PASS Theory and the Cognitive Assessment System Second Edition: A Theory Based Approach to Defining and Measuring Intelligence

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Resources

FOR MORE INFORMATION
PLEASE GO TO MY WEB PAGE

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Disclosures

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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 BASED ON THEORY
  - 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-2nd Edition a way to measure 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*

Administration and Interpretation Issues
- Test order, subtest interpretation, etc.

Reasons To Change
- Validity of PASS Theory

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Traditional IQ and Achievement Tests

- Working as a school psychologist in 1975 I noticed that items on the WISC we 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!
  - THAT DID NOT MAKE SENSE
  - In 1977 → UGA for Ph.D. With Alan Kaufman who said VIQ=achievement
  - THAT made sense!

1975 Charles Champagne Elementary, Bethpage, NY

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How and Why…

- First job as assistant professor at Northern Arizona University - 1979
  - Lecture on Navajo Native Americans
  - Testing students in Supai, AZ

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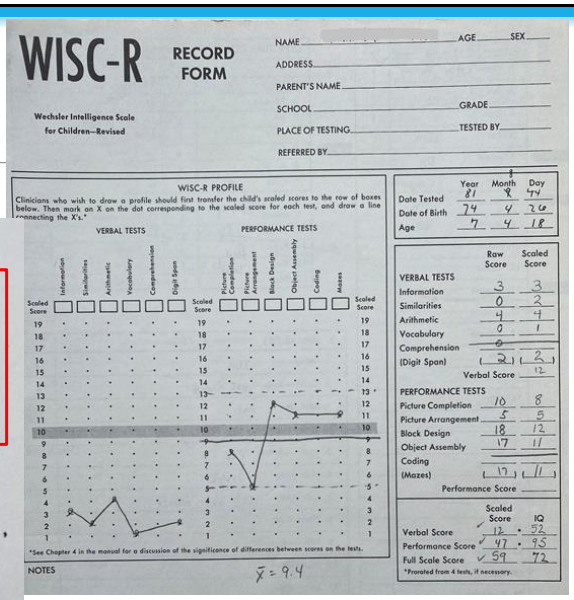
How and Why…

Test Results and Interpretations:

On the WISC-R, Amanda earned a Performance IQ of 95±7 which falls in the average range of intelligence and at the 37th percentile rank in comparison to the children her age in the standardization sample. In contrast to this score of average non-verbal intelligence was her Verbal IQ of 52±7. This score is quite low and indicates that her level of facility with the English language falls at about the 1st percentile rank. This score can NOT be considered an estimate of verbal intelligence because Amanda speaks mostly Supai and little English. Due to the large difference between these scores, no Full Scale IQ was computed.

Within the WISC-R a clear pattern emerged: Amanda performed well on tasks that required little or no English language comprehension or expression, and poorly on all tasks which did require these linguistic skills. In fact, even if a task was visual and non-verbal, but required English language comprehension of instructions, she performed more poorly.



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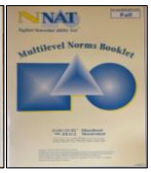
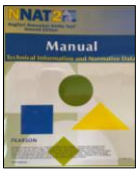
How and Why…

- First Research Article
  - Naglieri, J. A. (1982). Does the WISC-R measure verbal intelligence for non-English speaking children? *Psychology in the Schools, 19*, 478-479.
- Tests and books
  - Matrix Analogies Tests Individual and Group administrations (1985)
  - NNAT - 1997
  - CAS – 1997
  - Essentials of CAS Assessment 1999
  - Helping All Gifted Students Learn (Naglieri, Brulles & Lansdowne, 2009)

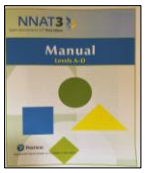
1985 MAT Short and Expanded Forms



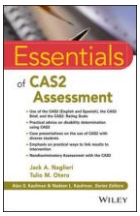
Naglieri Nonverbal Ability Test in 1997

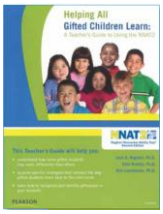


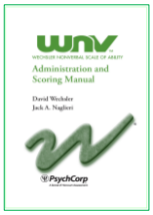
NNAT -2 published in 2008



NNAT -3 published in 2016



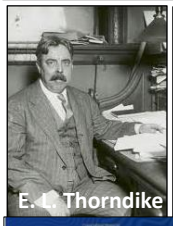


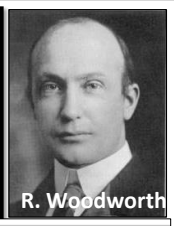


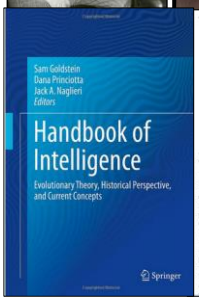
Why do we measure intelligence the way we do?

The History of IQ tests

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








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

Jack A. Naglieri

Context

- 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

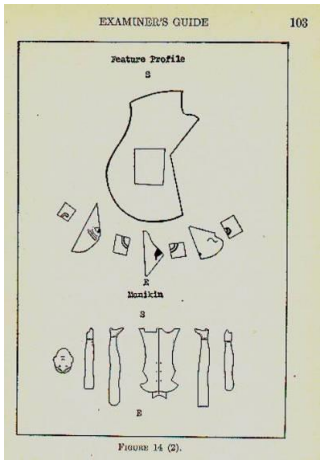
From Alpha & Beta to Wechsler IQ

- **Army Beta**
  - Maze
  - Cube Imitation
  - Cube Construction
  - Digit Symbol
  - Pictorial Completion
  - Geometrical Construction

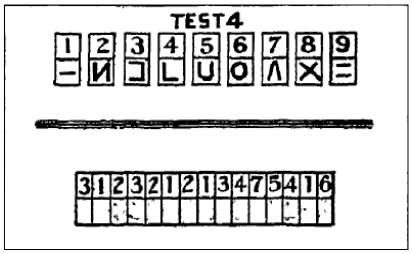
→ Originally called "Performance" now "Nonverbal" (Thinking)

→ WISC, DAS, WJ Cog
CogAT & Otis-Lennon

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.

1920 Army Testing (Yoakum & Yerkes)

Note there is no mention of measuring verbal and nonverbal intelligences – **they saw a social justice issue…and today in the era a BLM the need is even more urgent**

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.

CONCEPT OF GENERAL INTELLIGENCE 61

The Criteria of a Test of Intelligence. — Influenced both by the theoretical discussion of general intelligence and by the empirical work of testing, we have arrived at certain requirements for a good test of intelligence, which we may discuss under the four following headings:

1. *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 something that is commonly taught in school is not desirable, because those children who have reached the particular grade in which this is generally taught have memorized this fact, whereas other children of equal or greater intelligence may have had no opportunity to learn this same fact, simply because they may not have reached this particular grade in their school work. To ask the question, "Who discovered America?" would be indicative of the school progress or general cultural environment of the child rather than of his general intelligence. Failure to answer might indeed be due to lack of intelligence in the case of school children of a certain grade in which this had been a matter of instruction, but on the other hand a very intelligent child might fail to answer owing to the fact of his not being in the grade in which this was taught.

Pintner
(Intelligence Testing, 1923)

- This is a social justice issue for those from disadvantaged communities and those with limited education

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From Alpha & Beta to Wechsler IQ

- **Army Alpha**
  - Synonym- Antonym
  - Disarranged Sentences
  - Number Series
  - Arithmetic Problems
  - Analogies
  - Information

→ Verbal IQ (Knowledge)

- **Army Beta**
  - Maze
  - Cube Imitation
  - Cube Construction
  - Digit Symbol
  - Pictorial Completion
  - Geometrical Construction

→ Originally called "Performance" now "Nonverbal" (Thinking)

→ WISC, DAS, WJ Cog CogAT & Otis-Lennon

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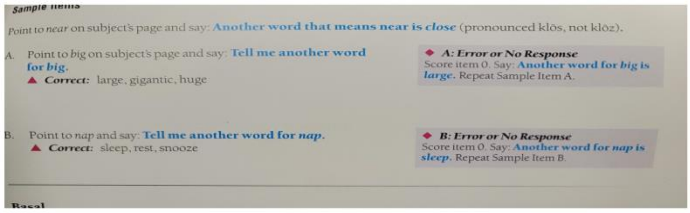
WJ-IV Items from Cognitive and Achievement Tests:

Cognitive: Oral Vocabulary Subtest 1


Sample Items

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

A. Point to *big* on subject's page and say: **Tell me another word for *big*.**
▲ **Correct:** large, gigantic, huge

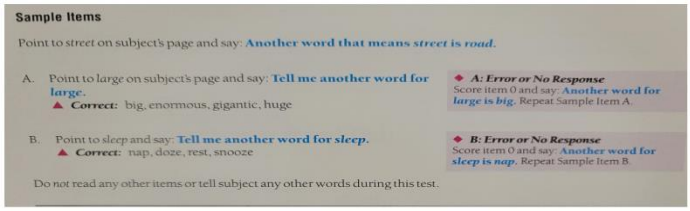
◆ **A: Error or No Response**
Score item 0. Say: **Another word for *big* is *large*.** Repeat Sample Item A.

B. Point to *nap* and say: **Tell me another word for *nap*.**
▲ **Correct:** sleep, rest, snooze

◆ **B: Error or No Response**
Score item 0. Say: **Another word for *nap* is *sleep*.** Repeat Sample Item B.

Basal

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 0 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 0 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.

