

Cognitive Assessment as a Social Justice Issue

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BIG Picture

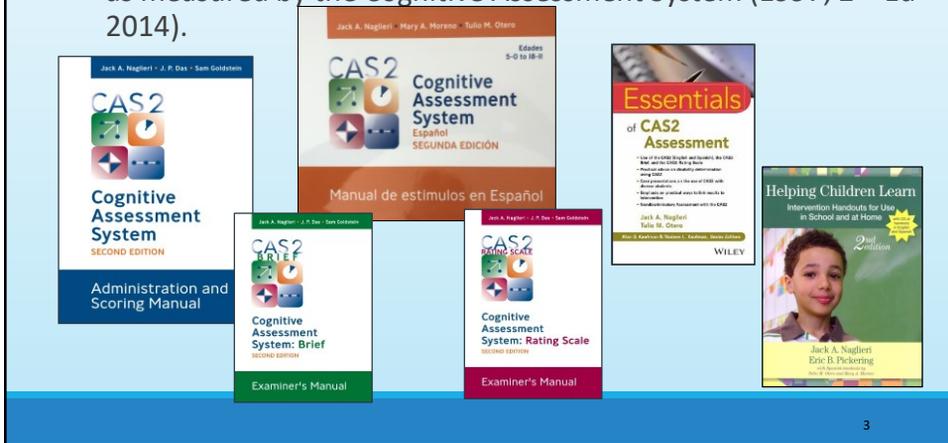
- What do we want from our ability tests?
 - A general picture of the student → Average, Gifted, Intellectual Disability
 - A more detailed picture that helps with specific learning disability or ADHD eligibility
 - A way to measure basic psychological processes to determine the student's pattern of learning strengths and weaknesses
 - A fair and equitable way to assess ability for students who are ELL and those from diverse populations
- In this session you will learn about how we can achieve all these goals

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Disclosures

- We will be speaking about publications we have authored that are designed to reinvent intelligence based on the theory of basic psychological processes called PASS (Naglieri & Das, 1997) as measured by the Cognitive Assessment System (1997; 2nd Ed 2014).



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Core Groups - Stimulate Thinking

- Groups of 3-5
- Introduce yourself to the group
- Establish roles:
 - Organizer (keeps time)
 - Coach
 - Recorder
 - Energizer



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Topical Outline

Introduction

- how IQ tests and social justice are related
- test items that require thinking versus knowing
- Are verbal tests needed for validity?
 - Evidence from KABC, CAS, NNAT, WISC5

➤ Making Intelligence tests socially just

- Measure Neurocognitive ability (PASS)
 - A look at PASS and its measurement
 - research on race & ethnic differences on intelligence tests
 - The impact this has on SLD and ID disability diagnosis
 - Alejandro, Alejandro and research

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Case of a male 7th grader -History

- **Manuel** had recently moved from New York to Puerto Rico at the end of 6th grade. Was English dominate.
- Both Parents and grand parents spoke Spanish at home and socially as he was growing up.
- His two year older sister always spoke English.
- Manuel understood Spanish but never had the need to speak it.
- **Early Educational Issues**
 - **Manuel** had a history of significant speech dysfluency, attention issues and difficulty learning math facts.
 - He received Speech and Language services in grades 5 & 6.

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The influence of Language on Knowledge

- Manuel attended public school. Instruction was all in Spanish.
- As happens with most 2nd language learners, he barely verbally communicated with peers or with teachers for the first year. Insecurity, fear, anxiety and limited vocabulary paralyzed him.
- Limited Spanish proficiency.
- Manuel had difficulty adjusting to his new language and cultural milieu. Although parents were Puerto Rican he was considered by peers as not really like them.
- Manuel did not participate in class, did not always understand the class lecture.
- Manuel began skipping class and hanging out with others who were doing the same and engaging in mischief.

After several visits to the principal's office and to the part-time school social worker, Manuel was referred to a psychologist for an evaluation.

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Evaluation Results & Recommendations (1973)

- Low scores obtained on the WISC-Spanish (70s)
- Manuel was doing as well as is expected given his low IQ.
- Dysfluent Speech
- Probable low self esteem
- Cultural Adjustment issues

- **Recommendations**
 - Provide tutoring
 - Provide opportunities for student to increase Spanish vocabulary.

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Core Group Discussion – 3 minutes

- Organizer – Have your group discuss the case of Manuel
- Coach – Help the group decide what to do
- Recorder – Keep notes on the conversation
- Energizer – Focus the group !



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THE REST OF THE STORY...

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1977

- Manuel graduated from H.S with A's and B's, left PR to attend college, went through a similar transition and adaptation process though college as he entered with the equivalency of a 6th grade formal English language education.
- He had poor GRE Scores, cultural adjustment issues, speech/language problem, attention, and learning issues continued.
- Professors told Manuel that college may not be this best option and doubted he would get into graduate school.

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Population Trends

- ◆ The United States Census Bureau estimates the Hispanic population would be 19% by 2020 (USCB, 2017).
- ◆ Examining school age populations, by 2020 Hispanic's children will represent 27% of U.S. Public school enrollment (NCES, 2015) and are projected to represent 30% by 2023 (USCB, 2017).
- A large number of these children have learning difficulties, and they are eligible for special educational services (Alliance for Excellent Education, 2006).
- According to the U.S. commission on civil rights (2009) an overrepresentation in special education is concentrated among minority groups, including Hispanics.
- *There are inequality in educational opportunities, and children who were misidentified with a specific learning disabilities (SLD) or who were never identified could be significantly harmed.*

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Urgency



- Against this scenario, exists and urgency to examine non-discriminatory diagnostic evaluation methods that provide reliable data to guide interventions for the growing Hispanic population.
- Hispanic (and other minority group) children with special education needs are victims of services and related inequities (Shiffer et al. 2011), and it has been suggested that legislation does not consider Hispanic children needs (Hacker et. al, 2015).

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Definition of Social Justice (Jack ideas)

- The concept of Social Justice is based on the idea that all members of a society should have equal rights and access to opportunities.
- The ethical principles of the American Psychological Association (2017) even require psychologists to ensure that their work **benefits** and respects the rights of all people, regardless of age, gender, gender identity, race, ethnicity, culture, national origin, religion, sexual orientation, disability, language, or socioeconomic status.

American Psychological Association. (2017). Ethical principles of psychologists and code of conduct (2002, Amended June 1, 2010 and January 1, 2017).

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Definition of Social Justice

- As it pertains to the assessment of intelligence:
 - ✓ Scores derived from a measures of intelligence should be practical.
 - ✓ An empirical guide for identifying difficulties a child may have.
 - ✓ Whatever the difficulties the student is found to have, the emphasis is on improvement though specialized intervention.
 - ✓ Low scores should not be treated as the student is incapable of more.

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Definition of Social Justice

- ✓ “A state or doctrine of egalitarianism (*Egalitarianism defined as 1: a belief in human **equality** especially with respect to **social, political, and economic** affairs; 2: a social philosophy advocating the **removal of inequalities among people***)” – [Merriam-Webster Dictionary](#)
- ✓ As applied to Assessment, we define Social Justice as providing equal opportunity for students to be assessed in a manner that is fair, nondiscriminatory, that ultimately benefits them through thoughtful interpretation of test results, and that leads to appropriate interventions regardless of language or cultural differences.

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Traditional IQ and Achievement Tests

➤ 1983 Allen Field Elementary School

Typical Test Battery

- Draw a person
- Bender gestalt Test
- WISC-R
- Peabody Individual Achievement test
- Sentence Completion
- History & and other tests as needed.



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Traditional IQ and Achievement Tests

- I noticed that parts of the WISC I was administering was VERY similar to parts of the achievement test I was giving
- HOW DOES THAT MAKE SENSE?
- WHY DO WE HAVE THIS PROBLEM?

