i.e., there apparently was no confirmation of the Asperger’s Disorder diagnoses; Blair, 2003).

Interview. Developed by Rutter, Le Couteur, and Lord (2003), the *Autism Diagnostic Interview – Revised* (ADI-R) represents one of the more recently published tools for use in the diagnosis of ASD. Along with the *Autism Diagnostic Observation Schedule*, the *AID-R* is currently considered the “gold standard” for the diagnosis of ASD (Filipek et al., 1999, p. 459). According to Klinger and Renner (2000): “The diagnostic interview that yields the most reliable and valid diagnosis of autism is the *ADI-R*” (p. 481).

The *ADI-R* employs a semi-structured interview format to elicit the information needed to diagnose autism. It provides separate algorithms for diagnosis and treatment or educational planning (with the latter referencing the full developmental history and the former focusing on current behavior). The interviews primary focus is on the three core domains of autism (i.e., language/communication; reciprocal social interactions; and restricted, repetitive, and stereotyped behaviors and interests). The *ADI-R* requires a trained interviewer and caregiver familiar with both the developmental history and the current behavior of the child. According to Rutter et al. (2003):

... in everyday clinical practice, the material provided in chapters 2 and 3 [of the ADI-R manual], together with the WPS set of teaching videotapes, will provide a sufficient introduction to the ADI-R for professionals who have prior training and experience in conducting extended clinical interviews and in working with individuals with ASDs. (p. 1)

In addition, it is important to note that the individual being assessed must have a developmental level of at least two years. The 93 items that comprise this measure take approximately 90 to

150 minutes to administer. This lengthy administration time represents one of the primary limitations of this tool. In addition it is important to reiterate that, as with all indirect assessments, the *ADI-R* is influenced by parental perceptions and agendas (Klinger & Renner, 2000).

Examination of the *ADI-R* manual suggests that it has solid psychometric properties (Rutter et al., 2003). The authors conclude that "...the *ADI-R* works very well for differentiation of ASD from nonautistic developmental disorders in clinically referred groups, provided that the mental age is above 2 years, 0 months" (p. 47). Among the *ADI-R*'s domains of autistic behavior and diagnosis, interrater reliability and retest reliability have been described as "consistently convincing" (Hill et al., 2001, p. 187). ASD false positives very rare, even when being used to differentially diagnose children with language disorders from those with high functioning ASD (Mildenberger, Sitter, Noterdaeme, & Amorosa, 2001; Noterdaeme, Mildenberger, Sitter, & Amorosa, 2002). The *ADI-R* algorithm is also reported to work well for the identification of Asperger's Disorder. However, it may not do so as well among children under 4 years of age.

Direct Assessment

Direct assessment involves obtaining data by observing the student suspected to have an ASD. It has the advantage of being relatively objective and is not as easily influenced by biased and/or inaccurate caregiver perceptions of the student's behavior. However, it is important to acknowledge that the behavior of students with ASD can be quite variable (from one situation to the next), thus the generalizability of this type of assessment data must always be questioned. Consequently, the indirect assessments just discussed are also important elements of any diagnostic assessment. By questioning caregivers about the behaviors observed during a direct assessment, the examiner will be able to determine how typical is the obtained observational data. From the author's experiences as a school psychologist, the following direct assessment techniques are offered as potentially valuable tools for use by the school psychologist who is attempting to diagnose an ASD.

Autism Diagnostic Observation Schedule (ADOS-G). As was just mentioned the *ADOS-G* (Lord, Rutter, DiLavore, & Risi, 1999a, 1999b) is considered to be part of the "gold standard" in the diagnosis of ASD (Filipek et al., 1999, p. 460). The *ADOS-G* is a standardized, semi-structured interactive play assessment of social behavior. By making use of "planned social occasions" the *ADOS-G* facilitates observation of the social, communication, and play or imaginative use of material behaviors related to the diagnosis of ASD.

The *ADOS-G* consists of four modules. Module 1 is designed for individuals who are preverbal or who speak in single words, Module 2 for those who speak in phrases, Module 3 for children and adolescents with fluent speech, and Module 4 for adolescents and adults with fluent speech. Administration of the *ADOS-G* requires 30 to 45 minutes and provides social-communication sequences that involve "presses" for particular social behaviors. Because its primary goal is accurate diagnosis, the authors suggest that it may not be a good measure of treatment effectiveness or developmental growth (especially in the later modules).

Psychometric data for a limited sample ($n = 223$) of disabled children and adults with and without ASD is presented. “Substantial” interrater and test-retest reliability for individual items, “excellent” interrater reliability within *ADOS-G* domains and internal consistency are reported (Lord et al., 2000, p. 205). Mean test scores were found to consistently differentiate ASD and non-ASD groups. The *ADOS-G* (in combination with the *ADI-R*) was found to be useful in the differential diagnosis of children with high functioning autism from those with a receptive language disorder (Noterdaeme et al., 2002). However, the *ADOS-G* was less consistently able to differentiate among the ASDs (Klinger & Renner, 2000).

Childhood Autism Rating Scale (CARS). At one time considered to the “strongest” objective scale for the diagnosis of ASD (Morgan, 1988), the *Childhood Autism Rating Scale* (CARS; Schopler, Reichler, & Renner, 1988) is one of the most widely used diagnostic tools for children over 2 years of age (Young & Brewer, 2002). The *CARS* is a 15-item structured observation tool. Each *CARS* item is scored on a 4-point scale ranging from 1 (normal) to 4 (severely abnormal). In making these ratings the evaluator is asked to compare the child being assessed to others of the same developmental level. Thus, an understanding of developmental expectations for the 15 *CARS* items is essential.

The sum of the *CARS* ratings is used to determine a total score and the severity of autistic behaviors (i.e., non-autistic, 15 to 29; mildly-moderately autistic; 30-37; severely autistic, 37+). In addition to direct observation of the child, *CARS* data can be obtained from parent interviews and student record reviews. The author’s use of this tool involved discussion of each *CARS* item by the entire assessment team during a case staffing. In this way it reflected the observations of several different evaluators (e.g., the language specialist, special education teacher, and school psychologist).

When the *CARS* was developed it attempted to include diagnostic criteria from a variety of classification systems and different theoretical perspectives, and it offers no weighting of the 15 scales when determining the total score. This may have created some problems for its current use given that the field of ASD study has begun to move toward consensus regarding the primary symptoms of these disorders. As a result the *CARS* currently includes items that are no longer considered essential for the diagnosis of autism (e.g., taste, smell, and touch response) and may imply to some users of this tool that they are essential to diagnosis (when in fact they are not; Prizant, 1992). In addition, it is important to acknowledge that the *CARS* has a tendency to incorrectly classify non-autistic students with mental retardation as autistic (Deisinger, 2001).

Psychometrically, the *CARS* has been described as “acceptable” (Prizant, 1992), “good” (Young & Brewer, 2002), and as a “well-constructed rating scale” (Welsh, 1992). Validity studies have suggested that following a review of the manual and when indicated the viewing of a training video, the *CARS* can be used by individuals from a variety of different disciplines (including those with limited experience with ASD; Prizant, 1992).