WISC-V:
Verbal Comprehension
- Similarities
- Vocabulary
- Information

Fluid Reasoning
- Figure Weights
- Arithmetic

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Knowledge is Included in "Ability" Tests

Stanford-Binet-5	WISC-V	WJ-IV	KABC-II	OLSAT	CogAT
• Verbal • Knowledge • Quantitative Reasoning • Vocabulary • Verbal Analogies	• Verbal Comprehension Vocabulary, Similarities, Information & Comprehension • Fluid Reasoning Figure Weights, Arithmetic	• Comprehension Knowledge: Vocabulary & General Information • Fluid Reasoning: Number Series & Concept Formation • Auditory Processing: Phonological Processing	• Knowledge / GC • Riddles, • Expressive Vocabulary, • Verbal Knowledge	• Verbal • Following directions • Verbal Reasoning • Quantitative • Verbal Arithmetic Reasoning	• Verbal Scale • Analogies • Sentence Completion • Verbal Classification • Quantitative • 45 pages of oral instructions

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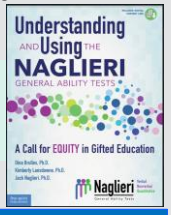
Race and Ethnic Differences in Ability Tests used in Identification of Gifted Students

Intelligence Test Mean Standard Score Differences by Race and Ethnicity.		
	Race	Ethnicity
Tests that require knowledge	**11.5**	**9.2**
Otis-Lennon School Ability Test (school system)	13.6	
Stanford-Binet IV (normative sample)	12.6	
WISC-V (normative sample)	11.6	
WJ- III (normative sample)	10.9	10.7
CogAT7 (Nonverbal scale)	11.8	7.6
WISC-V (statistical controls normative sample)	8.7	
Tests that require minimal knowledge	**3.5**	**2.6**
CAS-2 (normative sample)	6.3	4.5
CAS (statistical controls normative sample)	4.8	4.8
CAS-2 (statistical controls normative sample)	4.3	1.8
CAS-2 Brief (normative samples)	2	2.8
NNAT (matched samples)	4.2	2.8
Naglieri General Ability Test-Verbal	2.2	1.6
Naglieri General Ability Test-Nonverbal	1.0	1.1
Naglieri General Ability Test-Quantitative	3.2	1.3

Note: The results summarized here were reported for the Otis-Lennon School Ability Test by Avant and O'Neal (1986); Stanford-Binet IV by Wasserman (2000); Woodcock-Johnson III race differences by Edwards & Oakland (2006) and ethnic differences by Sotelo-Dynega, Ortiz, Flanagan & Chaplin (2013); CogAT7 by Carman, Walther and Bartsch (2018); WISC-V by Kaufman, Raiford & Coalson (2016); Kaufman Assessment Battery for Children-II by Lichenberger, Sotelo-Dynega and Kaufman (2009); CAS by Naglieri, Rojahn, Matto & Aquilino (2005); CAS-2 and CAS2:Brief by Naglieri, Das & Goldstein, 2014; Naglieri Nonverbal Ability Test by Naglieri and Ronning (2000), and Naglieri General Abiliy Tests by Naglieri, Brulles and Lansdowne (2021).

From: Brulles, D., Lansdowne, K. & Naglieri, J. A. (2022). Understanding and Using the Naglieri General Ability Tests: A Call to Equity in Gifted Education. Minneapolis, MN: Free Spirit Publishing.



Note: Even though these tests may not show psychometric bias (Worrell, 2019) some do yield large mean score differences which indicates lack of equity.

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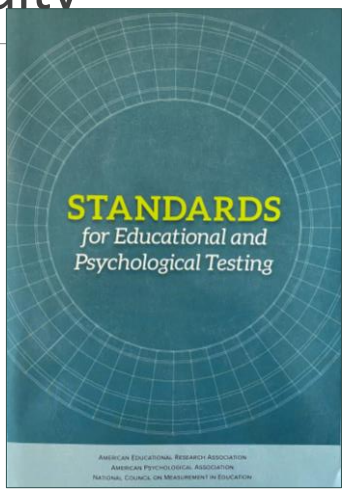
Opportunity to learn and Equity

- *According to the Standards for Educational and Psychological Testing* (AERA, APA & NCME, 2014),
- **Even if evidence of psychometric bias is not found a test can still be considered unfair** for students who have had limited opportunities to learn the content of the test **because** students are penalized for not having information.



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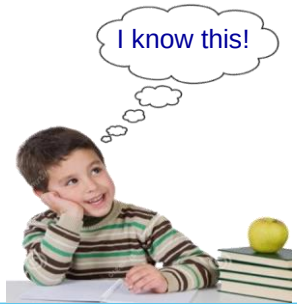
Solution: Measure Thinking not Knowledge

- What does the student have to know to complete a task?
  - This is dependent upon educational opportunity



- How does the student have to think to complete a task?
  - This is dependent on the brain

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Questions and Thoughts Please

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Ideas to Consider

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- Validity of PASS Theory

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Shift from Traditional To Second Generation Intelligence Tests

- Wechsler, et al
- **C**ognitive **A**ssessment **S**ystem 2nd 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 andwe began development of the **C**ognitive **A**ssessment **S**ystem (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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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

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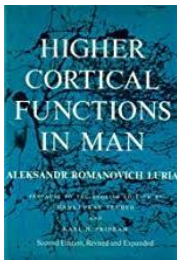
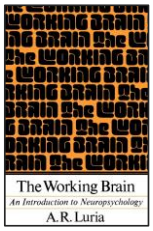
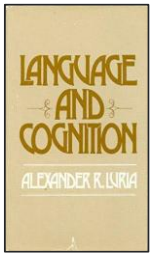
PASS Neurocognitive Theory







- **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!

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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

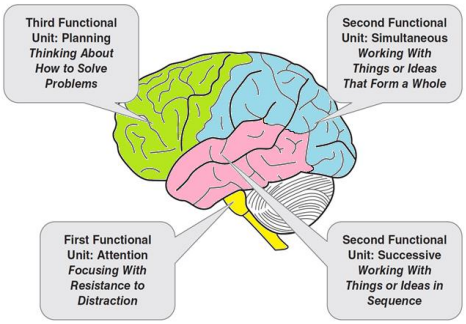


Figure 1.2 Three Functional Units and Associated Brain Structures

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

Neuropsychological Correlates of PASS

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

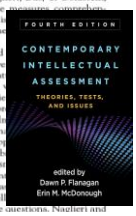
CHAPTER 6

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 (Plucker & Esping, 2014), one theory, first described by Das, Kirby, and Jarman (1979), was used explicitly to develop a new way to construct an intelligence test. In 1997, Naglieri and Das (1997a) published the Cognitive Assessment System (CAS), which was based on a neurocognitive theory called *planning, attention, simultaneous, and successive* (PASS) processing. These authors argued that a neurocognitive theory of intelligence provides the foundation necessary for test construction and is equally important for test interpretation. They also suggested that traditional IQ tests, which were based largely on the work of the U.S. military (see Naglieri, 2015), were too limited and could be improved if the constructs that were measured were related to brain functions. Naglieri and Das anticipated that the PASS neurocognitive approach would yield better diagnostic information, have relevance to instructional decision making, and be more 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: Espanol (Naglieri, Moreno, & Otero, 2017), the CAS2: Brief (Naglieri, Das, & Goldstein, 2014b), and the CAS2: Rating Scale (Naglieri, Das, & Goldstein, 2014c). We describe these [illegible] sively in Chapter 15 of this [illegible] we focus on the PASS the[illegible] these measures are based.

The PASS theory and [illegible] neurocognitive perspective [illegible] from that of traditional [illegible] in part, subtests requiring [illegible] knowledge). These batteries [illegible] the Army mental testing pr[illegible] akum and Yerkes (1920) al[illegible] PASS theory, as operationa[illegible] CAS2, has created an op[illegible] field of intelligence and al[illegible] emphasizing (1) that a *test* [illegible] be based on a *theory* of in[illegible] the test should measure ba[illegible] cesses defined by the intel[illegible] test, not the content of the questions. Naglieri and



28 Cognitive Assessment System: Redefining Intelligence From a Neuropsychological Perspective

Jack A. Naglieri and Tulio M. Otero

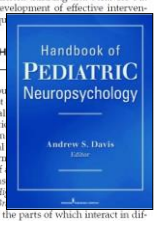
INTRODUCTION

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 access 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 interven-

FROM NEUROPSYCH[illegible]
TO ASSESSMENT

Luria's theoretical accou[illegible]
perhaps one of the most [illegible]
2008). Luria conceptual[illegible]
of brain–behavior relati[illegible]
orders that the clinician [illegible]
the brain, the functional [illegible]
syndromes and impairm[illegible]
and clinical methods of [illegible]
theoretical formulations[illegible]
lated in works such as *Ho*[illegible]
1980) and *The Working Br*[illegible]
as a functional mosaic, the parts of which interact in dif-



PASS Theory Based on Brain Function – Planning

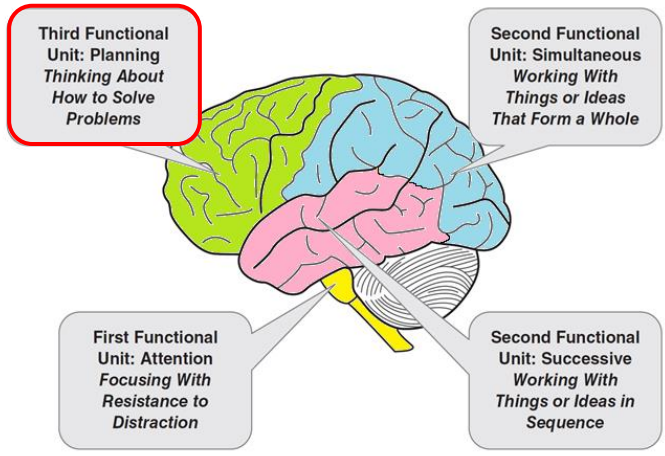


Figure 1.2 Three Functional Units and Associated Brain Structures

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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CAS2: Rating Scale Planning