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Evolution of IQ

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

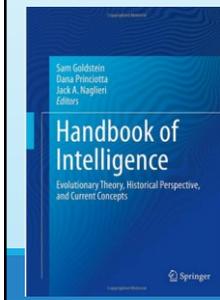
Hundred Years of Intelligence Testing: Moving from Traditional IQ to Second-Generation Intelligence Tests

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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



Context

April 6, 1917, is remembered as the day the United States entered World War I. On that same day a group of psychologists held a meeting in Harvard University's Emerson Hall to discuss the possible role they could play with the war effort (Yerkes 1921). 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,

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

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Origins of Traditional IQ

- A group of psychologists met in April of 1917 to construct an ability test to help the military evaluate recruits (WWI)
- Their goal was to develop a workable set of tests



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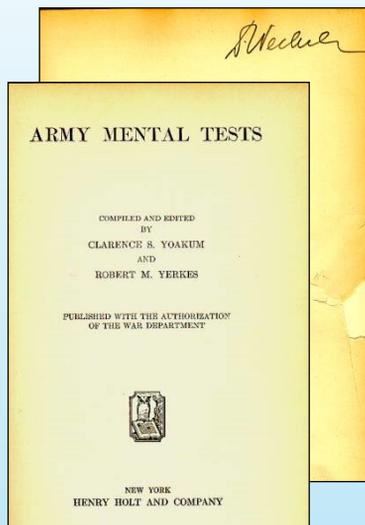
Origins of Traditional IQ

- On July 20, 1917 they 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 groups and individually administered IQ tests.**
 - **We have had more than 100 years of this approach to intelligence testing**

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From Alpha/Beta to Wechsler IQ



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

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From Alpha/Beta to Wechsler IQ

➤ Army Alpha

- Synonym- Antonym
- Disarranged Sentences
- Number Series
- Arithmetic Problems
- Analogies
- Information

Verbal & Quantitative questions demand knowledge

➤ Army Beta

- Maze
- Cube Imitation
- Cube Construction
- Digit Symbol
- Pictorial Completion
- Geometrical Construction

Nonverbal typically demand much less knowledge

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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 bonfire	14 Mars	24 frustrate	34 irony
5 misuse	15 dilapidated	25 flaunt	35 incrustation

SLIDES BY JACK A. NAGLIERI, PH.D. (JNAGLIERI@GMAIL.COM)

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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 | (46) |
| | | 2 | If you save \$6 a month for 5 months, how much will you save? | Answer | (30) |
| | | 3 | If 32 men are divided into squads of 8, how many squads will there be? | Answer | (4) |
| | | 4 | Mike had 11 cigars. He bought 3 more and then smoked 6. How many cigars did he have left? | Answer | (8) |
| | | 5 | A company advanced 6 miles and retreated 3 miles. How far was it then from its first position? | Answer | (3) |
| | | 6 | How many hours will it take a truck to go 48 miles at the rate of 4 miles an hour? | Answer | (12) |
| | | 7 | How many pencils can you buy for 40 cents at the rate of 2 for 5 cents? | Answer | (16) |
| | | 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 | (6) |
| | | 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 | (1.40) |
| | | 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 | (32) |

ARMY MENTAL TESTS

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The First IQ TEST: Alpha (Verbal)

- | | |
|---|-------------------|
| 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. The President during the Spanish War was | Mckinley |
| 10. Fatima is a make of | cigarette |

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

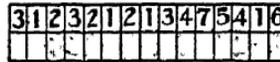
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Army Mental Tests - WISC Digit Symbol (Coding (WISC-V) & Mazes)

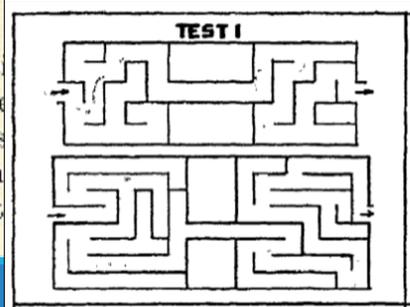
Test 7.—Digit Symbol

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



Test 8.—The Maze

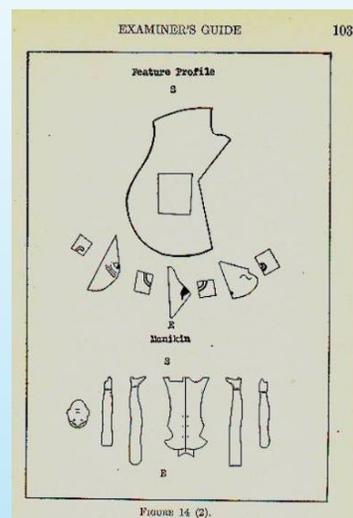
onstration maze (a), and with his pene
shortest way out. At critical points he
l in wrong direction without marking, s
continues to work in the right direction
t maze A, gives S. pencil, points to st



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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
- BUT WHY were nonverbal test included?



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1927 Army Testing (Yoakum & Yerkes)

METHODS AND RESULTS

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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.**

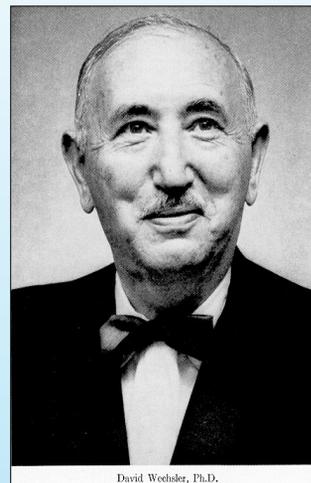
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Wechsler's Definition

- 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.

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A Test of Cognitive Functioning should Measure Thinking not Knowing

- What does the student have to **know** to complete a task?
 - *This is dependent on educational opportunity (e.g., Vocabulary, Arithmetic, phonological skills, etc.)*

- How does the student have to **think** to complete a task?
 - *This is dependent on the brain's neurocognitive processes*



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Are Verbal Tests Needed?

- Average correlations between IQ Scales with total achievement scores from Naglieri & Otero (2017)

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

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

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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 (ELL, SLD, etc.) will be at disadvantage when assessed with so-called Verbal and Quantitative reasoning “ability” tests
- SOLUTION ? **Re**invent intelligence

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Core Group Activity

- **O**rganizer – Have the group discuss this question: “How do you feel about what was just presented?”
- **C**oach – guide the discussion so that the group arrives at an answer to the question
- **R**ecorder – will report to the group
- **E**nergizer – keep the discussion going !



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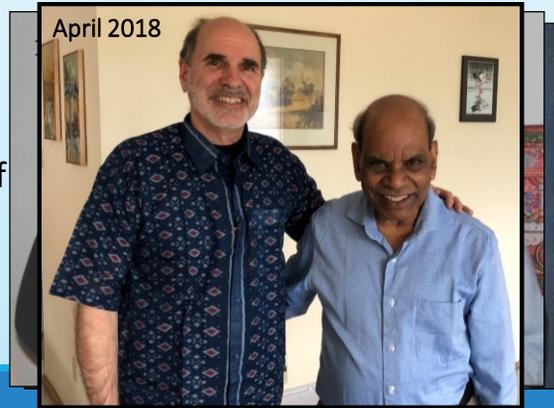
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Intelligence as Neurocognitive Abilities

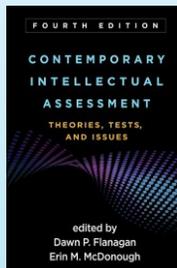
- In Das and Naglieri's first meeting (February 11, 1984) they proposed that intelligence was better REinvented as PASS processes and began development of the Cognitive Assessment System (Naglieri & Das, 1997).
- The CAS was the first intelligence *test* to be built on a specific *theory* of intelligence; and one defined as brain function



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Updates and details the Neuropsychological Correlates of PASS

Naglieri, J. A., & Otero, T. M. (2018). Redefining Intelligence as the PASS Theory of Neurocognitive Processes. In Flanagan, D. P., & Harrison, P. L. (Eds.), *Contemporary intellectual assessment: Theories, tests, and issues* (4th ed.). New York, NY: Guilford Press.



CHAPTER 6 • • • • •

Redefining Intelligence with the Planning, Attention, Simultaneous, and Successive Theory of Neurocognitive Processes

Jack A. Naglieri
Tullio M. Otero

Practitioners and test authors have become increasingly conscious of the need for theory-based intelligence tests. Although several theories of intelligence have been attached to traditional ability tests such as the Wechsler scales (Plucker & Esping, 2014), one theory, first described by Das, Kirby, and Jarman (1979), was used explicitly to develop a new way to construct an intelligence test. In 1997, Naglieri and Das (1997a) published the Cognitive Assessment System (CAS), which was based on a neurocognitive theory called *planning, attention, simultaneous, and successive* (PASS) processing. These authors argued that a neurocognitive theory of intelligence provides the foundation necessary for test construction and is equally important for test interpretation. They also suggested that traditional IQ tests, which were based largely on the work of the U.S. military (see Naglieri, 2015), were too limited and could be improved if the constructs that were measured were related to brain functions. Naglieri and Das anticipated that the PASS neurocognitive approach would yield better diagnostic information, have relevance to instructional decision making, and be more appro-

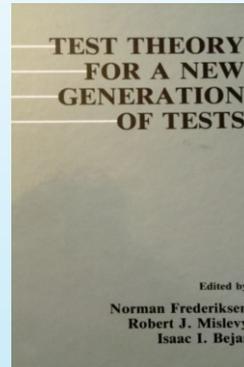
the four PASS processes. PASS theory has been most recently operationalized in the Cognitive Assessment System—Second Edition (CAS2; Naglieri, Das, & Goldstein, 2014a), the CAS2: Español (Naglieri, Moreno, & Otero, 2017), the CAS2: Brief (Naglieri, Das, & Goldstein, 2014b), and the CAS2: Rating Scale (Naglieri, Das, & Goldstein, 2014c). We describe these measures comprehensively in Chapter 15 of this book. In this chapter, we focus on the PASS theory upon which all of these measures are based.

