

## BRIEF REPORT: A Further Examination of the DSM-5 Autism Spectrum Disorder Criteria in Practice

### Abstract

*Taheri and Perry (2012) previously reported that only 62% of children aged 2–12 years diagnosed with autistic disorder (AD) or pervasive developmental disorder – not otherwise specified (PDD-NOS) using DSM-IV-TR criteria met DSM-5 criteria for autism spectrum disorder (ASD). The purpose of the present study was to replicate and extend these findings in a different sample of older individuals with lower cognitive and adaptive skills (n = 22; age range, 5–19 years). Only 55% of the sample met the DSM-5 criteria for ASD; this included 69% of those who had an original DSM-IV-TR diagnosis of AD, and only 17% (one child) with an original diagnosis of PDD-NOS. Those groups who met DSM-5 criteria had significantly greater autism severity, lower full scale IQ, and lower adaptive behaviour scores. Inter-rater agreement results showed comparable percentage agreement for individual criteria for both DSM-IV-TR and DSM-5 criteria.*

The Diagnostic and Statistical Manual of Mental Disorders (DSM) is commonly used to guide the diagnosis of autism (American Psychiatric Association (APA), 2000). The fifth edition of the manual, DSM-5, has substantially revised the criteria for the disorder (APA, 2013). The new criteria will include individuals previously diagnosed with autistic disorder (AD), Asperger disorder, childhood disintegrative disorder, and pervasive developmental disorder-not otherwise specified (PDD-NOS) into a new diagnosis called autism spectrum disorder (ASD). In comparison to the DSM-IV-TR (2000), the DSM-5 reduces the 12 criteria in the “triad of impairments” to seven criteria in a dyad, with social and communication items combined into one domain, and separate from repetitive behaviour and interests. Furthermore, unusual sensory behaviours are now included in the domain of repetitive behaviour, and the specific age of onset is removed.

Although the new ASD diagnosis is intended to be more inclusive, recent studies imply that the new criteria may inadvertently exclude children currently on the spectrum, particularly those with PDD-NOS and Asperger disorder (e.g., Gibbs, Aldridge, Chandler, Witzlsperger, & Smith, 2012; Matson, Kozlowski, Hattier, Horovitz, & Sipes, 2012; Mattila et al., 2011; McPartland, Reichow, & Volkmar, 2012; Worley & Matson, 2012). In a previous file review study of 131 children aged 2 to 12 years, diagnosed with AD or PDD-NOS (Taheri & Perry, 2012), only 62% met DSM-5 criteria (82% with AD; 18% with PDD-NOS), and children who met criteria had lower cognitive and adaptive scores and more severe autism. In that

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study, inter-rater agreement was 97% for overall DSM-5 diagnosis and averaged 88% for individual items. However, two other studies (Heurta, Bishop, Duncan, Hus, & Lord, 2012; Mazefsky, McPartland, Gastgeb, & Minshew, 2013) based on the Autism Diagnostic Interview-Revised (ADI-R; Le Couteur, Lord, & Rutter, 2003), and the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2000) suggest that there is acceptable continuity between the DSM-IV and the DSM-5.

The purpose of this study was to replicate and extend findings made by Taheri and Perry (2012) in a different sample of older individuals with lower cognitive and adaptive skills, as well as to examine the inter-rater agreement of DSM-5 compared to DSM-IV-TR. First, we examined the number of children who met or did not meet the seven individual DSM-5 criteria (the three A criteria and four B criteria). Second, the DSM-5 criteria for ASD (must meet all A items and at least two B items) were applied to the sample to determine the number of individuals who would or would not meet the proposed criteria. In addition, the study examined the percentage of those meeting DSM-5 criteria in relation to previous diagnoses of AD or PDD-NOS (based on the DSM-IV-TR) and IQ level. Third, those who met and those who did not meet the DSM-5 criteria were compared in terms of their age, autism severity, cognitive level, and adaptive behaviour skills. Finally, we explored the inter-rater agreement between two experienced psychologists for DSM-5 compared to DSM-IV-TR criteria.

## Method

### Participants

The data for this study was collected through a retrospective file review of cases available from the Treatment, Research, and Education for Autism and Developmental Disorders (TRE-ADD) program at Thistletown Regional Centre, Toronto, Ontario, a tertiary-level program serving children and adolescents with AD or PDD-NOS and developmental disability. Participant consent was not required since the data was based on file review information. Ethics approval was obtained for this study from the Centre's Research Ethics Board.

The sample consisted of 22 TRE-ADD clients (21 males, one female), whose files included all the measures needed for the study. Their age ranged from 5 to 19 years ( $M = 12.5$ ;  $SD = 3.2$ ). Individuals had a previous DSM-IV-TR diagnosis, made by one of the two psychologists completing the ratings for the present study, of either AD ( $n = 16$ ) or PDD-NOS ( $n = 6$ ). The sample had relatively low IQ ( $M = 41.6$ ;  $SD = 26.6$ ), and was divided into four IQ groups: 70 or above ( $n = 2$ ); 55–69 ( $n = 5$ ); 40–54 ( $n = 6$ ), and less than 40 ( $n = 8$ ). Adaptive behaviour scores based on the Vineland Adaptive Behaviour Composite ( $M = 50.5$ ;  $SD = 14.3$ ) and autism severity based on the Childhood Autism Rating Scale ( $M = 32.8$ ;  $SD = 5.1$ ) showed wide variability.

