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DSM-5 Diagnostic Criteria for Autism Spectrum Disorder With Implications for School Psychologists

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Changes to the diagnosis of autism spectrum disorder (ASD) within the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5; American Psychiatric Association, 2013) have important implications for school psychologists responsible for evaluating children with ASD, interpreting results to caregivers, and informing policy makers of needed revisions to eligibility criteria based on empirical understanding. The primary purpose of this review is to describe changes to the DSM-5 and the empirical evidence behind the modifications. A secondary goal is to describe implications for best practices in school evaluations for ASD. Given the concerns about the DSM-5 expressed by caregivers and individuals with ASD during the revision process, school psychologists who are aware of the rationale for and implications of the changes will be better positioned to assist local policy makers regarding diagnostic evaluations for ASD and address parental concerns regarding the evaluation process and service implications for their child.

Keywords: Autism, assessment, clinical diagnosis, practice issues, DSM-5

OVERVIEW OF NEW DIAGNOSTIC CRITERIA FOR AUTISM SPECTRUM DISORDER

The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5; American Psychiatric Association [APA], 2013) went into effect May 2013, and with it came significant revisions to the diagnosis of autism spectrum disorder (ASD). These revisions have important implications for school psychologists responsible for evaluating children with ASD, interpreting results to caregivers, and informing policy makers of needed revisions to eligibility criteria based on empirical understanding. Changes to the DSM-5 resulted from decades of research, and future research will be influenced by how ASD is now defined within the DSM-5.

Although the process of decision making for ASD in educational settings is distinct from that of a clinical diagnosis, the DSM informs how ASD is assessed within public education systems. A large number of children with ASD are identified for the first time through school evaluations (Wiggins, Baio, & Rice, 2006). Many children with ASD receive services beyond the school day (e.g., private therapies, county support services), and coverage for these services can require a medical diagnosis, leading parents to seek additional evaluations in the community. School evaluations that closely reflect the DSM-5 may reduce duplication of assessments, which would help families access community services more readily, as well as direct limited financial resources to treatment services.
Because many clinical evaluations include careful reviews of past assessments, school evaluations can significantly influence diagnostic decisions and provide critical information regarding a child’s behavior in natural social settings that is unavailable in clinical settings. Medical professionals, for example, are allotted less time for observation and direct assessment than is achievable in schools and, thus, can miss important nuances in a child’s social behavior.

The primary purpose of this paper is to describe changes to the DSM-5 and the empirical evidence behind the modifications. A secondary goal is to describe implications of these changes for best practices in school evaluations for ASD. Given the concerns about the DSM-5 that have been expressed by professionals, caregivers, and individuals with ASD, school psychologists who are aware of the rationale for and implications of the changes will be better positioned to assist local policy makers regarding diagnostic evaluations for ASD and address parental concerns regarding the evaluation process and service implications for their child.

From a Categorical to a Dimensional Approach

One of the more significant changes to the DSM-5 was the combining of the separate, categorical diagnoses of autistic disorder, Asperger’s disorder, and pervasive developmental disorder, not otherwise specified (PDD-NOS) into one diagnosis: autism spectrum disorder (ASD). While controversial, this change does not represent a stark departure from current practice. In 1991, Happé and Frith (1991) proposed the term “autism spectrum disorders” based on concerns that the umbrella category of pervasive developmental disorder (PDD) lacked clearly specified deficits, and trying to fit individuals into one of three categories was often arbitrary, obscuring understanding of the heterogeneity of ASD. Most research to identify distinctive features of Asperger’s, autism, and PDD-NOS failed to find any reliable differences across PDD subtypes once IQ or language were controlled. Distinctions among subtypes were inconsistent over time and variable across clinicians (e.g., Frith, 2004; Howlin, 2003; Lord et al., 2011; Macintosh & Dissanayake, 2004; Ozonoff, South, & Miller, 2000; Prior et al., 1998; Snow & Lecavalier, 2011). Furthermore, subtypes had poor predictive validity of child outcomes (Miller & Ozonoff, 2000; Szatmari et al., 2009; Szatmari, Bryson, Boyle, Steiner, & Duku, 2003) and thus were uninformative for treatment planning. Indeed, while the term was not adopted in the DSM-IV or ICD-10, “autism spectrum disorders” became commonly used (Williams et al., 2008).

The DSM-5 represents a move toward dimensionalization of disorders (e.g., Kraemer, 2007; Regier, 2007). The categorical approach, represented by earlier versions of the DSM, involves determining whether a disorder is present or not. While categorization is necessary to some extent in establishing a boundary between a disorder and normal variation in development, the development and course of childhood disorders are complex (Hudziak, Achenbach, Althoff, & Pine, 2007). Disorders that arise in childhood affect and are affected by development; what is considered normal and abnormal can change with age and must be taken into account within the diagnostic process. Diagnosis of childhood disorders also relies on information from multiple informants, such as parents, teachers, and the child. When information across sources does not fully align, it can be difficult to decide how to weigh the conflicting information to arrive at a diagnostic decision (Hudziak et al., 2007).

Dimensional approaches, in contrast, quantify the degree to which a child manifests particular kinds of problems in relation to variables known to influence development and behavior, such as age and gender. The DSM-5 does not substitute categorical diagnoses with dimensional; rather, diagnoses (i.e., categories) contain dimensional information to further specify and describe the disorder (Kraemer, 2007). The text of DSM-5 offers more detail on the topography of core symptoms of ASD at different ages; characteristics are described for toddlers, school-aged children, and adults. Social communication criteria provide examples of how symptoms may manifest in mildly affected individuals without language or cognitive deficits and in individuals with impairments in these areas. Examples relevant for different ages also are provided. For example, a possible symptom within the social relationships criterion is an apparent lack of interest in peers. This would be a relevant characteristic in toddlers for whom establishing and maintaining friendships are not yet developmentally expected.

