Adult ADHD Self-Report Scale (ASRS): Updated Scoring and Norms

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Dichotomous and Likert Scoring Methods

It is important to note that there are two scoring methods for the ASRS. The original method was dichotomous, with each item scored as either 0 or 1 depending on the respondent's selection (Kessler et al., 2005). This scoring method has since been updated, with the recommendation that the five-point Likert (0 to 4) scoring system be utilised due to it being more robust (Harvard Medical School, 2024). Due to the Likert scoring method's improved discriminant ability to differentiate response levels, it is NovoPsych's preferred and primary scoring method. However, the dichotomous scoring method is still used when presenting the Inattentiveness and Hyperactivity subscale scores, and is expressed as the "percent of symptoms endorsed" (Stanton et al., 2018). In NovoPsych's Results PDF, each item is displayed using the original dichotomous scoring scheme. However, the Part A, Part B, and Total scores are calculated in the background using the Likert scoring method; therefore, while the PDF displays scores in a dichotomous form like 0|0|0|1|1 (see Figure 1), the Likert scoring method calculates Part A, Part B, and Total scores with values ranging from 0 to 4 (i.e., 0|1|2|3|4).

Figure 1

NovoPsych's Results PDF displaying dichotomous scoring.

		Never	Rarely	Sometimes	Often	Very Often
1	PART A - How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?	0	0	1	1	1
2	How often do you have difficulty getting things in order when you have to do a task that requires organisation?	0	0	1	1	1
3	How often do you have problems remembering appointments or obligations?	0	0	1	1	1
4	When you have a task that requires a lot of thought, how often do you avoid or delay getting started?	0	0	0	1	1
5	How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?	0	0	0	1	1

Note. NovoPsych uses a five-point Likert scale ranging from 0 to 4 (i.e., 0|1|2|3|4) to calculate the Part A, Part B, and Total scores but still uses the dichotomous scoring method for the Inattentiveness and Hyperactivity subscale scores.

Percentile Calculations

To establish percentiles for the ASRS, NovoPsych calculated summed scores and their standard deviations for Part A (items 1-6), Part B (items 7-18), and the Total score (items 1-18) using item-level

data from Adler et al. (2018; see Table 3, p. 8). Mean scores were determined by summing the average item scores for each Part. This approach provides a straightforward method to establish central tendencies for Parts A and B, as well as for the Total score. To provide a realistic measure of score variability, the standard deviation calculations incorporated the correlation structure between items. These correlations were calculated from NovoPsych clinical data obtained between August 2021 and October 2024 (n = 200,715; NovoPsych, 2024). The standard deviation calculations incorporated both the average inter-item correlation (r = 0.32,) within Parts A and B, which adjusts for item interdependence within each Part, and the correlation between Part A and B summed scores (r = 0.74) to better estimate the Total score's standard deviation.

For the calculation of summed score variances, we start with the fundamental principle that for any sum of correlated variables, the variance is determined by both the individual item variances and their covariances, as seen in (1):

$$Variance_{SUM} = \sum(item\ variances) + 2\sum(item\ covariances) \quad (1)$$

This general principle is then implemented for the ASRS using two specific applications (see (2)). First, for calculating the standard deviations within Parts A and B, we use the average inter-item correlation (r = 0.32) to simplify the covariance structure:

$$SD_{SUM\ (Part\ A\ \&\ B)} = \sqrt{\sum_{i=1}^{n} {SD_i}^2 + 2r \times \sum_{i=1}^{n}\sum_{j=i+1}^{n}(SD_i \times SD_j)} \quad (2)$$

where:

- SD_i and SD_j are the standard deviations of individual items
- r = 0.32 (the average inter-item correlation; n = 200,715; NovoPsych, 2024)
- n = 6 for Part A and n = 12 for Part B

Then, for combining Parts A and B into the total score, we apply the same principle but now considering the parts as two composite scores with their known correlation (r = 0.74) in (3):

$$SD_{TOTAL} = \sqrt{({SD_A}^2 + {SD_B}^2 + 2r_{AB} \times SD_A \times SD_B} \quad (3)$$

where:

- SD_A and SD_B are the standard deviations of the Part A and Part B summed scores
- r_{AB} = 0.74 (the correlation between Part A and B summed scores; n = 200,715; NovoPsych, 2024)

The correlation adjustments account for the ASRS's hierarchical structure of the ASRS, where items within each part share a common average correlation (r = 0.32), while the summed scores of the two parts demonstrate a stronger correlation (r = 0.74). This method accounts for the correlation structure between Parts A and B rather than treating them as independent, while using uniform average correlations within each part for computational efficiency. This approach refines our estimates, making them more representative of the scale's actual variability patterns.

The resulting calculations yielded the following means and standard deviations for the ADHD group (n = 465):

- Part A (*M* = 16.71, *SD* = 5.07)
- Part B (*M* = 32.74, *SD* = 9.16)
- Total Score (*M* = 49.45, *SD* = 13.36)

For the non-ADHD group (n = 21,932), the values were:

- Part A (*M* = 10.88, *SD* = 3.76)
- Part B (*M* = 21.60, *SD* = 6.69)
- Total Score (*M* = 32.48, *SD* = 9.8)

The means and standard deviations were used to calculate percentiles for both the clinical (ADHD) and community (non-ADHD) groups, supporting a meaningful interpretation of where an individual's scores fall relative to these groups. The percentiles and their classifications are shown in Table 1. The classifications are based on the recommended descriptors for the Part A scores (Harvard Medical School, 2024) but they have been modified to be more clinically meaningful (i.e., low negative = Low; high negative = Mild to Moderate; low positive = High; high positive = Very High). The community comparison sample (non-ADHD group) percentile for each descriptor transition point (e.g., Low – Mild to Moderate; High – Very High) for Part A was used as a guide to transfer these descriptors to the Part B and Total scores.