The PASS theory and the CAS2 provide a neurocognitive perspective on ability that differs from that of traditional batteries (those including, in part, subtests requiring verbal and quantitative knowledge). These batteries have been used since the Army mental testing program described by Yerkes and Yerkes (1922) almost 100 years ago. The PASS theory, as operationalized by the CAS and CAS2, has created an opportunity to move the field of intelligence and ability testing forward by emphasizing (1) that a test of intelligence should be based on a theory of intelligence and (2) that the test should measure basic neurocognitive pro-

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Defining Neurocognitive Abilities

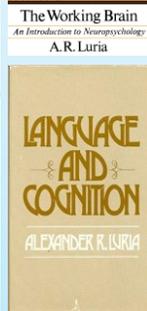
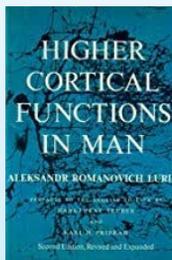
- How did we identify ‘basic psychological processes’?
 - We used research from cognitive and neuropsychology to construct a model to test
 - We did not assign new labels to traditional IQ subtests
- We recognized the limitations of developing a theory from factor analysis – *“a research program dominated by factor analyses of test intercorrelations is incapable of producing an explanatory theory of human intelligence”* (Lohman & Ippel, 1993, p. 41)



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What do we mean by thinking?



- Thinking means brain function
- That means we conceptualize thinking as basic psychological processes related to different brain areas
- What functions do different parts of the brain provide?
- We looked to A. R. Luria for the answers

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PASS Neurocognitive Theory

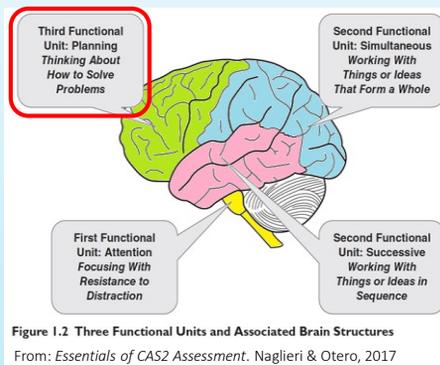
- **P**lanning = THINKING ABOUT HOW YOU DO WHAT YOU DECIDE TO DO
 - **A**ttention = BEING ALERT AND RESISTING DISTRACTIONS
 - **S**imultaneous = GETTING THE BIG PICTURE
 - **S**uccessive = FOLLOWING A SEQUENCE
- PASS** = 'basic psychological processes'

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PASS Theory: Planning

- **Planning** is a neurocognitive process that a person uses to determine, select, and use efficient solutions to problems
 - problem solving
 - developing plans and using strategies
 - retrieval of knowledge
 - impulse control and self-control
- These can also be described as executive function, metacognition, strategy use



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CAS2: Rating Scale Planning

Directions for Items 1–10. These questions ask how well the child or adolescent decides how to do things to achieve a goal. They also ask how well a child or adolescent thinks before acting and avoids impulsivity. Please rate how well the child or adolescent creates plans and strategies to solve problems.

During the past month, how often did the child or adolescent . . .

	Never	Rarely	Sometimes	Frequently	Always
1. produce a well-written sentence or a story?	0	1	2	3	4
2. evaluate his or her own actions?	0	1	2	3	4
3. produce several ways to solve a problem?	0	1	2	3	4
4. have many ideas about how to do things?	0	1	2	3	4
5. have a good idea about how to complete a task?	0	1	2	3	4
6. solve a problem with a new solution when the old one did not work?	0	1	2	3	4
7. use information from many sources when doing work?	0	1	2	3	4
8. effectively solve new problems?	0	1	2	3	4
9. have well-described goals?	0	1	2	3	4
10. consider new ways to finish a task?	0	1	2	3	4

— + — + — + — + — =

Planning Raw Score

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Planned Codes 1

- ▶ Jack Jr. at age 5
- ▶ Child fills in the codes in the empty boxes
- ▶ Children are encouraged to think of a good way to complete the page

A	B	C	D	
X O	O O	X X	O X	
A	B	C	D	A
X O	O O	X X		
A	B	C	D	A
X O	O O			
A	B	C	D	A
X O	O O			

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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.

Name _____

Doubles and Near Doubles

double
 $8 + 8 = 16$

How many are there? $8 + 9 = 17$ near double

Ring the double. Add.

1. $6 + 6 = 12$
 $6 + 7 = 13$

2. $5 + 5 = 10$
 $5 + 6 = 11$

3. $7 + 7 = 14$
 $7 + 8 = 15$

4. $4 + 4 = 8$
 $4 + 5 = 9$

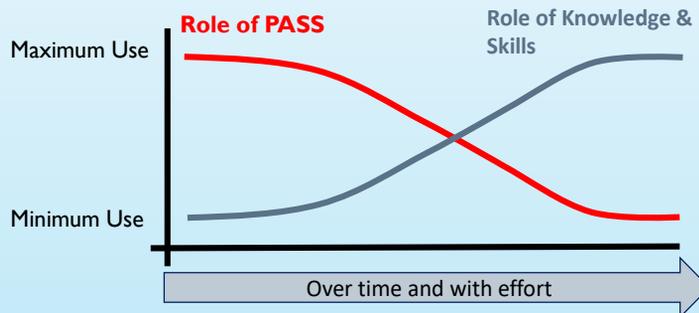
CHECK If you know the sum of $8 + 8$, how can you find $8 + 9$?

three hundred thirty-five 335

56

Planning Learning Curves

- Learning depends upon many factors especially PASS
- At first, PASS plays a major role in learning
- When a task is practiced and learned it requires less thinking (PASS) and becomes a skill



Note: A skill is the ability to do something well with minimal effort (thinking)

59

PASS Theory

- ▶ **Attention** is a basic psychological process we use to selectively attend to some stimuli and ignores others
 - focused cognitive activity
 - selective attention
 - resistance to distraction

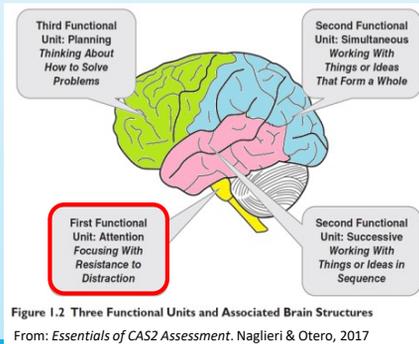
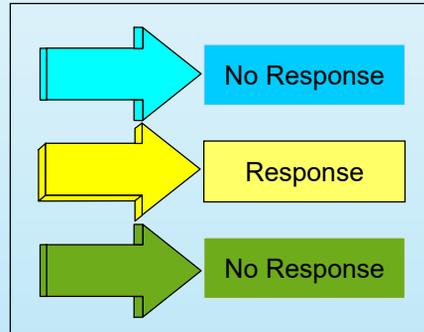


Figure 1.2 Three Functional Units and Associated Brain Structures
From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017



CAS2: Rating Scale Attention

Directions for Items 21–30. These questions ask how well the child or adolescent pays attention and resists distractions. The questions also ask about how well someone attends to one thing at a time. Please rate how well the child or adolescent pays attention.

During the past month, how often did the child or adolescent . . .