Three Domains Become Two

The DSM-5 represents ASD symptoms across two domains (social communication deficits and restricted, repetitive behaviors), whereas the DSM-IV presented a triad of symptoms, which separated social and communication symptoms. While DSM-IV social interaction and communication domains were collapsed and reorganized in DSM-5, individual symptoms are largely retained. The DSM-5 version identifies a smaller number of more general principles in social communication that are expected to be present in all individuals with ASD regardless of age or developmental level, but that can be manifested in many different ways (Mahjouri & Lord, 2012). Social communication symptoms have been reconfigured as a dimensional continuum of behaviors representing social-emotional reciprocity, coordination of verbal and nonverbal communication, and establishing, maintaining, and understanding social relationships.

A large body of research supports that ASD symptoms are best represented by a two-domain model (Constantino et al., 2004; Frazier et al., 2012; Gotham, Risi, Pickles, & Lord, 2007; Norris, Lecavalier, & Edwards, 2012). Constantino
et al.’s (2004) landmark factor analytic study revealed that symptoms representing the DSM-IV clusters, Social Interaction and Communication, were best represented by a single “social communication” factor. Furthermore, stereotyped speech loaded on the repetitive behaviors factor rather than social communication. Studies using the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2000) also showed symptoms were better represented by a two-factor solution of Social Affect and Restricted/Repetitive Behaviors versus a three-factor solution (Gotham et al., 2007). In the second edition of the ADOS (ADOS-2; Lord, Luyster, Gotham, & Guthrie, 2012a, 2012b), algorithms now reflect the two symptom clusters of the DSM-5.

Reorganization of Symptom Criteria

The DSM-5 includes modifications to the descriptions of social interaction and communication symptoms contained in the DSM-IV, and increases the number of criteria that must be met in the restricted, repetitive behavior domain. The DSM-IV autistic disorder criterion of a delay or complete lack of development in expressive language has been removed, because research has shown this feature is neither unique to nor universal in individuals with ASD (Hartley & Sikora, 2009; Matson & Neal, 2010). The DSM-IV criterion of limitation in or lack of development of imaginative play has been narrowed to deficits in sharing imaginative play with others. Further, unlike the DSM-IV, the DSM-5 requires that all social communication criteria are met, either currently or by history, for a diagnosis of ASD. These changes were made to improve diagnostic specificity.

Restricted, repetitive behaviors now are organized across symptoms of repetitive actions, fixated interests in narrow or unusual areas, insistence on sameness, and unusual responses to sensory stimuli. The rationale for this organization also comes from factor analytic studies, which lend support to separate symptom clusters of the DSM-5.

Restriction of Symptom Criteria

In the DSM-5, two restricted, repetitive domain criteria must be met, either currently or by history. Support for requiring multiple restricted, repetitive behaviors comes from research showing these behaviors to be prevalent in ASD, even in young children (Bishop et al., 2006; Ozonoff, Heung, Byrd, Hansen, & Hertz-Picciotto, 2008; Richler et al., 2007). Furthermore, in a large-scale longitudinal study that included a group of children with developmental delays, the presence of multiple repetitive behaviors was predictive of ASD, but the presence of any one repetitive behavior was not (Richler et al., 2007).

While there is a good foundation of research to support two symptom domains and the organization of restricted, repetitive behavior criteria, there is less research to support the division of behaviors across social communication criteria. Research has not yet identified consistent subdivisions of social communication symptoms in this way. There are early indicators that the assignment of symptoms to DSM-5 criteria may not be straightforward. Two separate groups of researchers (Barton, Robins, Jashar, Brennan, & Fein, 2013; Huerta, Bishop, Duncan, Hus, & Lord, 2012) recently attempted to assign symptoms on the Autism Diagnostic Interview-Revised (ADI-R; Rutter, LeCouteur, & Lord, 2003) and ADOS to their corresponding DSM-5 criteria. The two groups disagreed on criterion assignment for almost a third of the 54 ADI-R/ADOS symptoms. For example, making an awkward overture could be considered an “abnormal social approach” or “difficulty adjusting behavior to suit different social contexts” depending on the form and content of the overture (Barton et al., 2013).