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

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

___ + ___ + ___ + ___ + ___ = ☐

Planning Raw Score

34

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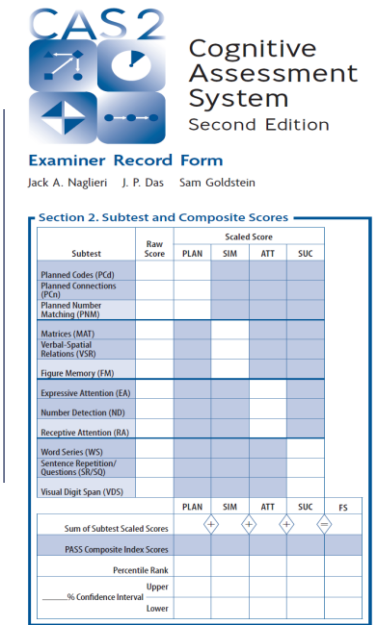
Planning Subtests

Planned Codes

Planned Connections

Planned Number Matching

5176	5761	5167	1576	5176	1567



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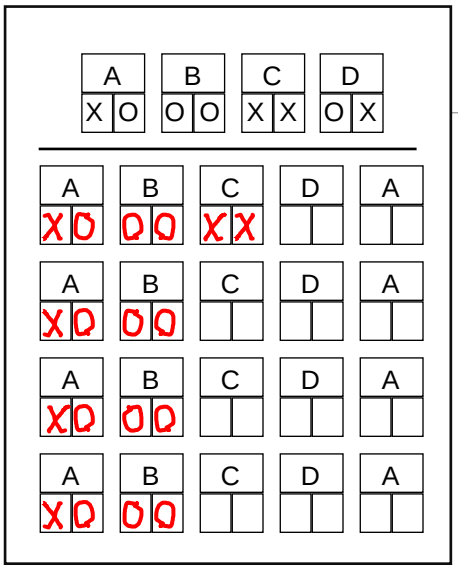
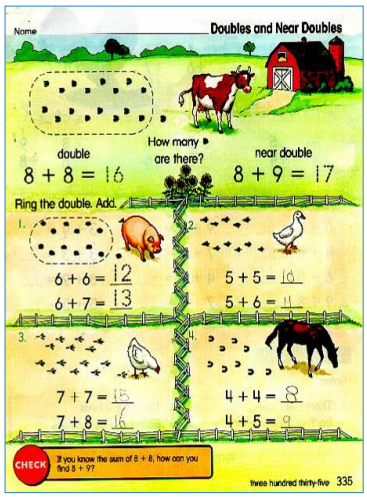


Planned Codes Page 1

- 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”

Math strategies stimulate thinking



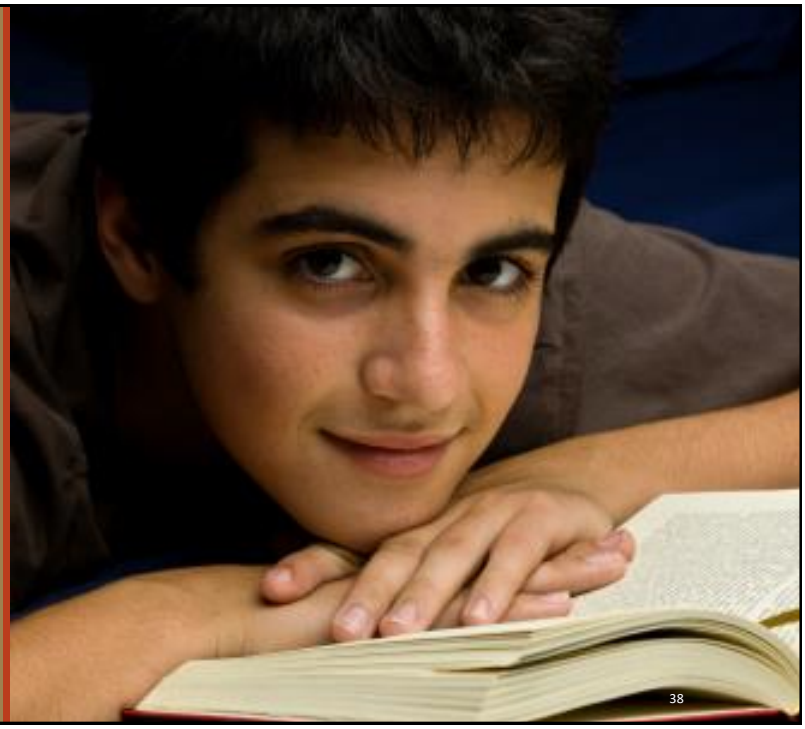
This work sheet encourages the child to use strategies (plans) in math such as: “If 8 + 8 = 16, then 8 + 9 is 17”

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.

The Case of Rocky

Strengths with Specific Learning Disability and

ADHD



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The case of Rocky

- Rocky[1] 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.

39

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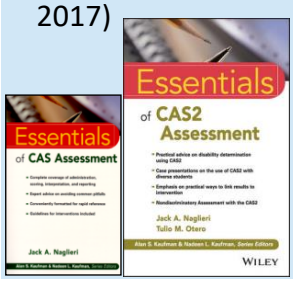
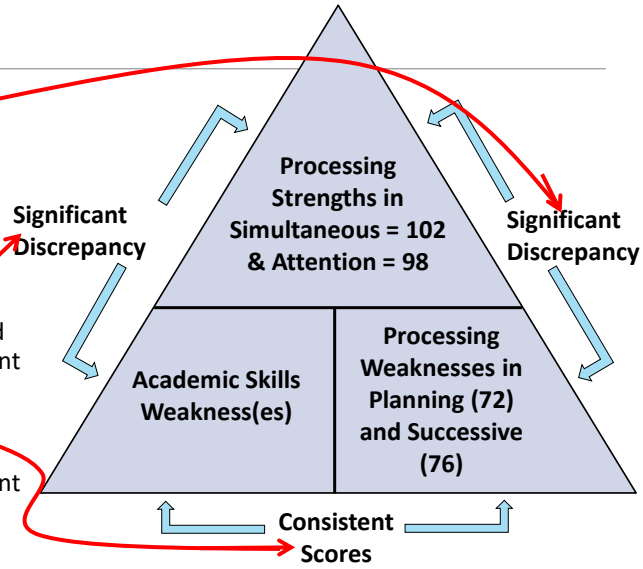
- The Discrepancy Consistency Method (DCM) was first introduced in 1999 (most recently in 2017)



- 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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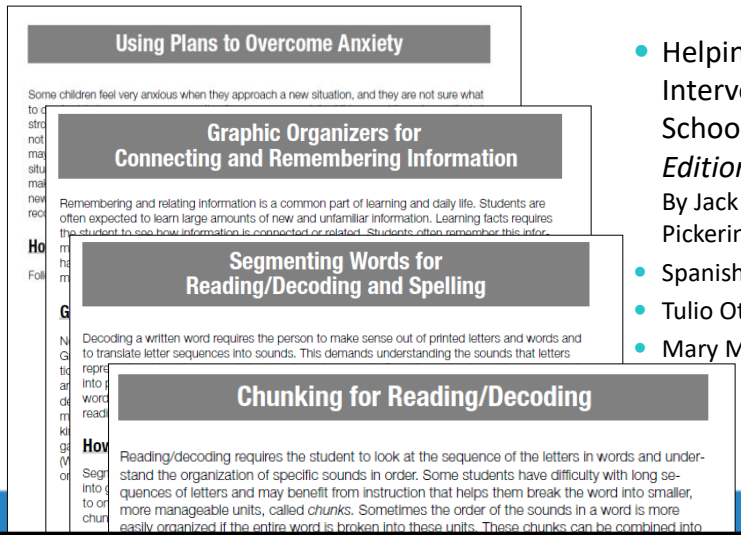
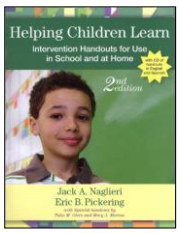
Interventions for Rocky



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



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Hammill Institute on Disabilities

Journal of Learning Disabilities
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SAGE

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

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

Abstract

The authors examined the effectiveness of cognitive strategy 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 reas the comparison group received- ievement were given at pretest. All dized achievement tests (*Woodcock- ed Achievement Test, Second Edition,* ncy was also administered at 1 year up but not the comparison group on ations (0.40 and –0.14, respectively). n group. These findings suggest that nsfer to standardized tests of math nd continued advantage 1 year later

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.

