Intelligence Redefined as PASS Neurocognitive Processes and Measured with the CAS2

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1

1

Naglieri Disclosures

2

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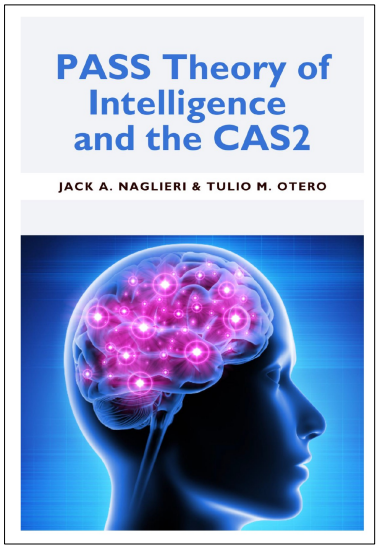
3

QR Codes



Download Free E-Book

The goal of this e-book is to describe the context in which the PASS Theory of Intelligence was conceived and explain how it guided the construction of the Cognitive Assessment System and its various versions of the second edition.

CAS2 Free Access for Univ Professors

Neurodiversity Podcast

PASS Theory & CAS2

CAS2 Digital Norming Study

4

From Norway September 2022 to Cyprus November 2024

"Multifaceted aspects of Applied Neuroscience in typical and atypical cognition"

PROGRAM

Dr Elena Philippou,
Associate Professor Department of Life Sciences, University of Nicosia, Cyprus
'Associations between chrono-nutrition behaviours and cognitive function in middle-aged adults: the NUTRICO cross-sectional cohort study.'

Evgenia-Peristera Kouki,
Ph.D. Student
'Visual Expertise for Print in School-Age Children: An Event-Related Potentials Study on Pseudowords and Letter Strings.'

Dr Prokopis C. Prokopiou
Instructor in Radiology, Athinoula A. Martinos, Center for Biomedical Imaging
'Lower resting-state phasic LC activity is associated with cortical tau deposition and Aβ-related cognitive decline in preclinical Alzheimer's Disease.'

1300 - 1400 **Light Reception & Poster Viewings**

1400 - 1520 **CAN Presentations**

Prof. George Spanoudis
Prof. of Psychology & Director of the Language and Cognitive Development Research Group, UCY
& Andreas Savva,
Ph.D. Student
'Reframing Cognitive Development: A New Theoretical Perspective through Information Geometry and Mathematical Modeling'

Prof. Timothy C. Papadopoulos
RIF Distinguished Prof. of Psychology, & Director of the Learning Disabilities Group , UCY
& Dr Argyro Fella
Assistant Prof. of Education, UNIC
'Eye-Tracking in Reading Research: A Systematic Review of Studies with Children of Varying Reading Ability'

Prof. Georgia Panayiotou
Prof. of Psychology & Director of the Clinical Psychology and Psychophysiology Laboratory, UCY
'Using psychophysiology to assess emotion processes in the lab and beyond and cognitive processes'

1530 - 1630 **Keynote**
Prof Jack Naglieri
Emeritus Prof., George Mason University & Senior Research Scientist, Devereux Center for Resilient Children
'Intelligence Redefined as PASS Neurocognitive Processes and Measured with the CAS2'

1630 - 1700 **Coffee Break & Poster Viewings**

1700 - 1800 **Panel Discussion**

1800 - 1815 **Closing Comments**

5

Ideas to Consider

A 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
- To *g* or not to *g*

PASS Profiles SLD ADHD and ASD
- Diagnostic implications

6

6

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
  - 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

1975 Charles Campagne Elementary, Bethpage, NY

7

1981

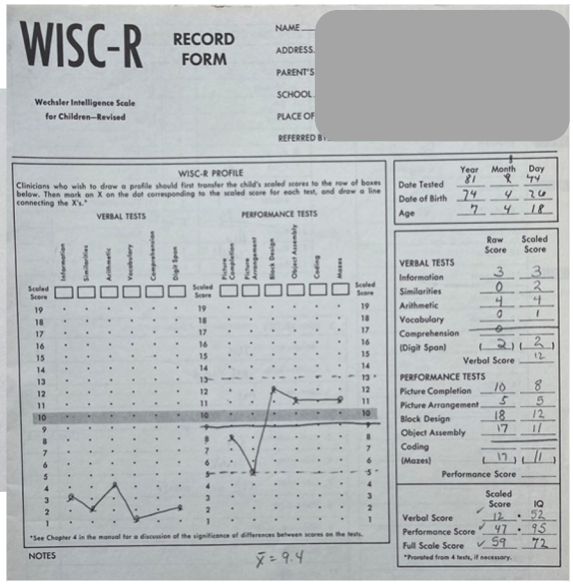
Test Results and Interpretations:

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.

WISC-V Full Scale

Verbal Comprehension	Visual Spatial	Fluid Reasoning	Working Memory	Processing Speed
Similarities	Block Design	Matrix Reasoning	Digit Span	Coding
Vocabulary	Visual Puzzles	Figure Weights	Picture Span	Symbol Search
Information		Picture Concepts	Letter–Number Sequencing	Cancellation
Comprehension		Arithmetic		



Naglieri, J. A. (1982). Does the WISC-R measure verbal intelligence for non-English speaking children? *Psychology in the Schools, 19*, 478-479.

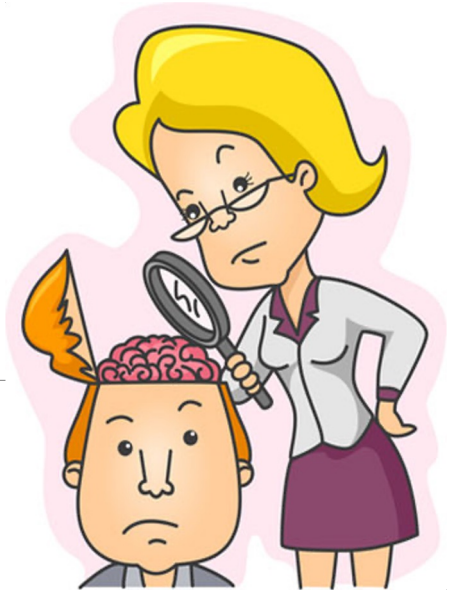
8

8

I realized that we should measure intelligence in a way that was not dependent on knowledge

Why we measure intelligence the way we do?

The History of IQ tests



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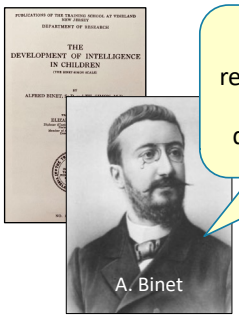
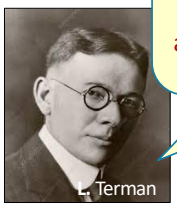
Binet -> Stanford-Binet -> Army Mental Tests -> WISC



A. Binet

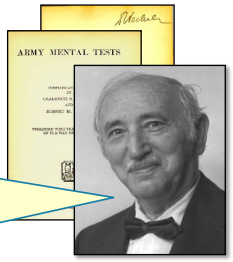
When working on the 1911 scale, Binet removed items from 1908 scale because 'they depended too much on school learning'



L. Terman

Terman added items dependent upon school learning in the 1916 Stanford-Binet because he believed 'intelligence at the verbal and abstract levels is the highest form of mental ability'.