Age of Onset and Functional Impairment

Finally, the DSM-IV required presence of symptoms before age 3 years. Recognizing that some children may not show clear symptoms until social expectations exceed their capacities, the DSM-5 requires that symptoms must be present early in life but no longer uses age 3 as a benchmark. The symptoms of ASD also must result in impairment in social, occupational, and/or other important areas of functioning, with the caveat that individuals may be able to reduce or mask some symptoms through intervention, compensation, or environmental supports. Although specific symptom criteria can be documented by history, ASD symptoms should remain sufficient to cause current impairment (APA, 2013). Table 1 compares symptom criteria across
<table>
<thead>
<tr>
<th>DSM-5 Autism Spectrum Disorder</th>
<th>DSM-IV Autistic Disorder</th>
<th>ICD-10 Childhood Autism</th>
<th>IDEA Autism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Communication</strong></td>
<td><strong>Social Interaction</strong></td>
<td><strong>Social Interaction</strong></td>
<td><strong>Social Interaction</strong></td>
</tr>
<tr>
<td>1. Deficits in social-emotional reciprocity; ranging from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.</td>
<td>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</td>
<td>1. Failure adequately to use eye-to-eye gaze, facial expression, body posture and gesture to regulate social interaction</td>
<td>A developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects a child’s educational performance…</td>
</tr>
<tr>
<td>2. Deficits in nonverbal communicative behaviors used for social interaction; ranging from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body-language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.</td>
<td>2. Failure to develop peer relationships appropriate to developmental level</td>
<td>2. Failure to develop (in a manner appropriate to mental age, and despite ample opportunities) peer relationships that involve a mutual sharing of interests, activities, and emotions</td>
<td></td>
</tr>
<tr>
<td>3. Deficits in developing, maintaining, and understanding relationships, ranging from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.</td>
<td>3. Lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people)</td>
<td>3. A lack of socio-emotional reciprocity as shown by an impaired or deviant response to other people’s emotions; or lack of modulation of behavior according to social context, or a weak integration of social, emotional and communicative behaviors</td>
<td></td>
</tr>
<tr>
<td>4. Lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level</td>
<td>4. Lack of social or emotional reciprocity Communication</td>
<td>1. Delay in, or total lack of development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)</td>
<td>1. Delay in, or total lack of development of spoken language that is not accompanied by an attempt to compensate through the use of gesture or mime as alternative modes of communication (often preceded by a lack of communicative babbling).</td>
</tr>
<tr>
<td>2. In individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others</td>
<td>2. Relative failure to initiate or sustain conversational interchange (at whatever level of language skills are present) in which there is reciprocal to-and-from responsiveness to the communications of the other person</td>
<td>2. Relative failure to initiate or sustain conversational interchange (at whatever level of language skills are present) in which there is reciprocation to-and-from responsiveness to the communications of the other person</td>
<td></td>
</tr>
<tr>
<td>3. Stereotyped and repetitious use of language or idiosyncratic language</td>
<td>3. Stereotyped and repetitious use of language or idiosyncratic use of words or phrases</td>
<td>3. Stereotyped and repetitious use of language or idiosyncratic use of words or phrases</td>
<td></td>
</tr>
</tbody>
</table>
**Restricted, Repetitive Behaviors**

1. Stereotyped or repetitive motor movements, use of objects, or speech.

2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior.

3. Highly restricted, fixated interests that are abnormal in intensity or focus.

4. Hyper-or hyporeactivity to sensory input or unusual interest in sensory aspects of environment.

Note. Bolded text represents similarities in social communication criteria, and underlined text represents similarities in restricted, repetitive behavior criteria across all classification systems.
DSM-IV, ICD-10, and DSM-5, as well as the Individuals with Disabilities Education Act (IDEA, 2004) autism criteria.

Specifiers and Severity
Following a dimensional approach, descriptions of criteria and specifiers have been added to provide better guidance on the manifestation of symptoms by age, gender, and in the context of co-occurring disorders (e.g., intellectual disability). To provide more meaningful detail, including description of variables known to be associated with daily functioning and predictive of outcome, diagnosticians should now provide specifiers and severity ratings. Specifiers indicate whether the individual has ASD “with or without accompanying intellectual impairment” and “with or without accompanying language impairment” and the level of impairment, if present (e.g., single words, no intelligible accompanying language impairment” and the level of accompanying intellectual impairment” and “with or without intellectual impairment.” Specifiers and Severity

Severity is rated separately for social communication and restricted, repetitive behavior domains. Because a diagnosis requires that symptoms impair functioning, even the lowest level of severity indicates the presence of noticeable impairments or interference with functioning. Three levels of severity are available: Level 1, Requiring support; Level 2, Requiring substantial support; and Level 3, Requiring very substantial support. Each level provides descriptions of the extent to which social communication and repetitive behavior deficits affect an individual’s functioning. The DSM-5 severity ratings are designed to provide information on the extent to which ASD impacts daily functioning. The DSM-5 attempts to provide objective information for clinicians to use in choosing a rating. For example, a Level 2 repetitive behavior should appear frequently enough to be noticed by the “casual observer” (APA, 2013, p. 52). Although severity ratings are based on current behavior, the DSM-5 recognizes that a child’s level of impairment may be fluid over time or vary by context.

A New Diagnosis: Social Communication Disorder
As part of the reclassification of PDDs, a new diagnosis was created: social (pragmatic) communication disorder (SCD). SCD is considered a language disorder, separate from ASD and speech-language impairment, with deficits primarily in social or pragmatic aspects of language. Pragmatic language refers to deficits in integrating nonverbal cues to interpret spoken language, understanding conversational language, and understanding indirect language (Rapin & Allen, 1983). This diagnosis may fit children with social communication deficits who do not have a clear history of restricted, repetitive behaviors.

Criticisms of DSM-5
Much public concern has accompanied the release of the revised ASD criteria (Carey, 2012). Early studies of DSM-5 criteria suggested an alarming decrease in numbers of individuals qualifying for an ASD diagnosis, especially for those diagnosed with PDD-NOS. Most notably, McPartland, Reichow, and Volkmar (2012) found that, in their sample, only 25% of children with Asperger Syndrome and 28% of children with PDD-NOS met the DSM-5 criteria for ASD. Other studies also found that only a minority of children with PDD-NOS would qualify for ASD (Barton et al., 2013; Gibbs, Aldridge, Chandler, Witzlsperger, & Smith, 2012; Mayes, Black, & Tierney, 2013; Taheri & Perry, 2012). Arguments were made that relaxing the required number of social communication criteria to be met from three to two would improve sensitivity (Matson, Hattier, & Williams, 2012), but others found that this compromised specificity (Frazier et al., 2012; Huerta et al., 2012; Taheri & Perry, 2012). Many of these studies were performed using early drafts of the criteria that were more restrictive; for example, initial drafts required all social communication to be met based on current behavior. More recent, large-scale studies did not find such significant decreases in diagnoses (Frazier et al., 2012; Huerta et al., 2012; Kent et al., 2013; Maenner et al., 2014; Mazefsky, McPartland, Gastgeb, & Minshew, 2013). In one study using a large, multisite data set (Huerta et al., 2012), over 90% of those diagnosed with DSM-IV PDDs retained an ASD diagnosis using DSM-5 criteria. Another population-based study looked at the medical and educational records of 6,577 children who met criteria for a DSM-IV PDD diagnosis and found that 80% retained a diagnosis of ASD under DSM-5. Of those who lost their diagnosis, the most common reason for the change was a lack of deficits in nonverbal communication used for social interaction (Maenner et al., 2014).

