

# Equitable Assessment Using the PASS Theory & Cognitive Assessment System-2<sup>nd</sup> Edition

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[https://youtube.com/channel/UCHZrB27V-wfndq6\\_XNdosew](https://youtube.com/channel/UCHZrB27V-wfndq6_XNdosew)

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Senior Research Scientist Devereux  
Emeritus Faculty George Mason Univ.

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## Resources

FOR MORE INFORMATION  
PLEASE GO TO MY WEB PAGE

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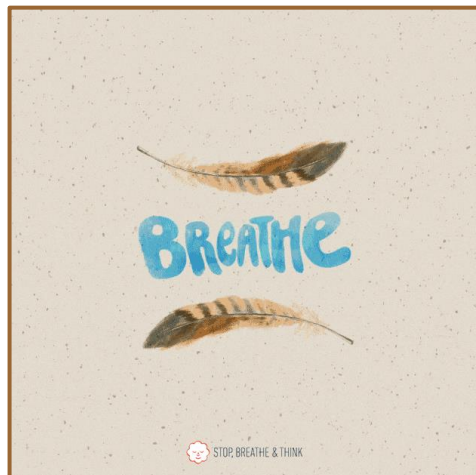
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# Disclosures



## Feeling Overwhelmed?

## Mindful Breathing



# The BIG picture

- The comprehensive assessments we provide can alter the course of a student's life; making this one of the most important tasks we have.
- We want Intellectual assessment that
  - Is consistent with IDEA and state regulations regarding SLD determination
  - Helps us understand WHY a student fails
  - Informs us about academic strengths & weaknesses and interventions
  - Is fair for students from diverse populations
- These goals can be achieved if we use second-generation tests that measure the way students THINK to LEARN
  - The definition of THINKING should be based on BRAIN function
  - PASS theory is a way of defining THINKING and the Cognitive Assessment System-2<sup>nd</sup> Edition measures a student's ABILITY to think

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## Ideas to Consider



### My Professional Journey

- An Awakening About Traditional Intelligence Tests

### A Theory Based on Brain Function

- Thinking vs Knowing and Social Justice

### From PASS to CAS2

- A Different View of People

### Research Update

- PASS and Equity – Measure Thinking not Knowing
- To *g* or not to *g*

### Eligibility Determination

- What to use

### Reasons To Change

- Validity of PASS Theory

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## Introduction

- Interest in intelligence and instruction
- Experiences as a school Psychologist



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## Traditional IQ and Achievement Tests

- When I started working as a school psychologist in 1975...I noticed that parts of the intelligence tests we used were VERY similar to parts of the achievement tests
  - In fact the Peabody Individual Achievement Test (1970) had a General Information and Arithmetic subtests JUST LIKE THE WISC! We noticed that parts of the WISC we were administering was VERY similar to parts of the achievement tests
- THAT DID NOT MAKE SENSE



1975 Charles Champagne Elementary, Bethpage, NY

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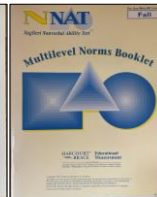
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## 1980 – First Academic Job @ NAU

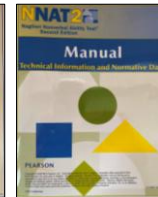
- Lecture on Navajo Indians
  - Havasupai Reservation
- My work in equitable assessment began in 1982



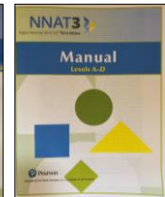
1985 MAT Short and Expanded Forms



Naglieri Nonverbal Ability Test in 1997

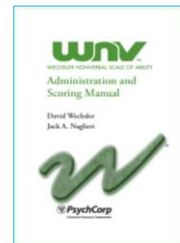


NNAT -2 published in 2008



NNAT -3 published in 2016

- First Research
  - Naglieri, J. A. (1982). Does the WISC-R measure verbal intelligence for non-English speaking children? *Psychology in the Schools*, 19, 478-479.
- First Test
  - Matrix Analogies Tests Individual and Group administrations (1985)
- First Book on Gifted
  - Helping All Gifted Students Learn (Naglieri, Brulles & Lansdowne, 2009)



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## Tests Created with Equity as a Goal

1. Naglieri, J. A. (1985). *Matrix Analogies Test - Expanded Form*. San Antonio: The Psychological Corporation.
2. Naglieri, J. A. (1985). *Matrix Analogies Test - Short Form*. San Antonio: The Psychological Corporation.
3. Naglieri, J. A. (1997). *Naglieri Nonverbal Ability Test*. San Antonio, TX: The Psychological Corporation.
4. Naglieri, J. A., & Bardos, A. N. (1997). *General Ability Scale for Adults (GAMA)* San Antonio, TX: Pearson.
5. Naglieri, J. A., & Das, J. P. (1997). *Cognitive Assessment System*. Austin: ProEd.
6. Naglieri, J. A. (2003). *Naglieri Nonverbal Ability Test - Individual Form*. San Antonio, TX: Pearson.
7. Wechsler, D., & Naglieri, J. A. (2006). *Wechsler Nonverbal Scale of Ability*. San Antonio, TX: Pearson.
8. Naglieri, J. A. (2008). *Naglieri Nonverbal Ability Test – 2nd Edition*. San Antonio, TX: Pearson.
9. Naglieri, J. A., Das, J. P., & Goldstein, S. (2014). *Cognitive Assessment System Second Edition*. Austin, TX: ProEd.
10. Naglieri, J. A. (2016). *Naglieri Nonverbal Ability Test – Third Edition*. San Antonio, TX: Pearson.
11. Naglieri, J. A., Moreno, M. A., & Otero, T. M. (2017). *Cognitive Assessment System – Español*. Austin, TX: ProEd.
12. Naglieri, J. A. (2021). *Naglieri Ability Test: Nonverbal*. Markham, Canada: Multi-Health Systems.
13. Naglieri, J. A. & Brulles, D. (2021). *Naglieri Ability Test: Verbal*. Markham, Canada: Multi-Health Systems.
14. Naglieri, J. A. & Lansdowne, K. (2021). *Naglieri Ability Test: Quantitative*. Markham, Canada: Multi-Health Systems.

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# Why do we measure intelligence the way we do?

The History of IQ tests



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Neil  
deGrasse  
Tyson

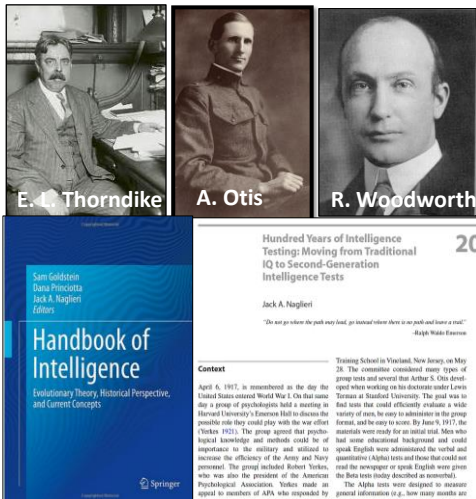


One of the great challenges in this world is knowing  
enough about a subject to think your right;  
but not enough about the subject to know your wrong!

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# Evolution of IQ <http://www.jacknaglieri.com/cas2.html>



- A group of psychologists met at Harvard in April of 1917 to construct an ability test to help the US military evaluate recruits (WWI)
- By July 1917 their research showed that the Army Alpha (Verbal & Quantitative) and Beta (Nonverbal) 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).
- This was the foundation of the Wechsler Scales – Verbal, Performance (Nonverbal) and Quantitative subtests as well as the Otis-Lennon and CogAT

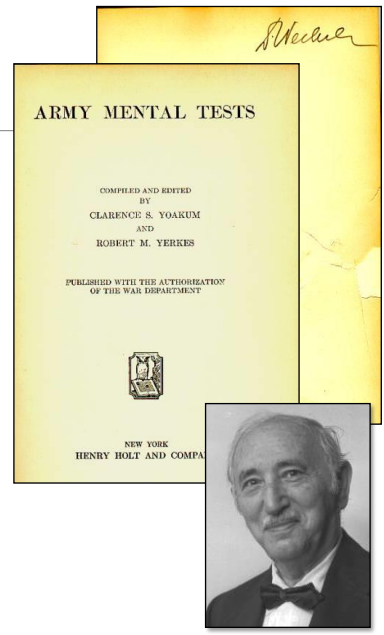
## Alpha & Beta → Wechsler

- **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 & Quant IQ (Knowledge)

Nonverbal IQ (Thinking)

WISC, WJ Cog, CogAT & Otis-Lennon



# Our Tests Demand Knowledge

## Stanford-Binet 5

- Verbal
- Knowledge
- Quantitative Reasoning
- Vocabulary
- Verbal Analogies

## WISC-V

- Verbal Comprehension: Similarities, Information & Comprehension
- Fluid Reasoning: Figure Weights, Picture Concepts, Arithmetic

## WJ-IV and Bateria-IV (including Cross Battery)

- Comprehension Knowledge: Vocabulary & General Information
- Fluid Reasoning: Number Series & Concept Formation
- Auditory Processing: Phonological Processing

## K-ABC-II

- Knowledge / GC: Riddles, Expressive Vocabulary, Verbal Knowledge

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# Very Similar Items on “Different” Tests

## WJ-IV Items from Cognitive and Achievement Tests:

### Cognitive: Oral Vocabulary Subtest 1

**Sample Items**

Point to *near* on subject's page and say: **Another word that means near is close** (pronounced klos, not kloz).

A. Point to *big* on subject's page and say: **Tell me another word for big.**

▲ **Correct:** large, gigantic, huge

◆ **A: Error or No Response**  
Score Item D. Say: **Another word for big is large.** Repeat Sample Item A.

B. Point to *nap* and say: **Tell me another word for nap.**

▲ **Correct:** sleep, rest, snooze

◆ **B: Error or No Response**  
Score Item D and say: **Another word for nap is sleep.** Repeat Sample Item B.

### Achievement: Reading Vocabulary-Synonyms Subtest 17

**Sample Items**

Point to *street* on subject's page and say: **Another word that means street is road.**

A. Point to *large* on subject's page and say: **Tell me another word for large.**

▲ **Correct:** big, enormous, gigantic, huge

◆ **A: Error or No Response**  
Score Item D and say: **Another word for large is big.** Repeat Sample Item A.

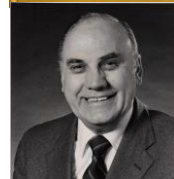
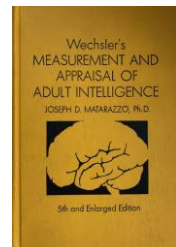
B. Point to *sleep* and say: **Tell me another word for sleep.**

▲ **Correct:** nap, doze, rest, snooze

◆ **B: Error or No Response**  
Score Item D and say: **Another word for sleep is nap.** Repeat Sample Item B.

Do not read any other items or tell subject any other words during this test.

- Matarazzo (1972) wrote about the Wechsler Scales
  - “...Vocabulary is necessarily influenced by ... education and cultural opportunities (p. 218)”
  - when referring to the Arithmetic subtest, “...its merits are lessened by the fact that it is influenced by education (p. 203).”

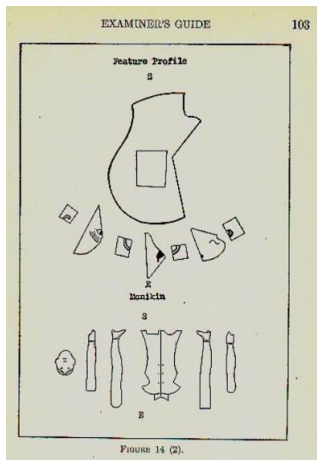


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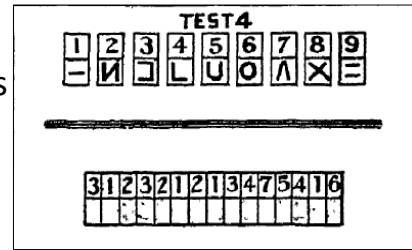
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# The US Army Beta Test (Nonverbal)



- Wechsler's Performance tests were taken from the Army Beta
- **BUT WHY** were nonverbal test included?



Test 7.—Digit Symbol

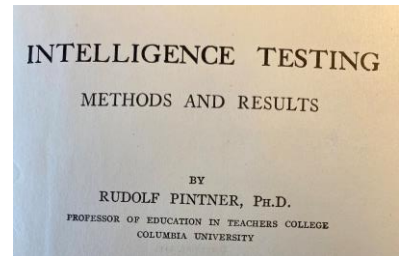
E. shows S. the record sheet, points to blank below 2 in the sample, then to symbol for 2 at top of page, writes in symbol, proceeds in the same way with the other parts of the sample, then gives S. pencil, points to space below 3 in the test, and nods affirmatively.

# Army Testing (Yoakum & Yerkes, 1920) & Pintner (1923)

METHODS AND RESULTS 19

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.



I. *Tests must be relatively new.* — A good intelligence test must avoid as much as possible anything that is commonly learned by the subjects tested. In a broad sense this rests upon a differentiation between knowledge and intelligence. To use as a test of intelligence

## “You didn’t make me feel stupid”

➤ Dr. Naglieri,

I've been using the CAS2 for approximately nine months now and have been amazed by some of the results. Not only has... the instrument provided useful information. But the student's reactions following the administration of the test have been even more remarkable.

Recently, I ... administer the CAS2 to a ... student placed in foster care. This young man was black, had significant medical problems, a history of trauma, multiple behavioral placements, multiple retentions ... a history of chronic absenteeism

➤ When I arrived to test him he had been locked in the bathroom for 20 minutes. However, he agreed to meet with me and do his best.

