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# AUTISM SPECTRUM RATING SCALES<sup>™</sup> (ASRS<sup>®</sup>)

DSM-5 Update

Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.



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# Autism Spectrum Rating Scales™ (ASRS®)

## Technical Report #2 DSM-5 Update

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This technical report provides information about how the Autism Spectrum Rating Scales™ (ASRS®) have been updated to align with the revised Autism Spectrum Disorder (ASD) criteria published in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). Overall, the impact of the new ASD criteria on the ASRS is minimal. The primary update involves the replacement of the DSM-IV-TR Scale with the new DSM-5 Scale (this scale now includes items related to hyper- and hyporeactivity to sensory input, or unusual interest in sensory aspects of the environment). The terminology used in the reports has also been updated to match the changes in the DSM-5; that is, all references to Autistic Disorder or Asperger’s Disorder have been removed, and the plural term “Autism Spectrum Disorders” has been replaced with the single diagnostic category “Autism Spectrum Disorder.” The final change includes the removal of the Delay of Communication items from the scoring algorithms. These DSM-5 updates are now available for both hand-scoring and computerized scoring options. Supporting psychometric information is provided in this report.

### Background

The Autism Spectrum Rating Scales™ (ASRS®; Goldstein & Naglieri, 2013a) is a rating scale designed to measure behaviors associated with Autism Spectrum Disorders in children and youth aged 2 through 18 years. The ASRS includes factor-derived scales labeled Social/Communication and Unusual Behaviors (for ages 2 to 18 years), and Self-Regulation (for ages 6 to 18 years only). A DSM scale is also included that evaluates the symptom criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition–Text Revision (DSM-IV-TR; APA, 2000) for Autistic Disorder, Asperger’s Disorder, and Pervasive Developmental Disorder–Not Otherwise Specified (PDD-NOS). The ASRS also includes Treatment Scales whose content cover clinically relevant symptoms that are included in the DSM, as well as associated features that are not covered in the DSM (i.e., Sensory Sensitivity and Attention/Self-Regulation).

The release of the updated Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; APA, 2013) introduced changes to the symptom criteria of Autism Spectrum Disorder (ASD; refer to Table 1 for the full DSM-5 diagnostic criteria for ASD), thus an update to the ASRS was required. Because the content of the ASRS was comprehensive enough to include items related to the new symptom for ASD in the DSM-5 (i.e., hyper- or hyporeactivity to sensory input, or unusual interest in sensory aspects of the environment), a DSM-5 Scale could be constructed using existing items within the ASRS. This technical report describes the updates made to the ASRS to align it with the new DSM-5 diagnostic criteria.

For comprehensive information about the administration, scoring, and interpretation of the ASRS, please refer to the *ASRS Technical Manual* and *ASRS Technical Report #1* (Goldstein and Naglieri, 2013a, b).

**Table 1. DSM-5 Diagnostic Criteria for Autism Spectrum Disorder**

<b>A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive; see text):</b>	1. Deficits in social-emotional reciprocity, ranging, for example, 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.
	2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, 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.
	3. Deficits in developing, maintaining, and understanding relationships, ranging, for example, 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.
<b>B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):</b>	1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypies, lining up of toys or flipping objects, echolalia, idiosyncratic phrases).
	2. Insistence on sameness, inflexibility, adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food everyday day).
	3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
	4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g., apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).
<b>C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).</b>	
<b>D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.</b>	
<b>E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.</b>	

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## Updates to the ASRS Corresponding to DSM Criteria Changes

Table 2 provides an overview of the changes to the DSM-5 diagnostic criteria, as well as how those changes have impacted the ASRS. As can be seen from this table, the impact on the ASRS is minimal given the existing alignment of the ASRS structure and content with the new DSM-5 criteria. Therefore, only minimal updates were required to align with the DSM-5 ASD criteria. The ASRS QuikScore™ forms have been updated with the new DSM-5 Scale. These updates are also available as a new DSM-5 scoring option in the computerized software and online scoring programs.

## Scoring and Reporting Adjustments

### Hand Scoring

The full-length QuikScore Forms have been updated with the changes described in Table 2. The application of these changes to hand scoring is described below.

**Calculating Raw Scores and T-scores.** The DSM columns in the Scoring Grid and Raw Score to T-score and Percentile Rank Conversion Table on all full-length forms have been updated to allow for the computation of the DSM-5 Scale (the calculations and conversions for all other scales remain unchanged).

