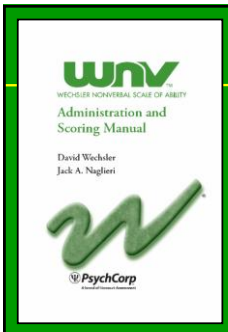

Wechsler Nonverbal Scale of Ability

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Router

WNV Overview

Router

Presentation Outline

1. **Overview**
2. **Administration**
3. **Subtest Description**
4. **Interpretation**
5. **Reliability**
6. **Validity**
7. **What does the WNV measure?**
8. **Case Studies**
9. **Conclusions**

Router

Instructions

- **Pre administration instruction**
- **Subtest administration has three levels**
  - **Pictorial directions**
  - **Short verbal instructions**
    - **Provided in 5 languages**
  - **Opportunity to provide help as needed**

Router

WNV Overview

- **The WNV is a nonverbal measure of general ability measured using tests that**
  - **involve different demands**
  - **do not contain verbal content (e.g., Vocabulary)**
  - **do not require the examinee to speak**
  - **use pictorial directions**

Router

WNV Overview

- WNV was specifically created for:
  - Individuals from diverse linguistic groups
  - Those who have limited language skills
  - Hard of hearing or deaf individuals
  - Individuals with language disorders
  - Identification of gifted children from linguistically and culturally diverse populations

WNV Overview

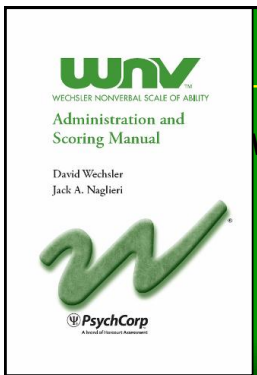
- The test is intended for fair assessment of culturally and linguistically diverse populations from many countries
- Standardized in the US and Canada
- For ages 4:0 – 21:11
- Yields a Full Scale and subtest scores
- Innovative administration format
- Full (45 minute) and brief (20 minute) versions *and software* included in every kit

WNV Overview

- The WNV can be given to a wide variety of individuals making it ideal for students who speak many languages
- Minimal adaptation needed for use in different countries or with those from different countries
- Meets IDEA 2004 requirements for reliable and valid nondiscriminatory assessment

WNV Overview

- The WNV uses a new method for informing the examinee of the demands of the test – Pictorial Directions (patent pending)
- Examinees are shown a series of pictures that illustrate what he or she has to do
- The Pictorial Directions include gestures by the examiner that draw the examinee's attention to the correspondence between the directions and the stimuli on the table



WNV Subtests

Administration

WNV Overview

- Ages 4:00 – 7:11
- 4 Subtests
  - Matrices
  - Coding
  - Object Assembly
  - Recognition
- 2 Subtests
  - Matrices
  - Recognition

- Ages 8:0 – 21:11
- 4 Subtests
  - Matrices
  - Coding
  - Spatial Span
  - Picture Arrangement
- 2 Subtests
  - Matrices
  - Spatial Span

Presentation Outline

1. Overview
2. Administration
3. Subtest Description
4. Interpretation
5. Reliability
6. Validity
7. What does the WNV measure?
8. Case Studies
9. Conclusions

Before Starting

Getting Started

Introducing the WNV to Examinees Ages 4:0–7:11

Before you begin, ensure that the necessary test materials are in order, and that the examinee is engaged in the testing process. (Refer to chapter 2 of this Manual for guidelines in establishing and maintaining rapport.) When you feel that you have attained a sufficient level of support and engagement, introduce the WNV by saying,

E: You will be doing several different things today. I will show you some pictures that will help you understand what to do. Look carefully to see what the children in the pictures are doing. That will show you what to do. You can also ask me questions.

F: Aujourd'hui, nous allons faire différentes choses. Je vais te montrer des images qui t'aideront à comprendre ce qu'il faut faire. Regarde attentivement pour voir ce que font les enfants dans ces images. Ils te montreront ce que tu dois faire. Tu peux aussi me poser des questions.

S: Hoy vas a hacer varias cosas diferentes. Te voy a enseñar algunos dibujos que te van a audar entender lo que tienes que hacer. Mira con cuidado a lo que hacen los niños en los dibujos. Eso te enseña lo que tienes que hacer. También puedes preguntarme.

C: 今天將請你做幾件不同的事情。我會給你一些圖片來幫助你理解所要做的事情。

Instructions

- Pre administration instruction
- Subtest administration has three levels
  - Pictorial directions
  - Short verbal instructions
    - Provided in 5 languages
  - Opportunity to provide help as needed

Matrices Administration

Item Administration

Demonstration Item

4–7

1. Place the coil-bound edge of the Stimulus Book toward the examinee. Turn to the pictorial directions for Matrices.

Matrices Administration

2. Slowly point to each frame of the pictorial directions from the examinee's left to right, briefly looking at the examinee as you point to each frame to be sure he or she is attending.

Matrices Administration

3. Allow the examinee time to look at the pictorial directions (up to a minute if needed).
4. Point to the first frame of the pictorial directions, then point to the top of the stimulus page.

Matrices Administration

5. Point to the second frame of the pictorial directions, then slowly sweep your hand along the response options in numerical order.

Matrices Administration

6. Point to the third frame of the pictorial directions, point to the question mark in the matrix, slowly sweep your hand along the response options in numerical order, and then look at the examinee.

Instructions

- Pre administration instruction
- Subtest administration has three levels
  - Pictorial directions
  - Short verbal instructions
    - Provided in 5 languages
  - Opportunity to provide help as needed

Matrices Administration

7. If the examinee does not respond or appears confused, prompt by saying, **Which one of these** (sweep your hand along the response options in numerical order) **goes here** (point to the question mark)? Provide additional help until the examinee understands the task.

E: Which one of these goes here?	F: Laquelle de celles-ci va ici?
S: ¿Cuál de éstos va aquí?	C: 這些中的哪一個填在這兒?
G: Welches von diesen passt hier?	D: Welk van deze past hier?

Instructions

- Verbal directions in several languages are provided in the Administration Manual

If the examinee does not respond or appears confused, prompt by saying, **Which one of these** (sweep your hand along the response options in numerical order) **goes here** (point to the question mark)? Provide additional help until the examinee understands the task.

E: Which one of these goes here?	F: Laquelle de celles-ci va ici?
S: ¿Cuál de éstos va aquí?	C: 這些中的哪一個填在這兒?
G: Welches von diesen passt hier?	D: Welk van deze past hier?

Matrices Administration

Incorrect response/No response:

1. Point to all of the blue circles in the matrix and then point to the question mark. Sweep your hand along the response options in numerical order and say, **This one is the answer** (point to 1).

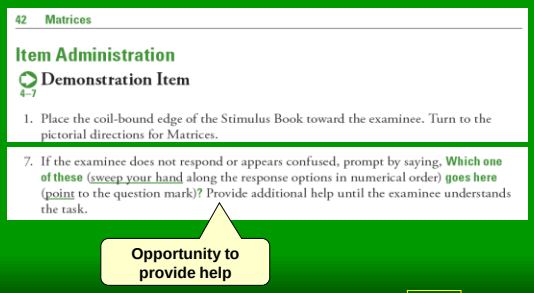
E: This one is the answer.	F: Celle-ci est la réponse.
S: Esta es la respuesta.	C: 這個是正確答案。
G: Dieses ist die Antwort.	D: Dit is het goede antwoord.

2. Provide additional help, as needed, until the examinee understands the task.
3. Proceed to Sample Item A.

Instructions

- Pre administration instruction
- Subtest administration has three levels
  - Pictorial directions
  - Short verbal instructions
    - Provided in 5 languages
  - Opportunity to provide help as needed

Provide Help



42 Matrices

Item Administration

Demonstration Item
4–7

1. Place the coil-bound edge of the Stimulus Book toward the examinee. Turn to the pictorial directions for Matrices.

7. If the examinee does not respond or appears confused, prompt by saying, **Which one of these** (sweep your hand along the response options in numerical order) **goes here** (point to the question mark)? Provide additional help until the examinee understands the task.

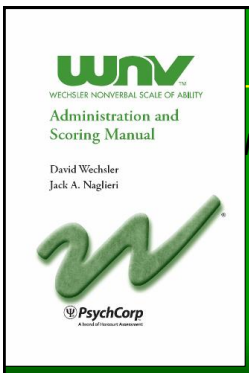
Opportunity to provide help

Instructions

- Provide help instruction allows the examiner to interact with the examinee in any manner to ensure that the demands of the task are understood. This is not teaching how to do the task, but instead explaining what is required.

Presentation Outline

1. Overview
2. Administration
3. Subtest Description
4. Interpretation
5. Reliability
6. Validity
7. What does the WNV measure?
8. Case Studies
9. Conclusions



WNV Subtests

Content and Administration

Matrices

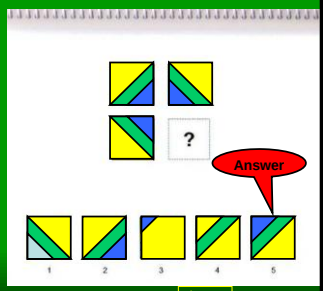
Table 2.4 Summary of Start Points, Reverse Rules, and Discontinue Rules

Subtest	Start Point	Reverse Rule	Discontinue Rule
Matrices (MA)	**Ages 4–5** Demonstration Item, Sample Items A–C, then Item 1 **Ages 6–15** Demonstration Item, Sample Items A–C, then Item 7 **Ages 16–21** Demonstration Item, Sample Items A–C, then Item 12	**Ages 6–21** Score of **0** on *either* of the first two items given, administer preceding items in reverse sequence until two consecutive perfect scores are obtained	After **4** scores of 0 on *five* consecutive items

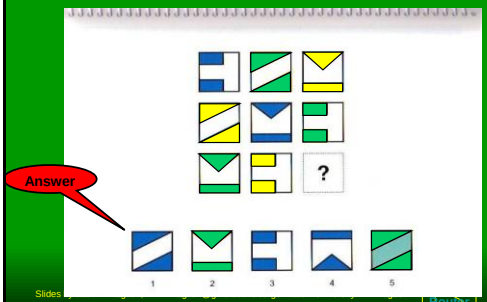
Stop when 4 of 5 items failed

Matrices

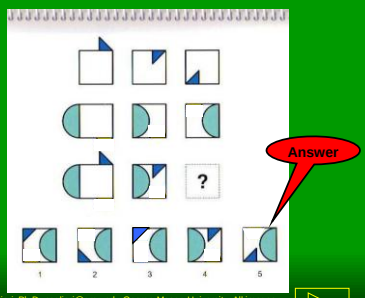
- Adapted from the Naglieri Nonverbal Ability Test (NNAT)
- Multiple color, without color-blindness issues