➤ The information the CAS2 provided me was far more useful in designing an effective program than the WISC-V. Even more important to me than any of the scores was what the student shared with me following the testing. The student said, "Mr. H. that testing wasn't as bad as I thought it was going to be and I appreciated that you didn't talk down to me or make me feel "stupid".

➤ Take care, Tom

Feb 25, 2021

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## Race and Ethnic Differences in Ability Tests

Note: Even though these tests may not show psychometric bias (Worrell, 2019) some do yield mean score differences.


Mean Score Differences in Intelligence Test Scores by Race & Ethnicity.		
	Race	Ethnicity
<b>Tests that require knowledge</b>		
Otis-Lennon School Ability Test (school system)	13.6	
Stanford-Binet IV (normative sample)	12.6	
WISC-V (normative sample)	11.6	9.1
WJ- III (normative sample)	10.9	10.7
CogAT7 (Nonverbal scale)	11.8	7.6
WISC-V (statistical controls normative sample)	8.7	5.4
<b>Tests that require minimal knowledge</b>		
CAS-2 (normative sample)	6.3	4.5
CAS (statistical controls normative sample)	4.8	4.8
CAS-2 (statistical controls normative sample)	4.5	1.8
NNAT (matched samples)	4.2	2.8

Citations: For the Otis-Lennon School Ability Test by Avant and O'Neal (1986); Stanford-Binet IV from Wasserman (2000); Woodcock-Johnson III race differences from Edwards & Oakland (2006) and ethnic differences from Sotelo-Dynega, Ortiz, Flanagan & Chaplin (2013); CogAT7 from Carman, Walther and Bartsch (2018); WISC-V from Kaufman, Raiford & Colson (2016); CAS from Naglieri, Rojahn, Matto & Aquilino (2005); CAS-2 from Naglieri, Das & Goldstein, 2014; Naglieri Nonverbal Ability Test (Naglieri & Ronning, 2000).

From: Brulles, D., Lansdowne, K. & Naglieri, J. A. (2022). Ensuring Equity: Identifying and Serving All Gifted Students Using the Naglieri Tests of General Ability. Minneapolis, MN: Free Spirit Publishing. And Naglieri, J. A. & Otero, T. M. (2017). Essentials of CAS2 Assessment. New York: Wiley.

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# WE CAN DO BETTER

## Your Thoughts or ?

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### My Professional Journey

- An Awakening About Traditional Intelligence Tests

### A Theory Based on Brain Function

- Thinking vs Knowing and Social Justice

### From PASS to CAS2

- A Different View of People

### Research Update

- PASS and Equity – Measure Thinking not Knowing
- To *g* or not to *g*

### Eligibility Determination

- What to use

### Reasons To Change

- Validity of PASS Theory

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Shift from  
Traditional  
To Second  
Generation  
Intelligence Tests

→ Wechsler, et al

→ Cognitive Assessment System 2<sup>nd</sup> Edition

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## Intelligence as Neurocognitive Functions

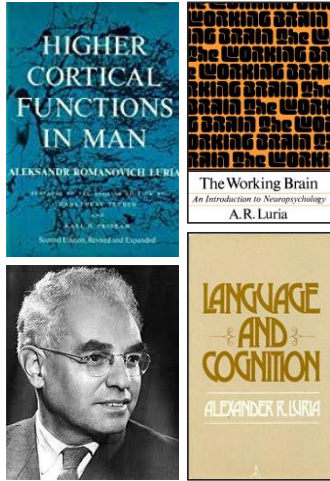
- In my first working meeting with JP Das (February 11, 1984) we proposed that intelligence was better REinvented as neurocognitive processes and we began development of the **Cognitive Assessment System** (Naglieri & Das, 1997).
- We conceptualized intelligence as Planning, Attention, Simultaneous, and Successive (PASS) neurocognitive processes based on Luria's concepts of brain function.



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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'

NOTE: Easy to understand concepts!

# Neuropsychological Correlates of PASS

Naglieri, J. A., & Otero, T. M. Redefining Intelligence as the PASS Theory of Neurocognitive Processes.

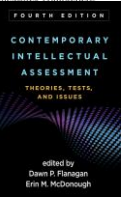
## CHAPTER 6

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

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 (Pucker & 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 appropriate for diverse populations (Naglieri & Otero, 2011, 2017).

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 instruments briefly in Chapter 15 of this book. The PASS theory and its operationalization in these measures are based on a neurocognitive perspective from that of traditional but, in part, subsets requiring knowledge). These batteries, the Army mental testing program and Yerkes (1920) PASS theory, as operationalized in the CAS2, has created an open field of intelligence and ability testing based on a theory of intelligence that is based on the theory of intelligence defined by the test, not the content of the test, not the content of the

measures. Facilities and



## 28 Cognitive Assessment System: Redefining Intelligence From a Neuropsychological Perspective

Jack A. Naglieri and Tulio M. Otero

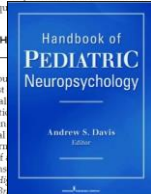
### INTRODUCTION

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 assess brain damage. Neuropsychological tests, however,

Such tools should not only evaluate the underlying processes necessary for efficient thinking and behavior but also provide for the development of effective interventions and address the p

### FROM NEUROPSYCHOLOGY TO ASSESSMENT

Luria's theoretical account perhaps one of the most (2008). Luria's conceptual of brain-behavior relationships that the clinician the brain, the functional syndromes and impair and clinical methods of theoretical formulations later in works such as H (1980) and *The Working B* as a functional mosaic, the parts of which interact in dif-



# PASS Theory Based on Luria's Concept of Functional Units

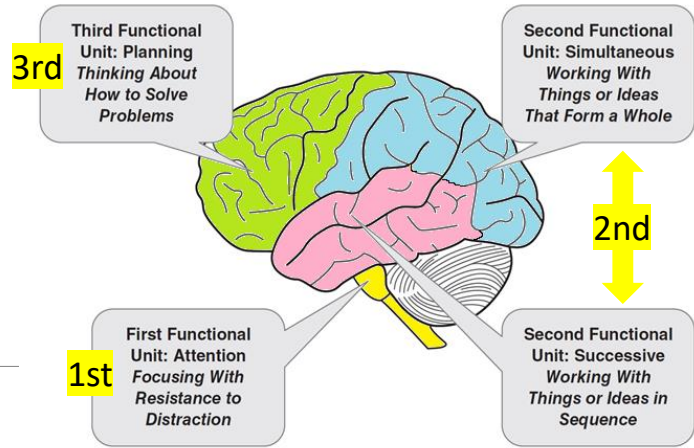


Figure 1.2 Three Functional Units and Associated Brain Structures

From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

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# PASS Theory Based on Brain Function – Planning

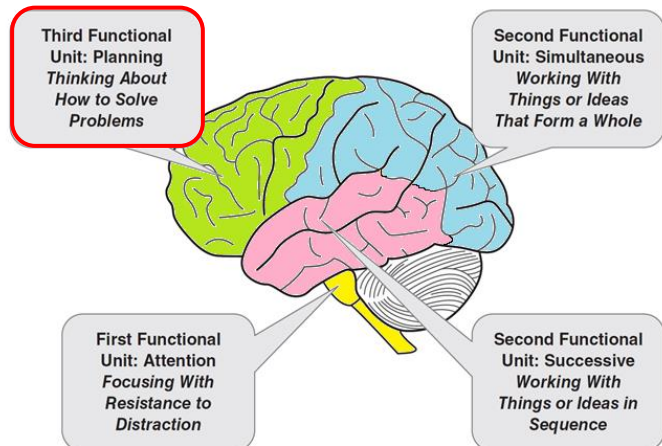


Figure 1.2 Three Functional Units and Associated Brain Structures

From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

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## PASS Theory: Planning

- Planning is a term used to describe a neurocognitive function similar to metacognition and executive function
- Planning is needed for setting goals, making decisions, predicting the outcome of one's own and others actions, impulse control, strategy use and retrieval of knowledge
- Planning helps us make decisions about how to solve any kind of a problem from academics to social situations and life in general
- Math calculation, written expression, etc

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## Planned Codes Page 1

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				

- Jack Jr. at age 5
- Child fills in the codes in the empty boxes
- After being told the test requirement, examinees are told: "You can do it any way you want"

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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

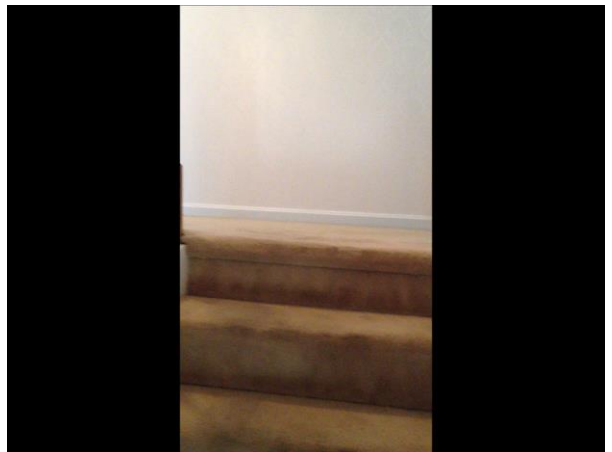
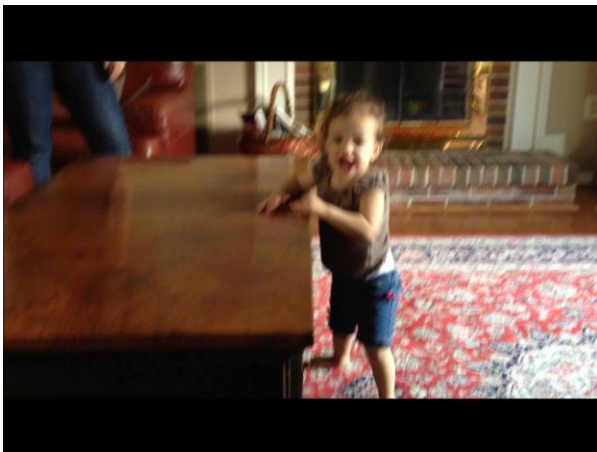
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Planning Raw Score

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## A 13 month old's Plan      At 19 months Planning & Knowledge



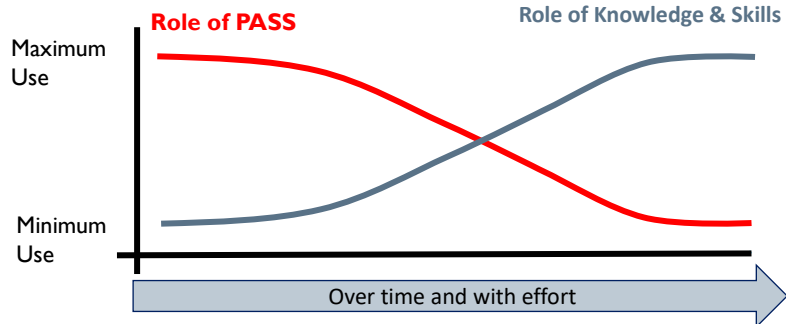
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# Planning Learning Curves

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



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

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# Math strategies stimulate thinking

Name \_\_\_\_\_

**Doubles and Near Doubles**

double      How many are there?      near double

$8 + 8 = 16$        $8 + 9 = 17$

Ring the double. Add

1.  $6 + 6 = 12$        $5 + 5 = 10$   
 $6 + 7 = 13$        $5 + 6 = 11$

3.  $7 + 7 = 14$        $4 + 4 = 8$   
 $7 + 8 = 15$        $4 + 5 = 9$

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

three hundred thirty-five 335

This work sheet encourages the child to use strategies (plans) in math such as: "If  $8 + 8 = 16$ , then  $8 + 9$  is 17"

**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.

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## PASS Theory Based on Brain Function — Attention

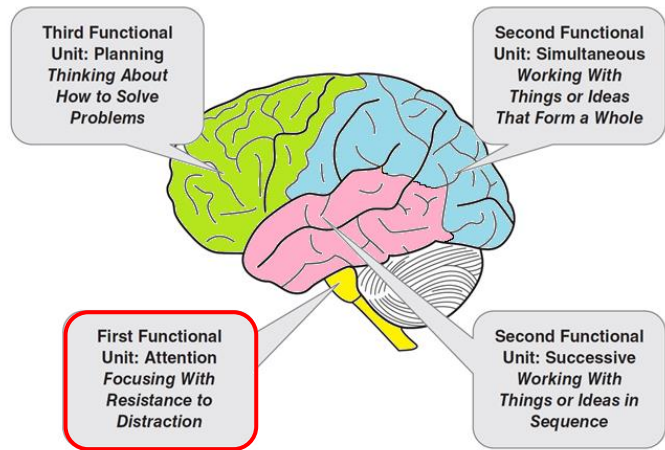


Figure 1.2 Three Functional Units and Associated Brain Structures  
From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

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## PASS Theory: Attention

- Attention is a basic psychological process we use to
  - selectively attend to some stimuli and ignores others
  - Focus our cognitive activity
  - Selective attention
  - Resistance to distraction
  - Listening, as opposed to hearing

RED	RED	BLUE
YELLOW	YELLOW	RED
BLUE	RED	YELLOW
BLUE	BLUE	BLUE
YELLOW	BLUE	YELLOW

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## Expressive Attention – Italian and Korean versions

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

빨강	파랑	초록	노랑
노랑	초록	빨강	파랑
빨강	노랑	노랑	초록
초록	파랑	초록	빨강
초록	노랑	빨강	노랑

37

## 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

38

38

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



leave school

11. 3:15 p.m.

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.