**Table 2. Updates to the ASRS Corresponding to Changes in the DSM-5**

Change to DSM-5	Updates to ASRS
Four previously separate Pervasive Developmental Disorders (Autistic Disorder, Asperger’s Disorder, PDD-NOS, and Childhood Disintegrative Disorder) in the DSM-IV-TR were combined to form a new single category in the DSM-5, named Autism Spectrum Disorder.	<b>New Terminology.</b> The ASRS has always included a single DSM scale that encompassed the diagnostic criteria from Autistic Disorder, Asperger’s Disorder, and PDD-NOS; therefore, no change in the test structure was required with this update. However, the diagnostic label has been changed from the plural Autism Spectrum Disorders (DSM-IV-TR) to the singular Autism Spectrum Disorder (DSM-5) within the QuikScore forms and computerized reports.
The two categories of symptoms in the DSM-IV-TR related to impairment in reciprocal social interaction and communication for Autistic Disorder were combined into one category in the DSM-5: impairment in social communication.	<b>No Change.</b> The original psychometric analyses of ASRS data supported the combination of social and communication domains into one category and restrictive, repetitive behaviors into another. This structure already reflects the new DSM-5 ASD criteria; therefore, no change in test structure was required.
The DSM-IV-TR symptom of a delay in or total lack of language development has been removed from the DSM-5.	<b>Removal of Delay of Communication Questions.</b> These items have been removed from the DSM-5 update to the ASRS Parent (2–5 Years) and (6–18 Years) QuikScore Forms and from the Summary and Items by Scale sections of the Interpretive Reports. <sup>1</sup>
The third category of symptoms in the DSM-IV-TR that related to restricted, repetitive, and stereotyped patterns of behavior in the DSM-IV-TR was renamed to restricted interests/repetitive patterns of behaviors in the DSM-5. Within this category, a new symptom was included in the DSM-5: hyper- or hyporeactivity to sensory input, or unusual interest in sensory aspects of the environment.	<b>New DSM-5 Scale.</b> The DSM-IV-TR Scale has been replaced with a new DSM-5 Scale on the QuikScore forms. The DSM-5 Scale is also available as a new scoring option in the computerized reports. <sup>2</sup> To accommodate the new symptom, all of the Sensory Sensitivity <sup>3</sup> scale items have been added to all existing DSM-IV-TR Scale items (no items from the DSM-IV-TR Scale had to be dropped from the DSM-5 Scale as they were still directly relevant to the content of the DSM-5 diagnostic criteria for ASD). The ASRS DSM-5 Scale was restandardized with the new item list.

<sup>1</sup> The Delay of Communication items are still available on the Response Booklets for individuals who choose to use the DSM-IV-TR scoring option when using computerized scoring methods.

<sup>2</sup> For those who wish to continue to use the DSM-IV-TR Scale, a DSM-IV-TR scoring option has been provided along with the new DSM-5 scoring option for all computerized scoring methods.

<sup>3</sup> The Sensory Sensitivity scale will continue to be available as a separate Treatment Scale.

**Confidence Intervals and Critical Values.** Given that the DSM-IV-TR Scale and the DSM-5 Scale were so highly correlated and that the Cronbach’s alpha coefficients are practically identical for the two scales (see *Standardization and Reliability of the ASRS DSM-5 Scale*), the confidence intervals (see appendix A in the *ASRS Technical Manual*) and critical values for assessing change over time and across raters (see chapter 4 of the *ASRS Technical Manual*) remain unchanged.

**Hand Scoring for Ratings of Individuals Who Do Not Speak or Speak Infrequently.** As described in the *ASRS Technical Report #1* and appendix F in the *ASRS Technical Manual*, a prorating method is used to score the ASRS when rating individuals who do not speak or speak infrequently. See the appendix in this report for details about using the prorating method with the DSM-5 Scale.

## Computerized Scoring

A new DSM-5 scoring option is now available for computerized scoring methods (i.e., the MHS Scoring Software or the MHS Online Assessment Center). For users who choose the DSM-5 scoring option, the changes outlined in Table 2 have been made to the ASRS full-length reports.

A DSM-IV-TR scoring option is still available to accommodate users who may wish to continue to generate reports with the DSM-IV-TR Scale.

## Standardization and Reliability of the ASRS DSM-5 Scale

Norms for the ASRS DSM-5 Scale were constructed in the same fashion as were the original scales of the instrument (see chapter 6 of the *ASRS Technical Manual, Standardization*) and the same normative samples were used (see chapter 5 of the *ASRS Technical Manual, Development*, for sample characteristics). Actual construction of the norms was conducted by rater type for each of the three age groups (i.e., 2–5, 6–11, 12–18 Years). The process began by fitting the obtained frequency distribution for each scale to normal probability standard scores via the actual percentile ranks associated with raw scores for each scale. Minor irregularities in raw score to *T*-score progressions were eliminated by smoothing. Standard scores (i.e., *T*-scores with a mean of 50 and standard deviation of 10) were computed, based on separate percentile score distributions for teacher and parent raters according to age.