	Never	Rarely	Sometimes	Frequently	Always
21. work well in a noisy area?	0	1	2	3	4
22. stay with one task long enough to complete it?	0	1	2	3	4
23. not allow the actions or conversations of others to interrupt his or her work?	0	1	2	3	4
24. stay on task easily?	0	1	2	3	4
25. concentrate on a task until it was done?	0	1	2	3	4
26. listen carefully?	0	1	2	3	4
27. work without getting distracted?	0	1	2	3	4
28. have a good attention span?	0	1	2	3	4
29. listen to instructions or directions without getting off task?	0	1	2	3	4
30. pay attention in class?	0	1	2	3	4

— + — + — + — + — =
Attention Raw Score

CAS2 Expressive Attention

The child says the color not the word

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

Expressive Attention - Español

ROJO	AZUL	VERDE	AMARILLO	ROJO
AMARILLO	VERDE	ROJO	AZUL	AMARILLO
ROJO	AMARILLO	AMARILLO	VERDE	AZUL
VERDE	AZUL	VERDE	ROJO	AZUL
VERDE	AMARILLO	ROJO	AMARILLO	VERDE
ROJO	AZUL	ROJO	VERDE	AMARILLO
AZUL	VERDE	AMARILLO	ROJO	AZUL
AMARILLO	AZUL	ROJO	VERDE	AZUL

Conjunto de Item 6

Number Detection

- Items 1 - 4 have 180 numbers on each page
- Each child is given two pages
- Targets appear at the top of the page
- Score for targets found and

false detections

Find the numbers that look like this: 1 2 3

5	<u>2</u>	1	2	<u>3</u>	6	4	<u>3</u>	6	3	<u>3</u>	4
5	2	3	1	6	4	<u>1</u>	4	4	<u>1</u>	5	5
4	5	<u>2</u>	2	3	4	1	<u>2</u>	8	<u>3</u>	2	<u>3</u>
6	5	2	3	6	3	1	4	1	5	<u>1</u>	3

that look like this: 1 2 3

<u>1</u>	4	<u>2</u>	6	4
3	<u>3</u>	<u>1</u>	2	6
<u>1</u>	<u>5</u>	<u>6</u>	<u>2</u>	<u>3</u>

67

Attention

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.

Reading comprehension is difficult because of the similarity of the options

68

Modern Theory: Successive

- ▶ **Successive** processing is a basic psychological process we use to manage stimuli in a specific serial order
 - Stimuli form a chain-like progression
 - Word Series

Academic tasks

Decoding words
 Letter-sound correspondence
 Phonological tasks
 Understanding the syntax of sentences
 Comprehension of written instructions
 Sequence of words, sentences, paragraphs
 Remembering the sequence of events
 Learning motor movements

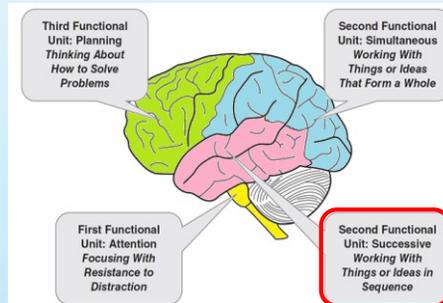


Figure 1.2 Three Functional Units and Associated Brain Structures
 From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

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CAS2: Rating Scale Successive

Directions for Items 31–40. These questions ask how well the child or adolescent remembers things in order. The questions ask about working with numbers, words, or ideas in a series. The questions also ask about doing things in a certain order. Please rate how well the child or adolescent works with things in a specific order.

During the past month, how often did the child or adolescent ...

	Never	Rarely	Sometimes	Frequently	Always
31. recall a phone number after hearing it?	0	1	2	3	4
32. remember a list of words?	0	1	2	3	4
33. sound out hard words?	0	1	2	3	4
34. correctly repeat long, new words?	0	1	2	3	4
35. remember how to spell long words after seeing them once?	0	1	2	3	4
36. imitate a long sequence of sounds?	0	1	2	3	4
37. recall a summary of ideas word for word?	0	1	2	3	4
38. repeat long words easily?	0	1	2	3	4
39. repeat sentences easily, even if unsure of their meaning?	0	1	2	3	4
40. follow three to four directions given in order?	0	1	2	3	4

— + — + — + — + — =

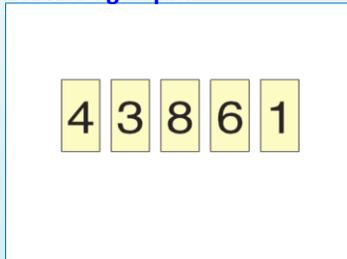
Successive Raw Score

70

70

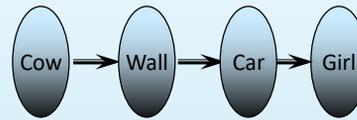
Successive Processing Tests

Visual Digit Span



- **Sentence Repetition**
 - Child repeats sentences exactly as stated by the examiner such as:
 - *The red greened the blue with a yellow.*

Word Series



- **Sentence Questions**
 - Child answers a question about a statement made by the examiner such as the following:
 - *The red greened the blue with a yellow. Who got greened?*

71

71

Insights...

- Even though tasks were different in content (numbers and words) and modality (auditory and visual), they required the same kind of thinking – Successive processing

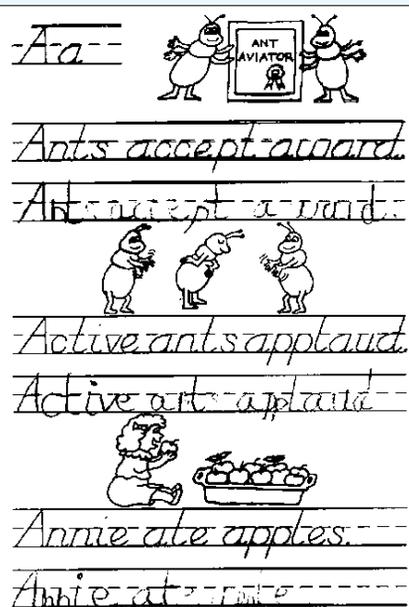


72

72

Successive Processing

The sequence of the sounds is emphasized in this work sheet



73

FAR Phonemic Awareness = Successive

“Now I am going to say parts of words. I want you to put the parts together to make a whole word.”

Blending: Advantage

Item	Correct response	# of syllables	Score
ad : van : tage	advantage	3	0 1

From the Feifer Assessment of Reading (2016)

74

74

Successive Processing & Reading Decoding

- The ability to sequence and sequence multiple sounds together to identify a word in print is critical for reading decoding



75

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PASS Theory

- **Simultaneous** processing is used to integrate stimuli into groups
 - Each piece must be related to the other
 - Stimuli are seen as a whole
- **Academics:**
 - Reading comprehension
 - geometry
 - math word problems
 - whole language
 - verbal concepts

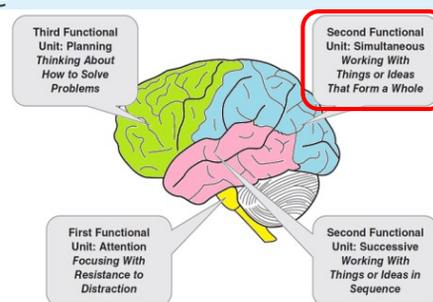


Figure 1.2 Three Functional Units and Associated Brain Structures
From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

77

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CAS2: Rating Scale Simultaneous

Directions for Items 11–20. These questions ask how well the child or adolescent sees how things go together. They also ask about working with diagrams and understanding how ideas fit together. The questions involve seeing the whole without getting lost in the parts. Please rate how well the child or adolescent visualizes things as a whole.

During the past month, how often did the child or adolescent ...

	Never	Rarely	Sometimes	Frequently	Always
11. like to draw designs?	0	1	2	3	4
12. figure out how parts of a design go together?	0	1	2	3	4
13. classify things into groups correctly?	0	1	2	3	4
14. work well with patterns and designs?	0	1	2	3	4
15. see how objects and ideas are alike?	0	1	2	3	4
16. work well with physical objects?	0	1	2	3	4
17. like to use visual materials?	0	1	2	3	4
18. see the links among several things?	0	1	2	3	4
19. show interest in complex shapes and patterns?	0	1	2	3	4
20. recognize faces easily?	0	1	2	3	4