Matrices



Matrices



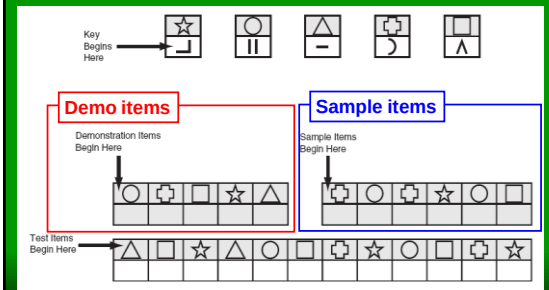
Coding

Table 2.4 Summary of Start Points, Reverse Rules, and Discontinue Rules

Subtest	Start Point	Reverse Rule	Discontinue Rule
Coding (CD)	**Ages 4–7** Coding A Demonstration Items, Sample Items, then Test Items **Ages 8–21** Coding B Demonstration Items, Sample Items, then Test Items	None	**Ages 4–7** After 120 seconds **Ages 8–21** After 120 seconds

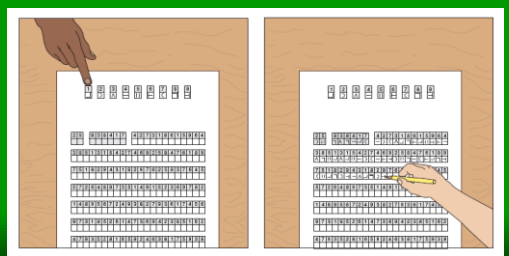
120 seconds

Coding



Coding A & B

- Adapted from WISC-IV



Spatial Span

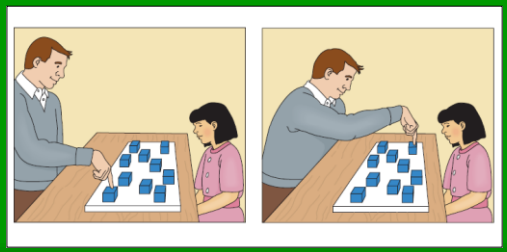
- Only for Older Examinees
- Adapted from WISC-IV Integrated
- Forward and Backwards

Stop after scores of 0 on both trials of an item

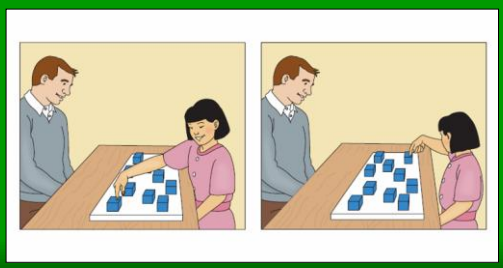
Table 2.4 Summary of Start Points, Reverse Rules, and Discontinue Rules

Subtest	Start Point	Reverse Rule	Discontinue Rule
Spatial Span (SSp)	Ages 8–21 **Forward:** Demonstration Item, Sample Item, then Item 1 **Backward:** Demonstration Item, Sample Item, then Item 1	None	**Forward:** After scores of 0 on *both* trials of an item **Backward:** After scores of 0 on *both* trials of an item

Spatial Span Forward



Spatial Span Forward



Object Assembly

- Adapted from WPPSI-III, WISC-IIII, & WAIS-III

Stop after 2 consecutiv e scores of 0

Table 2.4 Summary of Start Points, Reverse Rules, and Discontinue Rules

Subtest	Start Point	Reverse Rule	Discontinue Rule
Object Assembly (OA)	Ages 4–5 Demonstration Item, Sample Item, then Item 1 Ages 6–7 Demonstration Item, Sample Item, then Item 3	Ages 6–7 Imperfect assembly on *either* of the first two items given, administer preceding items in reverse sequence until two consecutive perfect scores are obtained	After **2** consecutive scores of 0

Object Assembly

Recognition

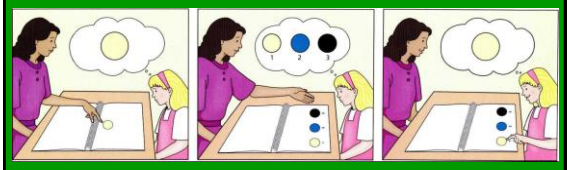
- New Subtest

Stop when 4 of 5 items failed

Table 2.4 Summary of Start Points, Reverse Rules, and Discontinue Rules

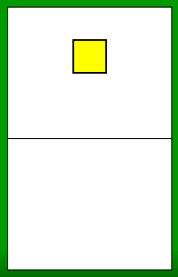
Subtest	Start Point	Reverse Rule	Discontinue Rule
Recognition (RG)	Ages 4–5 Demonstration Item, Sample Items A–C, then Item 1 Ages 6–7 Demonstration Item, Sample Items A–C, then Item 4	Ages 6–7 Score of **0** on *either* of the first two items given, administer preceding items in reverse sequence until two consecutive perfect scores are obtained	After **4** scores of 0 on *five* consecutive items

Recognition

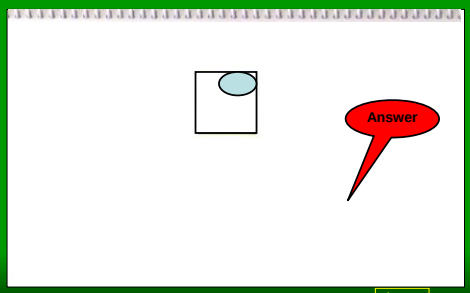


Recognition

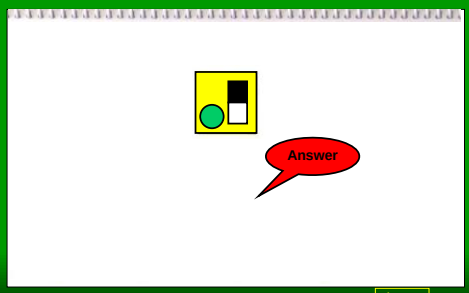
- Recall of stimulus after 3 second exposure



Recognition



Recognition



Picture Arrangement

- Older examinees only
- Adapted from WISC-III & WAIS-III

Stop at 4 consecutive failures

Table 2.4 Summary of Start Points, Reverse Rules, and Discontinue Rules

Subtest	Start Point	Reverse Rule	Discontinue Rule
Picture Arrangement (PA)	Ages 8–21 Demonstration Item, Sample Item, then Item 1	None	After 4 consecutive scores of 0

Picture Arrangement

Standardization

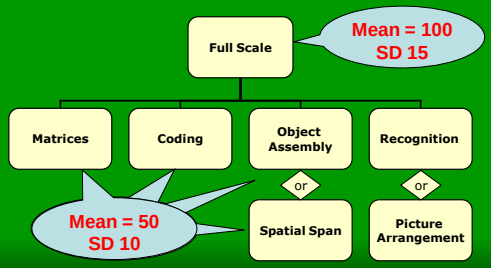
Standardization Samples

- US sample closely matches the population (N = 1323)
- Canadian sample closely matches the population (N = 875)

Scoring the WNV

A few important points…

WNV Scores



Subtest T scores
Mean = 50, SD = 10

The T score metric is used for greater precision of raw score to standard scores

Table A.1 WNV^{US}: *T* Score Equivalents of Total Raw Scores for Subtests, by Age Group *(continued)*

Ages 15:0–15:3

T Score	MA	CD	SSp	PA
51	24	59	—	17
52	—	60–61	—	—
53	25	62–63	17	18
54	26	64–65	—	—
55	—	66–67	—	19
56	27	68–69	18	—
57	28	70	—	20
58	—	71–72	—	—

Full Scale 4

- Full Scale (M=100, SD=15, 40-160)

Table A.2 WNV^{US}: Full Scale Score Equivalents of Sums of *T* Scores for the 4-Subtest Battery *(continued)*

Sum of *T* Scores	Full Scale Score	Percentile Rank	Confidence Level 90%	Confidence Level 95%	Sum of *T* Scores	Full Scale Score	Percen Rank
204	102	55	95–109	94–110	245	124	95
205	102	55	95–109	94–110	246	125	95
206	103	58	96–109	95–111	247	125	95
207	103	58	96–109	95–111	248	126	96
208	104	61	97–110	96–112	249	126	96
209	104	61	97–110	96–112	250	127	96
210	105	63	98–111	97–113	251	127	96

Full Scale 2

- **Full Scale (M=100, SD=15, 40-160)**

Table A.3 WNV^{US}: Full Scale Score Equivalents of Sums of *T* Scores for the 2-Subtest Battery *(continued)*

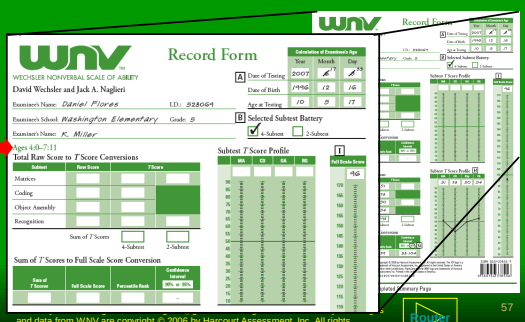
Sum of *T* Scores	Full Scale Score	Percentile Rank	Confidence Level 90%	Confidence Level 95%	Sum of *T* Scores	Full Scale Score	Percentile Rank
102	102	55	95–109	94–110	143	138	99
103	102	55	95–109	94–110	144	139	99.5
104	103	58	96–109	95–111	145	140	99.6
105	104	61	97–110	96–112	146	141	99.7

Test Age Equivalents

Table A.5 WNV^{US}: Test-Age Equivalents of Total Raw Scores for Subtests and Selected Optional Scores

Test Age	Subtests MA	CD	OA	RG	SSp	PA
<4:1	0–7	0–3	0–9	0–5		
4:1	—	4–5	10–11	6		
4:4	8	6–7	12–13	7		
4:7	—	8–9	14	8		
4:10	9	10–11	15–16	9		
5:1	10	12–14	17–18	—		
5:4	—	15–16	19–20	10		
5:7	11	17–18	21	—		
5:10	12	19–20	22–23	11		

Record Form



Record Form

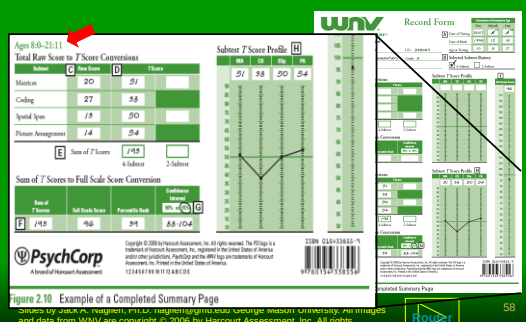
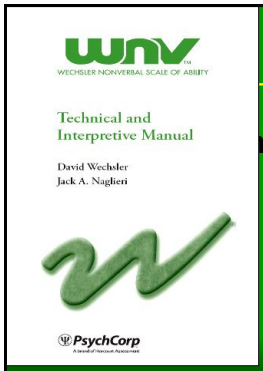


Figure 2.10 Example of a Completed Summary Page

Presentation Outline

1. Overview
2. Administration
3. Subtest Description
4. Interpretation
5. Reliability
6. Validity
7. What does the WNV measure?
8. Case Studies
9. Conclusions



nterpretation

Chapter 6

Step 1

- **Report WNV Full Scale standard score**

following: Lucy obtained a WNV Full Scale score of 103, which is ranked at the 58th percentile. She did as well as, or better than, 58% of examinees her age in the normative sample on the WNV Full Scale score. There is a 90% chance that her true Full Scale score lies within the range of 96 and 109. Lucy's Full Scale score of 103 lies within the Average classification.