These later studies also pointed to improvements in diagnostic accuracy. Huerta et al. (2012) found that DSM-5 criteria resulted in fewer false positives than DSM-IV, though false positives were still higher than desired. Kent and colleagues (2013) developed an algorithm of DSM-5 symptoms based on the Diagnostic Interview for Social and Communication Disorders (DISCO) that resulted in an equitable balance of high sensitivity and specificity.

A limitation of all of these studies is that analyses were retrospective, using data collected under the DSM-IV, and clinicians may not have attended to or documented symptoms meeting DSM-5 criteria because they were not considered relevant at the time (Maenner et al., 2014). While these reviews were informative, researchers agreed the full consequences of the revised criteria would not be revealed until the DSM-5 was in place for a period of time (King, Veenstra-Vanderweele, & Lord, 2013).

A popular concern voiced within the Asperger community was that the dimensional ASD category would lose clinically meaningful distinctions that helped to convey the types of interventions that may be warranted (Grant & Nozyce, 2013). However, others argued that the defining
elements of Asperger syndrome are intact in the DSM-5 through the application of intellectual and language specifiers; people with DSM-IV labels of Asperger syndrome are now captured by the specifiers of ASD “without intellectual impairment” and “without language impairment” (Baron-Cohen, 2013).

Another concern regards SCD. SCD was intended to fill a diagnostic gap for children with needs similar to others with ASD, but who either never showed repetitive behaviors or for whom a thorough history that might have documented such behaviors was not performed (Mahjouri & Lord, 2012). Clinical researchers voiced strong concerns that SCD lacks validity and reliability (Mandy, Charman, & Skuse, 2012; Ozonoff, 2012; Tanguay, 2011), and a pragmatic language disorder distinct both from SLI and ASD does not have empirical support (Norbury, 2013; Tager-Flusberg, 2013). After reviewing research on children with non-ASD social communication deficits, Norbury concluded that the DSM-5 criteria for SCD do not appear to represent a coherent, persistent clinical condition. She argued that social communication and pragmatic language deficits are separate entities, with the latter being more closely tied to structural language development (i.e., expressive and receptive language); thus, the requirement that both deficits be present for a diagnosis of SCD may be impossible to attain. She further cautioned that culturally valid measures of social communication are lacking. Norbury concluded that social communication and pragmatic language impairments are best conceptualized as symptoms, rather than a diagnostic entity.

Other critics (Ritvo, 2012) worried that SCD would become plagued by the same problems that befell PDD-NOS in terms of being overapplied to children who do not fit well into another diagnostic category. Preliminary evidence supports this concern. Results of DSM-5 work group preliminary field testing showed a decrease in ASD cases compared to DSM-IV but a 14% net increase in overall diagnosed cases due to application of SCD (Swedo et al., 2012).

DSM-5 and ICD-11

The International Classification of Diseases (ICD) is the world’s standard tool for classifying and monitoring health conditions (World Health Organization [WHO], 1992). The criteria for pervasive developmental disabilities in the 10th edition of the ICD are largely consistent with those of the DSM-IV. Like the DSM-IV, ICD-10 contains separate categorical diagnoses of autistic disorder, Asperger’s syndrome, and pervasive developmental disorder, unspecified, and three symptom domains of social interaction, communication, and stereotyped/repetitive behaviors (WHO, 1992). A revision of the ICD is under way and expected to be released in 2015. At the time of this writing, it is unknown whether the ICD-11 will follow the DSM-5 in collapsing the separate categories into one dimensional diagnosis of ASD (Vivanti et al., 2013), or whether it will organize symptoms across two domains (social communication and restricted, repetitive behaviors) instead of three. Should the ICD-11 retain separate categorical diagnoses, there is concern that a lack of international consistency may complicate research efforts into the causes, developmental course, and best-practice interventions for ASD (Vivanti et al., 2013).

DSM-5 IMPLICATIONS FOR SPECIAL EDUCATION EVALUATIONS

The DSM-5’s emphasis on history and its increased requirement of at least two restricted and repetitive behaviors suggests that evaluations under DSM-5 will require greater attention to detail. With its 12 criteria across three domains, and because individuals were not required to meet all criteria within each domain, the DSM-IV allowed for 2,027 symptom combinations. The DSM-5 allows for only 11 combinations (McPartland et al., 2012). However, this comparison is somewhat misleading, as each new social communication criterion can be met in multiple ways, and can be met based on history or current behavior. One of the criticisms of research suggesting large numbers of children would lose their diagnosis under the DSM-5 was that the studies were based on file review of old diagnoses given under the DSM-IV. In other words, DSM-5 criteria were applied to existing records containing evaluation data describing DSM-IV symptoms. A possible implication is that DSM-IV methods, on which many of our evaluation tools are based, may not capture the full spectrum of behaviors included in the DSM-5. Thus, for departments of education that seek to maintain evidence-based diagnostic evaluations for children with ASD, changes in the diagnostic process will need to include careful and more thorough descriptions of ASD symptoms, developmental history, and current developmental level.