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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

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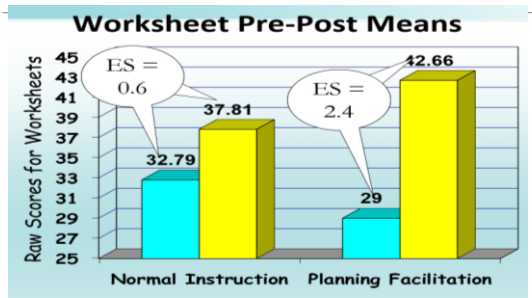
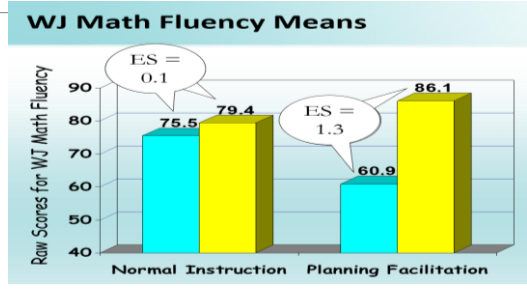
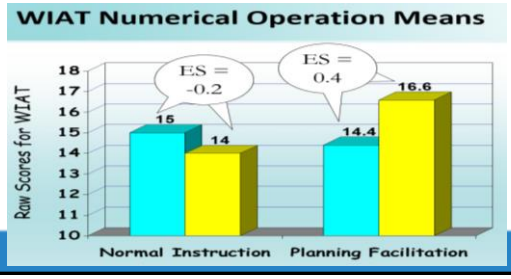
Pre-Post Means and Effect Sizes for the Students with LD and ADHD







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

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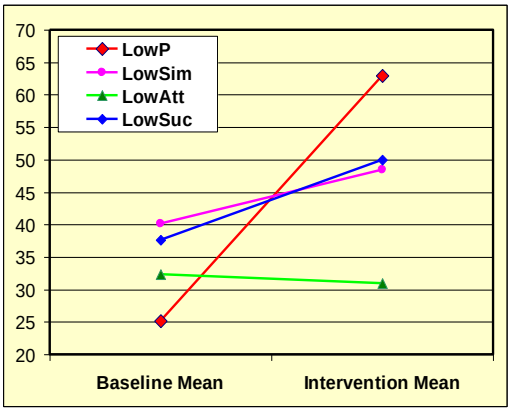
Pre-Post Changes for the Students with LD and ADHD

- The students with a weakness in Planning, Simultaneous or Successive processing scales benefited from the Planning Facilitation method
- Importantly, the students with a weakness in Planning improved the most
- This has been the case in all the studies of Planning Facilitation
- COGNITION PREDICTS RESPONSE TO INTERVENTION



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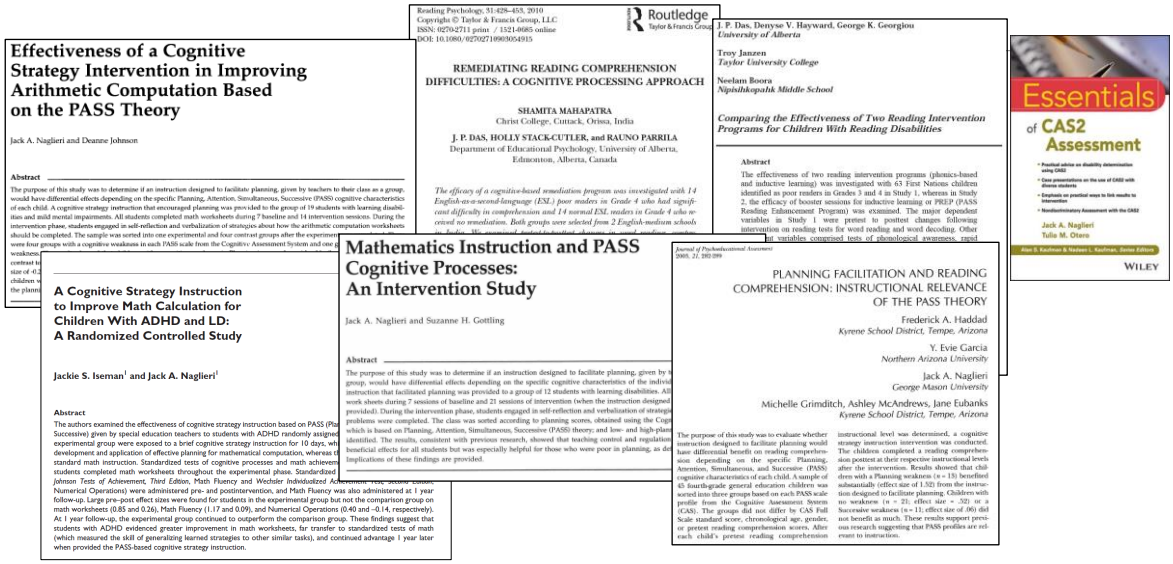
Summary of PASS Intervention Research in Essentials of CAS2



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PASS Theory Based on Brain Function -– Attention

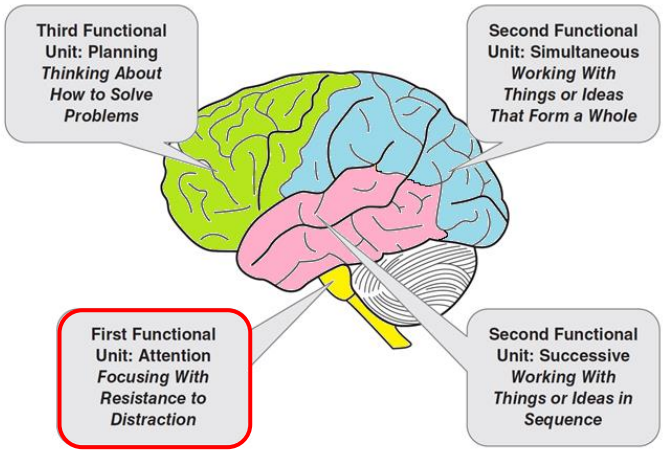

Figure 1.2 Three Functional Units and Associated Brain Structures

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

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Attention Subtests

Expressive Attention

Number Detection

Find the numbers that look like this: 1 2
1 5 1 4 2 2 5

Receptive Attention

N n	T r	b t
TR	n b	A a

CAS2 Cognitive Assessment System Second Edition

Examiner Record Form

Jack A. Naglieri J. P. Das Sam Goldstein

Section 2. Subtest and Composite Scores

Subtest	Raw Score	Scaled Score PLAN	SIM	ATT	SUC
Planned Codes (PCd)					
Planned Connections (PCn)					
Planned Number Matching (PNM)					
Matrices (MAT)					
Verbal-Spatial Relations (VSR)					
Figure Memory (FM)					
Expressive Attention (EA)					
Number Detection (ND)					
Receptive Attention (RA)					
Word Series (WS)					
Sentence Repetition/ Questions (SR/SQ)					
Visual Digit Span (VDS)					

	PLAN	SIM	ATT	SUC	FS
Sum of Subtest Scaled Scores		+	+	+	=
PASS Composite Index Scores					
Percentile Rank					
% Confidence Interval Upper					
% Confidence Interval Lower					

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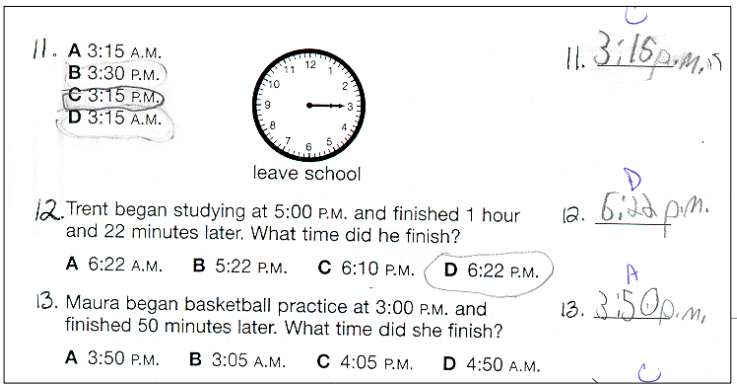
PASS Theory: Attention

- 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

50

50



Attention

READING COMPREHENSION IS DIFFICULT BECAUSE OF THE SIMILARITY OF THE OPTIONS

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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

52

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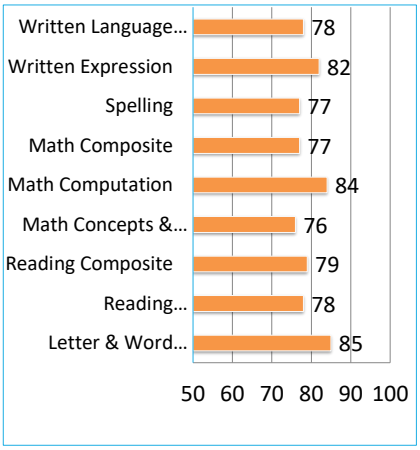
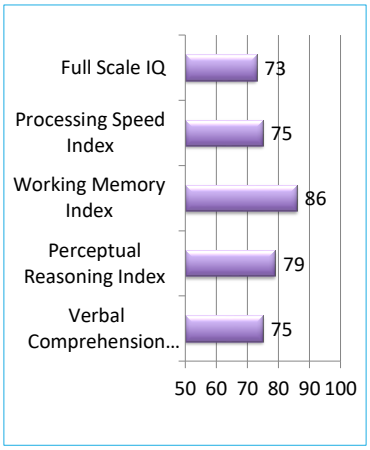
WISC-IV ASSESSMENT

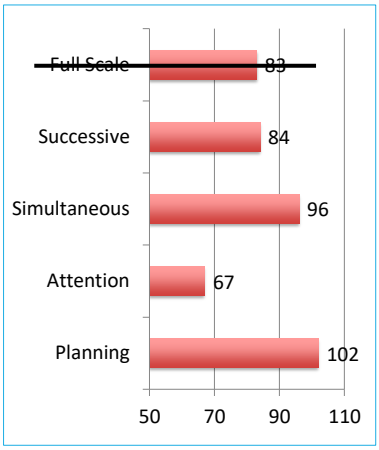
KTEA2



WISC-IV



CAS2



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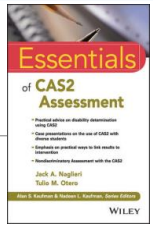
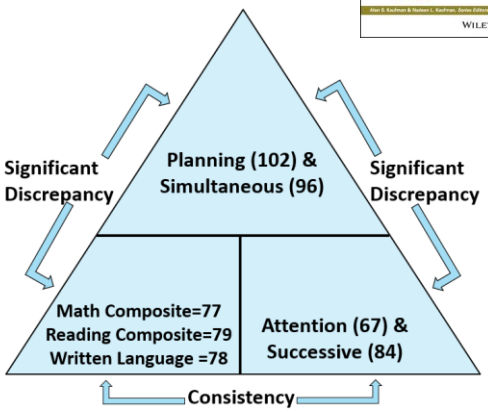
Alejandro and PASS (by Dr. Otero)



- 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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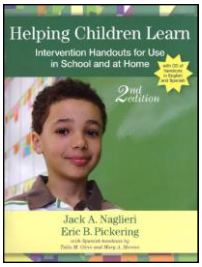
55

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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Jose: Age 10, 5th Grade, Bilingual Student by Tulio M. Otero, Ph.D.

