

WNVTM
WECHSLER NONVERBAL SCALE OF ABILITY

A Nonverbal Measure of Ability
for Anyone, Regardless of the Language Spoken

*-especially designed
for culturally and linguistically diverse groups*

Presenter and author of the WVN: Jack A. Naglieri, Ph.D.
Professor of Psychology, George Mason University
May 29th, 2008

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PEARSON

Fair Assessment and Intervention for Children from Culturally and Linguistically Diverse Backgrounds

**Jack A. Naglieri, PhD
Professor of Psychology
George Mason University
naglieri@gmu.edu**

Presentation Overview



Wechsler & Naglieri, 2006



The Wechsler Nonverbal Scale of Ability

- Administration
- Subtest Description
- Scoring
- Interpretation
- Technical Characteristics
- Case Study
- What does the WNV measure?
- Conclusions

Presentation Overview



Wechsler & Naglieri, 2006



The Wechsler Nonverbal Scale of Ability

- **Administration**
- **Subtest Description**
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- **Technical Characteristics**
- **Case Study**
- **What does the WNV measure?**
- **Conclusions**

WNV Authors



Wechsler & Naglieri, 2006

David Wechsler, PhD



David Wechsler obtained his Master of Arts (1917) and Doctorate (1925) degrees at Columbia University under R. Woodworth. He worked with E. Boring on the Army Alpha and was sent by the U.S. Army to the University of London to work with C. Spearman and K. Pearson. While completing his doctoral degree he worked at the Bureau of Child Guidance as a clinical psychologist and at The Psychological Corporation. After he completed his doctoral degree he continued his work as a clinical psychologist in private practice and then at Bellevue Psychiatric Hospital until 1967. He was also a clinical professor at the Medical College of New York University until 1967.

Dr. Wechsler shaped the field of intelligence testing with his views and creation of a number of tests. Dr. Wechsler is known for three book publications: *The Range of Human Capacities* (1935), *The Measurement of Adult Intelligence* (1939), *The Measurement and Appraisal of Adult Intelligence* (1958), and three

test publications: the *Wechsler-Bellevue Intelligence Scale* (1939), the *Wechsler Intelligence Test for Children* (WISC; 1949), and the *Wechsler Adult Intelligence Test*. On verbal and performance (i.e., nonverbal) tasks, Dr. Wechsler distinguished between kinds of intelligences, but rather different ways of measuring them.

David Wechsler passed away in 1981, but his legacy continues.

Jack A. Naglieri, PhD



Jack A. Naglieri obtained his Master of Science degree from St. John's University (1974). He worked as a school psychologist in the New York area from 1974 to 1977, prior to earning his doctorate from the University of Georgia (1979) under the direction of A. S. Kaufman, who had worked with Dr. Wechsler. In 1980 he began his career as a university professor at Northern Arizona University and from 1982 to 2000 was on the faculty at Ohio State University. Dr. Naglieri was director of GMU's Center for Cognitive Development from 2000–2004, and is now a Professor of Psychology and the School Psychology Program Director at George Mason University in Fairfax, Virginia. He holds an appointment as a Senior Research Scientist at the Devereux Foundation's Institute for Clinical Training and Research and is director of the school psychology program. He is the Senior Editor of the *Journal of Attention Disorders* and is on the editorial boards of many professional journals.

Dr. Naglieri is the author of more than 250 scholarly publications and books in the area of psychological assessment and intervention, including *Helping Children Learn: Intervention Handouts for Use at School and Home* (with Pickering, 2003). He is the author of the widely used *Naglieri Nonverbal Ability Tests* (1997; 2003), as well as other tests designed to measure ability, cognitive processing, emotional disorders, resilience, and impairment.

naglieri@gmu.edu

What is the WNV?



Overview

WNV Overview



Wechsler & Naglieri, 2006

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



Wechsler & Naglieri, 2006

- **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**
- **Meets IDEA 2004 requirements for reliable and valid nondiscriminatory assessment**

WNV Overview



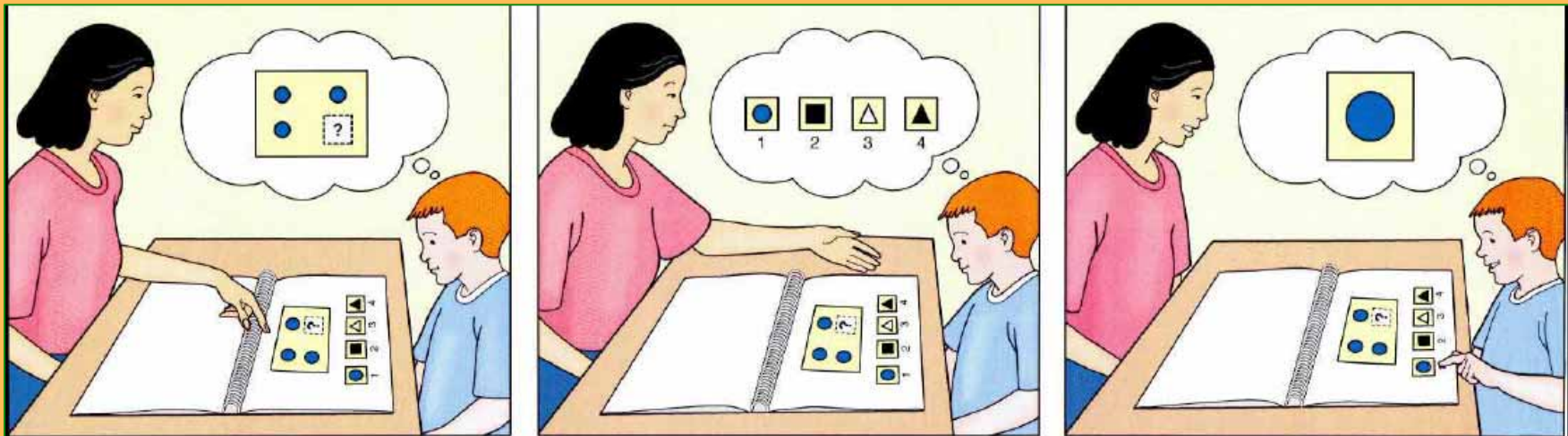
Wechsler & Naglieri, 2006

The WNV is a nonverbal measure of general ability using subtests that

- Have different demands
 - Some require memory other sequencing****
- Do not contain verbal content (e.g., Vocabulary)**
- Do not require the examinee to speak**
- Use pictorial directions**

WNV Overview

The pictorial directions make it *easy for the examinee* to understand what they have to do and *easy for the examiner*



WNV Overview



Wechsler & Naglieri, 2006

In addition to the Pictorial Directions

- Administration instructions include gestures by the examiner that draw the examinee's attention to the demands of the task
- Verbal instructions are used as needed and provided in six languages
- Examiners have the opportunity to provide additional help as needed

