The Evolution of Intelligence and Intelligence Tests: We Can and Must do Better

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www.jacknaglieri.com

- General information
- Copies of presentations, research and book chapters
- To ask a question

Conclusions

- Traditional intelligence tests have changed very little *since 1917*
  - Verbal and quantitative test are too achievement laden and therefore they distort the IQ score
- "Second-generation intelligence tests" (KABC & CAS) do a much better job of *explaining current level of competence and predicting future performance; and they are better for diverse populations*

"Do not go where the path may lead, go instead where there is no path and leave a trail." Ralph Waldo Emerson

Presentation Outline

- Traditional IQ
  - Take an IQ test
  - Why were these tests devised and by who?
  - Do they measure Ability or Achievement?
- Does a brain-based approach to intelligence make a difference?
  - Conceptualizing intelligence from brain function
  - Evidence that this approach has validity

The First IQ TEST: Alpha

1. Bull Durham is the name of tobacco
2. The Mackintosh Red is a kind of fruit
3. The Oliver is a typewriter
4. A passenger locomotive type is the Mogul
5. Stone & Webster are well know engineers
6. The Brooklyn Nationals are called Superbas
7. Pongee is a fabric
8. Country Gentleman is a kind of corn
9. President during the Spanish War Mckinley
10. Fatima is a make of cigarette

From: Psychological Examining the United States Army (Yerkes, 1921, p. 213)

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Slides by Jack A. Naglieri, Ph.D. (jnaglieri@gmail.com)

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Origins of Traditional IQ

- April 6, 1917 is remembered as the day the United States entered World War I.

"All the News That's Fit to Print."

The New York Times.

LATE CITY EDITION

NEW YORK, TUESDAY, DECEMBER 9, 1941

THREE CENTS

U. S. DECLARES WAR, PACIFIC BATTLE WIDENS; MANILA AREA BOMBED; 1,500 DEAD IN HAWAII; HOSTILE PLANES SIGHTED AT SAN FRANCISCO

TURN BACK TO SEA

Two Formations Neared City on Radio Beams, Then Went Astray

ALARM IS WIDESPREAD

Whole Coast Has a Nervous Night—Many Cities Blacked Out

Philippines Pounded All Day As Raiders Strike at Troops

Air Base Near Capital Among Targets Hit by Japanese—Landing on Luzon With Aid of Fifth Columnists Reported

By H. FORD WILKINS

MANILA, Tuesday, Dec. 9—

1 BATTLESHIP LOST

Capsized in Pearl Harbor, Destroyer Is Blown Up, Other Ships Hurt

FLEET NOW IS FIGHTING

Aid Rushed to Hawaii—Some Congressmen Sharply Critical

UNITY IN CONGRESS

Only One Negative Vote as President Calls to War and Victory

BOUNDS OF CHEERS

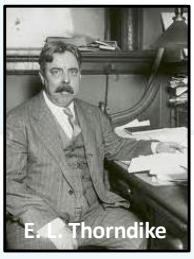
Miss Rankin's Is Sole 'No' as Both Houses Act in Quick Time

Origins of Traditional IQ

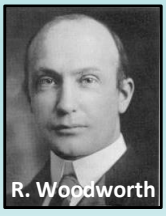
On that day same a group of psychologists held a meeting in **Harvard University's Emerson Hall** to discuss the possible role psychologists could play with the war effort (Yerkes, 1921). Some of the members: Yerkes, Thorndike, Seashore, Terman, Otis and others…

Origins of Traditional IQ

- They met at the Training School in Vineland, New Jersey on May 28, 1917 to construct a test
- Once they had a collection of tasks they conducted research on the newly devised measures


E. L. Thorndike

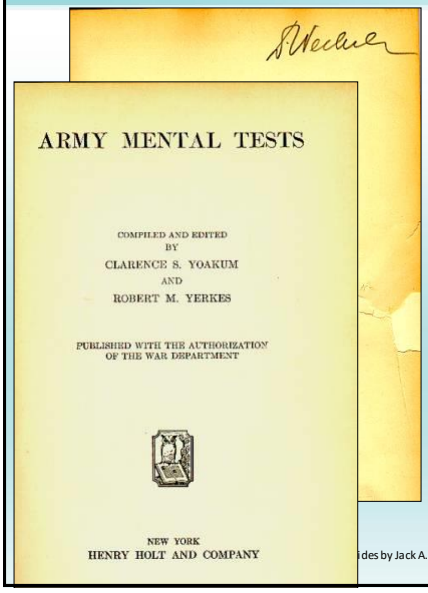

Lieut. Arthur S. Otis. Fall 1917

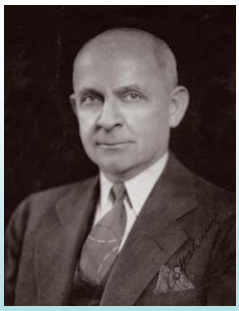

R. Woodworth

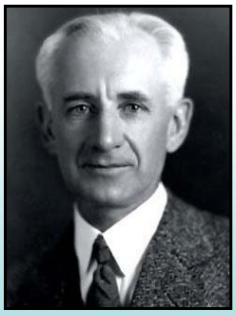
Origins of Traditional IQ

- On July 20, 1917 the authors concluded that the Army Alpha and Beta tests could
  - "aid in segregating and eliminating the mentally incompetent, classify men according to their mental ability; and assist in selecting competent men for responsible positions" (p. 19, Yerkes, 1921).
- Thus**, July 20, 1917** is the birth date of the verbal, quantitative, nonverbal IQ test format -- **Traditional group and individually administered IQ tests.**
  - **In 2 years we can celebrate the 100th year of IQ**

From Alpha/Beta to Wechsler IQ







- Yoakum & Yerkes (1920) summarized the methods used by the military to

From Alpha/Beta to Wechsler IQ

- 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 (Performance)

Army Mental Tests - Vocabulary (WISC-V)

Test J, vocabulary.

Materials.—Accompanying five series of words.

Directions.—Place the list so that subject may see the words and pronounce them if he wishes. If a word is pronounced incorrectly, examiner should give the correct pronunciation. Formula: "What does the word ..... mean?" If subject hesitates or seems to think that he must give a formal definition, examiner says, "It doesn't matter how you say it. All I care for is to find out whether you know what the word means. Tell me the meaning any way you want to express it." Subject is encouraged as liberally as necessary.

Ordinarily it will not be necessary to secure responses to all of the 40 words in a series, as some will obviously be too hard or too easy for the subject being tested. This is especially true in series 1, the words of which have been graded accurately according to difficulty. In each series, however, the testing should be over a wide enough range to secure an accurate score.

Scoring.—Credit each response as + or −. Occasionally half credits may be given, but in general this should be avoided.

The score is + if the response shows that subject knows at least one approximately correct meaning of the word. It is not necessary that the meaning given be the most common one. The form of definition is disregarded in computation of score, but for clinical purposes it is well to designate especially superior definitions by + +.

Series 1.

1 lecture	11 forfeit	21 conscientious	31 gelatinous
2 guitar	12 majesty	22 philanthropy	32 milksop
3 scorch	13 shrewd	23 exaltation	33 declivity
4 honfire	14 Mars	24 frustrate	34 irony
5 misuse	15 dilapidated	25 flaunt	35 incrustation

Army Mental Tests - Information (WISC-V)

EXAMINATION Q

Test 5 Information.

1 The color of fresh snow is white blue brown green
2 The ears are used in breathing digestion hearing seeing
3 Cows eat mostly meat grass nuts fruit
4 Dogs like best to eat grass seeds fruits meat
5 Thorns grow on daisies buttercups sun-flowers roses
6 Bull Durham is the name of chewing-gum aluminum-ware tobacco clothing
7 America was discovered by Drake Hudson Columbus Cabot
8 The apple grows on a vine bush tree reed
9 Berlin is the capital of Russia Germany England France
10 Blood is pumped by the lungs liver heart kidneys
11 Molasses is obtained from honey petroleum turpentine sugar-cane
12 Bowling is played with rackets cards balls dice
13 Baltimore is in Maryland Virginia Pennsylvania Ohio
14 St. Paul is in Missouri Minnesota Mississippi Florida
15 Ordinary flour is made from barley rye oats wheat
16 The lemon is most like the apple pear peach orange
17 The sacrifice hit comes in foot-ball tennis base-ball hand-ball
18 Gas engines are lubricated by gasoline air water oil
19 Buenos Ayres is a city of Spain Argentina Brazil Portugal

Army Mental Tests - Arithmetic (WISC-V)

TEST 2

Get the answers to these examples as quickly as you can.
Use the side of this page to figure on if you need to.

SAMPLES
1 How many are 5 men and 10 men?....Answer (15)
2 If you walk 4 miles an hour for 3 hours, how far do you walk?..Answer (12)

1 How many are 40 guns and 6 guns?....Answer ( )
2 If you save $6 a month for 5 months, how much will you save?....Answer ( )
3 If 32 men are divided into squads of 8, how many squads will there be?....Answer ( )
4 Mike had 11 cigars. He bought 3 more and then smoked 6. How many cigars did he have left?....Answer ( )
5 A company advanced 6 miles and retreated 3 miles. How far was it then from its first position?....Answer ( )
6 How many hours will it take a truck to go 48 miles at the rate of 4 miles an hour?....Answer ( )
7 How many pencils can you buy for 40 cents at the rate of 2 for 5 cents?....Answer ( )
8 A regiment marched 40 miles in five days. The first day they marched 9 miles, the second day 6 miles, the third 10 miles, the fourth 9 miles. How many miles did they march the last day?....Answer ( )
9 If you buy 2 packages of tobacco at 8 cents each and a pipe for 55 cents, how much change should you get from a two-dollar bill?....Answer ( )
10 If it takes 8 men 2 days to dig a 160-foot drain, how many men are needed to dig it in half a day?....Answer ( )

ARMY MENTAL TESTS

Army Mental Tests → Picture Arrangement & Block Design (WISC-V)

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 construction; shows S. bottom, top, and sides of model; then places it...