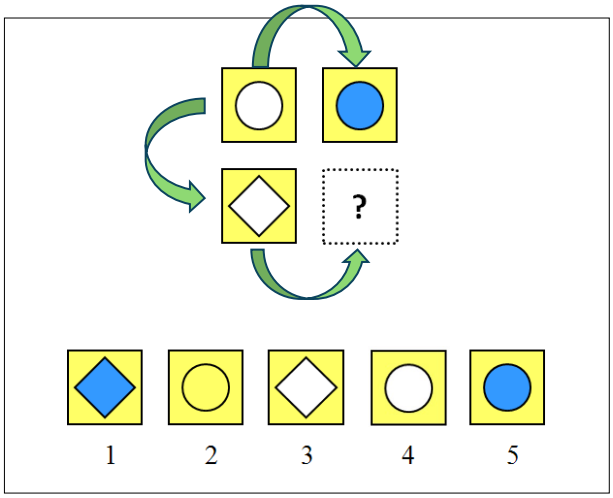
Arthur Otis (Terman's student) was instrumental in the development of the U.S. Army Alpha (Verbal & Quantitative) and Beta (Nonverbal) and the Otis-Lennon Ability Test



Wechsler based his intelligence test on the U.S. Army Mental Tests (Verbal, Quantitative & Nonverbal)

10

Tests that Measure Thinking or Knowing?



Girl is woman as boy is to ____?

3 is to 6 as 4 is to ____?

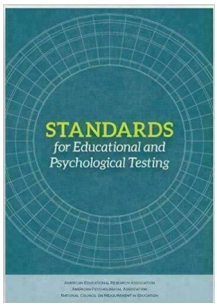
C^7 is to F as E^7 is to ____?

11

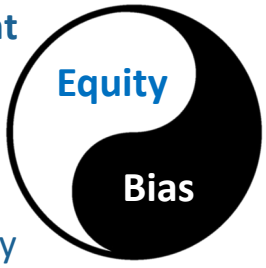
11

Test Bias vs Test Equity

According to the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014) Psychometric TEST BIAS and EQUITY are two different ways of measuring test fairness.

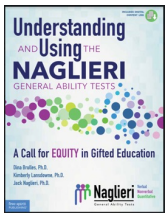


- … **if a person has had limited opportunities to learn the content in a test of intelligence, *that test may be considered unfair* even if there is no evidence of psychometric test bias.**
- Evidence of EQUITY is examined by test content and mean score differences



12

Race and Ethnic Differences for *Traditional* and *Second-Generation* Intelligence Tests



Note: Even though traditional intelligence tests may not show psychometric bias (Worrell, 2019) the large mean score differences suggest they are unfair (Brulles, et al., 2022).

	By Race	By Ethnicity
Tests that require knowledge	**Mn = 9.4**	**Mn =6.6**
Otis-Lennon School Ability Test (district wide)	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	11.8	7.6
CogAT7 - Verbal	6.6	5.3
CogAT7-Quantitative	5.6	3.6
CogAT- Nonverbal	6.4	2.9
CogAT-Total (V, Q & NV)	7.0	4.5
K-ABC II Fluid-Crystallized Index	9.4	9.8
K-ABC II Mental Processing Index	8.1	8.2
WISC-V (statistical controls)	8.7	
Tests that require minimal knowledge	**Mn = 4.3**	**Mn = 2.9**
K-ABC (normative sample)	7.0	
K-ABC (matched samples)	6.1	
KABC-II (adjusted for gender & SES)	6.7	5.4
CAS-2 (normative sample)	6.3	4.5
CAS (statistical control normative data)	4.8	4.8
CAS-2 (statistical control normative data)	4.3	1.8
CAS-2 Brief (normative samples)	2.0	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 and Oakland (2006) and ethnic differences by Sotelo-Dynega, Ortiz, Flanagan, and Chaplin (2013); CogAT7 by Carman, Walther and Bartsch (2018) and Lohman (2016), WISC-V by Kaufman, Raiford, and Coalson (2016); Kaufman Assessment Battery for Children-II by Lichtenberger, Volker, Kaufman & Kaufman, (2006) and Scheiber, C., Kaufman, A.S. Which of the Three KABC-II Global Scores is the Least Biased?. Journal of Pediatric Neuropsychology 1, 21–35 (2015); CAS by Naglieri, Rojahn, Matto, and Aquilino (2005); CAS-2 and CAS2:Brief by Naglieri, Das, and Goldstein, 2014a and 2014b; Naglieri Nonverbal Ability Test by Naglieri and Ronning (2000), and Naglieri General Ability Tests by Naglieri, Brulles, and Lansdowne (2022).

13

13

What is the Practical Impact?

The test you choose **determines** the **results** you receive, the **decisions** you make, and the **future** of that student.

14

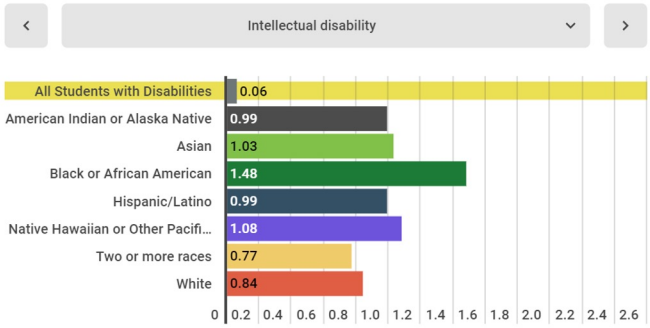
14

OSEP Office of Special Education Programs
Office of Special Education and Rehabilitative Services

OSEP Fast Facts: Race and Ethnicity of Children with Disabilities Served under IDEA Part B

For the purposes of this fact sheet, racial ethnic groups are defined in the IDEA Part B Child Count and Educational Environments for School Year 2019-2020, OSEP Data Documentation. https://www2.ed.gov/programs/osepidea/618-data/collection-documentation/data-documentation-files/part-b/child-count-and-educational-environment/idea-partb-childcountandedenvironment-2019-20.pdf

Risk Ratio of Students with Disabilities by Disability Category and by Specific Race and Ethnicity, Ages 5 (in kindergarten) through 21: SY 2019-20



The relative risk ratio of students with disabilities under IDEA by race and Ethnicity is the probability of a student with a disability being identified for intellectual disability. The higher the number, the larger the probability. Nationally, **Black Students are 1.48 times more likely to be identified with intellectual disability** compared to all students with disabilities.

https://sites.ed.gov/idea/osep-fast-facts-race-and-ethnicity-of-children-with-disabilities-served-under-idea-part-

https://ldaamerica.org/lda_today/disproportionate-identification-of-students-of-color-in-special-education/

15

Questions about What I Just Presented?

16

Ideas to Consider

- **A 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
  - To *g* or not to *g*
- **PASS Profiles SLD ADHD and ASD**
  - Diagnostic implications

17

17

Intelligence as Neurocognitive Functions

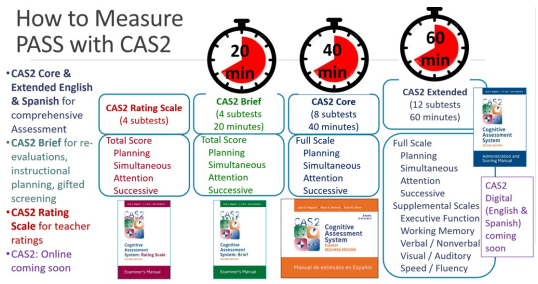
- In my first working meeting with JP Das (February 11, 1984) we proposed that intelligence was better REinvented as neurocognitive processes andwe began development of the **C**ognitive **A**ssessment **S**yste

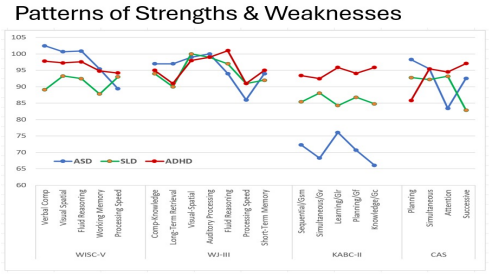
➢ We conceptualized intelligence as Planning, Attention, Simultaneous, and Successive (PASS) neurocognitive processes based on Luria's concepts of brain function.