This will be illustrated in the slides that follow

WNV Subtest Overview



Wechsler & Naglieri, 2006

- **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 Overview



Wechsler & Naglieri, 2006

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- Conclusions

wnvTM
WECHSLER NONVERBAL SCALE OF ABILITY

**Administration and
Scoring Manual**

David Wechsler
Jack A. Naglieri

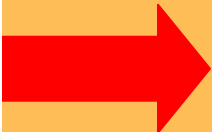


PsychCorp
A brand of Harcourt Assessment

WNV Subtests

Administration

Instructions



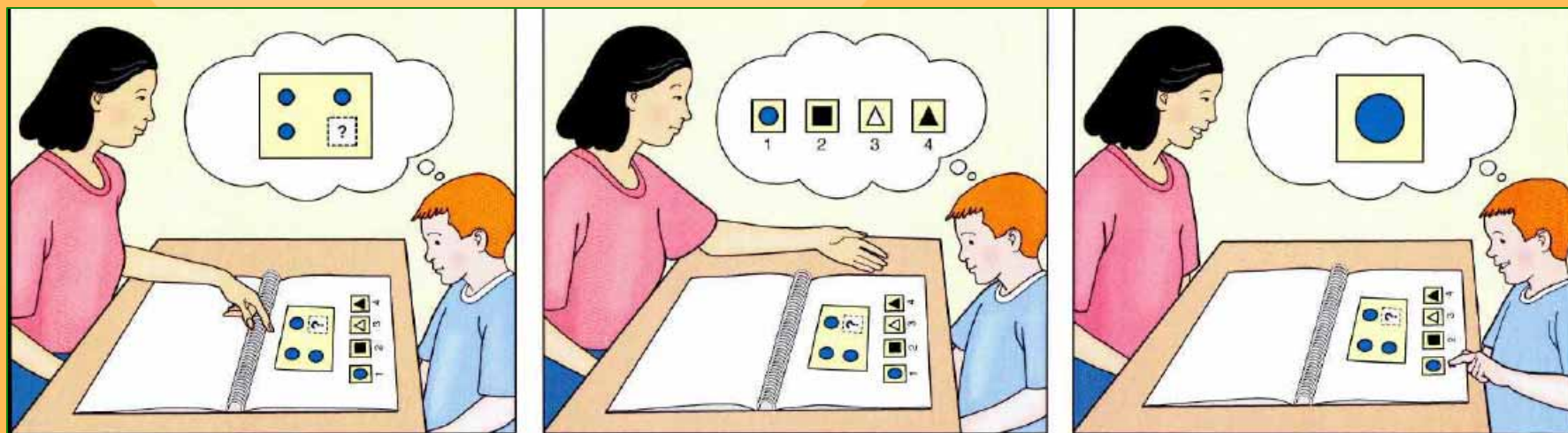
Pre administration instruction

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

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

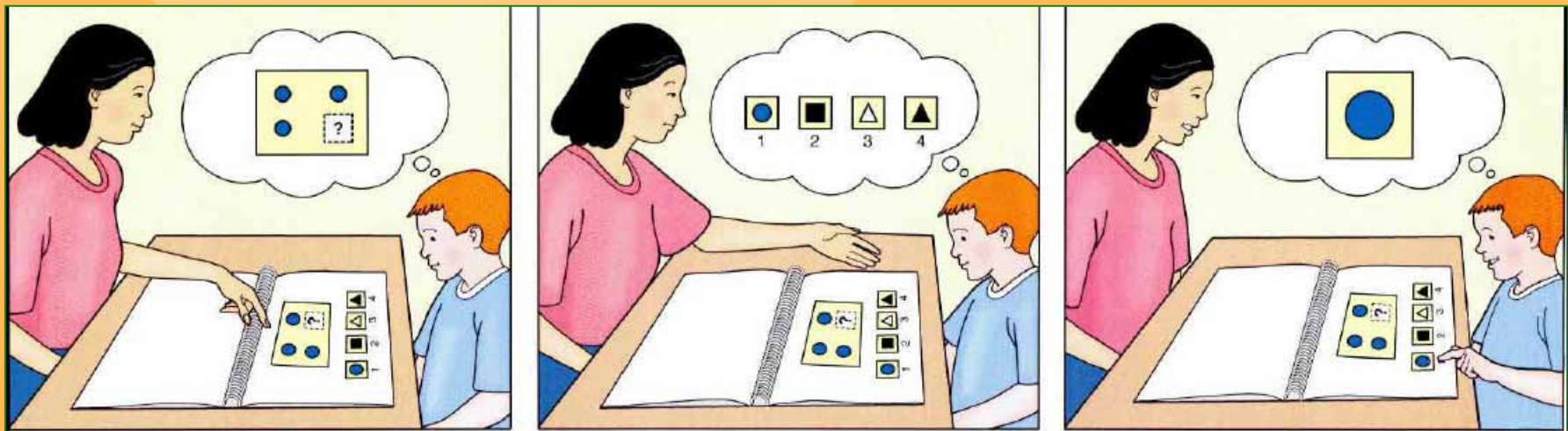


Item Administration

➡ Demonstration Item 4-7

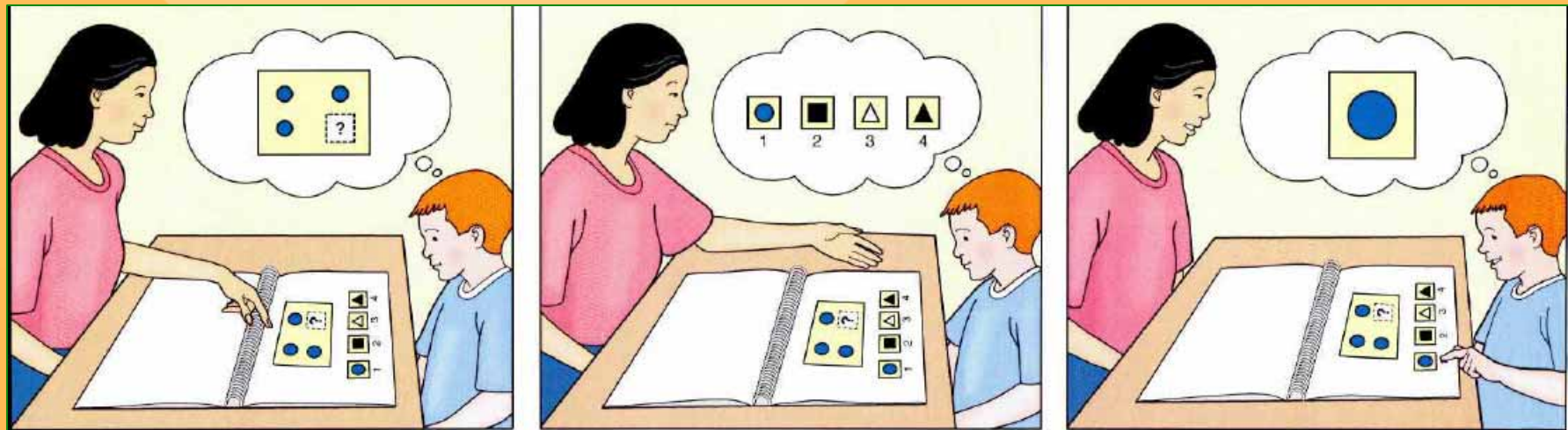
1. Place the coil-bound edge of the Stimulus Book toward the examinee. Turn to the pictorial directions for Matrices.

Matrices Administration



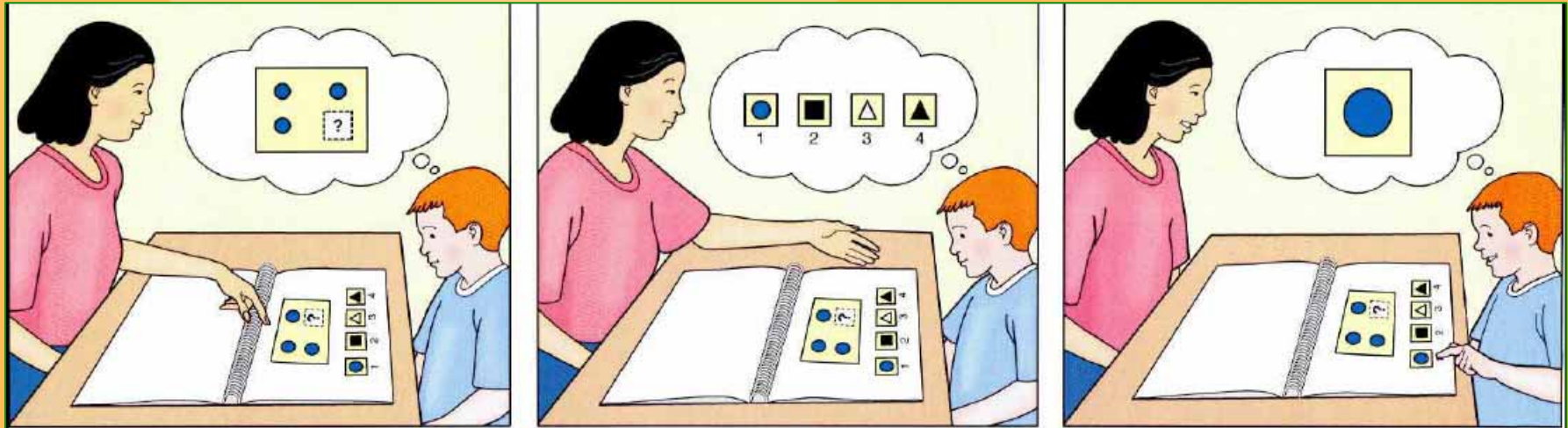
2. Slowly point to each frame of the pictorial directions from the examinee's left to right, briefly looking at the examinee as you point to each frame to be sure he or she is attending.

Matrices Administration



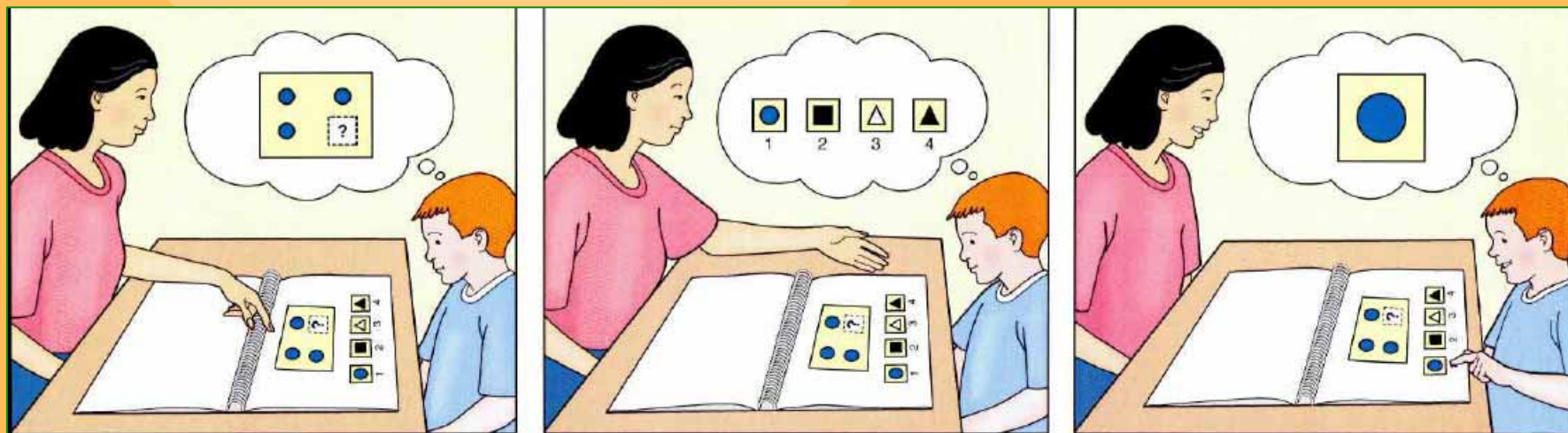
3. Allow the examinee time to look at the pictorial directions (up to a minute if needed).
4. Point to the first frame of the pictorial directions, then point to the top of the stimulus page.

Matrices Administration



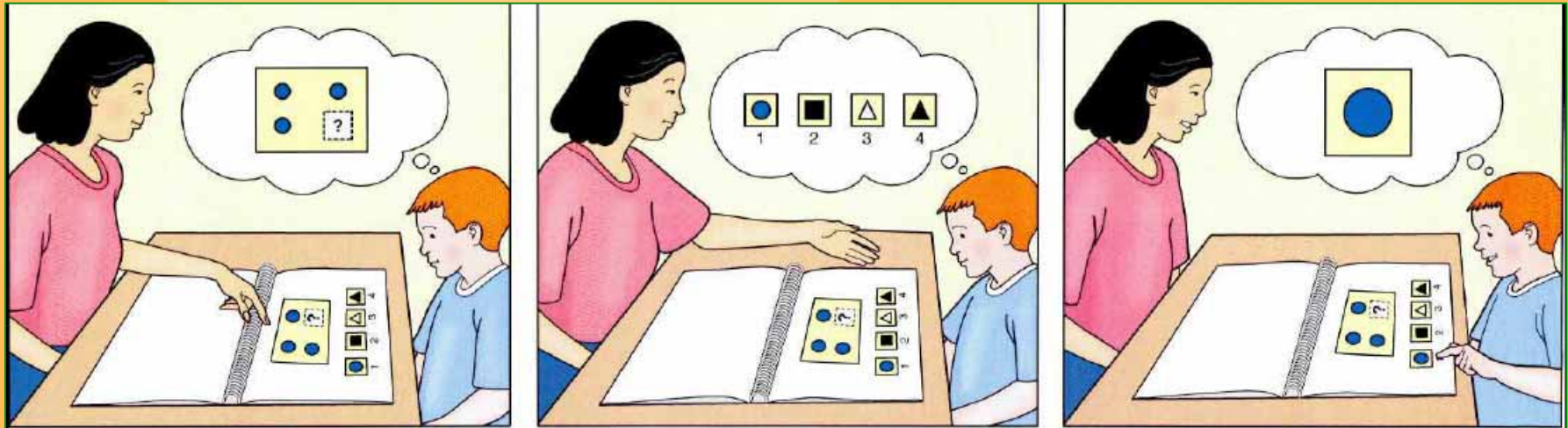
3. Allow the examinee time to look at the pictorial directions (up to a minute if needed).
4. Point to the first frame of the pictorial directions, then point to the top of the stimulus page.

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



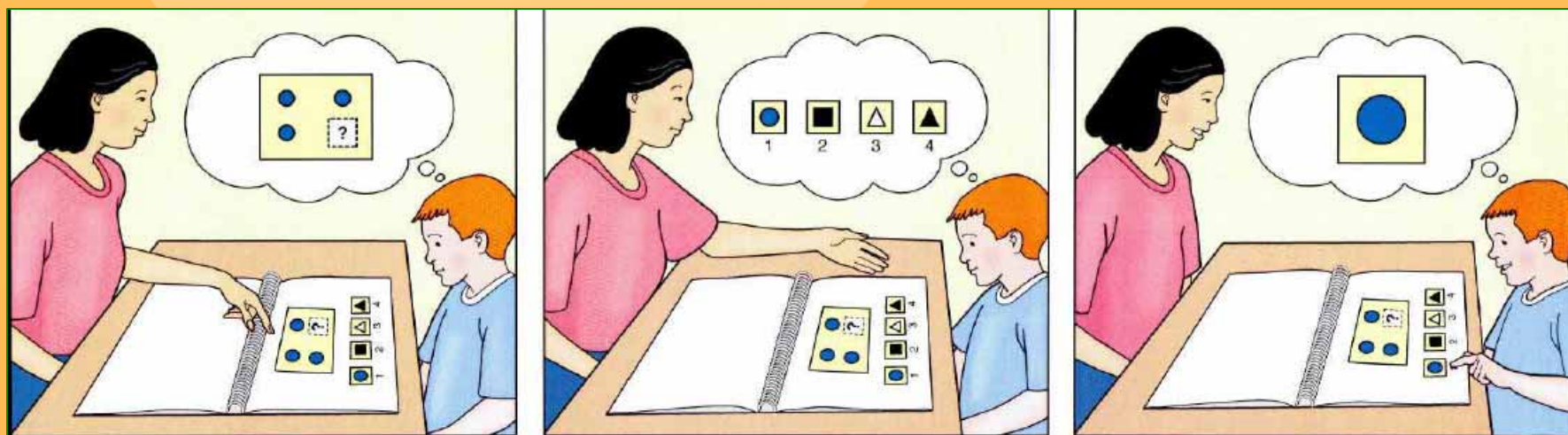
6. Point to the third frame of the pictorial directions, point to the question mark in the matrix, slowly sweep your hand along the response options in numerical order, and then look at the examinee.

