

Content Validation of the Handwriting Difficulties Screening Checklist for individuals with Autism Spectrum Disorder (HDSC-ASD) as per RPWD Act 2016.



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Abstract

The purpose of this study was to evaluate the content validity of the *Handwriting Difficulties Screening Checklist for Autism Spectrum Disorder (HDSC-ASD)*, a screening tool designed to assess handwriting challenges in individuals with Autism Spectrum Disorder (ASD) as per RPWD Act 2016. The checklist consists of ten domains reflecting core aspects of handwriting performance. A panel of experts in occupational therapy, special education, and developmental disorders reviewed the tool for relevance, clarity, and representativeness. Content validity was assessed using the Item Content Validity Index (I-CVI) and Scale Content Validity Index (S-CVI/Ave). The results supported strong content validity for the tool, with all items achieving acceptable I-CVI values and an overall S-CVI/Ave of 0.92. These findings suggest that HDSC-ASD is a content-valid tool for screening handwriting difficulties in individuals with ASD.

1. Introduction

Handwriting difficulties are commonly reported among individuals with Autism Spectrum Disorder (ASD), manifesting as poor motor coordination, letter formation deficits, alignment issues, and abnormal writing pressure. These challenges can significantly affect academic performance, self-esteem, and overall independence.

While several handwriting assessment tools exist, few are specifically designed or validated for children with ASD. Tools developed for typically developing children or those with other disabilities may not capture the unique motor, sensory, and perceptual challenges experienced by individuals on the autism spectrum.

The *Handwriting Difficulties Screening Checklist for Autism Spectrum Disorder (HDSC-ASD)* was developed to bridge this gap. It comprises ten domains: Joint Stability, Posture, Pressure on Pencil/Pen, Primary Strokes, Letter Formation, Number Formation, Horizontal Alignment, Vertical Alignment, Spacing, and Speed. Each domain is scored from 1 to 10, allowing for a comprehensive profile of handwriting ability.

The present study aimed to establish the **content validity** of the HDSC-ASD using expert review. Content validity refers to the extent to which an instrument adequately samples the domain of interest—in this case, handwriting difficulties among individuals with ASD.

2. Methods

2.1 Instrument Description

The HDSC-ASD is a ten-item screening tool, each scored on a 10-point Likert-type scale, where 10 indicates excellent performance and 1 represents no performance. The total score ranges from 10 to 100. Performance is categorized as:

- <35: Profound difficulties
- <45: Severe difficulties
- <55: Mild difficulties
- <75: Moderate difficulties

Each domain addresses a specific component of handwriting performance, including motor control, posture, spatial organization, and pressure regulation.

2.2 Expert Panel

A panel of **eight experts** was recruited based on the following inclusion criteria:

- Minimum 5 years of clinical or academic experience in occupational therapy, special education, developmental paediatrics, or psychology.
- Experience working with children with ASD.
- Familiarity with handwriting assessment tools.

The panel consisted of four occupational therapists, two special educators, and two clinical psychologists.

2.3 Content Validation Process

Experts were provided with the HDSC-ASD tool and a validation form. They were instructed to rate each item based on its **relevance** to the construct of handwriting difficulties in ASD using a 4-point ordinal scale:

- 1 = Not relevant
- 2 = Somewhat relevant
- 3 = Quite relevant
- 4 = Highly relevant

For each item, the **Item Content Validity Index (I-CVI)** was calculated as the number of experts rating

the item as 3 or 4 divided by the total number of experts.

The **Scale Content Validity Index (S-CVI/Ave)** was calculated as the average of all I-CVIs.

Criteria for adequacy:

- I-CVI ≥ 0.78 is considered acceptable (for ≥ 6 experts)
- S-CVI/Ave ≥ 0.90 indicates excellent scale-level content validity

Experts were also invited to provide qualitative feedback on the clarity, redundancy, and completeness of each item.