### Measures

Depending on the participant's level of functioning and age, one of several cognitive tests was used: the Mullen Scales of Early Learning (MSEL; Mullen, 1995), the Stanford-Binet Intelligence Scale: 4<sup>th</sup> (Thorndike, Hagen, & Sattler, 1986) or 5<sup>th</sup> Edition (Roid, 2003), or the Wechsler Intelligence Scale for Children: 3<sup>rd</sup> or 4<sup>th</sup> Editions (Wechsler, 1999; Wechsler, 2002). The Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1984) or VABS-II (Sparrow, Cicchetti, & Balla, 2005) was used to assess the children's adaptive functioning in communication, daily living skills, and socialization. The Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1988) was used to assess autism severity.

### Procedure

An experienced psychologist (AP) completed the DSM-5 checklist (developed for the earlier study) containing all of the items for an ASD diagnosis for all the children based on available file review information. She used clinical notes, ratings on the CARS, and the VABS to complete the checklist. Those who met the DSM-5 criteria were then compared to those who did not meet criteria. In order to examine between group differences in terms of child characteristics (i.e., age, autism severity, cognitive level, and adaptive behaviour) we conducted independent *t*-tests. Inter-rater reliability of this procedure was assessed by having a second highly

experienced psychologist (DF) independently complete the DSM-5 checklist for 45% of the cases, selected at random.

To compare the inter-rater agreement of DSM-5 to that of DSM-IV-TR, 10 files were selected at random. In order to ensure that the two psychologists were blind to any identifying information and to previous diagnosis in the files, all relevant information was extracted by the first author (AT). The two psychologists, who had worked together for 28 years, then completed both DSM-IV-TR and DSM-5 checklists based solely on the extracted information.

## Results

### Individual DSM-5 ASD Criteria Met

Of the seven individual DSM-5 criteria, most individuals met the Social Communication criteria and two of the Restricted, Repetitive Behaviour, Interests or Activities criteria (B1 & B4) (see Table 1).

Table 1. Percentage of Children Rated as Meeting Individual DSM-5 Criteria

Criterion	Met <i>n</i> (%)
A1 (reciprocity)	20 (90.9%)
A2 (nonverbal communication)	17 (77.3%)
A3 (relationships)	19 (86.4%)
B1 (repetitive behaviour)	18 (81.8%)
B2 (routines & rituals)	5 (22.7%)
B3 (restricted interests)	4 (18.2%)
B4 (sensory)	16 (72.7%)

### DSM-5 ASD Diagnosis Met vs. DSM-IV-TR Diagnosis

Of the total sample of 22, only 12 (54.5%) children met the DSM-5 criteria for ASD. The majority (68.8%) of those who had an original DSM-IV-TR diagnosis of AD, and only one individual with PDD-NOS met the criteria. The pattern revealed was significantly different from chance ( $\chi^2 = 7.22, p < 0.001$ ; see Table 2). In addition, the rate of DSM-5 criteria being met

was clearly related to IQ group, also shown in Table 2, with lower rates of ASD diagnosis met as IQ grouping was higher.

Table 2. Percentage of Sample and Subgroups Meeting DSM-5 ASD Diagnosis

	<i>n</i> (%) meeting ASD on DSM-5
Total Sample ( <i>N</i> = 22)	12 (54.5%)
Previous AD ( <i>n</i> = 16)	11 (68.8%)
Previous PDD-NOS ( <i>n</i> = 6)	1 (16.7%)
IQ < 40 ( <i>n</i> = 9)	8 (88.9%)
IQ 40–54 ( <i>n</i> = 6)	3 (50.0%)
IQ 55–69 ( <i>n</i> = 5)	1 (20.0%)
IQ 85+ ( <i>n</i> = 2)	0 (0%)

### DSM-5 ASD Criteria in Relation to Developmental and Autism Severity Scores

Those who met the DSM-5 ASD criteria had significantly higher (more severe) CARS scores and significantly lower VABS scores and IQ scores (See Table 3). All effect sizes (Cohen's *d*) were very large. However, the two subgroups did not differ in age.

### DSM-IV-TR vs. DSM-5 Inter-Rater Agreement

There was a 100% inter-rater agreement for overall diagnosis (i.e., ASD or not ASD) using the DSM-5 checklist and the percentage agreement for each specific criterion varied from 70 to 100%, with a mean of 87% (see Table 4). For the same 10 files reviewed using DSM-IV-TR criteria, the inter-rater agreement ranged from 70 to 90% for each individual criterion, with a mean of 84% (see Table 5). Using the DSM-IV-TR, agreement on specific diagnosis (i.e., both AD or both PDD-NOS) was 80%, but agreement defined as a diagnosis (either AD or PDD-NOS) versus no diagnosis was 100%.