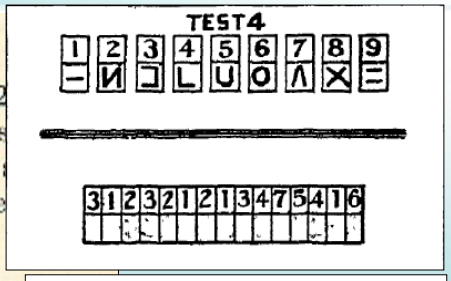
Army Mental Tests - WISC Digit Symbol (Coding (WISC-V) & Mazes

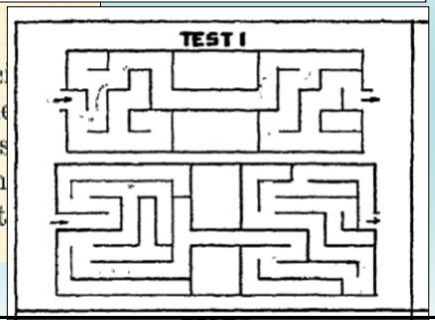
Test 7.—Digit Symbol

record sheet, points to blank below 2
mbol for 2 at top of page, writes in s
me way with the other parts of the
il, points to space below 3 in the te

Test 8.—The Maze

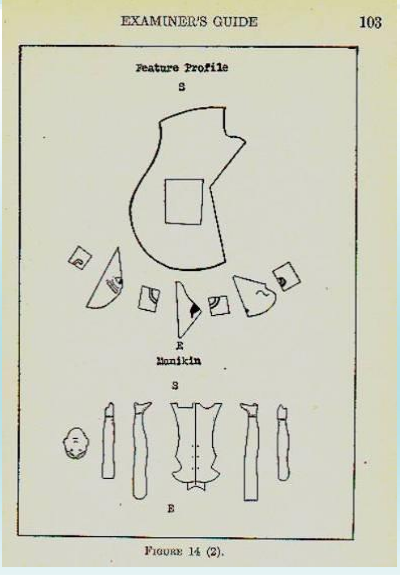
onstration maze (*a*), and with his penc
shortest way out. At critical points h
l in wrong direction without marking, s
tinues to work in the right direction
maze A, gives S. pencil, points to st





Army Mental Tests - WISC Object Assembly

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

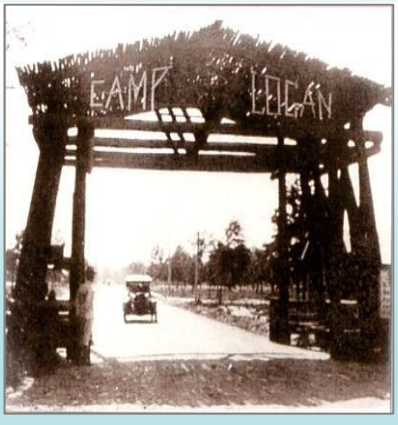


US Army tests became IQ

Because of David Wechsler

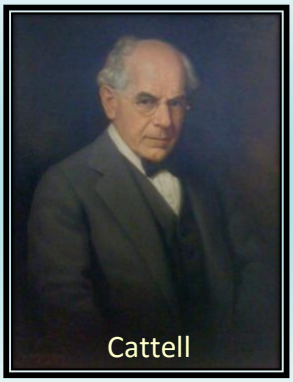
Origins of Traditional IQ

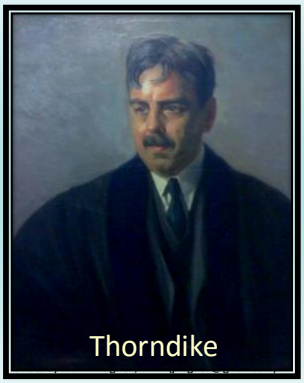
- In May of 1918 a 22 year-old David Wechsler administered the Alpha and Beta (Yerkes, 1921, p. 40) at Camp Logan in Texas
- He made a version of the Army tests for use by clinical psychologists
- He contacted the Psychological Corporation, and spoke to ….

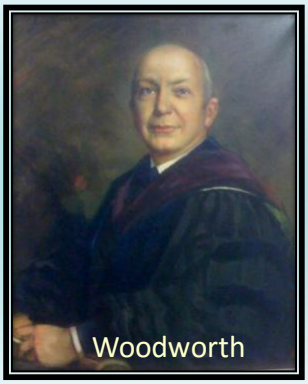


The Psychological Corporation

Cattell, Thorndike and Woodworth all have portraits at corporate headquarters of The Psychological Corporation (now Pearson) in San Antonio, Texas. They were on the board of the and instrumental in the formation of the company.







Army Alpha and Beta

- The Army Alpha (Verbal & Quantitative) tests became Wechsler's **Verbal IQ scale**
- The Army Beta (visual-spatial) tests became Wechsler's **Performance IQ**, which is now referred to as Nonverbal
- Did this mean Wechsler believed in Verbal and Nonverbal intelligences?

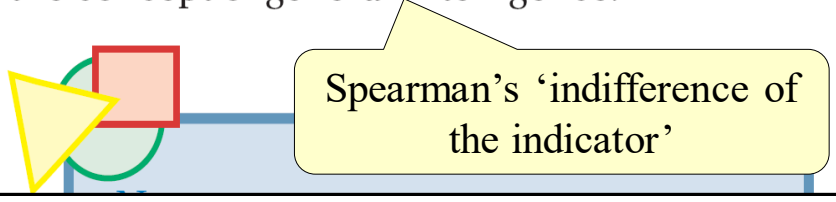
What a Nonverbal Test Measures
(Naglieri, Brulles, & Lansdown, 2008)

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

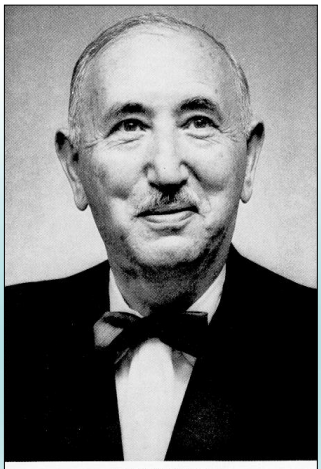
What a Nonverbal Test Measures
(Naglieri, Brulles, & Lansdown, 2008)

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.



Wechsler's Definition

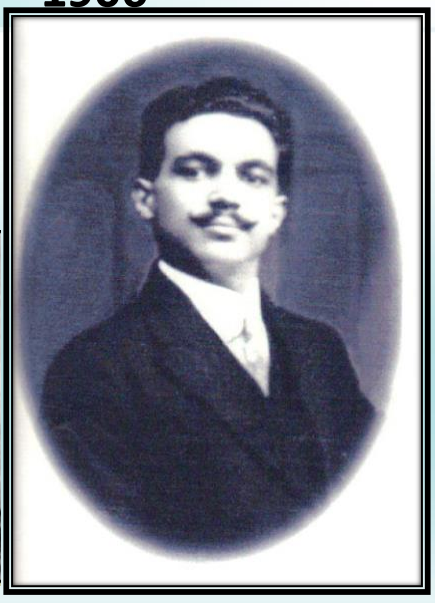
- Definition of intelligence does not mention verbal or nonverbal *abilities*:
  "The aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment (1939)"


David Wechsler, Ph.D.

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
- **Why NONVERBAL** ?

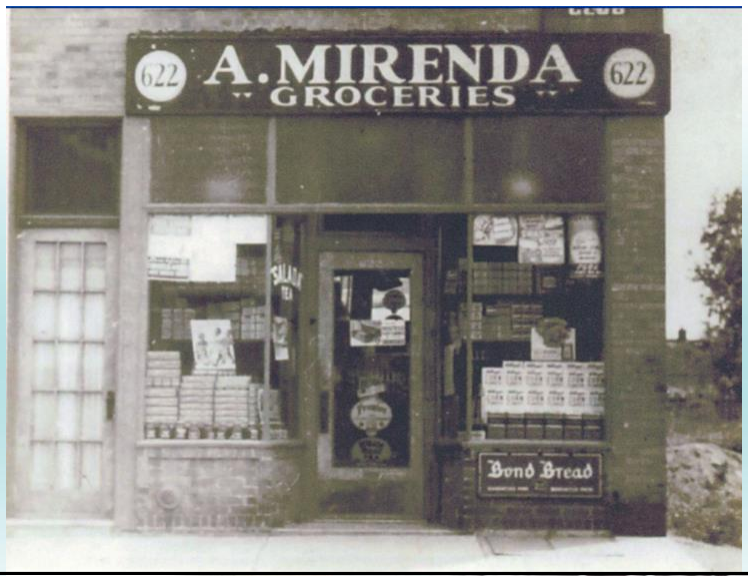
Antonino Mirenda - 1906



Antonino Mirenda - 1907

28

A. Mirenda Groceries
622 Ave X, Brooklyn, NY



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1927 Army Testing

Why Beta?

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 intelligences – it was a social justice issue.

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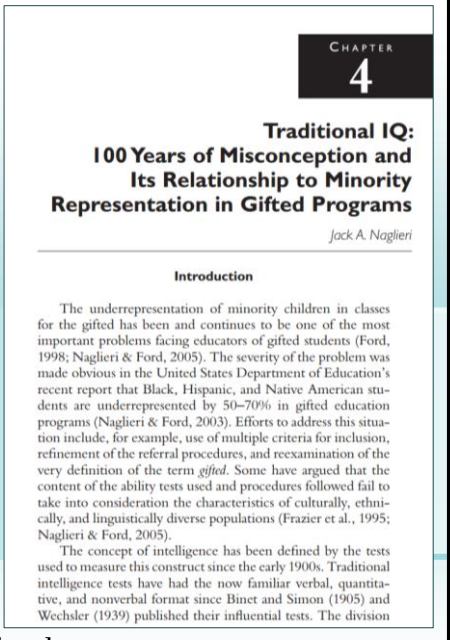
Verbal tests = Knowledge

Verbal intelligence or achievement?



CHAPTER 4

Traditional IQ: 100 Years of Misconception and Its Relationship to Minority Representation in Gifted Programs

Jack A. Naglieri

Introduction

The underrepresentation of minority children in classes for the gifted has been and continues to be one of the most important problems facing educators of gifted students (Ford, 1998; Naglieri & Ford, 2005). The severity of the problem was made obvious in the United States Department of Education's recent report that Black, Hispanic, and Native American students are underrepresented by 50–70% in gifted education programs (Naglieri & Ford, 2003). Efforts to address this situation include, for example, use of multiple criteria for inclusion, refinement of the referral procedures, and reexamination of the very definition of the term *gifted*. Some have argued that the content of the ability tests used and procedures followed fail to take into consideration the characteristics of culturally, ethnically, and linguistically diverse populations (Frazier et al., 1995; Naglieri & Ford, 2005).

The concept of intelligence has been defined by the tests used to measure this construct since the early 1900s. Traditional intelligence tests have had the now familiar verbal, quantitative, and nonverbal format since Binet and Simon (1905) and Wechsler (1939) published their influential tests. The division

http://www.jacknaglieri.com/nnat.html

VIQ is Achievement - Vocabulary

What does *scared* mean?

(The child answers orally)

Wechsler or Binet Vocabulary item presented orally by the examiner:

Someone who is *glad* is

(a) tall

(b) proud

(c) happy

(d) alone

Stanford Achievement Test Reading Vocabulary

VIQ is Achievement - Arithmetic

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

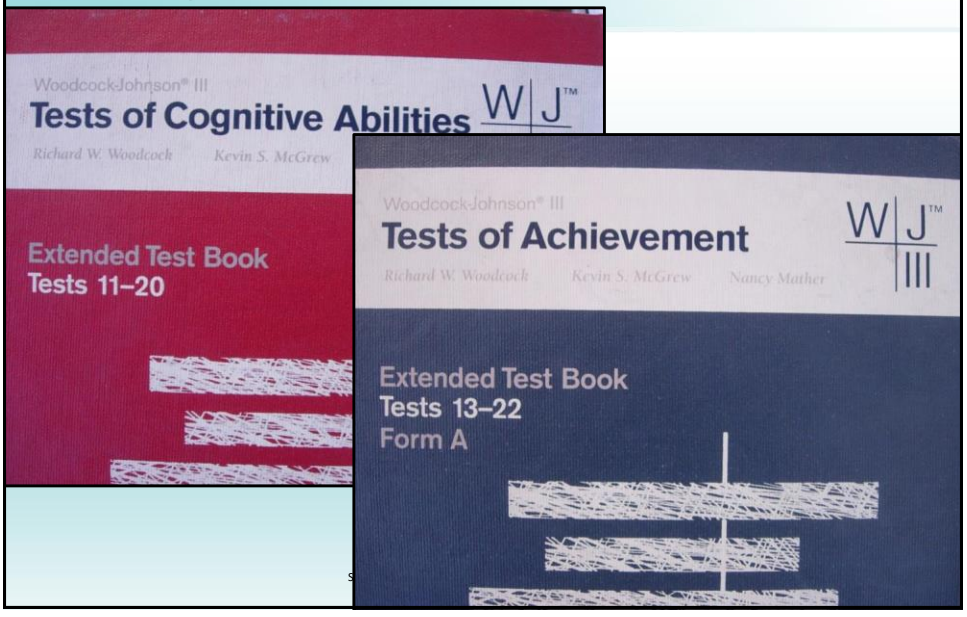
Stanford-Binet 5th Ed. Quantitative items

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?