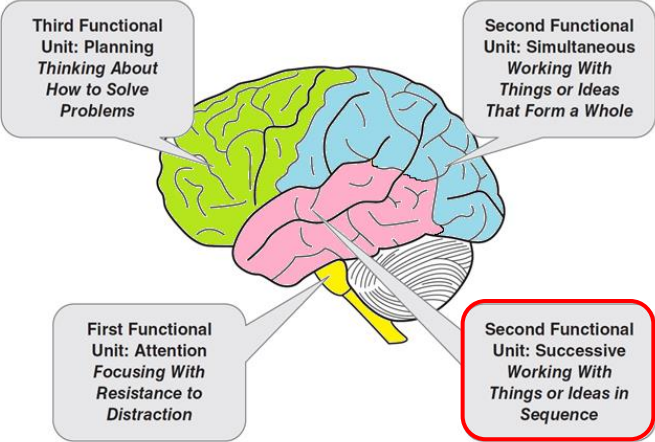
12. 6:22 p.m.

13. 3:50 p.m.

## Attention

READING COMPREHENSION IS DIFFICULT BECAUSE OF THE SIMILARITY OF THE OPTIONS

## PASS Theory Based on Brain Function – Successive Processing



**Third Functional Unit: Planning**  
Thinking About How to Solve Problems

**Second Functional Unit: Simultaneous**  
Working With Things or Ideas That Form a Whole

**First Functional Unit: Attention**  
Focusing With Resistance to Distraction

**Second Functional Unit: Successive**  
Working With Things or Ideas in Sequence

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

## PASS 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
  - Recall a series of words
  - Decoding words
  - Letter-sound correspondence
  - Phonological tasks
  - Understanding the syntax of sentences
  - Comprehension of written instructions

Recall of Numbers in Order  
Successive Processing

4 3 8 6 1

41

41

## Successive and Syntax

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

42

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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.

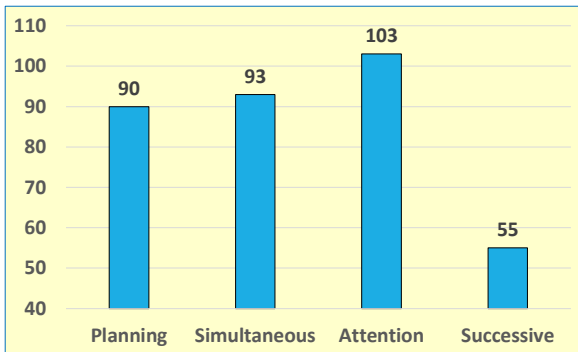
During the past month, how often did the child or adolescent . . .

	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

# PASS and Handwriting

➤ Acquisition of handwriting demands Successive processing



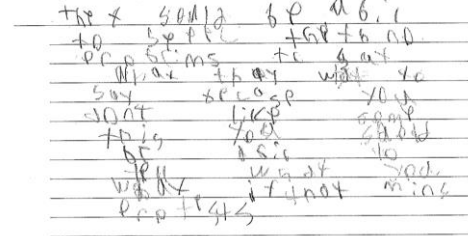
The First Amendment, 1791

"Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press, of the right of the people peaceably to assemble, and the petition the government for a redress of grievances."

Prompt:

After reading the Case Background and the First Amendment – Do you think the school has the right to censor symbolic speech or do people have the right to use symbolic speech to protest government?

Please support your answer with cited evidence from the Case Background, and complete a 3 paragraph response to the prompt.



## PASS Theory Based on Brain Function - Simultaneous Processing

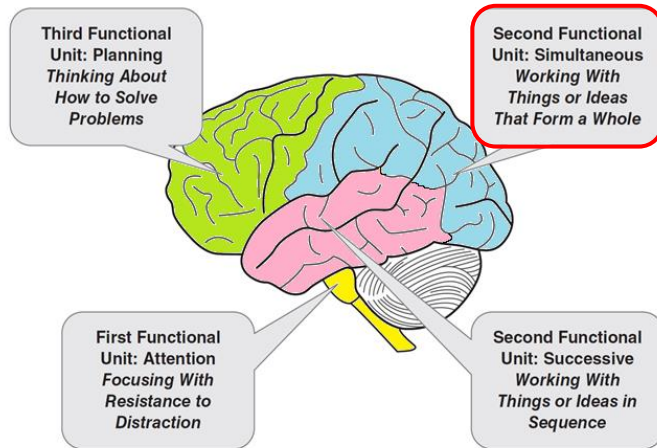


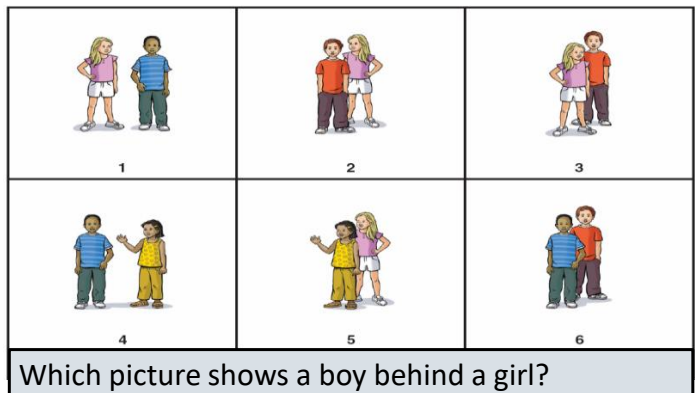
Figure 1.2 Three Functional Units and Associated Brain Structures  
From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

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## PASS Theory: Simultaneous

- **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



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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

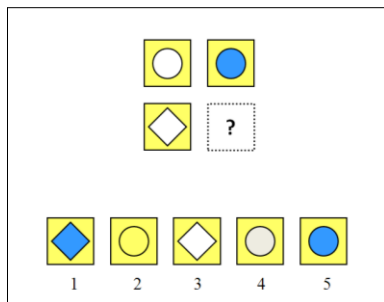
— + — + — + — + — =   
Simultaneous Raw Score

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## Thinking vs Knowing

Solving these analogies demands the same kind of thinking



Girl is woman as boy is to \_\_\_\_?

C<sup>7</sup> is to F as E<sup>7</sup> is to \_\_\_\_?

3 is to 6 as 4 is to \_\_\_\_?

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## And Consider this...

Why do  
*different* tasks  
use the *same*  
PASS process?



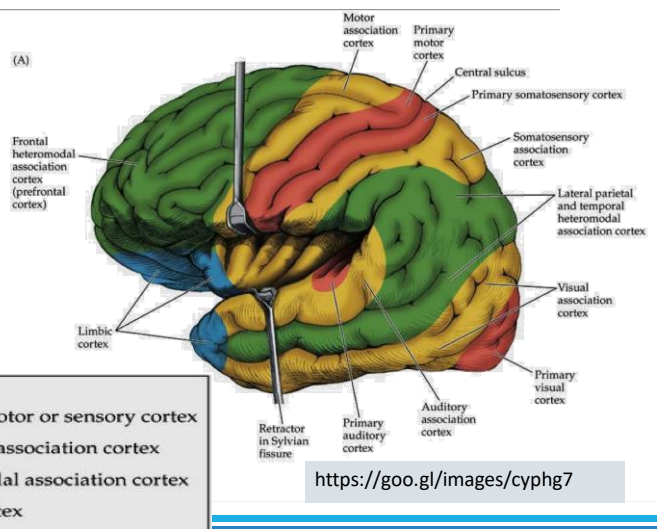
- Even though the tasks were different in content (shapes, words, numbers & musical notations) and modality (auditory and visual), they required **Simultaneous** processing!

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## Heteromodal Association Cortex (Goldberg, 2006)

- Our brains *merge stimuli* coming in from the senses (unimodal association cortex) into one stream of information in the **Heteromodal association cortex**
- (green areas)



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## PASS Provides a Common Language

- Psychologists, teachers, parents, and students can all use a common language to describe abilities without the esoteric terms we have used for years – NO psychobabble

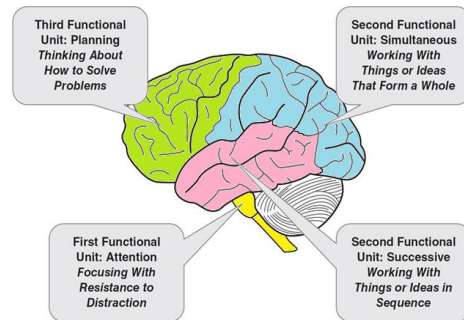


Figure 1.2 Three Functional Units and Associated Brain Structures

From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

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## CAS2 Measures Thinking (PASS) 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*

I need a PLAN !



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WE CAN DO BETTER



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## PASS → CAS2



### My Professional Journey

- An Awakening About Traditional Intelligence Tests

### A Theory Based on Brain Function

- Thinking vs Knowing and Social Justice

### From PASS to CAS2

- A Different View of People

### Research Update

- PASS and Equity – Measure Thinking not Knowing
- To *g* or not to *g*

### Eligibility Determination

- What to use

### Reasons To Change

- Validity of PASS Theory

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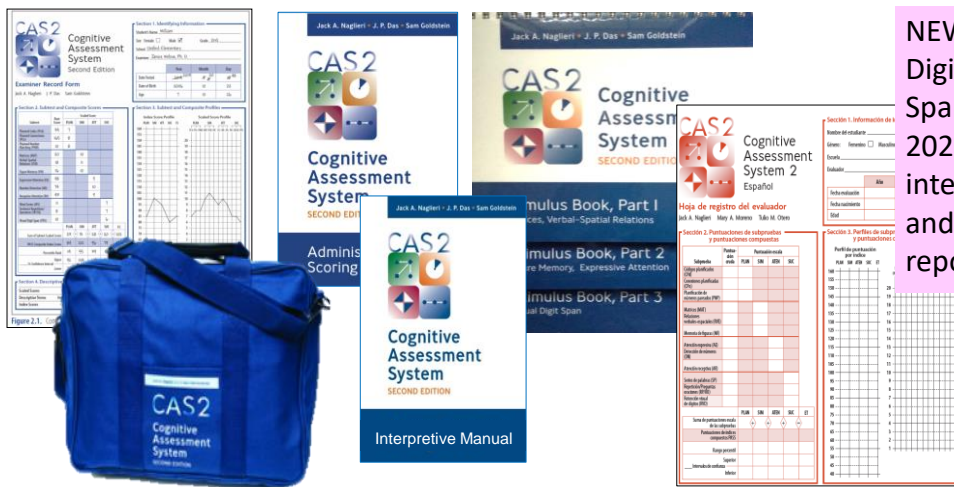
# PASS Comprehensive System

(Naglieri, Das, & Goldstein, 2014)

- **CAS2 Core & Extended English & Spanish** for comprehensive Assessment
- **CAS2 Brief** for re-evaluations, instructional planning, gifted screening
- **CAS2 Rating Scale** for teacher ratings

<p><b>CAS2 Rating Scale</b> (4 subtests)</p> <p><b>Total Score</b> Planning Simultaneous Attention Successive</p> 	<p><b>CAS2 Brief</b> (4 subtests 20 minutes)</p> <p><b>Total Score</b> Planning Simultaneous Attention Successive</p> 	<p><b>CAS2 Core</b> (8 subtests 40 minutes)</p> <p><b>Full Scale</b> Planning Simultaneous Attention Successive</p> 	<p><b>CAS2 Extended</b> (12 subtests 60 minutes)</p> <p><b>Full Scale</b> Planning Simultaneous Attention Successive</p> <p>Supplemental Scales Executive Function Working Memory Verbal / Nonverbal Visual / Auditory Speed / Fluency</p> 
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# CAS2 for (Ages 5-18 yrs.)



The collage displays various components of the CAS2 system:
 

- Examiner Record Forms (Second Edition)
- Administration and Scoring Manual (Second Edition)
- Interpretive Manual (Second Edition)
- Stimulus Books, Part 1 (Verbal-Spatial Relations), Part 2 (Working Memory, Expressive Attention), and Part 3 (Digit Span)
- Spanish version materials: Hoja de registro del evaluador and Hoja de registro de calificación y puntuaciones compuestas.
- A blue carrying bag with the CAS2 logo.

**NEW! CAS2 Digital**(English and Spanish) coming in 2021 with integrated scoring and narrative report

# CAS2 Online Score & Report

<http://www.proedinc.com/customer/ProductView.aspx?ID=7277>

- ▶ Enter data at the subtest level or enter subtest raw scores
- ▶ Online program converts raw scores to standard scores, percentiles, etc. for all scales.
- ▶ A narrative report with graphs and scores is provided

**CAS2: Online Scoring and Report System (1-Year Base Subscription)** (14311)  
 This product requires a check of customer qualifications. Click [here](#) to download qualifications form. TO ORDER, CALL: 800-897-3202.

Price: \$199.00

**NEW**

**NOW AVAILABLE!**

Ages: 5 through 18 years  
 Testing Time: 40 to 60 minutes  
 Administration: Individual

The new PC, Mac™, and iPad™ compatible CAS2 Online Scoring and Report System program is an efficient and easy way to obtain CAS2 scores and corresponding narrative.

**ORDERING OPTIONS:**

- CAS2: Online Scoring and Report System (Add-on 5-User License) \$69.00
- CAS2: Online Scoring and Report System (Annual Renewal) \$69.00

**Use CAS2 Online Scoring and Report System for:**

- converting CAS2 subtest raw scores into standard scores, percentile ranks, descriptive terms, and age equivalents;
- generating PASS and Full Scale composite scores;
- comparing CAS2 subtest and PASS scale scores to identify significant intra-individual differences;
- providing a pdf report of CAS2 performance; and
  - Sample Interpretive Report
  - Sample Score Summary
- providing intervention options.

**Ordering options:**

- CAS2 Online Scoring and Report System first-time base subscription provides one-year unlimited online scoring and report access for up to 5 users.
- Annual base subscription renewal provides one-year unlimited online scoring and report access for up to 5 users.