Psycho-Educational Assessment

While not all school psychologists will have the training to diagnose a specific ASD, all will likely be required to assess the student with autism or autistic-like behaviors and asked to assist IEP teams in determining special education eligibility. Given this reality it is important for all school psychologists to understand how to conduct the traditional psycho-educational assessment with this population. Perhaps most importantly, school psychologists must recognize that when assessing the developmental levels (or present levels of functioning) of these students, it is essential to keep in mind that the core deficits of ASD can significantly impact test performance (Goodlin-Jones & Solomon, 2003; Shriver et al., 1999). For example, as pointed out by Loftin & Lantz (2003), the student's qualitative impairments in communication may make it difficult for him or her to respond to verbal test items (especially those that involve multiple steps) and/or generate difficulty understanding the directions that accompany many nonverbal tests. In addition, qualitative impairments in social relations may result in difficulty establishing the joint attention necessary to complete many traditional psycho-educational tests.

As a consequence of the challenges to assessment presented by the characteristics of ASD, these students are often labeled as "untestable." Such perceptions of the student with autism typically reflects a lack of knowledge of appropriate testing accommodations and modification, and specific tests (Goodlin-Jones & Soloman, 2003; Loftin & Lantz, 2003). Thus, this section examines testing accommodations and modifications, and discusses specific tests appropriate for use with ASD students.

Testing Accommodations and Modifications

Testing students with ASD requires special expertise, training, and experience to minimize the effects of autistic behavior on test validity (Koegel, Koegel, & Smith, 1997; Siegel, Minshew, & Goldstein, 1996). The school psychologist must constantly assess the degree to which tests being used reflect symptoms of autism or the specific targeted abilities (e.g., intelligence, achievement, psychological processes). For example, in the case of an IQ test (especially one with an emphasis on verbal abilities) examiners must constantly question whether obtained scores reflect cognitive potential, or the qualitative impairments in communication that are typical of autism. To address these challenges examiners will often need to make testing accommodations. Before offering specific suggestions that might be appropriate for students with ASD, it is important to acknowledge that this population is very heterogeneous (Loftin & Lantz, 2003). Thus, there is not any one set of accommodations that will work for every student. In other words, it is important to consider each student as an individual and to select specific accommodations to meet specific needs. With this preface in mind the following accommodations that might be helpful when testing the student with autism are offered.

Prepare the student for the testing experience. Many students with ASD have great difficulty adjusting to environmental changes. Consequently, the novel testing room environment may make it difficult for the student to perform at his or her best. Thus, before assessing the student with autism it will be important to familiarize him or her with the examiner, the testing room, and the testing experience. This can be accomplished by having a few meetings with the student in the examiner's testing room before beginning any formal assessment procedure (Loftin & Lantz, 2003). One alternative for the student who is extremely resistant to leaving the familiar classroom environment is to find a way to conduct the

assessment in the classroom itself. Obviously, this would need to be done at a time when classroom distractions are at a minimum.

Place the testing session in the student's daily schedule. Students with ASD also have difficulty adjusting to changes in routine. They may, for example, react with great distress if an expected activity does not occur at an expected time. Consequently, it is not unusual for testing sessions (which occur infrequently) to be a distressing disruption to the student's routine. Given this possibility, once the student has become familiar and comfortable with the testing environment, the next important consideration is to make sure he or she knows exactly when the testing session(s) will take place. If the student is making use of a daily and/or weekly schedule, the testing session can be placed on it giving the student the warning he or she needs that a session will take place. Another way to minimize disruption to the student's daily routine is to break testing sessions into smaller, more discrete segments. Doing so will also allow the student to adapt to the relatively novel testing procedures (Cummings, 2004

Minimize distractions. Some students with ASD have unusual visual and auditory sensitivities. They may for example find certain sounds (e.g., a phone ringing, a pencil being sharpened, someone coughing) extremely distressing. Thus, before assessing the student it will be important to inquire about such sensitivities and to make appropriate environmental adjustments. In general, it would be a good idea to minimize all distractions (Loftin & Lantz, 2003).

Make use of pre-established physical structures and work systems. In addition to making use of a daily schedule, another way to minimize the disruption to routine, is to place the session within a pre-established physical structure and work system. For example, in a classroom that makes use of structured teaching techniques (e.g., Schopler, Reichler, & Lansing, 1980), testing could take place in the pre-established one-on-one work area and make use of an already developed individual work system. Such systems inform students how much testing will be done (for example, by placing selected test items in "to do" baskets), indicates when a testing item is completed (for example, by placing test materials in a "finished basket"), and specifies what will happen once testing is completed (Marcus, Flagler, & Robinson, 2001; Marcus, Lansing, & Schopler, 1993). As will be discussed next, this last element can help to facilitate the use of external motivation for engaging in testing.

Make use of powerful external rewards. Given the just mentioned challenges (i.e., sensory issues and difficulty adjusting to changes in environment and routine) it will not be surprising to find students with ASD unmotivated to perform in testing sessions. In fact, they may find it aversive. Thus, it will be important to consider how to reward test performance and increase test-taking motivation (Goodlin-Jones & Solomon, 2003). Specific strategies include the use of frequent reinforcement breaks (Koegel, Koegel, & Smith, 1997) and behavioral shaping (Siegel, Minshew, & Goldstein, 1996). One way to inform the student of pending reinforcement breaks is to place a desired task on the student's daily schedule immediately after the testing session. In this way the student will be informed that once testing is completed (e.g., all test materials are in the "finished basket") a desirable activity will immediately follow (Marcus et al. 2001; Marcus et al., 1993). Using this strategy it may be possible to classically condition positive feelings about test taking. The specific rewards selected may make use of

some of the unusual and intense interests students with ASD have. For example, at the conclusion of testing the student may be allowed to count cars as they pass by the classroom window or review baseball statistics. Of course, as is the case with all efforts to use external rewards to influence behavior, it will be essential to ensure that the individual student finds the selected reinforcer reinforcing. In addition, parents and/or teachers should always be consulted about the appropriateness of the selected reinforcers.

Carefully pre-select task difficulty. Another strategy to maintain the student's motivation is to alternate difficult tasks (typically language items) with easy tasks (e.g., visual-motor tasks; Loftin & Lantz, 2003; Marcus et al. 2001; Marcus et al., 1993). Data obtained from classroom observations, and parent and teacher interviews should inform the examiner regarding what kinds of tasks will be difficult for the student and what tasks will be easy. With this knowledge difficult tasks can be followed by what is expected to be an easy task, which can help to maintain the student's test taking motivation.

Modify test administration and allow nonstandard responses. Many of the just mentioned accommodations might be implemented without having to break standardized test administration and scoring procedures. Obviously, to the extent it is possible, standardized administrations are preferred. However, if it becomes necessary, changing test directions (e.g., simplifying, shortening, and/or repeating them), allowing the student to respond to the task in alternative ways (e.g., using a picture communication system), and/or allowing additional time to respond to test items would be appropriate (Marcus et al., 2001; Marcus et al., 1993). While such administrations will affect the examiner's ability to compare the student's test performance to those of students in the given standardization sample, such non-standard administrations can be very helpful in understanding the student's relative pattern of strengths and weaknesses.

Behavioral Observations

As is the case with all psycho-educational assessments, behavioral observations are essential. Students with ASD are a very heterogeneous group, and in addition to the core feature of ASD, it is not unusual for them to display a range of behavioral symptoms including hyperactivity short attention span impulsivity, aggressiveness, self-injurious behavior, and (particularly in young children) temper tantrums (Hendren, 2003). Obviously, identification of these unique behavioral challenges will be important for educational program planning and may become targets for functional behavioral assessments.

Observation of the student with ASD in typical environments, such as the classroom, will also facilitate the evaluation of test taking behavior. From such observations judgments regarding how typical the students test taking behaviors were can be made and the validity of the obtained test results assessed. In addition to being used to assess the validity of test results, observation of test taking behavior may also help to document the core features of autism. For example, observation of communication abilities, eye contact with the examiner, and parent and/or teacher separation and reunification behaviors are among the behaviors that might be documented during the testing session.