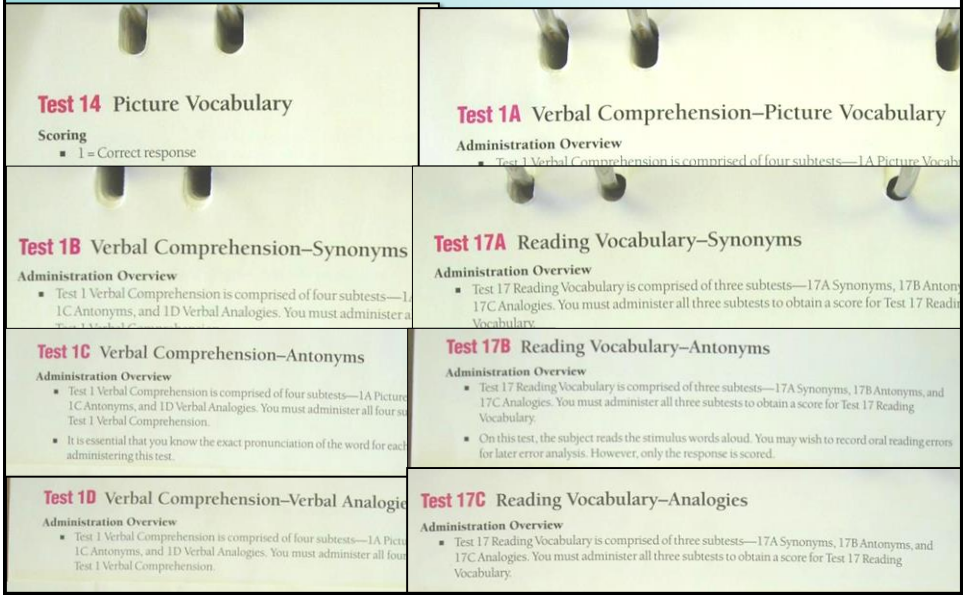
(a) 22 (b) 13 (c) 12

Stanford Achievement Test Math item

Ability or Achievement ?



Which is Ability and which is Achievement?

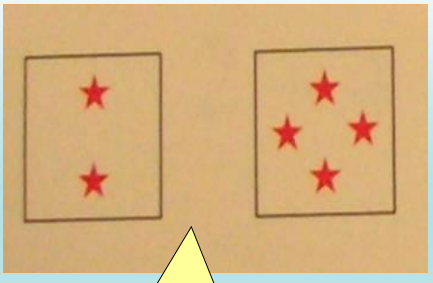


Quantitative Ability or Achievement?

- "Neal had five marbles. Then his mother gave him three more marbles. How many marble did he have then?"

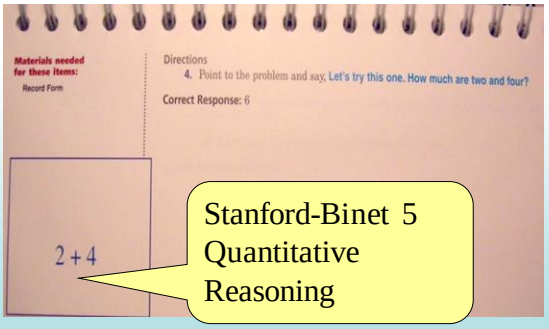
Wechsler Individual Achievement Numerical Operations Subtest

- "How many stars are there all together?"

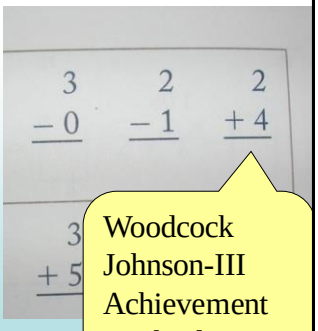


Stanford-Binet 5 Quantitative Reasoning

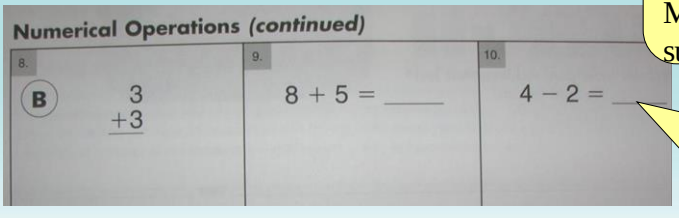
The Same Arithmetic Item!



Stanford-Binet 5 Quantitative Reasoning



Woodcock Johnson-III Achievement Math Fluency subtest



WIAT-II Numerical Operations

Myth of Verbal IQ - Conclusions

- The lack of a clear distinction between ability and achievement tests has corrupted the very concept of "verbal ability"
- A child who does not have an adequately enriched educational experience will be at disadvantage when assessed with so-called Verbal and Quantitative reasoning "ability" tests
- Children with Specific Learning Disabilities don't acquire the knowledge needed to do well on Verbal and Quantitative tests leading to low IQ scores

Minority Representation

- There is under-representation of minorities in gifted (Ford, 1998).
  - Black, Hispanic, and Native American students by 50% to 70% (U.S. Department of Education, 1993)
- The over-representation of minorities in special education is a significant problem (Naglieri & Rojahn, 2000).
- Achievement laced IQ tests distort the assessment of ability

Effect of Verbal Knowledge on Ability

American Journal on Mental Retardation, 2001, Vol. 106, No. 4, 359–367

Intellectual Classification of Black and White Children in Special Education Programs Using the WISC-III and the Cognitive Assessment System

Jack A. Naglieri
George Mason University

Johannes Rojahn
The Ohio State University

Naglieri & Rojahn (2001)

- White children earned the same mean scores on WISC-III and CAS
- Black children earned lower VIQ than PIQ scores due to language / achievement tasks
- Black children earned higher scores on CAS than whites
- Fewer Black children would be identified as having intellectual disability using CAS than WISC-III

Effect of Verbal Knowledge on Ability

Psychological Assessment
2004, Vol. 16, No. 1, 81–84

1040-3590/04/$12.00 DOI: 10.1037/1040-3590.16.1.

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 with (n = 148) and without (n = 148) limited English proficiency were given the Naglieri Nonverbal Ability Test (NNAT; J. A. Naglieri, 1997a) and the Stanford Achievement Test—9th edition (SAT–9; 1995). The groups were selected from the NNAT standardization sample (N = 22,620) and matched on geographic region, gender, socioeconomic status, urbanicity, and ethnicity. There was a very small difference (d ratio = 0.1) between the NNAT standard scores for the children with limited English proficiency (M = 98.0) and those without limited English proficiency (M = 96.7). The NNAT correlated moderately and similarly with achievement for the 2 groups. The sample of children with limited English proficiency earned considerably lower scores on SAT–9 Reading and Verbal subtests. Results suggest that the NNAT may be useful for the assessment of Hispanic children with and without limited English proficiency.

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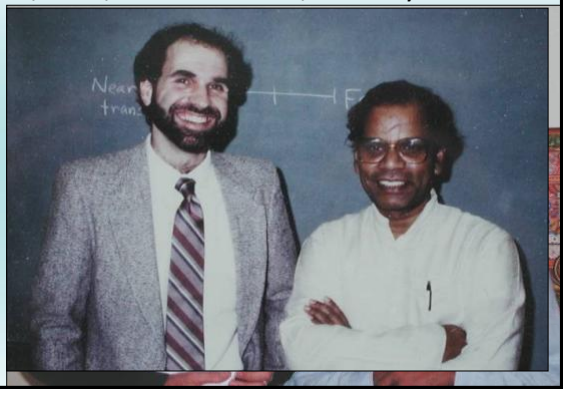
  - Conceptualizing intelligence from brain function
  - Evidence that this approach has validity

Presentation Outline

- Traditional IQ
  - Take an IQ test
  - Why were these tests devised and by who?
  - Do they measure Ability or Achievement?
- Does a brain-based approach to intelligence make a difference?
  - Conceptualizing intelligence from brain function
  - Evidence that this approach has validity

IQ as Neurocognitive Abilities

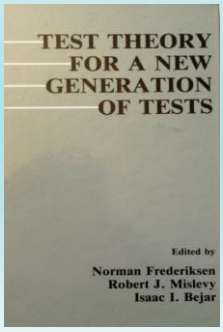
- Das and Naglieri proposed a neurocognitive theory of intelligence called PASS and a way to measure it (**C**ognitive **A**ssessment **S**ystem (Naglieri & Das, 1997) and the **CAS2** (Naglieri, Das, & Goldstein, 2014.)
  - The CAS was the first intelligence *test* to be built on a specific *theory* of intelligence.



Defining Neurocognitive Abilities

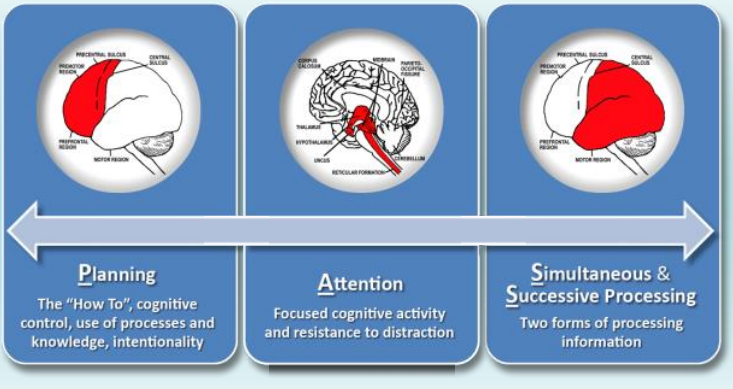
- How did we identify 'basic psychological processes'?
  - We used research from cognitive and neuropsychology to construct a model to test
  - We did not assign new labels to traditional IQ subtests
  - We recognized the limitations of developing a theory from factor analysis – "*a research program dominated by factor analyses of test intercorrelations is incapable of producing an explanatory theory of human intelligence*"

(Lohman & Ippel, 1993, p. 41)



IQ as Neurocognitive Abilities

Three Functional Units described by A. R. Luria (1972)



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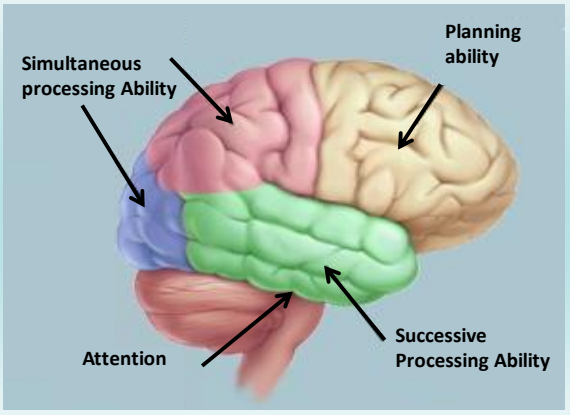
IQ as Neurocognitive Abilities

- The brain is the seat of abilities called PASS
- These abilities comprise what has been described as a modern view of intelligence (Naglieri & Otero, 2011)

Naglieri, J. A. & Otero, T. (2011). Cognitive Assessment System: Redefining Intelligence from A Neuropsychological Perspective. In A. Davis (Ed.). *Handbook of Pediatric Neuropsychology (320-333)*. New York: Springer Publishing.