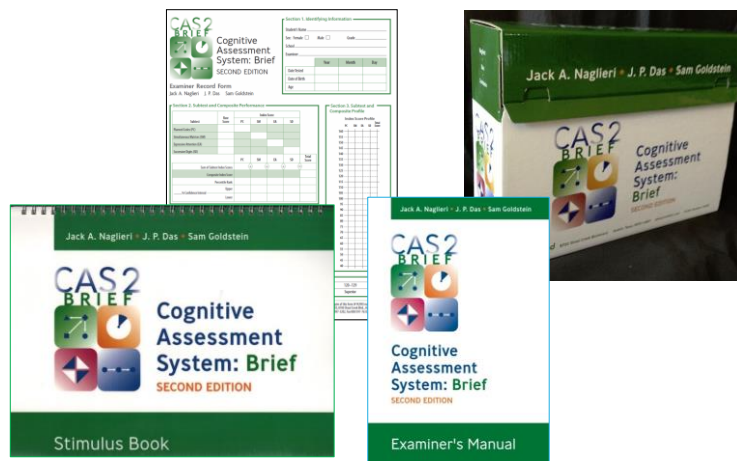
57

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# CAS2: Brief for Ages 4-18 years

For special educators and others with some assessment training

- 4 subtests (20 minutes)
- PASS and Total Scales provided



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**CAS2 BRIEF**  
Cognitive Assessment System: Brief  
SECOND EDITION

Examiner Record Form  
Jack A. Naglieri J. P. Das Sam Goldstein

**Section 1. Identifying Information**  
Student's Name: Tommy  
Sex: Female  Male  Grade: 1st  
School: Parkview Elementary  
Examiner: R. Durham, PhD

Date Tested	Year: 2009	Month: 11	Day: 22
Date of Birth	Year: 2009	Month: 11	Day: 22
Age	Year: 0	Month: 0	Day: 0

**Section 2. Subtest and Composite Performance**

Subtest	Raw Score	Index Score				Total Score
		PC	SM	EA	SD	
Planned Codes (PC)	112	112				
Simultaneous Matrices (SM)	100		100			
Expressive Attention (EA)	96			96		
Successive Digits (SD)	7				82	
Sum of Subtest Index Scores		112	100	96	82	390
Composite Index Score						96
Percentile Rank		77	50	40	12	40
90% Confidence Interval		Upper: 118	111	107	96	104
		Lower: 105	84	84	72	88

**Section 3. Subtest and Composite Profile**

**Section 4. Subtest Comparisons**

Subtest	Index Score	Z-value	95% CI	Strength Weakness	N in Sample
Planned Codes (PC)	112	14.5	(S) NK	ST WK	151
Simultaneous Matrices (SM)	100	2.5	Sr (S)	ST WK	82.8
Expressive Attention (EA)	96	-1.5	Sr (S)	ST WK	87.8
Successive Digits (SD)	82	-15.5	(S) NK	ST (NK)	14.2
Subtest mean	97.5				

**Section 5. Descriptive Terms**

Index Scores	<70	70-79	80-89	90-109	110-119	120-129	≥130
Descriptive Terms	Very Poor	Poor	Below Average	Average	Above Average	Superior	Very Superior

Figure 3.1. Example of page 1 of the CAS2: Brief Examiner Record Form, completed for Tommy.

# CAS2: Brief

- Give in 20 minutes
- Yields PASS and Total standard scores (Mn 100, SD 15)
- Directions for administration are in the Record Form
- All items are different from CAS2
  - Planned Codes
  - Simultaneous Matrices
  - Expressive Attention
  - Successive Digits (forward only)

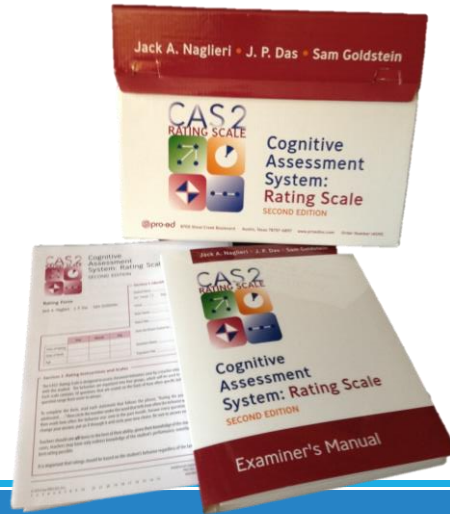
## Alternative High School

- Small school in medium sized city in the west
- Special education faculty administered CAS2: Brief to their students and found nearly ALL had a weakness in some PASS area
- Many undetected learning disabilities are suggested by these data

CAS2: Brief Standard Scores				
	Planning	Attention	Simultaneous	Successive
1	133	91	103	125
2	94	82	94	78
3	61	91	90	100
4	91	92	97	100
5	70	83	100	70
6	65	75	66	50
7	40	89	68	80
8	87	87	87	85
9	89	85	90	70
10	96	103	101	85
11	59	61	62	55
12	99	98	105	125
13	56	82	92	85
14	103	83	92	80
15	97	99	100	115
16	94	89	99	90
17	95	76	97	122
18	81	98	70	75
19	96	105	100	95
20	75	89	98	55
21	81	79	104	110
22	77	85	100	80
23	52	81	80	65
24	94	82	82	100
25	56	145	106	115
26	86	95	75	80
27	80	74	82	75
28	134	89	107	85
29	96	83	85	100
30	88	79	73	80
31	64	129	98	121
32	98	118	85	75
33	85	97	75	80
34	98	107	102	83
35	64	91	90	65
36	83	91	93	60
MN	83.8	91.2	90.2	86.5
SD	20.1	15.6	12.4	20.4

# CAS2 Rating Scales (Ages 4-18 yrs.)

- The CAS2: Rating measures behaviors associated with PASS constructs
- Completed by teachers and can be used by psychologists, special educators and regular educators



# CAS2 Rating Scales

- The CAS2: Rating form contains 40 items
- 10 items for each PASS scale
- PASS and Total scales are set to have a mean of 100 and standard deviation of 15

**Section 1: Identifying Information**

Student's Name: \_\_\_\_\_  
 Sex:  Male  Female Grade: \_\_\_\_\_  
 School: \_\_\_\_\_  
 Room's Name: \_\_\_\_\_  
 Room's Size: \_\_\_\_\_  
 Rate for Student for \_\_\_\_\_ (years/months)  
 Examiner's Name: \_\_\_\_\_  
 Examiner's Title: \_\_\_\_\_

**Section 2: Rating Instructions and Scales**

The CAS2: Rating Scale is designed to assess classroom behaviors seen by a teacher who has had at least 4 weeks of experience with the student. The behaviors are organized into four groups, which will be used to obtain scores for four different scales. Each scale contains 10 questions that are scored on the basis of how often specific behaviors were seen. The scores for each question range from never to always.

To complete the form, read each statement that follows the phrase, "During the past month, how often did the child or adolescent..." then circle the number under the word that tells how often the behavior was seen. Read each question carefully, then mark how often the behavior was seen in the past month. Answer every question without skipping any. If you want to change your answer, put an X through it and circle your new choice. Be sure to answer every question.

Teachers should rate all items to the best of their ability, given their knowledge of the student and the student's peers. In some cases, teachers may have only indirect knowledge of the student's performance; nevertheless, the teacher should provide the best rating possible.

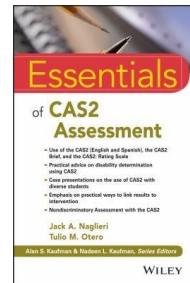
It is important that ratings should be based on the student's behavior regardless of the language or medium used.

Additional copies of this form of CAS2 may be purchased from PRO-ED, 5700 North Loop West, Austin, TX 78751-1099. <http://www.pro-ed.com>

14. work well with partners and groups?  1  2  3  4  5  
 15. use how objects and ideas are alike?  1  2  3  4  5  
 16. work well with physical objects?  1  2  3  4  5  
 17. like to use visual materials?  1  2  3  4  5  
 18. use the links among several things?  1  2  3  4  5  
 19. should interest in complex shapes and patterns?  1  2  3  4  5  
 20. recognize faces easily?  1  2  3  4  5

## CAS2, CAS2-Espanol, CAS2: Brief & CAS2 Rating Scale

- This book is the most complete discussion of PASS theory and its measurement
- Chapters cover all versions of the CAS2 as well as the online scoring and report writer
- Administration, scoring, interpretation
- Reliability, validity (PASS profiles, evidence of test fairness,
- Discrepancy Consistency Method for SLE
- Intervention planning and clinical case studies



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## Elephant in the room

- Traditional intelligence tests require too much knowledge
  - We should be measuring THINKING (intelligence) in a way that is not dependent upon academic skills like vocabulary and arithmetic
- Traditional intelligence tests were not developed on the basis of a theory of intelligence (i.e. the definition of thinking)
  - Theory defines what a test of intelligence should test
  - Theory provides the basis of test interpretation
  - It is the test authors' responsibility to inform the user how to interpret the intelligence test scores NOT the user

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# CASE by Tulio Otero: ALEJANDRO (C.A. 7-0 GRADE 1)

## REASON FOR REFERRAL

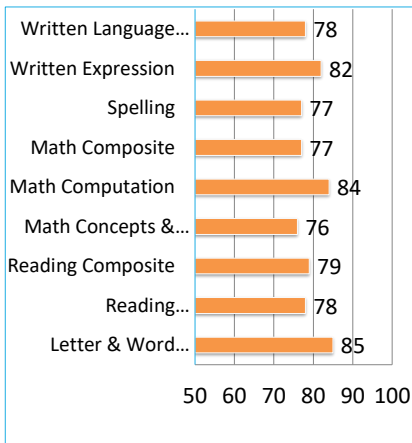
- Does he have ID?
- Academic:
  - Could not identify letters/sounds
  - October. Could only count to 39
  - All ACCESS scores of 1
- Behavior:
  - Difficulty following directions
  - Attention concerns
  - Refusal/defiance



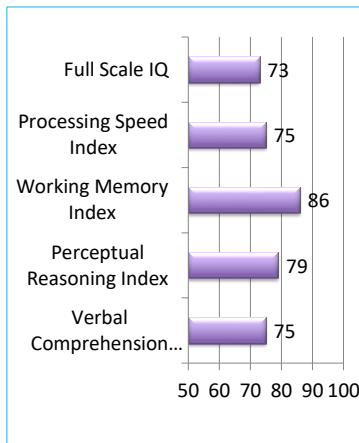
Note: this is not a picture of Alejandro

## WISC-IV ASSESSMENT

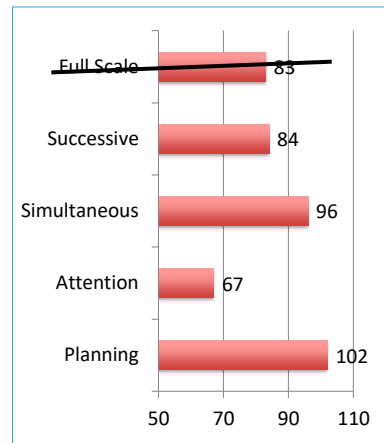
### KTEA2



### WISC-IV

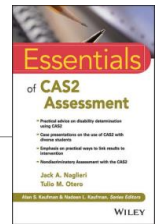
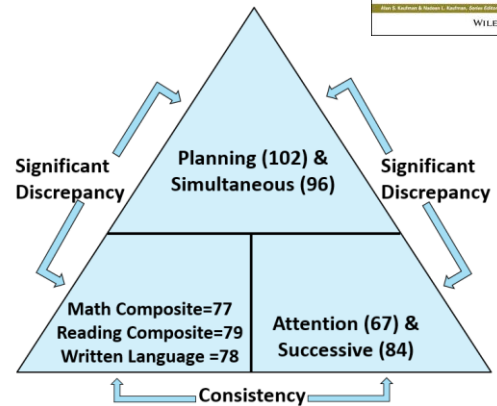


### CAS2



## Alejandro and PASS (by Dr. Otero)

- ▶ Alejandro is not a slow learner.
- ▶ He has good processing scores:
  - ▶ Simultaneous = 96 and Planning = 102
- ▶ He has a “disorder in one or more of the basic psychological processes”
  - Attention = 67 and Successive = 84
- ▶ Using the Discrepancy Consistency Method (1999, 2017) he meets criteria for SLD (see Naglieri & Otero, 2017).



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## Intervention Protocol (Naglieri & Kryza, 2019)

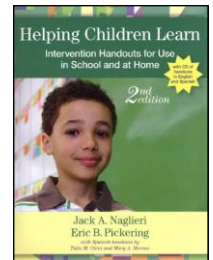
1. Help child understand their PASS strengths and challenges (be intentional & transparent)
2. Encourage Motivation & Persistence (student's mindset)
3. Encourage strategy use (build skill sets)
4. Encourage independence and self efficacy (metacognition, self assessment & self correction)

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## Be Intentional and Transparent

- Give Alejandro the PASS handouts
  - *“The test showed that your brain is strong in seeing the BIG PICTURE (Simultaneous Processing) and recognizing sequences. (Successive Processing) Does that make sense to you?”*
- Explain to him the PASS areas that are challenges for him
  - The part of your brain that makes learning challenging for you is the part that PLANS (PFC).
  - We’re going to work on using your strengths and helping you develop your PLANNING skills.



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## Your Questions or Thoughts?