Focus on History

The DSM-5’s emphasis on symptom presence by history requires diagnosticians to focus on a child’s early development. Special education eligibility decisions are based on current concerns, but documenting a child’s early history has always been a key element in determining whether the ASD category is appropriate. This increases diagnostic accuracy and allows for differentiating ASD from other diagnoses with overlapping symptoms. For example, a child with ADHD and a child with ASD may both demonstrate socially inappropriate behavior and have few friendships at school age, but the child with ASD is more likely to have had an early history of lacking interest in peers. Moreover, children with a history of restricted/repetitive behaviors, but who are not currently showing noticeable symptoms in this area, are likely still most appropriately served under the ASD category due to social needs.
Specifiers Provide Structure for Eligibility and Service Decisions

Intellectual and language-level specifiers identify areas of need outside of core ASD symptoms that are relevant to educational planning. Assessing a child’s intellectual and language skills is critical to determining eligibility for ASD, as deficits in social skills must be evaluated in relation to a child’s overall level of development. Recent estimates indicate that about 38% of children with ASD will experience impaired intellectual skills (Centers for Disease Control and Prevention [CDC], 2012), and 63% will have a language disorder (Levy et al., 2010). Thus, evaluations that address intellectual and language impairment specifiers will provide important information for school psychologists and IEP teams to consider a child’s characteristics and make recommendations for level of support and services, including informing decisions about least restrictive environment.

Similarly, severity ratings in the DSM-5 may provide a useful structure for summarizing information from observation and interview measures in evaluation reports, to lead to service and support decisions. For example, social communication severity ratings describe a child’s ability to interact with general education peers and teachers without supports. A child with mild social communication severity may do well with coaching and instruction given within inclusive settings, while a child with severe social communication deficits may need a service plan that includes assistive/augmentative communication. Restricted/repetitive behavior severity ratings can inform intervention planning by considering when behaviors are disruptive to others and/or interfering with a child’s learning opportunities. If a repetitive behavior is judged to be mild, educators may be able to use it adaptively as a motivator (e.g., a child with a strong interest in marine animals could be motivated to work on writing tasks involving that topic). A child with severe restricted/repetitive behaviors may be prone to aggressive outbursts when his or her repetitive behaviors are disrupted, and this may signal the need to develop a Behavior Intervention Plan as part of the IEP process.

ADJUSTING SCHOOL EVALUATIONS FOR THE DSM-5

Address Early History

Best practice in ASD evaluation involves a multidisciplinary team gathering information across multiple sources, including at minimum a detailed parent interview, structured observation of behaviors related to ASD, and direct assessment of developmental skills (cognitive, language, adaptive). It is beyond the scope of this paper to describe in detail the elements of an evidence-based diagnostic evaluation. Several articles are recommended that address best practices in assessment (Hammond, Campbell, & Ruble, 2013; Ozonoff, Goodlin-Jones, & Solomon, 2005). Instead, a brief review is provided for those aspects most impacted by the DSM-5.

School evaluations for ASD should now include a parent interview that covers early history as well as current behavior. Semistructured, examiner-led interviews are the preferred method for gathering developmental history (Corsello et al., 2007). For many children with ASD, social communication deficits emerge late in the first year of life (Ozonoff et al., 2010; Wetherby et al., 2004; Zwaigenbaum et al., 2005), although they develop and change with maturation and intervention (Dawson, 2008). Developmental history interviews should focus on the unfolding of social communication and behavior over time. Patterns of early communication development also should be assessed, including when the child began talking, the purposes for which the child used communication, and the content of the communication, as these factors are important for distinguishing ASD from other disabilities. Between 25% and 30% of parents of children with ASD report a regression in language and/or other areas of development (e.g., Goldberg et al., 2003), and observational studies of early ASD have found higher rates of regression (Ozonoff et al., 2010). Regression in the first years of life represents strong evidence for ASD, as skill loss does not typically occur within other disorders (Pickles et al., 2009).

Comprehensive Coverage of Symptoms

The most accurate and reliable diagnostic decisions are made by experienced clinicians using well-validated, standardized measures (Lord et al., 2011). School-based examiners should review existing diagnostic measures to ensure that they will cover a wide range of behaviors reflecting the core symptoms of ASD. Now that symptoms in all social communication and two repetitive behavior domains must be documented, it is advisable to select measures containing multiple items per criterion due to the inherent heterogeneity of ASD.

Important variables for reliability and validity of diagnostic measures are sensitivity and specificity. Sensitivity indicates the ability of a measure to accurately identify children who truly have the diagnosis (i.e., true positives). Specificity indicates the measure’s ability to correctly exclude children who do not have the diagnosis of interest (i.e., true negatives). Diagnostic measures for ASD and their psychometric properties are presented in Table 2.