Cognitive Functioning

Assessment of cognitive function is essential given that, with the exception of Asperger's Disorder, a significant percentage (as high as 80 percent) of students with ASD will also be mentally retarded (APA, 2000; Chakrabarti, & Fombonne, 2001; Ritvo et al., 1989; Volkmar & Cohen, 1986; Young & Brewer, 2002). The presence of mental retardation also has diagnostic implications as *DSM IV-TR* (APA, 2000) specifies that in the presences of severe to profound retardation will make it difficult to diagnosis Autistic Disorder.

In addition, to ruling in or ruling out mental retardation, the student's level of cognitive functioning provides data important to educational program planning. For example, IQ is associated with adaptive functioning, the ability to learn and acquire new skills, and long-term prognosis. Thus, level of cognitive functioning has significant implications for determining how restrictive the educational environment will need to be. IQ test results can also be helpful in the differential diagnosis among the various ASDs. Specifically, students with Rett's Disorder typically have profound to severe IQ deficits, those with Childhood Disintegrative Disorder typically have severe deficits, those with Autistic Disorder typically have moderate deficits, and those with Asperger's Disorder do not typically have any cognitive delay (APA, 2000).

Intelligence test performance is also a powerful predictor of ASD symptom severity, with higher IQ scores being associated with a lower degree of ASD symptoms (Filipek et al., 1999; Goodlin-Jones & Solomon, 2003). However, given that children with ASD are ideally first evaluated when they are very young (i.e., 2- to 3-years of age), it is important to keep in mind that it is not until age 5 that childhood IQ correlates highly with adult IQ (Sattler, 1988). In addition, the anecdotal observations of Goodlin-Jones and Solomon (2003) suggest that:

...developmental quotients of very young children with autism, especially those who had normal early motor development (suggesting less neurodevelopmental dysfunction), are generally not predictive of response to treatment and potential for growth. That is, many children who do poorly on tests will still improve significantly with intervention. (p. 71)

Similarly, Marcus et al. (1993) suggest: "With the preschooler ... such prognostic indicators [IQ testing] should either not be used or used only with considerable caution" (p. 329). Thus, it is important to treat the IQ scores of the very young child with caution when offering a prognosis, and when making placement and program planning decisions. However, for school aged children it is clear that the appropriate IQ test is an "...excellent predictor of a student's later adjustment and functioning in real life" (Frith, 1989, p. 84). Filipek et al. (1999) suggest that it may be beneficial to conduct IQ testing before kindergarten entry to help with curriculum planning. In addition, such IQ test results can provide a baseline and serve as one way to measure intervention effectiveness.

Regardless of the overall level of cognitive functioning, it is not unusual for the student being tested to display an uneven profile of cognitive abilities (Lincoln, Allen, & Kilman, 1995). Thus, rather than simply providing an overall global intelligence test score, it is essential to identify these cognitive strengths and weaknesses. Doing so will assist educational planning (Filipek et al., 1999). At the same time, however, it is important to avoid the temptation to generalize from isolated or "splinter" skills when forming an overall impression of cognitive

functioning, given that such skills may significantly overestimate typical abilities (National Research Council, 2001).

Selection of specific tests is important to obtaining a valid assessment of cognitive functioning (and not the symptoms characteristic of ASD). Goodlin-Jones and Solomon (2003) suggest that the *Wechsler* (2003) and *Stanford-Binet* (Roid, 2003) scales are appropriate for the individual with spoken language. On the other hand, for students who have more severe language delays measures that minimize verbal demands are recommended. Goodlin-Jones and Solomon suggest that the *Leiter International Performance Scale – Revised* (Roid & Miller, 1997) “... is a reasonable choice for assessing a child who has limited language ability or is nonverbal” (p. 68). Adapted from Cummings (2004), Tables 15 and 16 provide listings of tests for use in assessing students with autism who have language abilities and those who have communication challenges.

Table 15
IQ Test Appropriate For Use With Students Who Have Spoken Language

<i>Intelligence Test</i>	<i>Age Range</i>
Wechsler Preschool and Primary Scale of Intelligence-Third Edition (Wechsler 2002)	3-7 years
Wechsler Intelligence Scale for Children-Forth Edition (Wechsler 2003)	6-16 years
Wechsler Adult Intelligence Scale-Third Edition (Wechsler 1997)	16 years & up
Wechsler Abbreviated Scale of Intelligence (Wechsler 1999)	6-89 years
Stanford-Binet Intelligence Scale-Fifth Edition (Roid, 2003)	2 years-adult
Differential Ability Scales (Elliott 1990)	2-17 years

Table 16
IQ Test Appropriate For Use With Students Who Have Communication Challenges

<i>Intelligence Test</i>	<i>Age Range</i>
Leiter International Performance Scales-Revised (Roid & Miller 1997)	2-21 years
Bayley Scales of Infant Development-II (Bayley 1993)	1-42 months
Mullen Scales of Early Learning (Mullen 1995)	1-60 months
Columbia Mental Maturity Scale-Third Edition (Burgemeister, Blum & Lorge 1972)	3.5-10 years
Merrill-Palmer Scale of Mental Tests (Stutsman 1931)	1-6 years
Raven’s Coloured Progressive Matrices (Raven, Court & Raven, 1986, cited in Deisinger, 2001)	5-11 years
Test of Nonverbal Intelligence-Third Edition (Brown, Sherbenou, & Johnsen 1990)	5 years & up
Kaufman Assessment Battery for Children (Kaufman and Kaufman 1983)	2-12 years

Adaptive Behavior

As was just mentioned, the majority of individuals with ASD also have mental retardation. Given that diagnosing mental retardation requires examination of both IQ and adaptive behavior (APA, 2000), it is also important to administer measures of adaptive behavior when assessing students with ASD (Klin, Carter, & Sparrow, 1997). According to Carter et al. (1998), other uses of adaptive behavior scales when assessing students with ASD are: (a) identifying strengths and weaknesses for educational planning and intervention; (b) documenting

intervention efficacy, and (c) monitoring progress over time. Regarding this last purposes, it is important to note that children with ASD have been shown to improve in all adaptive behavior domains (as measured by the *Vineland Adaptive Behavior Scales*; Sparrow, Balla, & Cicchetti, 1984) over time. However, the rate of growth in the Communication and Daily Living Skills domains is related to initial IQ. The rate of growth in the Social Skills domain is independent of initial IQ (Freeman, Del’Homme, Guthrie, & Zhang, 1999).

When interpreting the results of these scales it is important to keep in mind that the profiles of students with ASD are unique. While individuals with only mental retardation typically display flat profiles across adaptive behavior domains, students with ASD might be expected to display relative strengths in daily living skills, relative weaknesses in socialization skills, and intermediate scores on measures of communication abilities (Bölte & Poustka, 2002; Carter et al., 1998).

To facilitate the use of the *Vineland Adaptive Behavior Scales* (Sparrow et al., 1984) in the assessment of individuals with ASD, Carter et al. (1998) have provided special norms (Tables 17, 18, 19 20, 21, 22, and 23) for four groups of individuals with autism: (a) children under 10 with no verbal skills; (b) children under 10 with at least some verbal skills; (c) individuals above 10 with no verbal skills; and (d) individuals above 10 with at least some verbal skills. Use of these special norms have been suggested by Carter et al. to facilitate the use of the *Vineland Adaptive Behavior Scales* as a diagnostic tool given that individuals with ASD typically obtain Socialization scores much lower than would be expected given their mental age.