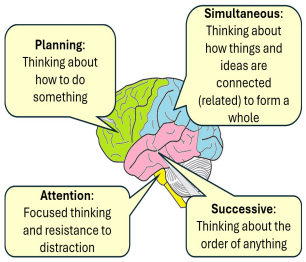
18

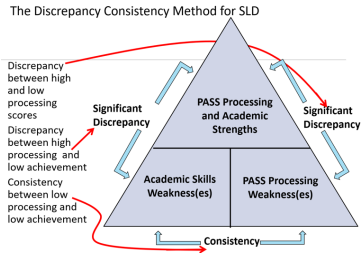
18

Intelligence Redefined as PASS Theory









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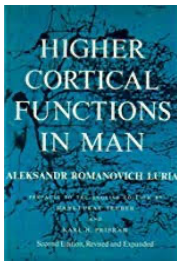
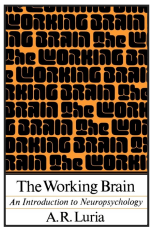
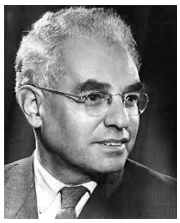
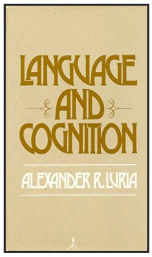
19

PASS Neurocognitive Theory









- **P**lanning = THINKING ABOUT HOW YOU DO WHAT YOU DECIDE TO DO
- **A**ttention = FOCUSED THINKING AND RESISTANCE TO DISTRACTIONS
- **S**imultaneous = THINKING ABOUT HOW THINGS GO TOGETHER
- **S**uccessive = THINKING ABOUT THE SEQUENCE OF THINGS

PASS = 'basic psychological processes'

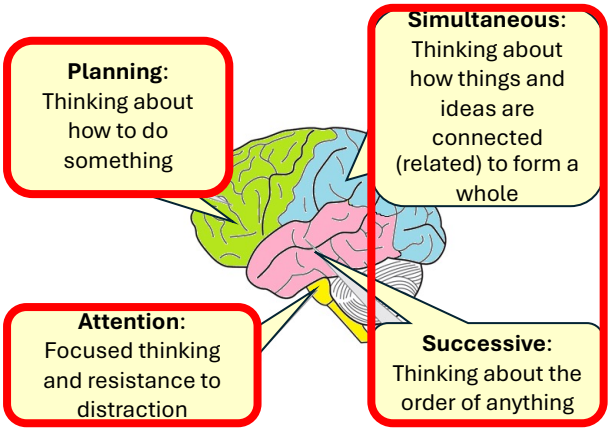
NOTE: Easy to understand concepts!

20

20

A Way to Understand Learning, Obstacles to Learning and Specific Learning Disabilities

- The first step is being alert and focused
- The second step is deciding how to achieve a goal
- The third step is applying different ways to solving various tasks

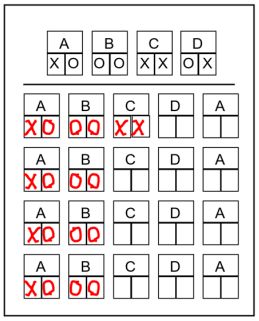


From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017 Figure 1.2 Functional Units from A. R. Luria

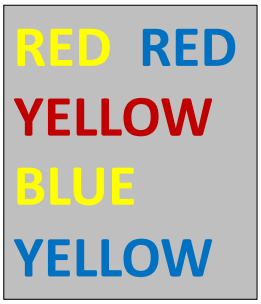
21

21

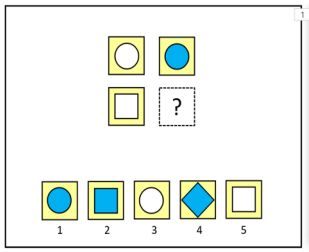
Four Ways to Measure Thinking (PASS) not Knowing



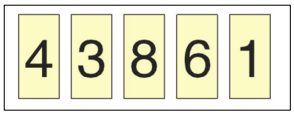
Planning
1. Planned Codes
2. Planned Connections
3. Planned Number Matching



Attention
1. Expressive Attention
2. Number Detection
3. Receptive Attention



Simultaneous
1. Matrices
2. Verbal Spatial Relations
3. Figure Memory



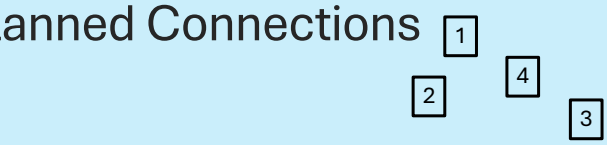
Successive
1. Visual Digit Span
2. Word Series
3. Sentence Repetition or Questions

22

Planning Subtests

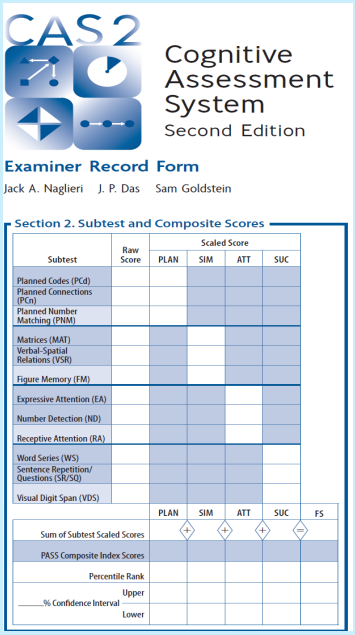
Planned Codes

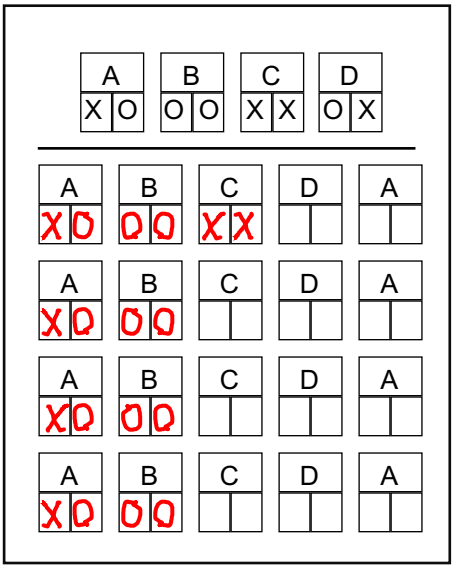
Planned Connections



Planned Number Matching

5176	5761	5167	1576	5176	1567





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”

Attention Subtests

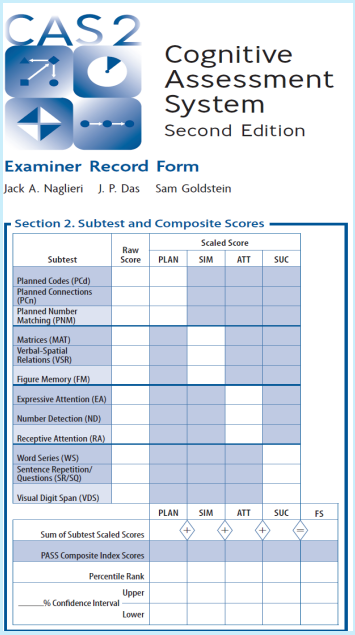
Expressive Attention

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

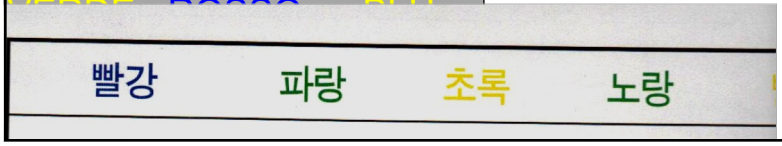


25

25

PASS Theory: Attention

- Attention is a basic psychological process we use to
  - selectively attend to some stimuli
  - Focus our cognitive activity
  - Selective attention
  - Resistance to distraction
  - osed to hearing



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

26

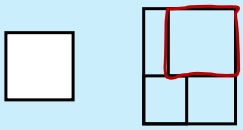
26

Simultaneous Subtests

Matrices

Verbal Spatial Relations

Figure Memory



CAS 2 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)					