Instructions

- **Pre administration instruction**
- **Subtest administration has three levels**
 - **Pictorial directions**
 - **Short verbal instructions**
 - Provided in 6 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?**

S: **¿Cuál de éstos va aquí?**

G: **Welches von diesen passt hier?**

F: **Laquelle de celles-ci va ici?**

C: **這些中的哪一個填在這兒?**

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?**

S: **¿Cuál de éstos va aquí?**

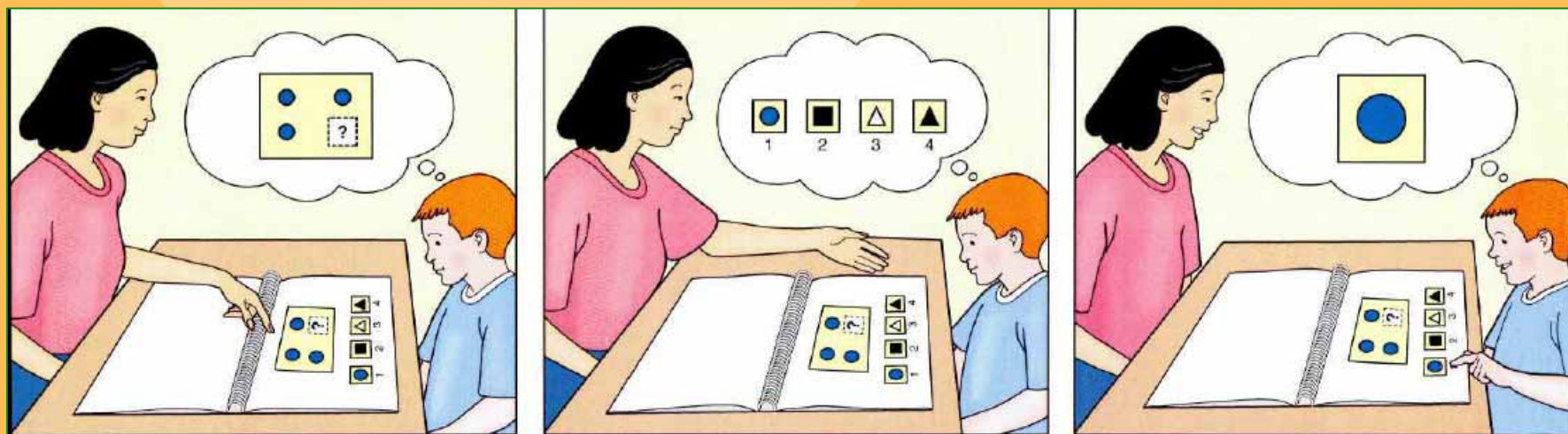
G: **Welches von diesen passt hier?**

F: **Laquelle de celles-ci va ici?**

C: **這些中的哪一個填在這兒?**

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。**

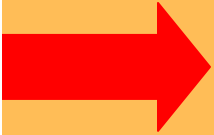
G: **Dieses ist die Antwort.**

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 if Needed

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**

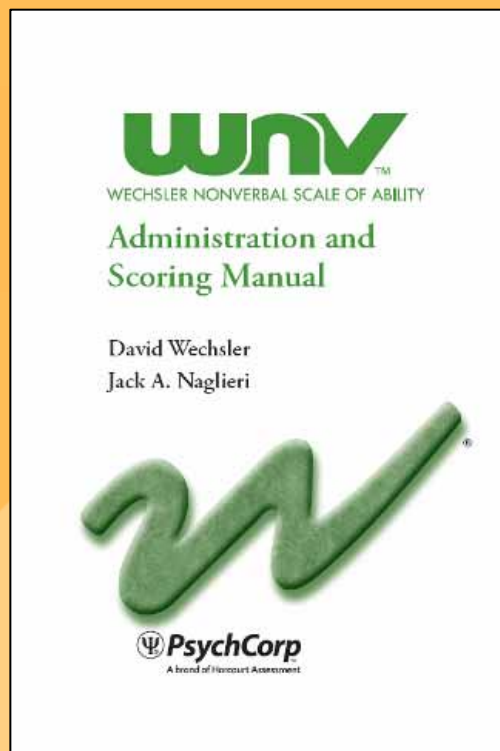
Instructions

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.

WNV Subtests



Content and Administration



Matrices

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

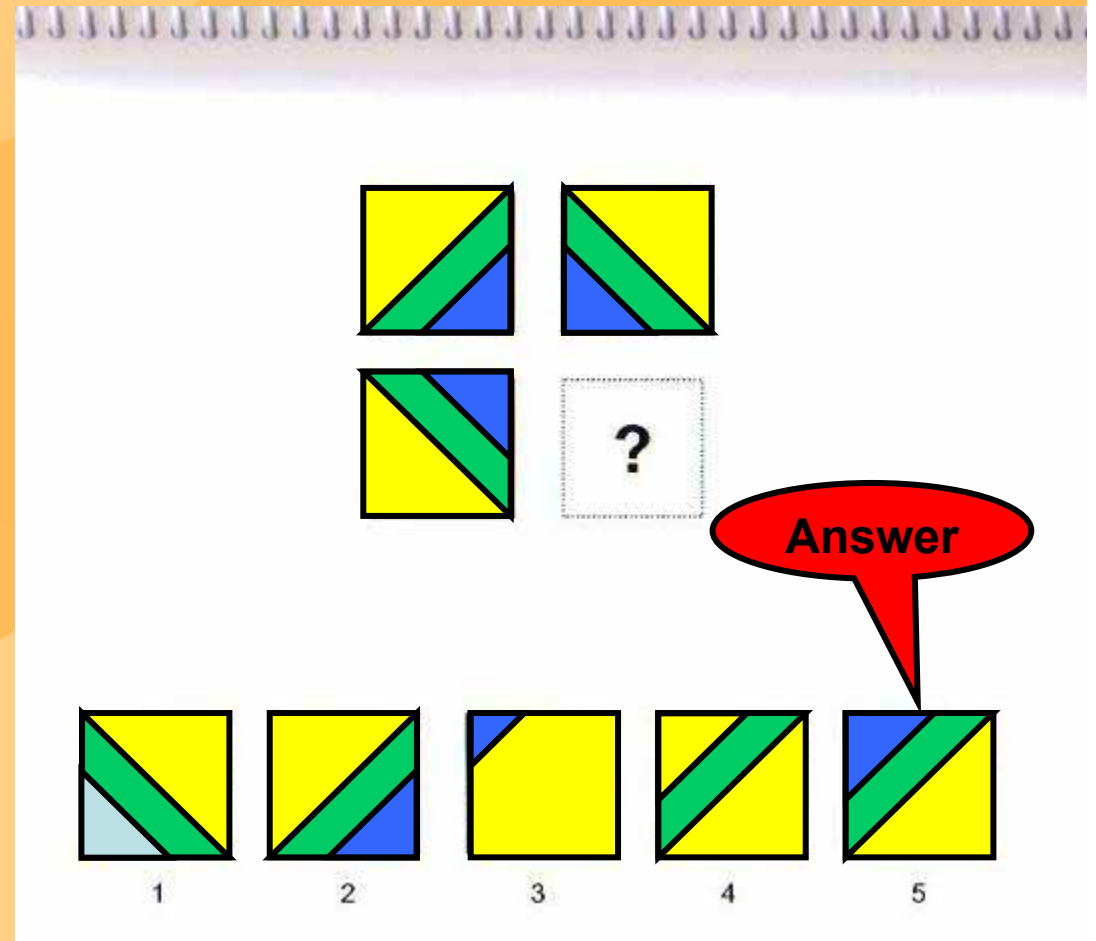
Subtest	Start Point	Reverse Rule	Discontinue Rule
Matrices (MA)	Ages 4–5 Demonstration Item, Sample Items A–C, then Item 1	Ages 6–21 Score of 0 on <i>either</i> of the first two items given, administer preceding items in reverse sequence until two consecutive perfect scores are obtained	After 4 scores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

**Stop
when 4 of
5 items
failed**

Matrices

Adapted from the
*Naglieri Nonverbal
Ability Test (NNAT)*

- Multiple color,
without color
blindness issues



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	None	Ages 4–7 After 120 seconds
	Ages 8–21 Coding B Demonstration Items, Sample Items, then Test Items		Ages 8–21 After 120 seconds

**120
seconds**

Coding



Demo items

Demonstration Items
Begin Here

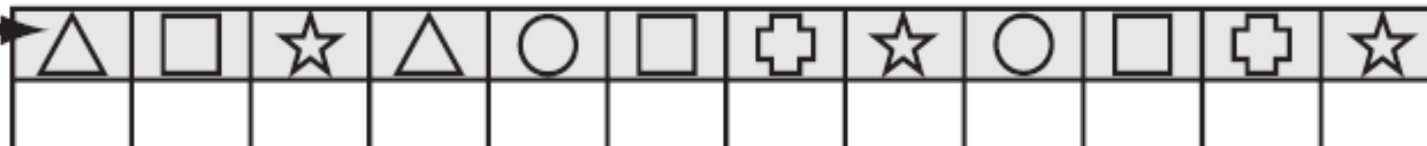


Sample items

Sample Items
Begin Here

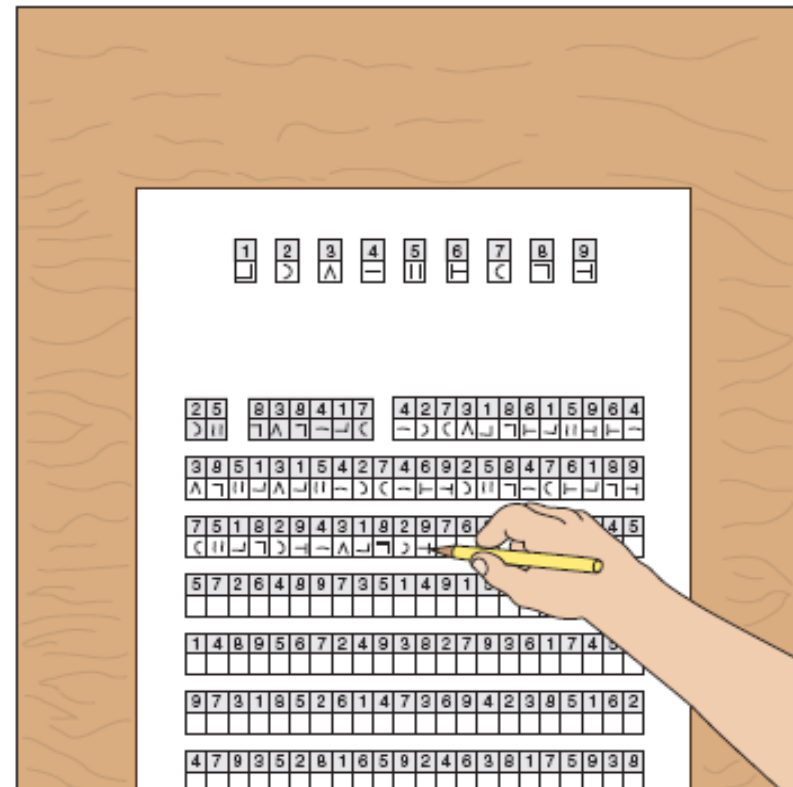
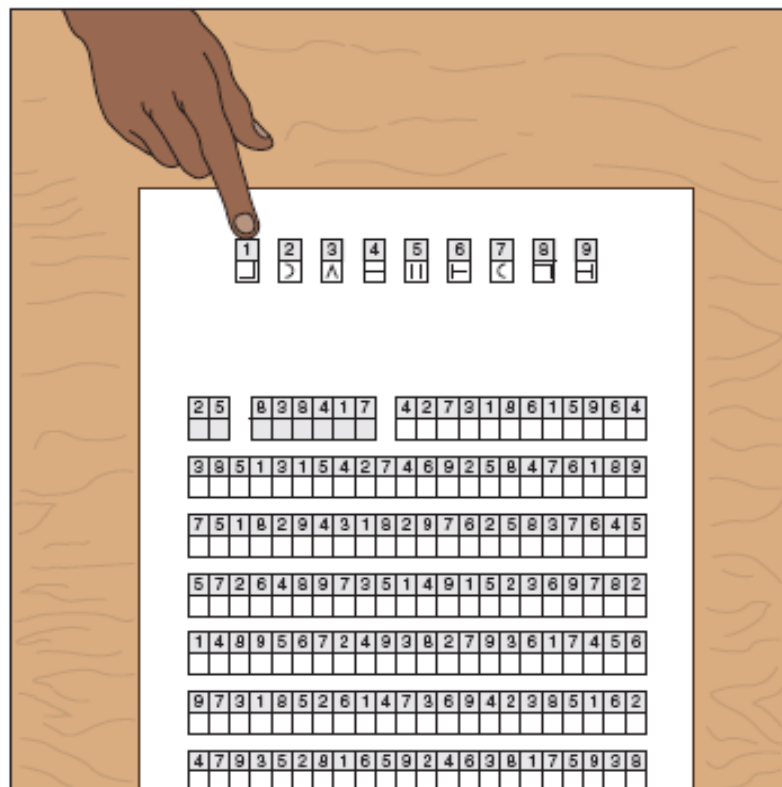