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## CAS2 is Different



### My Professional Journey

- An Awakening About Traditional Intelligence Tests

### A Theory Based on Brain Function

- Thinking vs Knowing and Social Justice

### From PASS to CAS2

- A Different View of People

### Research Update

- PASS and Equity – Measure Thinking not Knowing
- To *g* or not to *g*

### Eligibility Determination

- What to use

### Reasons To Change

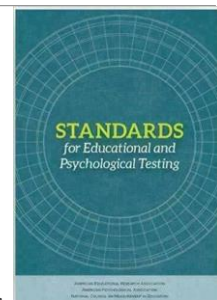
- Validity of PASS Theory

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## Differences in Mean Scores = Impact

- According to the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014), **equitable assessment** provides examinees *an equal opportunity to display one's ability* and ...
- And ... **if a person has had limited opportunities to learn the content in a test of intelligence, that test may be considered unfair** if it penalizes students for not knowing the answers **even if the norming data do not demonstrate test bias.**



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# Race and Ethnic Differences in Ability Tests

Note: Even though these tests may not show psychometric bias (Worrell, 2019) some do yield mean score differences.

Mean Score Differences in Intelligence Test Scores by Race & Ethnicity.

	Race	Ethnicity
<b>Tests that require knowledge</b>		
Otis-Lennon School Ability Test (school system)	13.6	
Stanford-Binet IV (normative sample)	12.6	
WISC-V (normative sample)	11.6	9.1
WJ- III (normative sample)	10.9	10.7
CogAT7 (Nonverbal scale)	11.8	7.6
WISC-V (statistical controls normative sample)	8.7	5.4
<b>Tests that require minimal knowledge</b>		
CAS-2 (normative sample)	6.3	4.5
CAS (statistical controls normative sample)	4.8	4.8
CAS-2 (statistical controls normative sample)	4.5	1.8
NNAT (matched samples)	4.2	2.8

Citations: For the Otis-Lennon School Ability Test by Avant and O'Neal (1986); Stanford-Binet IV from Wasserman (2000); Woodcock-Johnson III race differences from Edwards & Oakland (2006) and ethnic differences from Sotelo-Dynega, Ortiz, Flanagan & Chaplin (2013); CogAT7 from Carman, Walther and Bartsch (2018); WISC-V from Kaufman, Raiford & Coalson (2016); CAS from Naglieri, Rojahn, Matto & Aquilino (2005); CAS-2 from Naglieri, Das & Goldstein, 2014; Naglieri Nonverbal Ability Test (Naglieri & Ronning, 2000).  
 From: Brulles, D., Lansdowne, K. & Naglieri, J. A. (2022). Ensuring Equity: Identifying and Serving All Gifted Students Using the Naglieri Tests of General Ability. Minneapolis, MN: Free Spirit Publishing. And Naglieri, J. A. & Otero, T. M. (2017). Essentials of CAS2 Assessment. New York: Wiley.

**WE CAN DO BETTER**

# Naglieri, Rojahn, Matto (2007)

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

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect  
Intelligence 35 (2007) 568–579

ELSEVIER INTELLIGENCE

## Hispanic and non-Hispanic children's performance on PASS cognitive processes and achievement<sup>☆</sup>

Jack A. Naglieri<sup>a,\*</sup>, Johannes Rojahn<sup>a</sup>, Holly C. Matto<sup>b</sup>

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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

# PASS scores – English and Spanish

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

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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 referred bilingual Hispanic children on the Planning, Attention, Simultaneous, Successive (PASS) theory as measured 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 differences were noted between the means of the English and Spanish versions for the Simultaneous and Successive processing scales; however, mean Full Scale scores were similar. Specific subtests within the Simultaneous and Successive scales were found to contribute to the differences between the English and Spanish versions of the CAS. Comparisons of the children's profiles of cognitive weakness on both versions of the CAS showed that these children performed consistently despite the language difference.

**Keywords:** bilingual assessment, intelligence, PASS Theory, Cognitive Assessment System, non-biased assessment

Means, SDs, *d*-ratios, Obtained and Correction Correlations Between the English and Spanish Version of the CAS ( $N = 55$ ).

	CAS English		CAS Spanish		<i>d</i> -ratio	Correlations	
	Mean	SD	Mean	SD		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

- Very similar scores in both versions
- >90% agreement between PASS weakness & strengths using English and Spanish CAS

# Otero, Gonzales, Naglieri (2013)

- Very similar PASS scores when giving the CAS English and Spanish versions
- >90% agreement between PASS weakness & strengths using English and Spanish CAS

APPLIED NEUROPSYCHOLOGY: CHILD, 0: 1-9, 2012  
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 ISSN: 2162-2965 print/2162-2973 online  
 DOI: 10.1080/21622965.2012.670547

Psychology Press  
Taylor & Francis Group

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

Tulio M. Otero  
*Departments of Clinical Psychology and School Psychology, Chicago School of Professional Psychology,  
 Chicago, Illinois*

Lauren Gonzales  
*George Mason University, Fairfax, Virginia*

Jack A. Naglieri  
*University of Virginia, Fairfax, Virginia*

This study examined the performance of referred Hispanic English-language learners (N = 40) on the English and Spanish versions of the *Cognitive Assessment System* (CAS; Naglieri & Das, 1997). The CAS measures basic neuropsychological processes based on the Planning, Attention, Simultaneous, and Successive (PASS) theory (Naglieri & Das, 1997; Naglieri & Otero, 2011c). Full Scale (FS) scores as well as PASS processing scale scores were compared, and no significant differences were found in FS scores or in any of the PASS processes. The CAS FS scores on the English (M = 86.4, SD = 8.73) and Spanish (M = 87.1, SD = 7.94) versions correlated .94 (uncorrected) and .99 (corrected for range restriction). Students earned their lowest scores in Successive processing regardless of the language in which the test was administered. PASS cognitive profiles were similar on English and Spanish versions of the PASS scales. These findings suggest that students scored similarly on both versions of the CAS and that the CAS may be a useful measure of these four abilities for Hispanic children with underdeveloped English-language proficiency.

## Illinois School District U-46

Main question: Does the District's gifted program unlawfully discriminate against Hispanic Students?

The district with 42% Hispanics but only 2% of students in gifted were Hispanic.

IN THE UNITED STATES DISTRICT COURT  
 FOR THE NORTHERN DISTRICT OF ILLINOIS  
 EASTERN DIVISION

DANIEL, DINAH and DEANNA MCFADDEN, )  
 minors, by their parent and next friend, Tracy )  
 McFadden; KAREN, RODOLFO and KIARA )  
 TAPIA, minors, by their parent and next friend, )  
 Mariela Montoya; JOCELYN BURCIAGA, minor, )  
 by her parent and next friend, Griselda Burciaga; )  
 and KASHMIR IVY, minors, by their parent )  
 and next friend, Beverly Ivy; KRISTIANNE )  
 SIFUENTES, minors, by her parent and next )  
 friend, Irma Sifuentes, ) )

) )  
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Plaintiffs, ) No. 05 C 0760  
 v. )  
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BOARD OF EDUCATION FOR ILLINOIS )  
 SCHOOL DISTRICT U-46, )  
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Defendant. ) )

Judge Robert W. Gettleman

On July 11, 2013, Judge Robert Gettleman issued a decision holding that District U-46 intentionally discriminated against Hispanic students specific in their gifted programming (placement), and found problems with policies and instruments for screening and identification, (c) use of both verbal and math scores at arbitrary designated levels for screening and for identification, (d) use of weighted matrix, as well as content and criteria in weighted matrices that favored achievement and traditional measures, (e) too little reliance on a nonverbal test (Naglieri Nonverbal Ability Test) for admission to

# Wechsler vs CAS for Students with ID

- **WISC-III**
  - **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 resulting in Full Scale scores low enough to qualify as ID
- **CAS**
  - **Black** children earned *higher* scores on CAS than on the WISC-III because CAS DOES NOT HAVE TESTS OF KNOWLEDGE
  - **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.**

*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

# California

Many of you may already be familiar with the CAS1. Use of the CAS1 with an African-American student was successfully defended by our office before the Office of Administration ("OAH")<sup>4</sup>. Further in 2006, the Special Education Department of the California Department of Education presented a list of acceptable tests for African-American children and the CAS1 was included<sup>5</sup>. While the CAS2 is similar to the CAS1, the CAS2 provides an even more accurate picture with minorities.

Since *Larry P.* was decided we can more accurately assess cognitive ability. When educators are developing educational programming for students, a more comprehensive and accurate picture of the student will lead to more successful Individualized Education Programs. In lieu of indirect assessment through interviews and surveys about the student, we recommend using the CAS2 or other similar options. If you would like a list of similar options, one is available in footnote 4 or you may contact our office.

If you need any further assistance or advice, please feel free to contact our office.

- STEPHANIE VIRREY GUTCHER

This very difference - that the CAS2<sup>1</sup> is not reliant on knowledge and the IQ - is the reason these nontraditional tests are acceptable for assessing any student. The CAS2 correlates stronger to a student's cognitive ability than the IQ test, although it omits the achievement component. Moreover, the CAS2 identifies cognitive processing weaknesses with greater clarity than almost any other assessment tool.

*Education Law Updates are intended to alert clients to developments in legislation, opinions of courts and administrative bodies and related matters. They are not intended as legal advice in any specific situation. Please consult legal counsel as to how the issue presented may affect your particular circumstances.*

<sup>4</sup> Kern High v. Student, OAH Case Number 2014031032. In this particular instance, OAH approved the use of certain pieces of the CAS1. However, piecemealing is not legally defensible without a justified basis, and is no longer necessary.

<sup>5</sup> Holly Evans-Pomnitz and Bernard Yalton of the California Department of Education, Restoring *Larry P. v. Rife* - A CASP Convention 2006 Report. (PDF; Outside Source), February 2006. [http://www.caspsurvey.org/cv\\_56\\_15.asp](http://www.caspsurvey.org/cv_56_15.asp)

<sup>1</sup> District may consider. DA bar is available following the link in footnote 4.1





Journal Information  
Journal TOC

PsycoARTICLES: Journal Article

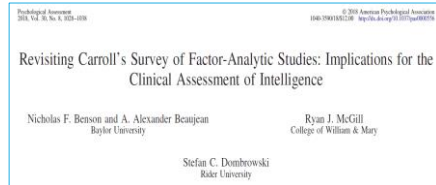
Structural validity of the Wechsler Intelligence Scale for Children–Fifth Edition: Confirmatory factor analyses with the 16 primary and secondary subtests.

© Request Permissions

Canivez, Gary L., Watkins, Marley W., Dombrowski, Stefan C., Canivez, G. L., Watkins, M. W., & Dombrowski, S. C. (2017). Structural validity of the Wechsler Intelligence Scale for Children–Fifth Edition: Confirmatory factor analyses with the 16 primary and secondary subtests. *Psychological Assessment*, 29(4), 458–472. <https://doi.org/10.1037/pas0000358>

- ...The small portions of variance uniquely captured by [subtests]... render the group factors [scales] of questionable interpretive value independent of g (FSIQ general intelligence)
- Present CFA results confirm the EFA results (Canivez, Watkins, & Dombrowski, 2015); Dombrowski, Canivez, Watkins, & Beaujean (2015); and Canivez, Dombrowski, & Watkins (2015).

## Support for ‘g’



- The results of this study indicate that most **cognitive abilities specified in John Carroll's three-stratum theory have little-to-no interpretive relevance above and beyond that of general intelligence.**

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## Research Supports ‘g’ but little More

Benson, N. F., Beaujean, A. A., McGill, R. J., & Dombrowski, S. C. (2018). Revisiting **Carroll's Survey of Factor-Analytic Studies**: Implications for the Clinical Assessment of Intelligence. *Psychological Assessment*, 30, 8, 1028–1038.

Canivez, G. L., Watkins, M. W., & Dombrowski, S. C. (2017). Structural validity of the **Wechsler Intelligence Scale for Children–Fifth Edition**: Confirmatory factor analyses with the 16 primary and secondary subtests. *Psychological Assessment*, 29, 458–472.

Canivez, G. L., & McGill, R. J. (2016). Factor structure of the **Differential Ability Scales–Second Edition**: Exploratory and hierarchical factor analyses with the core subtests. *Psychological Assessment*, 28, 1475–1488. <http://dx.doi.org/10.1037/pas0000279>

Canivez, G. L., & McGill, R. J. (2016). Factor structure of the **Differential Ability Scales–Second Edition**: Exploratory and hierarchical factor analyses with the core subtests. *Psychological Assessment*, 28, 1475–1488. <https://doi.org/10.1037/pas0000279>

Canivez, G. L. (2008). Orthogonal higher order factor structure of the **Stanford-Binet Intelligence Scales–Fifth Edition** for children and adolescents. *School Psychology Quarterly*, 23, 533–541.

Dombrowski, S. C., **Canivez, G. L.**, & Watkins, M. W. (2017, May). Factor structure of the 10 **WISC–V** primary subtests across four standardization age groups. *Contemporary School Psychology*. Advance online publication.

Dombrowski, S. C., McGill, R. J., & Canivez, G. L. (2017). Exploratory and hierarchical factor analysis of the **WJ IV Cognitive** at school age. *Psychological Assessment*, 29, 394–407.

McGill, R. J., & **Canivez, G. L.** (2017, October). Confirmatory factor analyses of the **WISC–IV Spanish** core and supplemental Subtests: Validation evidence of the Wechsler and CHC models. *International Journal of School and Educational Psychology*. Advance online publication.

Watkins, M. W., Dombrowski, S. C., & **Canivez, G. L.** (2017, October). Reliability and factorial validity of the **Canadian Wechsler Intelligence Scale for Children–Fifth Edition**. *International Journal of School and Educational Psychology*.