— + — + — + — + — =

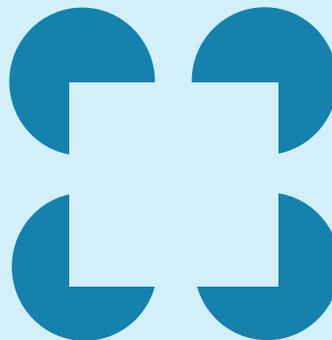
Simultaneous Raw Score

78

78

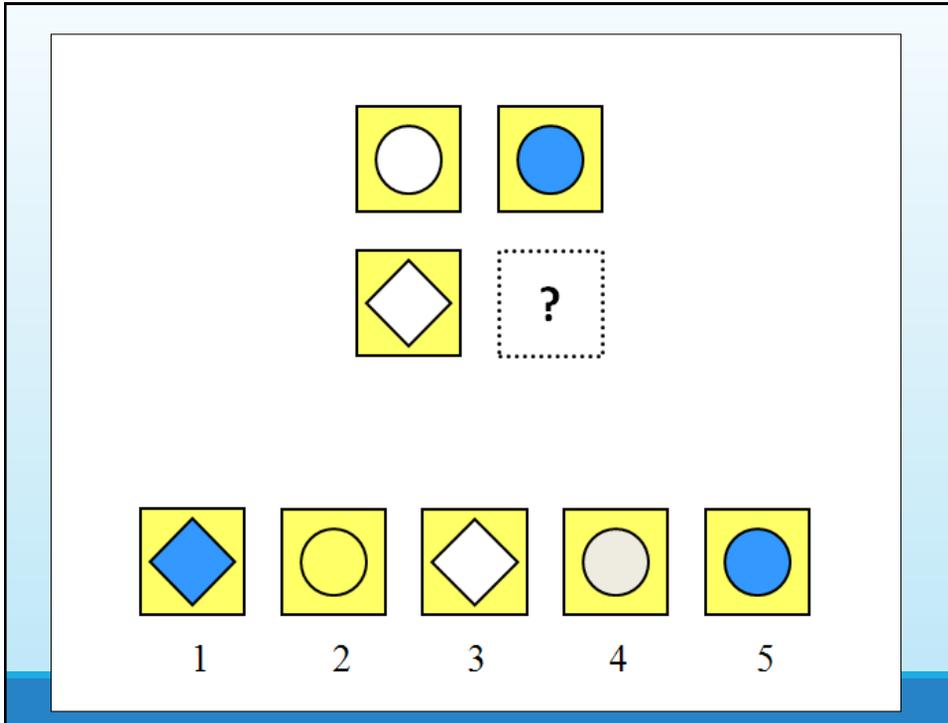
PASS Theory

- **Simultaneous** processing is what Gestalt psychology was based on
- Seeing the whole



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80

Different content same processing

3 is to 6 as 5 is to ___?

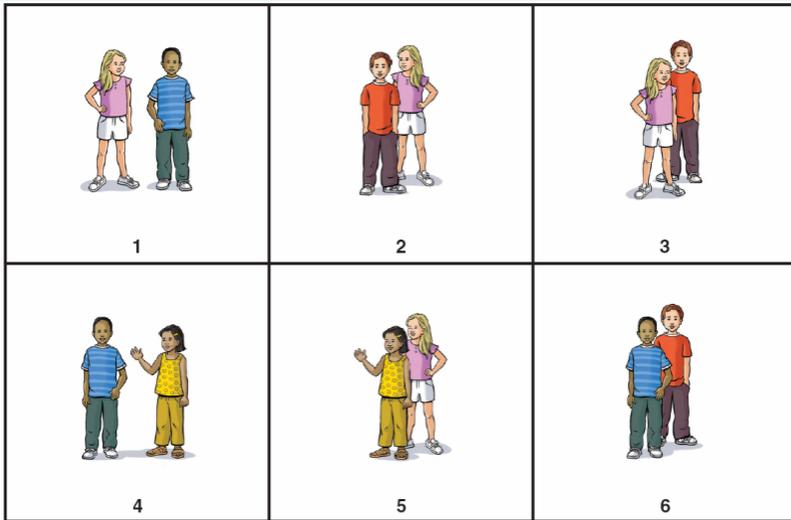
Girl is to woman as boy is to _____?

C⁷ is to F as E⁷ is to _____?

81

81

CAS2 Verbal-Spatial Relations



Which picture shows a boy behind a girl?

83

Numbers from 1 to 100

Simultaneous processing facilitated by this work sheet

Name Jack Secret number _____

Write the numbers 1 to 100 in order.

100% beautiful numbers!!

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

TR20 Blank Hundred Chart © J.C. Pheen and Co.

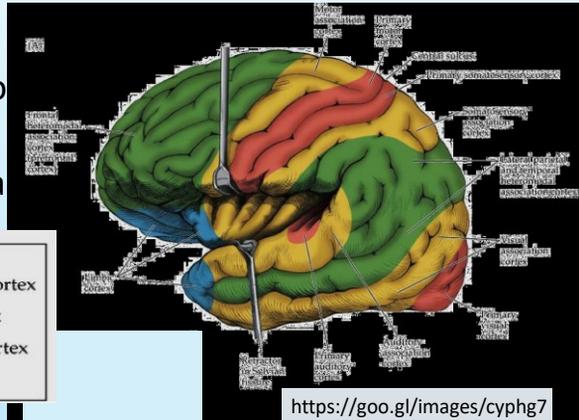
84

Heteromodal Association Cortex

(Goldberg, 2006)

- Our brains merge stimuli coming in from the senses (unimodal association cortex) into one stream of information for
- integration of sensory information
 - Most of the neocortex in humans

Key	
■	Primary motor or sensory cortex
■	Unimodal association cortex
■	Heteromodal association cortex
■	Limbic cortex



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PASS Comprehensive System

(Naglieri, Das, & Goldstein, 2014)

CAS2 Rating Scale
(4 subtests)

CAS2 Brief
(4 subtests)

CAS2 Core
(8 subtests)

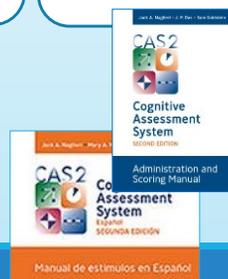
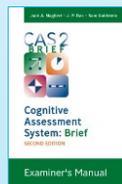
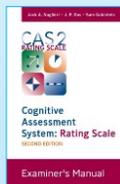
CAS2 Extended
(12 subtests)

Total Score
Planning
Simultaneous
Attention
Successive

Total Score
Planning
Simultaneous
Attention
Successive

Full Scale
Planning
Simultaneous
Attention
Successive

Full Scale
Planning
Simultaneous
Attention
Successive
Supplemental Scales
Executive Function
Working Memory
Verbal / Nonverbal
Visual / Auditory

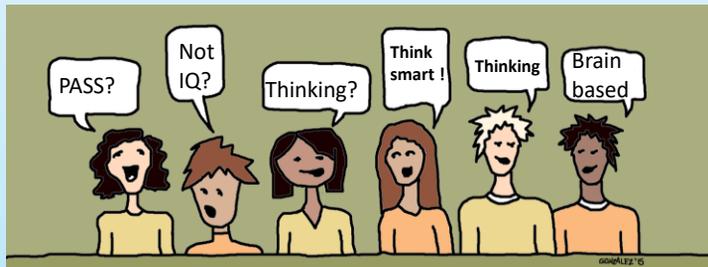


86

86

Core Group Activity – 3 minutes

- Organizer – Have the group discuss this question: “How is PASS more socially just?”
- Coach – guide the discussion
- Recorder – will report to the group
- Energizer – keep the discussion going !



87

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Topical Outline

- Introduction
 - how IQ tests and social justice are related
 - test items that require thinking versus knowing
 - Are verbal tests needed for validity?
 - Evidence from KABC, CAS, NNAT, WISC5
- Making Intelligence tests socially just
 - Measure Neurocognitive ability (PASS)
 - A look at PASS and its measurement
 - ➔ Case examples & research on race & ethnic differences on intelligence tests
 - The impact this has on SLD and ID disability diagnosis
 - Alejandro, Alejandro and research

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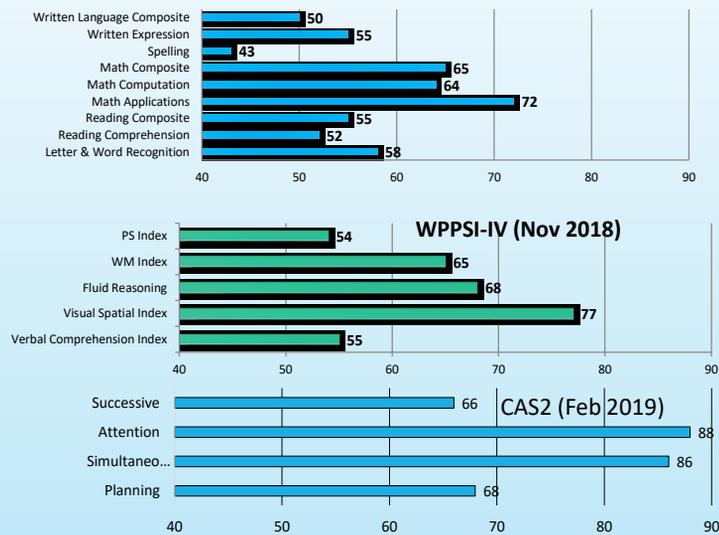
Alexandra: Age 8-1; 2nd Grade Re-evaluation: Concern is student ID?