Test Items
Begin Here



Coding A & B

Adapted from WISC-IV



Spatial Span

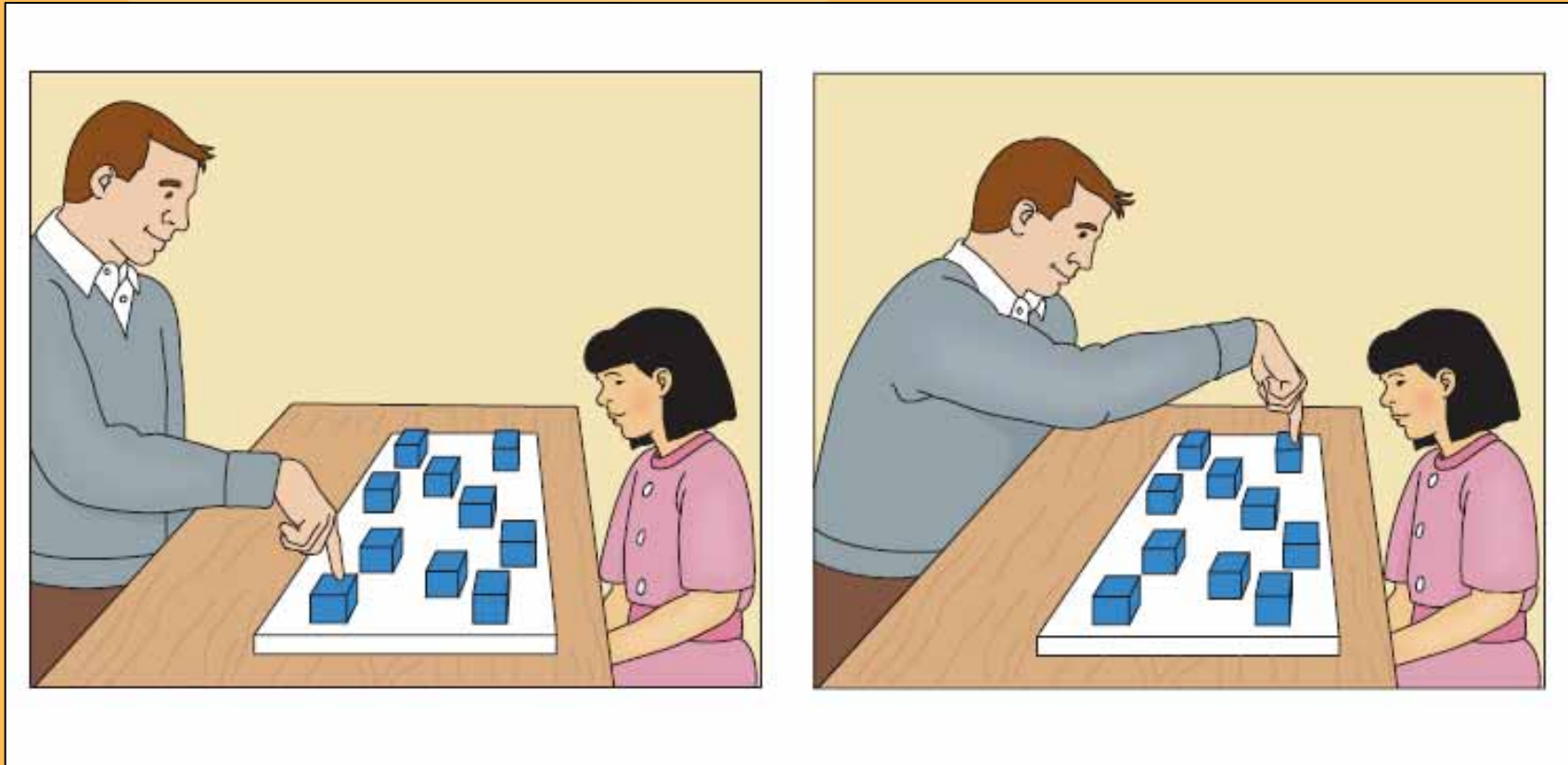
- Only for Older Examinees
- Adapted from WISC-IV Integrated
- Forward and Backwards

**Stop after
scores of
0 on both
trials of an
item**

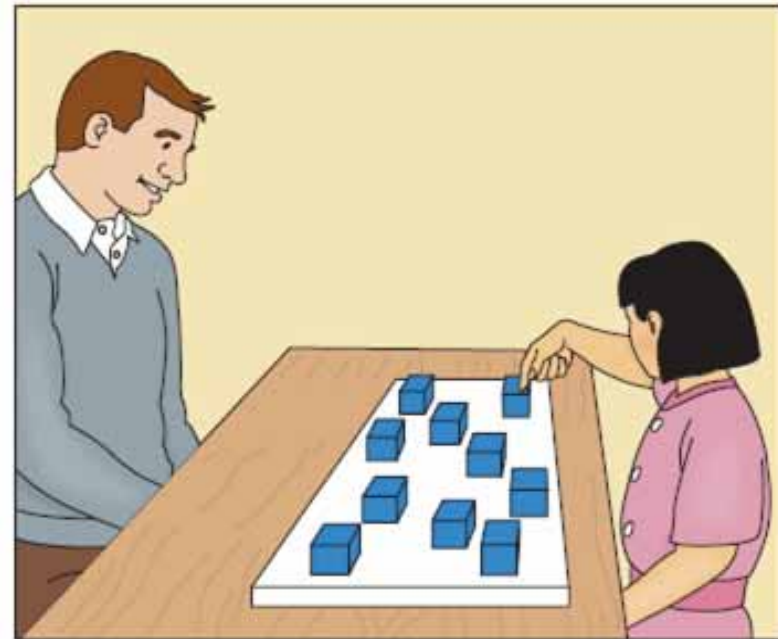
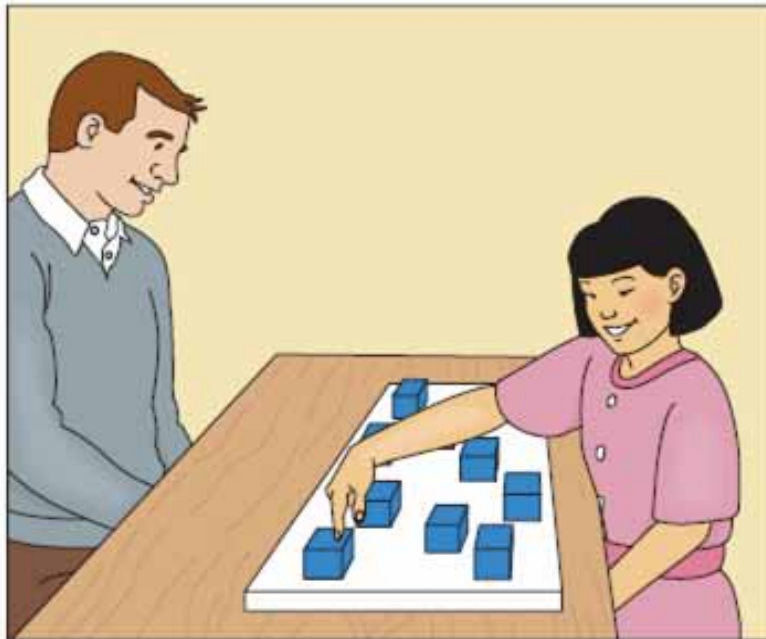
Table 2.4 Summary of Start Points, Reverse Rules, and Discontinue Rules

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 <i>both</i> trials of an item Backward: After scores of 0 on <i>both</i> trials of an item

Spatial Span Forward



Spatial Span Forward



Object Assembly

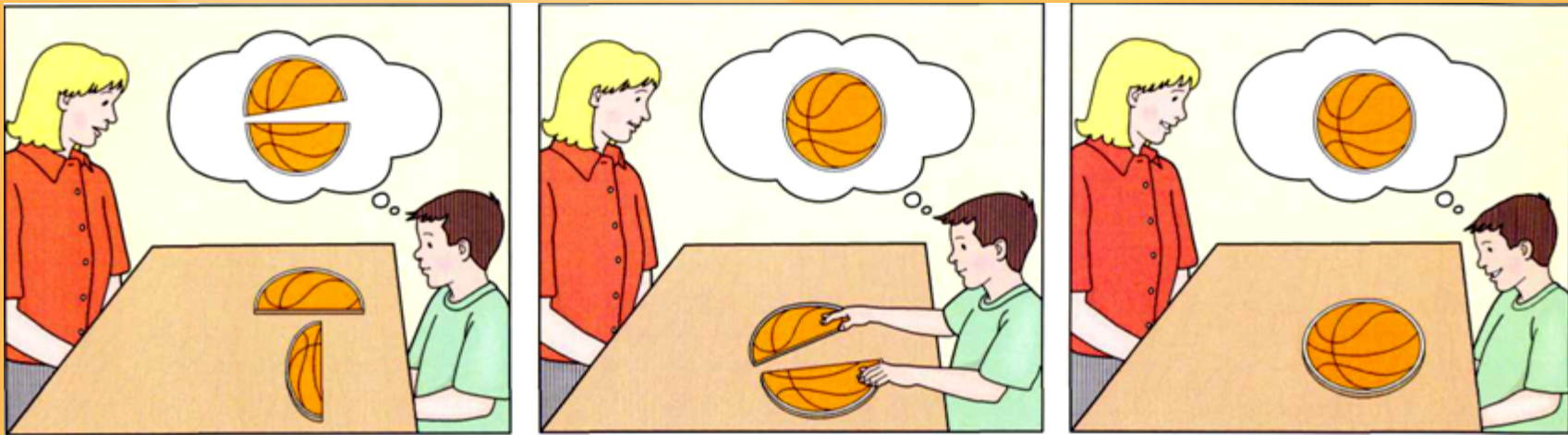
Adapted from WPPSI-III, WISC-III,
& WAIS-III

Stop after 2
consecutive
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 Imperfect assembly on <i>either</i> 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
	Ages 6–7 Demonstration Item, Sample Item, then Item 3		