Table 3. Developmental and Autism Severity Scores in Two Subgroups with DSM-5 Criteria Met or Not Met

	DSM-5				<i>t</i>	<i>p</i>	<i>d</i>
	Met ( <i>n</i> = 12) <i>M</i> ( <i>SD</i> )		Not Met ( <i>n</i> = 10) <i>M</i> ( <i>SD</i> )				
Autism Severity (CARS)	36.09	(3.49)	29.20	(4.06)	-4.18	< .001	1.82
Cognitive level							
Full Scale IQ	25.67	(14.44)	60.60	(25.65)	4.03	.001	1.67
Nonverbal IQ	29.68	(16.02)	65.00	(22.69)	4.27	< .001	1.80
Verbal IQ	23.60	(17.32)	58.60	(26.21)	3.64	.002	1.57
Adaptive level (Vineland)							
Communication	43.83	(9.41)	60.90	(18.38)	2.81	< .001	1.70
Daily Living Skills	44.50	(7.96)	62.30	(18.24)	3.06	< .001	1.26
Socialization	43.33	(4.16)	57.20	(13.98)	3.28	< .001	1.34
ABC	41.83	(7.37)	60.80	(12.67)	4.38	< .001	1.83
Age	13.34	(2.53)	11.73	(3.84)	-1.13	ns	-

Table 4. Inter-Rater Agreement for Each DSM-5 Criterion (*n* = 10 files)

DSM-5 Criterion	Agreement
A1 Social-emotional Reciprocity	90%
A2 Nonverbal Communication	100%
A3 Relationships	90%
B1 Stereotyped Behav/Speech	90%
B2 Routines/Rituals	90%
B3 Restricted Interests	70%
B4 Sensory	80%
	<i>M</i> = 87.14%

Table 5. Inter-Rater Agreement for Each DSM-IV-TR Criterion (*n* = 10 files)

DSM-IV-TR Criterion	Agreement
A1 Nonverbal Social Interaction	90%
A2 Peer Relationships	70%
A3 Spontaneous Interests	90%
A4 Social/Emotional Reciprocity	70%
B1 Verbal Communication	90%
B2 Conversation	80%
B3 Stereotyped Speech	90%
B4 Pretend Play	90%
C1 Restricted Interests	90%
C2 Routines/Rituals	90%
C3 Stereotyped/Repetitive Motor	90%
C4 Preoccupation with Parts of Objects	70%
	<i>M</i> = 84.33%

## Discussion

Although the sample used in this study was different (i.e., older, lower functioning, more severe), the results were consistent with our previous study and with several other recently published studies. A sizable proportion of the sample did not meet DSM-5 ASD criteria, especially those with PDD-NOS and those individuals with relatively higher IQ. The subgroup who did meet DSM-5 criteria had significantly greater autism severity on the CARS, lower IQ scores, and lower adaptive behaviour scores. The results support the body of literature cited in the Introduction of this paper which imply that the DSM-5 may have low sensitivity in identifying milder, higher functioning individuals.

A unique aspect of the study was to compare the two DSM versions in terms of inter-rater agreement. Results revealed comparable percentage agreement for individual criteria in both systems, which is encouraging. However, both clinicians reported anecdotally that DSM-5 criteria were more difficult to rate, especially in this file review context (versus an actual clinical assessment).

This study is not without limitations. Although a number of measures and clinical notes were used, the DSM-5 checklists were completed based on file review information and not clinical evaluations. We had a small sample size of only 22 participants, many of whom had substantial cognitive limitations. In addition, our sample only consisted of individuals with PDD-NOS and AD, and no other PDD categories. We used only the pre-publication draft criteria of the DSM-5 that were available at the time, without all the supplementary material and narrative of specifiers of severity.

There are significant implications of these and other similar results for both future research and clinical practice. There is a risk that research will exclude children who do not receive the ASD diagnosis, but display a number of symptoms, resulting in different groups of children being studied and compared over time. This could adversely affect research into cause, characteristics, and outcomes for people with ASD. Clinically, if the DSM-5 criteria are used by policymakers and professionals to determine funding and eligibility for services,

the concern is that individuals may not receive a diagnosis, and thus may not receive suitable treatment or intervention. However, it has been suggested that these concerns have been exaggerated (Heurta et al., 2012; Mahjouri & Lord, 2012). Research will be needed as soon as possible using actual clinical assessments rather than retrospective file review methods. It remains to be seen how the DSM-5 will impact routine clinical practice; however, it seems likely that clinical judgment will be required more than ever in making the diagnosis of ASD.

## Key Messages From This Article

**People with disabilities:** The rules are changing about how professionals make a diagnosis of an autism spectrum disorder. This might mean people's diagnosis could change or maybe they won't have a diagnosis at all. This might be bad if it makes people lose the help they get because of having a certain diagnosis, but we're not sure exactly what will happen.

**Professionals:** Diagnosis requires information from a variety of sources, and a comprehensive assessment process. Clinical judgment will be required with respect to using the DSM-5 ASD criteria as part of a comprehensive assessment, especially for individuals who are higher functioning.

**Policymakers:** Caution is needed with respect to using the DSM-5 ASD criteria in isolation to determine funding or eligibility for services rather than individual need.

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