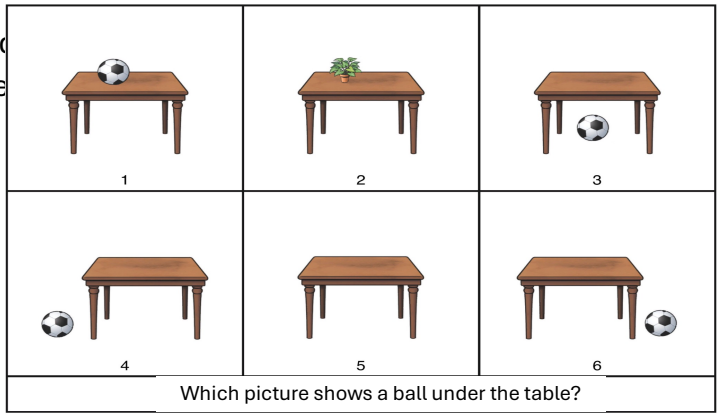
	PLAN	SIM	ATT	SUC	FS
Sum of Subtest Scaled Scores		+	+	+	=
PASS Composite Index Scores					
Percentile Rank					
____% Confidence Interval Upper					
____% Confidence Interval Lower					

27

27

PASS Theory: Simultaneous

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



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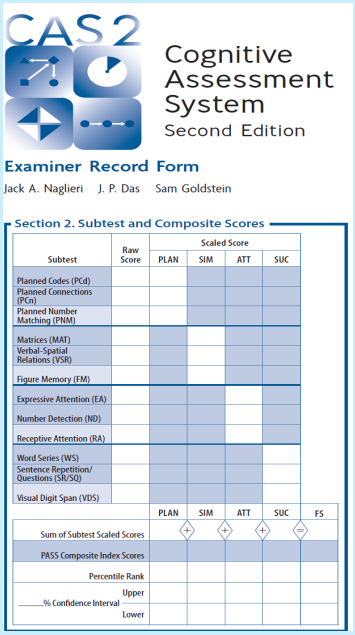
Successive Subtests

Word Series

Sentence Repetition or Sentence Questions

Visual Digit Span


CAS 2
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
Upper
_____% Confidence Interval
Lower

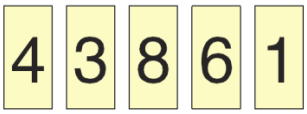
29

29

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



- 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?***

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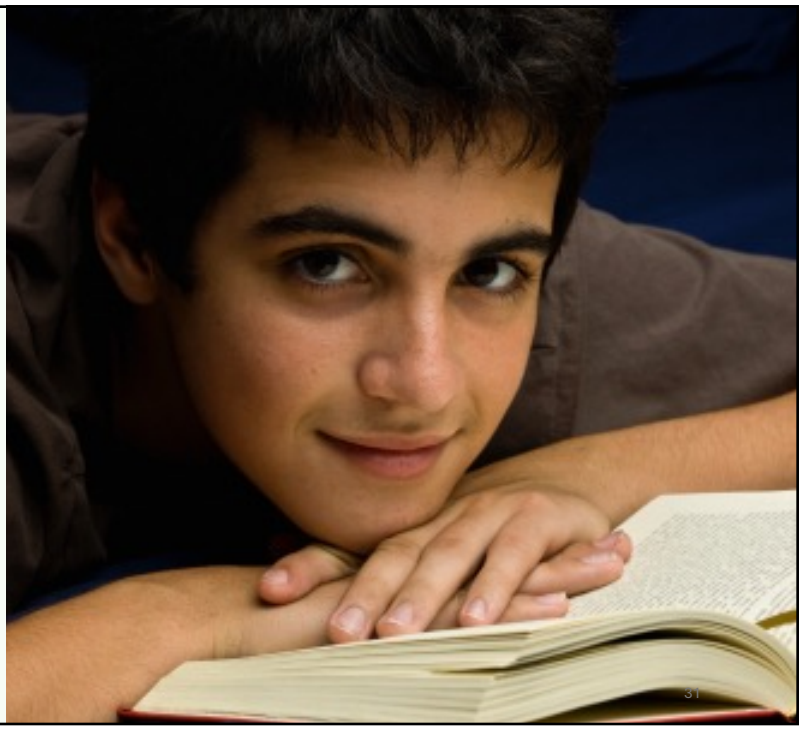
The Case of Rocky

Strengths with Specific Learning Disability and ADHD



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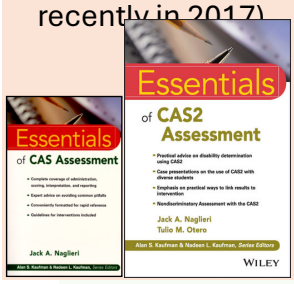
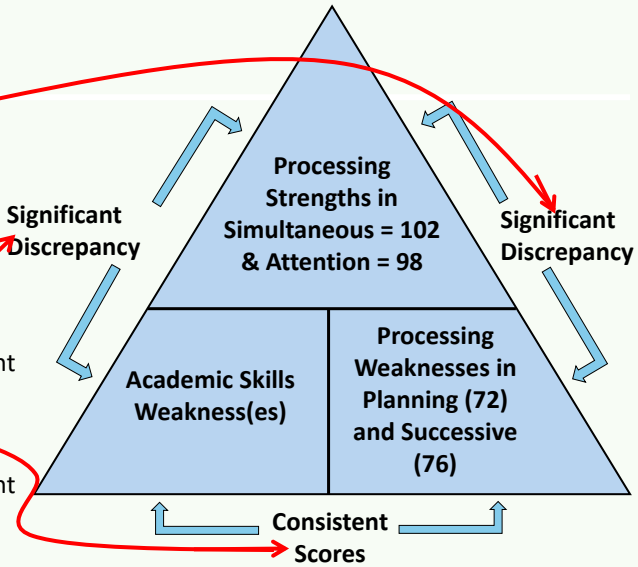
- The Discrepancy Consistency Method (DCM) was first introduced in 1999 (most recently in 2017)



- 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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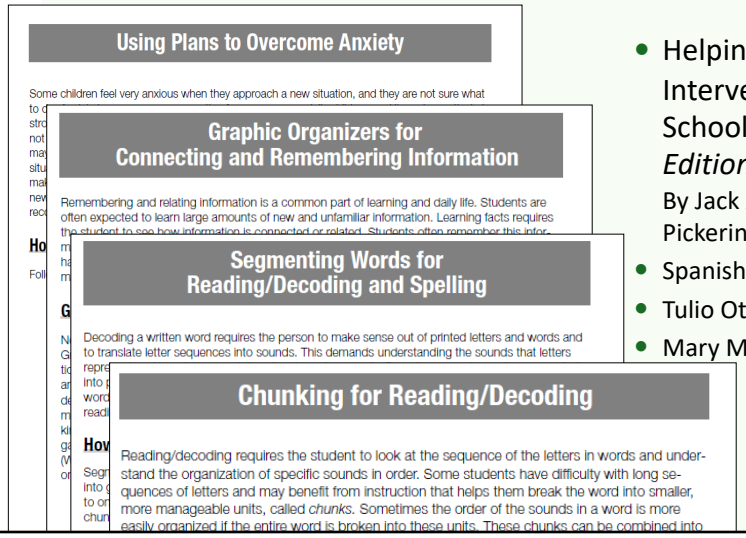
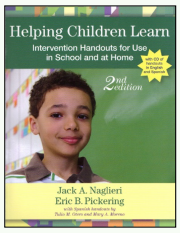
Interventions for Rocky