Step 1

Table 6.2 Qualitative Classifications of Full Scale Scores and Percentages in the Theoretical and Actual Normative Samples

Full Scale Score	Classification	Percent Included: Theoretical Normal Curve	Percent Included: U.S. Sample [a]
≥130	Very Superior	2.2	1.7
120–129	Superior	6.7	7.8
110–119	High Average	16.1	17.1
90–109	Average	50.0	49.8
80–89	Low Average	16.1	15.4
70–79	Borderline	6.7	5.4
≤69	Extremely Low	2.2	2.8

Step 1

- **Compare WNV Full Scale to WIAT-II**
  - **Tables B.2 and B.3 provide differences between WNV FS (4-Subtest Battery) and WIAT–II Subtest and Composite Scores using the Predicted-Difference Method**
  - **Tables B.5 and B.6 provide the values using the Simple Difference Method**
- **Base rate data is provided for both types of comparisons**

Step 2

- **Step 2. Subtest Analysis**
  - **Compute the mean of the four T scores**
  - **Subtract the mean from each T score**
  - **Compare the differences to the value in Table B.1**
  - **Differences that are equal to or greater than the value in Table B.1 are significant**
    - **Negative values are Weaknesses**
    - **Positive values are Strengths**

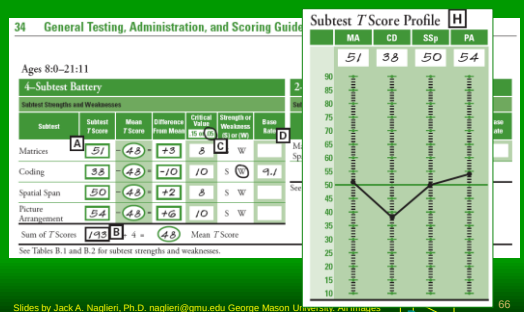
Subtest Comparisons

Table B.1 WNV^{US}: Differences Required for Statistical Significance (Critical Values) for Comparison of Single Subtest *T* Scores to Mean *T* Score of the 4-Subtest Battery, by Age Band

Ages 4:0–7:11	Significance Level		Ages 8:0–21:11	Significance Level	
Subtest	.15	.05	Subtest	.15	.05
Matrices	7	8	Matrices	6	8
Coding	7	9	Coding	8	10
Object Assembly	8	10	Spatial Span	7	8
Recognition	8	10	Picture Arrangement	9	10

Note. The differences required for statistical significance (critical values) are based on the average standard error of measurement across all ages and calculated with the following formula provided by Davis (1959):

Subtest Str & Wk



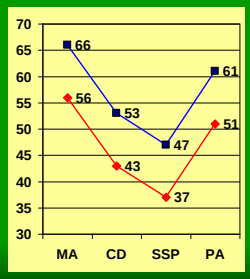
Step 2

- **Subtest T scores:**

Matrices	56
Coding	43
Spatial Span	37
Picture Arrangement	51
mean T score =	47

Matrices is a strength (56 – 47 = 9; need 8 @ .05)

Spatial Span is a weakness (37 – 47 = –10; need 8 @ .05) *and* it is below 40



Router

Step 2

Subtests:	
Matrices	57
Coding	44
Spatial Span	38
Picture Arr	52
mean T =	48

Lucy's scores on individual subtests indicate a relative strength on Matrices, a subtest requiring reasoning with spatial designs (Matrices = 57 vs. Mean = 48), and a relative weakness on Spatial Span, a subtest requiring visual-spatial memory (Spatial Span = 38 vs. Mean = 48). Additionally, Lucy's Spatial Span score is below average and the discrepancy between Lucy's Spatial Span *T* score and her mean *T* score was unusual (occurring in only about 6% of the normative sample).

Router

Step 2

Table B.3 WNV^{US}: Differences Required for Statistical Significance (Critical Values) for Comparisons Between Two Subtest *T* Scores, by Age Band

Ages 4:0–7:11				
Subtest	MA	CD	OA	RG
Matrices	—	8	8	8
Coding	11	—	9	9
Object Assembly	12	12	—	9
Recognition	11	12	13	—

Ages 8:0–21:11				
Subtest	MA	CD	SSp	PA
Matrices	—	8	7	9
Coding	11	—	9	10
Spatial Span	10	12	—	9
Picture Arrangement	12	14	12	—

Note. Differences between subtest *T* scores required for significance (critical values) at the .15 level appear above the diagonal in the shaded area, and differences required for statistical significance at the .05 level appear below the diagonal. The differences required for statistical significance are based on the average standard error of measurement across all ages for each subtest and calculated with the following formula:

Critical Value of Difference Score = $Z\sqrt{SEM_a^2 + SEM_b^2}$

Router

Step 3

- **Spatial Span Forward and Backward each yield a T score**
  - **These scores can be compared using Table C.2 in the Administration Manual**

Table C.2 WNV^{US}: Differences Required for Statistical Significance (Critical Values) for Comparison of Spatial Span Forward (SSpF) and Spatial Span Backward (SSpB) *T* Scores

	Significance Level	Difference
SSpF–SSpB	.15	9
	.05	13

Router

Optional Analysis

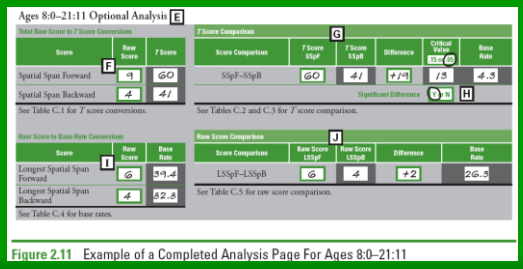


Figure 2.11 Example of a Completed Analysis Page For Ages 8:0–21:11

Router

Spatial Span Fw vs Bk

Table C.2 WNV^{US}: Differences Required for Statistical Significance (Critical Values) for Comparison of Spatial Span Forward (SSpF) and Spatial Span Backward (SSpB) *T* Scores

	Significance Level	Difference
SSpF–SSpB	.15	9
	.05	13

Note. Differences required for statistical significance are based on the standard errors of measurement of each composite for each age group and calculated with the following formula:

Critical Value of Difference Score = $Z\sqrt{SEM_a^2 + SEM_b^2}$

Router

Step 3

- **Base rates for the differences**
  - **25% obtained Spatial Span Forward 7 or more points higher than Backwards**

Table C.3 WNV^{US}: Cumulative Percentages of Normative Sample (Base Rates) Obtaining Various *T* Score Differences for Spatial Span Forward (SSpF) and Spatial Span Backward (SSpB)

Absolute Difference	SSpF vs. SSpB		Absolute Difference	SSpF vs. SS
	SSpF<SSpB (–)	SSpF>SSpB (+)		SSpF<SSpB (–)
≥55	0.0	0.0	25	1.0
54	0.0	0.0	24	1.3
53	0.0	0.0	23	1.5

Step 3

Table C.4 WNV^{US}: Cumulative Percentages of Normative Sample (Base Rates) Obtaining Various Raw Scores for Longest Spatial Span Forward (LSSpF) and Longest Spatial Span Backward (LSSpB), by Age

Longest Span	Age Group 8		9		10		11	
	LSSpF	LSSpB	LSSpF	LSSpB	LSSpF	LSSpB	LSSpF	LSSpB
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
7	2.1	0.0	3.1	1.0	7.1	1.0	6.1	3.1
6	13.5	6.3	34.7	12.2	39.4	19.2	55.1	35.7
5	41.7	24.0	65.3	42.9	67.7	44.4	77.6	63.3
4	87.5	69.8	90.8	80.6	92.9	82.8	98.0	90.8
3	96.9	87.5	100.0	90.8	100.0	92.9	100.0	93.9
2	100.0	97.9	100.0	95.9	100.0	97.0	100.0	98.0
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean	4.4	3.8	4.9	4.2	5.1	4.3	5.4	4.8
SD	1.0	1.2	1.0	1.3	1.1	1.3	0.9	1.3
Median	4.0	4.0	5.0	4.0	5.0	4.0	6.0	5.0

Step 4

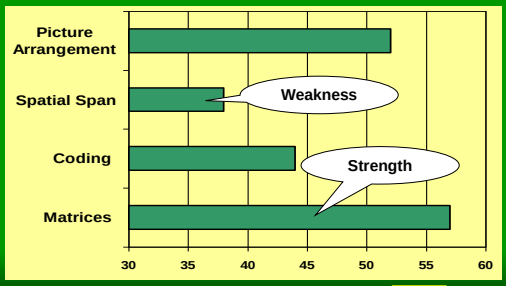
- Intersubtest scatter - the simple-difference between the examinee's highest and lowest subtest *T* scores can be examined
- Cumulative percentages are reported

- **4-Subtest WNV scatter statistics**
  - **Mean = 5.7**
  - **SD = 4.1**
- **2-Subtest WNV scatter statistics**
  - **Mean = 8.6**
  - **SD = 46.1**

Step 5 Intervention

- **Intervention**
  - **Based on subtest scores**
  - **Manual example of Lucy**
    - **She performed poorly in relation to her overall subtest mean and in relation to her peers**
      - **This suggests that it may be useful to consider the role memory difficulties may play in academic tasks**
      - **Also consider other evidence of memory status**
        - » **Teacher and parent reports**
        - » **Other data**

Step 5 Intervention



Step 5 Intervention

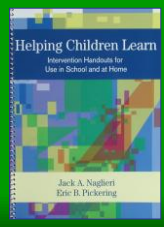
- Lucy performed poorly in relation to her mean *and* her peers on Spatial Span
  - consider the role of memory in academic tasks
  - especially if there are parent or teacher concerns about Lucy remembering information
  - The same hypothesis could be associated with
    - Recognition
    - Coding -- if the examinee did not appear to remember the correspondence between shapes and numbers

Step 5 Intervention

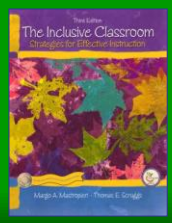
- Use chunking or mnemonic methods for tasks that demand recall of information
- There is much empirical support for these techniques for improving memory (Mastropieri & Scruggs, 2006; Minskoff & Allsopp, 2003).
- To aid in the selection and communication of these interventions to parents and teachers use Naglieri and Pickering (2003) handouts

Step 5 Intervention

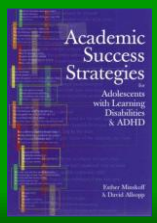
Naglieri & Pickering (2003)



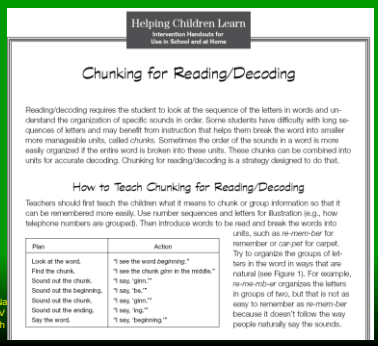
Mastropieri & Scruggs (2005)



Minskoff & Allsopp (2003)



Step 5 Intervention



Helping Children Learn
Intervention Handouts for Use in School and at Home

Chunking for Reading/Decoding

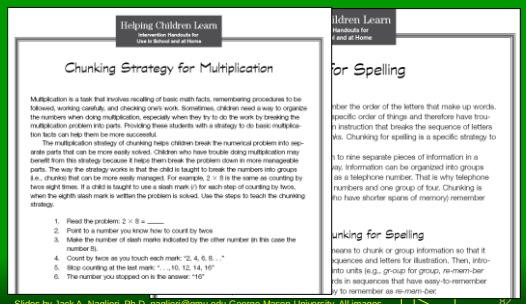
Reading/decoding requires the student to look at the sequence of the letters in words and understand the organization of specific sounds in order. Some students have difficulty with long sequences of letters and may benefit from instruction that helps them break the word into smaller more manageable units, called chunks. Sometimes the order of the sounds in a word is more easily organized if the entire word is broken into these units. These chunks can be combined into units for accurate decoding. Chunking for reading/decoding is a strategy designed to do that.

