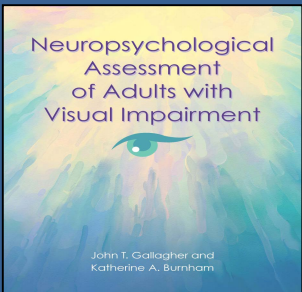




Neuropsychological Assessment of Adults with Visual Impairments (NAAVI) Assessment Battery

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Abstract

There is a dearth of assessment instruments for individuals with visual impairments. Researchers sought to develop a full neuropsychological battery to broadly assess those with visual impairments.

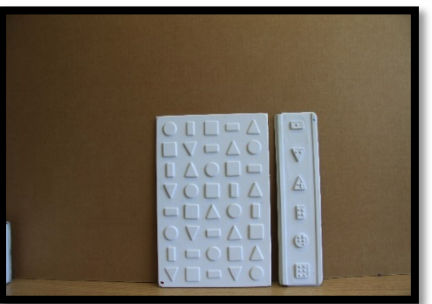
Drawing on past assessment tools, using modified assessments, and incorporating theory of blind assessment, an entire battery of subtests was developed to broadly assess cognitive, neuropsychological, and motor functioning.

Data were collected from over 500 individuals with visual impairments who were administered the subtests. Psychometric data and normative scores were generated. Researchers compared performance of those capable of travel performance with those not capable and compared very low birth weight individuals with typical birth weight.

A textbook covering areas of nonvisual assessment and a complete test battery with manipulatives and record forms were produced for testing with individuals with visual issues. The test was found to help predict functional skills in blind individuals.

Introduction and Methods

Clinicians and researchers have struggled to fully understand abilities of individuals with visual impairments, often relying on self-modified assessments or verbal subtests. This is not sufficient as this approach is not standardized, does not contextualize performance relative to the population, and does not assess a full range of functions.



NAAVI Purpose

- To address the relative lack of validated, informative instruments for cognitive/neuropsychological assessment of persons who are blind or visually impaired
- To provide an assessment with normative scores standardized with population of visually impaired
- To gather used and new instruments and provide a convenient and standardized format for administration
- To have an extensive textbook covering all aspects of cognitive/neuropsychological testing for this population
- To instigate further research and clinical work with visually impaired, including young people

Methods and Materials

Over 500 individuals of varied backgrounds and abilities, ages 16-75, were administered NAAVI subtests. Participants had no sight or were blindfolded for standardization. Data collected from these individuals were used to produce scaled score tables and answer the following research questions:

- What data predict travel independence of blind individuals?
- Is there a distinct group of blind individuals with very low birth weight (<2.2lbs) (VLBW) who perform differently and have different needs and treatment compared with those with just impairments (OVI)?

Tests Instruments Used

- Tactual Formboard (TFBT)
- Pattern of Search (POS)
- Tactile Block Design
- Object Assembly
- Arithmetic (WAIS)
- Comprehension (WAIS)

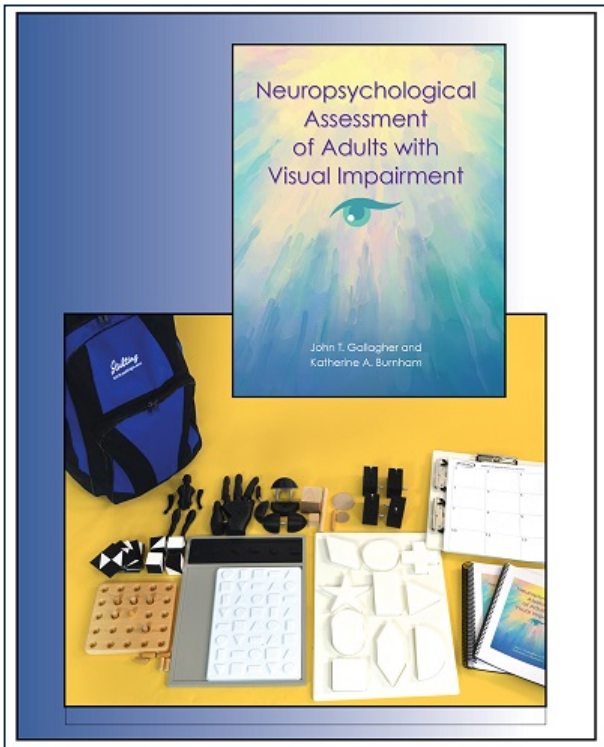
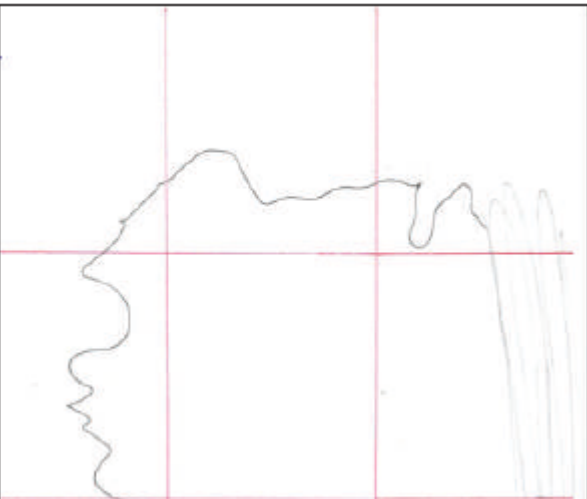
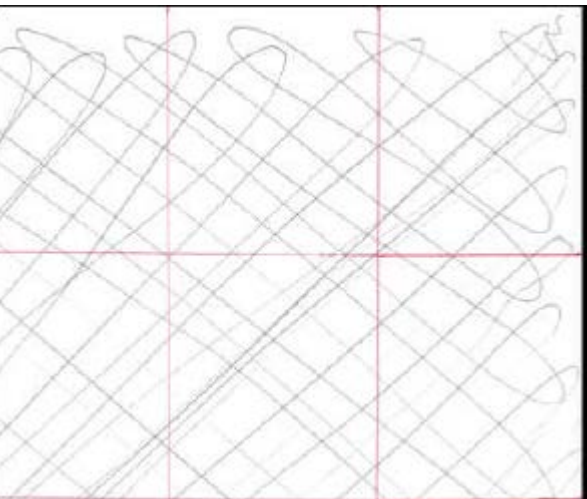