Multiple sources of information

Thorough coverage of behavioral characteristics for ASD is best achieved through combining information across multiple measures (Risi et al., 2006). Whereas a diagnostic or developmental history interview obtains comprehensive information about a child’s past and current behavior, a
<table>
<thead>
<tr>
<th>Measure</th>
<th>Intended students</th>
<th>Administration</th>
<th>Social Communication Symptoms</th>
<th>Restricted, Repetitive Behavior Symptoms</th>
<th>Sensitivity/Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADI-R</td>
<td>2 years-adult; any verbal level; cognitive abilities &gt; = moderate ID</td>
<td>Examiner-parent/caregiver interview (90–180 min) Coverage of past and current symptoms</td>
<td>Social/Emotional reciprocity Nonverbal communication Relationships</td>
<td>Repetitive behaviors Rituals/routines Fixated interests Hyper/hypo-sensitivity</td>
<td>ASD v. NS, age 3 : Se = .89, Sp = .59 ¹; ASD v. NS, under age 3: Se = .83, Sp = .72 ¹</td>
</tr>
<tr>
<td>ADOS-2</td>
<td>12 months-adult; any verbal level; nma &gt; = 12 months</td>
<td>Examiner-child interactive observation (30–60 min) Coverage of current symptoms only</td>
<td>Social/Emotional reciprocity Nonverbal communication Relationships (Modules 3 &amp; 4)</td>
<td>Repetitive behaviors Rituals/routines Fixated interests</td>
<td>AUT v. NS: Se = .91–.98, Sp = .84–.94 ²; Se = .82–.94, Sp = .80–.10 ³; Se = .87–.92, Sp = .71–.76 ⁴ Non-Autism ASD v. NS: Se = .72–.84, Sp = .76–.83 ⁵; Se = .60–.95, Sp = .75–1.0 ⁶; Se = .53–.86, Sp = .62–.63 ⁷ Toddler ADOS-2, ASD v. NS: Se = .88–.91, Sp = .91 ⁸ Se = .95, Sp = .83 ⁹</td>
</tr>
<tr>
<td>CARS-2</td>
<td>Standard version: 2–6 years or 2+ years with impaired communication and/or cognitive abilities</td>
<td>Examiner-completed rating form; Parent questionnaires (unscored) to inform examiner ratings (5–10 min) Current symptoms only</td>
<td>Nonverbal communication Relationships</td>
<td>Repetitive behaviors Rituals/routines Hyper/hypo-sensitivity</td>
<td>None reported</td>
</tr>
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<td></td>
<td>High-functioning version: 6+ years who are verbally fluent and IQ &gt; 80</td>
<td>Structured parent interview form (unscored) for information about development during early childhood; Current symptoms only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GARS/ GARS-2</td>
<td>3–22 years, any verbal or cognitive level</td>
<td>Parent/caregiver or teacher questionnaire (5–10 min); Coverage of past and current symptoms Structured parent interview form (unscored) for information about development during early childhood; Current symptoms only</td>
<td>Social/Emotional reciprocity Nonverbal communication Relationships</td>
<td>Repetitive behaviors Rituals/routines Hyper/hypo-sensitivity</td>
<td>ASD v. NS: Se = .83, Sp = .68 ⁷; Se = .53, Sp = .54 ⁸ ASD only: Se = .38 ⁹</td>
</tr>
<tr>
<td>M-CHAT</td>
<td>16–30 months, any verbal or cognitive level</td>
<td>Parent/caregiver checklist Follow-up interview is recommended for children who fail Current symptoms only</td>
<td>Social/Emotional reciprocity Nonverbal communication Relationships</td>
<td>Repetitive behaviors Hyper/hypo-sensitivity</td>
<td>ASD v. NS, with follow-up interview: Se = .97, Sp = .99 ¹⁰ ASD v. NS, checklist alone: Failing 2 critical items: Se = .70, Sp = .38 ¹¹ Se = .77, Sp = .43 ¹² Failing any 3 items: Se = .92, Sp = .27 ¹² Se = .88, Sp = .38 ¹¹ Failing either cutoff: Se = .60, Sp = .50 ¹³</td>
</tr>
</tbody>
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(continued)
<table>
<thead>
<tr>
<th>Measure</th>
<th>Intended students</th>
<th>Administration</th>
<th>Social Communication Symptoms</th>
<th>Restricted, Repetitive Behavior Symptoms</th>
<th>Sensitivity/Specificity</th>
</tr>
</thead>
</table>
| SCQ     | 4+ years; nvma ≥ 2 years | Parent/caregiver questionnaire (10 min) | Social/emotional reciprocity | Repetitive behaviors | ASD v. NS: Se = .85, Sp = .75<sup>14</sup>  
|         |                  | Lifetime Version: Coverage of past and current symptoms | Nonverbal communication Relationships |                      | Se = .88, Sp = .72<sup>15</sup>  
|         |                  | Current Version Current symptoms only | Rituals/routines |                      | Se = .86, Sp = .78<sup>16</sup>  
|         |                  |                                  | Fixated interests |                      | Se = .71, Sp = .71<sup>17</sup>  
|         |                  |                                  | Hyper/hypo-sensitivity |                      | Se = .74, Sp = .54<sup>12</sup>  
|         |                  |                                  |                  |                      | Se = .92, Sp = .62<sup>18</sup>  
| SRS-2   | 4–18 years, any verbal or cognitive level | Parent/caregiver or teacher questionnaire (15–20 min) | Social/emotional reciprocity | Repetitive behaviors | ASD v. NS:  
|         |                  |                                  | Nonverbal communication Relationships |                      | Se = .78, Sp = .67<sup>16</sup>  
|         |                  |                                  | Rituals/routines |                      | Se = .75, Sp = .96<sup>19</sup>  
|         |                  |                                  | Fixated interests |                      | Se = .92, Sp = .08 (parent ratings)<sup>20</sup>  
|         |                  |                                  | Hyper/hypo-sensitivity |                      | Se = .84, Sp = .41 (teacher ratings)<sup>20</sup>  
|         |                  |                                  |                  |                      | Se = .76, Sp = .82<sup>21</sup>  