How to Teach Chunking for Reading/Decoding

Teachers should first teach the children what it means to chunk or group information so that it can be remembered more easily. Use number sequences and letters for illustration (e.g., how telephone numbers are grouped). Then introduce words to be read and break the words into units, such as *re-mem-ber* for remember or *car-pet* for carpet. Try to organize the groups of letters in the word in ways that are natural (see Figure 1). For example, *re-me-mb-er* organizes the letters in groups of two, but that is not as easy to remember as *re-mem-ber* because it doesn't follow the way people naturally say the sounds.

Plan	Action
Look at the word.	"I see the word *beginning*."
Find the chunk.	"I see the chunk *ginn* in the middle."
Sound out the chunk.	"I say, 'ginn.'"
Sound out the beginning.	"I say, 'be.'"
Sound out the chunk.	"I say, 'ginn.'"
Sound out the ending.	"I say, 'ing.'"
Say the word.	"I say, 'beginning.'"

Step 5 Intervention



Helping Children Learn
Intervention Handouts for Use in School and at Home

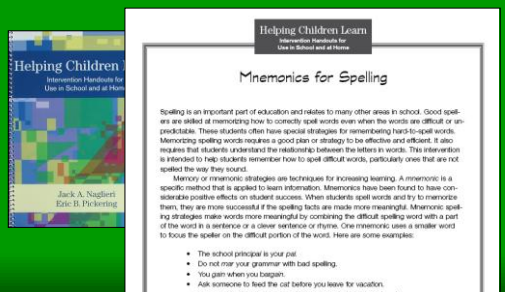
Chunking Strategy for Multiplication

Multiplication is a task that involves recalling of basic math facts, remembering procedures to be followed, working carefully, and checking one's work. Sometimes, children need a way to organize the numbers when doing multiplication, especially when they try to do the work by breaking the multiplication problem into parts. Providing these students with a strategy to do basic multiplication facts can help them be more successful.

The multiplication strategy of chunking helps children break the numerical problem into separate parts that can be more easily solved. Children who have trouble doing multiplication may benefit from this strategy because it helps them break the problem down in more manageable parts. The way the strategy works is that the child is taught to break the numbers into groups (i.e., chunks) that can be more easily managed. For example, 2 × 8 is the same as counting by twos eight times. If a child is taught to use a slash mark (/) for each step of counting by twos, when the eighth slash mark is written the problem is solved. Use the steps to teach the chunking strategy.

1. Read the problem: 2 × 8 = ____
2. Point to a number you know how to count by twos
3. Make the number of slash marks indicated by the other number (in this case the number 8).
4. Count by twos as you touch each mark: "2, 4, 6, 8. . ."
5. Stop counting at the last mark: ". . . 10, 12, 14, 16"
6. The number you stopped on is the answer: "16"

Step 5 Intervention



Helping Children Learn
Intervention Handouts for Use in School and at Home

Mnemonics for Spelling

Spelling is an important part of education and relates to many other areas in school. Good spellers are skilled at memorizing how to correctly spell words even when the words are difficult or unpredictable. These students often have special strategies for remembering hard-to-spell words. Memorizing spelling words requires a good plan or strategy to be effective and efficient. It also requires that students understand the relationship between the letters in words. This intervention is intended to help students remember how to spell difficult words, particularly ones that are not spelled the way they sound.

Memory or mnemonic strategies are techniques for increasing learning. A *mnemonic* is a specific method that is applied to learn information. Mnemonics have been found to have considerable positive effects on student success. When students spell words and try to memorize them, they are more successful if the spelling facts are made more meaningful. Mnemonic spelling strategies make words more meaningful by combining the difficult spelling word with a part of the word in a sentence or a clever sentence or rhyme. One mnemonic uses a smaller word to focus the speller on the difficult portion of the word. Here are some examples:

- The school principal is your *pal*.
- Do not *mar* your grammar with bad spelling.
- You gain when you bargain.
- Ask someone to feed the *cat* before you leave for vacation.

Step 5 Intervention

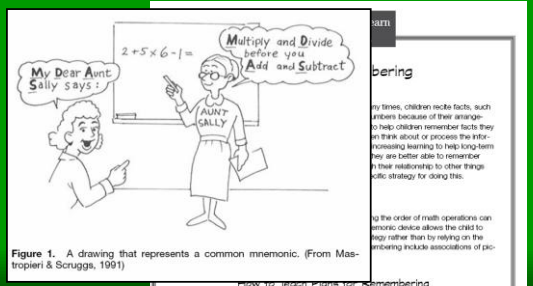


Figure 1. A drawing that represents a common mnemonic. (From Mastropieri & Scruggs, 1991)

Step 5 Intervention

- If scores on Matrices, Picture Arrangement, and Object Assembly are significantly lower than the mean and below Average
- These subtests require an examinee to relate parts of the items into a coherent whole (described by Naglieri [1999] as involving simultaneous processing)
- What to use?

Step 5 Intervention

- **Methods such as Graphic Organizers and Story Maps (Mastropieri & Scruggs, 2006; Minskoff & Allsopp, 2003; Naglieri & Pickering,2003) may help**
- **These methods provide the student with ways of working with information that must be arranged as a conceptual whole**

Step 5 Intervention

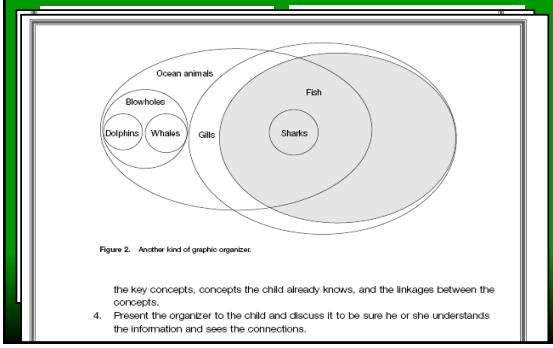


Figure 2. Another kind of graphic organizer.

the key concepts, concepts the child already knows, and the linkages between the concepts.

4. Present the organizer to the child and discuss it to be sure he or she understands the information and sees the connections.

- **Graphic Organizers help students see how information is related**

Step 5 Intervention

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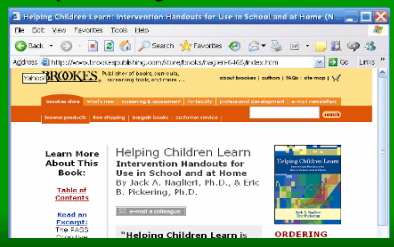

Presentation Outline

1. Overview
2. Administration
3. Subtest Description
4. Interpretation
5. Reliability
6. Validity
7. What does the WNV measure?
8. Case Studies
9. Conclusions

Reliability US

Table 4.1 WNV^{US}: Reliability Coefficients of the Subtests, Optional Scores, and Full Scale Scores, by Age Group

Subtest/Full Scale Score	Age Group 4	5	6	7	8	9	10	11	12	13	14	15	16–17	18–19	20–21	Overall Average r_{xx}[a]
Matrices	.89	.83	.88	.88	.90	.87	.90	.86	.88	.88	.93	.92	.92	.94	.94	.91
Coding	.84	.84	.84	.84	.74	.74	.74	.74	.74	.82	.82	.82	.82	.82	.82	.80
Object Assembly	.79	.83	.81	.71												.79
Recognition	.78	.78	.80	.81												.79
Spatial Span					.88	.85	.86	.80	.86	.86	.87	.87	.88	.89	.85	.86
Picture Arrangement					.72	.78	.71	.75	.74	.72	.78	.74	.72	.75	.75	.74
Spatial Span – Forward					.76	.72	.75	.71	.74	.81	.80	.75	.83	.76	.72	.76
Spatial Span – Backward					.79	.85	.83	.77	.81	.81	.80	.87	.79	.88	.82	.82
Full Scale Score: 4	.91	.90	.92	.91	.91	.91	.87	.88	.92	.90	.92	.92	.92	.93	.92	.91
Full Scale Score: 2	.88	.87	.91	.89	.92	.91	.91	.87	.91	.88	.92	.93	.93	.94	.92	.91

[a] Average reliability coefficients were calculated with Fisher's z transformation.

Reliability Canada

Table 4.2 WNV^{CDN}: Reliability Coefficients of the Subtests, Optional Scores, and Full Scale Scores, by Age Group

Subtest/Full Scale Score	Age Group 4	5	6	7	8	9	10	11	12	13	14	15	16–17	18–19	20–21	Overall Average r_{xx}[a]
Matrices	.85	.86	.85	.78	.75	.89	.84	.92	.93	.93	.90	.91	.94	.94	.96	.90
Coding[b]	.84	.84	.84	.84	.74	.74	.74	.74	.74	.82	.82	.82	.82	.82	.82	.80
Object Assembly	.82	.68	.81	.74												.77
Recognition	.81	.73	.80	.86												.80
Spatial Span					.93	.90	.87	.84	.90	.88	.86	.84	.84	.86	.85	.87
Picture Arrangement					.68	.70	.74	.68	.75	.78	.73	.68	.77	.75	.70	.73
Spatial Span – Forward					.79	.83	.73	.79	.81	.77	.77	.82	.78	.78	.77	.79
Spatial Span – Backward					.83	.86	.86	.80	.87	.85	.78	.59	.82	.84	.73	.81
Full Scale Score: 4	.90	.87	.88	.87	.89	.91	.91	.87	.90	.92	.90	.86	.90	.93	.91	.90
Full Scale Score: 2	.88	.85	.86	.84	.88	.93	.90	.91	.94	.93	.92	.91	.93	.92	.89	.91

[a] Average reliability coefficients were calculated with Fisher's z transformation.