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Table 1

Percentile Tables for Part A, Part B, and Total Scores for the Clinical Comparative Sample (ADHD Group) and the Community Comparative Sample (non-ADHD Group)

	Part A			Part B			Total Score		
Score	ADHD Group	non-ADHD Group		ADHD Group	non-ADHD Group		ADHD Group	non-ADHD Group	
0		0.2	Low						
1	0.1	0.4			0.1				
2	0.2	1			0.2				
3	0.3	2			0.3			0.1	
4	0.6	3			0.4			0.2	
5	1	6		0.1	0.7			0.25	
6	2	10		0.18	1			0.3	
7	3	15		0.2	1.5			0.5	
8	4	22		0.3	2			0.6	
9	6	31		0.5	3		0.1	0.8	
10	9	41	Mild to Moderate	0.7	4		0.2	1	
11	13	51		1	6		0.20	1.4	
12	18	62		1.2	8		0.3	2	
13	23	71		1.6	10		0.32	2.3	
14	30	80	High	2	13		0.4	3	
15	37	86		3	16		0.6	4	
16	44	91		3.4	20		0.7	5	
17	52	95		4	25		0.8	6	
18	60	97	Very High	5	30		1	8	
19	67	98.5		7	35		1.2	9	
20	74	99.2		8	41	Mild to Moderate	1.5	11	
21	80	99.6		10	46		1.7	13	
22	85	99.8		12	52		2	15	
23	89	99.9		14	58		2.5	17	
24	92	99.98		17	64		3	20	
				20	69		3.4	23	
				23	74		4	26	
				27	79	High	5	29	
				30	83		5.4	32	
				34	87		6	36	
				38	90		7	40	
				42	92		8	43	
				47	94		9	47	
				51	96	Very High	11	51	
				55	97		12	55	
				60	98		13	59	
				64	98.4		15	63	
				68	99		17	66	
				72	99.3		19	70	
				75	99.5		21	73	
				79	99.7		25	79	
				82	99.8		27	82	
				84	99.89		30	84	
				87	99.93		32	87	
				89	99.96		35	89	
				91	99.98		38	90	
				93	99.99		40	92	
				94			43	93	
				95			46	94	
							49	95	
							52	96	
							55	97	
							57	97.7	
							60	98	
							63	98.5	
							66	98.9	
							68	99	
							71	99.3	
							73	99.5	
							75	99.6	
							78	99.7	
							80	99.8	
							82	99.85	
							84	99.89	
							87	99.94	
							88	99.96	
							90	99.97	
							91	99.98	
							92	99.99	
							93		
							94		
							95		
							96		

Note. Calculated from data compiled by Adler et al. (2018). Descriptors used for each of the scores are presented within the table.

This approach to determine descriptors for Part B and Total scores, based upon the community sample percentile transition points from Part A, represents a statistically sound method. By using the same percentile cutoffs across all parts of the scale, the descriptors maintain a consistent meaning relative to the general population distribution. This ensures that a 'High' or 'Very High' score represents the same degree of deviation from community norms regardless of which part of the scale is being interpreted. While the different parts of the scale have different numbers of items (6 versus 12), the percentile-based approach inherently accounts for these structural differences by positioning scores relative to the reference population and this method provides a coherent framework for interpretation across all parts of the scale while maintaining the clinical utility of the descriptors.

Methodological Limitations

The methodology used to calculate pooled standard deviations for Part A, Part B and the Total score of the ASRS represents a practical approach to a complex statistical challenge but contains several important limitations that warrant consideration. These limitations primarily concern the assumptions made in calculating the variability of scores and their implications for score interpretation.

A central limitation lies in the use of a uniform inter-item correlation (r = 0.32) when calculating the standard deviations within Parts A and B. While this approach provides a tractable solution to estimating the variance of sum scores, it assumes that all items within each part share the same average correlation. Specific items within each part will have stronger or weaker relationships with each other, which might affect the true variability of the composite scores. This simplification, while mathematically convenient, might lead to either over- or under-estimation of the true standard deviations for these parts. Similarly, the calculation of the Total score standard deviation relies on the correlation between Parts A and B (r = 0.74), treating this as constant across all score levels. This assumption, while necessary for computing the overall variability, may not fully capture potential differences in the relationship between the two parts across different severity levels. For instance, the correlation between Part A and B might vary at different points along the severity spectrum, which could impact the accuracy of the Total score standard deviation estimate.

From a mathematical perspective, the approach to calculating standard deviations assumes that the variance-covariance structure can be adequately captured through average correlations. While this

provides a practical solution, it necessarily simplifies the underlying complexity of symptom interrelationships. The formula used for combining the standard deviations of Parts A and B into a Total score standard deviation, while mathematically sound, relies on these simplified correlation assumptions too. These limitations do not invalidate the current approach but rather highlight areas where precision might be questioned. The method chosen represents a reasonable balance between statistical rigour and practical utility, providing means and standard deviations that can be meaningfully interpreted in clinical settings.

Conclusion

In conclusion, while the methodology employs sound statistical principles for calculating standard deviations, the assumptions made in service of computational feasibility introduce certain limitations. Understanding these limitations is crucial for appropriate interpretation of scores, particularly when making comparisons across different levels of symptom severity.

References

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