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## Hierarchical Factor Structure of the Cognitive Assessment System: Variance Partitions From the Schmid–Leiman (1957) Procedure

Gary L. Canivez  
Eastern Illinois University

Orthogonal higher-order factor structure of the Cognitive Assessment System (CAS; Naglieri & Das, 1997a) for the 5–7 and 8–17 age groups in the CAS standardization sample is reported. Following the same procedure as recent studies of other prominent intelligence tests (Dombrowski, Watkins, & Brogan, 2009; Canivez, 2008; Canivez & Watkins, 2010a, 2010b; Nelson & Canivez, 2011; Nelson, Canivez, Lindstrom, & Hatt, 2007; Watkins, 2006; Watkins, Wilson, Kotz, Carbone, & Babula, 2006), three- and four-factor CAS exploratory factor extractions were analyzed with the Schmid and Leiman (1957) procedure using MacOrtho (Watkins, 2004) to assess the hierarchical factor structure by sequentially partitioning variance to the second- and first-order dimensions as recommended by Carroll (1993, 1995). Results showed that greater portions of total and common variance were accounted for by the second-order, global factor, but compared to other tests of intelligence CAS subtests measured less second-order variance and greater first-order Planning, Attention, Simultaneous, and Successive (PASS) factor variance.

**Keywords:** CAS, construct validity, hierarchical exploratory factor analysis, Schmid–Leiman higher-order analysis, structural validity

## Support for PASS Scales

- “...compared to the WISC–IV, WAIS–IV, SB–5, RIAS, WASI, and WRIT, the CAS subtests had less variance apportioned to the higher-order general factor ( $g$ ) and *greater proportions of variance apportioned to first-order (PASS...) factors.*”
- This is consistent with the subtest selection and construction in an attempt to measure PASS dimensions linked to PASS theory ... and neuropsychological theory (Luria).” (p. 311)

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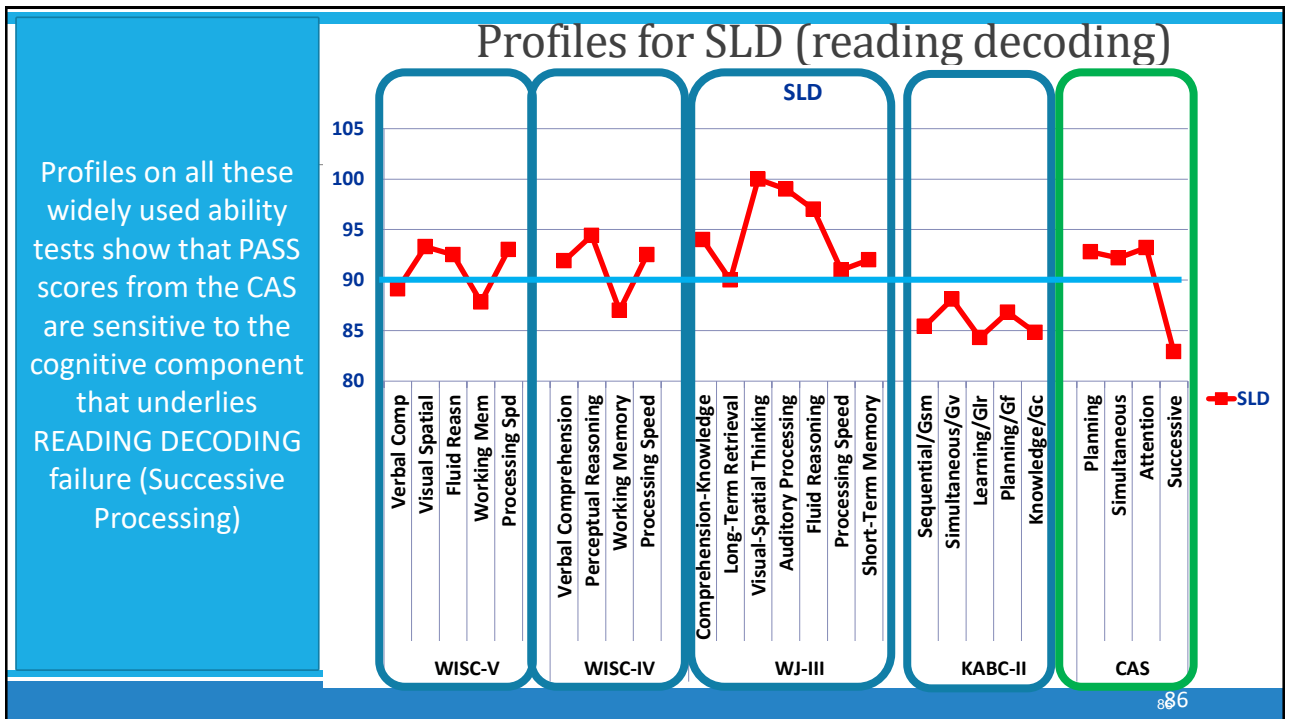
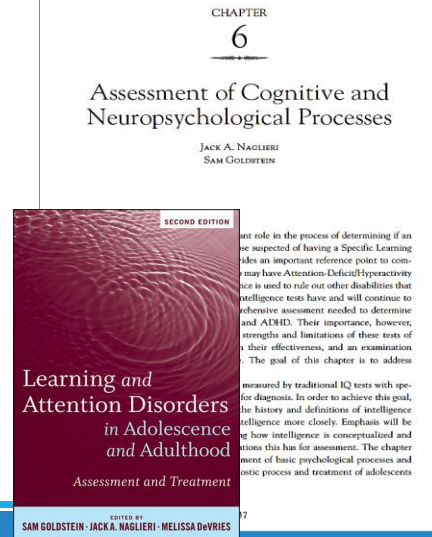
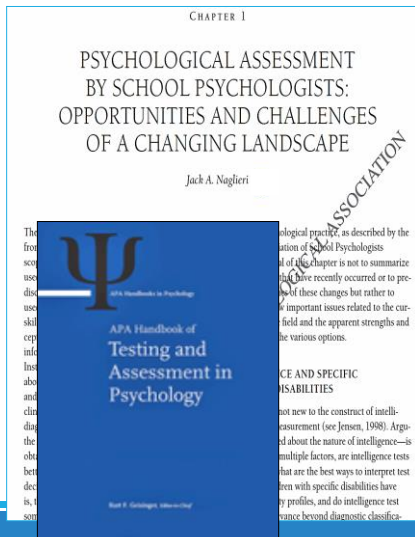
## PASS

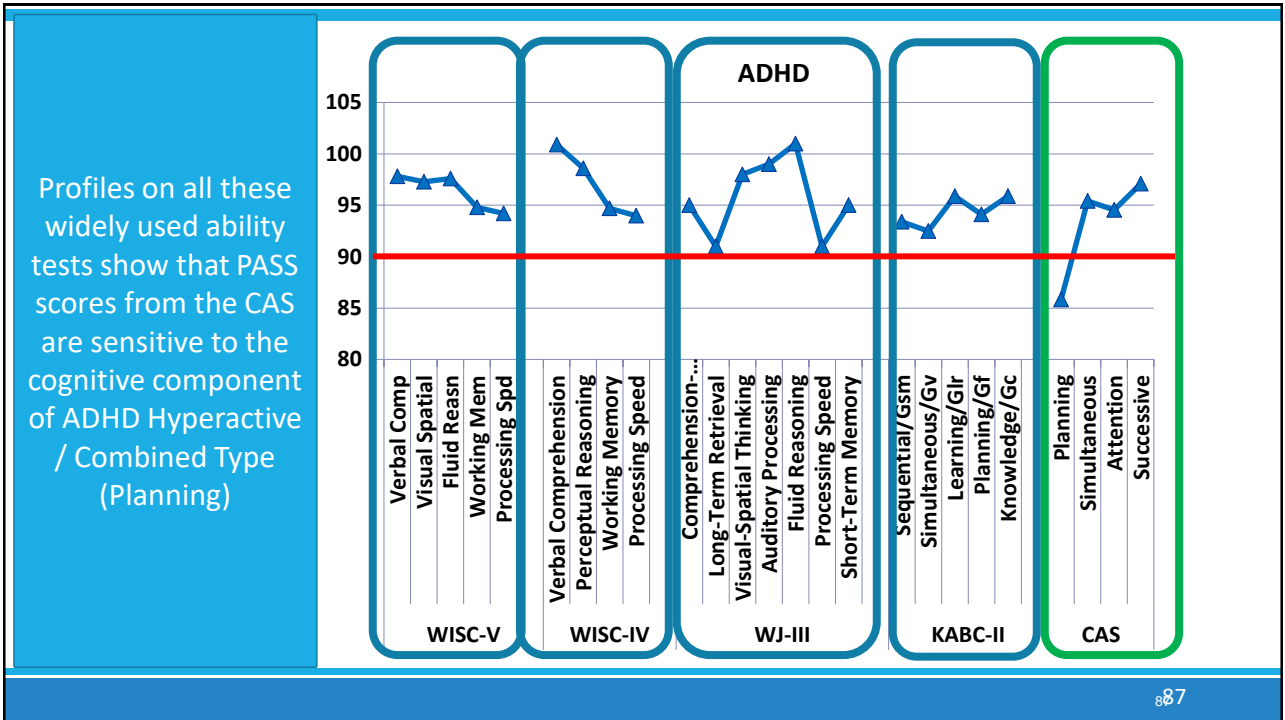


- Given that PASS scales CAN be interpreted it is important to know
  - if these scales yield PROFILES that can be used in a Pattern of Strengths and Weaknesses approach to eligibility determination AND
  - do PASS scores relate to achievement more than traditional intelligence tests?

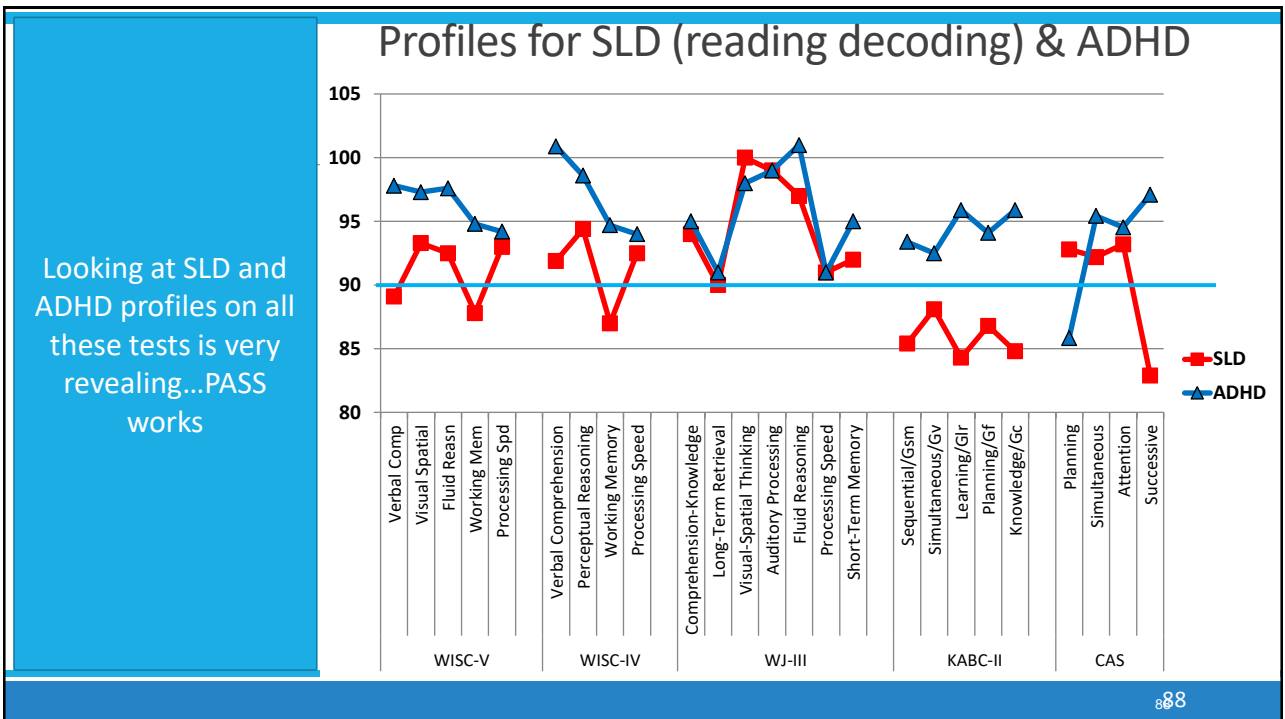
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# PASS Scales can be Interpreted and SHOULD be: Profiles





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# Research on PASS Profiles

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

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

Leesa V. Huang<sup>1</sup>, Achilles N. Bardos<sup>2</sup>, and Rik Carl D'Amato<sup>2</sup>

**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 megaculter 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 results of the LD sample

School Psychology Quarterly, Vol. 15, No. 4, 2000, pp. 419-433

## 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

“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.

# Research on PASS Profiles

➤ “the CAS...yields information that contributes to the differential diagnosis of students suspected of having a learning disability in writing”

## 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

Correspondence concerning this paper should be addressed to Gary L. Canivez, Ph.D., Department of Psychology, Eastern Illinois University, 600 Lincoln Avenue, Charleston, IL 61920-3099. Dr. Canivez can also be contacted via E-mail at gcanivez@eiu.edu or the World Wide Web at <http://www.eiu.edu/~gcanivez>. This handout is based on a manuscript presently submitted for publication so please do not reference without permission.

Journal of Psychoeducational Assessment  
2005, 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, 1998). 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 85% of the students as members of their respective groups.

• “the present study demonstrated the potential of the CAS to correctly identify students who demonstrated behaviors consistent with ADHD diagnosis.”

# Correlation with Achievement

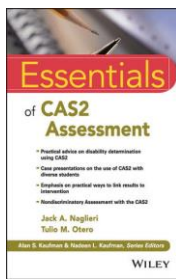
- When studying the relationships between intelligence tests and achievement there is a confounding factor...
  - Traditional tests have achievement in them !
  - That is called criterion contamination
- Measures of neurocognitive processes do not have academic content
- This is good for fair assessment, but does it limit the power of processing scores to predict achievement?

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# Correlations: We can do better!