[b] U.S. test-retest stability coefficients were used for Coding.

Presentation Outline

1. Overview
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WNV Validity Studies

Correlations with Ability Tests

WNV & WPPSI–III

Table 5.15. WNV and WPPSI–III

		WNV		
	FSIQ	Mean	*SD*	*N*
Full Scale Score 4	**.71**	**101.9**	**11.7**	**56**
Full Scale Score 2	**.67**	**101.4**	**11.9**	**56**
WPPSI-III				
Mean	**101.7**			
SD	**9.9**			
N	**56**			

Notes. **All correlations were computed separately for each order of administration in counterbalance design and corrected for the variability of the WNV standardization sample (Guilford & Fruchter, 1978). The weighted average across both orders was obtained with Fisher's z. The Means are the average of the two orders.**

Similar means

WNV & WISC-IV

Table 5.16. WNV and WISC-IV

		WNV		
	FSIQ	Mean	*SD*	*N*
Full Scale Score: Four	**.76**	**103.8**	**12.3**	**102**
Full Scale Score: Two	**.58**	**102.7**	**13.3**	**102**
WISC-IV				
Mean	**101.8**			
SD	**12.1**			
N	**102**			

Similar means

WNV & NNAT-I

Table 5.16. WNV and NNAT-I

		WNV		
	FSIQ	Mean	*SD*	*N*
Full Scale Score: Four	**.73**	**104.0**	**12.5**	**54**
Full Scale Score: Two	**.71**	**102.7**	**13.8**	**54**
NNAT-I				
Mean	**103.2**			
SD	**14.9**			
N	**54**			

Similar means

WNV & UNIT

Table 5.20 WNV and UNIT

		WNV		
	FSIQ	Mean	*SD*	*N*
Full Scale Score: Four	**.73**	**102.3**	**12.6**	**79**
Full Scale Score: Two	**.62**	**99.8**	**12.8**	**79**
UNIT				
Mean	**101.4**			
SD	**12.3**			
N	**79**			

Similar means

WNV & WISC-IV Spanish

Table 5.17

		WNV		
	FSIQ	Mean	*SD*	*N*
Full Scale 4	.82	96.5	12.8	33
Full Scale 2	.67	96.2	14.2	33
WISC-IV Sp				
Mean [a]	96.4			
SD	14.7			
N	32			

Similar means

WNV & WAIS III

Table 5.18

		WNV		
	FSIQ	Mean	*SD*	*N*
Full Scale 4	.72	102.2	10.1	45
Full Scale 2	.57	101.5	11.5	45
WAIS III				
Mean [a]	102.9			
SD	10.1			
N	45			

Similar means

WNV & WIAT-II

		WNV		
	Total	Mean	*SD*	*N*
WNV FS-4	**.60**	**97.4**	**11.1**	**88**
WISC-III	**.59**	**-**	**-**	**1,286**
WIAT-II				
Mean	**97.4**			
SD	**12.7**			
N	**84**			

Similar means

WISC-III data from WIAT Manual Table C.1 ages 6-16 summarized by Naglieri (1999)

WNV Validity Studies

Group Differences

Samples

Table 5.22 WNV[US]: Demographic Data for the Special Group Studies

	Special Group							
	Gifted	Mild MR	Moderate MR	RWD	Language Disorder	English Language Learners	Deaf	Hard of Hearing
N	41	51	31	25	36	55	37	48
Age								
Mean	14.2	12.8	13.7	11.7	10.2	12.6	13.6	11.2
SD	4.8	4.3	4.2	3.8	4.1	5.0	4.7	5.0
Sex								
Female	43.9	49.0	51.6	32.0	50.0	54.5	51.4	50.0
Male	56.1	51.0	48.4	68.0	50.0	45.5	48.6	50.0
Race/Ethnicity								
White	73.2	62.7	61.3	64.0	63.9	1.8	83.8	77.1
African American	7.3	21.6	16.1	16.0	19.4	1.8	8.1	8.3
Hispanic	17.1	11.8	22.6	16.0	16.7	78.2	8.1	14.6

Rover

Gifted

- 41 examinees ages 5–21 identified as gifted
- examinees had to have existing scores on a standardized measure of cognitive ability that were at least 130

Rover

Gifted

Table 5.23 WNV[US]: Mean Performance of Gifted and Matched Co

Subtest/ Full Scale Score	Gifted Mean	Gifted *SD*	Matched Control Group Mean	Matched Control Group *SD*
Matrices	64.2	9.0	52.9	10.0
Coding	57.2	13.6	51.7	9.7
Object Assembly	59.6	11.2	54.3	9.9
Recognitio	2	5.2	51.4	8.5
Spatial Sp	3	12.3	52.0	
Picture Arrangement	62.5	7.8	51.6	9.0
Full Scale Score: 4	123.7	13.4	104.2	12.3
Full Scale Score: 2	123.8	15.0	104.0	13.2

FS=124

FS=104

Rover

Mental Retardation

- 51 non-institutionalized examinees ages 4–21
  - Diagnosed with mild mental retardation and/or IQ scores 2–3 SDs below the mean (i.e., 55 ≤ FSIQ ≤ 70).
- The WNV was also administered to 31 non-institutionalized examinees, ages 5–21, who were previously
  - diagnosed with moderate mental retardation and/or IQ scores 3–4 SDs below the mean (i.e., 40 ≤ FSIQ ≤ 55).

Rover

Mental Retardation: Mild

Subtest/ Full Scale Score	Mental Retardation-Mild Severity Mean	Mental Retardation-Mild Severity *SD*	Matched Control Group Mean	Matched Control Group *SD*
Matrices	34.7	8.6	48.8	10.1
Coding	35.7	12.0	50.1	12.1
Object Assembly	33.5	6.0	46.2	11.9
Recognition	32.3	11.6	47.4	9.7
Spatial Sp	3	8.6	48.3	
Picture Arrangement	31.6	9.0	49.6	
Full Scale Score: 4	67.3	12.9	97.4	15.3
Full Scale Score: 2	69.4	13.0	96.8	15.5

FS=67

FS=97

Rover

Mental Retardation: Moderate

Subtest/ Full Scale Score	Mental Retardation-Moderate Severity Mean	Mental Retardation-Moderate Severity *SD*	Matched Control Group Mean	Matched Control Group *SD*
Matrices	22.8	9.1	50.6	8.7
Coding	19.3	9.9	50.3	9.7
Object Assembly	24.3	2.5	50.2	6.9
Recognition	25.7	7.2	54.1	10.3
Spatial Sp	.1	5.6	50.4	
Picture Arrangement	24.1	5.1	47.6	10.0
Full Scale Score: 4	45.9	8.9	99.3	14.1
Full Scale Score: 2	49.2	10.1	100.7	13.8

FS=46

FS=99

Rover

English Language Learners

- The WNV was administered to 55 examinees, ages 8–21, who met the criteria for classification as English Language Learners.
  - native language was not English
  - primary language they spoke was not English
  - language other than English spoken at home
  - parents had resided in the US less than 6 years

English Language Learners

Subtest/ Full Scale Score	English Language Learners Mean	SD	Matched Control Group Mean	SD
Matrices	50.2	10.0	52.1	9.4
Coding	51.0	8.1	51.7	9.4
Object Assembly	51.1	9.9	51.1	9.9
Recognition	53.2	7.6	50.0	8.7
Spatial Span	3	9.4	50.0	
Picture Arrangement	49.4	10.0	50.4	
Full Scale Score: 4	101.7	13.4	102.1	13.4
Full Scale Score: 2	102.1	14.1	101.6	12.7

FS=102

FS=102

Deaf

- examinees selected based on their lack of ever having heard spoken language
  - examinees must not have been able to hear tones after the age of 18 months
  - must not lip read
  - must not use cued speech (i.e., they must have routine discourse by some means of communicating other than spoken language)
  - severe to profound deafness (hearing loss measured with dB, Pure Tone Average greater than or equal to 55).

Deaf Individuals

Subtest/ Full Scale Score	Deaf Mean	SD	Matched Control Group Mean	SD
Matrices	51.5	7.7	50.5	9.9
Coding	47.7	7.6	49.9	8.9
Object Assembly	53.7	9.8	49.8	11.4
Recognition	57.3	6.9	50.1	9.2
Spatial Span	2	7.8	50.5	
Picture Arrangement	54.1	9.7	51.8	
Full Scale Score: 4	102.5	9.0	100.8	14.3
Full Scale Score: 2	103.0	10.3	100.4	15.5

FS=103

FS=101

Hard of Hearing

- Examinees have had exposure to spoken language, either through hearing or lip reading
- The group could have a unilateral or bilateral hearing loss or deafness
- age of onset of their inability to hear could be any age.
- The examinee could have cochlear implants.
- And the following additional criteria:
  - No disability or impairment other than being deaf or hard of hearing
  - No diagnosis of a neurological disorder

Hard of Hearing

Subtest/ Full Scale Score	Hard of Hearing Mean	SD	Matched Control Group Mean	SD
Matrices	48.4	10.3	50.9	10.5
Coding	47.4	9.0	50.0	8.8
Object Assembly	49.4	11.8	50.8	11.1
Recognition	46.2	9.8	50.1	9.4
Spatial Span	3	9.9	50.0	
Picture Arrangement	51.6	11.6	50.5	
Full Scale Score: 4	96.7	15.9	100.5	14.8
Full Scale Score: 2	96.0	15.3	100.4	14.9

FS=97

FS=101

White Black Difference

- Black (N = 54) White (N=153) FS difference = 4.6 (d =
  - No variables controlled
- Black (N = 54) White (N=153) FS difference = 2.6 (d = 0.30)
  - SES controlled

Summary

- The WNV
  - Provides an innovative method for administration
  - Has excellent reliability
  - Strong validity evidence
  - Easy to interpret
  - Has instructional implications
  - Can be given to a wide age range

Presentation Outline

1. Overview
2. Administration
3. Subtest Description
4. Interpretation
5. Reliability
6. Validity
7. What does the WNV measure?
8. Case Studies
9. Conclusions

Putting the WNV in Context

Do nonverbal tests measure half of ability?

Nonverbal Tests

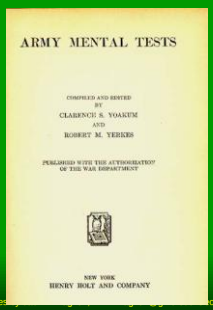
- Nonverbal tests measure what?
  - Verbal intelligence?
  - Nonverbal intelligence?
- Is verbal and nonverbal a theory of ability?

Verbal Nonverbal Refers to the Content of the Tests

Where did the verbal nonverbal format come from?

A little history...