- Very Low in Math, Reading and Spelling.
- Difficulty remembering information, keeping information in order, limited use of strategies.
- Spend 40% of her day in a cluster classroom with kindergarteners and 1st graders.
- Has received Sp/L services for two years. History of selective mutism
- Currently receives services under Developmental Delay.
- Spanish dominant. Low vocabulary in both English and Spanish

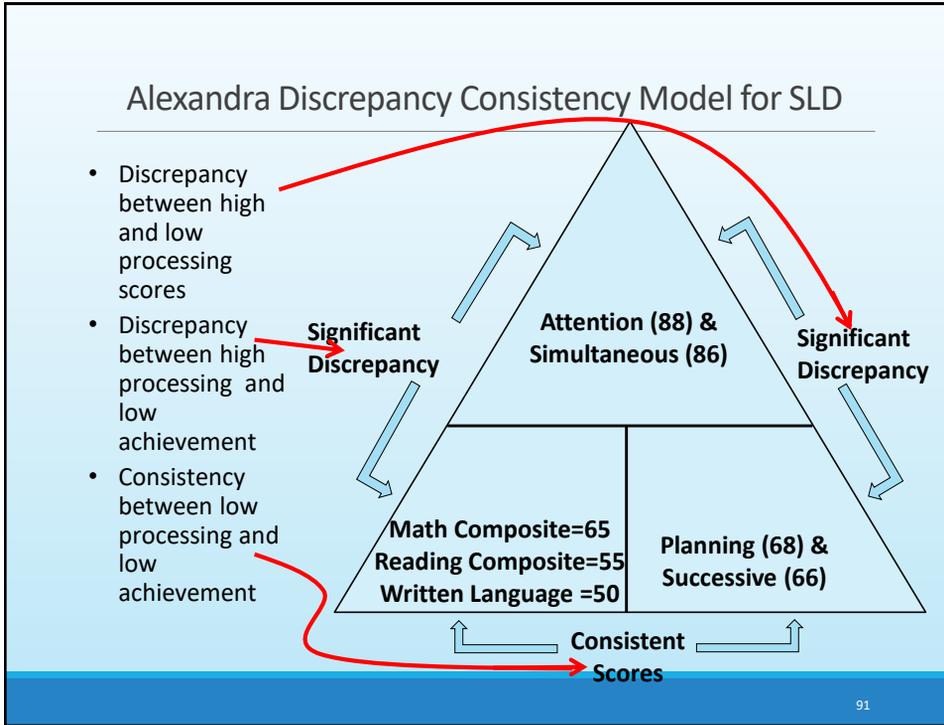


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Alexandra Bateria-IV, WPPSI-IV, CAS2



90



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Naglieri, Rojahn, Matto (2007)



ELSEVIER

Available online at www.sciencedirect.com



ScienceDirect

Intelligence 35 (2007) 568–579



INTELLIGENCE

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

Jack A. Naglieri^{a,*}, Johannes Rojahn^a, Holly C. Matto^b

^a Center for Cognitive Development, George Mason University, Department of Psychology, MSB 2C6, United States
^b Virginia Commonwealth University, United States

Received 16 May 2006; received in revised form 6 November 2006; accepted 6 November 2006
Available online 8 January 2007

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.
Published by Elsevier Inc.

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

92

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PASS scores – English and Spanish

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

Jack A. Naglieri

George Mason University

Tulio Otero

Columbia College, Elgin Campus

Brianna DeLauder

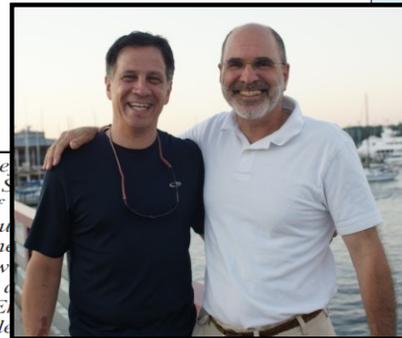
George Mason University

Holly Matto

Virginia Commonwealth University

School Psychology Quarterly

2007, Vol. 22, No. 3, 432–448



This study compared the performance of re on the Planning, Attention, Simultaneous, S ured by English and Spanish versions of (CAS; Naglieri & Das, 1997a). The results su on both English and Spanish versions of the CAS, the bilingual children earned their low regardless of the language used during test e nces were noted between the means of the E Simultaneous and Successive processing scale were similar. Specific subtests within the Simultaneous and Successive scales

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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		<i>d</i> -ratio	Correlations	
	Mean	<i>SD</i>	Mean	<i>SD</i>	<i>d</i>	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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IRFAX, VA 22030. NAGLIERI@GMU.EDU

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94

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

Subtests and scales	Italian			U.S.			F	p	d-ratio
	M	SD	n	M	SD	n			
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 System; PASS = Planning, Attention, Simultaneous, and Successive. U.S. sample Ns vary due to missing data. Designations for d-ratios are as follows: L = large (.8), M = medium (.5), and S = small (.2). For all F values the dfs are (1, 1219) and (1, 762).

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

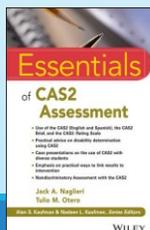
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Race Differences

Table 1.6 Standard Score Mean Differences by Race on Traditional and Nontraditional Intelligence Tests

Test	Difference
Traditional IQ Tests	
SB-IV (matched samples)	12.6
WISC-IV (normative sample)	11.5
WJ-III (normative sample)	10.9
WISC-IV (matched samples)	10.0
Nontraditional Tests	
K-ABC (normative sample)	7.0
K-ABC (matched samples)	6.1
KABC-II (matched samples)	5.0
CAS2 (normative sample)	6.3
CAS (demographic controls of normative sample)	4.8
CAS2 (demographic controls of normative sample)	4.3

Note: The data for these results are reported for the Stanford-Binet IV from Wasserman (2000); Woodcock-Johnson III from Edwards and Oakland (2006); Kaufman Assessment Battery for Children from Naglieri (1986); Kaufman Assessment Battery for Children II from Lichtenberger, Sotelo-Dynega, and Kaufman (2009); CAS from Naglieri, Rojahn, Matto, and Aquilino (2005); CAS2 from Naglieri, Das, and Goldstein (2014a); and Wechsler Intelligence Scale for Children IV (WISC-IV) from O'Donnell (2009).



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Topical Outline

- Introduction
 - how IQ tests and social justice are related
 - test items that require thinking versus knowing
 - Are verbal tests needed for validity?
 - Evidence from KABC, CAS, NNAT, WISC5
- Making Intelligence tests socially just
 - Measure Neurocognitive ability (PASS)
 - A look at PASS and its measurement
 - Case examples & research on race & ethnic differences on intelligence tests
- ➔ The impact this has on SLD and ID disability diagnosis
 - Alejandro and research

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CASE STUDY: ALEJANDRO (C.A. 7-0 GRADE 1)

REASON FOR REFERRAL

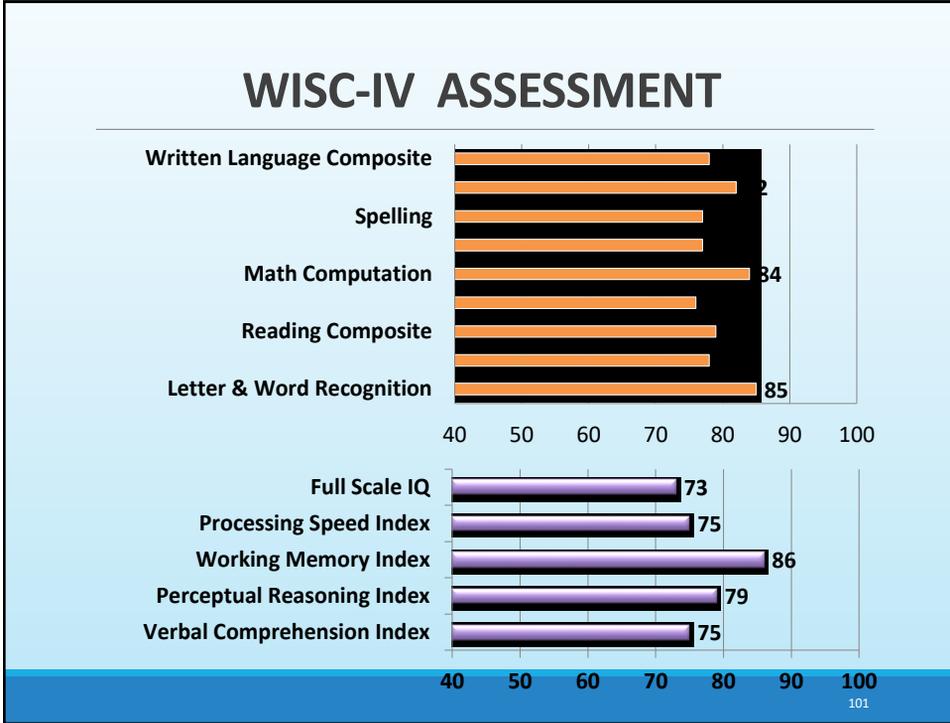
- Academic:
 - Could not identify letters/sounds
 - October. Could only count to 39
 - All ACCESS scores of 1
- Behavior:
 - Difficulty following directions
 - Attention concerns
 - Refusal/defiance