Jose reading problems and the teacher these concerns:

phonemic awareness, reading fluency, reading comprehension math problem-solving, spelling, written expression

Jose also receives ELL services and his current ACCESS scores are as follows: Listening 5.8, Speaking 1.9, Reading 2.8, Writing 3.5.

2018 WISC4 Spanish : VCI 55, PRI 92, WM 86, PS 91

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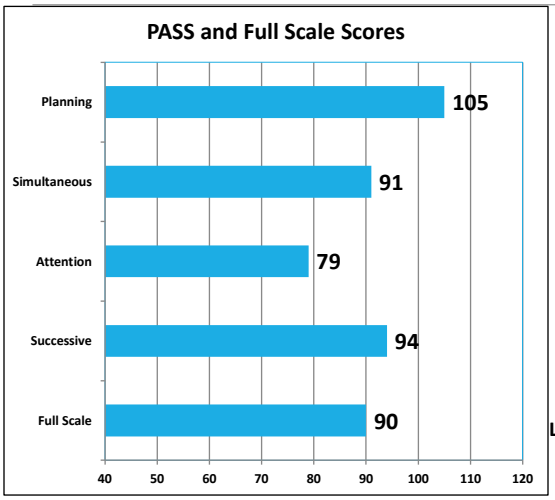
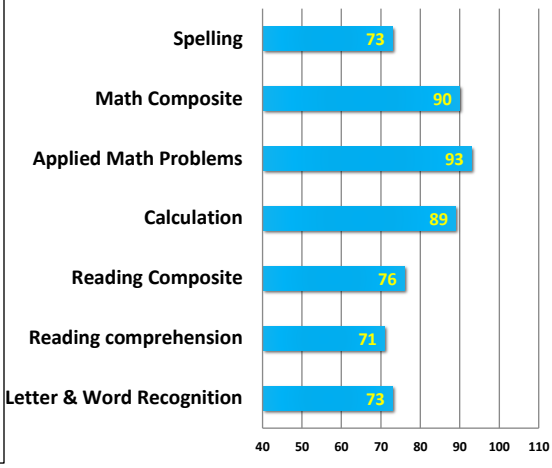
CAS2 and KTEA-III Scores (January 2020)





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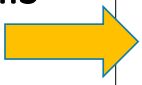
Jose was given this simple intervention

Remember to check how well you are attending. If you are having a problem, use a plan and look at this (taped to his desk).



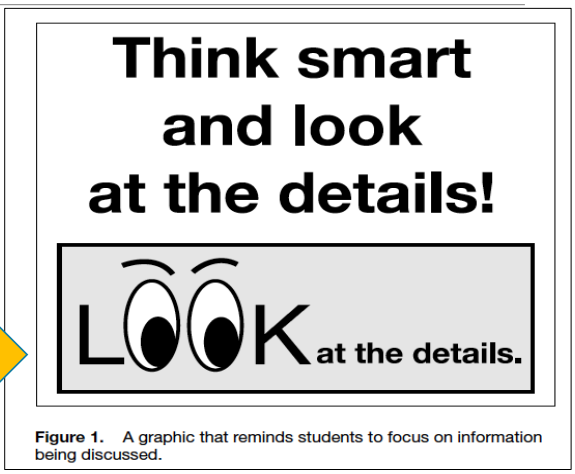


Figure 1. A graphic that reminds students to focus on information being discussed.

From: Naglieri, J. A., & Pickering, E. B. (2010). *Helping Children Learn: Intervention Handouts for Use at School and Home (Second Edition).* Baltimore, MD: Brookes Publishing.

59

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Two weeks later!

- Teacher reported that José has increased his reading accuracy by at least 80%.
- He read 16 words correctly out of a list of 20.
- He has done this over the last 3. sessions.

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PASS Theory Based on Brain Function - Simultaneous Processing

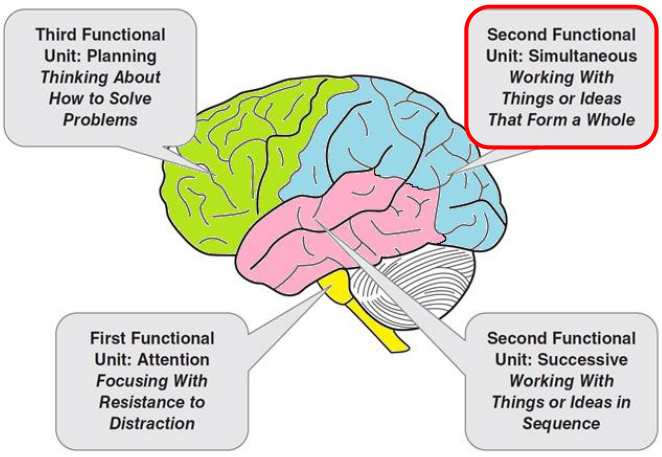

Figure 1.2 Three Functional Units and Associated Brain Structures

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

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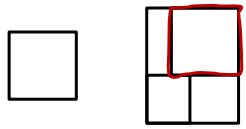
Simultaneous Subtests

Matrices

Verbal Spatial Relations

Figure Memory



CAS2 Cognitive Assessment System Second Edition

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Jack A. Naglieri J. P. Das Sam Goldstein

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Sentence Repetition/ Questions (SR/SQ)					
Visual Digit Span (VDS)					

	PLAN	SIM	ATT	SUC	FS
Sum of Subtest Scaled Scores		+	+	+	=
PASS Composite Index Scores					
Percentile Rank					
____% Confidence Interval Upper					
____% Confidence Interval Lower					

62

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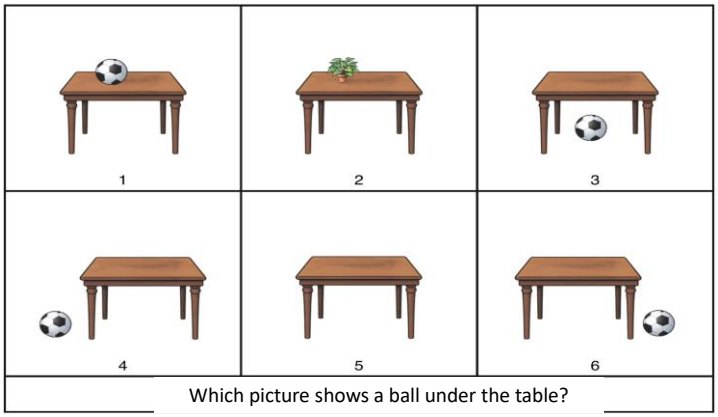
PASS Theory: Simultaneous

- **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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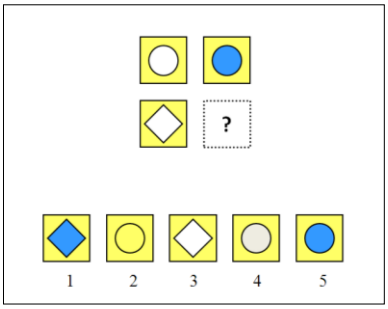
Thinking vs Knowing

Solving these analogies demands the same kind of thinking

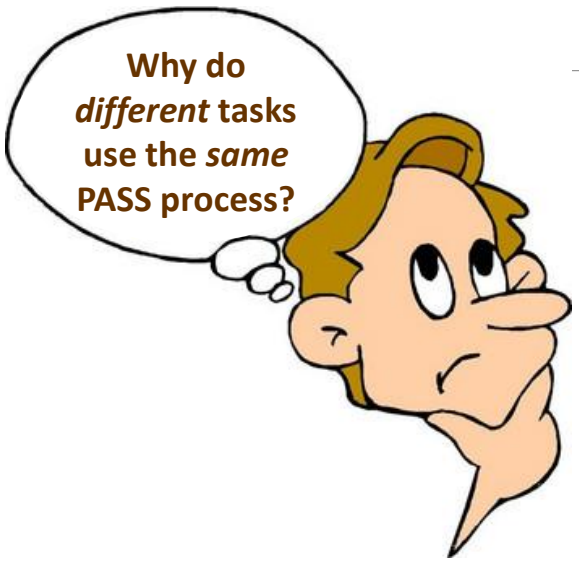


Girl is woman as boy is to ____?

3 is to 6 as 4 is to _____?

C^7 is to F as E^7 is to _____?

64



And Consider this…

- 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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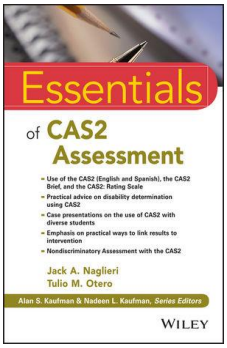
Case: Neil (Naglieri & Feifer, 2017, Intervention Chapter 5)

- Neil (9 year-old 4th grader)
  - Difficulty with spelling and written language math facts, and inconsistent with reading comprehending skills.
    - Difficulty keeping pace with his peers and often failed to complete his work in a timely manner.
    - The Child Development Team (CDT) recommended a comprehensive psychological evaluation.