- 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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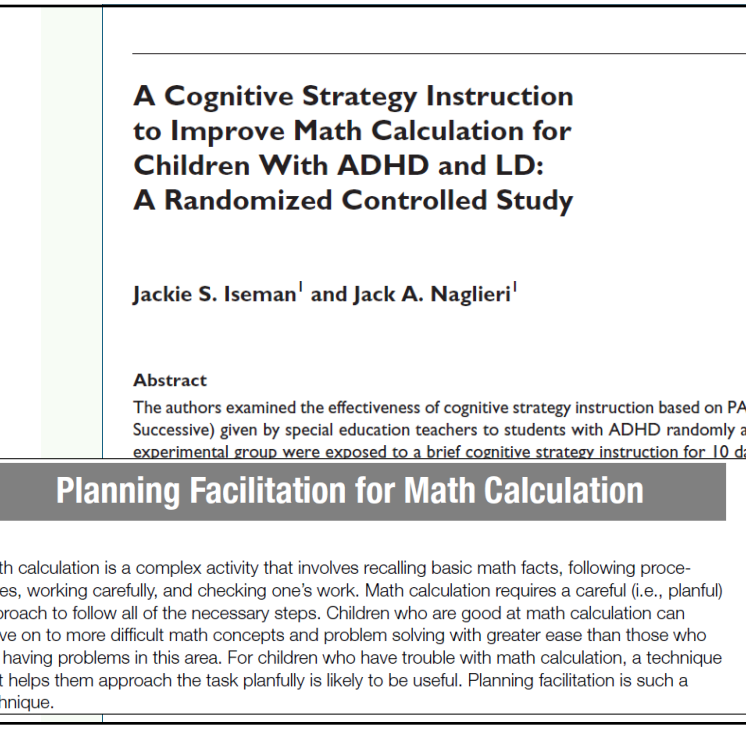

34

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

35

35

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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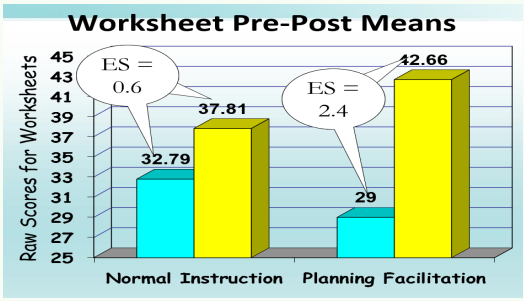
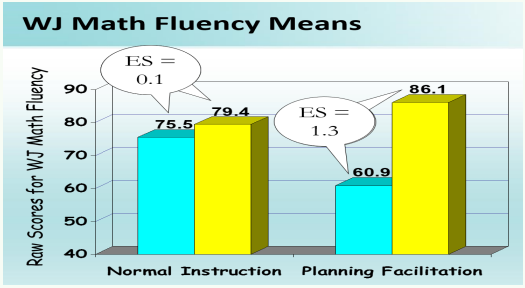
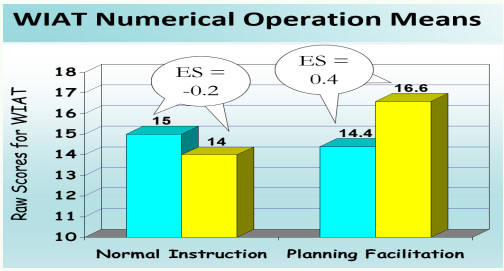
36

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







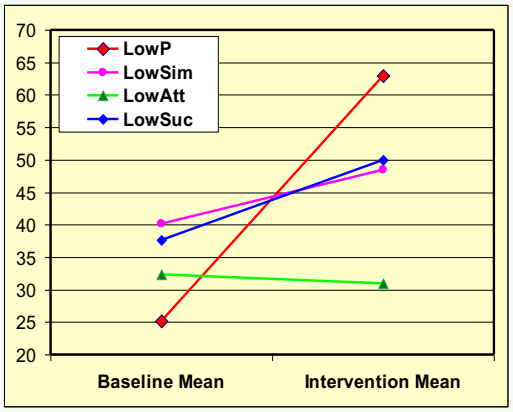
At 1-year follow-up, 27 of the students were retested on the WJ-III ACH Math Fluency subtest as part of the school's typical yearly evaluation of students. This group included 14 students from the comparison group and 13 students from the experimental group. The results indicated that the improvement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

37

37

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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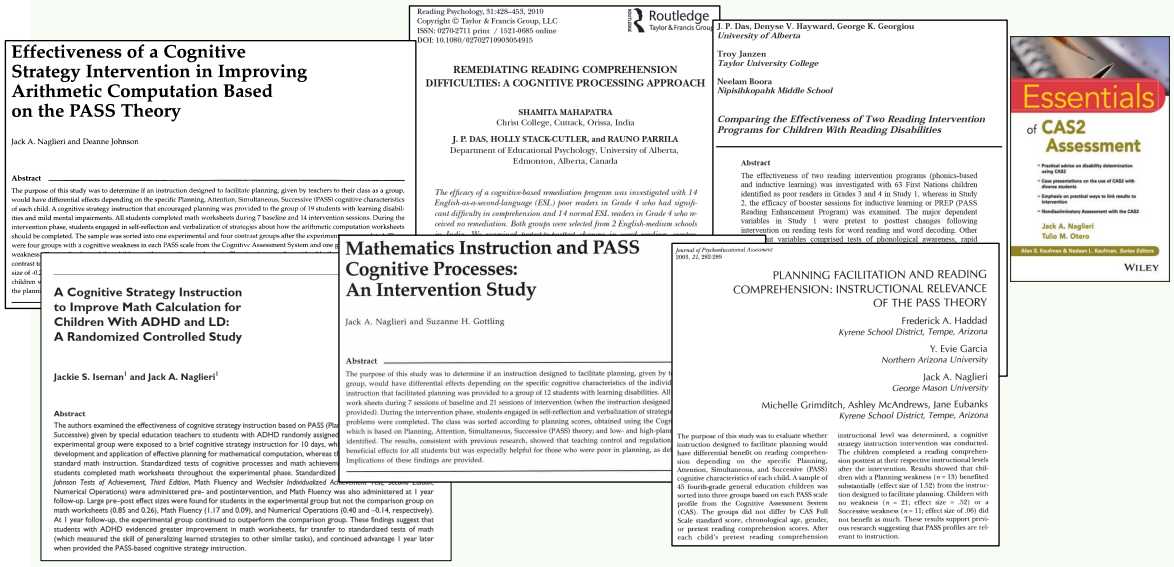
38

Summary of PASS Intervention Research in Essentials of CAS2



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39

Questions or Comments about What I Just Presented?

40

Ideas to Consider

A 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
- To *g* or not to *g*

PASS Profiles SLD ADHD and ASD
- Diagnostic implications

41

41

CAS2 for (Ages 5-18 yrs.)

NEW! CAS2 Digital (English and Spanish) coming soon with integrated scoring and narrative report

42

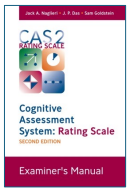
42

Ways to Measure PASS

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

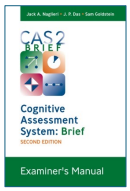
CAS2 Rating Scale
(4 subtests)

Total Score
Planning
Simultaneous
Attention
Successive



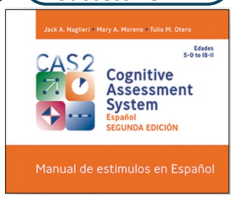
CAS2 Brief
(4 subtests
20 minutes)

Total Score
Planning
Simultaneous
Attention
Successive



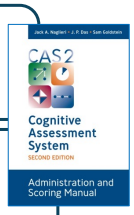
CAS2 Core
(8 subtests
40 minutes)

Full Scale
Planning
Simultaneous
Attention
Successive



CAS2 Extended
(12 subtests
60 minutes)

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



CAS2 Digital (English & Spanish) coming soon

43

43

Ideas to Consider

A 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
- To *g* or not to *g*

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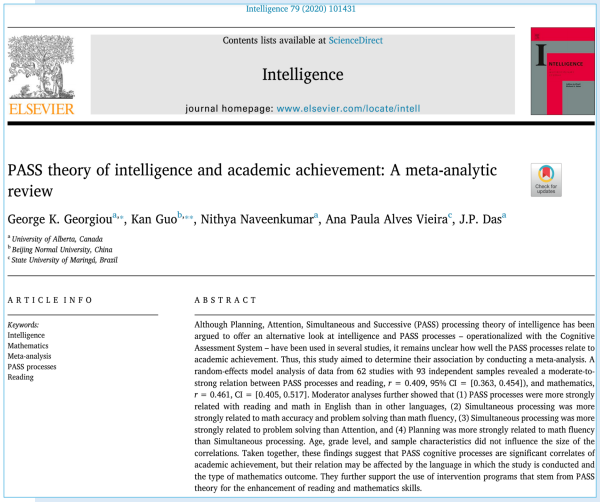
- Diagnostic implications