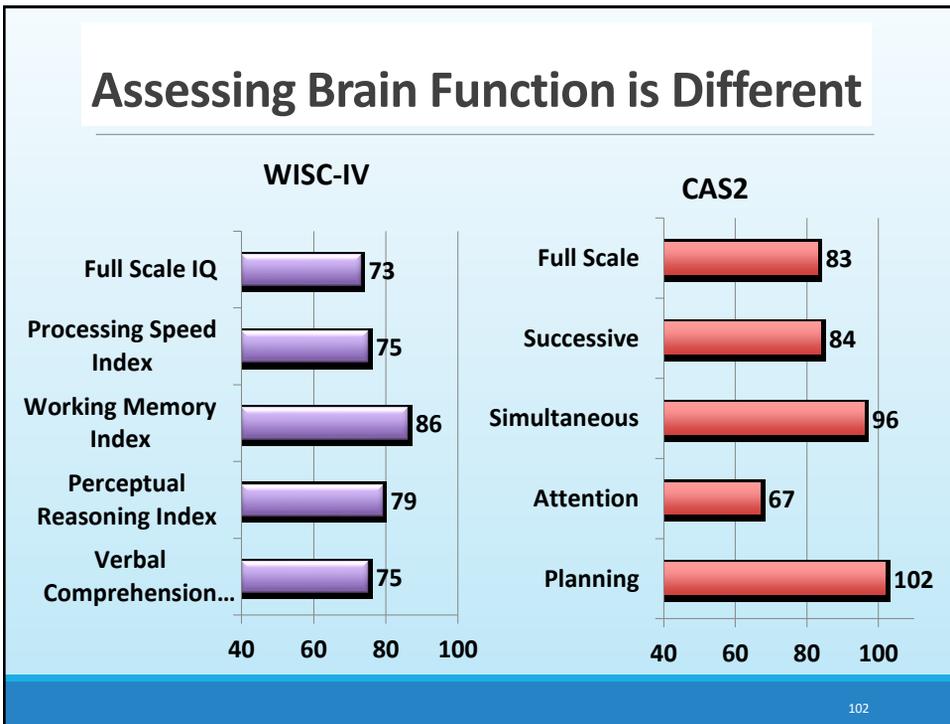
Note: this is not a picture of Alejandro

100

100



101



102

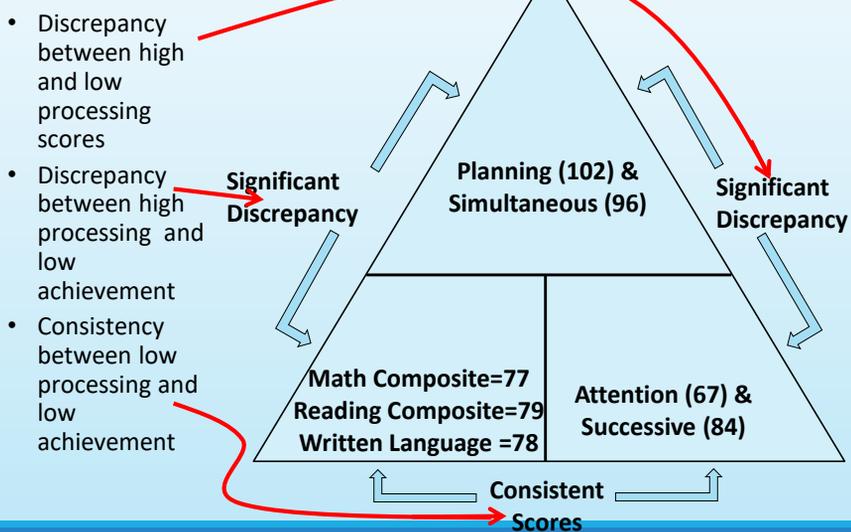
Alejandro and PASS (by Dr. Otero)

- ▶ Alejandro is not a slow learner.
- ▶ He has good scores in basic psychological processes:
 - ▶ Simultaneous = 96 and Planning = 102
- ▶ He has a “disorder in one or more of the basic psychological processes”
 - Attention = 67 and Successive = 84
- ▶ And he has academic failure which equals an SLD determination.

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Discrepancy Consistency Method for SLD



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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

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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 → low Full Scale
- **Black** children earned **higher** scores on CAS than whites
- **Fewer** Black children would be identified as having intellectual disability based on Full Scale scores using CAS than WISC-III
- **THIS IS A SOCIAL JUSTICE ISSUE.**

106

Core Group Activity – 3 minutes

- **O**rganizer – Have the group discuss this question: “What thoughts or concerns do we have at this point in the discussion?”
- **C**oach – guide the discussion
- **R**ecorder – will report to the group
- **E**nergizer – keep the discussion going !



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-
- In 2011, Hispanics accounted for 24% of the enrollment of public schools in the United States, and they are expected to represent 30% by 2023 (USDOE, 2010).
 - The growth rates for Hispanic children exceeds that of other minority groups.

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- Based on data collected on December 2017-February 2018, 11,554 students from Puerto Rico enrolled in public schools across School Districts.

State	School Enrollment as of 12/5/2018	School Enrollment as of 2/6/2018	% increase over 2015 total enrollment
Florida	10,324	11,554	6%
Massachusetts	2,298	2,556	3%
Pennsylvania	2,407	2,874	3%
New York	2,052	2,218	1%
Connecticut	1,188	1,827	3%
New Jersey	No Data	886	1%

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Case of María by Dr. Mary A. Moreno

AGE 13-8 GRADE 8

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CASE STUDY: MARIA (C.A. 13-8 GRADE 8)

REASON FOR REFERRAL

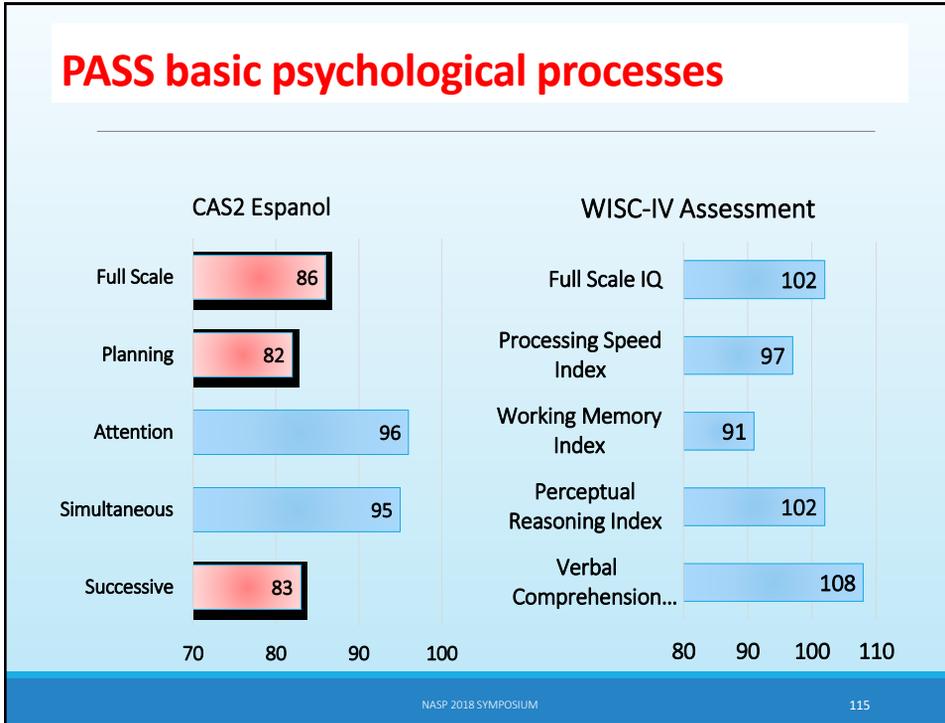
- Academic:
 - **Delays in mathematical skills**
 - Mainly use of fractions
 - Difficulties with multiplication
 - **Reading and writing**
 - Poor reading fluency (slow or "tired" while reading)
 - Mistakes when reading aloud, repeats, stops often or "loses place" when reading
 - Reads without expression and ignores punctuation marks
 - Organizational problems in reading and writing
 - Writes very slowly
 - **Learn Aid Test:** scores low average in reading and math (scores = 1)