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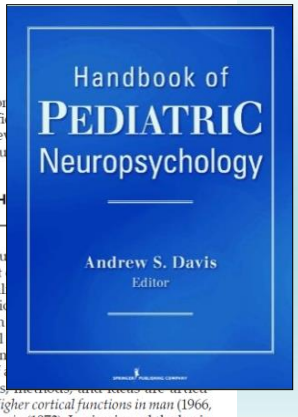
The Neurocognitive *Theory*

http://www.jacknaglieri.com/cas2.html

28 Cognitive Assessment System: Redefining Intelligence From a Neuropsychological Perspective

Jack A. Naglieri and Tulio M. Otero



INTRODUCTION

Pediatric neuropsychology has become an important field for understanding and treating developmental, psychiatric, psychosocial, and learning disorders. By addressing both brain functions and environmental factors intrinsic in complex behaviors, such as thinking, reasoning, planning, and the variety of executive capacities, clinicians are able to offer needed services to children with a variety of learning, psychiatric, and developmental disorders. Brain–behavior relationships are investigated by neuropsychologists by interpreting several aspects of an individual's cognitive, language, emotional, social, and motor behavior. Standardized instruments are used by neuropsychologists to collect information and derive inferences about brain–behavior relationships. Technology, such as magnetic resonance imaging (MRI), functional MRI (FMRI), positron emission tomography, computerized tomography, and diffusion tensor imaging, has reduced the need for neuropsychological tests to localize and access brain damage. Neuropsychological tests, however,

Such tools should not o
cesses necessary for effi
also provide for the de
tions and address the qu

**FROM NEUROPSYCH
TO ASSESSMENT**

Luria's theoretical accou
perhaps one of the most
2008). Luria conceptual
of brain–behavior relati
orders that the clinician
the brain, the functional
syndromes and impairm
and clinical methods of
theoretical formulations
lated in works such as *Higher cortical functions in man* (1966, 1980) and *The Working Brain* (1973). Luria viewed the brain as a functional mosaic, the parts of which interact in dif-

The Neurocognitive *Test*

http://www.jacknaglieri.com/cas2.html

The Cognitive Assessment System

Jack A. Naglieri, Cara Conway

THEORY UNDERLYING THE CAS

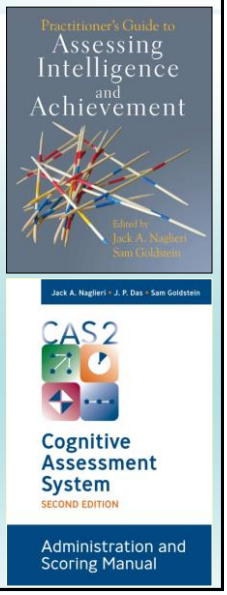
The *Cognitive Assessment System (CAS)* (Naglieri & Das, 1997a) is a multidimensional measure of ability based on a cognitive and neuropsychological processing theory called *Planning, Attention, Simultaneous, and Successive (PASS)* (Naglieri, 1999a, 2005). The PASS theory described by Naglieri and Das (1997b, 2005) is a reconceptualization of intelligence largely, but not solely, based on the neuropsychological work of A. R. Luria (1966, 1973, 1980, 1982). The four processes that make up the PASS theory represent a blend of cognitive and neuropsychological constructs, such as executive functioning (Planning) and selective attention (Attention), including tests that in the past were often arguably described as nonverbal/visual-spatial (Simultaneous) and sequencing/memory (Successive) (Naglieri & Das, 2002).

The PASS theory is a different approach to understanding intelligence that not only the theory may have its roots in neuropsychology, "its branches are spread over developmental and educational psychology" (Varnhagen & Das, 1986, p. 130). Thus, with its connections to developmental and cognitive processing, the PASS theory offers an advantage in explanatory power over the notion of traditional general intelligence (Naglieri & Das, 2002).

PASS Defined

The four cognitive processes that make up the PASS theory are each associated with different brain regions, cognitive abilities, and behaviors (Naglieri, Conway, & Goldstein, 2007). The four processes of the PASS theory are described more fully below.

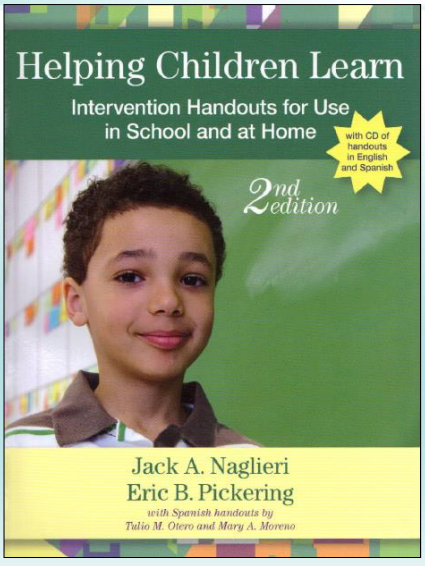
Planning is a mental activity that provides cognitive control, intentionality, organization, self-regulation and use of processes, knowledge, and skills. This includes self-monitoring and impulse control as well as generation, evaluation, and execution of a plan. This process may involve control over the other three processes, as well as



Teach Children about their Abilities

http://www.jacknaglieri.com/publications.html

- PASS theory and academic interventions
- Helping Children Learn Intervention Handouts for Use in School and at Home, *Second Edition*
  By Jack A. Naglieri, Ph.D., & Eric B. Pickering, Ph.D.,
- Spanish handouts by Tulio Otero, Ph.D., & Mary Moreno, Ph.D.



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IQ as Neurocognitive Abilities

- **PASS** theory is a neurocognitive approach to defining (and measuring) intelligence
  - **P**lanning = THINKING ABOUT THINKING
  - **A**ttention = FOCUS & RESIST DISTRACTION
  - **S**imultaneous = GETTING THE BIG PICTURE
  - **S**uccessive = FOLLOWING A SEQUENCE

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PASS Theory: Planning

- **Planning** is a neurocognitive ability that a person uses to determine, select, and use efficient solutions to problems
  - developing plans and using strategies
  - Know when to get more information
  - impulse control and self-control
  - control of behavior, emotions, and thinking

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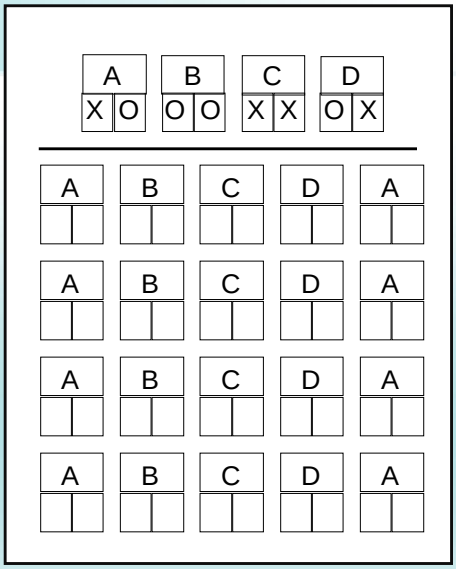
Planned Codes

- Child fills in the codes in the empty boxes
- Students are encouraged to think of a good way to complete the page



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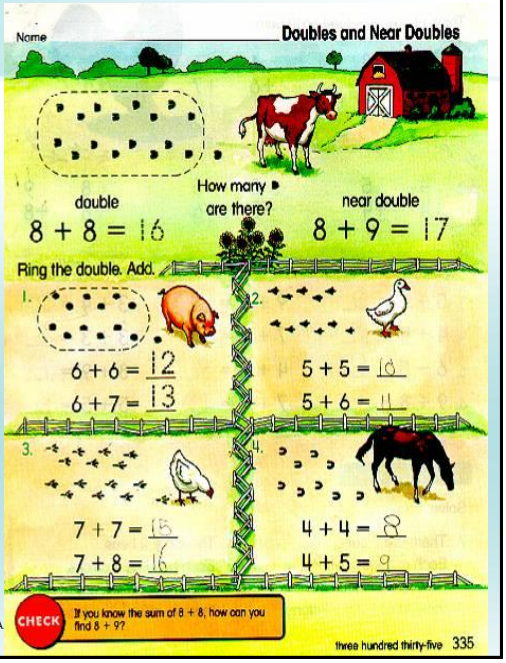
Math Strategies

Note to the Teacher:
When we teach children skills by helping them use strategies and plans for learning, we are teaching both knowledge and processing. Both are important.



Jack A

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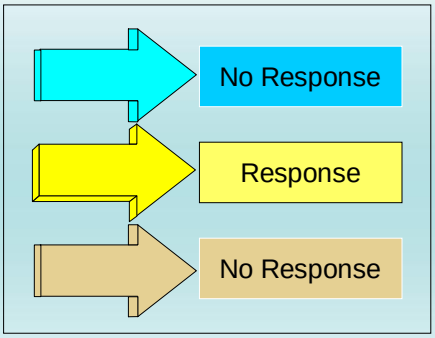
PASS Theory

- **Attention** is a neurocognitive ability used to selectively attend and resist distractions
  - selective attention
  - focused cognitive activity over time
  - resistance to distraction



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CAS2 Expressive Attention

- The child says the color not the word
- Score is time and number correct

RED	BLUE	GREEN	YELLOW
YELLOW	GREEN	RED	BLUE
RED	YELLOW	YELLOW	GREEN
BLUE	GREEN	RED	BLUE
GREEN	YELLOW	RED	YELLOW

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Expressive Attention - Italiano

ROSSO	BLU	VERDE	GIALLO
GIALLO	VERDE	ROSSO	BLU
ROSSO	GIALLO	GIALLO	VERDE
BLU	VERDE	ROSSO	ROSSO
VERDE	GIALLO	BLU	GIALLO

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Attention

This sheet has a strong Attention demands because of the similarity of the options

11. **A** 3:15 A.M.
B 3:30 P.M.
C 3:15 P.M.
D 3:15 A.M.

leave school

12. Trent began studying at 5:00 P.M. and finished 1 hour and 22 minutes later. What time did he finish?

A 6:22 A.M. **B** 5:22 P.M. **C** 6:10 P.M. **D** 6:22 P.M.

13. Maura began basketball practice at 3:00 P.M. and finished 50 minutes later. What time did she finish?

A 3:50 P.M. **B** 3:05 A.M. **C** 4:05 P.M. **D** 4:50 A.M.