44

44



Intelligence 79 (2020) 101431

Contents lists available at ScienceDirect

Intelligence

journal homepage: www.elsevier.com/locate/intell

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]

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[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…"

45

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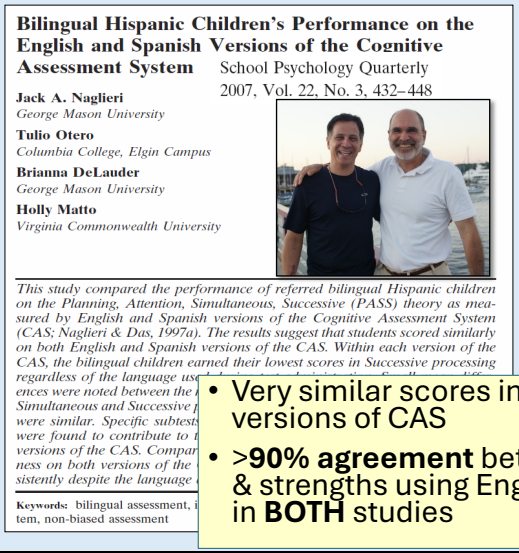
PASS scores – English and Spanish



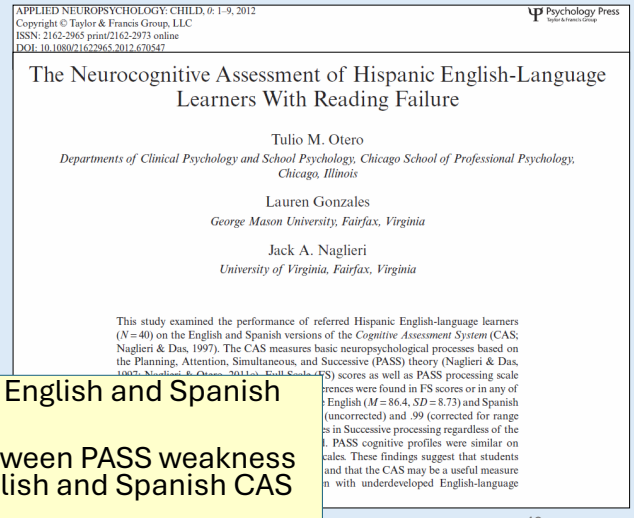
Bilingual Hispanic Children's Performance on the English and Spanish Versions of the Cognitive Assessment System

School Psychology Quarterly
2007, Vol. 22, No. 3, 432–448

Jack A. Naglieri
George Mason University
Tulio Otero
Columbia College, Elgin Campus
Brianna DeLauder
George Mason University
Holly Matto
Virginia Commonwealth University

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

Keywords: bilingual assessment, i
tem, non-biased assessment



APPLIED NEUROPSYCHOLOGY: CHILD, 0: 1–9, 2012
Copyright © Taylor & Francis Group, LLC
ISSN: 2162-2965 print/2162-2973 online
DOI: 10.1080/21622965.2012.670547

Psychology Press

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,

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

46

46

CAS in Italy

Using US norms, Italian sample (N = 809) CAS Full Scale was 100.9 and matched US sample (N = 1,174) was 100.5 and factorial invariance was found

Psychological Assessment

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

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

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University of Virginia and Devereux Center for Resilient Children

Stefano Taddei
University of Florence

Kevin Williams
Multi-Health Services, Toronto, Ontario, Canada

This study examined Italian and U.S. children's performance on the English and Italian versions, respectively, of the Cognitive Assessment System (CAS; Naglieri & Conway, 2009; Naglieri & Das, 1997), a test based on a neurocognitive theory of intelligence entitled PASS (Planning, Attention, Simultaneous, and Successive; Naglieri & Das, 1997; Naglieri & Otero, 2011). CAS subtest, PASS scales, and Full Scale scores for Italian (N = 809) and U.S. (N = 1,174) samples, matched by age and gender, were examined. Multigroup confirmatory factor analysis results supported the configural invariance of the CAS factor structure between Italians and Americans for the 5- to 7-year-old (root-mean-square error of approximation [RMSEA] = .038; 90% confidence interval [CI] = .033, .043; comparative fit index [CFI] = .96) and 8- to 18-year-old (RMSEA = .036; 90% CI = .028, .043; CFI = .97) age groups. The Full Scale standard scores (using the U.S. norms) for the Italian (100.9) and U.S. (100.5) samples were nearly identical. The scores between the samples for the PASS scales were very similar, except for the Attention Scale (d = 0.26), where the Italian sample's mean score was slightly higher. Negligible mean differences were found for 9 of the 13 subtest scores, 3 showed small d-ratios (2 in favor of the Italian sample), and 1 was large (in favor of the U.S. sample), but some differences in subtest variances were found. These findings suggest that the PASS theory, as measured by CAS, yields similar mean scores and showed factorial invariance for these samples of Italian and American children, who differ on cultural and linguistic characteristics.

47

47

PsycARTICLES: Journal Article

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

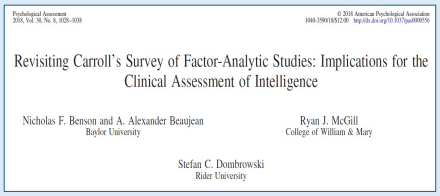
Canivez, Gary L.,Watkins, Marley W.,Dombrowski, Stefan C.

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

Journal Information
Journal TOC

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.**

48

48

KABC-II

- "No evidence for a four-factor (Luria model) solution was found"
- Support for the "general factor" was found … "interpretation should focus primarily, if not exclusively, at that level"

Article

Exploratory Higher Order Analysis of the Luria Interpretive Model on the Kaufman Assessment Battery for Children–Second Edition (KABC-II) School-Age Battery

Assessment
2017, Vol. 24(4) 540–552
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DOI: 10.1177/1073191115614081
journals.sagepub.com/home/asm
SAGE

Ryan J. McGill[1] and Angelia R. Spurgin[1]

Abstract

Higher order factor structure of the Luria interpretive scheme on the Kaufman Assessment Battery for Children–Second Edition (KABC-II) for the 7- to 12-year and the 13- to 18-year age groups in the KABC-II normative sample (N = 2,025) is reported. Using exploratory factor analysis, multiple factor extraction criteria, and hierarchical exploratory factor analysis not included in the KABC-II manual, two-, three-, and four-factor extractions were analyzed to assess the hierarchical factor structure by sequentially partitioning variance appropriately to higher order and lower order dimensions as recommended by Carroll. No evidence for a four-factor solution was found. Results showed that the largest portions of total and common variance were accounted for by the second-order general factor and that interpretation should focus primarily, if not exclusively, at that level of measurement.

49

49

Research Supports 'g' but little More

Watkins, M. W., & Canivez, G. L. (2021). Assessing the psychometric utility of IQ scores: A tutorial using the Wechsler intelligence scale for children–fifth edition. School Psychology Review, 1-15.