Average correlations between IQ Scales with total achievement scores from *Essentials of CAS2 Assessment* Naglieri & Otero (2017)



Correlations Between Ability and Achievement			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			
CAS N=1,600	Knowledge/GC	.70	.59		
	WJ-III ACH	Planning			.57
	WJ-III ACH	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.

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

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Intelligence 79 (2020) 101431

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journal homepage: [www.elsevier.com/locate/intell](http://www.elsevier.com/locate/intell)

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**PASS theory of intelligence and academic achievement: A meta-analytic review**

George K. Georgiou<sup>a,\*</sup>, Kan Guo<sup>b,c,d</sup>, Nithya Naveenkumar<sup>a</sup>, Ana Paula Alves Vieira<sup>e</sup>, J.P. Das<sup>a</sup>

<sup>a</sup>University of Alberta, Canada  
<sup>b</sup>Jiangxi Normal University, China  
<sup>c</sup>Soochow University of Moring, Brazil

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ARTICLE INFO      ABSTRACT

**Keywords:**  
Intelligence  
Mathematics  
Meta-analysis  
PASS processes  
Reading

Although Planning, Attention, Simultaneous and Successive (PASS) processing theory of intelligence has been argued to offer an alternative look at intelligence and PASS processes - operationalized with the Cognitive Assessment System - have been used in several studies, it remains unclear how well the PASS processes relate to academic achievement. Thus, this study aimed to determine their association by conducting a meta-analysis. A random-effects model analysis of data from 62 studies with 93 independent samples revealed a moderate-to-strong relation between PASS processes and reading,  $r = 0.409$ , 95% CI = [0.363, 0.454], and mathematics,  $r = 0.461$ , CI = [0.405, 0.517]. Moderator analyses further showed that (1) PASS processes were more strongly related with reading and math in English than in other languages, (2) Simultaneous processing was more strongly related to math accuracy and problem solving than math fluency, (3) Simultaneous processing was more strongly related to problem solving than Attention, and (4) Planning was more strongly related to math fluency than Simultaneous processing. Age, grade level, and sample characteristics did not influence the size of the correlations. Taken together, these findings suggest that PASS cognitive processes are significant correlates of academic achievement, but their relation may be affected by the language in which the study is conducted and the type of mathematics outcome. They further support the use of intervention programs that stem from PASS theory for the enhancement of reading and mathematics skills.

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Georgiou, G., Guo, K., Naveenkumar, N., Vieira, A. P. A., & Das, J. P. (2019). PASS theory of intelligence and academic achievement: A meta-analytic review. *In press Intelligence*.

## PASS Research


- “The results clearly show that when CAS Full Scale is used it correlates **.60 with reading** and **.61 with mathematics**.”
- “These correlations are significantly stronger ... than the correlations reported in previous meta-analysis for other measures of intelligence (e.g., Peng et al., 2019; Roth et al., 2015)...(e.g., WISC) that include tasks (e.g., Arithmetic, Vocabulary)...”
- “if we conceptualize intelligence as ... **cognitive processes that are linked to the functional organization of the brain**” it leads to significantly higher relations with academic achievement.”
  - “and these processes have direct implications for instruction and intervention...”

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**WE CAN DO BETTER**

Questions about what you just heard

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**CAS2 is Different**

**My Professional Journey**

- An Awakening About Traditional Intelligence Tests

**A Theory Based on Brain Function**

- Thinking vs Knowing and Social Justice

**From PASS to CAS2**

- A Different View of People

**Research Update**

- PASS and Equity – Measure Thinking not Knowing
- To *g* or not to *g*

**Eligibility Determination**

- What to use

**Reasons To Change**

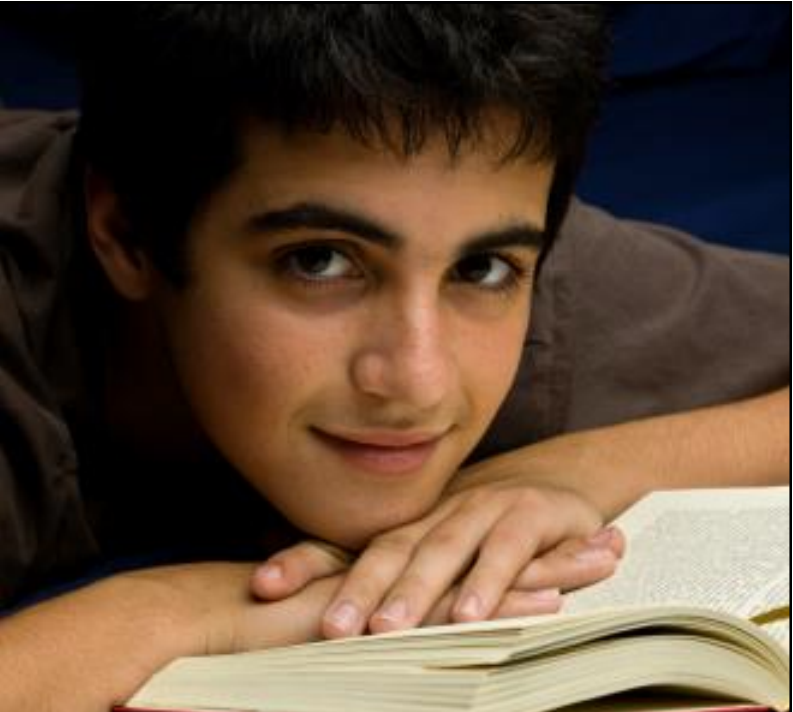
- Validity of PASS Theory

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# The Case of Rocky

Strengths with Specific Learning Disability and ADHD



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# The case of Rocky

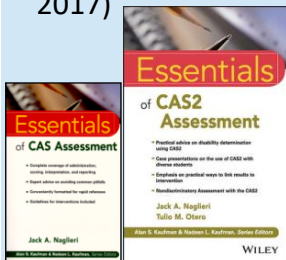
- ▶ Rocky<sup>1</sup> went to school in a large middle-class district
- ▶ In first grade Rocky was significantly below grade benchmarks in reading, math, and writing.
  - He received group reading instruction weekly and six months of individual reading instruction but minimal progress →retained
- ▶ By the middle of his second year in first grade he still struggling
  - decoding, phonics, and sight word vocabulary; math problems, addition, problem solving activities and focusing and paying attention.”
- ▶ After two years of special team meetings and special reading instruction he is now working two grade levels below his peers in reading, writing, and math

Note: This child's name and other potentially revealing data have been changed to protect his identity.

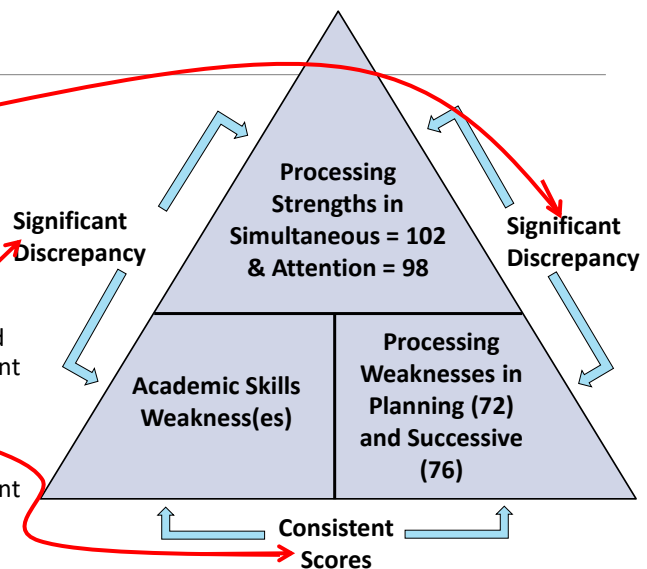
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- The Discrepancy Consistency Method (DCM) was first introduced in 1999 (most recently in 2017)



- Discrepancy between high and low processing scores
- Discrepancy between high processing and low achievement
- Consistency between low processing and low achievement



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# CAS2 Achievement Analyzer for PSW

**CAS2 12-Subtest Extended Battery**

**BOX #1 - Is there a PASS Pattern of Strengths and Weaknesses (Discrepancy 1)?**

Differences Between PASS Scale Standard Scores and the Student's Average PASS Score (p < .05) for the CAS2 12-Subtest EXTENDED Battery

Cognitive Assessment System	PASS Mean & Standard Score	Differences: (Mean - Student's Average PASS Score)	Significantly Different (at p < .05) from PASS Mean?	Strength or Weakness
Planning	72	-15.0	yes	Weakness
Simultaneous	102	15.0	yes	Strength
Attention	98	11.0	yes	Strength
Successive	76	-11.0	yes	Weakness

**Notes:**  
 1. A Weakness is defined as PASS standard score that is significantly below the child's average PASS score (positive comparison at the .05 level) and the PASS score is below 90 (i.e. below the Average Range).  
 2. A Strength is defined as PASS standard score that is significantly above the child's average PASS score (positive comparison at the .05 level) and the PASS score is above 105 (i.e. above the Average Range).  
 3. See Essentials of CAS2 Assessment Interpretation Chapter for more details and examples. Note: Comparisons at p < .05.

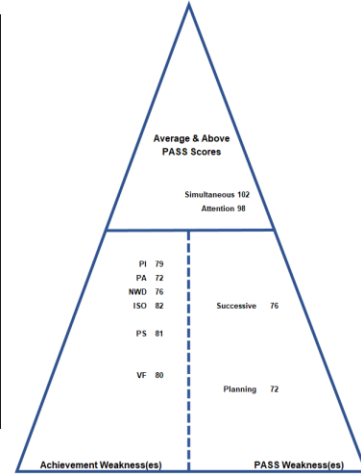
Note: These **FREE** analyzers can be downloaded from [www.jacknaglieri.com](http://www.jacknaglieri.com)

**BOX #2 - Are high PASS scores significantly different from low achievement scores (Discrepancy 2)? Are low PASS scores similar to low achievement scores (Consistency)?**

Standard Score	PASS Scores from CAS2			
	Planning	Simultaneous	Attention	Successive
72	72	102	98	76

**Further Assessment of READING**

Standard Score	Phonological Index	Phonemic Awareness	Nonsense Word Decoding	Isolated Word Reading Fluency	Oral Reading Fluency	Postword Sounds	Fluency Index	Rapid Automatic Naming	Verbal Fluency	Visual Perception	Irregular Word Reading Fluency	Orthographic Processing	Mixed Index	Comprehension Index	Semantic Concepts	Word Recall	Print Knowledge	Morphological Processing	Silent Reading Fluency	Comprehension	Total Index	
79	Consistent	Discrepant	Discrepant	Consistent																		
72	Consistent	Discrepant	Discrepant	Consistent																		
76	Consistent	Discrepant	Discrepant	Consistent																		
82	Consistent	Discrepant	Discrepant	Consistent																		
88	Consistent	Discrepant	Discrepant	Consistent																		
81	Consistent	Discrepant	Discrepant	Consistent																		
92	Consistent	Discrepant	Discrepant	Consistent																		
105	Consistent	Discrepant	Discrepant	Consistent																		
80	Consistent	Discrepant	Discrepant	Consistent																		
76	Consistent	Discrepant	Discrepant	Consistent																		
81	Consistent	Discrepant	Discrepant	Consistent																		
80	Consistent	Discrepant	Discrepant	Consistent																		
84	Consistent	Discrepant	Discrepant	Consistent																		



# Interventions for Rocky

**Using Plans to Overcome Anxiety**

Some children feel very anxious when they approach a new situation, and they are not sure what to do.

**Graphic Organizers for Connecting and Remembering Information**

Remembering and relating information is a common part of learning and daily life. Students are often expected to learn large amounts of new and unfamiliar information. Learning facts requires the student to see how information is connected or related. Students often remember this information better when they use graphic organizers.

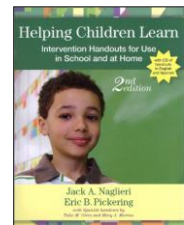
**Segmenting Words for Reading/Decoding and Spelling**

Decoding a written word requires the person to make sense out of printed letters and words and to translate letter sequences into sounds. This demands understanding the sounds that letters represent.

**Chunking for Reading/Decoding**

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

- 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.



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

Jackie S. Iseman<sup>1</sup> and Jack A. Naglieri<sup>1</sup>

**Abstract**

The authors examined the effectiveness of cognitive strategy instruction based on PASS (Planning, Attention, Simultaneous, Successive) given by special education teachers to students with ADHD randomly assigned by classroom. Students in the experimental group were exposed to a brief cognitive strategy instruction for 10 days, which was designed to encourage

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 DOI: 10.1177/0022219410391190  
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 SAGE



## Planning Facilitation for Math Calculation

Math calculation is a complex activity that involves recalling basic math facts, following procedures, working carefully, and checking one's work. Math calculation requires a careful (i.e., planful) approach to follow all of the necessary steps. Children who are good at math calculation can move on to more difficult math concepts and problem solving with greater ease than those who are having problems in this area. For children who have trouble with math calculation, a technique that helps them approach the task planfully is likely to be useful. Planning facilitation is such a technique.

reas the comparison group received-  
 evement were given at pretest. All  
 dized achievement tests (*Woodcock-  
 Achievement Test, Second Edition*,  
 ency was also administered at 1 year  
 up but not the comparison group on  
 ations (0.40 and -0.14, respectively).  
 on group. These findings suggest that  
 nsfer to standardized tests of math  
 nd continued advantage 1 year later

## Instructional Sessions

- Math lessons were organized into "instructional sessions" delivered over 13 consecutive days
- Each instructional session was 30-40 minutes
- Each instructional session was comprised of three segments as shown below

10 minutes	10-20 minutes	10 minutes
10 minute math worksheet	Planning Facilitation or Normal Instruction	10 minute math worksheet

### Experimental Group

19 worksheets with Planning Facilitation

Vs.