14. Lance fished from 6:00 A.M. to 9:45 A.M. How long did he fish?

A 3 hours **B** 3 hours and 15 minutes
C 3 hours and 45 minutes **D** 4 hours and 45 minutes

Use the calendar for 15 – 17

11. C 3:15 p.m.
12. D 6:22 p.m.
13. A 3:50 p.m.
14. C 3 hours 45 min.

PASS Theory

- **Simultaneous** is a neurocognitive ability a person uses to integrate stimuli into groups
  - Parts are seen as a whole
  - Seeing relationships among parts
  - Visual spatial tasks like Block Design, Object Assembly, Matrices
  - WISC Perceptual Reasoning, KABC Simultaneous Scale

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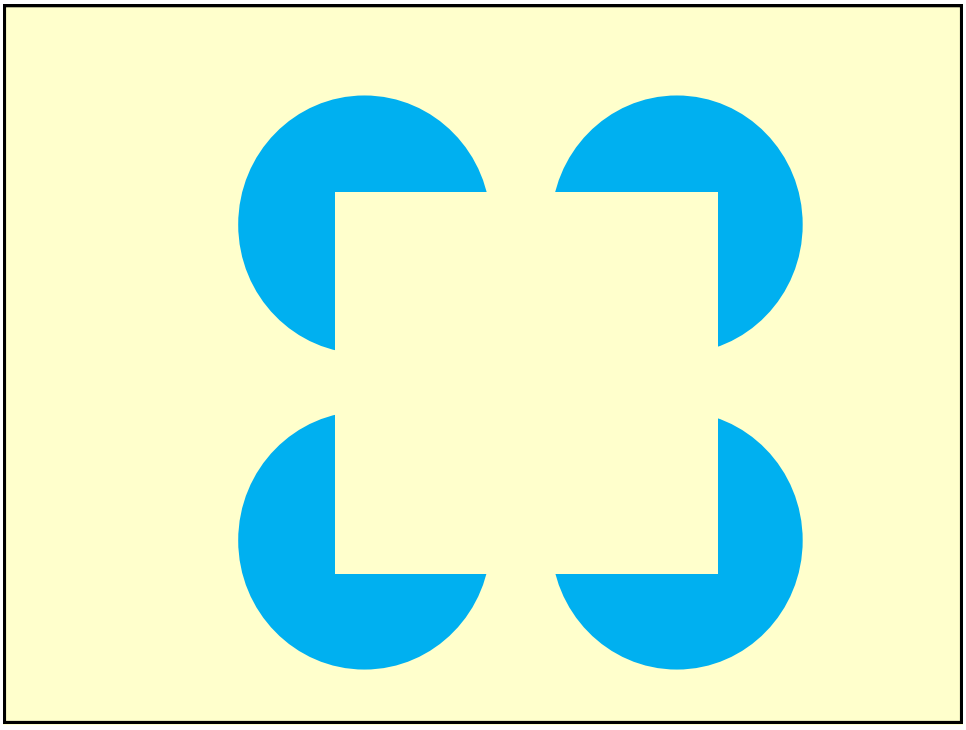
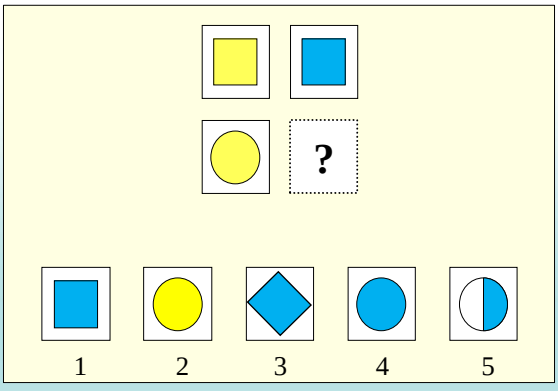


Simultaneous Neurocognitive Ability

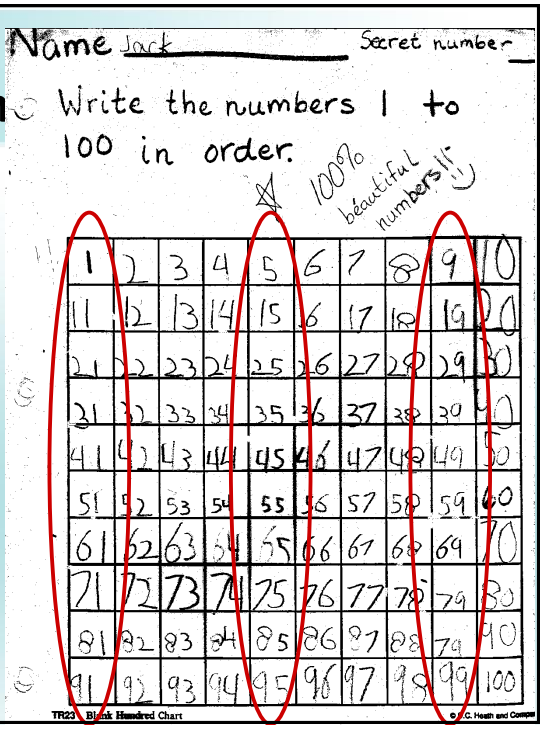
Simultaneous neurocognitive ability is used whenever the inter-relationships among ideas is required.



Just as… Girl is to Woman, as Boy is to__?

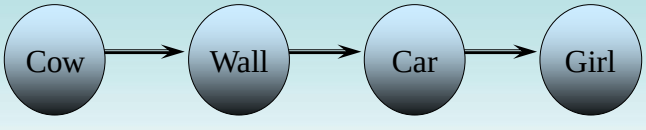
Numbers from 1 to 100

Simultaneous processing is facilitated by this work sheet



Successive Processing Ability

- **Successive** processing is a basic cognitive ability which we use to manage stimuli in a specific serial order
  - Stimuli form a chain-like progression
  - Stimuli are not inter-related
  - Speech, motor movements, reading decoding, spelling, recall of numbers in order, etc.



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Sentence Questions (Ages 8-17)

- The child answers a question read by the examiner

1. The blue is yellow. Who is yellow?

...

10. The red greened the blue with a yellow. Who used the yellow?

...

20. The red blues a yellow green of pinks, that are brown in the purple, and then grays the tan. What does the red do first?

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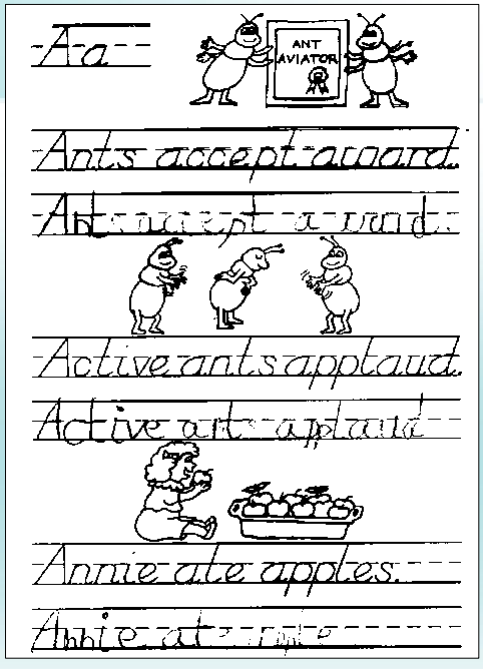
Successive

The sequence of the sounds is emphasized in this work sheet

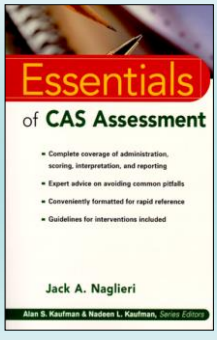


Presentation Outline

- Traditional IQ
  - Take an IQ test
  - Why were these tests devised and by who?
  - Do they measure Ability or Achievement?
- Does a brain-based approach to intelligence make a difference?
  - Conceptualizing intelligence from brain function
  - Evidence that this approach has validity

IQ Correlations with Achievement?

- IQ scores correlate about **.5 to .55** with achievement Intelligence (Brody, 1992)
- But traditional tests have achievement in them
- Naglieri (1999) summarized the correlations between several tests and achievement
  - The median correlation between each test's overall score and all achievement variables was obtained



Ability & Achievement (Naglieri, 1999)

	Tests with knowledge			Tests with Little knowledge	
	WISC-III FSIQ	DAS GCA	WJ-R Cog	K-ABC MPC	CAS FS
Median r	.590	.600	.625	.630	.700
N	1,284	2,400	888	2,636	1,600

WISC-3: WIAT Manual Table C.1 ages 6-16; WJ-R Technical Manual; CAS Interpretive Handbook; K-ABC Interpretative Manual; DAS Handbook. Increase = $(r^2_1 - r^2_2)/ r^2_1$ where r^2_1 = WISC-3 WIAT correlation

Conclusion: YOU DON'T need Verbal and Quantitative to correlate with achievement

Correlations with Achievement

- Next, a summary of ability test correlations with achievement EXCLUDING the scales that clearly require knowledge
- The average correlations of the SCALES with achievement and those without achievement were obtained to avoid ***criterion contamination***…

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Correlations with Achievement

- Correlations between ability & achievement tests show the strength of measuring basic psychological processes

Note: All correlations are reported in the ability tests' manuals. Values per scale were averaged within each ability test using Fisher z transformations.

Correlations Between Ability and Achievement Test Scores			Average Correlation: All Scales	Average Correlation: Scales without achievement
WISC-V	Verbal Comprehension	.74		
WIAT-III	Visual Spatial	.46		
N = 201	Fluid Reasoning	.40		
	Working Memory	.63		
	Processing Speed	.34	.53	.47
WJ-IV COG	Comprehension Knowledge	.50		
WJ-IV ACH	Fluid Reasoning	.71		
N = 825	Auditory Processing	.52		
	Short Term Working Memory	.55		
	Cognitive Processing Speed	.55		
	Long-Term Retrieval	.43		
	Visual Processing	.45	.54	.50
KABC	Sequential/Gsm	.43		
WJ-III ACH	Simultaneous/Gv	.41		
N = 167	Learning/Glr	.50		
	Planning/Gf	.59		.48
	Knowledge/GC	.70	.53	
CAS	Planning	.57		
WJ-III ACH	Simultaneous	.67		
N=1,600	Attention	.50		
	Successive	.60	.59	

Note: WJ-IV Scales Comp-Know= Vocabulary and General Information; Fluid Reasoning = Number Se… Concept Formation; Auditory Processing = Phonological processing.

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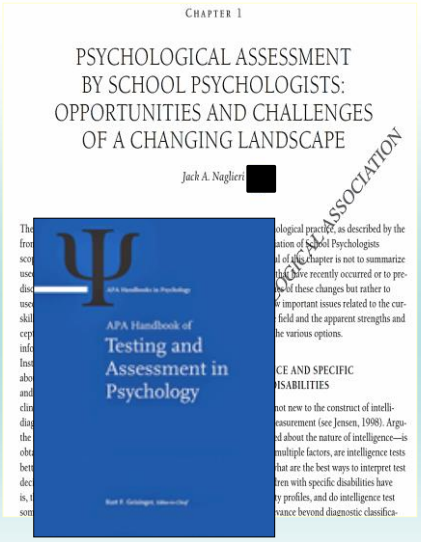
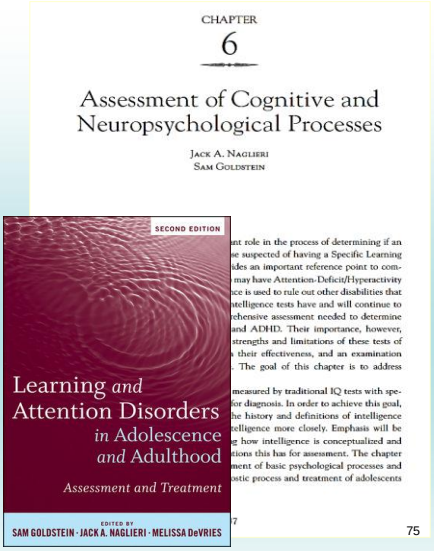
Which Tests have Useful Profiles ?

http://www.jacknaglieri.com/cas2.html





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Naglieri & Goldstein (2011)

GROUP PROFILES BY ABILITY TEST

Because ability tests play such an important role in the diagnostic process, it is crucial to understand the sensitivity each test may have to any unique characteristics of those with an SLD or attention deficit. Clinicians need to know if an adolescent or adult has a specific deficit in ability that is related to a specific academic learning problem. There has been considerable research on, for example, Wechsler subtest profile analysis, and most researchers conclude that no profile has diagnostic utility for individuals with SLD or ADHD (Kavale & Forness, 1995). The failure of subtest profiles has led some to argue (e.g., Naglieri, 1999) that scale, rather than subtest, variability should

1. We need to know if intelligence tests yield distinctive profiles

2. Subtest profile analysis is UNSUPPORTED so use scale profiles instead

Naglieri & Goldstein (2011)

be examined, especially if the separate scales have ample theoretical and empirical support. In the sections that follow, research on the scale profiles is presented first for those ability tests that are used for adolescents and adults, and then for those that can be used only with adolescents. The goal is not to describe these instruments; interested readers should examine their respective test manuals. Instead, the goal is to examine the mean scores of the scales from each test. This examination helps us understand if the ability test shows a particular pattern for a specific clinical group. Such information could have important implications for understanding the cognitive characteristics of that clinical group and allow for possible diagnostic and intervention considerations. These findings, however, must be taken with recognition that the samples are not matched across the various studies, the accuracy of the diagnosis may not have been verified, and some of the sample sizes may be small. Notwithstanding these limitations, the findings do provide important insights into the extent to which these various tests can be used for assessment of adolescents and adults suspected of having an SLD or attention deficit.