A comparison of the *T*-score means and standard deviations is provided for the DSM-5 Scale and the DSM-IV-TR Scale in Tables 3 and 4. Pearson product-moment correlations are also provided between the DSM-5 and the DSM-IV-TR Scales of the ASRS. These coefficients ranged from .98 to .99 (Median = .99) across norm groups and rater versions (see Tables 3 and 4).

Cronbach's alpha coefficients for the DSM-5 Scale items are presented in Tables 5 and 6. These values were calculated for the normative groups using the same procedure as the DSM-IV-TR Scale. Alpha reliabilities were calculated

separately for the clinical and normative samples. The weighted average of these two samples was determined by the method described by Rodriguez and Maeda (2006; see also Hakstian & Whalen, 1976; Shadish & Haddock, 1994), which uses reliability generalization methods that incorporate the sampling distribution of coefficient alpha, the number of items in the scale, and the sample sizes.

**Table 3. T-score Descriptive Statistics for the ASRS DSM-5 Scale, DSM-IV-TR Scale, and Pearson Correlations (ASRS 2–5 Years)**

Form	Scale	<i>M</i>	<i>SD</i>	<i>r</i>
Parent ( <i>n</i> = 320)	DSM-5	50.1	9.9	.988
	DSM-IV-TR	49.9	10.1	
Teacher ( <i>n</i> = 320)	DSM-5	50.0	9.9	.993
	DSM-IV-TR	50.0	10.1	

Note. DSM-IV-TR Scale data taken from chapter 6 of the *ASRS Technical Manual, Standardization*; *r* = Pearson product-moment correlation between the DSM-IV-TR Scale and the DSM-5 Scale.

**Table 4. T-score Descriptive Statistics for the ASRS DSM-5 Scale, DSM-IV-TR Scale, and Pearson Correlations (ASRS 6–18 Years)**

Form	Scale	<i>M</i>	<i>SD</i>	<i>r</i>	
Parent	6–11	DSM-5	50.0	9.9	.993
		DSM-IV-TR	50.0	9.9	
	12–18	DSM-5	49.9	9.9	.990
		DSM-IV-TR	50.0	10.1	
Teacher	6–11	DSM-5	49.9	10.0	.990
		DSM-IV-TR	50.0	10.0	
	12–18	DSM-5	50.0	10.1	.976
		DSM-IV-TR	50.1	9.9	

Note. DSM-IV-TR Scale data taken from chapter 6 of the *ASRS Technical Manual, Standardization*; *r* = Pearson product-moment correlation between the DSM-IV-TR Scale and the DSM-5 Scale.

**Table 5. Cronbach's Alpha Coefficients: ASRS DSM-5 Scale vs. DSM-IV-TR Scale (Age 2–5 Years)**

Form	DSM-IV-TR Scale (35 Items)			DSM-5 Scale (41 Items)		
	Normative	Clinical	Weighted	Normative	Clinical	Weighted
Parent	.91	.97	.95	.93	.97	.95
Teacher	.91	.98	.95	.91	.98	.95

Note. DSM-IV-TR Scale data taken from chapter 7 of the *ASRS Technical Manual, Reliability*.

**Table 6. Cronbach's Alpha Coefficients: ASRS DSM-5 Scale vs. DSM-IV-TR Scale (Age 6–18 Years)**

Form		DSM-IV-TR Scale (34 Items)			DSM-5 Scale (40 Items)		
		Normative	Clinical	Weighted	Normative	Clinical	Weighted
Parent	6–11	.95	.96	.96	.95	.97	.96
	12–18	.94	.96	.95	.94	.97	.96
Teacher	6–11	.94	.96	.95	.94	.96	.95
	12–18	.94	.96	.95	.95	.96	.96

Note. DSM-IV-TR Scale data taken from chapter 7 of the *ASRS Technical Manual, Reliability*.

Cronbach’s alpha coefficients were also calculated for the DSM-5 Scale, excluding the items not used in the scoring method for individuals who do not speak or speak infrequently (see appendix F in the *ASRS Technical Manual or Technical Report #1, Scoring the ASRS for Individuals*

*Who Do Not Speak or Speak Infrequently*). These values are presented in Tables 7 and 8. The alpha coefficients never deviated by more than .01 from the original DSM-IV-TR Scale.

**Table 7. Cronbach’s Alpha Coefficients: ASRS DSM-5 Scale vs. DSM-IV-TR Scale—Scoring for Individuals Who Do Not Speak or Speak Infrequently (Age 2–11 Years)**

Form	DSM-IV-TR Scale		DSM-5 Scale	
	Original (35 Items)	Prorated (27 Items)	Original (41 Items)	Prorated (33 Items)
Parent	.95	.94	.95	.94
Teacher	.95	.94	.95	.95

*Note.* DSM-IV-TR data taken from appendix F of the *ASRS Technical Manual* and *Technical Report #1*.