Language Functioning

A speech and language pathologist typically conducts a comprehensive examination of language functioning. However, there may be instances where the school psychologists needs to obtain estimates of expressive and receptive language, and Goodlin-Jones and Solomon (2003) recommend the *Peabody Picture Vocabulary Test – Third Edition* (Dunn & Dunn, 1997) and the *Expressive One-Word Picture Vocabulary Test* (Brownell, 2000) for such use. When interpreting the results of such measures, it is important to keep in mind that these tests may overestimate language abilities as they do not require sentence production or comprehension, nor do they assess social language or pragmatics (Goodlin-Jones & Solomon, 2003). Also, in many higher functioning students with ASD receptive language may be lower than expressive language (APA, 2000).

Table 17
 Supplemental Norm Group Percentile Ranks Corresponding Raw Scores: Age Less Than 10 Years Old – Autism Special Population: Mute

Supplementary norm group percentile rank	Raw Scores			
	Communication	Daily Living Skills	Socialization	Motor Skills
SP 99	100-134	119-184	92-132	72
SP 98	98-99	113-118	90-91	70-71
SP 95	87-97	96-112	79-89	65-69
SP 90	76-86	84-95	70-78	61-64
SP 85	65-75	75-83	63-69	58-60
SP 80	56-64	67-74	56-62	55-57
SP 75	48-55	61-66	50-55	53-54
SP 70	41-47	55-60	45-49	51-52
SP 65	35-40	50-54	40-44	49-50
SP 60	30-34	45-49	36-39	47-48
SP 55	26-29	41-44	33-35	45-46
SP 50	23-25	37-40	30-32	43-44
SP 45	20-22	34-36	27-29	41-42
SP 40	18-19	31-33	25-26	40
SP 35	16-17	28-30	23-24	38-39
SP 30	15	25-27	21-22	35-37
SP 25	14	22-24	19-20	33-34
SP 20	13	20-21	18	31-32
SP 15	12	17-19	17	28-30
SP 10	10-11	15-16	16	25-27
SP 5	5-9	12-14	15	19-24
SP 2	3-4	11	14	17-18
SP 1	0-2	0-10	0-13	0-16

Table 18
 Supplemental Norm Group Percentile Ranks Corresponding Raw Scores: Age Less Than 10 Years Old – Autism Special Population: Verbal

Supplementary norm group percentile rank	Raw Scores			
	Communication	Daily Living Skills	Socialization	Motor Skills
SP 99	118-134	123-184	84-132	69-72
SP 98	112-117	115-122	79-83	67-68
SP 95	97-111	98-115	69-78	63-66
SP 90	88-96	89-97	63-68	61-62
SP 85	82-87	32-88	59-62	59-60
SP 80	76-81	78-82	56-58	58
SP 75	72-75	73-77	54-55	56-57
SP 70	68-71	69-72	51-53	55
SP 65	64-67	66-68	49-50	54
SP 60	61-63	62-65	47-48	52-53
SP 55	58-60	59-61	45-46	51
SP 50	55-57	56-58	43-44	50
SP 45	52-54	53-55	42	49
SP 40	49-51	50-52	40-41	47-48
SP 35	46-48	47-49	38-39	46
SP 30	43-45	44-46	36-37	44-45
SP 25	40-42	41-43	34-35	43
SP 20	37-39	37-40	31-33	41-42
SP 15	34-36	34-36	29-30	38-40
SP 10	30-33	29-33	25-28	35-37
SP 5	24-29	21-28	19-24	28-34
SP 2	22-23	19-20	16-18	26-27
SP 1	0-21	0-18	0-15	0-25

Table 19
 Supplemental Norm Group Percentile Ranks Corresponding Raw Scores: Age 10 Years and Older – Autism Special Population: Mute

Supplementary norm group percentile rank	Raw Scores		
	Communication	Daily Living Skills	Socialization
SP 99	115-134	145-184	101-132
SP 98	113-114	142-144	100
SP 95	110-112	130-141	91-99
SP 90	105-109	121-129	83-90
SP 85	97-104	112-120	74-82
SP 80	84-96	105-111	66-73
SP 75	69-83	98-104	58-65
SP 70	55-68	91-97	51-57
SP 65	44-54	84-90	45-50
SP 60	35-43	78-83	40-44
SP 55	29-34	72-77	36-39
SP 50	28	67-71	32-35
SP 45	27	61-66	29-31
SP 40	26	56-60	26-28
SP 35	25	50-55	24-25
SP 30	24	45-49	22-23
SP 25	23	40-44	20-21
SP 20	22	35-39	19
SP 15	20-21	30-34	18
SP 10	19	25-29	17
SP 5	10-18	19-24	-
SP 2	8-9	18	-
SP 1	0-7	0-17	0-16

Table 20
 Supplemental Norm Group Percentile Ranks Corresponding Raw Scores: Age 10 Years and Older – Autism Special Population: Verbal

Supplementary norm group percentile rank	Raw Scores		
	Communication	Daily Living Skills	Socialization
SP 99	129-134	174-184	114-132
SP 98	128	170-173	108-113
SP 95	125-127	156-169	94-107
SP 90	121-124	147-155	86-93
SP 85	117-120	139-146	80-85
SP 80	113-116	132-138	76-79
SP 75	108-112	126-125	72-75
SP 70	103-107	121-125	68-71
SP 65	98-102	115-120	64-67
SP 60	93-97	110-114	61-63
SP 55	87-92	105-109	58-60
SP 50	81-86	99-104	55-57
SP 45	76-80	94-98	52-54
SP 40	70-75	89-93	49-51
SP 35	64-69	84-88	46-48
SP 30	58-63	78-83	43-45
SP 25	53-57	72-77	40-42
SP 20	47-52	66-71	37-39
SP 15	42-46	58-65	33-36
SP 10	37-41	50-57	28-32
SP 5	32-36	37-49	21-27
SP 2	31	33-36	19-20
SP 1	0-30	0-32	0-18

Table 21
 Supplemental Norm Group Percentile Ranks Corresponding to sum of Raw Scores:
 Ages Less Than 10 Years Old – Autism Special Population: Mute

Supplementary norm group percentile rank	Sum of 3 domain raw scores (Communication + Daily Living Skills + Socialization)	Sum of 4 domain raw scores (Communication + Daily Living Skills + Socialization + Motor)
99	303-Up	366-Up
98	294-302	357-365
95	258-293	319-318
90	227-257	287-318
85	201-226	258-286
80	177-200	232-257
75	157-176	210-231
70	139-156	189-209
65	124-138	171-188
60	111-123	156-170
55	99-110	141-155
50	89-98	129-140
45	80-88	118-128
40	73-79	108-117
35	66-72	100-107
30	61-65	92-99
25	56-60	86-91
20	52-55	60-85
15	48-51	75-79
10	45-47	71-74
5	43-44	67-70
2	42	65-66
1	0-41	0-64

Table 22
 Supplemental Norm Group Percentile Ranks Corresponding to sum of Raw Scores:
 Ages Less Than 10 Years Old – Autism Special Population: Not Mute