3. Results

3.1 Quantitative Findings

Item	I-CVI
Joint Stability	1.00
Posture	1.00
Pressure on Pencil/Pen	0.88
Primary Strokes	1.00
Letter Formation	1.00
Number Formation	0.88
Horizontal Alignment	0.88
Vertical Alignment	0.88
Spacing	1.00
Speed	1.00

S-CVI/Ave = 0.952

All items achieved acceptable I-CVI values (≥ 0.78), and the average scale-level CVI exceeded the 0.90 threshold, indicating excellent content validity.

3.2 Qualitative Feedback

Experts noted that:

- The inclusion of both letter and number formation was valuable.
- Terminology was clear and easy to interpret.
- Suggested adding examples or illustrations for better consistency in scoring.
- One expert recommended merging vertical and horizontal alignment into a single spatial alignment item.

4. Discussion

This study provides strong evidence for the content validity of the HDSC-ASD checklist. All items were deemed relevant by a panel of experienced professionals, and the tool achieved an overall S-CVI/Ave of 0.952, exceeding accepted thresholds.

The results support the inclusion of specific items like "Joint Stability" and "Pressure on Pencil/Pen," which are not commonly emphasized in traditional handwriting assessments but are highly relevant in ASD due to sensory-motor integration challenges.

Minor suggestions, such as merging alignment items or adding visual aids, reflect opportunities for further refinement but do not detract from the checklist's fundamental validity.

Limitations:

- Content validation alone does not establish construct or criterion validity.
- Limited geographic diversity among reviewers.
- Further testing is needed in real-world school or clinical settings.

Future Directions:

- Pilot testing with children diagnosed with ASD.
- Inter-rater reliability and test-retest reliability studies.
- Exploratory and confirmatory factor analysis to establish construct validity.
- Tool applicability as functional assessment tool to provide exemption guidelines under RPwD Act 2016

5. Conclusion

The HDSC-ASD demonstrates strong content validity as a screening tool for handwriting difficulties in

individuals with Autism Spectrum Disorder. Expert feedback confirms the relevance and comprehensiveness of the items. The tool is ready for pilot testing and further psychometric validation to confirm its utility in clinical and educational practice. Additionally, this tool implementation on assessing need of scribe as per RPWD Act 2016 shall be explored.

6. References

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Appendices

Appendix A: HDSC-ASD Checklist Handwriting Difficulties Screening Checklist for Autism Spectrum Disorder (HDSC-ASD)

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Sr.No	Item	Score
1	Joint Stability	___/10
2	Posture	___/10
3	Pressure on pencil/pen over paper	___/10
4	Primary strokes	___/10
5	Letter formation	___/10
6	Number Formation	___/10
7	Horizontal Alignment	___/10
8	Vertical Alignment	___/10
9	Spacing	___/10
10	Speed	___/10
Total		___/100

Scoring:

- Scoring for each component to be given individually
- Score 1 to 10 where 10 is best performance and 1 for **no performance**.
- +7 Excellent performance
- 6 Good performance
- 5 Average performance
- Less than or equal 4 Poor Performance

Total score interpretation:

<35	Profound Handwriting difficulties
<45	Severe Handwriting difficulties
<55	Mild Handwriting difficulties
<75	Moderate Handwriting Difficulties

Appendix B: Expert Validation Form

Instructions: Please rate the relevance of each item using the following scale: 1 = Not relevant, 2 = Somewhat relevant, 3 = Quite relevant, 4 = Highly relevant.

Item	Relevance (1-4)	Comments
Joint Stability	_____	_____
Posture	_____	_____
Pressure on Pencil/Pen	_____	_____
Primary Strokes	_____	_____
Letter Formation	_____	_____
Number Formation	_____	_____
Horizontal Alignment	_____	_____
Vertical Alignment	_____	_____
Spacing	_____	_____
Speed	_____	_____

Appendix C: Instructions to Reviewers

- Review the checklist carefully.
- Rate each item on its relevance to handwriting difficulties in ASD.
- Provide any additional comments or suggestions for improvement.