Note. Se = sensitivity; Sp = specificity; ID = intellectual disability; NS = nonspectrum; AUT = autistic disorder; nvma = nonverbal mental age; CARS-2 = Childhood Autism Rating Scale, 2nd edition; GARS/GARS-2 = Gilliam Autism Rating Scale; M-CHAT = Modified Checklist for Autism in Toddlers; SCQ = Social Communication Questionnaire; SRS-2 = Social Responsiveness Scale, 2nd Edition.  
1 Adapted from Risi et al. (2006).  
2 Adapted from Gotham, Risi, Pickles, & Lord (2007).  
3 Adapted from Gotham et al. (2008).  
4 Adapted from de Bildt et al. (2009).  
5 Adapted from Luyster et al. (2009).  
6 Adapted from Guthrie, Swineford, Notke, & Wetherby (2013).  
7 Adapted from Eaves, Woods-Groves, Williams, & Fall (2006).  
9 Adapted from Lecavalier (2005).  
10 Adapted from Robins, Fein, Barton, & Green (2001).  
11 Adapted from Snow & Lecavalier (2008).  
12 Adapted from Eaves, Wingert, & Ho (2006).  
13 Adapted from Matson, Kozlowski, Fitzgerald, & Sipes (2013).  
14 Adapted from Berument, Rutter, Lord, Pickles, & Bailey (1999).  
15 Adapted from Chandler et al. (2007).  
16 Adapted from Cholemkery, Kitzerow, Rohrmann, & Freitag (2013).  
17 Adapted from Corsello et al. (2007).  
18 Adapted from Witwer & Lecavalier (2007).  
19 Adapted from Constantino et al. (2007).  
20 Adapted from Aldridge, Gibbs, Schmidhofer, & Williams (2012).  
21 Adapted from Cholemkery, Kitzerow, Rohrmann, & Freitag (2013).
structured observation provides a snapshot of a child’s current social communication and repetitive behaviors. The ADI-R and the ADOS/ADOS-2 are the most researched diagnostic measures and are considered the gold standard for evidence-based diagnosis of ASD (e.g., Gray, Tange, & Sweeney, 2008). The ADI-R is a semistructured parent/caregiver interview that covers behavior areas important to accurate ASD diagnosis, including early history (not leaving out whether a regression occurred), communication impairments in verbal and nonverbal areas, social impairments, restricted and repetitive behaviors, and general behaviors that may impact functioning (e.g., aggression, seizures). Each question asks about the child’s current and past behavior, with corresponding numeric ratings assigned based on whether the parents’ descriptions reflect behaviors consistent with ASD, behaviors that are slightly abnormal and/or suggestive of ASD, or that do not reflect abnormality of the type specified. The ADOS is a semistructured, standardized assessment of communication, social interaction, and play or imaginative use of materials for individuals who have been referred for possible ASD (Lord et al., 2000). The second edition of the ADOS (ADOS-2; Lord et al., 2012a, 2012b) consists of five modules, each of which has its own schedule of activities for use with individuals at a particular developmental and language level, ranging from no expressive or receptive language to verbally fluent adolescents and adults. Activities are designed to provide a context for judging social communication, play, and restricted, repetitive behaviors.

A recent study evaluated whether the ADI-R and ADOS would adequately document DSM-5 symptoms, using a research sample of individuals with ASD carefully characterized and diagnosed according to DSM-IV criteria (Mazefsky et al., 2013). Behaviors from both measures were mapped onto DSM-5 criteria. Using the ADOS alone, only 33% of individuals with ASD met DSM-5 criteria. The ADI-R alone captured 83%. The best agreement, 93%, came from using the ADI-R and the ADOS together. Two similar studies (Huerta et al., 2012; Barton et al., 2013) found that both measures contained items representing each social communication criterion. However, both studies showed that, for children who were not verbally fluent, the ADOS did not capture the restricted, repetitive behavior criterion involving routines/rituals.

The ADI-R and the ADOS are both available in multiple languages in multiple countries. However, they were developed and normed in the United States and United Kingdom (Lord et al., 2000; Lord et al., 2012a, 2012b; Rutter et al., 2003) and may not be available in some countries. While validation samples in the United States included representative numbers of African American children (Risi et al., 2006), children and families who were not proficient in English generally were excluded. These are limitations that must be considered when choosing appropriate evaluation measures.

A strength of school-based evaluations is that they can include observations of a child in his/her natural environment. Observations may be particularly helpful in adding information that may not be directly observable in standardized tools such as the ADOS, including relationships with peers and deficits in understanding and adjusting one’s behavior to a variety of social expectations. Regarding nonfunctional routines and rituals, using information reported by parents or teachers, observations can be targeted to times of day and situations in which these rituals are likely to occur to get a sense of the impact of these rituals on the child’s functioning.

**ASD checklists**

Multiple checklists and questionnaires for ASD are available for use in clinics and schools; however, their quality and utility vary. For school purposes, questionnaires with strong psychometric properties are best suited to screening to identify children who should be referred for a full evaluation. In practice, many schools substitute a checklist for a developmental history/diagnostic interview. This may not be adequate for reliable, valid identification of ASD, particularly for children with mild features who tend to be under-identified by these measures (Corsello et al., 2007). Conversely, checklists often over-identify children with high levels of general problem behaviors (Cholemkery, Kitzerow, Rohrmann, & Freitag, 2013; Hus, Bishop, Gotham, Huerta, & Lord, 2013). Furthermore, most checklists focus only on current behavior. A selection of ASD checklists and their psychometric properties is included in Table 2 to assist practitioners in selecting tools for educational evaluations. Some checklists may be adequate for students being reevaluated and for whom eligibility is not in question, whereas students being evaluated for the first time may require measures with a higher standard of psychometric quality. Diagnostic measures and checklists were included in this table if (a) studies of psychometric properties were available from sources other than the measure’s authors to provide independent validation, and (b) if measure results were compared against independent clinical evaluation or school classification.