Supplementary norm group percentile rank	Sum of 3 domain raw scores (Communication + Daily Living Skills + Socialization)	Sum of 4 domain raw scores (Communication + Daily Living Skills + Socialization + Motor)
99	311-Up	321-Up
98	293-310	306-325
95	251-292	270-305
90	228-250	250-269
85	212-227	236-249
80	199-211	225-235
75	188-198	215-224
70	178-187	206-214
65	170-177	198-205
60	162-169	191-197
55	154-161	184-190
50	146-153	177-183
45	139-145	170-176
40	132-138	163-169
35	125-131	156-162
30	118-124	149-115
25	110-117	142-148
20	102-109	134-141
15	93-101	124-133
10	82-92	113-123
5	65-81	94-112
2	59-64	88-93
1	0-58	0-87

Table 23
 Supplemental Norm Group Percentile Ranks Corresponding to sum of Raw Scores:
 Ages Greater Than or Equal to 10 Years Old: Autism Special Population

Supplementary norm group percentile rank	Sum of 3 domain raw scores (Communication + Daily Living + Socialization)	
	Not Mute (<i>n</i> = 171)	Mute (<i>n</i> = 98)
99	404-Up	348-Up
98	396-403	345-347
95	368-395	327-344
90	347-367	304-326
85	330-346	277-303
80	314-329	249-276
75	300-313	222-248
70	286-299	196-212
65	272-285	172-195
60	259-271	152-171
55	246-258	134-151
50	234-245	120-133
45	221-233	108-119
40	209-220	99-107
35	196-208	92-98
30	183-195	86-91
25	170-182	81-85
20	156-169	78-80
15	141-155	76-77
10	124-140	74-75
5	101-123	73
2	95-100	72
1	0-94	0-71

Psychological Processes

The comprehensive psycho-educational evaluation of the student with ASD will also require the school psychologist to evaluate basic psychological process. Doing so will help to further identify learning strengths and weakness important to program planning. In addition, it is possible that the student may have a co-morbid learning disability that will require special educational intervention in its own right. Depending upon the student's age and developmental level, traditional measures of such processes may be appropriate.

It would not be surprising to find the student with ASD to exhibit spared rote, mechanical, and visual-spatial processes; and deficient higher-order conceptual processes, such as abstract reasoning (Ehlers et al., 1997; Goodlin-Jones & Solomon, 2003). While IQ test profiles should never be used for diagnostic purposes, it would not be surprising to find the student with Autistic Disorder to perform better on non-verbal (visual/spatial) tasks (in particular the *WISC* Block Design subtest) than tasks that require verbal comprehension and expression (Ehlers et al., 1997; Siegel et al., 1996). The student with Asperger's Disorder may display the exact opposite profile (Goodlin-Jones & Solomon, 2003), with lower scores on Object Assembly and Coding subsets (Ehlers et al., 1997). In addition, in comparison with Autistic Disorder, students with Asperger's Disorder might be expected to have relatively well developed crystallized abilities. Students with Autistic Disorder typically perform poorly on acquired knowledge tasks (Ehlers et al., 1997).

While attention problems are often noted among students with ASD, they are not of the type typically seen among those with Attention-deficit/Hyperactivity Disorder (AD/HD). While students with ADHD typically have more difficulty with sustained attention and are more distracted by external environmental stimuli, those with ASD are typically more distracted by internal factors, such as their own special and intense interests (Garretson, Fein, & Waterhouse, 1990). Students with autism also are more likely to over focus attention on irrelevant details while missing the main ideas. However, ADHD can co-exist with autism (Goodlin-Jones & Solomon, 2003). If comorbid ADHD is suspected, then it is recommended that an ADHD evaluation be conducted using methods such as those described by Brock (1999).

Academic/Developmental Functioning

A special education teacher typically conducts a comprehensive examination of academic functioning. However, there may be instances where school psychologists need to obtain estimates of achievement. As was the case for cognitive assessment, assessment of academic functioning will often reveal a profile of strengths and weaknesses important to educational planning. Variability among achievement test scores is common. For example, it is not unusual for students with ASD to be hyperverbal and hyperlexic, while at the same time having poor reading comprehension and difficulties dealing with abstract language. For other students, calculation skills may be well developed, while mathematical concepts may be delayed (Marcus et al., 2001).

For students functioning at or below the preschool range and with a chronological age of 6 months to 7 years, the *Psychoeducational Profile – Revised* (Schopler, Reichler, Bashford, Lansing, & Marcus, 1990) may be an appropriate choice (Marcus et al, 2001). This measure is divided into two sections: one that assesses developmental functions (i.e., imitation, perception, fine and gross motor skills, eye-hand integration, and cognitive verbal and performance skills), and one that helps to identify unusual or atypical behaviors (i.e., relating and affect, play an interest in materials, sensory responses, and language abnormalities). For older, higher functioning students, the *Woodcock-Johnson Tests of Achievement* (Woodcock, McGrew, & Mather, 2001) and the *Wechsler Individual Achievement Test* (Wechsler, 1992) would be appropriate tools. However, Marcus et al. (2001) caution that formal achievement tests alone may not provide necessary information on the overall educational functioning of the student and that "...a curriculum-based evaluation might provide the most useful data for the autistic population" (p. 285).

Emotional Functioning

As the student with ASD matures, new symptoms and behavior that interfere with daily functioning may appear. ASD can be associated with a variety of other symptoms and 65% present with symptoms of an additional psychiatric disorder such as AD/HD, oppositional defiant disorder, obsessive-compulsive disorder and other anxiety disorders, tics disorders, affective disorders, and psychotic disorders (Hendren, 2003). Given these possibilities, it will also be important for the school psychologist to evaluate the student's emotional/behavioral status. Traditional measures such as the *Behavioral Assessment System for Children* (Reynolds, & Kamphaus, 1998) would be appropriate as a general purpose screening tool, while more

specific measures such as *The Children's Depression Inventory* (Kovacs, 1992) and the *Revised Children's Manifest Anxiety Scale* (Reynolds & Richmond, 1998) would be appropriate for assessing more specific presenting concerns.

CONCLUDING COMMENTS

The increasing incidence of ASDs, combined with the importance of early identification creates the need for school psychologists to become better prepared to identify these disorders. With appropriate intervention there is hope that the student with ASD will be able to achieve a significant degree of independent functioning. These interventions, however, can only be provided if the student with ASD is identified and his or her unique pattern of strengths and weakness documented. It is hoped that this paper has provided information that will assist school psychologists in the important identification tasks of case finding, screening, diagnosis, and psycho-educational evaluation.