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Case: Neil 4th grade –CAS2

CAS-2	STANDARD SCORE	RANGE
Planning:	**94**	**Average**
Attention:	**98**	**Average**
Simultaneous the ability to reason and problem solve by integrating separate elements into a conceptual whole, and often requires strong visual-spatial problem solving skills.	**74**	**Very Low**
Successive	**90**	**Average**
~~**CAS-2 Full SCale**~~	~~**89**~~	~~**Below Average**~~

FAR index	Standard score
Phonological Index	90
Fluency Index	73
Mixed Index	81
Comprehension Index	97
FAR Total Index	**84**

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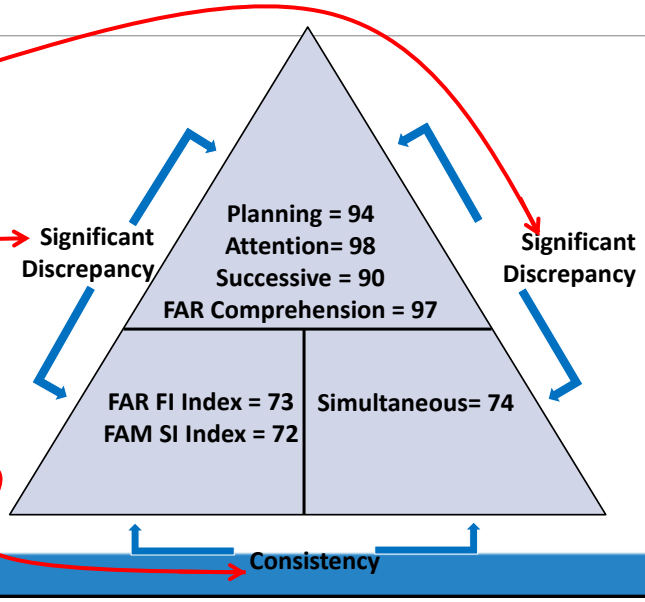
Case: Discrepancy Consistency for Neil

- 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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PASS Theory Based on Brain Function – Successive Processing

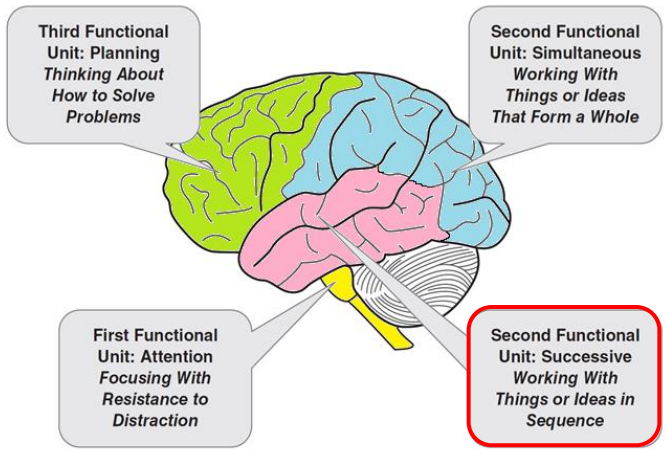

Figure 1.2 Three Functional Units and Associated Brain Structures

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

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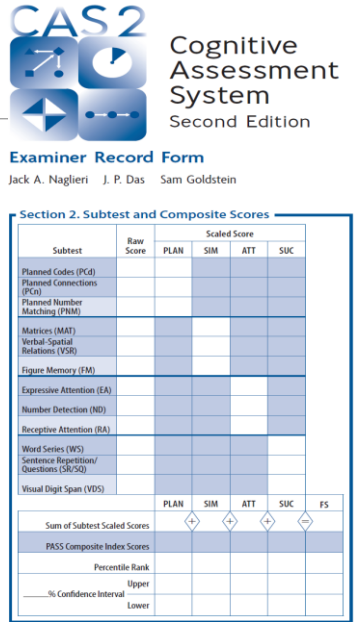
Successive Subtests

Word Series

Sentence Repetition or Sentence Questions

Visual Digit Span



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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

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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?***

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.

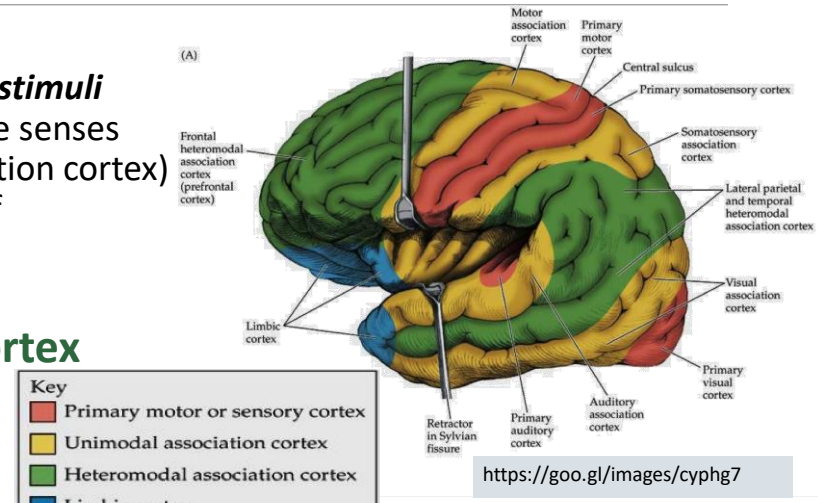
During the past month, how often did the child or adolescent . . .	Never	Rarely	Sometimes	Frequently	Always
31. recall a phone number after hearing it?	0	1	2	3	4
32. remember a list of words?	0	1	2	3	4
33. sound out hard words?	0	1	2	3	4
34. correctly repeat long, new words?	0	1	2	3	4
35. remember how 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

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)



https://goo.gl/images/cyphg7

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Case of Paul: gr. 4 Dyslexia (Steve Feifer)

- **Case of Paul -**A 9-year-old in 4th grade
  - Problems in reading and math
  - Can't remember the sequence of steps when doing math and math facts
  - Good memory for details
  - Can't sound out words
  - Poor spelling
  - Poor reading comprehension

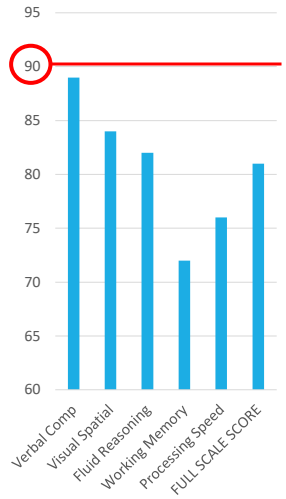
75

75

Paul – age 9 years

Presenting Concerns: Reading, Math Word Problems, Anxiety

WISCV	COMPOSITE SCORE	RANGE	PERCENTILE RANK
Verbal Comprehension	89	Below Average	23%
Visual Spatial	84	Below Average	14%
Fluid Reasoning	82	Below Average	12%
Working Memory	72	Very Low	3%
Processing Speed	76	Very Low	6%
FULL SCALE SCORE	81	Below Average	10%
WIAT III Reading	87	Below Average	19%
WIAT III Math	90	Average	25%
WIAT III Writing	94	Average	34%



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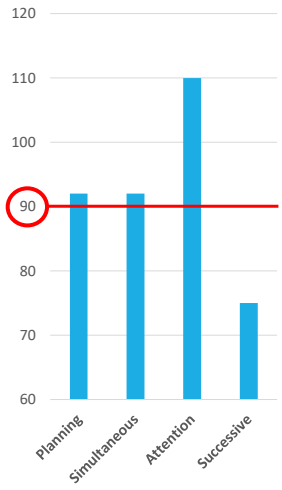
Paul – age 9 years

CAS-2	STANDARD SCORE	Classification
Planning	92	Average
Simultaneous	92	Average
Attention	110	Average
Successive	75	Very Low

Differences Between PASS Scale Standard Scores and the Student's Average PASS Score Required for Significance for the CAS2 12-Subtest EXTENDED battery AGES 8-18 Years.

Ages 8-18 YEARS

Cognitive Assessment System - 2		Difference from PASS Mean of:	Significantly Different (at $p < .05$) from	Strength or Weakness	
PASS Scales	Standard Score	92.3			
Planning	92	-0.3	no		
Simultaneous	92	-0.3	no		
Attention	110	17.8	yes	Strength	
Successive	75	-17.3	yes		Weakness



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Questions and Thoughts Please

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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*
- Administration and Interpretation Issues
  - Test order, subtest interpretation, etc.
- Reasons To Change
  - Validity of PASS Theory

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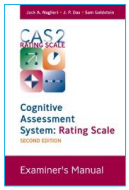
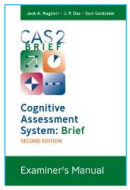
PASS Comprehensive System

(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

CAS2 Rating Scale (4 subtests)	**CAS2 Brief** (4 subtests 20 minutes)	**CAS2 Core** (8 subtests 40 minutes)	**CAS2 Extended** (12 subtests 60 minutes)
Total Score Planning Simultaneous Attention Successive	Total Score Planning Simultaneous Attention Successive	Full Scale Planning Simultaneous Attention Successive	Full Scale Planning Simultaneous Attention Successive Supplemental Scales Executive Function Working Memory Verbal / Nonverbal Visual / Auditory Speed / Fluency





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CAS2 for (Ages 5-18 yrs.)

