

Outcomes Star™ Psychometric Factsheet: Spectrum Star™

Dr Anna Good, Outcomes Star

Background

The Spectrum Star is a version of the Outcomes Star for people on the autistic spectrum. It was developed in 2011 by Outcomes Star with Accomplish, The National Autistic Society and the Bristol Autism Spectrum Service. In 2024, it was updated with valued contributions from Rox Faulks, Outcomes Star; Billy Alexander, Autism & Neurodiversity North Scotland; and Wales National Neurodivergence Team.

More information about the development of the Spectrum Star can be found on our website (<https://www.outcomesstar.org.uk/using-the-star/find-your-star/spectrum-star/>).

Method and analytic strategy

Data routinely collected and entered onto the Star Online for 539 service users in five organisations was analysed to confirm the Star's validity as an outcomes measurement tool. A full explanation of the analytic strategy is provided in the accompanying document – [Outcomes Star Psychometric Factsheets: Overview](#).

Service users were included if they had at least two collaboratively completed standard readings (i.e. not completed retrospectively) and responsiveness was assessed by comparing first and second readings.

Additional analyses looking at convergence with the Rosenberg self-esteem scale was conducted on data from a 12-week specialist Enablement intervention.

Results

Does it make sense for the different outcome areas of the Spectrum Star to be included in the same tool?

Factor Structure: Although there were 14 inter-item correlations lower than .30, the Kaiser-Meyer-Olkin value was good (.81), exceeding the recommended minimum value of 0.60 (Kaiser 1970, 1974) and there was also a significant Bartlett's Test of Sphericity (Bartlett, 1954) supporting the suitability of the data for factor analysis. A unidimensional factor structure was advised with one factor explaining 50% of the variance in the data.

Internal Consistency: Internal consistency was good and exceeded the .7 threshold (Cronbach's $\alpha = .81$).

Is each outcome area measuring a unique aspect of the service user's situation?

Item redundancy: No inter-item correlation exceeded the 0.7 threshold, suggesting no redundancy between areas (see Table 1).

Does the Spectrum Star detect change occurring within services?

Responsiveness to change: Wilcoxon Signed Rank Test comparing 1st and 2nd Star readings revealed statistically significant increases for all outcome areas. After excluding those who could not move forward (who began at 10 on the individual outcome areas), all effect sizes were medium ($p < .001$, see Table 2). The results when including all service users are shown in Table 3.

Do Spectrum Star readings correlate with validated measures?

Convergence: Star readings were completed at baseline, immediately after the intervention and 12 weeks post-intervention. Spearman's rank correlation showed that Rosenberg self-esteem scale scores were strongly positively associated with Star readings on the Well-being and self-esteem area of the Spectrum Star at all three time-points:

Week 1: $r(30) = .52, p < .01$

Week 12: $r(30) = .53, p < .01$

Week 24: $r(30) = .78, p < .01$

Change in Rosenberg self-esteem scores (week 1 to 12) also showed a significant positive association with change in the overall Star mean ($r = .47, p < .01$), Physical health ($r = .50, p < .01$) and Time and activities ($r = .39, p < .05$).

Conclusion

The results of these initial analyses are encouraging and suggest that the Spectrum Star is a valid outcomes measurement tool, with a single underlying construct, responsiveness to positive changes and convergence with another validated outcome measure.

Further research

External research about the Star as an outcomes and keywork measure can be found on our website: <http://www.outcomesstar.org.uk/about-the-star/evidence-and-research/research-library/#all>

TABLE 1: Polychoric correlation matrix for outcome areas (N = 549)

	2	3	4	5	6	7	8	9
1. Physical health	.50	.46	.20	.32	.40	.29	.20	.30
2. Living skills and self-care	-	.34	.14	.34	.43	.29	.22	.39
3. Well-being and self-esteem		-	.42	.37	.40	.40	.34	.32
4. Sensory needs			-	.22	.25	.20	.54	.19
5. Communicating				-	.68	.42	.34	.29
6. Social skills					-	.49	.28	.42
7. Relationships						-	.28	.36
8. Being safe and responsible							-	.17
9. Time and activities								-

TABLE 2: Responsiveness of the Spectrum Star (excluding service users starting at 10 who could not move forward)

Scale	Time 1	Time 2	Wilcoxon	Effect	n
	Median	Median	statistic	size ¹	
			Z	r	
1. Physical health	5.00	6.00	-11.71***	0.36	529
2. Living skills and self-care	5.00	7.00	-12.23***	0.38	525
3. Well-being and self-esteem	4.00	6.00	-15.06***	0.46	532
4. Sensory needs	5.00	6.00	-9.75***	0.36	368
5. Communicating	6.00	7.00	-12.07***	0.38	517
6. Social skills	5.00	6.00	-12.30***	0.38	529
7. Relationships	6.00	7.00	-11.58***	0.36	517
8. Being safe and responsible	7.00	8.00	-7.16***	0.32	248
9. Time and activities	5.00	6.00	-13.99***	0.43	519

*** $p < .001$

¹ Cohen provided rules of thumb for interpreting these effect sizes, suggesting that an r of .1 represents a 'small' effect size, .3 represents a 'medium' effect size and .5 represents a 'large' effect size

TABLE 3: Responsiveness of the Spectrum Star: 1st to 2nd reading (N = 539)

	First Star median	Final Star median	Z	Effect size <i>r</i>¹
Physical health	5.00	7.00	-11.67	0.36
Living skills and self-care	5.00	7.00	-12.08	0.37
Well-being and self-esteem	4.00	6.00	-14.97	0.46
Sensory needs	7.00	7.00	-8.21	0.25
Communicating	6.00	7.00	-11.62	0.35
Social skills	5.00	6.00	-12.11	0.37
Relationships	6.00	7.00	-11.00	0.34
Being safe and responsible	10.00	10.00	-5.58	0.17
Time and activities	5.00	7.00	-13.53	0.41

*** $p < .001$

¹ Cohen provided rules of thumb for interpreting these effect sizes, suggesting that an r of .1 represents a 'small' effect size, .3 represents a 'medium' effect size and .5 represents a 'large' effect size

References

- Bartlett, M. S. (1954). A note on the multiplying factors for various χ^2 approximations. Journal of the Royal Statistical Society. Series B (Methodological), 296-298.
- Burns, S. & MacKeith, J., Ford, P.T., Hahn, S.& Tierney, J. (2024). The Spectrum Star User Guide (1.2), Brighton: Outcomes Star
- Kaiser, H. F. (1970). A second generation little jiffy. Psychometrika, 35(4), 401-415
- Kaiser, H. F., & Rice, J. (1974). Little jiffy, mark IV. Educational and psychological measurement, 34(1), 111-117.
- MacKeith, J., (2014). Assessing the reliability of the Outcomes Star in research and practice. Housing, Care and Support, 17(4), 188-197.