References

- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., Text Rev.). Washington, DC: Author.
- Attwood, T. (1998). *Asperger's syndrome: A guide for parents and professionals*. London: Kingsley.
- Bayley, N. (1993). *The Bayley Scales of Infant Development* (2nd Ed.). San Antonio, TX, Psychological Corporation.
- Baird, G., Charman, T., Baron-Cohen, S., Cox, A., Swettenham, J., Wheelwright, S., & Drew, A. (2000). A screening instrument for autism at 18 months of age: A 6-year follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39, 694-702.
- Baron-Cohen, S., Allen, J., & Gillberg, C. (1992). Can autism be detected at 18 months? The needle, the haystack, and the CHAT. *British Journal of Psychiatry*, 161, 839-843.
- Baron-Cohen, S., Cox, A., Baird, G., Swettenham, J., Nightingale, N., Morgan, K., Drew, A., & Charman, T. (1996). Psychological markers in the detection of autism in infancy in a large population. *British Journal of Psychiatry*, 168, 158-163.
- Baron-Cohen, S., Wheelwright, S., Cox, A., Baird, G., Charman, T., Swettenham, J., Drew, A., Coehring, P. (2000). Early identification of autism by the CHecklist for Autism in Toddlers (CHAT). *Journal of the Royal Society of Medicine*, 93, 521-525.
- Berument, S. K., Rutter, M., Lord, C., Pickles, A., & Bailey, A. (1999). Autism screening questionnaire: Diagnostic Validity. *British Journal of Psychiatry*, 175, 444-451.
- Birgance, A. (1986). *The BIRGANCE® Screens*. North Billerica, MA: Curriculum Associates.
- Blair, K. A. (2003). Test review of the Asperger Syndrome Diagnostic Scale. From B. S. Plake, J. C. Impara, & R. A. Spies (Eds.), *The fifteenth mental measurements yearbook* [Electronic version]. Retrieved December 23, 2003, from the Buros Institute's *Test Reviews Online* website: <http://www.unl.edu/buros>
- Bölte, S., & Poustka, F. (2002). The relation between general cognitive level and adaptive behavior domains in individuals with autism with and without co-morbid mental retardation. *Child Psychiatry and Human Development*, 33, 165-172.
- Bracken, B. A., & McCallum, R. S. (1998). *Universal Nonverbal Intelligence Test (UNIT)*. Itasca, IL: Riverside Publishing.
- Brereton, A. V., Tonge, B. J., MacKinnon, A. J., Einfeld, S. L. (2002). Screening young people for autism with the Developmental Behavior Checklist. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41, 1369-1375
- Bricker, D., & Squires, J. (1994). *Ages and Stages Questionnaire*. Baltimore, MD: Paul H. Brooks.
- Brock, S. E. (1999). The diagnosis of Attention-deficit/Hyperactivity Disorder in childhood. *The California School Psychologist*, 4, 18-29.
- Brown, L., Sherbenou, R. J., & Johnson, S. K. (1997). *Test of Nonverbal Intelligence-3 (TONI-3): A language-free measure of intelligence, aptitude and reasoning*. Austin, TX PRO-ED.

- Brownell, R. (2000). *Expressive One-Word Picture Vocabulary Test*. Novato, CA: Academic Therapy Publications.
- Burgemeister, B. B., Blum, L. H., & Lorge, I. (1972). *Columbia Mental Maturity Scale* (3rd Ed.). New York: Harcourt Brace.
- California Department of Developmental Services (2002). *Autistic spectrum disorders: Best practice guidelines for screening, diagnosis and assessment*. Sacramento, CA: Author. Retrieved August 11, 2003 from <http://www.ddhealthinfo.org>
- Carter, A. S., Volkmar, F. R., Sparrow, S. S., Wang, J., Lord, C., Dawson, G., Fombonne, E., Loveland, K., Mesibov, G., & Schopler, E. (1998). The Vineland Adaptive Behavior Scales: Supplemental norms for individuals with Autism. *Journal of Autism and Developmental Disorders*, 28, 287-302.
- Chakrabarti, S., & Fombonne, E. (2001). Pervasive developmental disorders in preschool children. *JAMA*, 285, 3093-3099.
- Cummings, C. (2004). *School psychologists' knowledge of autism*. Unpublished Masters Thesis, California State University Sacramento.
- De Giacomo, A., & Fombonne, E. (1998). Parental recognition of developmental abnormalities in autism. *European Child & Adolescent Psychiatry*, 7, 131-136.
- Deisinger, J. A. (2001). Diagnosis and assessment of autistic spectrum disorders. In T. Wahlberg, F. Obiakor, S. Burkhardt, & A. F. Rotatori (Eds.), *Autistic spectrum disorders: Educational and clinical interventions* (Advances in Special Education, Vol. 14, pp. 181-209). New York: JAI (Elsevier Science).
- Dunn, L. M., & Dunn, L., M. (1997). *The Peabody Picture Vocabulary Test* (3rd ed.). Circle Pines, MN: American Guidance Service.
- Ehlers, S., & Gillberg, G. (1993). The epidemiology of Asperger syndrome: A total population study. *Journal of Child Psychology and Psychiatry*, 34, 1327-1350.
- Ehlers, S., Gillberg, G., & Wing, L. (1999). A screening questionnaire for Asperger syndrome and other high functioning autism spectrum disorders in school age children. *Journal of Autism and Developmental Disorders*, 29, 129-141.
- Ehlers, S., Nydén, A., Gillberg, C., Dahlgren Sandberg, A., Dahlgren, S., Hjelmquist, E., & Odén, A. (1997). Asperger syndrome, autism and attention disorders: A comparative study of the cognitive profiles of 120 children. *Journal of Child Psychiatry and Psychology*, 38, 207-217.
- Elliott, C. (1990). *Differential Abilities Scale*. San Antonio, TX: Psychological Corporation.
- Einfeld, S. L., & Tonge, B. J. (1995). The Developmental Behaviour Checklist: The development and validation of an instrument to assess behavioural and emotional disturbance in children and adolescents with mental retardation. *Journal of Autism and Developmental Disorders*, 25, 81-104.
- Freeman, B. J., Del'Homme, M., Guthrie, D., & Zhang, F. (1999). Vineland Adaptive Behavior Scale scores as a function of age and initial IQ in 210 autistic children. *Journal of Autism and Developmental Disorders*, 29, 379-384.
- Filipek, P. A., Accardo, P. J., Baranek, G. T., Cook E. H., Dawson, G., Gordon, B., Gravel, J. S., Johnson, C. P., Kallen, R. J., Levy, S. E., Minshew, N. J., Prizant, B. M., Rapin, I., Rogers, S. J., Stone, W. L., Teplin, S., Tuchman, R. F., & Volkmar, F. R. (1999). The screening and diagnosis of autistic spectrum disorders. *Journal of Autism and Developmental Disorders*, 29, 439-484.