1920 Army Testing



- Yoakum & Yerkes (1920) summarized the methods used by the military to classify people from many backgrounds by mental capacity

1920 Army Testing

- Army Alpha
  - Synonym- Antonym
  - Disarranged Sentences
  - Number Series
  - Arithmetic Problems
  - Analogies
  - Information
- Army Beta
  - Maze
  - Cube Imitation
  - Cube Construction
  - Digit Symbol
  - Pictorial Completion
  - Geometrical Construction

Verbal & Quantitative

Nonverbal

WHY NONVERBAL TESTS?

Antonino Mirenda

Antonino Mirenda - 1912

Antonino Mirenda - 1912

Nonverbal Testing

"The whole experience was very frightening.... They brought me up to a room....They put a pegboard before me with little sticks of different shapes and little holes....I had to put them in place, the round ones and the square ones...and I did it perfectly. They said, 'Oh, we must have made a mistake. This little girl...naturally she doesn't know English, but she's very bright, intelligent.' So they took the cross [chalkmark] off me so we were cleared."

Victoria Sarfatti Fernández, a Macedonian Jewish immigrant in 1916, interviewed in 1985.

How did the Army's tests influece what we have today?

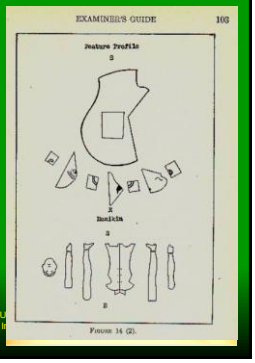
From the military to the middle school

Army Testing Program?

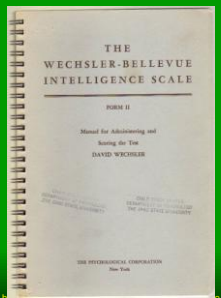
- David Wechsler was a military examiner who worked at Fort Logan Texas in the early 1900s
- He administered the Army tests described by Yoakum & Yerkes (1920)

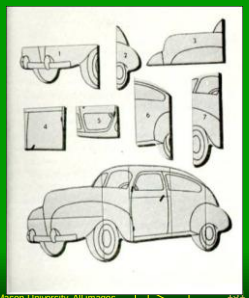
Army Testing Program

- Wechsler used the Army tests as a basis for his tests
- Wechsler's nonverbal tests were much like those included in the Army Beta



Wechsler-Bellevue (1939)



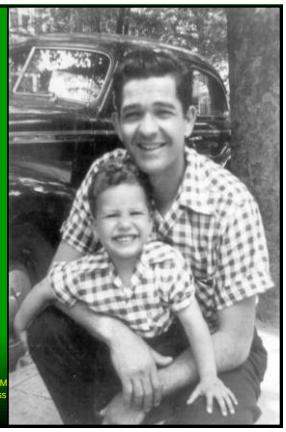


The latest in style !

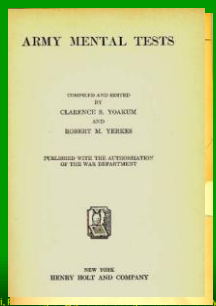
1939 Studebaker Commander Custom Sedan Coupe which cost about $690

1952

- 1941 Chevy
- Sam Naglieri age 26
- Jack Naglieri age 2



1927 Army Testing


ARMY MENTAL TESTS

COMPILED AND EDITED BY
CLARENCE S. YOAKUM
AND
ROBERT M. YERKES

PUBLISHED WITH THE AUTHORIZATION OF THE WAR DEPARTMENT

NEW YORK
HENRY HOLT AND COMPANY

Router

Coding & Picture Completion

Test 7.—Digit Symbol

E. shows S. the record sheet, points to blank below 2 in the sample, then to symbol for 2 at top of page, writes in symbol, proceeds in the same way with the other parts of the sample, then gives S. pencil, points to space below 3 in the test, and nods affirmatively.

Test 10.—Picture Completion

E. places material before S. as previously described. He then slowly points to the same boy in each of the pictures in succession to indicate the proper sequence of events. He next returns to the demonstrational picture, points to dressed and undressed foot and to empty space. Next he looks leisurely

Router

Picture Arrangement & Block Design

Test 9.—Picture Arrangement

E. presents demonstrational set and allows S. to see it for about 15 seconds. Then, making sure that S. is attending, he slowly rearranges the pictures and points to each one in succession, attracti
of important
sents set (*a*),
to indicate th
stand, E. sho
to set (*b*). S
as (*a*), except

Test 4.—Cube Construction

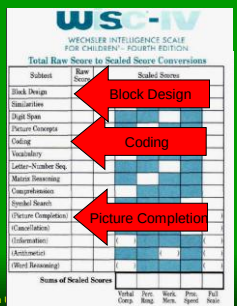
(*a*) E. presents model 1 and the corresponding blocks, points to bottom, top, and sides of model; then places it upon the table and assembles the blocks rather slowly, turning each block over in the fingers and pointing to painted and unpainted sides. E. now presents the same model and the blocks in irregular order, then points in order to S., to the model, to the blocks, and nods affirmatively. E. repeats, if S. does not understand.

(*b*) E. presents model 2 with the nine blocks for its construc-

Router

WISC-IV

- These nonverbal tests have a long history as measures of general ability
- Nonverbal tests have been shown to be effective measures of general ability



Verbal Tests

Or general ability measured using tests with verbal content

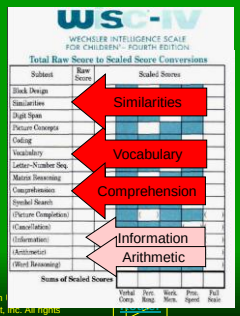
Router

Wechsler Verbal Tests

- Where did the verbal tests come from?
  - Stanford-Binet
    - Vocabulary
    - Similarities
    - Comprehension
  - Army Alpha
    - Information
    - Comprehension
    - Arithmetic

WISC-IV

- These verbal tests have a long history
- Verbal tests have been shown to be effective measures of general ability
- But they present a problem today as they did in the early 1900s

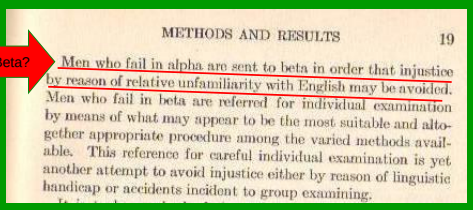


Problem

- What if the examinee does not speak English?
- What if the examinee did not have much education?
- What if the examinee comes from a disadvantaged background?

1927 Army Testing

Why Beta?



METHODS AND RESULTS 19

Men who fail in alpha are sent to beta in order that injustice by reason of relative unfamiliarity with English may be avoided. Men who fail in beta are referred for individual examination by means of what may appear to be the most suitable and altogether appropriate procedure among the varied methods available. This reference for careful individual examination is yet another attempt to avoid injustice either by reason of linguistic handicap or accidents incident to group examining.

Note there is no mention of measuring verbal and nonverbal intelligence

Verbal tests of general ability

How much of a problem is this?

Minority Representation

- Over-representation of minorities in special education (Naglieri & Rojahn, 2000)
  - Too many Blacks and Hispanics are identified as having mental retardation
- Under-representation of minorities in gifted (Naglieri & Ford, 2000)
  - Black, Hispanic, and Native American students are under-represented by 50% to 70% (U.S. Department of Education, 1993)

Minority Representation

- Messick (1995) argued that the validity of instruments must be questioned if they contribute to overrepresentation of minorities in special education classes for children with mental retardation (Oswald, Couthino, Best, & Singh, 1999).

Possible Solutions

- Ban the use of IQ tests
- Change the definition of intelligence
- Increase fair assessment of children using measures that do not use verbal and achievement laden measures of "ability"

How much is achievement in ability tests?

The answer may surprise you

Ability vs Achievement

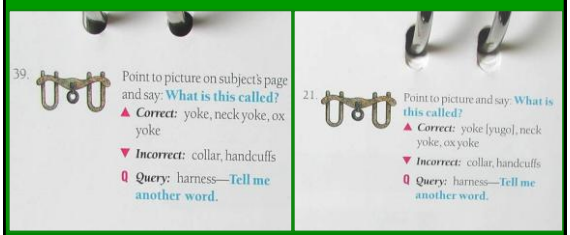
What does ***scared*** mean?
(The child answers orally)

Someone who is ***glad*** is
(a) tall
(b) proud
(c) happy
(d) alone

Many IQ tests include Vocabulary items presented orally by the examiner

Many Group Achievement Tests included Reading Vocabulary

Ability vs Achievement



Ability vs Achievement

- Group ability tests require reading and measure academic skills

5. The opposite of cruelty is -
a. concern b. kindness c. leniency d. brutality
19. Dust is to speck as water is to -
a. wash b. drop c. sink d. ocean
24. What number comes next in the series?
1 2 5 6 9 10 13 14 ?
a. 17 b. 18 c. 16 d. 15

Ability vs Achievement

- **CogAT Verbal Classification**
  - **Which answer goes with the words "red, brown, yellow"**
    - **A color**
    - **B crayon**
    - **C paint**
    - **D green**
    - **E marker**

- ITBS Vocabulary test
  - Select the answer that has the same meaning as the target word.
    - "To peek in the box"
      - A push
      - B stand
      - C break
      - D look

Ability vs Achievement

- **The child reads a sentence and selects an option that completes the meaning**

  Birds ____ in the sky"

  A nest **C swim**

  B fly **D float**
- **This is also a vocabulary test**
- **And, these questions require reading**
- **What level of reading is required?**

Rover

Ability vs Achievement

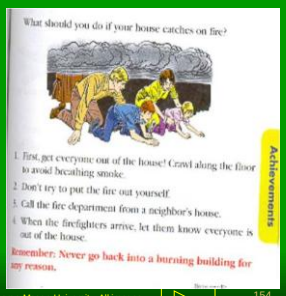
- **CogAT Form D Level 6 is intended for children in grades 5 and 6**
- **The Sentence Completion test readability grade level is 6.1 (range 3.7 - 10.4) using Flesch-Kincaid readability formula**
- **80% of the items have readability of grade 5 or more!**

Rover

Ability vs Achievement

One item on the a verbal Comprehension subtest is like this:

What should you do if you see smoke in your house?

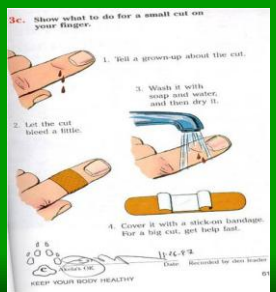


Rover

Ability vs Achievement

One item on the a Comprehension subtest is like this:

What should you do if you cut your finger?



Rover

Ability vs Achievement

- **Quantitative tests with names like**
  - **Arithmetic**
  - **Numerical Reasoning**
  - **Etc.**

Rover

Ability vs Achievement

"A boy had twelve books and sold five. How many books did he have left?"

Peter counted seventeen lily pads at the pond. There were frogs sitting on five of the lily pads, and the rest were empty. How many lily pads were empty?
(a) 22 (b) 13 (c) 12

Quantitative subtest items

Group and Individual Achievement Tests

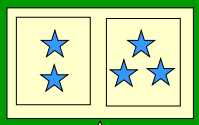
Rover

Ability vs Achievement

- How many marble does Joe have in

An Individual Achievement Numerical Operations Subtest item

- "How many stars are there all together?"



