

# PASS Neurocognitive Theory of Intelligence: Assessment, Eligibility Determination and Intervention using the CAS2

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How Are You Feeling Today?



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## Let's Get Ready to Learn



Mindful Breathing



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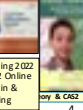

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## Disclosures

Executive Function	Social Emotional	Autism	Gifted Identification	PASS Neurocognitive Theory: Assessment & Intervention Handouts		
						
						

Coming 2023  
CAS2 Online Admin & Scoring  
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FOR MORE INFORMATION PLEASE GO TO MY WEB PAGES





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### Core Group Discussion → Deeper Learning

- **C**oach – Help the group decide what to do
- **O**rganizer – Guide the discussion
- **R**ecorder – Keep notes and speak for the group
- **E**nergizer – Focus the group !



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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 consistent with IDEA and state regulations regarding SLD determination
  - Helps us understand WHY a student fails
  - Informs us about academic strengths & weaknesses and interventions
  - Is fair for students from diverse populations
- These goals can be achieved if we use second-generation tests that measure the way students THINK to LEARN
  - The definition of THINKING should be based on BRAIN function
  - PASS theory is a way of defining THINKING and the Cognitive Assessment System - 2<sup>nd</sup> Edition a way to measure a student's ABILITY to think



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

- Case of Paul -A9-year-old in 4<sup>th</sup> 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



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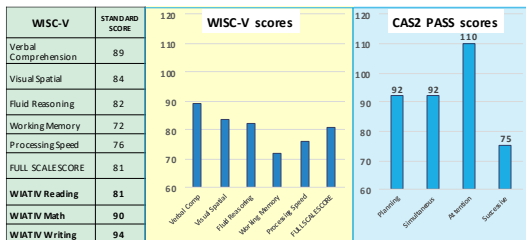
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### Paul – age 9 Presenting Concerns: Reading, Math Word Problems, Anxiety



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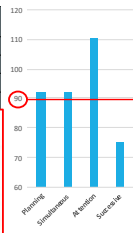
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Paul - age 9 years

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

Subtest	Standard Score	Mean	SD	Percentile Rank	Classification
Planning	92	100	15	50	Average
Simultaneous	92	100	15	50	Average
Attention	110	100	15	95	Average
Successive	75	100	15	10	Very Low




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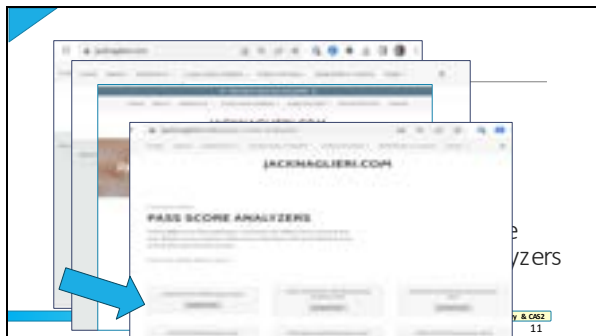
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PASS Score Analyzer for WIAT-IV

**Interpreting Consistency Method (ICM) for comparing PASS scores**  
 How to Use the Consistency Method (ICM) for comparing PASS scores  
 How to Use the Consistency Method (ICM) for comparing PASS scores  
 How to Use the Consistency Method (ICM) for comparing PASS scores

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### CAS2 PSW Analyzer for WJ4, KTEA3, FAR, FAM, Bateria

Enter PASS and Achievement test standard scores and all comparisons are evaluated

PASS Strengths & Weaknesses Identified

Discrepancies & consistencies Identified

PASS and Achievement Weaknesses

Strengths

FREE - on [www.jacknaglieri.com](http://www.jacknaglieri.com)

PASS Theory in Use 13

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### Paul's Discrepancy Consistency Results

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

Plan (92), Simultaneous (93), Attention (110)

WIAT Reading = 81

Cognitive Weakness in Successive (75)

Discrepancy

Discrepancy

Consistency

14 14

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### Intervention Protocol (Naglieri & Kryza, 2019)

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

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## Be Intentional and Transparent

- The test results showed that your brain is strong at
  - Noticing details (Attention)
  - seeing how things go together (Simultaneous)
  - And figuring out how to do things (Planning)
- The results also showed that
  - It is very hard for you to follow a sequence (Successive)
- But we can help you with that...
  - Handouts for students to manage sequences



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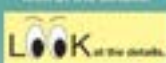
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## Four Ways to Think Smart!