- Filipek, P. A., Accardo, P. J., Asshwal, S., Baranek, G. T., Cook, E. H., Dawson, G., Gordon, B., Gravel, J. S., Johnson, C. P., Kallen, R. J., Levy, S. E., Minshew, N. J., Ozonoff, S., Prizant, B. M., Rapin, I., Rogers, S. I., Stone, W. I., Teplin, S. W., Tuchman, R. F., & Volkmar, F. R. (2000). Practice parameter: Screening and diagnosis of autism. *Neurology*, *55*, 468-479.
- Fogt, J. B., Miller, D. N., & Zirkel, P. A. (2003). Defining autism: Professional best practice and published case law. *Journal of School Psychology*, *41*, 201-216.
- Frith, U. (1989). *Autism: Explaining the enigma*. Cambridge, MA: Blackwell.
- Garretson, H. B., Fein, D., Waterhouse, L. (1990). Sustained attention in children with autism. *Journal of Autism and Developmental Disorders*, *20*, 101-114.
- Gilliam, J. E. (1995). *Gilliam Autism Rating Scale (GARS)*. Austin, TX: Pro-Ed.
- Glascoc, F. P. (1997). *Parents' Evaluation of Developmental Status (PEDS)*. Nashville, TN: Ellsworth & Vandermeer Press.
- Goodwin-Jones, B. J., & Solomon, M. (2003). Contributions of the psychology. In S. Ozonoff, S. J. Rogers, & R. L. Hendren (Eds.), *Autism spectrum disorders: A research review for practioners* (pp. 55-85). Washington, DC: American Psychiatric Press.
- Greenspan, S. I. (1999). *Building healthy minds*. Perceus Books.
- Hansen, R. L., & Hagerman, R. J. (2003). Contributions of the pediatrics. In S. Ozonoff, S. J. Rogers, & R. L. Hendren (Eds.), *Autism spectrum disorders: A research review for practioners* (pp. 87-109). Washington, DC: American Psychiatric Press.
- Hendren, R. L. (2003). Contributions of the psychiatrist. In S. Ozonoff, S. J. Rogers, & R. L. Hendren (Eds.), *Autism spectrum disorders: A research review for practioners* (pp. 37-53). Washington, DC: American Psychiatric Press.
- Hill, A., Bölte, S., Petrova, G., Beltcheva, D., Tacheva, S., & Poustka, R. (2001). Stability and interpersonal agreement of the interview-based diagnosis of autism. *Psychopathology*, *34*, 187-191.
- Howlin, P., & Asgharian, A. (1999). The diagnosis of autism and Asperger syndrome: Findings from a survey of 770 families. *Developmental Medicine and Child Neurology*, *41*, 834-839.
- Ireton, H. (1992). *Child Development Inventories*. Minneapolis, MN: Behavior Science Systems.
- Kabot, S., Masi, W., & Segal, M. (2003). Advances in the diagnosis and treatment of autism spectrum disorders. *Professional Psychology: Research and Practice*, *34*, 26-33.
- Kaufman, A. S., & Kaufman, N L. (1983). *Kaufman Assessment Battery for Children*. Circle Pines, MN: American Guidance Services
- Klin, A., Carter, A. S., & Sparrow, S. S. (1997). Psychological assessment of children with autism. In D. J. Cohen & F. R. Volkmar (Eds.), *Handbook of autism and pervasive developmental disorders* (2nd ed., pp. 418-427). New York: Wiley.
- Klinger, L. G., & Renner, P. (2000). Performance-based measures in autism: Implications for diagnosis, early detection, and identification of cognitive profiles. *Journal of Clinical Child Psychology*, *29*, 479-493.
- Koegel, L. K., Koegel, R. L., & Smith, A. (1997). Variables related to differences in standardized test outcomes for children with autism. *Journal of Autism and Developmental Disorders*, *27*, 233-243.
- Kohrt, B. (2004, Winter). School psychologists respond to ASD survey. *CASP Today*, *53*(1), 4.

- Kovacs, M. (1982). *The Children's Depression Inventory*. North Tonawanda, NY: Multi-Health Systems.
- Lincoln, A. J., Allen, M. H., & Kilman, A. (1995). The assessment and interpretation of intellectual abilities in people with autism. In E. Schopler & G. B. Mesibov (Eds.), *Learning and Cognition in Autism* (pp. 89-117). New York: Plenum.
- Loftin, R., & Lantz, J. (2003). Cognitive assessment of children with autism spectrum disorders. *The School Psychologist, 57*(3), 105-108.
- Lord, C., Risi, S., Lambrecht, L., Cook, E. H. Jr., Leventhal, B. L., DiLavore, P. C., Pickles, A., & Rutter, M. (2000). The autism diagnostic observation schedule-generic: A standard measure of social and communication deficits associated with the spectrum of autism. *Journal of Autism and Developmental Disorders, 30*, 205-223.
- Lord, C., Rutter, M., & DiLavore, P.C. & Risi, S. (1999a). *Autism Diagnostic Observation Schedule-WPS (WPS Edition)*, Los Angeles, CA: Western Psychological Services.
- Lord, C., Rutter, M., DiLavore, P. C., & Risi, S. (1999b). The autism diagnostic observation schedule-generic: A standard measure of social and communication deficits associated with the spectrum of autism. *Journal of Autism and Developmental Disorders, 30*, 205-223.
- Lotter, V. (1967). Epidemiology of autistic conditions in young children, II: Some characteristics of parents and their children. *Social Psychiatry, 1*, 163-173.
- Madsen, K. M., Hviid, A., Vestergaard, M., Schendel, D., Whofahrt, J., Thorsen, P., Olsen, J., & Melbye, M. (2002). A population-based study of measles, mumps, and rubella vaccination and autism. *The New England Journal of Medicine, 347*, 1477-1482.
- Marcus, L. M., Lansing, M., & Schopler, E. (1993). Assessment of children with autism and pervasive developmental disorder. In J. L. Culbertson & D. J. Willis (Eds.), *Testing young children: A reference guide of developmental, psychoeducational, and psychosocial assessments* (pp. 319-344). Austin, TX: Pro-Ed.
- Marcus, L. M., Flagler, S., & Robinson, S. (2001). Assessment of children with autism. In R. J. Simeonsson & S. L. Rosenthal (Eds.), *Psychological and developmental assessment: Children with disabilities and chronic conditions* (pp. 267-291). New York: Guilford Press.
- Mastergeorge, A. M., Rogers, S. J., Corbett, B. A., & Solomon, M. (2003). Nonmedical interventions for autism spectrum disorders. In S. Ozonoff, S. J. Rogers, & R. L. Hendren (Eds.), *Autism spectrum disorders: A research review for practioners* (pp. 133-160). Washington, DC: American Psychiatric Press.
- Mildenberger, K., Sitter, S., Noterdaeme, & Amorosa, H. (2001). The use of the ADI-R as a diagnostic tool in the differential diagnosis of children with infantile autism and children with a receptive language disorder. *European Child & Adolescent Psychiatry, 10*, 248-255.
- Mirenda, P. (2003). Test review of the Asperger Syndrome Diagnostic Scale. From B. S. Plake, J. C. Impara, & R. A. Spies (Eds.), *The fifteenth mental measurements yearbook* [Electronic version]. Retrieved December 23, 2003, from the Buros Institute's *Test Reviews Online* website: <http://www.unl.edu/buros>
- Morgan, S. (1988). Diagnostic assessment of autism: A review of objective scales. *Journal of Psychoeducational Assessment, 6*, 139-151.
- Mullen, E. M. (1995). *Mullen Scales of Early Learning, AGS Edition*. Circle Pines, MN: American Guidance Service.