8-subtest version takes

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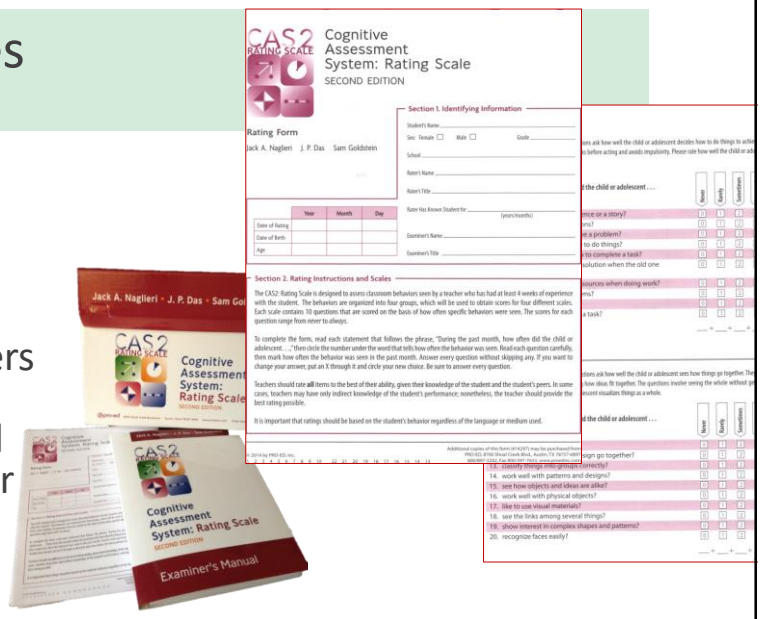
CAS2 Rating Scales
(Ages 4-18 yrs.)

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



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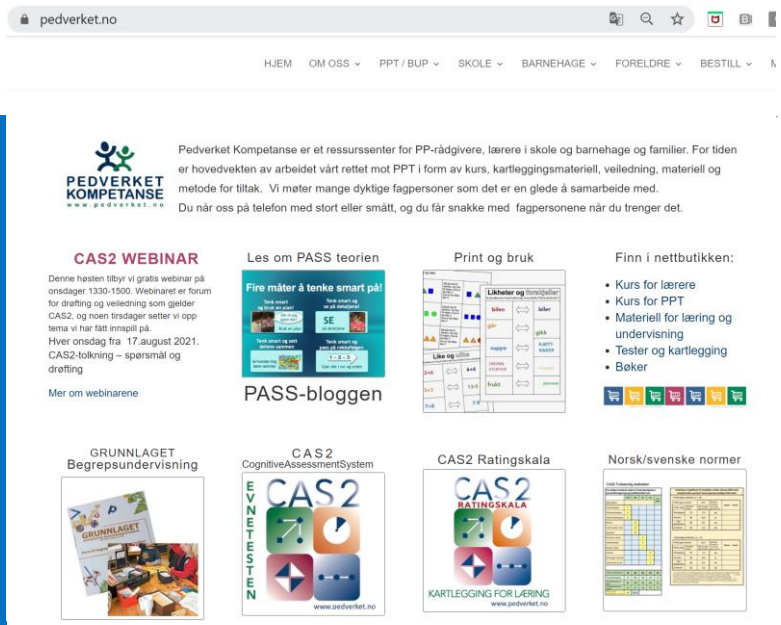
Introducing the 2021 CAS2- with Norms for Norway and Sweden from

pedverket.no



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Questions and Thoughts Please

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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*
- **Administration and Interpretation Issues**
  - Test order, subtest interpretation, etc.
- **Reasons To Change**
  - Validity of PASS Theory

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Research on Interpretation of Test Scores and PSW

Journal Information
Journal TOC

PsycARTICLES: Journal Article

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

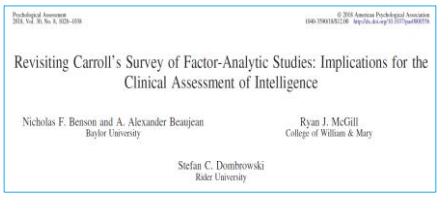
© Request Permissions

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

Support for 'g'

- …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).



Revisiting Carroll's Survey of Factor-Analytic Studies: Implications for the Clinical Assessment of Intelligence

Nicholas F. Benson and A. Alexander Beaujean
Baylor University

Ryan J. McGill
College of William & Mary

Stefan C. Dombrowski
Rider University

- **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**.

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*.

School Psychology Quarterly
2011, Vol. 26, No. 4, 305–317

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1045-3830/11/$12.00 DOI: 10.1037/a0025973

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)

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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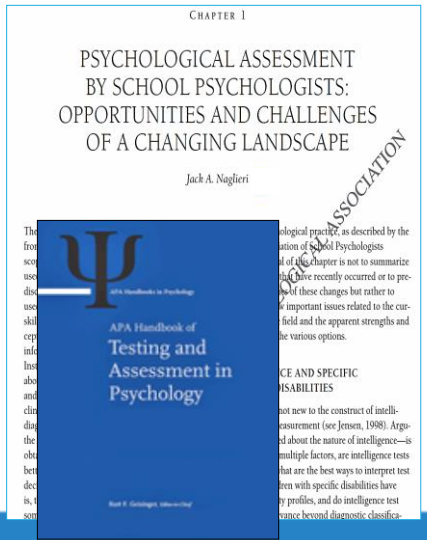
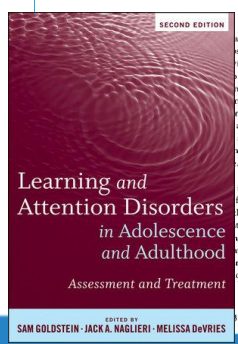
PASS Scales can be Interpreted and SHOULD be: Profiles


CHAPTER 1

PSYCHOLOGICAL ASSESSMENT BY SCHOOL PSYCHOLOGISTS: OPPORTUNITIES AND CHALLENGES OF A CHANGING LANDSCAPE

Jack A. Naglieri



CHAPTER 6

Assessment of Cognitive and Neuropsychological Processes

JACK A. NAGLIERI
SAM GOLDSTEIN

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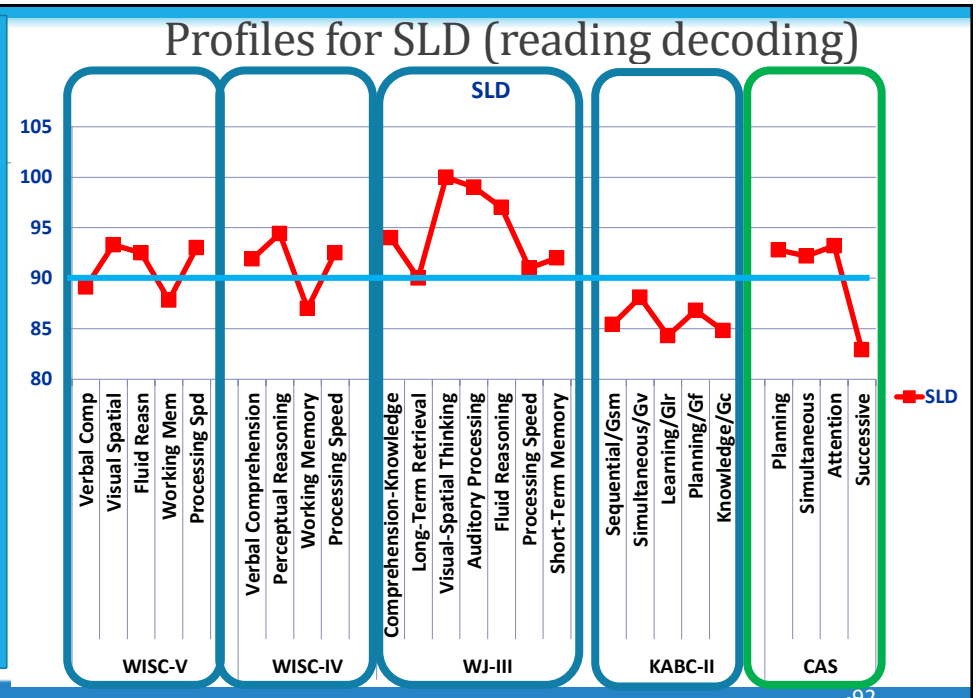
Profiles on all these widely used ability tests show that PASS scores from the CAS are sensitive to the cognitive component that underlies READING DECODING failure (Successive Processing)



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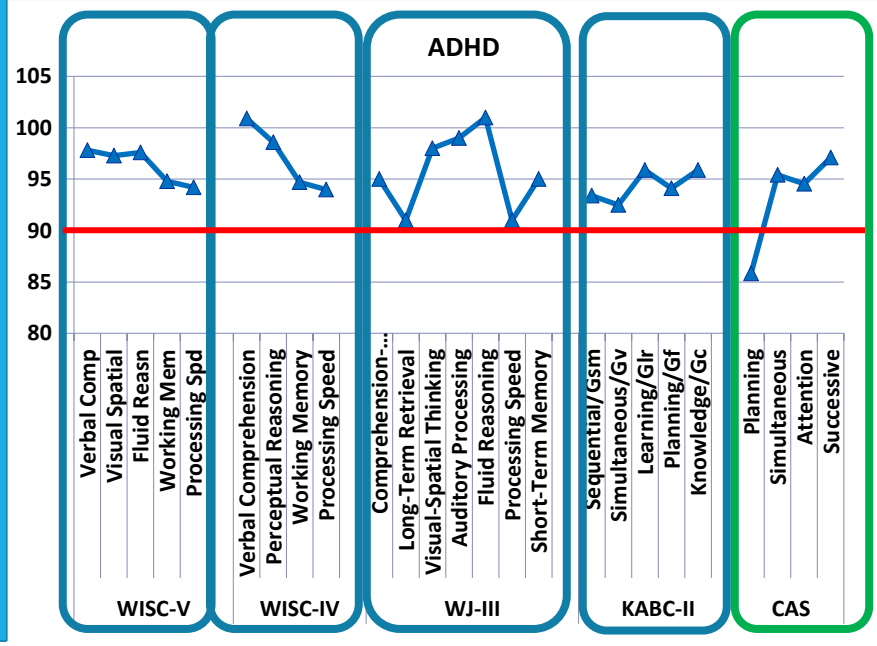
Profiles on all these widely used ability tests show that PASS scores from the CAS are sensitive to the cognitive component of ADHD Hyperactive / Combined Type (Planning)