A Quantitative Reasoning item on an individual IQ test

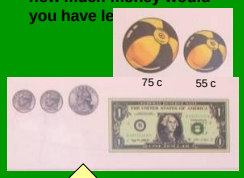
Rover

Quantitative Ability or Achievement?

- How much money would these drinks and snacks cost?

Individual IQ test Quantitative Reasoning

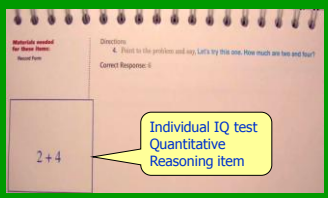
- If you these two balls and you had this much money, how much money would you have le



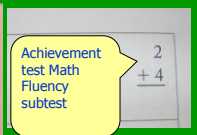
WJ-III ACH Applied Problems

Rover

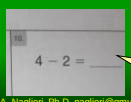
The Same Question



Individual IQ test Quantitative Reasoning item



Achievement test Math Fluency subtest

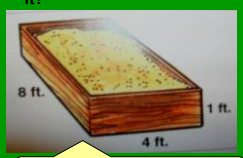


Achievement test Numerical Operations

Rover

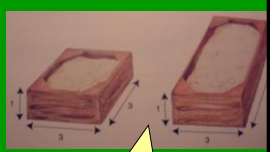
Quantitative Ability or Achievement?

- The sandbox is eight feet long, four feet wide, and one foot deep. How many cubic feet would be needed to fill it?



Achievement subtest Applied Problems

- How much sand is needed to fill this sandbox half way?



IQ test Quantitative Reasoning item

Rover

Poverty & Test Scores

- Poverty or low SES negatively affects test scores because of limited enrichment at home
  - high poverty is correlated with low test scores because of issues associated with educational enrichment at home and at school
  - many students receive low test scores because of limited opportunity to learn
    - Mminorities are penalized on traditional tests of intelligence and denied access to gifted education programs and services
    - Such denial of access is common when ability tests are highly verbal and achievement oriented

Rover

Nonverbal Assessment

- Bracken and Naglieri (2003) state
  - "general intelligence tests with verbal content and nonverbal content measure essentially the same construct as general ability tests that are entirely nonverbal" (p. 247)
  - Both types measure general ability
    - one measures general ability with varying content (verbal, quantitative, and nonverbal) and the other uses nonverbal tests

Is a Nonverbal Tests as Powerful as a Verbal/Nonverbal Test?

Can we test this hypothesis?

Perhaps ...

General Ability

	WISC-III FSIQ WIAT	NNAT NAI SAT9	WNV FS4 WIAT2
Median r	.59	?	?
N	1,284		

WISC-3 data from WIAT Manual Table C.1 ages 6-16
NNAT data from Naglieri (1997) NNAT Technical Manual
WNV data from Wechsler & Naglieri (2006) Technical Manual

What is the result if verbal tests are not used?

Race Ethnic differences

Race Differences

Group Means for Matched Samples by Race

Test	Black	White	Diff
Binet 4	94.4	107.0	12.6
WJ-R Cog	90.9	102.6	11.7
NNAT	95.1	99.3	4.2
WNV	96.4	101.0	4.6
CAS	95.2	100.0	4.8

Presentation Outline

1. Overview
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7. What does the WNV measure?
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Verbal Nonverbal Intelligence?

- Verbal / Nonverbal is a practical division
- Advantages of Verbal tests
  - they correlate with achievement because they have achievement in them
    - Information, Vocabulary, Arithmetic
- Advantages of Nonverbal Tests
  - they correlate with achievement without having achievement in them
  - they treat everyone the same
- These don't measure Verbal Intelligence and Nonverbal Intelligence- they measure general ability

Nonverbal Assessment

- Nonverbal assessment describes the methods used to measure general intelligence, not nonverbal ability
- There is no assumption that nonverbal, as opposed to verbal, abilities are being measured
- general ability is measured using nonverbal tests so that a wide variety of individuals may be assessed using the same set of questions
  - a nonverbal test of general ability is considered more appropriate, or fair, for culturally and/or linguistically diverse populations
  - a nonverbal test holds much promise for opening doors to gifted culturally and linguistically diverse students

What does the WNV measure?

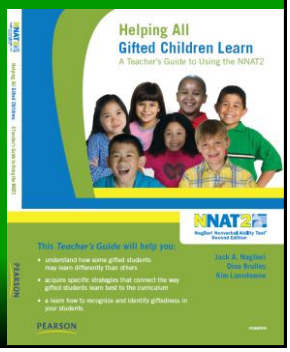
- The WNV is a test of general ability measured using nonverbal tests
- It is not a measure of nonverbal intelligence
  - measure general ability by using tests that do not require verbal skills
  - not "nonverbal ability"
  - measure "general ability" nonverbally

WNV Administration Manual Forward

[redacted]. In addition, the emphasis in the *WNV Manual* that the Full Scale measures *general ability nonverbally*—and *not* nonverbal ability—is an important distinction that further ties the WNV to Dr. Wechsler. Although his intelligence tests in the 1930s and 1940s departed from the one-score *Stanford-Binet* by offering separate Verbal and Performance IQs as well as a profile of scaled scores, Dr. Wechsler remained a firm believer in Spearman's *g* theory throughout his lifetime. He believed that his Verbal and Performance Scales represented different ways to access *g*, but he never believed in nonverbal intelligence as being separate from *g*. Rather, he saw the Performance Scale as the most sensible way to measure the general intelligence of people with hearing impairments, language disorders, or limited proficiency in English. And that is precisely what the WNV is intended to do.

Alan S. Kaufman, PhD
Clinical Professor of Psychology
Yale Child Study Center
Yale University School of Medicine

General Intelligence



General Intelligence

Helping All Gifted Children Learn: A Teacher's Guide to Using the NNAT2

It is important to understand that even though Wechsler's intelligence (IQ) tests were organized into verbal and nonverbal sections, he did not mean that verbal and nonverbal are different types of ability. Wechsler (1958) explicitly stated that the organization of subtests into verbal and performance scales did *not* indicate that two distinctive types of intelligence were being measured. In fact, he

General Intelligence

wrote: "the subtests are *different measures of intelligence*, not *measures of different kinds of intelligence"* (p. 64). Similarly, Naglieri (2003) further clarified that "the term nonverbal refers to the content of the test, not a type of ability" (p. 2). Thus, tests may differ in their content or specific demands, but still measure the concept of general intelligence.

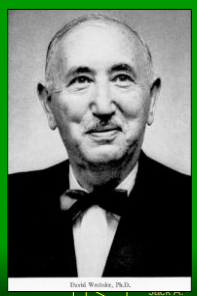
General Intelligence

Note

Wechsler (1975) included all of his intelligence tests under the umbrella term called general ability. He wrote "… the attributes and factors of intelligence, like the elementary particles in physics, have at once collective and individual properties" (p. 138). Even though a test may have questions that are verbal, quantitative, or nonverbal, they can be combined under the concept of general ability.

Wechsler's Definition

- **Definition of intelligence:**
  "The aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment (1939)"



General Intelligence

- **The meaning of general intelligence**
  - **"we did not start with a clear definition of general intelligence… [but] borrowed from every-day life a vague term implying all-round ability and… we [are] still attempting to define it more sharply and endow it with a stricter scientific connotation" (p. 53)".**
  - ***Intelligence Testing: Methods and Results* by Roudolf Pintner (1923)**

General Intelligence

- **General ability is what allows people to solve a number of different kinds of problems that may involve words, pictures, or numbers**
- **These problems may involve**
  - **reasoning, memory, sequencing, verbal and math skills, patterning, connecting ideas across and within content areas, insights, making connections, drawing inferences, analyzing simple and complex ideas.**

Conclusions

- Tests of general ability are very similar despite the difference in content
- Verbal or nonverbal tests are simply different ways to measure general ability
- A nonverbal test can correlate with achievement just as well as a verbal and nonverbal test
- What evidence is there that this helps with fair assessment?

NNAT Race/Ethnic Differences

Naglieri, J. A., & Ronning, M. E. (2000). Comparison of White, African-American, Hispanic, and Asian Children on the Naglieri Nonverbal Ability Test. *Psychological Assessment, 12*, 328-334

Comparisons of White, African American, Hispanic, and Asian Children on the Naglieri Nonverbal Ability Test

Jack A. Naglieri and Margaret E. Ronning

Naglieri & Ronning (2000)

- Samples selected from total group of 89,600 matched on:
  - Gender
  - Region
  - SES
  - Urbanicity
  - Ethnicity
  - Public/private school setting

Race Ethnic Differences

	N	Mean	Diff
White	2,306	99.3	
Black	2,306	95.1	4.2

Race Ethnic Differences

	N	Mean	Diff
White	2,306	99.3	
Black	2,306	95.1	4.2
White	1,176	101.4	
Hispanic	1,176	98.6	2.8

Race Ethnic Differences

	N	Mean	Diff
White	2,306	99.3	
Black	2,306	95.1	4.2
White	1,176	101.4	
Hispanic	1,176	98.6	2.8
White	466	103.6	
Asian	446	103.9	0.3

NNAT & Gifted Identification

- Increasing Identification of Gifted Minority Children Using the Naglieri Nonverbal Ability Test (NNAT)
- Jack A. Naglieri & Donna Ford
- Gifted Child Quarterly (2003)

Addressing Underrepresentation of Gifted Minority Children Using the Naglieri Nonverbal Ability Test (NNAT)

Jack A. Naglieri
George Mason University

Donna Y. Ford
The Ohio State University

ABSTRACT

A persistent problem in education is the underrepresentation of diverse students in gifted education programs. Many educators attribute the poor participation of diverse students in gifted programs to the ineffectiveness of standardized tests in capturing the ability of these students. Thus, a primary agenda of school selection committees is to find more culturally sensitive measures. This study examined the effectiveness of the Naglieri Nonverbal Ability Test (NNAT) in identifying gifted Black and Hispanic students in comparison to White students. The sample was comprised of

attribute the problem to standardized tests, contending that these tests fail to assess the strengths and abilities of culturally, ethnically, and linguistically diverse populations (e.g., Frazier et al., 1995). Support for this assertion comes from reports showing that Black, Hispanic, and Native American students consistently score lower than White students on traditional standardized tests (Brody, 1992; Sattler, 1988).