**Table 8. Cronbach’s Alpha Coefficients: ASRS DSM-5 Scale vs. DSM-IV-TR Scale—Scoring For Individuals Who Do Not Speak or Speak Infrequently (Age 6–18 Years)**

Form		DSM-IV-TR Scale		DSM-5 Scale	
		Original (34 Items)	Prorated (26 Items)	Original (40 Items)	Prorated (32 Items)
Parent	6–11	.96	.95	.96	.95
	12–18	.95	.94	.96	.95
Teacher	6–11	.96	.94	.95	.94
	12–18	.95	.94	.96	.95

*Note.* DSM-IV-TR data taken from appendix F of the *ASRS Technical Manual* and *Technical Report #1*.

# Appendix

To use the prorating method for ratings of individuals who do not speak or speak infrequently, use Table A.1 to convert the DSM-5 raw score into the prorated score. First, find the raw score using either Raw Score column. Follow the row across to the corresponding prorated nonverbal score by locating the appropriate column for the age of the rated

individual (i.e., 2–5 Years or 6–18 Years). Transfer this value to the Scale Score Summary Table on the QuikScore form and continue to follow the scoring instructions provided on the form (see the *ASRS Technical Report #1* and appendix F in the *ASRS Technical Manual* for complete scoring instructions).

**Table A.1. Prorated Score Conversion Table: ASRS DSM-5 Scale**

Raw Score	DSM-5 Scale Prorated Score		Raw Score
	2–5 Years	6–18 Years	
1	1	1	1
2	2	3	2
3	4	4	3
4	5	5	4
5	6	6	5
6	7	8	6
7	9	9	7
8	10	10	8
9	11	11	9
10	12	13	10
11	14	14	11
12	15	15	12
13	16	16	13
14	17	18	14
15	19	19	15
16	20	20	16
17	21	21	17
18	22	23	18
19	24	24	19
20	25	25	20
21	26	26	21
22	27	28	22
23	29	29	23
24	30	30	24
25	31	31	25
26	32	33	26
27	34	34	27
28	35	35	28
29	36	36	29
30	37	38	30
31	39	39	31
32	40	40	32
33	41	41	33
34	42	43	34
35	43	44	35
36	45	45	36
37	46	46	37
38	47	48	38
39	48	49	39
40	50	50	40
41	51	51	41
42	52	53	42
43	53	54	43
44	55	55	44



Table A.1. (continued) Prorated Score Conversion Table: ASRS DSM-5 Scale

Raw Score	DSM-5 Scale Prorated Score		Raw Score
	2-5 Years	6-18 Years	
45	56	56	45
46	57	58	46
47	58	59	47
48	60	60	48
49	61	61	49
50	62	63	50
51	63	64	51
52	65	65	52
53	66	66	53
54	67	68	54
55	68	69	55
56	70	70	56
57	71	71	57
58	72	73	58
59	73	74	59
60	75	75	60
61	76	76	61
62	77	78	62
63	78	79	63
64	80	80	64
65	81	81	65
66	82	83	66
67	83	84	67
68	84	85	68
69	86	86	69
70	87	88	70
71	88	89	71
72	89	90	72
73	91	91	73
74	92	93	74
75	93	94	75
76	94	95	76
77	96	96	77
78	97	98	78
79	98	99	79
80	99	100	80
81	101	101	81
82	102	103	82
83	103	104	83
84	104	105	84
85	106	106	85
86	107	108	86
87	108	109	87
88	109	110	88
89	111	111	89
90	112	113	90
91	113	114	91
92	114	115	92
93	116	116	93
94	117	118	94
95	118	119	95
96	119	120	96
97	121	121	97
98	122	123	98
99	123	124	99

Table A.1. (continued) Prorated Score Conversion Table: ASRS DSM-5 Scale

Raw Score	DSM-5 Scale Prorated Score		Raw Score
	2-5 Years	6-18 Years	
100	124	125	100
101	125	126	101
102	127	128	102
103	128	129	103
104	129	130	104
105	130	131	105
106	132	133	106
107	133	134	107
108	134	135	108
109	135	136	109
110	137	138	110
111	138	139	111
112	139	140	112
113	140	141	113
114	142	143	114
115	143	144	115
116	144	145	116
117	145	146	117
118	147	148	118
119	148	149	119
120	149	150	120
121	150	151	121
122	152	153	122
123	153	154	123
124	154	155	124
125	155	156	125
126	157	158	126
127	158	159	127
128	159	160	128
129	160		129
130	162		130
131	163		131
132	164		132

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