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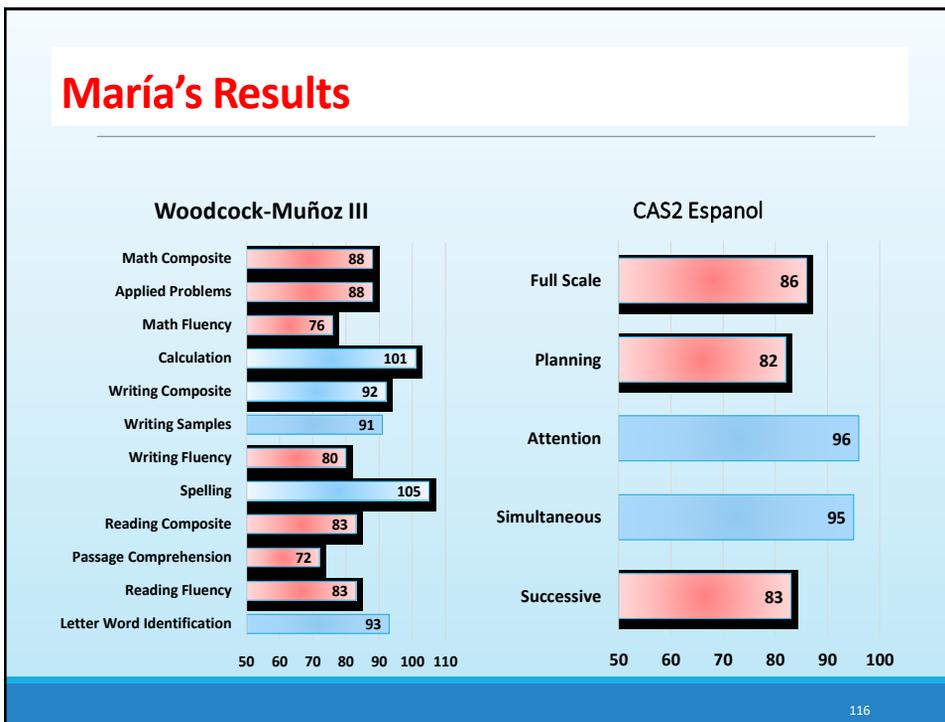
Previous evaluations

- Previous evaluation using different Wechsler versions (WPPSI, WISC-R PR) her general IQ scores were high average.
- Achievement test scores were below average in math
- Interventions:
 - **School special program**
 - Small groups
 - Supervised studies
 - **Private tutoring at home**

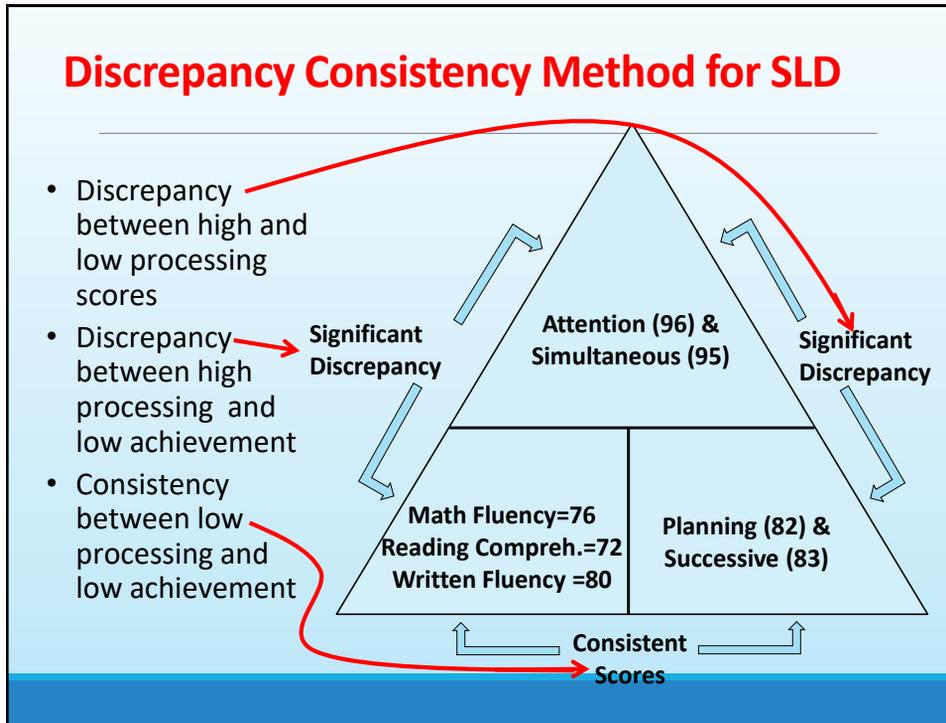
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The case of María (by Dr. Moreno-Torres)

- ▶ María has a “disorder in one or more of the basic psychological processes”
 - Planning = 82 and Successive = 83
- Good scores in basic psychological processes:
 - Simultaneous = 95 and Attention = 96
- ▶ She has documented:
 - ▶ Academic difficulties – Fluency, math and reading skills
 - ▶ Behavioral difficulties – Anxiety
 - ▶ Executive functioning difficulties – Organization, self-monitoring

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The case of María (by Dr. Moreno-Torres)

▶ Conclusions:

- ▶ She has intra-individual differences in basic psychological processes that underlie her academic problems.
- ▶ She earned CAS-2 Successive processing and Planning scores below the average range.
- ▶ She has considerable problems working with academic tasks that demand:
 - ▶ Sequencing of information
 - ▶ Use of different strategies and cognitive flexibility
- ▶ María has low scores in basic reading, math and writing organization
- ▶ Taken together, the results demonstrate consistency in relation to her cognitive processing skills and achievement.

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How we can help María?

➤ For María:

- Cognitive modification interventions
 - Planning
 - Successive processing

➤ For teachers:

- Train them to promote cognitive processes in their classrooms.

➤ For parents:

- Teaching María's parents to understand what planning and successive processing is and how promote them at home.

NASP 2018 SYMPOSIUM

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Final Thoughts About Maria

- Maria's case is similar to that of thousands of Hispanic children currently attending schools in the United States.
- Some of them may present academic difficulties that may be confused with difficulties in language proficiency.
- When evaluating them, it is important to use instruments that allow the identification of cognitive strengths and weaknesses that underlie their academic difficulties, without penalizing them for their difficulties in defining or explaining concepts.

Conclusions: Social Justice Means...

- **fair, nondiscriminatory assessment**
 - PASS scores from CAS2 ARE the most fair
 - The brain-based PASS Theory drove subtest development
 - The subtests content is not laden with knowledge
- **interpretation that informs intervention regardless of language or culture**
 - PASS intervention research is strong
 - PASS scales are the focus of interpretation because CAS2 is based on a THEORY

Learning & the Brain Summer Institute 2019 July 8-12 by Naglieri & Kryza

- <https://www.learningandthebrain.com/Event-395/Neuroscience-and-the-Learning-Brain/>
- In this highly interactive Institute, you will learn about the four PASS neurocognitive abilities that are critical to students' academic and social-emotional success and how to match those abilities to specific instructional methods. You will leave with readily implementable strategies to teach students to effectively self-regulate their own academic and social-emotional lives.

The screenshot shows the website for the Learning & the Brain Summer Institute. At the top, there is a navigation bar with the logo "LEARNING & the BRAIN" and a brain icon. To the right of the logo are links for "Register Now", "About", and "Contact Us". Below the logo, there is a horizontal menu with links for "CONFERENCES", "ONE-DAY PD SEMINARS", "SUMMER INSTITUTES", "ON-SITE PD", and "L&B BLOG". The main content area features a large image of a beach with palm trees and mountains in the background. Overlaid on the image is the text: "Neuroscience and the Learning Brain", "Developing the Pre-Frontal Cortex for Academic and Social-Emotional Success", "July 8-12, 2019", "Santa Barbara, CA", and "Jack A. Naglieri & Kathleen M. Kryza". At the bottom right of the page, the number "123" is displayed.

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