Scales should fit a theory and show mean score differences within a measure

Limitations: different samples and accuracy of diagnostic group likely varies

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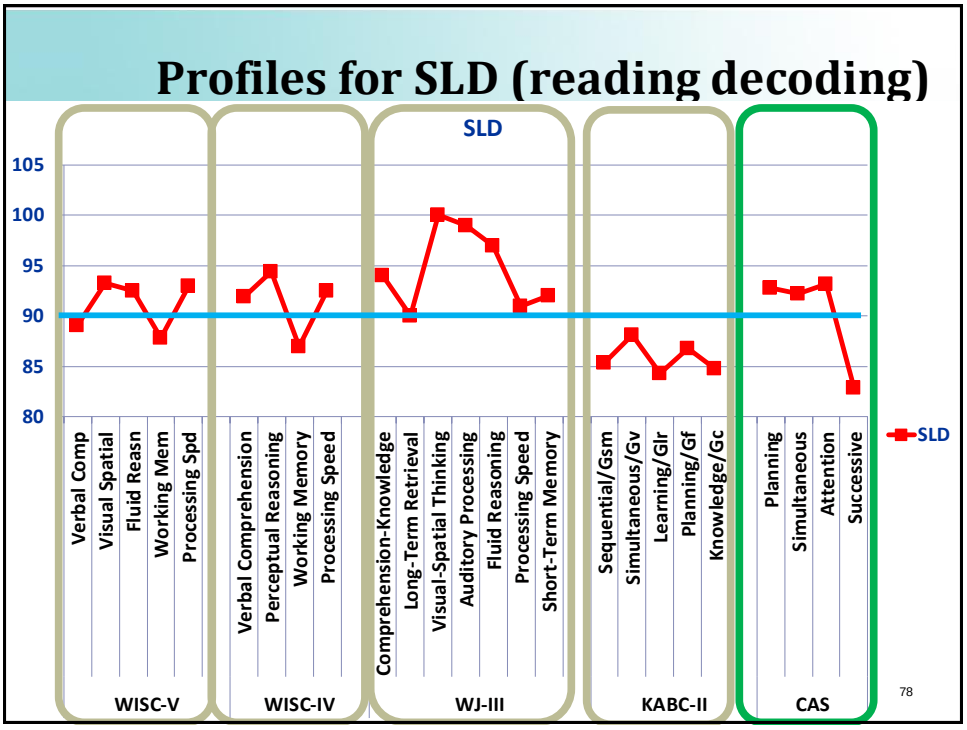
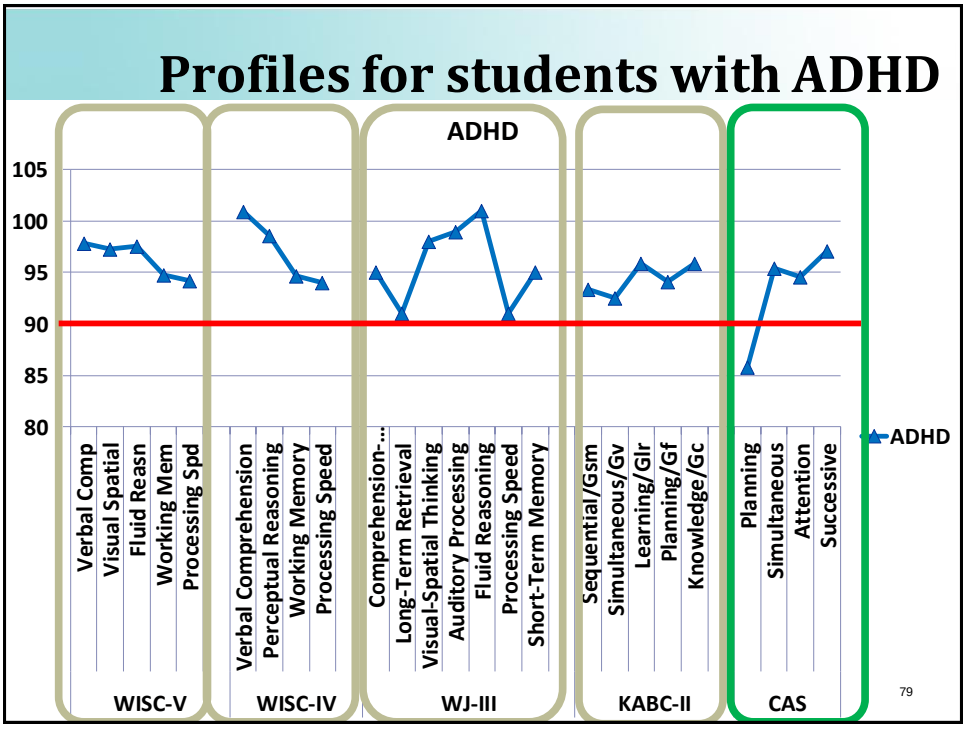
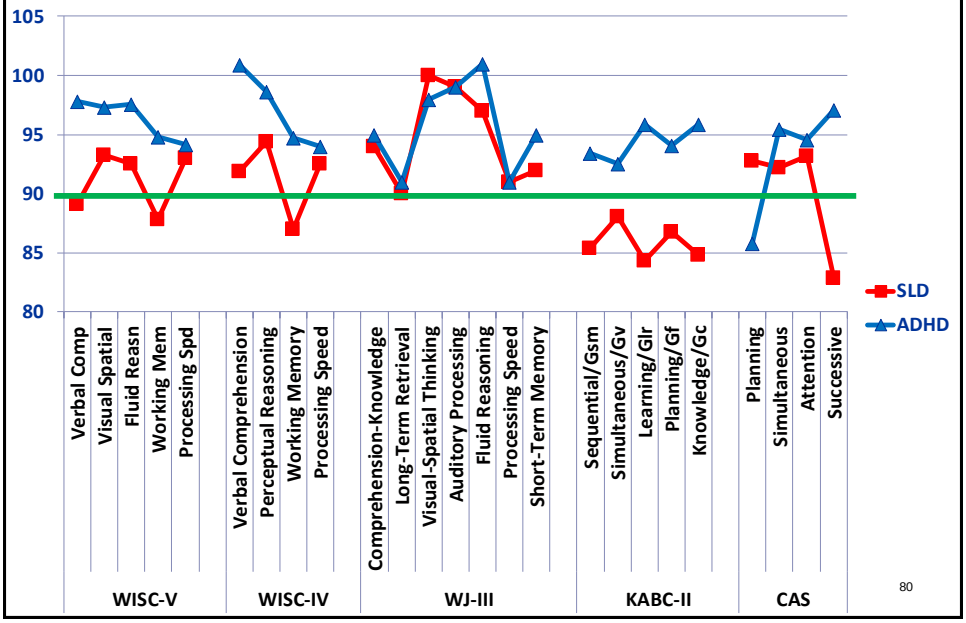

Profiles for SLD (reading decoding)
SLD
105
100
95
90
85
80
Verbal Comp
Visual Spatial
Fluid Reasn
Working Mem
Processing Spd
Verbal Comprehension
Perceptual Reasoning
Working Memory
Processing Speed
Comprehension-Knowledge
Long-Term Retrieval
Visual-Spatial Thinking
Auditory Processing
Fluid Reasoning
Processing Speed
Short-Term Memory
Sequential/Gsm
Simultaneous/Gv
Learning/Glr
Planning/Gf
Knowledge/Gc
Planning
Simultaneous
Attention
Successive
SLD
WISC-V
WISC-IV
WJ-III
KABC-II
CAS
78


Profiles for students with ADHD
ADHD
105
100
95
90
85
80
Verbal Comp
Visual Spatial
Fluid Reasn
Working Mem
Processing Spd
Verbal Comprehension
Perceptual Reasoning
Working Memory
Processing Speed
Comprehension-...
Long-Term Retrieval
Visual-Spatial Thinking
Auditory Processing
Fluid Reasoning
Processing Speed
Short-Term Memory
Sequential/Gsm
Simultaneous/Gv
Learning/Glr
Planning/Gf
Knowledge/Gc
Planning
Simultaneous
Attention
Successive
ADHD
WISC-V
WISC-IV
WJ-III
KABC-II
CAS
79

Profiles for SLD (reading decoding) & ADHD



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PASS Profiles and Educational Placement

Students receiving special education were more than four times as likely to have at least one PASS weakness and a comparable academic weakness than those in regular education

School Psychology Quarterly, Vol. 15, No. 4, 2000, pp. 419-43[3]

Can Profile Analysis of Ability Test Scores Work? An Illustration using the PASS Theory and CAS with an Unselected Cohort

Jack A. Naglieri
George Mason University

A new approach to ipsative, or intraindividual, analysis of children's profiles on a test of ability was studied. The Planning, Attention, Simultaneous, and Successive (PASS) processes measured by the Cognitive Assessment System were used to illustrate how profile analysis could be accomplished. Three methods were used to examine the PASS profiles for a nationally representative sample of 1,597 children from ages 5 through 17 years. This sample included children in both regular (n = 1,453) and special (n = 144) educational settings. Children with significant ipsatized PASS scores, called Relative

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SLD Profiles on CAS (Huang, Bardos, D'Amato, 2010)

Journal of Psychoeducational Assessment
28(1) 19–30

DOI: 10.1177/0734282909333057
http://jpa.sagepub.com
SAGE

Identifying Students With Learning Disabilities: Composite Profile Analysis Using the Cognitive Assessment System

Leesa V. Huang[1], Achilles N. Bardos[2], and Rik Carl D'Amato[3]

Abstract

The detection of cognitive patterns in children with learning disabilities (LD) has been a priority in the identification process. Subtest profile analysis from traditional cognitive assessment has drawn sharp criticism for inaccurate identification and weak connections to educational planning. Therefore, the purpose of this study is to use a new generation of cognitive tests with megacluster analysis to augment diagnosis and the instructional process. The Cognitive Assessment System uses a contemporary theoretical model in which composite scores, instead of subtest scores, are used for profile analysis. Ten core profiles from a regular education sample (N = 1,692) and 12 profiles from a sample of students with LD (N = 367) were found. The majority of the LD profiles were unique compared with profiles obtained from the general education sample. The implications of this study substantiate the usefulness of profile analysis on composite scores as a critical element in LD determination.

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Johnson, Bardos & Tayebi, 2003

- "this study suggests that the CAS…yields information that contributes to the differential diagnosis of students suspected of having a learning disability in writing"

Journal of Psychoeducational Assessment
2003, *21*, 180-195

DISCRIMINANT VALIDITY OF THE COGNITIVE ASSESSMENT SYSTEM FOR STUDENTS WITH WRITTEN EXPRESSION DISABILITIES

Judy A. Johnson
University of Houston - Victoria
Achilles N. Bardos
University of Northern Colorado
Kandi A. Tayebi
Sam Houston State University

This study explored the PASS cognitive processing theory in junior high students (aged 11-15 years) with and without written expression disabilities. Ninety-six students with (n = 48) and without (n = 48) written expression disabilities were administered the Das-Naglieri: Cognitive Assessment System (DN:CAS; 1997) and the writing subtests of the Wechsler Individual Achievement Test (WIAT; 1992). Discriminant analyses were utilized to identify the DN:CAS subtests and composites that contributed to group differentiation. The Planning composite was found to be the most significant contributor among the four composite scores. Subsequent efficiency of classification analyses provided strong support for the validity of the obtained discriminant functions in that the four DN:CAS composite scale scores correctly identified 83% of the students as members of their respective groups.