Object Assembly



Recognition

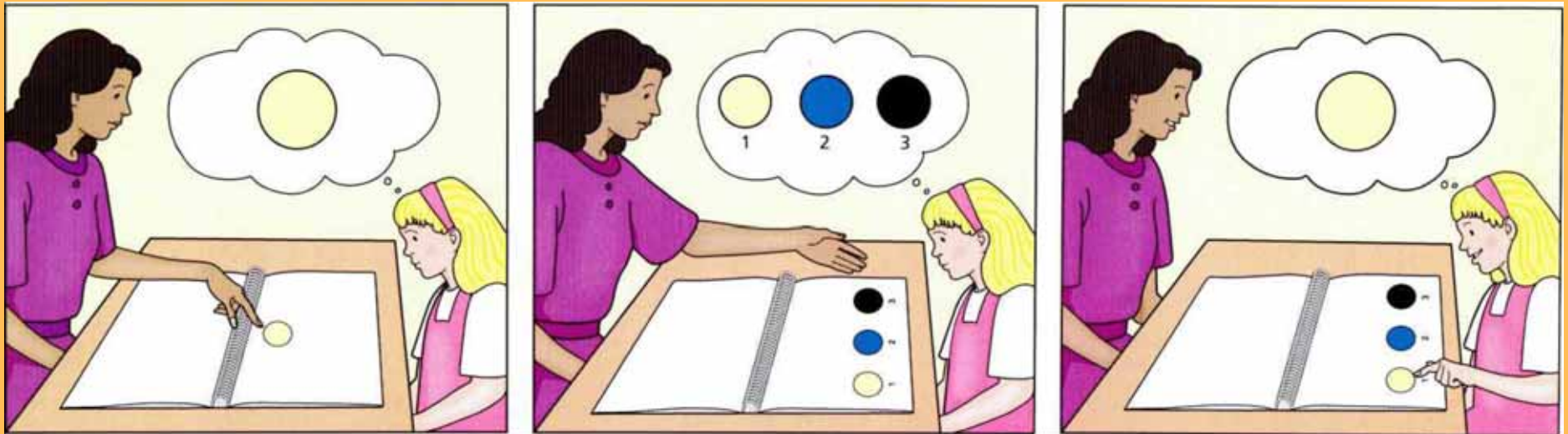
New Subtest

**Stop when
4 of 5 items
failed**

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

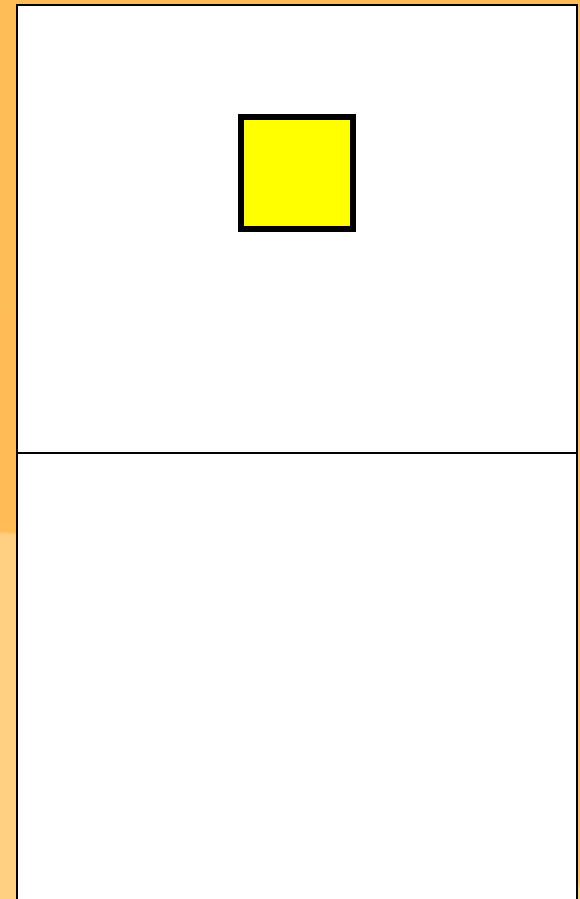
Subtest	Start Point	Reverse Rule	Discontinue Rule
Recognition (RG)	Ages 4–5 Demonstration Item, Sample Items A–C, then Item 1	Ages 6–7 Score of 0 on <i>either</i> of the first two items given, administer preceding items in reverse sequence until two consecutive perfect scores are obtained	After 4 scores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

Recognition



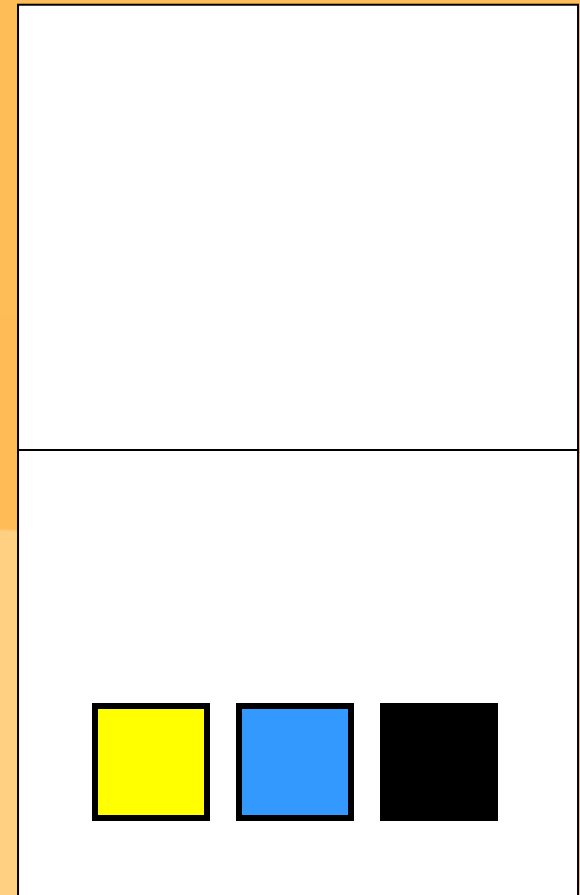
Recognition

**Recall of stimulus after
3 second exposure**

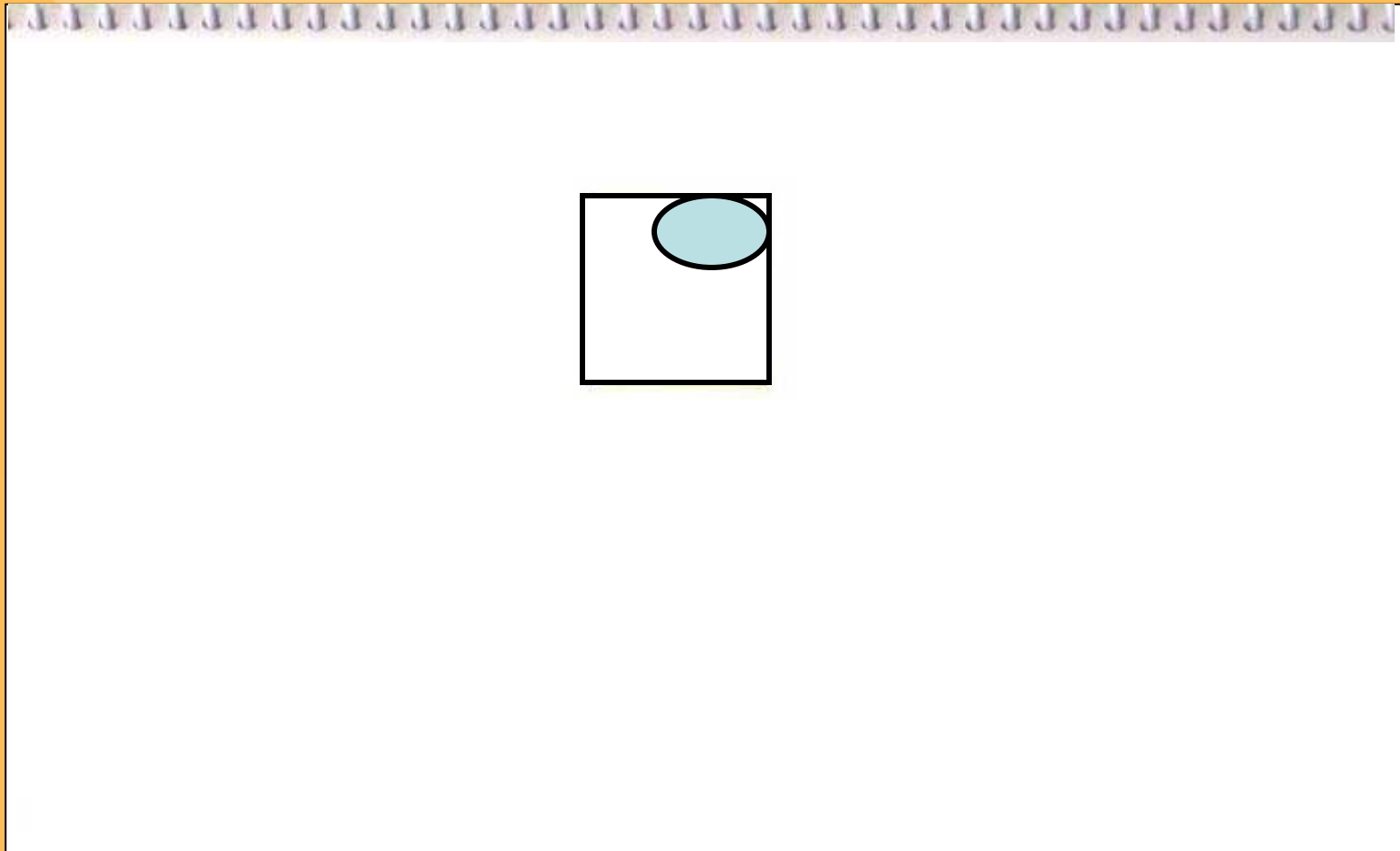


Recognition

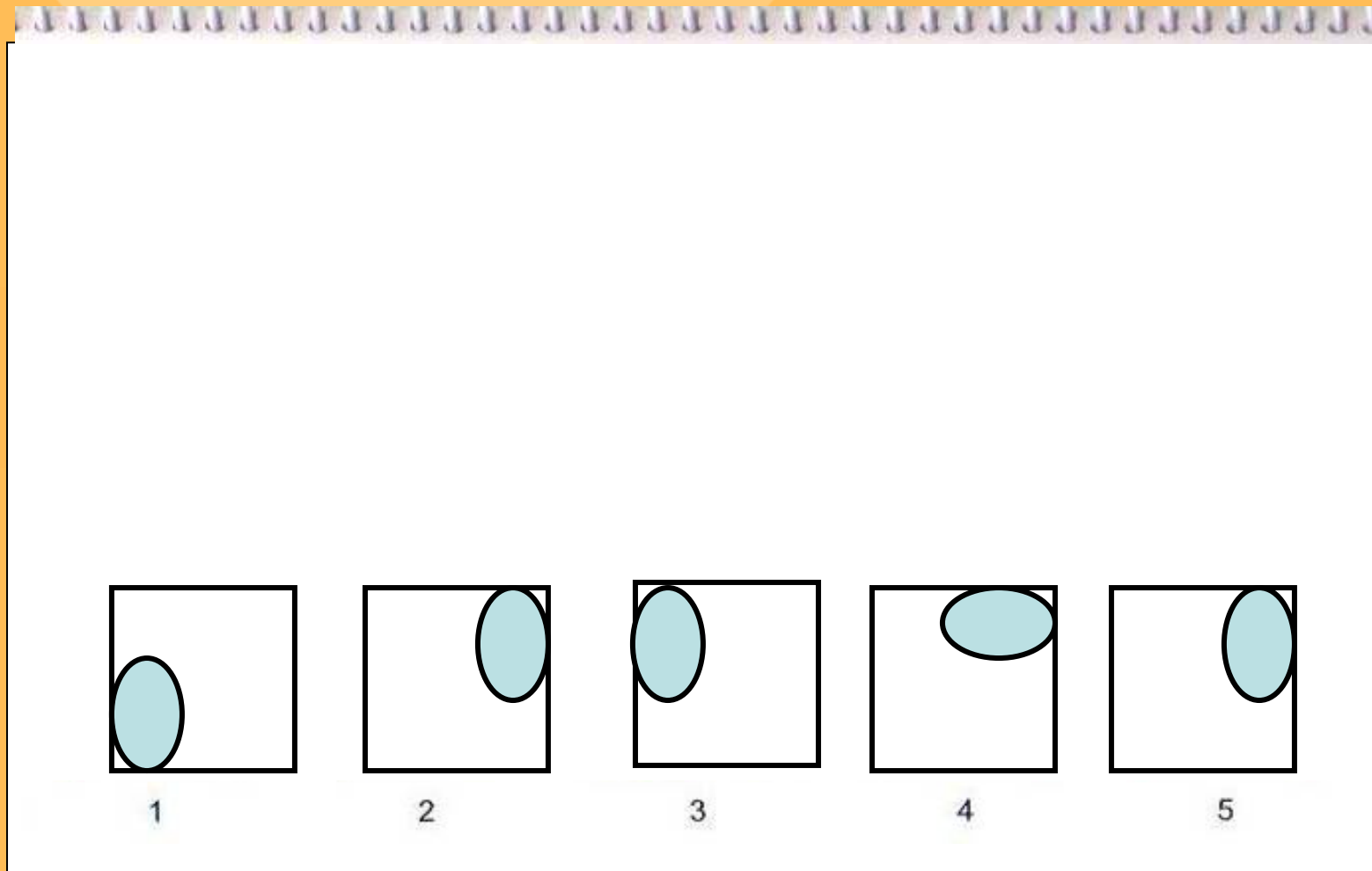
**Recall of stimulus after
3 second exposure**