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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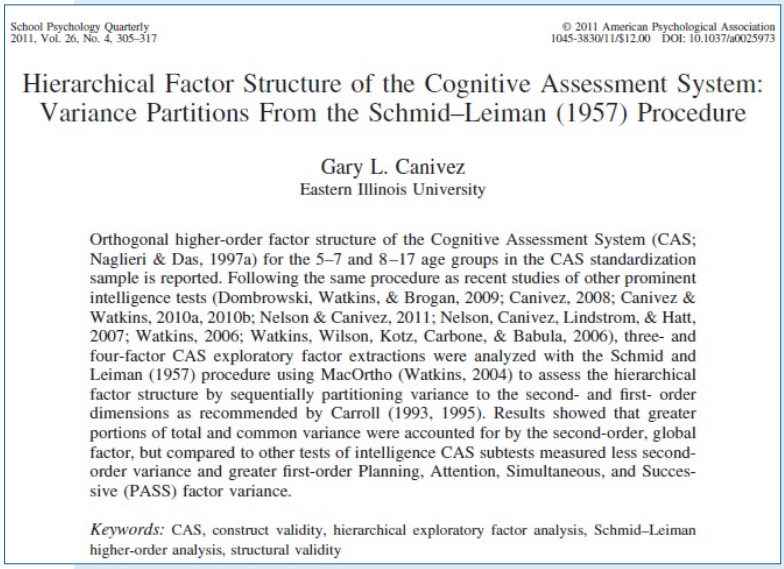

School Psychology Quarterly
2011, Vol. 26, No. 4, 305–317

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

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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)

51

51

CAS2 Factor Analytic Study (in review 2024)

Unravelling the Multifaceted Nature of Intelligence: A Correlated Factor Model Approach with Insights from the PASS Theory

Papadopoulos, Spanoudis, Naglieri and Das concluded:

"Our results unambiguously support the notion is not a unidimensional entity but a composite of distinct cognitive processes…planning, attention, simultaneous and successive processing."

- **Abstract**: Intelligence, a subject of profound interest within psychology, has seen extensive exploration of its psychological and psychometric foundations. This study delves into the multifaceted nature of intelligence, using advanced structural equation modeling techniques to examine theory-driven conceptualizations of the construct. We tested g factor models, including unidimensional, correlated, higher-order, and bifactor symmetrical and asymmetrical models. To enhance the reliability and generalizability of the findings, we used a large and diverse cohort based on the PASS (Planning, Attention, Simultaneous, Successive) theory and the Cognitive Assessment System 2 (CAS2), which was standardized in the US. Results showed that the correlated factor model, which posits separate cognitive domains, offers the most fitting representation of intelligence. This outcome aligns with the PASS theory's theoretical foundations, emphasizing intelligence's multifaceted nature. Also, our exploration of gender invariance underscores the importance of considering gender-related differences in cognitive processes. By endorsing a correlated factor model, our study encourages a nuanced understanding of intelligence that acknowledges the diversity and interconnectedness of cognitive processes, with potential implications for education and clinical assessment practices.

52

52

Questions about What I Just Presented?

Perguntas sobre o que eu apr esentei?

53

Ideas to Consider

- **A 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
  - To *g* or not to *g*
- **PASS Profiles SLD ADHD and ASD**
  - Diagnostic implications

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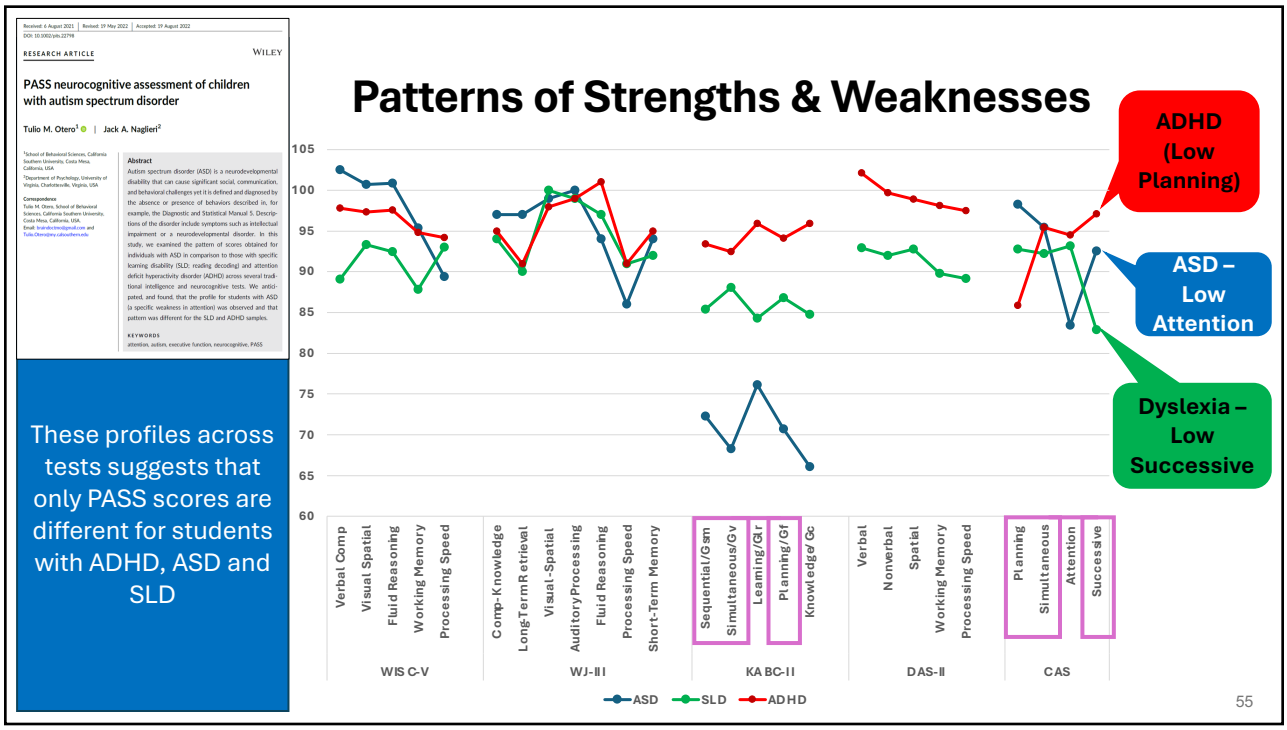

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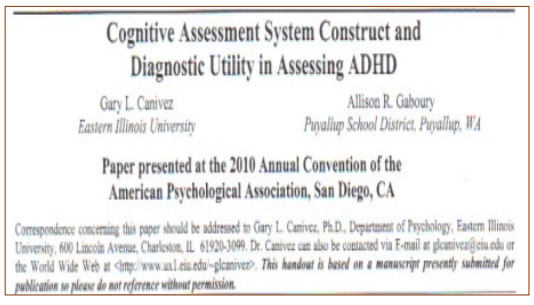
Research on PASS Profiles

- "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

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Allison R. Gaboury
Puyallup School District, Puyallup, WA

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

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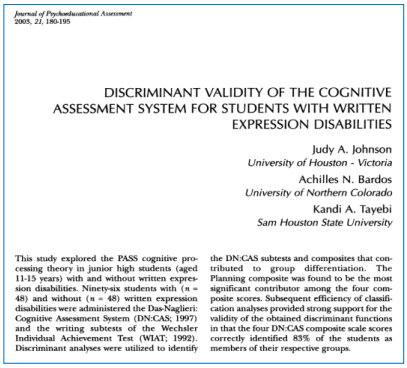
Journal of Psychoeducational Assessment
2003, 21, 180-195

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

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University of Houston - Victoria

Achilles N. Bardos
University of Northern Colorado

Kandi A. Tayebi
Sam Houston State University

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

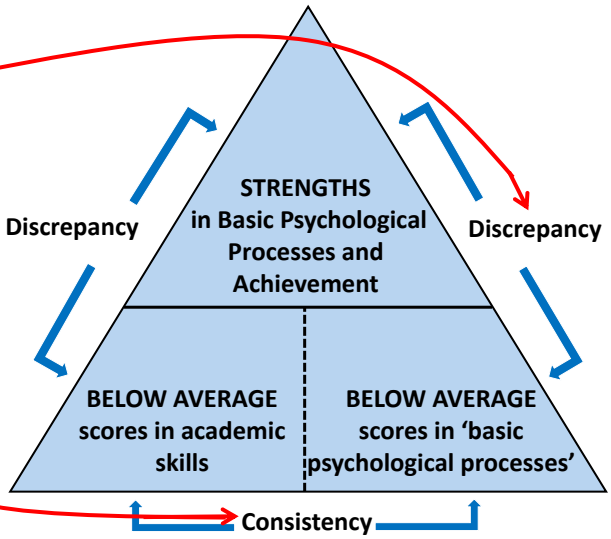
- "the present study demonstrated the potential of the CAS to correctly identify students who **demonstrated behaviors consistent with ADHD** diagnosis."