Despite the fact that intelligence tests such as the Wechsler Intelligence Scale for Children–Third Edition

PUTTING THE RESEARCH TO USE

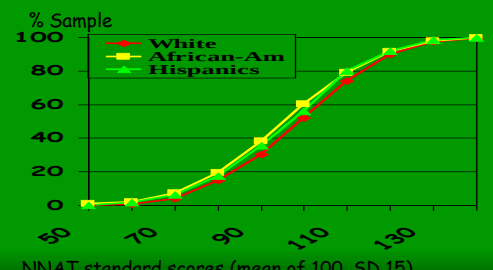
Naglieri & Ford (2001)

- Sample:
  - 19,210 children (fall 1995 NNAT sample)
  - Grades K to 12
  - Representative of US according to:
    - geographic region
    - socioeconomic status
    - ethnicity
    - type of school setting (public or private)

Naglieri & Ford (2001)

- Purpose of the study
  - to examine the differential hit rates for different groups of children identified as earning several high NNAT scores
  - Cumulative frequency distributions were obtained for White (n = 14, 316) , Black (n = 2,880), and Hispanic (n = 2, 014) samples

Naglieri & Ford (2003)



Naglieri & Ford (2003)

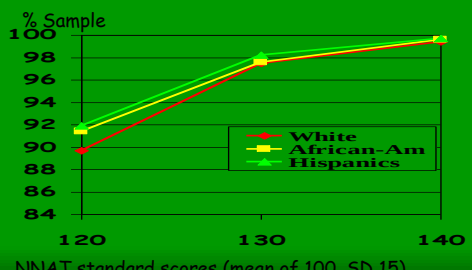


Table 2

NNAT Scores

	White		Black		Hispanic		Expected
	n	%	*n*	%	*n*	%	%
120 & above	1,571	10.3	269	9.4	190	9.5	9.0
125 & above	906	5.6	145	5.1	88	4.4	5.0
130 & above	467	2.5	75	2.6	46	2.3	2.0
135 & above	190	1.1	42	1.5	18	0.9	1.0
140 & above	90	0.6	19	0.6	9	0.4	0.4
Total Sample *n*	14,141		2,863		1,991		

Note. *Expected percentage values are those associated with normal curve probabilities.*

relations to achievement provided by Naglieri and Ronning (2000a, 2000b) to include an important examination of the differential rates of identification for diverse groups. These results are similar to previous studies of the NNAT and its earlier version, the MAT (Naglieri, 1985a, 1985b), which demonstrated that the instrument yielded small differences between majority and minority groups (Naglieri, 1985b; Naglieri & Ronning, 2000a). More importantly, however, quently, provide access to gifted education services. The primary difference between the NNAT and other group ability tests is that the latter typically include verbal, quantitative, as well as nonverbal tests. Some researchers have argued that a general ability test with verbal and quantitative items is limited in utility because it demands English language skills and knowledge directly taught in school (Naglieri, 1999; Naglieri & Prewett, 1990). This study

Naglieri & Ford (2003)

- **Conclusions**
  - **distributions of scores were remarkably similar for white, African-American, and Hispanics**
  - **Similar percentages of children were identified using a cut off score of 130 and 140**
  - ***NNAT* can be used to assist when fair assessment of all children for gifted programs is desired**

Comparison of Hispanic Children with and without Limited English Proficiency on the NNAT

BRIEF REPORTS

Comparison of Hispanic Children With and Without Limited English Proficiency on the Naglieri Nonverbal Ability Test

Jack A. Naglieri
George Mason University

Ashley L. Booth
University of Virginia

Adam Winsler
George Mason University

Hispanic Children

- **148 Hispanic children with limited English language proficiency**
  - **98 % from West and South**
  - **53 % males**
  - **82% Low and Low Middle SES**
  - **41% Urban settings**
- **148 Hispanic children without limited English language proficiency**
  - **98 % from West and South**
  - **53 % males**
  - **82% Low and Low Middle SES**
  - **41% Urban settings**

Hispanic Children

Table 2

Means, Standard Deviations, and Sample Sizes for Hispanic LEP and Non-LEP Matched Samples on Ability and Achievement Measures

	LEP			Non-LEP				
Measure	*M*	*SD*	*n*	*M*	*SD*	*n*	*d* ratio	*F*
NNAT	98.0	19.8	148	96.7	17.6	148	0.1	0.4
Total Reading	91.7	14.7	148	95.4	12.8	144	0.3	5.3*
Vocabulary	90.1	17.0	133	94.7	13.0	143	0.3	6.5*
Reading Comprehension	93.6	14.7	130	97.1	13.0	130	0.2	4.1*
Listening	88.9	14.5	137	96.2	12.4	137	0.5	19.8**
Total Math	98.5	15.7	148	96.7	14.0	144	0.1	1.1
Problem Solving	97.3	14.8	113	97.2	13.6	110	0.0	0.0
Procedures	102.3	18.2	113	100.4	17.6	113	0.1	0.7

Note. LEP = limited English proficiency.
* $p < .05$. ** $p < .01$.

Hispanic Children

Table 3

Correlations Between Naglieri Nonverbal Ability Test and Stanford Achievement Test Standard Scores for Hispanic LEP and Non-LEP Matched Samples

Measure	LEP	*n*	Non-LEP	*n*
Total Reading	.70	148	.59	144
Vocabulary	.49	133	.39	143
Reading Comprehension	.69	130	.62	130
Listening	.78	137	.41	137
Total Math	.80	148	.73	144
Problem Solving	.83	113	.73	110
Procedures	.77	113	.77	113

Note. All correlations are significant at $p < .01$. LEP = limited English proficiency.

Presentation Outline

1. Overview
2. Administration
3. Subtest Description
4. Interpretation
5. Reliability
6. Validity
7. What does the WNV measure?
8. Case Studies
9. Conclusions

WNV Case Studies

Case of Rosina – Is she mentally retarded?

Case of Gerry – Hearing Impairment and Learning Problems

Note: The names of children used in ALL these case studies have been changed to protect their identity.

Case of Rosina

Recently Immigrated to the US from Ghana

Case of Rosina

- Rosina is 7-years old who recently moved to the US
- Her family is originally from Ghana
- Twi was the primary language spoken at home, with some English spoken
- Prior to assessment a Twi interpreter was obtained to interpret educational tests.
  - The interpreter reported that Rosina did not comprehend informal or formal language in Twi

To case studies

Case of Rosina

- English Language Screening results -- Rosina is at a LEVEL 1 in English Language Proficiency
- She can comprehend
  - simple statements, questions and the general idea of basic messages and conversations
  - basic vocabulary and simple grammatical structures
- Rosina is beginning to acquire pre-reading skills while relying on visual cues

Case of Rosina

- Comprehension is limited to simple language containing high-frequency vocabulary and predictable language patterns
- Rosina's general ability, was measured by WNV
- *Processing was measured with the* CAS

Case of Rosina

Ages 4:0–7:11

Total Raw Score to *T* Score Conversions

Subtest	Raw Score	*T* Score	
Matrices	11	40	
Coding	25	46	
Object Assembly	8	28	
Recognition	13	48	
Sum of *T* Scores		162 (4-Subtest)	(2-Subtest)

Router

Case of Rosina

	T Score	Age Eqv	% tile
Matrices	40	5:7	16
Coding	46	6:6	34
Object Assm	28	<4:1	1
Recognition	48	6:10	42

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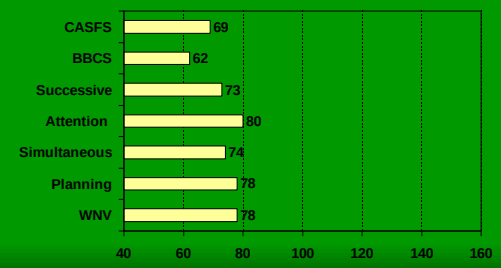
Case of Rosina



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Case of Rosina

- Low adaptive skills
- School problems

BASC-II Composite Score Summary

	Raw Score	T Score	Percentile Rank	90% Confidence Interval
Externalizing Problems	159	53	71	50-56
Internalizing Problems	167	57	80	51-63
School Problems	136	70	96	66-74
Behavioral Symptoms Index	389	69	95	66-72
Adaptive Skills	155	28	2	25-31

Router

Case if Rosina

Bracken Basic Concept Scale-Revised

Subtest	Scale Score	Confidence 95% Level	Percentile Rank	Normative Classification	Concept Age Development
SRC	3	2 to 8	1	Very Delayed	5-4
Direction Position	3	2 to 4	1	Very Delayed	3-5
Self-/Social Awareness	3	2 to 6	1	Very Delayed	4-5
Texture/Material	2	0 to 4	<1	Very Delayed	3-4
Quantity	4	3 to 5	2	Very Delayed	4-6
Time/Sequence	3	1 to 5	1	Very Delayed	4-2
Total Test	62	59-67	1	Very Delayed	4-4

Router

To case studies

Case of Gary

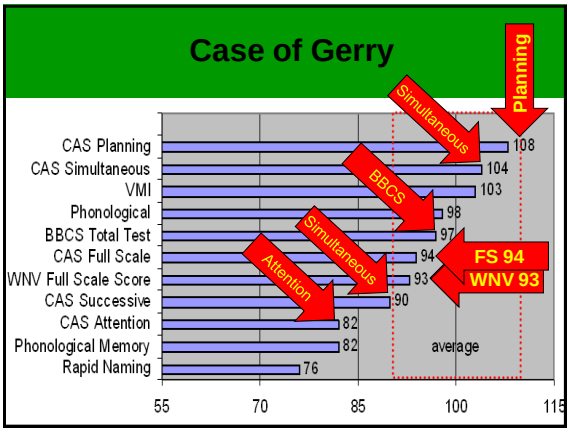
What impact does his hearing impairment have on functioning?

Router

Case of Gary

- Teachers are asking how much the hearing loss is influencing Gary's learning
- Is anything else going on?
- Teacher reports that Gary does show inattention problems in the classroom.

Case of Gerry



Case of Gerry

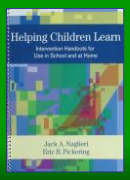
- WNV FS suggested Average ability
- CAS FS suggested Average ability but…
  - PASS scale analysis showed a cognitive processing disorder in ATTENTION
  - Low Attention - consistent with teacher report
- Gerry's attention problems in the class are related to his Attention processing weakness this may be compounded by his hearing loss

Case of Gerry

- Conclusions
- Cognitive processing disorder in Attention (CAS SS=82, 12th percentile rank)
  - Note that Gerry's Attention processing was measured using VISUAL tests that do not require hearing
  - Poor Attention can have an adverse impact on learning in the classroom if a student has difficulty with concentration, focusing on essential details of tasks and important information, resisting distraction, and sustaining attention and effort over time.

Case of Gerry

- Cognitive Interventions are needed to help Gerry
  - See Helping Children Learn handouts
    - Improving Inattention



To case studies

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Conclusions

- Nonverbal tests provide a culturally reduced way to measure general ability
- Nonverbal tests have excellent reliability and validity
- Nonverbal tests provide a way to measure general ability that does not require verbal and quantitative skills
- Nonverbal tests are useful for culturally and linguistically diverse populations

Summary Nonverbal Tests

- Strong relationships to achievement
- Small Race / Ethnic differences
- Similar identification rates for gifted children
- Similar scores for children with limited English language skills

Presentation Router

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