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

U.S. and Canadian samples

Standardizations

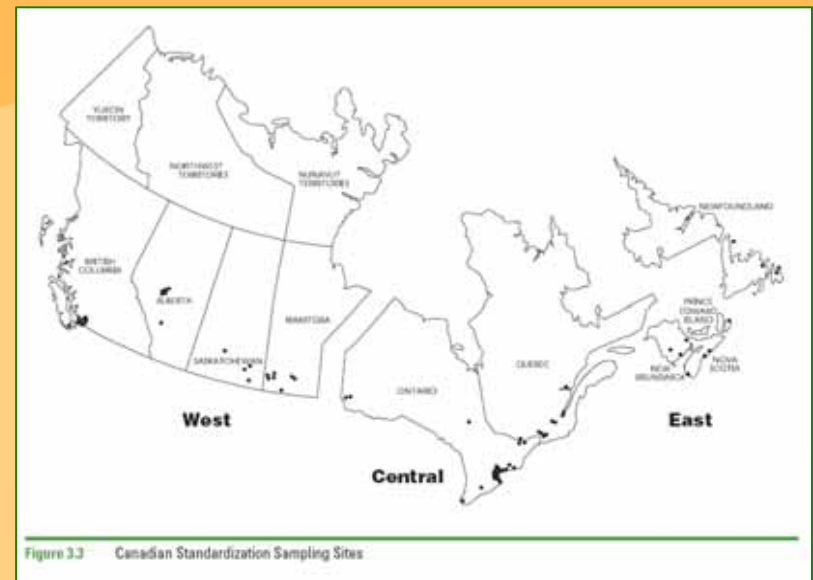
**US sample closely
matches the population**

(N = 1323)



**Canadian sample
closely matches the
population**

(N = 875)



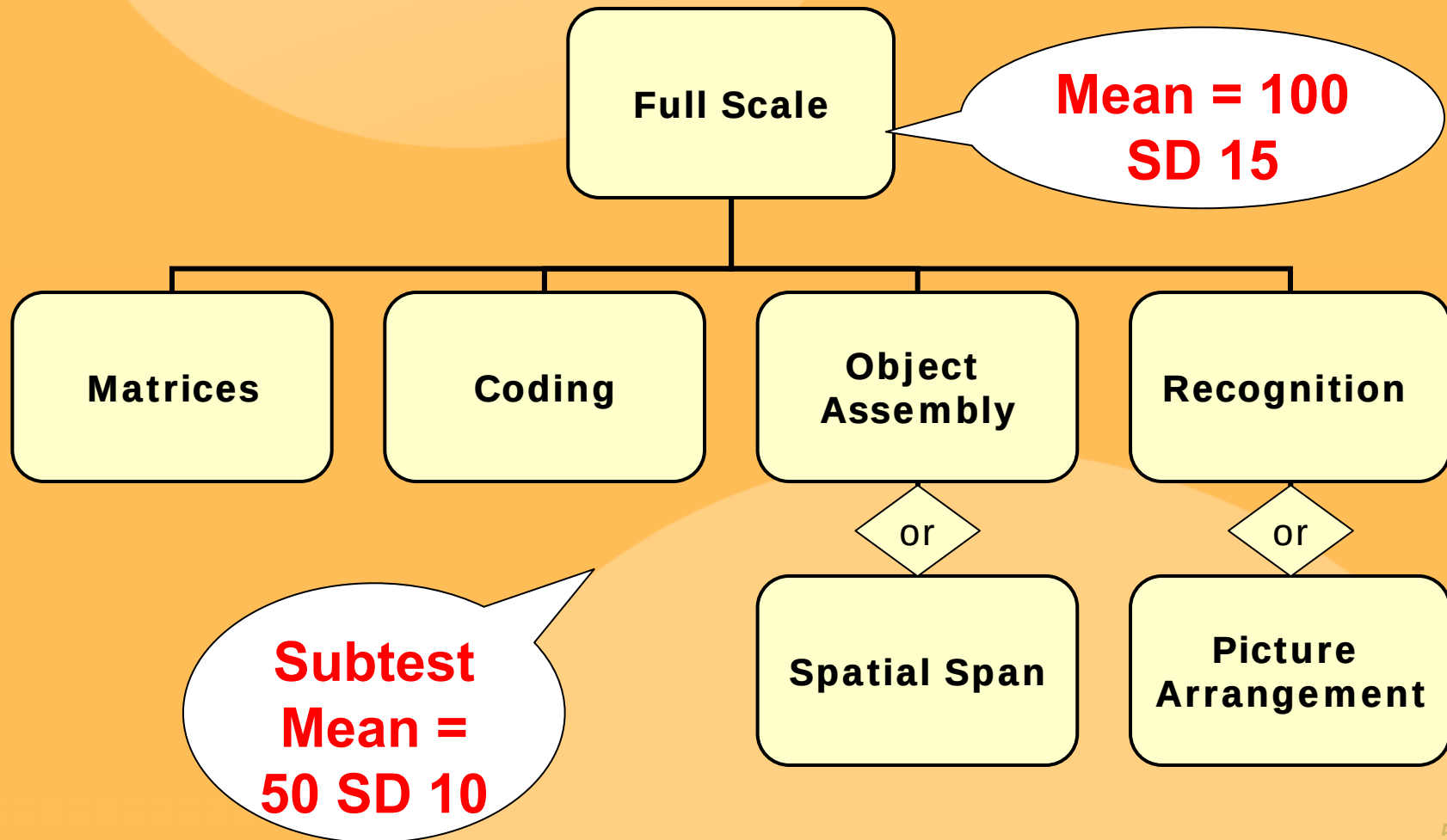
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WNV Scores



Subtest *T* scores

Mean = 50, SD = 10

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

Ages 15:0–15:3

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

<i>T</i> 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 <i>T</i> Scores	Full Scale Score	Percentile Rank	Confidence Level		Sum of <i>T</i> Scores	Full Scale Score	Percentile Rank
			90%	95%			
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 <i>T</i> Scores	Full Scale Score	Percentile Rank	Confidence Level		Sum of <i>T</i> Scores	Full Scale Score	Percentile Rank
			90%	95%			
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

Record Form

Wechsler & Naglieri, 2006

WNVTM
WECHSLER NONVERBAL SCALE OF ABILITY
David Wechsler and Jack A. Naglieri

Examinee's Name: *Daniel Flores* I.D.: *528069*

Examinee's School: *Washington Elementary* Grade: *5*

Examiner's Name: *K. Miller*

Record Form

Calculation of Examinee's Age

Year	Month	Day
2007	17	33

A Date of Testing

Date of Birth: 1996 12 16

Age at Testing: 10 5 17

B Selected Subtest Battery

☒ 4-Subtest ☐ 2-Subtest

Subtest T Score Profile

Subtest	MA	CD	OA	RG
Matrices				
Coding				
Object Assembly				
Recognition				

Sum of T Scores: 4-Subtest 2-Subtest

Sum of T Scores to Full Scale Score Conversion

Sum of T Scores	Full Scale Score	Percentile Rank	Confidence Interval 90% or 95%

Subtest T Score Profile

MA	CD	OA	RG

Full Scale Score

I 96

WNVTM
WECHSLER NONVERBAL SCALE OF ABILITY
David Wechsler and Jack A. Naglieri

Examinee's Name: *Daniel Flores* I.D.: *528069*

Examinee's School: *Washington Elementary* Grade: *5*

Examiner's Name: *K. Miller*

Record Form

Calculation of Examinee's Age

Year	Month	Day
2007	17	33

A Date of Testing

Date of Birth: 1996 12 16

Age at Testing: 10 5 17

B Selected Subtest Battery

☒ 4-Subtest ☐ 2-Subtest

Subtest T Score Profile

Subtest	MA	CD	OA	RG
Matrices				
Coding				
Object Assembly				
Recognition				

Sum of T Scores: 4-Subtest 2-Subtest

Sum of T Scores to Full Scale Score Conversion

Sum of T Scores	Full Scale Score	Percentile Rank	Confidence Interval 90% or 95%

Subtest T Score Profile

MA	CD	OA	RG

Full Scale Score

H 96

Completed Summary Page

Record Form

Wechsler & Naglieri, 2006

Ages 8:0-21:11 

Total Raw Score to T Score Conversions

Subtest	C Raw Score	D T Score
Matrices	20	51
Coding	27	38
Spatial Span	13	50
Picture Arrangement	14	54

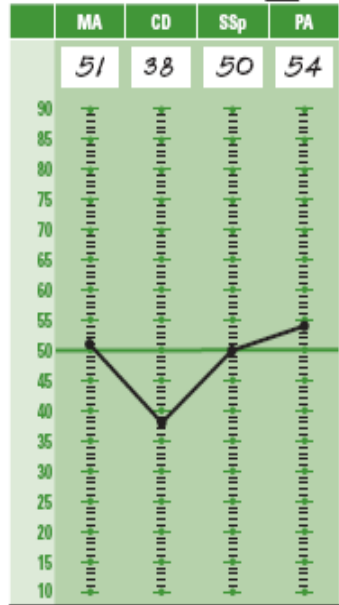
E Sum of T Scores **193**
4-Subtest 2-Subtest

Sum of T Scores to Full Scale Score Conversion

Sum of T Scores	Full Scale Score	Percentile Rank	Confidence Interval 90% or 95% G
F 193	96	39	88-104

Subtest T Score Profile **H**

MA	CD	SSp	PA
51	38	50	54



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123456789 101112 A B C D E

ISBN 015433855-9



9 780154 338556

WNVTM **Record Form**

Calculation of Examinee's Age

Year	Month	Day
2007	12	16

Date of Testing: 2007 / 12 / 16
Date of Birth: 1996 / 12 / 16
Age at Testing: 10 / 8 / 17

B Selected Subtest Battery
☒ 4-Subtest ☐ 2-Subtest

Subtest T Score Profile **I**

MA	CD	SSp	PA
51	38	50	54

Sum of T Scores to Full Scale Score Conversion

Sum of T Scores	Full Scale Score	Percentile Rank	Confidence Interval 90% or 95% G
193	96	39	88-104

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ISBN 015433855-9



9 780154 338556

Figure 2.10 Example of a Completed Summary Page

Presentation Overview



Wechsler & Naglieri, 2006

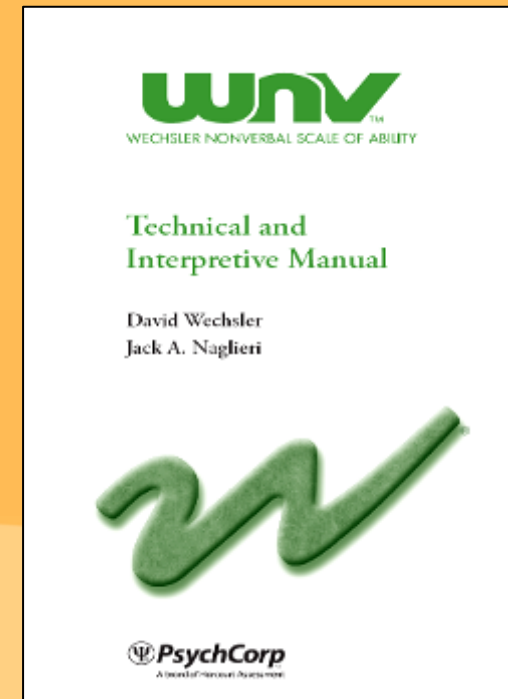
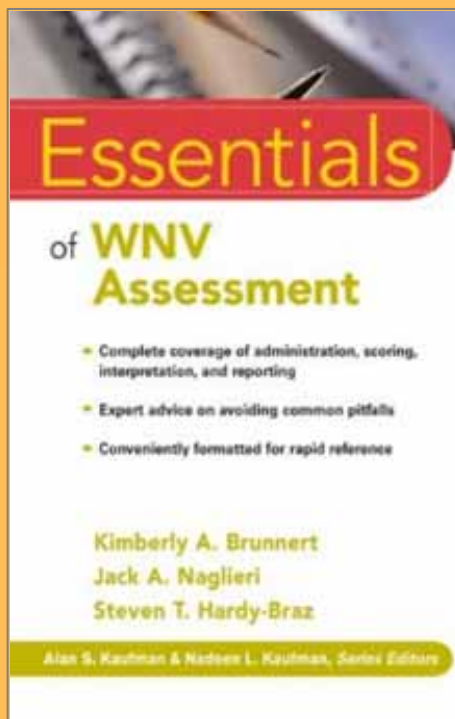
- The Wechsler Nonverbal Scale of Ability
- Administration
- Subtest Description
- Scoring
-  Interpretation
- Technical Characteristics
- Case Study
- What does the WNV measure?
- Conclusions