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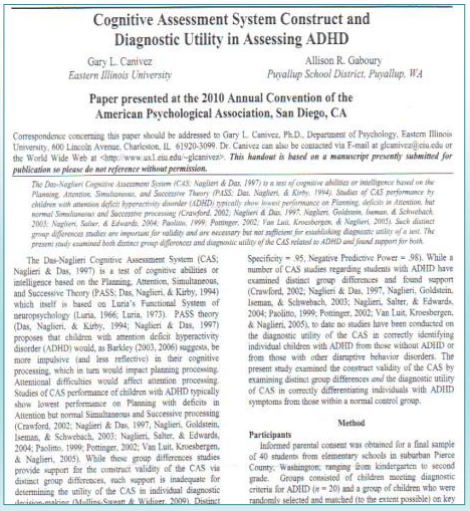
Canivez & Gaboury (2010)

- "the present study demonstrated the potential of the CAS to correctly identify students who demonstrated behaviors consistent with ADHD diagnosis."

glcanivez@eiu.edu



Cognitive Assessment System Construct and Diagnostic Utility in Assessing ADHD

Gary L. Canivez
Eastern Illinois University

Allison R. Gaboury
Puyallup School District, Puyallup, WA

Paper presented at the 2010 Annual Convention of the American Psychological Association, San Diego, CA

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The Das-Naglieri Cognitive Assessment System (CAS; Naglieri & Das, 1997) is a test of cognitive abilities or intelligence based on the Planning, Attention, Simultaneous, and Successive Theory (PASS; Das, Naglieri, & Kirby, 1994). Studies of CAS performance by children with attention deficit hyperactivity disorder (ADHD) typically show lowest performance on Planning, deficits in Attention, but normal Simultaneous and Successive processing (Crawford, 2002; Naglieri & Das, 1997; Naglieri, Goldstein, Iseman, & Schwebach, 2003; Naglieri, Salter, & Edwards, 2004; Paolitto, 1999; Pottinger, 2002; Van Luit, Kroesbergen, & Naglieri, 2005). Such distinct group differences studies are important for validity and are necessary but not sufficient for establishing diagnostic utility of a test. The present study examined both distinct group differences and diagnostic utility of the CAS related to ADHD and found support for both.

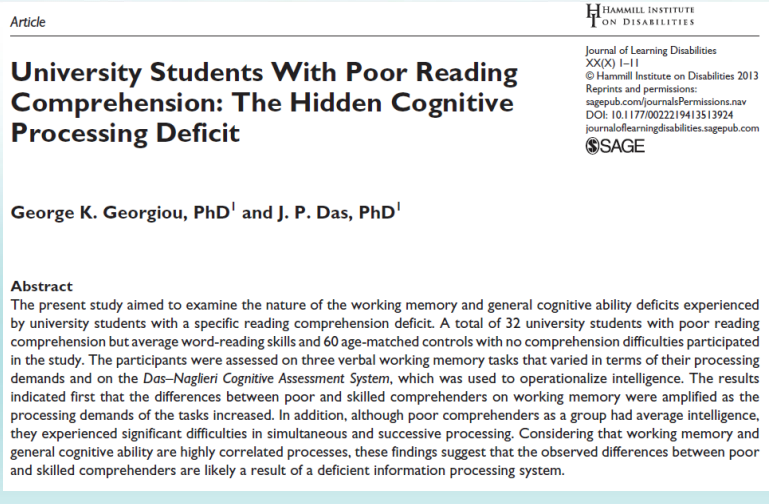
The Das-Naglieri Cognitive Assessment System (CAS; Naglieri & Das, 1997) is a test of cognitive abilities or intelligence based on the Planning, Attention, Simultaneous, and Successive Theory (PASS; Das, Naglieri, & Kirby, 1994) which itself is based on Luria's Functional System of neuropsychology (Luria, 1966; Luria, 1973). PASS theory (Das, Naglieri, & Kirby, 1994; Naglieri & Das, 1997) proposes that children with attention deficit hyperactivity disorder (ADHD) would, as Barkley (2003, 2006) suggests, be more impulsive (and less reflective) in their cognitive processing, which in turn would impact planning processing. Attentional difficulties would affect attention processing. Studies of CAS performance of children with ADHD typically show lowest performance on Planning with deficits in Attention but normal Simultaneous and Successive processing (Crawford, 2002; Naglieri & Das, 1997; Naglieri, Goldstein, Iseman, & Schwebach, 2003; Naglieri, Salter, & Edwards, 2004; Paolitto, 1999; Pottinger, 2002; Van Luit, Kroesbergen, & Naglieri, 2005). While these group differences studies provide support for the construct validity of the CAS via distinct group differences, such support is inadequate for determining the utility of the CAS in individual diagnostic decision-making (Mollins-Sweatt & Widiger, 2009). Distinct Specificity = .95, Negative Predictive Power = .98). While a number of CAS studies regarding students with ADHD have examined distinct group differences and found support (Crawford, 2002; Naglieri & Das, 1997; Naglieri, Goldstein, Iseman, & Schwebach, 2003; Naglieri, Salter, & Edwards, 2004; Paolitto, 1999; Pottinger, 2002; Van Luit, Kroesbergen, & Naglieri, 2005), to date no studies have been conducted on the diagnostic utility of the CAS in correctly identifying individual children with ADHD from those without ADHD or from those with other disruptive behavior disorders. The present study examined the construct validity of the CAS by examining distinct group differences *and* the diagnostic utility of CAS in correctly differentiating individuals with ADHD symptoms from those within a normal control group.

Method

Participants

Informed parental consent was obtained for a final sample of 40 students from elementary schools in suburban Pierce County, Washington; ranging from kindergarten to second grade. Groups consisted of children meeting diagnostic criteria for ADHD ($n = 20$) and a group of children who were randomly selected and matched (to the extent possible) on key

Georgiou & Das (2013)



Article

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University Students With Poor Reading Comprehension: The Hidden Cognitive Processing Deficit

George K. Georgiou, PhD[1] and J. P. Das, PhD[1]

Abstract

The present study aimed to examine the nature of the working memory and general cognitive ability deficits experienced by university students with a specific reading comprehension deficit. A total of 32 university students with poor reading comprehension but average word-reading skills and 60 age-matched controls with no comprehension difficulties participated in the study. The participants were assessed on three verbal working memory tasks that varied in terms of their processing demands and on the *Das–Naglieri Cognitive Assessment System*, which was used to operationalize intelligence. The results indicated first that the differences between poor and skilled comprehenders on working memory were amplified as the processing demands of the tasks increased. In addition, although poor comprehenders as a group had average intelligence, they experienced significant difficulties in simultaneous and successive processing. Considering that working memory and general cognitive ability are highly correlated processes, these findings suggest that the observed differences between poor and skilled comprehenders are likely a result of a deficient information processing system.

Performance Across Race, Ethnicity, Culture and Language

We must use tests that

are fair to minority groups

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Which Ability tests are Non-Discriminatory?

"(3) ADDITIONAL REQUIREMENTS.—Each local educational agency shall ensure that—

"(A) assessments and other evaluation materials used to assess a child under this section—

"(i) are selected and administered so as not to be discriminatory on a racial or cultural basis;

"(ii) are provided and administered in the language and form most likely to yield accurate information on what the child knows and can do academically, developmentally, and functionally, unless it is not feasible to so provide or administer;

"(iii) are used for purposes for which the assessments or measures are valid and reliable;

"(iv) are administered by trained and knowledgeable personnel; and

"(v) are administered in accordance with any instructions provided by the producer of such assessments;

"(B) the child is assessed in all areas of suspected disability;

"(C) assessment tools and strategies that provide relevant information that directly assists persons in determining the educational needs of the child are provided;

non discriminatory assessments

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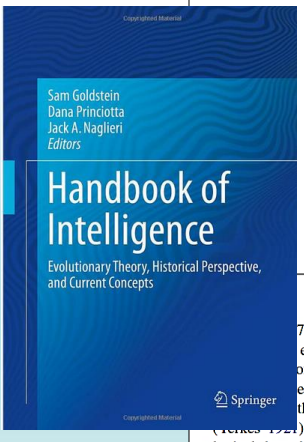
Mean Differences by Test

http://www.jacknaglieri.com/cas2.html



Hundred Years of Intelligence Testing: Moving from Traditional IQ to Second-Generation Intelligence Tests **20**

Jack A. Naglieri

"Do not go where the path may lead, go instead where there is no path and leave a trail."
–Ralph Waldo Emerson

7, is remembered as the day the entered World War I. On that same of psychologists held a meeting in ersity's Emerson Hall to discuss the they could play with the war effort). The group agreed that psychological knowledge and methods could be of importance to the military and utilized to increase the efficiency of the Army and Navy personnel. The group included Robert Yerkes, who was also the president of the American Training School in Vineland, New Jersey, on May 28. The committee considered many types of group tests and several that Arthur S. Otis developed when working on his doctorate under Lewis Terman at Stanford University. The goal was to find tests that could efficiently evaluate a wide variety of men, be easy to administer in the group format, and be easy to score. By June 9, 1917, the materials were ready for an initial trial. Men who had some educational background and could speak English were administered the verbal and quantitative (Alpha) tests and those that could not read the newspaper or speak English were given the Beta tests (today described as nonverbal).

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PASS psychological processes measured by CAS and CAS2 yield the smallest difference

Table 20.1 Mean score differences in standard scores by race on traditional IQ and second-generation intelligence tests

Test	Difference
Traditional	
SB-IV (matched)	12.6
WISC-IV (normative sample)	11.5
WJ-III (normative sample)	10.9
WISC-IV (matched)	10.0
Second generation	
KABC (normative sample)	7.0
KABC (matched)	6.1
KABC-2 (matched)	5.0
CAS2 (normative sample)	6.3
CAS (demographic controls)	4.8
CAS2 (demographic controls)	4.3

Naglieri, Rojahn, Matto (2007)

Hispanic White difference on CAS Full Scale of 4.8 standard score points (matched)

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Hispanic and non-Hispanic children's performance on PASS cognitive processes and achievement☆

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Abstract

Hispanics have become the largest minority group in the United States. Hispanic children typically come from working class homes with parents who have limited English language skills and educational training. This presents challenges to psychologists who assess these children using traditional IQ tests because of the considerable verbal and academic (e.g., quantitative) content. Some researchers have suggested that intelligence conceptualized on the basis of psychological processes may have utility for assessment of children from culturally and linguistically diverse populations because verbal and quantitative skills are not included. This study examined Hispanic children's performance on the Cognitive Assessment System (CAS; [Naglieri, J.A., and Das, J.P. (1997). Cognitive Assessment System. Itasca, IL: Riverside.]) which is based on the Planning, Attention, Simultaneous, and Successive (PASS) theory of intelligence. The scores of Hispanic (N=244) and White (N=1956) children on the four PASS processes were obtained and the respective correlations between PASS and achievement compared. Three complementary sampling methodologies and data analysis strategies were chosen to compare the Ethnic groups. Sample size was maximized using nationally representative groups and demographic group differences were minimized using smaller matched samples. Small differences between Hispanic and non-Hispanic children were found when ability was measured with tests of basic PASS processes. In addition, the correlation between the PASS constructs and achievement were substantial for both Hispanic and non-Hispanic children and were not significantly different between the groups.
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PASS neuropsychological abilities in other languages

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Hispanic ELL Students with Reading Problems

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Hispanic ELL Students with Reading Problems

http://www.jacknaglieri.com/cas2.html

Bilingual Hispanic Children's Performance on the English and Spanish Versions of the Cognitive Assessment System

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George Mason University
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Columbia College, Elgin Campus
Brianna DeLauder
George Mason University
Holly Matto
Virginia Commonwealth University

This study compared the performance of re
on the Planning, Attention, Simultaneous, S
sured by English and Spanish versions of the Cognitive Assessment System
(CAS; Naglieri & Das, 1997a). The results suggest that students scored similarly on both English and Spanish versions of the CAS. Within each version of the CAS, the bilingual children earned their lowest scores in Successive processing regardless of the language used during test administration. Small mean differ-

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English Spanish CAS

Means, *SDs*, *d*-ratios, Obtained and Correction Correlations Between the English a

Spanish Version of the CAS (*N* = 55).