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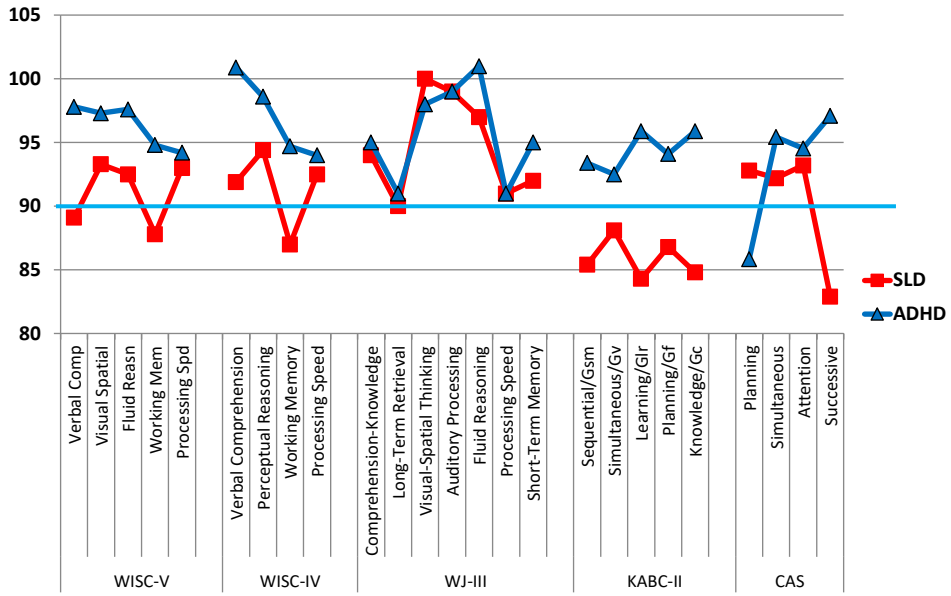
Looking at SLD and ADHD profiles on all these tests is very revealing…PASS works

Profiles for SLD (reading decoding) & ADHD



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Intelligence Tests and Prediction

- Intelligence tests are one of the primary tools for identifying children with Intellectual disability, specific learning disabilities, and giftedness
  - The goal is to determine if there is a cognitive explanation for academic successes or failure
- The correlations between intelligence and achievement tests and the profiles of scores these tests measure tell us the value these test scores have for both predication and explanation of specific academic success and failure

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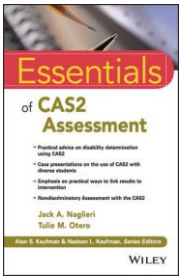
Correlations: We can do better!

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



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

Note: WJ-IV Scales Comp-Know= Vocabulary and General Information; Fluid Reasoning = Number 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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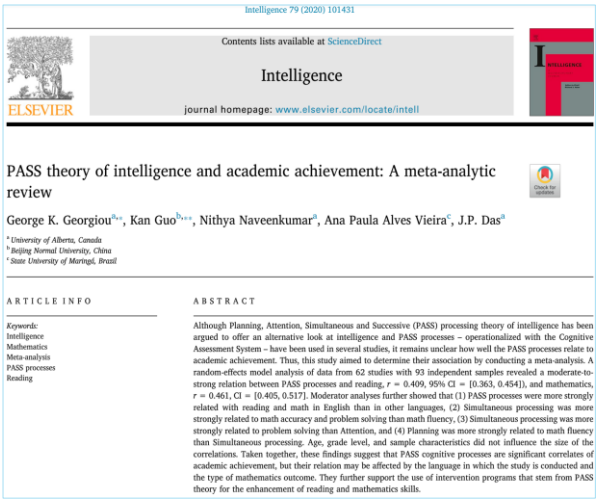
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PASS theory of intelligence and academic achievement: A meta-analytic review

George K. Georgiou[a,*], Kan Guo[b,**], Nithya Naveenkumar[a], Ana Paula Alves Vieira[c], J.P. Das[a]

[a] University of Alberta, Canada
[b] Beijing Normal University, China
[c] State University of Maringá, Brazil

ARTICLE INFO

Keywords:
Intelligence
Mathematics
Meta-analysis
PASS processes
Reading

ABSTRACT

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.

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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Questions and Thoughts Please

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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
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  - A Different View of People
- Research Update
  - PASS and Equity – Measure Thinking not Knowing
  - To *g* or not to *g*
- Administration and Interpretation Issues
  - Test order, subtest interpretation, etc.
- Reasons To Change
  - Validity of PASS Theory

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Answering the Question: "Why the student struggles?"

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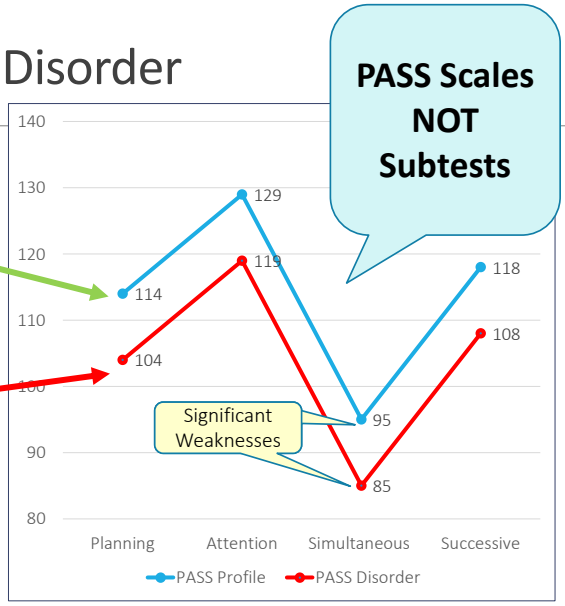
How to Determine a Disorder

- Two criteria for a disorder
  - Significant variation in relation to student's average has *instructional relevance*
  - Significant variation in relation to student's average **AND** a standard score less than 90 (< 25th %tile) *supports designation as SLD*



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PASS Score Analyzer

Enter CAS2 Subtest Scaled scores in Yellow Boxes and Input a level of significance for confidence intervals.

CAS2 Subtests	Planning	imultaneou	Attention	Successive	Full Scale
	Subtest Scaled Scores				
Planned Codes	10				
Planned Connections	10				
Planned Number Matching	10				
Matrices		7			
Verbal-Spatial Relations		7			
Figure Memory		7			
Expressive Attention			11		
Number Detection			11		
Receptive Attention			11		
Word Series				13	
Sentence Repetition/Questions				13	
Visual Digit Span				13	

PASS Standard Scores	110	76	115	129	110
Percentile Rank	75	5	84	97	75
Upper Confidence Interval	120	86	126	138	117
Lower Confidence Interval	98	68	102	116	103
Input a Level of Confidence (.01, .05, etc)	.01	99%			

Notes:

1. The subtest scores are based on US standardization sample and the PASS and Full Scale scores are based on the samples from Norway and Sweden.

Differences Between PASS Scale Standard Scores and the Student's Average PASS Score at p = .05 for the CAS2 12-Subtest battery.

CAS-2 PASS Scales	Standard Score	PASS Mean & Differences: 107.5	Significantly Different (at p = .05) from PASS Mean?	Strength or Weakness
Planning	110	2.5	no	
Simultaneous	76	-31.5	yes	Weakness
Attention	115	7.5	no	
Successive	129	21.5	yes	Strength

Differences Between PASS Scale Standard Scores and the Student's Average PASS Score at p = .10 for the CAS2 12-Subtest battery.

CAS-2 PASS Scales	Standard Score	PASS Mean & Differences: 107.5	Significantly Different (at p = .05) from PASS Mean?	Strength or Weakness
Planning	110	2.5	no	
Simultaneous	76	-31.5	yes	Weakness
Attention	115	7.5	no	
Successive	129	21.5	yes	Strength

1. A Weakness is defined as PASS standard score that is significantly below the child's average PASS score (ipsative 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 (ipsative comparison at the .05 level) and the PASS score is above 109 (i.e. above the Average range). 3. See Essentials of CAS2 Assessment (Naglieri & Otero, 2017) Interpretation Chapter for more details and examples of how to interpret PASS score variability.

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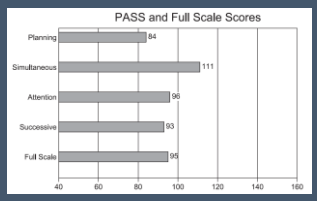
Interpretation Details

- Full Scale – Is misleading if there is PASS scale variability
- You may want to exclude the Full Scale completely



FULL SCALE

Tony earned a Cognitive Assessment System, Second Edition (CAS2) Full Scale score of 95, which is within the Average classification and is a percentile rank of 37. This means that his performance is equal to or greater than that of 37% of children his age in the standardization group. There is a 90% probability that Tony's true Full Scale score falls within the range of 91 to 99. The CAS2 Full Scale score is made up of separate scales called Planning, Attention, Simultaneous, and Successive cognitive processing. Because there was significant variation among the PASS scales, the Full Scale will sometimes be higher and other times lower than the four scales in this test. The Planning Scale was found to be a significant cognitive weakness. This means that Tony's Planning score was a weakness both in relation to his average PASS score and when compared to his peers. This cognitive weakness has important implications for diagnosis, eligibility determination, therapeutic and educational programming. The Simultaneous Scale was found to be a significant cognitive strength. This means that Tony's Simultaneous score was a strength both in relation to his average PASS score and when compared to his peers. This cognitive strength has important implications for instructional and educational programming.

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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*
- Administration and Interpretation Issues
  - Test order, subtest interpretation, etc.
- Reasons To Change
  - Validity of PASS Theory

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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**. (Digital CAS2 is in final stages of development.)
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 data 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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Questions and Thoughts Please

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For more information:

- www.jacknaglieri.com
- www.naglierigiftedtests.com

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