56

56

Discrepancy Consistency Method (DCM)

- **Discrepancy** between high and low processing scores
- **Discrepancy** between high processing and low achievement
- **Consistency** between low processing and low achievement = WHY the student fails



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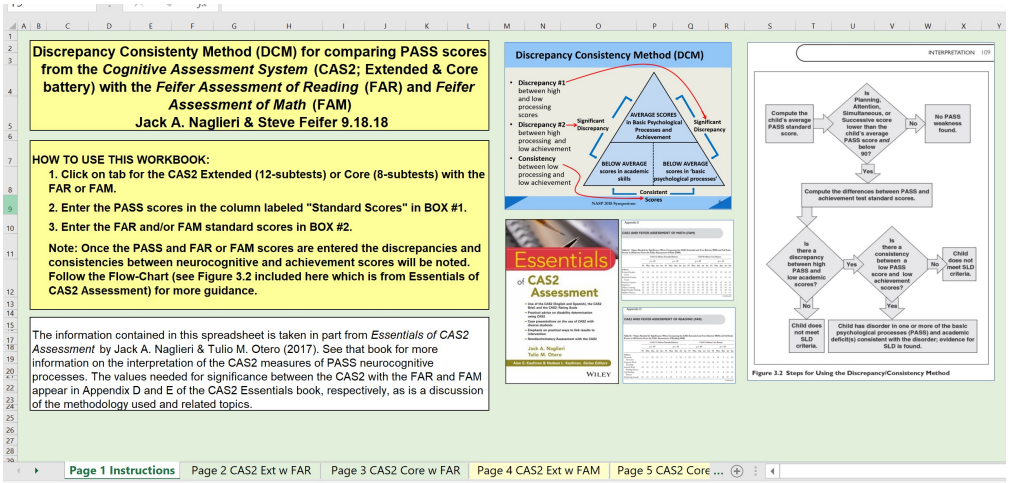
FREE CAS2 PSW Analyzer for FAR, FAM, & FAW, WJ4, KTEA3, WIAT4



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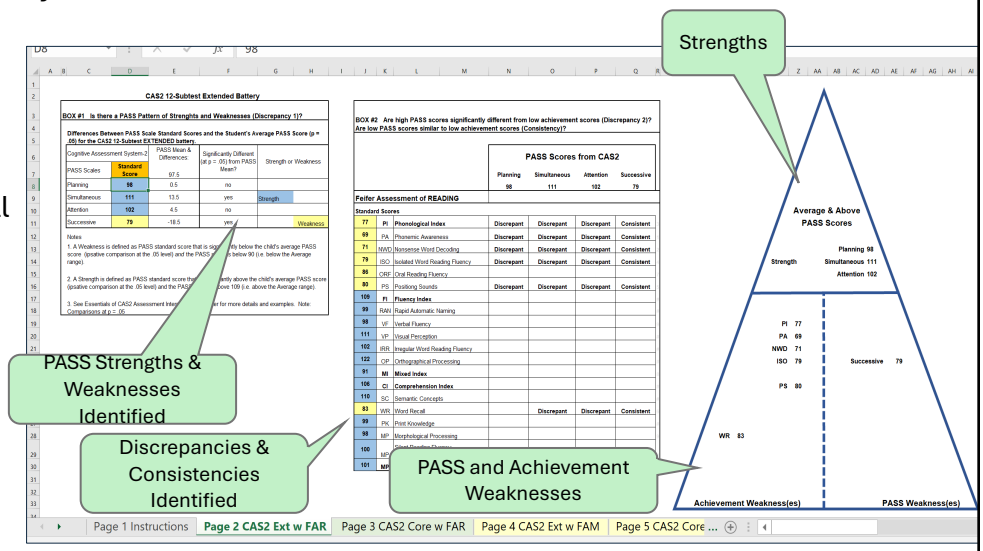
CAS2 PSW Analyzer for WJ4, KTEA3, FAR, FAM

- Enter PASS and achievement test standard scores and all comparisons are tested for significance



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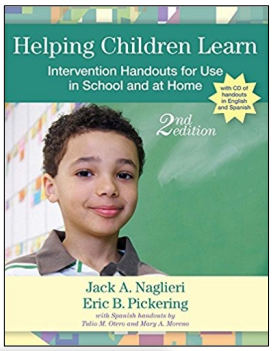
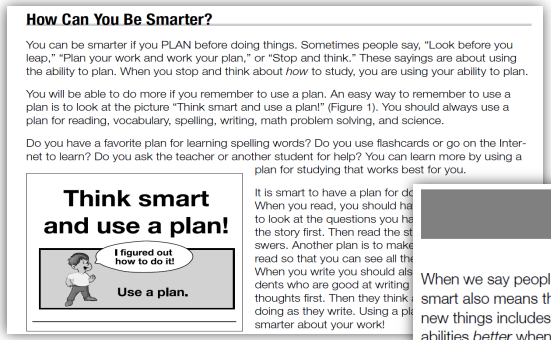
Academic interventions tied to PASS strengths and weaknesses





How Can You Be Smarter?

You can be smarter if you PLAN before doing things. Sometimes people say, "Look before you leap," "Plan your work and work your plan," or "Stop and think." These sayings are about using the ability to plan. When you stop and think about *how* to study, you are using your ability to plan.

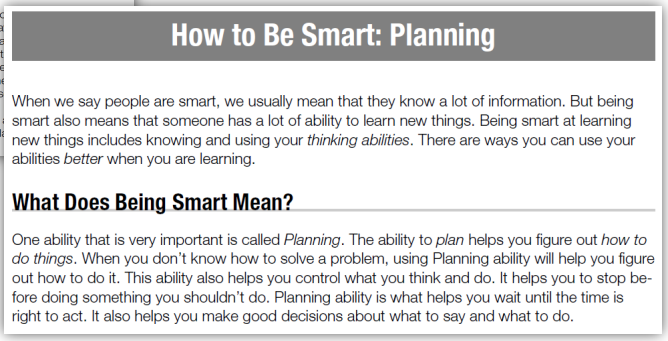
You will be able to do more if you remember to use a plan. An easy way to remember to use a plan is to look at the picture "Think smart and use a plan!" (Figure 1). You should always use a plan for reading, vocabulary, spelling, writing, math problem solving, and science.

Do you have a favorite plan for learning spelling words? Do you use flashcards or go on the Internet to learn? Do you ask the teacher or another student for help? You can learn more by using a plan for studying that works best for you.

Think smart and use a plan!

I figured out how to do it!

Use a plan.



How to Be Smart: Planning

When we say people are smart, we usually mean that they know a lot of information. But being smart also means that someone has a lot of ability to learn new things. Being smart at learning new things includes knowing and using your *thinking abilities*. There are ways you can use your abilities *better* when you are learning.

What Does Being Smart Mean?

One ability that is very important is called *Planning*. The ability to *plan* helps you figure out *how to do things*. When you don't know how to solve a problem, using Planning ability will help you figure out how to do it. This ability also helps you control what you think and do. It helps you to stop before doing something you shouldn't do. Planning ability is what helps you wait until the time is right to act. It also helps you make good decisions about what to say and what to do.

60

Questions about What I Just Presented?

Perguntas sobre o que eu apr esentei?

61

Maybe It's Time to Let the Old Ways Die

NYASP 2022 Legends in School Psychology Award

62

62

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 – the MOST EQUITABLE intelligence test.
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 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.

63

63