### Control Group

19 worksheets with Normal Instruction

# Planning (Metacognitive) Strategy Instruction

## Teachers Asked

- ▶ Teachers *facilitated* discussions to help students become more self-reflective about use of strategies
- ▶ Teachers asked questions like:
  - What was your goal?
  - Where did you start the worksheet?
  - What strategies did you use?
  - How did the strategy help you reach your goal?
  - What will you do again next time?

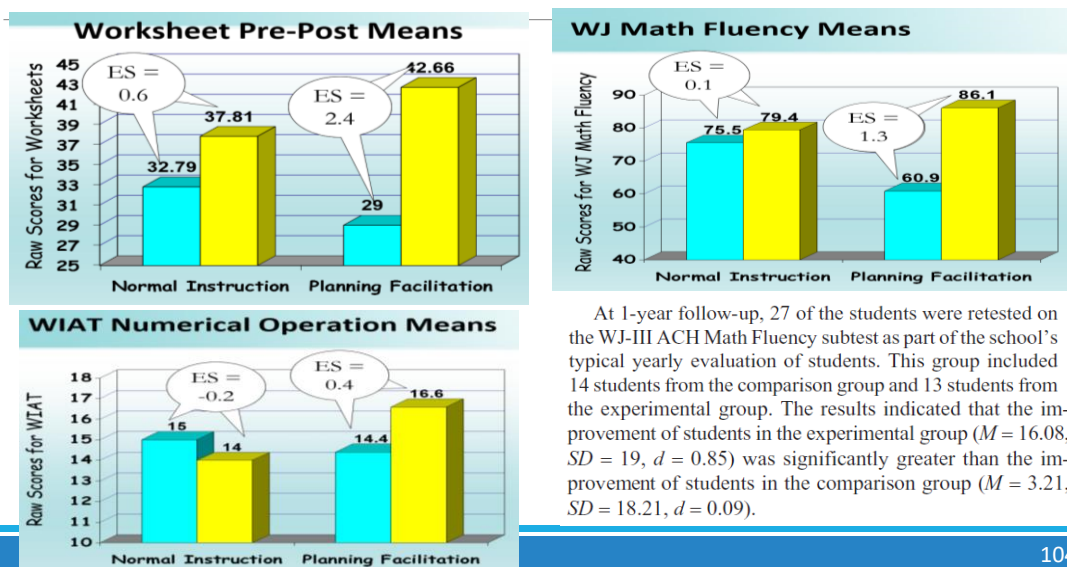
## Students Responded

- ▶ “My goal was to do all of the easy problems on every page first, then do the others.”
- ▶ “I do the problems I know, then I check my work.”
- ▶ “I draw lines to keep the columns straight”
- ▶ “I did the ones that took the least time”

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



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# Summary of PASS Intervention Research in Essentials of CAS2

## Effectiveness of a Cognitive Strategy Intervention in Improving Arithmetic Computation Based on the PASS Theory

Jack A. Naglieri and Deanne Johnson

### Abstract

The purpose of this study was to determine if an instruction designed to facilitate planning, given by teachers to their class as a group would have differential effects depending on the specific Planning, Attention, Simultaneous, Successive (PASS) cognitive characteristics of each child. A cognitive strategy instruction that encouraged planning was given to the group of 19 students with learning disabilities and mild reading impairments. All students completed math worksheets during 7 baseline and 14 intervention sessions. During the intervention phase, students engaged in self-reflection and verbalization of strategies about how the arithmetic computation worksheets should be completed. The sample was sorted into one experimental and four control groups after the experimental group were four groups with a cognitive weakness in each PASS scale from the Cognitive Assessment System and one of the worksheets contrast to the other three groups of children by the plan.

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

Jackie S. Iseman<sup>1</sup> and Jack A. Naglieri<sup>1</sup>

### Abstract

The authors examined the effectiveness of cognitive strategy instruction based on PASS (Planning, Attention, Simultaneous, Successive) given by special education teachers to students with ADHD randomly assigned experimental group were exposed to a brief cognitive strategy instruction for 10 days, with development and application of effective planning for mathematical computation, whereas the standard math instruction. Standardized tests of cognitive processes and math achievement students completed math worksheets during the experimental phase. Standardized Johnson Tests of Achievement, Third Edition, Math Fluency and Worded Individualized Numerical Operations were administered pre- and postintervention, and Math Fluency was also administered at 1 year follow-up. Large pre-post effect sizes were found for students in the experimental group but not the comparison group on math worksheets (0.83 and 0.26), Math Fluency (1.17 and 0.09), and Numerical Operations (0.60 and -0.14, respectively). At 1 year follow-up, the experimental group continued to outperform the comparison group. These findings suggest that students with ADHD evidenced greater improvement in math worksheets, for comparison to standardized tests of math (which measured the skill of generating learned strategies to other similar tasks), and continued advantage 1 year later when provided the PASS-based cognitive strategy instruction.

Reading Psychology, 31:428-455, 2010  
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DOI: 10.1080/00207179.2010.5054935



## REMEDYING READING COMPREHENSION DIFFICULTIES: A COGNITIVE PROCESSING APPROACH

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J. P. DAS, HOLLY STACK-CUTLER, and RAUNO PARRILA  
Department of Educational Psychology, University of Alberta,  
Edmonton, Alberta, Canada

The efficacy of a cognitive-based remediation program was investigated with 14 English-as-second-language (ESL) poor readers in Grade 4 who had significant difficulty in comprehension and 14 normal ESL readers in Grade 4 who were given no remediation. Both groups were selected from 2 English-medium schools in the city of Toronto, Ontario, Canada.

## Mathematics Instruction and PASS Cognitive Processes: An Intervention Study

Jack A. Naglieri and Suzanne H. Gotting

### Abstract

The purpose of this study was to determine if an instruction designed to facilitate planning, given by a group, would have differential effects depending on the specific cognitive characteristics of the individual instruction that facilitated planning was provided to a group of 12 students with learning disabilities. All work sheets during 7 sessions of baseline and 21 sessions of intervention (when the instruction designed) provided. During the intervention phase, students engaged in self-reflection and verbalization of strategic problems were completed. The class was sorted according to planning scores, obtained using the Cog which is based on Planning, Attention, Simultaneous, Successive (PASS) theory and low- and high-planning identified. The results, consistent with previous research, showed that teaching content and regulation beneficial effects for all students but was especially helpful for those who were poor in planning, as do implications of these findings are provided.

Journal of Psychological Assessment  
2009, 21, 202-209

## PLANNING FACILITATION AND READING COMPREHENSION: INSTRUCTIONAL RELEVANCE OF THE PASS THEORY

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Kyrene School District, Tempe, Arizona

Y. Evie Garcia

Northern Arizona University

Jack A. Naglieri

George Mason University

Michelle Grinditch, Ashley McAndrews, Jane Eubanks

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The purpose of this study was to evaluate whether instructional designed to facilitate planning would have differential benefits on reading comprehension depending on the specific Planning, Attention, Simultaneous, and Successive (PASS) cognitive characteristics of each child. A sample of 45 fourth-grade general education children was randomly assigned to one of two experimental groups based on each PASS scale profile from the Cognitive Assessment System (CAS). The groups did not differ by CAS Full Scale standard score, chronological age, gender, or pretest reading comprehension scores. After each child's pretest reading comprehension instructional level was determined, a cognitive strategy instruction intervention was conducted. The children completed a reading comprehension posttest at their respective instructional levels after the intervention. Results showed that children with a Planning weakness ( $n = 19$ ) benefited substantially (effect size of 1.32) from the instruction designed to facilitate planning. Children with low worksheets ( $n = 21$ ) effect size = .32) as a baseline weakness ( $n = 11$ ) effect size of .06) did not benefit as much. These results support previous research suggesting that PASS profiles are relevant to instruction.

J. P. Das, Densye V. Hayward, George K. Georgiou  
University of Alberta

Troy Janzen

Taylor University College

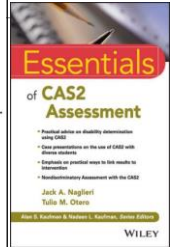
Neelam Bora

Nipahatigapah Middle School

## Comparing the Effectiveness of Two Reading Intervention Programs for Children With Reading Disabilities


### Abstract

The effectiveness of two reading intervention programs (phonics-based and inductive learning) was investigated with 63 First Nations children identified as poor readers in Grades 1 and 4 in Study 1, whereas in Study 2, the efficacy of booster sessions for inductive learning of PREP (PASS Reading Enhancement Program) was examined. The major dependent variables in Study 1 were percent of correct responses following intervention on reading tests for word reading and word decoding. Other variables compared tests of orthological awareness, rapid



# Questions and Thoughts Please





**10 REASONS WHY YOU SHOULD EMBRACE CHANGE**

- 01 Change can help you to challenge your beliefs
- 02 Change can help you to re-evaluate your values
- 03 Change can help you to get closer to your potential
- 04 Change is important for personal growth
- 05 Change can help you to move on
- 06 Change can help you to learn from your mistakes
- 07 Change can help to trigger progress
- 08 Change can help you to see opportunities
- 09 Change can help to reveal your strengths
- 10 Change is a bridge you cross to people

**My Professional Journey**

- An Awakening About Traditional Intelligence Tests

**A Theory Based on Brain Function**

- Thinking vs Knowing and Social Justice

**From PASS to CAS2**

- A Different View of People

**Research Update**

- PASS and Equity – Measure Thinking not Knowing
- To *g* or not to *g*

**Eligibility Determination**

- What to use

**Reasons To Change**

- Validity of PASS Theory

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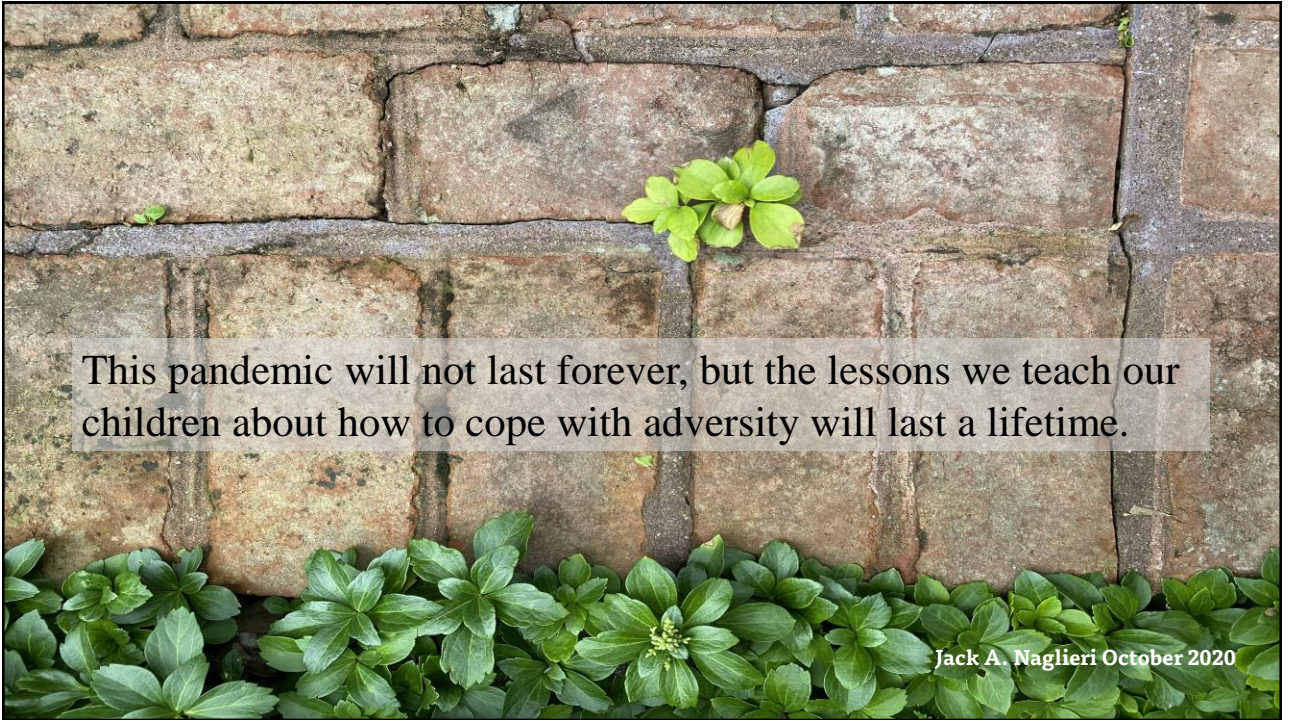
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## Summary: PASS theory and CAS2 (see Naglieri & Otero, 2017)

1. The PASS scales on the CAS2 measure *thinking* (i.e. basic psychological processing) rather than *knowing* (e.g., vocabulary, arithmetic etc.), making the test good for assessment of diverse populations and those with limited educational opportunity.
2. PASS scores can be easily obtained in 20 minutes (using the 4-subtest CAS2 Brief), 40 minutes (using the 8-subtest Core Battery) or 60 minutes (using the 12-subtest Extended Battery), scored and a narrative reports provided using the online program.
3. PASS results are easy for teachers, parents and the students themselves to understand because the concepts can be explained in non-technical language.
4. The PASS theory and the CAS2 provide a way to both define and assess 'basic psychological processes' so that practitioners can obtain scores that are consistent with state and federal IDEA guidelines.
5. The PASS scores are strongly correlated to achievement, show distinct patterns of strengths and weaknesses, are very useful for intervention planning.
6. The CAS2 in combination with achievement (especially the FAR, FAM and/or FAW) provides examiners with a reliable and defensible Discrepancy Consistency Method to identify students with SLD.
7. Research has shown that PASS scores have relevance to instruction and intervention.

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## Moving Forward

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- I am available for follow-up webinars

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