	CAS English		CAS Spanish		*d*-ratio	Correlations	
	Mean	*SD*	Mean	*SD*	*d*	Obtained	Corrected
Planning	92.6	13.1	92.6	13.4	.00	.96	.97
Simultaneous	89.0	12.8	93.0	13.7	-.30	.90	.93
Attention	94.8	13.9	95.1	13.9	-.02	.98	.98
Successive	78.0	13.1	83.1	12.6	-.40	.82	.89
Full Scale	84.6	13.6	87.6	13.8	-.22	.96	.97

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Otero, Gonzales, Naglieri (2012)

SLD and PASS scores

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The Neurocognitive Assessment of Hispanic English-Language Learners With Reading Failure

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Jack A. Naglieri
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TABLE 2
Means, Standard Deviations, *d* Ratios, and Correlations Between the English and Spanish Versions of the Cognitive Assessment System (*N* = 40)

	CAS English		*CAS Spanish*			*Correlations*	
CAS Subtests and Scales	*M*	*SD*	*M*	*SD*	*d* ratio	*Obtained*	*Corrected*
Full Scale	86.40	8.73	87.10	7.94	–0.08	.936	.993

Otero, Gonzales, Naglieri (2012)

- Fagan (2000) as well as Suzuki and Valencia (1997) suggested that a cognitive processing approach like that used in the CAS would avoid the knowledge base required to answer verbal and quantitative questions found on most traditional IQ tests and would be more appropriate for culturally and linguistically diverse populations.
- PASS results support this idea.

INTERNATIONAL PASS RESULTS

CAS in Italy

Psychological Assessment

1040-3590/12/$12.00 DOI: 10.1037/a0029828

Multigroup Confirmatory Factor Analysis of U.S. and Italian Children's Performance on the PASS Theory of Intelligence as Measured by the Cognitive Assessment System

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ned Italian and U.S. children's performance on the English and Italian versions, e Cognitive Assessment System (CAS; Naglieri & Conway, 2009; Naglieri & Das, d on a neurocognitive theory of intelligence entitled PASS (Planning, Attention, Successive; Naglieri & Das, 1997; Naglieri & Otero, 2011). CAS subtest, PASS cale scores for Italian (N = 809) and U.S. (N = 1,174) samples, matched by age and mined. Multigroup confirmatory factor analysis results supported the configural CAS factor structure between Italians and Americans for the 5- to 7-year-old error of approximation [RMSEA] = .038; 90% confidence interval [CI] = .033, .043; lex [CFI] = .96) and 8- to 18-year-old (RMSEA = .036; 90% CI = .028, .043; CFI = he Full Scale standard scores (using the U.S. norms) for the Italian (100.9) and U.S. ere nearly identical. The scores between the samples for the PASS scales were very the Attention Scale (d = 0.26), where the Italian sample's mean score was slightly mean differences were found for 9 of the 13 subtest scores, 3 showed small d-ratios talian sample), and 1 was large (in favor of the U.S. sample), but some differences in were found. These findings suggest that the PASS theory, as measured by CAS, yields s and showed factorial invariance for these samples of Italian and American children, ural and linguistic characteristics.

US and Italian Samples– Mean Scores

Table 5

Means and SDs for Italian Children (N = 809) on the CAS Subtests and PASS and Full Scales Using U.S. Norms and Comparisons to U.S. Sample (N = 1,174), Matched by Age

	Italian			U.S.					
Subtests and scales	*M*	*SD*	*n*	*M*	*SD*	*n*	*F*	*p*	*d*-ratio
CAS composite scales									
Planning	97.7	13.4	809	100.5	15.4	1,174	18.1	<.01	−0.19
Simultaneous	103.0	13.9	809	101.1	14.1	1,174	9.3	<.01	0.14
Attention	104.2	13.7	809	100.6	14.4	1,174	32.2	<.01	0.26
Successive	99.0	12.5	809	100.5	14.5	1,174	5.1	.02	−0.11
Full Scale	100.9	12.9	809	100.5	14.8	1,174	2.3	.13	0.03

Note. CAS = Cognitive Assessment Syste SS = Planning, Attention, Simultaneous, and Successive. U.S. sample *N*s vary due Designations for *d*-ratios are as follows <.2), S = small (.2), M = medium (.5), and L = large (.8). For all *F* values the *df*s a for Speech Rate (1, 1219) and Se 762).

Italian mean = 100.9 &US mean = 100.5 using US NORMS

Presentation Outline

- Are traditional IQ tests fair?
  - Take an IQ test
  - Who devised these tests?
  - IDEA and test fairness
- A brain-based approach to intelligence
  Conceptualizing intelligence from brain function
  - Evidence that this approach has validity
    - Is PASS an approach that is more fair?
    - Is PASS relevant to instruction?

Iseman & Naglieri (2010)

http://www.jacknaglieri.com/cas2.html

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A Cognitive Strategy Instruction to Improve Math Calculation for Children With ADHD and LD: A Randomized Controlled Study

Jackie S. Iseman[1] and Jack A. Naglieri[1]

Abstract

The authors examined the effectiveness of cognitive strategy instructio
Successive) given by special education teachers to students with ADH
experimental group were exposed to a brief cognitive strategy instruc
development and application of effective planning for mathematical com
standard math instruction. Standardized tests of cognitive processes
students completed math worksheets throughout the experimental
Johnson Tests of Achievement, Third Edition, Math Fluency and *Wechs*
Numerical Operations) were administered pre- and postintervention,
follow-up. Large pre–post effect sizes were found for students in the ex
math worksheets (0.85 and 0.26), Math Fluency (1.17 and 0.09), and N
At 1 year follow-up, the experimental group continued to outperform the comparison group. These findings suggest that

Design of the Study

Experimental and Comparison Groups

7 worksheets with Normal Instruction

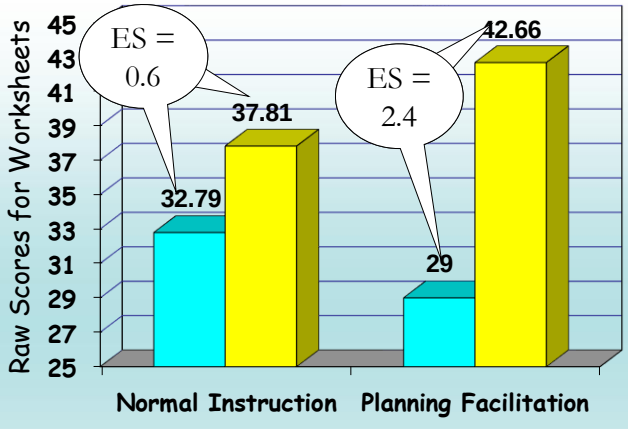
Experimental Group

19 worksheets with Planning Facilitation

Comparison Group

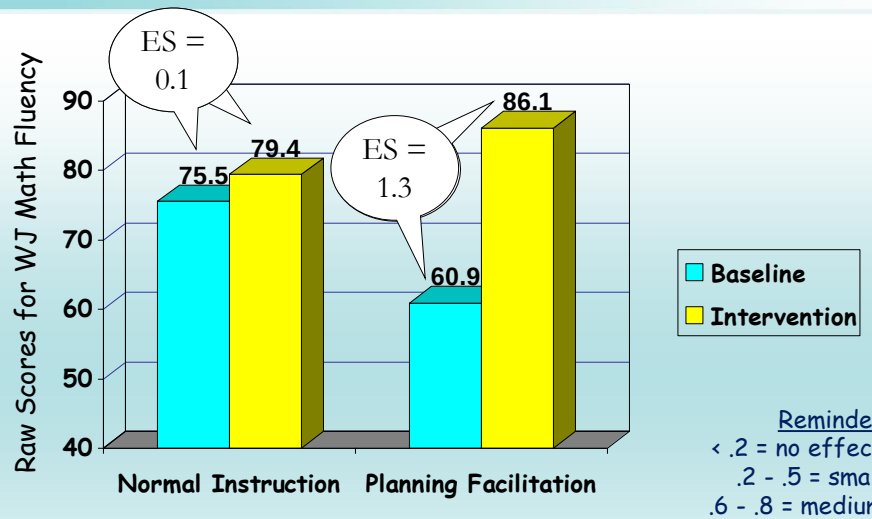
19 worksheets with Normal Instruction

Worksheet Pre-Post Means and Effect Sizes for the Students with ADHD



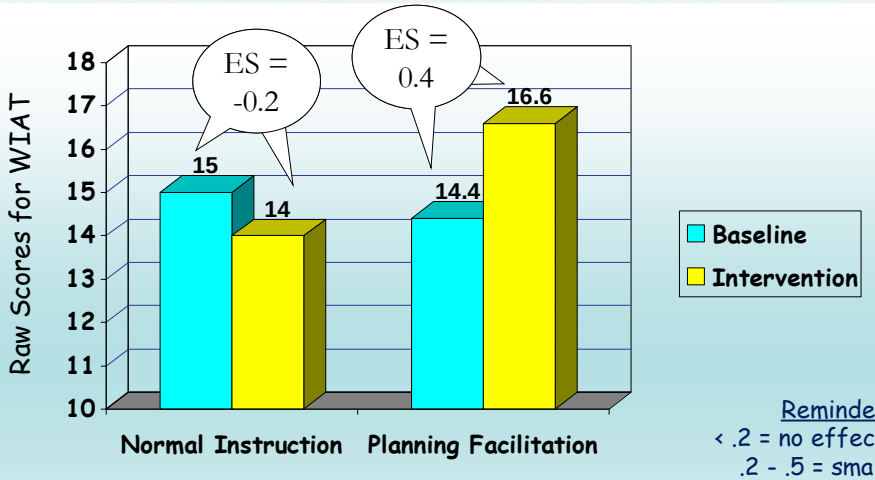
Reminder
< .2 = no effect
.2 - .5 = small
.6 - .8 = medium
> .8 = large

WJ Math Fluency Means and Effect Sizes for the Students with ADHD



Reminder
< .2 = no effect
.2 - .5 = small
.6 - .8 = medium
> .8 = large

WIAT Numerical Operation Means and Effect Sizes for Students with ADHD



Reminder
< .2 = no effect
.2 - .5 = small
.6 - .8 = medium
> .8 = large

One Year Follow-up

At 1-year follow-up, 27 of the students were retested on the WJ-III ACH Math Fluency subtest as part of the school's typical yearly evaluation of students. This group included 14 students from the comparison group and 13 students from the experimental group. The results indicated that the improvement of students in the experimental group ($M = 16.08$, $SD = 19$, $d = 0.85$) was significantly greater than the improvement of students in the comparison group ($M = 3.21$, $SD = 18.21$, $d = 0.09$).

Take Away Message

- All traditional IQ tests are contaminated by knowledge which distort the IQ score
- We can do better with the a neurocognitive approach to defining and measuring intelligence
  - Profiles for special populations
  - Smaller differences across race, ethnic and culture
  - Relevance to intervention

Resources available at:

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