Figure 1. NAAVI Battery.



SUBTEST	AREAS ASSESSED
ADAPTED TOKEN TEST	Receptive Language, Hearing, Understanding directions, Immediate verbal retention
REY AUDITORY VERBAL LEARNING TEST (RAVLT)	List learning, Incidental memory, Episodic memory, Additional trials and comparisons
TACTUAL FORMBOARD TEST (TFBT)	Spatial exploration, Spatial learning, Independent travel, Spatial distortion, Motor coordination, Sustained attention, Memory-recognition and recall, Spatial understanding, Spatial relations
AUDITORY CANCELLATION TEST	Attention- immediate and sustained, Impulsivity, Response monitoring, Adaptability
DIGIT SYMBOL	Spatial learning, Memory, Haptic sense, Processing speed, Learning, Spatial awareness and memory, Spatial orientation
BLOCK DESIGN	Spatial understanding, Tactual-spatial understanding, Spatial rotation understanding, Pattern analysis, Spatial construction
OBJECT ASSEMBLY	Spatial understanding, Spatial construction, Manual dexterity, Assembly skills, Part-to-whole reasoning and construction, Problem solving
PATTERN BOARD	Tactual-spatial memory, Spatial preference, Spatial distortion, Verbal memory, Kinesthetic memory
PATTERN OF SEARCH TEST	Independent travel capability, Executive function, Planning, Thoroughness of spatial exploration, Spatial functioning
MICHIGAN NONVISUAL MATHEMATICS TEST	Basic mathematics verbally administered up to the 7th grade level

Table 1. NAAVI subtests and cognitive domains assessed.

Figure 2. Pattern of Search Subtest examples (top)- Methodical, well-executed search (bottom)- Unorganized, sparse search

Results

Very Low Birth Weight Comparisons

VLBW individuals scored significantly lower than Other Visually Impaired (OVI) individuals on following subtests/subtest components

Subtest	t	p	Cohen's D
TFBT Location Time	-2.75	.01	.79
TFBT Shape Position Recall	4.75	<.01	1.03
POS Plan	2.83	<.01	.81
Block Design	7.90	<.01	1.50
Object Assembly	4.51	<.01	1.00
Arithmetic	3.46	.01	.74
Comprehension	3.39	<.01	.71

Table 2. Outcomes of significant subtests comparing VLBW and typical weight blind.

Independent Travel Prediction

TFBT Observations

- No improvements across trials
- Not able to place all 10 pieces
- Memory for location very poor

Independence	POS plus TFBT Score > 90	POS plus TFBT Score <55
Yes	45%	0%
No	9%	33%

Table 3. Percent of individuals with given travel status scoring POS scores above or below given score.

Discussion

Very Low Birth Weight Comparisons

- VLBW and blind performed worse than blind alone on tasks involving efficient pattern recognition, planning, part-to-whole assembly, calculations, comprehending verbal-social concepts, and location recognition and memory
- This suggests VLBW and blind have unique deficits, needing specific remediation and accommodation in these areas

Travel Independence

- Poor performance on tasks of location and memory of location, ability to learn location, spatial exploration (POS <55) suggest poor prognosis for independent travel

NAAVI

- One text book
 - Topics/Areas to test in full assessment
 - Recommendations for tests
 - Interpretation of tests to gain information
 - Case examples
- One Appendix
 - Subtest Administration Instructions
 - Subtest Description/Psychometrics
 - Scaled Score Conversion Tables
 - Reproducible Record Forms/Summary Sheets
 - Full diagnostic/background interview
- Manipulatives for administration of subtests

Conclusions

The NAAVI book and battery is the only text and full assessment of its kind to cover the area of neuropsychological testing of persons without vision to have been developed in recent decades.

It appears to be a useful tool for identifying individuals who struggle to travel independently. It also shows specific deficits that may be present in those with very low birth weight.

Further research should involve further assessment of those two clinical groups, continued NAAVI research, and application of the test.

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References

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NAAVI Information available at: <https://www.stoeltingco.com/neuropsychological-assessment-of-adults-with-visual-impairment-naavi-kit.html>
References available upon request at: bsyzdek@stoeltingco.com