**Functional Skills**

Assessment of functional skills informs Individualized Education Program (IEP) goals, selection of services, level of services and supports needed, and adaptations and accommodations. Skills that predict later outcomes for children with ASD are language level, cognitive skills, adaptive skills, problem behaviors, and motor coordination. In addition to specifiers of intellectual disability and language impairment, the DSM-5 emphasizes the influence of co-occurring disorders and associated features, including ADHD, anxiety, depression, epilepsy, sleep problems,
eating and gastrointestinal problems, adaptive skill deficits, motor deficits, and aggression or self-injury. Such co-occurring features should be covered in school evaluations as needed based on the child’s current concerns.

Severity Ratings

Determining severity of ASD is often challenging, as ASD symptoms are highly influenced by developmental impairment, especially in the area of language (Gotham et al., 2009). A child with no intelligible speech is inherently more impaired than a child who is verbally fluent, and ASD symptoms will manifest differently in a nonverbal child than in a highly verbal child of the same age. There also is evidence that children with greater intellectual impairment show more severe repetitive behaviors (e.g., Bishop et al., 2006). DSM-5 symptom criteria try to capture these differences; for example, in evaluating social reciprocity, a highly verbal child may make frequent but awkward initiations, while a nonverbal child may only rarely initiate. However, indicating level of severity can be useful in informing educational decisions on level of services and supports needed, as well as helping parents understand their child’s needs.

The increased detail in symptom criteria and severity ratings may provide guidance on conducting observations and parent/teacher interviews to capture this information in more objective ways. For example, school psychologists may want to include information on the frequency and intensity of repetitive behaviors and the extent to which these limit a child’s participation in the general education setting. Similarly, objective information on the frequency and number of contexts in which a child initiates communication and interaction, and the consistency with which he or she responds to others’ social approaches, can inform severity ratings.

The assessment process is stressful for families of children with ASD, and many parents are concerned about their child’s future level of functioning. With the elimination of the Asperger and PDD-NOS categories, parents will likely have even more questions about the severity of their child’s ASD (Weitlauf, Gotham, Vehorn, & Warren, 2013). Severity ratings are designed to provide further, objective information on the extent to which the child’s functioning is affected. However, concerns exist as to whether DSM-5 severity ratings are evidence-based and specified clearly enough to ensure consistent application across clinicians (Weitlauf et al., 2013). As with many aspects of testing, DSM-5 severity ratings should serve as a general guidepost, and more individualized data will be needed to determine specific supports and services.

CONCLUSION

As experts in psychological diagnosis and classification, school psychologists with detailed knowledge of the DSM-5 can provide advocacy and information to parents and policy makers. Parents and educators should be reassured that individual behaviors associated with ASD have not changed substantially from DSM-IV to DSM-5, and our current diagnostic measures remain relevant. As the DSM-5 is implemented, educational eligibility criteria in special education settings will need to be updated to reflect what has been learned over the past two decades, and school psychologists can play an integral role in that process.

Assessment is the first step in developing interventions to address student needs. Adjusting educational evaluations to gather information addressing DSM-5 criteria and specifiers should lead to more accurate characterization of a child’s needs, improving the ability to translate assessment findings into intervention. The increased detail and structure of the DSM-5 provide greater guidance to practitioners on areas to prioritize for assessment, and severity ratings may provide an objective structure for designing and summarizing naturalistic observations and assessment findings in general, leading to selection of services and supports. Greater description of age and language influences on ASD symptoms may help practitioners make more accurate identification decisions. The increased detail required by the DSM-5 reinforces the importance of using valid, standardized diagnostic tools for ASD, and several studies documented that diagnostic accuracy was high when DSM-5 symptoms were documented using detailed parent report measures (Frazier et al., 2012; Kent et al., 2013) or the ADI-R and ADOS together (Barton et al., 2013; Huerta et al., 2012; Mazefsky et al., 2012).

Given the evidence that DSM-IV criteria lacked specificity (Frazier et al., 2012; Huerta et al., 2012), it is likely that ASD was being overdiagnosed. Although at least three studies have found sensitivity commensurate with DSM-IV and improved specificity (Frazier et al., 2012; Huerta et al., 2012; Kent et al., 2013), concerns about sensitivity have been raised by many. One of the main implications of the changes to the DSM-5 is that evaluations will need to provide greater detail on a child’s array of symptoms, as well as their symptom history, to document symptoms necessary for diagnosis.

Some questions remain about whether the improved accuracy of DSM-5 criteria will be sustained once they are put to widespread use in community-based evaluations. The reorganization of symptoms into the three social communication and four restricted, repetitive behavior criteria, for example, may be a source of inconsistency. Because all social communication criteria must be met, clarity is needed on which symptoms belong in what cluster. The lack of clearly delineated criteria may lead to overdiagnosis if clinicians apply the same behaviors to multiple criteria, or underdiagnosis if they attribute too many to one. As demonstrated by Barton et al.’s (2013) finding on disagreement in symptom assignment, the DSM-5 is not immune from differences in interpretation among even
expert clinicians. Regarding restricted, repetitive behaviors, a concern is whether it will be inordinately difficult to meet two criteria now that stereotyped speech, repetitive uses of objects, and repetitive motor mannerisms have been collapsed into one criterion. Time will tell how identification of ASD adapts with the DSM-5 and whether feared unintended consequences materialize, such as difficulty qualifying for a diagnosis even when needs are considerable.

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