Interpretation



Wechsler & Naglieri, 2006

Chapter 6 in WNV Technical and Interpretive Manual



Essentials of WNV Assessment

Step 1



Wechsler & Naglieri, 2006

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

- **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

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			Ages 8:0–21:11		
Subtest	Significance Level		Subtest	Significance Level	
	.15	.05		.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 Strengths & Weaknesses

34 General Testing, Administration, and Scoring Guide

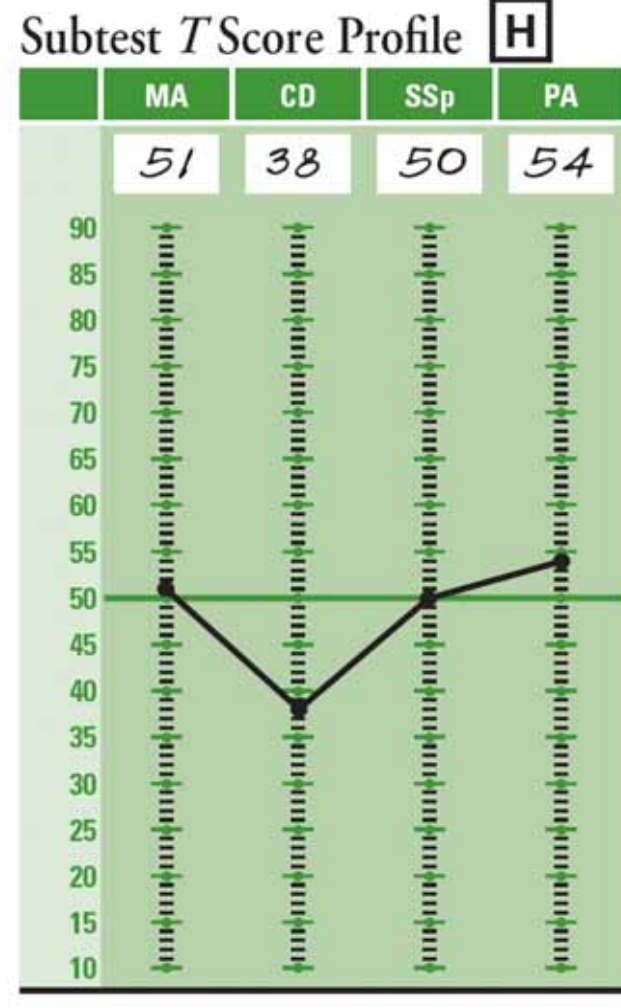
Ages 8:0–21:11

4-Subtest Battery

Subtest Strengths and Weaknesses

Subtest	Subtest T Score	Mean T Score	Difference From Mean	Critical Value .15 or .05	Strength or Weakness (S) or (W)	Base Rate
Matrices	A 51	48	+3	8 C	W	D
Coding	38	48	-10	10	S W	9.1
Spatial Span	50	48	+2	8	S W	
Picture Arrangement	54	48	+6	10	S W	
Sum of T Scores	B 193	48	Mean T Score			

See Tables B.1 and B.2 for subtest strengths and weaknesses.



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					Ages 8:0–21:11				
Subtest	MA	CD	OA	RG	Subtest	MA	CD	SSp	PA
Matrices	—	8	8	8	Matrices	—	8	7	9
Coding	11	—	9	9	Coding	11	—	9	10
Object Assembly	12	12	—	9	Spatial Span	10	12	—	9
Recognition	11	12	13	—	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:

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

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

Optional Analysis

Ages 8:0–21:11 Optional Analysis **E**

Total Raw Score to T Score Conversions

Score	Raw Score	T Score
Spatial Span Forward F	9	60
Spatial Span Backward	4	41

See Table C.1 for T score conversions.

Raw Score to Base Rate Conversions

Score	Raw Score	Base Rate
Longest Spatial Span Forward I	6	39.4
Longest Spatial Span Backward	4	82.8

See Table C.4 for base rates.

T Score Comparison **G**

Score Comparison	T Score SSpF	T Score SSpB	Difference	Critical Value .15 or .05	Base Rate
SSpF–SSpB	60	41	+19	13	4.3
Significant Difference				Y or N	H

See Tables C.2 and C.3 for T score comparison.

Raw Score Comparison **J**

Score Comparison	Raw Score LSSpF	Raw Score LSSpB	Difference	Base Rate
LSSpF–LSSpB	6	4	+2	26.3

See Table C.5 for raw score comparison.

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

Spatial Span Forward vs Backward

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:

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

Step 3

Base rates for the differences

25% obtained Spatial Span Forward, 7 or more points higher than Spatial Span 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. SSpB	
	SSpF<SSpB (-)	SSpF>SSpB (+)		SSpF<SSpB (-)	SSpF>SSpB (+)
≥55	0.0	0.0	25	1.0	0.0
54	0.0	0.0	24	1.3	0.0
53	0.0	0.0	23	1.5	0.0

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 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

Lucy 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 2

Subtest *T* scores:

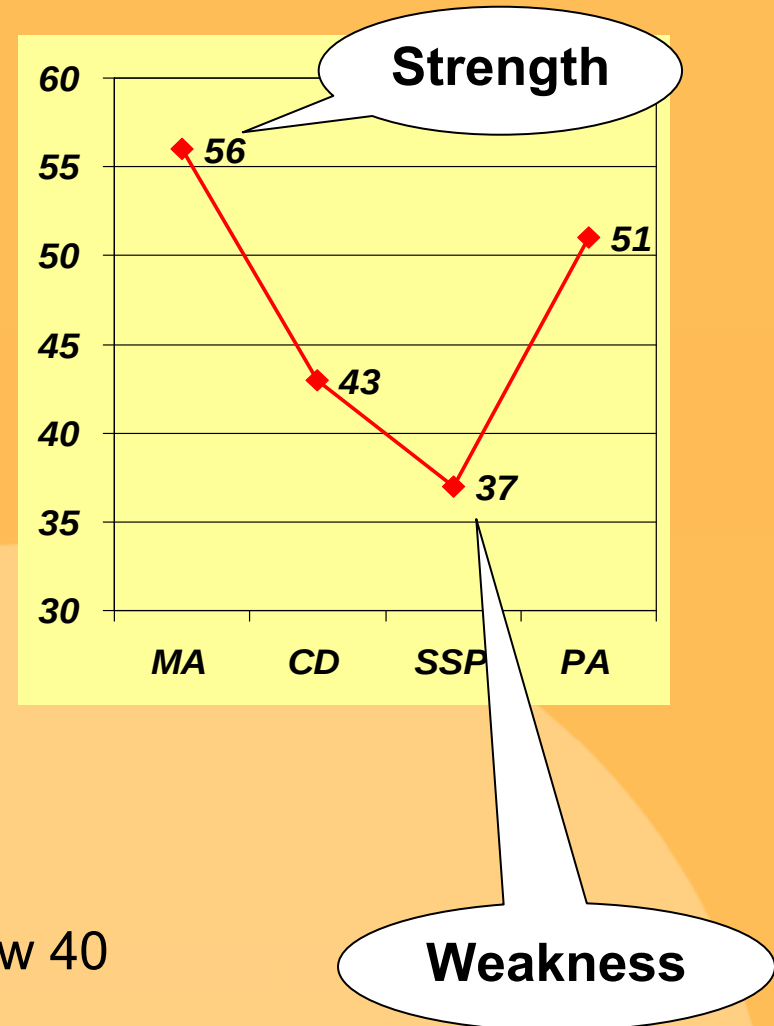
– Matrices	56
– Coding	43
– Spatial Span	37
– Picture Arr	51
– Mean <i>T</i> score =	47

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



Step 5 Intervention

Lucy performed poorly in relation to her mean and her peers on Spatial Span

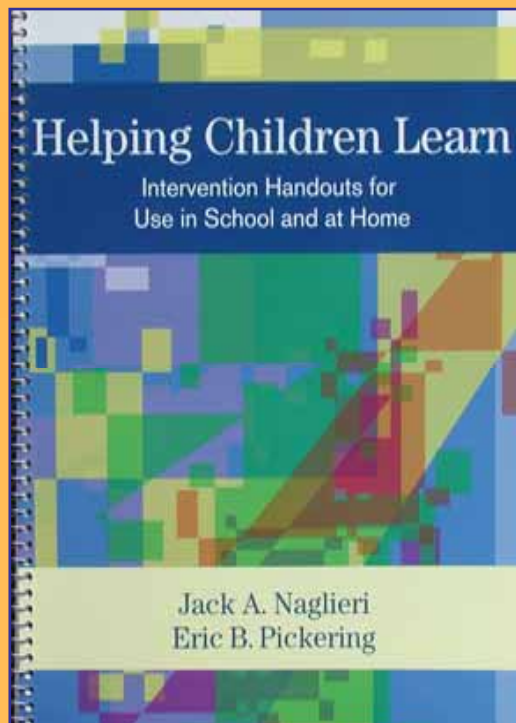
- Consider the role of memory in academic tasks**
- Especially if there are parent or teacher concerns about Lucy remembering information**
- The same hypothesis could be associated with**
 - Recognition**
 - Coding -- if the examinee did not appear to remember the correspondence between shapes and numbers**

Step 5 Intervention

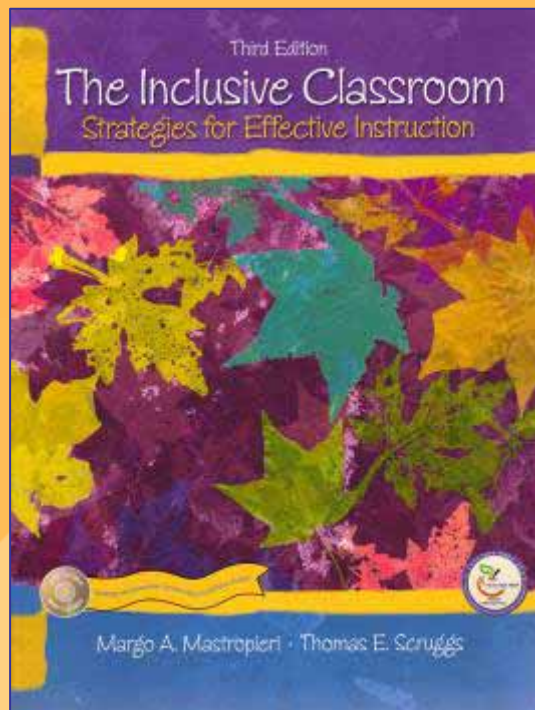
- **Use chunking or mnemonic methods for tasks that demand recall of information**
- **There is much empirical support for these techniques for improving memory (Mastropieri & Scruggs, 2006; Minskoff & Allsopp, 2003).**
- **To aid in the selection and communication of these interventions to parents and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