- Myles, B. S., Bock, S. J., & Simpson, R. L. (2001). *Asperger Syndrome Diagnostic Scale (ASDS)*. Austin, TX: Pro-Ed.
- National Research Council. (2001). *Educating children with autism*. Washington, DC: National Academy Press.
- Neuwirth, S., & Segal, J. (1997). *Autism*. Bethesda, MD: National Institute of Mental Health.
- Newschaffer, C. J., Fallin, D., & Lee, N. L. (2002). Heritable and nonheritable risk factors for autism spectrum disorders. *Epidemiologic Reviews*, *24*, 137-153.
- Noterdaeme, M., Mildenberger, K., Sitter, S., & Amorosa, H. (2002). Parent information and direct observation in the diagnosis of pervasive and specific developmental disorders. *Autism*, *6*, 159-168.
- Ozonoff, S. (2003, August 7). *Early identification of autism*. M.I.N.D. Summer Institute on Neurodevelopmental Disorders, Sacramento, CA.
- Ozonoff, S., & Rogers, S. (2003). From Kanner to the millennium. In S. Ozonoff, S. J. Rogers, & R. L. Hendren (Eds.), *Autism spectrum disorders: A research review for practitioners* (pp. 3-33). Washington, DC: American Psychiatric Press.
- Department of Education. (2000). List of correspondence. *Federal Register*, *65*(53), 14547.
- Prizant, B. M. (1992). Test review of the Childhood Autism Rating Scale. From J. J. Kramer & J. C. Conoley (Eds.), *The eleventh mental measurements yearbook* [Electronic version]. Retrieved December 23, 2003, from the Buros Institute's *Test Reviews Online* website: <http://www.unl.edu/buros>
- Reynolds, C. R., & Kamphaus, R. W. (1998). *BASC: Behavior Assessment System for Children*. Circle Pines, MN: American Guidance Services.
- Reynolds, C. R., & Richmond, B. O. (1998). *Children's Manifest Anxiety Scale*. Los Angeles, CA: Western Psychological Services.
- Ritvo, E., Freeman, B. J., Pingree, C., Mason-Brothers, A., Jorde, L., Jenson, W. R., McMahon, W. M., Peterson, P. B., Mo, A., & Ritvo, A. (1989). The UCLA-University of Utah epidemiologic survey of autism: Prevalence. *American Journal of Psychiatry*, *146*, 194-199.
- Robins, D., Fein, D., Barton, M., & Green, J. (2001). The Modified Checklist for Autism in Toddlers: An initial study investigating the early detection of autism and pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, *31*, 131-144.
- Roid, G. H., & Miller, L. J. (1997). *Leiter International Performance Scale – Revised*. Wood Dale, IL: Stoelting.
- Roid, G. H. (2003). *Stanford-Binet Intelligence Scales* (5th ed.). Chicago, IL: Riverside.
- Rogers, S. J. (1998). Empirically supported comprehensive treatments for young children with autism. *Journal of Clinical Child Psychology*, *27*, 167-178.
- Rogers, S. J. (2001). Diagnosis of autism before the age of 3. In L. M. Glidden (Ed.), *International review of research in mental retardation* (Vol. 23, pp. 1-31). San Diego, CA: Academic Press.
- Rutter, M., Bailey, A., & Lord, C. (2003). *Social Communication Questionnaire*. Los Angeles, CA: Western Psychological Services.
- Rutter, M., Le Couteur, A., & Lord, C. (2003). *Autism Diagnostic Interview-Revised: WPS edition*. Los Angeles, CA: Western Psychological Services.
- Sattler, J. M. (1988). *Assessment of children* (3rd ed.). San Diego, CA: Sattler Publishing.

- Scambler, D., Rogers, S. J., & Wehner, E. A. (2001). Can the Checklist for Autism in Toddlers differentiate young children with autism from those with developmental delays? *Journal of the American Academy of Child & Adolescent Psychiatry*, 40, 1457-1463.
- Scott, F. J., Baron-Cohen, S., Bolton, P., Brayne, C. (2002). The CAST (Childhood Asperger Syndrome Test): Preliminary development of a UK screen for mainstream primary-school-age children, *Autism*, 6, 9-31.
- Schopler, E., Reichler, R., & Renner, B. (1988). *The Childhood Autism Rating Scale (CARS)*. Los Angeles, CA: Western Psychological Services.
- Schopler, E., Reichler, R. J., Bashford, A., Lansing, M. D., & Marcus, L. M. (1990). *Individualized assessment and treatment for autistic and developmentally disabled children: Vol. 1 Psychoeducational Profile – Revised (PEP-R)*. Austin, TX: Pro Ed.
- Schopler, E., Reichler, R., & Lansing, M. (1980). *Individualized assessment and treatment for autistic and developmentally disabled children: Vol. 2. Teaching strategies for parents and professionals*. Austin, TX: Pro Ed.
- Shriver, M. D., Allen, K. D., & Mathews, J. R. (1999). Effective assessment of the shared and unique characteristics of children with autism. *School Psychology Review*, 28, 538-558.
- Siegel, B. (2001). *Pervasive Developmental Disorder Screening Test II*. (Available from Bryna Siegel, Pervasive Developmental Disorders Clinic and Laboratory, Langley Porter Psychiatric Institute, Box CAS, University of California, San Francisco, San Francisco, CA 94143-0984).
- Siegel, D. J., Minshew, N. J., & Goldstein, G. (1996). Wechsler IQ profiles in diagnosis of high-functioning autism. *Journal of Autism and Developmental Disorders*, 26, 389-406.
- South, M., William, B. J., McMahon, W. M., Owley, T., Filipek, P. A., Shernoff, E., Corsello, C., Lainhart, J. E., Landa, R., & Ozonoff, S. (2002). Utility of the Gilliam Autism Rating Scale in research and clinical populations. *Journal of Autism and Developmental Disorders*, 32, 593-599.
- Sparrow, S. S., Balla, D., & Cicchetti, D., (1984). *Vineland Adaptive Behavior Scales*. Circle Pines, MN: American Guidance Service.
- Spears, R., Tollefson, N., & Simpson, R. (2001). Usefulness of different types of assessment data in diagnosing and planning for a student with high-functioning autism. *Behavioral Disorders*, 26, 227-242.
- Stutsman, R. (1931). Guide for administering the Merrill-Palmer scale of mental tests. In L.M. Terman (Ed.), *Mental measurement of preschool children* (pp. 139-262). New York: Harcourt, Brace and World.
- Szatmari, P. (2004). *A proposal to base the classification of autism spectrum disorder on family genetic findings*. 2004 Distinguished Lecturer Series, M.I.N.D. Institute, University of California, Davis, Sacramento, CA.
- Tharp, B. R. (2003). Contributions of neurology. In S. Ozonoff, S. J. Rogers, & R. L. Hendren (Eds.), *Autism spectrum disorders: A research review for practitioners* (pp. 111-129). Washington, DC: American Psychiatric Press.
- Volkmar, F. R., & Cohen, D. J. (1986). Current concepts: Infantile autism and the pervasive developmental disorders. *Journal of Developmental and Behavioral Pediatrics*, 7, 324-329.
- Wechsler D., (2002). *Wechsler Preschool and Primary Scale of Intelligence, Third Edition*. San Antonio, TX: Psychological Corporation.

- Wechsler, D. (1991). *Wechsler Intelligence Scale for Children, 3rd Edition*. San Antonio, TX, Psychological Corporation.
- Wechsler, D. (1992). *Wechsler Individual Achievement Test*. San Antonio, TX: Psychological Corporation.
- Wechsler, D. (1997). *Wechsler Adult Intelligence Scale, 3rd Edition*. San Antonio, TX: Psychological Corporation.
- Wechsler, D. (1999). *Wechsler Abbreviated Scale of Intelligence*. San Antonio, TX: Psychological Corporation.
- Wechsler, D. (2003). *Wechsler Intelligence Scale for Children - Fourth Edition (WISC-IV)*. San Antonio, TX: Psychological Corporation.
- Welsh, J. S. (1992). Test review of the Childhood Autism Rating Scale. From J. J. Kramer & J. C. Conoley (Eds.), *The eleventh mental measurements yearbook* [Electronic version]. Retrieved December 23, 2003, from the Buros Institute's *Test Reviews Online* website: <http://www.unl.edu/buros>
- Wheelwright, S. (1995). Questions and answers about the CHAT. London: The National Autistic Society. Retrieved August 2, 2003, from www.nas.org.uk/profess/chat.html
- Wing, L. (1995). The relationship between Asperger's syndrome and Kanner's autism. In U. Firth (Ed.), *Autism and Asperger syndrome* (pp. 93-121). Cambridge, MA: Cambridge University Press.
- Woodcock, R. W., McGrew, K. S., & Mather, N. (2001). *Woodcock-Johnson III Tests of Achievement*. Chicago, IL: Riverside Publishing.
- Young, R., & Brewer, N. (2002). Diagnosis of autistic disorder: Problems and new directions. In L. M. Glidden (Ed.), *International review of research in mental retardation* (Vol. 25; pp. 107-134). Burlington MA: Academic Press.