Step 5 Intervention

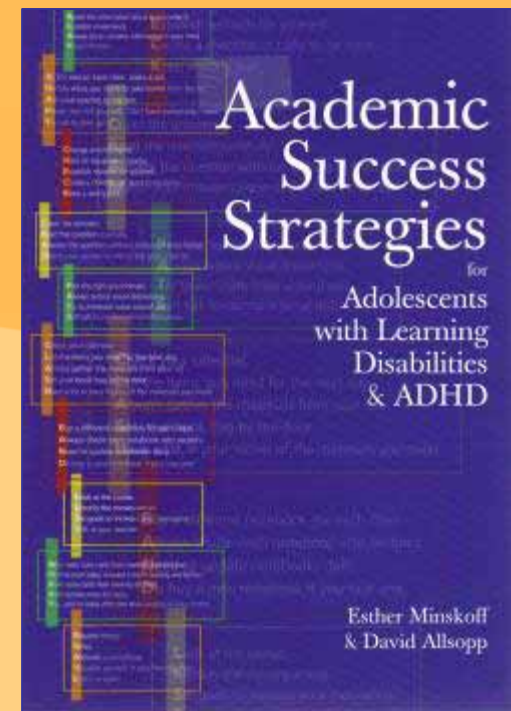
**Naglieri & Pickering
(2003)**



**Mastropieri & Scruggs
(2005)**



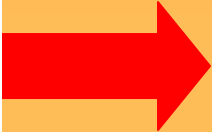
**Minskoff & Allsopp
(2003)**



Presentation Overview



Wechsler & Naglieri, 2006

- The Wechsler Nonverbal Scale of Ability
- Administration
- Subtest Description
- Scoring
- Interpretation
-  Technical Characteristics
- Case Study
- What does the WNV measure?
- Conclusions

WNV Reliability

**WNV has excellent internal
reliability**

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															Overall Average r_{xx}^a
	4	5	6	7	8	9	10	11	12	13	14	15	16-17	18-19	20-21	
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	.73	.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.



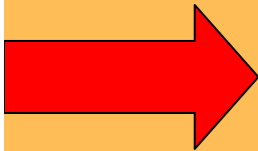
WNV Validity Studies

Correlations with Ability Tests

Concurrent Validity

WNV (4-subtest) Correlations with:

✓ WPPSI (N = 56)	.71
✓ WISC-IV (N = 102)	.76
✓ WISC-IV Spanish	.82
✓ WAIS-III (N = 45)	.72
✓ NNAT-I (N = 54)	.73
✓ UNIT (N = 79)	.73
✓ AVERAGE	.75

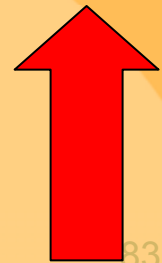


Concurrent Validity

	Other Ability Tests			WNV			Effect Size
	Mean	SD	N	Mean	SD	N	
WPPSI	101.7	9.9	56	101.9	11.7	56	0.02
WISC-IV	101.8	12.1	102	103.9	12.3	102	0.17
WISC-IV Spanish	96.4	14.7	32	96.5	12.8	32	0.01
WAIS-III	102.2	10.1	45	102.9	10.1	45	0.07
NNAT-I	103.2	14.9	54	104.0	12.5	54	0.06
UNIT	101.4	12.3	79	102.3	99.8	79	0.01

**No difference
between mean
Full Scale scores**

**Tiny
effect
sizes**



33

WNV Validity Studies

Group Differences

English Language Learners



Wechsler & Naglieri, 2006

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		Matched Control Group	
	Mean	<i>SD</i>	Mean	<i>SD</i>
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	52.3	9.4	50.0	8.0
Picture Arrangement	49.4	10.0	50.4	9.6
Full Scale Score: 4	101.7	13.4	102.1	13.4
Full Scale Score: 2	102.1	14.1	101.6	12.7

Effect Size = 0.03

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

Wechsler & Naglieri, 2006

Subtest/ Full Scale Score	Deaf		Matched Control Group	
	Mean	SD	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	51.2	7.8	50.5	10.5
Picture Arrangement	54.1	9.7	51.8	8.8
Full Scale Score: 4	102.5	9.0	100.8	14.3
Full Scale Score: 2	103.0	10.3	100.4	15.5

Effect Size = 0.14

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		Matched Control Group	
	Mean	<i>SD</i>	Mean	<i>SD</i>
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	48.3	9.9	50.0	9.0
Picture Arrangement	51.6	11.6	50.5	9.6
Full Scale Score: 4	96.7	15.9	100.5	14.8
Full Scale Score: 2	96.0	15.3	100.4	14.9

Effect Size = 0.25

Gifted



Wechsler & Naglieri, 2006

- **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**

Gifted

Table 5.23 WNV^{US}: Mean Performance of Gifted and Matched Co

Subtest/ Full Scale Score	Gifted		Matched Control Group	
	Mean	<i>SD</i>	Mean	<i>SD</i>
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
Recognition	61.2	5.2	51.4	8.5
Spatial Span	62.3	12.3	52.0	9.1
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

Effect Size = 1.5

Intellectual Disability



Wechsler & Naglieri, 2006

51 non-institutionalized examinees ages 4–21

- Diagnosed with mild mental retardation and/or IQ scores 2–3 SDs below the mean (i.e., $55 \leq \text{FSIQ} \leq 70$).

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., $40 \leq \text{FSIQ} \leq 55$).

Mild Disability

Subtest/ Full Scale Score	Mental Retardation- Mild Severity		Matched Control Group	
	Mean	<i>SD</i>	Mean	<i>SD</i>
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 Span	32.3	8.6	48.3	9.7
Picture Arrangement	31.6	9.0	49.6	9.7
Full Scale Score: 4	67.3	12.9	97.4	15.3
Full Scale Score: 2	69.4	13.0	96.8	15.5

Effect Size = 2.13

Moderate

Wechsler & Naglieri, 2006

Subtest/ Full Scale Score	Mental Retardation- Moderate Severity		Matched Control Group	
	Mean	SD	Mean	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 Span	22.1	5.6	50.4	9.5
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

Effect Size = 4.53

Presentation Overview



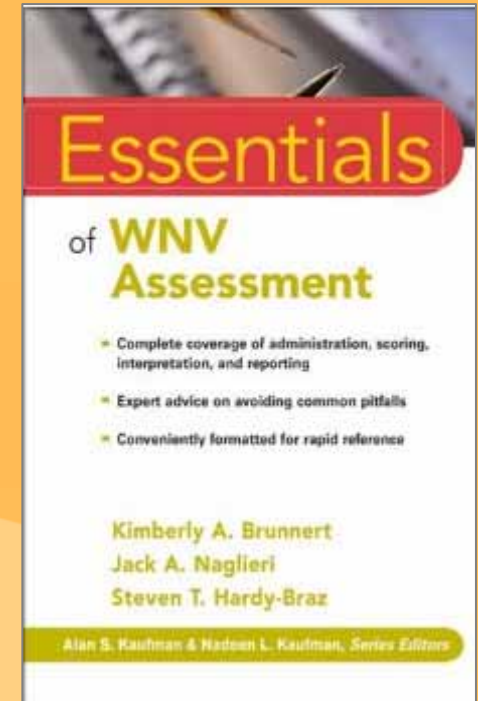
Wechsler & Naglieri, 2006

- **The Wechsler Nonverbal Scale of Ability**
- **Administration**
- **Subtest Description**
- **Scoring**
- **Interpretation**
- **Technical Characteristics**
- **Case Study**
- **What does the WNV measure?**
- **Conclusions**

Case Illustration

from

Essentials of WNV Assessment
(Brunnert, Naglieri, & Hardy-Braz, 2008)



Bilingual Evaluation



Wechsler & Naglieri, 2006

Reason for Referral

- Luis is well behaved in class
- His teacher is not sure how much he understand directions he is given
- He has difficulties with letters, numbers, and pre-literacy skills
- He does not always remember the names of the other children in his class

Bilingual Evaluation



Wechsler & Naglieri, 2006

Background

- Luis attended a bilingual Head Start program
- Currently in full-day Kindergarten with ELL support and speech and language services
- He is struggling in school
- During testing
 - Questions had to be repeated in several times before he was able to comprehend the English instructions
 - During administration of the WNV, some of the tasks were explained in Spanish, but pictorial directions greatly facilitated administration

Bilingual Evaluation



Wechsler & Naglieri, 2006

Selected Test Results

- **WPPSI – III**
 - Verbal IQ = 80 (9th percentile)
 - Performance IQ = 93 (32nd percentile)
 - Full Scale IQ = 93
- **Wechsler Nonverbal Scale of Ability**
 - Full Scale score of 105 (63rd percentile)

	<i>T</i> score	Percentile
» Matrices	58	79
» Coding	47	38
» Object Assembly	47	38
» Recognition	59	82

Notes: There is no significant difference between the four WNV subtests and the child's mean of 55. The percentiles corresponding to *T* scores and more details about this case conducted by Dr. Tulio Otero-Zeno are provided in *Essentials of WNV Assessment*.

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Bilingual Evaluation



Wechsler & Naglieri, 2006

Summary

by Dr. Tulio Otero-Zeno

Luis's general ability is within the average range as measured by his Full Scale scores on the WPPSI-III and the WNV. He earned a low VIQ on the WPPSI-III because of limited academic language skills in English. Luis's highest Full Scale score is on the WNV which suggests he performs well on cognitive tasks when language demands are eliminated.

Putting the WNV in Context

**Do nonverbal tests measure
half of ability?**

Presentation Overview



Wechsler & Naglieri, 2006

- **The Wechsler Nonverbal Scale of Ability**
- **Administration**
- **Subtest Description**
- **Scoring**
- **Interpretation**
- **Technical Characteristics**
- **Case Study**
- **What does the WNV measure?**

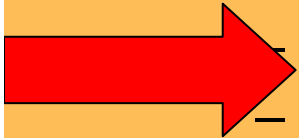
 **Conclusions**

What does the WNV measure?



Wechsler & Naglieri, 2006

- The WNV is a test of general ability measured using questions that do not require knowledge of words and instead all have nonverbal content
- 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
- Is this consistent with Wechsler’s view?



General Ability



Wechsler & Naglieri, 2006

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.

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General Ability



Wechsler & Naglieri, 2006

- **Nonverbal assessment describes the content of the test not a type of ability**
- **General ability is measured using nonverbal tests so that a wide variety of individuals may be assessed using the same questions**
 - **A nonverbal test of general ability is more appropriate for culturally and/or linguistically diverse populations**
 - **A nonverbal test holds much promise for opening doors to gifted culturally and linguistically diverse students**

Naglieri, J. A. (2008). Traditional IQ: 100 Years of Misconception and its Relationship to Minority Representation in Gifted Programs in J. VanTassel-Baska (Ed.) Critical Issues in Equity and Excellence in Gifted Education Series Alternative Assessment of Gifted Learners (pp. 67-88). Waco, TX: Prufrock Press.

Minority Representation



Wechsler & Naglieri, 2006

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

General Ability



Wechsler & Naglieri, 2006

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**
- Both types of tests are highly correlated with academic performance**

General Ability



Wechsler & Naglieri, 2006

	WISC-III WIAT	NNAT SAT9	WNV WIAT2
Correlation	.59	.63	.60
N	1,284	24,108	88

- Note: WISC-III data from WIAT Manual Table C.1 ages 6-16; NNAT data from NNAT Technical Manual (Naglieri, 1997); WNV data from Wechsler & Naglieri (2006) WNV Technical Manual.

•Conclusion

- Nonverbal tests of general ability have as much predictive validity as verbal and nonverbal tests of general ability

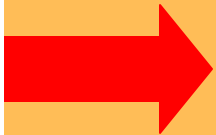
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Presentation Overview



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Conclusions



Wechsler & Naglieri, 2006

- **The WNV measures general ability with considerable reliability and validity**
- **This test can be used for fair assessment of children whose limited verbal skills would otherwise mask their real level of ability**
- **Pictorial directions and administration flexibility greatly enhance accurate evaluation of children from culturally and linguistically diverse backgrounds**