Think smart and use a plan!



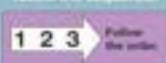
Think smart and look at the details!



Think smart and put the pieces together!



Think smart and follow the sequence!



CAS2  
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## Step 1 – Talk with Students

### 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 skills to learn new things. Being smart at learning new things includes knowing and using your thinking skills. These 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 skills 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.

CAS2  
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**Step 1 – Talk with Students**

**How to Be Smart: Simultaneous**

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

**What Does Being Smart Mean?**

Simultaneous ability is what you use to see how things fit together. This ability helps you see the big picture. The ability to read helps you understand the meaning of a sentence and a story. It is also very important for seeing patterns in numbers, word spellings, or themes in a story. It also lets you judge distances. For example, when you throw a ball you have to judge the distance to your target and how high you have to aim to get it there.

**How Can You Be Smarter?**

You can be smarter if you look to see how things are connected. Sometimes people say, "Get the big picture." This means to think using your Simultaneous ability. When you stop and think about how things fit together to make the "big picture," you are using your Simultaneous ability.

**CASE 22**

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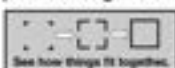
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**Step 1 – Talk with Students**

You will be able to learn more if you remember to see patterns and themes in all you do. An easy way to remember to do this is to look at the picture "Think smart and put the pieces together!" Figure 1. You should always use your ability to see how parts go together to make a whole when reading, studying, considering, learning, or listening and solving math problems.

**Think smart and put the pieces together!**



See how things fit together.

Figure 1. *Illustration by Linda Ward Beech*

It is smart to use your ability to see the big picture when doing all schoolwork. When you read, you should draw a picture of the characters and story line. Look a series of drawings that shows what happens in the story. Creating a story by using pictures is an excellent way to improve the information. Simultaneous ability is used when you do that, and it is a good way to be smarter about your work.

You can improve your math skills if you use your Simultaneous ability. Think about the problem, see what information is needed and what is not, figure out what is needed to what, and use both.

**CASE 23**

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**Step 1 – Talk with Students**

**How to Be Smart: Successive**

When we say people are smart, we usually mean 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?**

Successive ability is what you use to put information in order. It is what you use when you have to remember the sequence of information, such as a telephone number. When you do your class you have to do all the steps in the right order. When you are sounding out a word you haven't seen before, you are using your Successive ability to see the sounds in the correct order. When you read a word you have never heard before, especially if it is in a different language, you are using Successive ability. This ability also helps you put sounds together to say words, and words together to make sentences. Sequential ability is very important for reading, math, and all of your subjects.

**CASE 24**

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### Step 1 – Talk with Students

#### How Can You Be Smarter?

You can be smarter if you pay attention to the sequence of what things must be done. There are errors of making the sequence matter to remember. For example, giving letters when reading words. You could be reading the words to find out what they are. Do they look and make for you? It is easier to find out than you have negative feedback and there is no what words they are. Thinking about the sequence of things is a good way to be smarter about your work.

**Think smart and follow the sequence!**

1 2 3 Follow the order.

#### Remembering to Follow the Sequence

Remember that sometimes when you are confused, bored, or just doing too many things at one time, you might forget to look at the order in which things are to be done. When you do that you are not using your Executive skills, so to succeed, "Think smart and follow the sequence" (see Figure 1). Looking closely at the sequence of things will make you smarter!

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### Ideas to Consider



- A Theory Based on Brain Function**
  - Thinking vs Knowing
- 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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Shift from Traditional To Second Generation Intelligence Tests

- Wechsler, et al
- Cognitive Assessment System 2<sup>nd</sup> Edition

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### Intelligence as Neurocognitive Functions

➤ In my first working meeting with JP Das (February 11, 1984) we proposed that intelligence was better REinvented as neurocognitive processes and we began development of the Cognitive Assessment System (Naglieri & Das, 1997).

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



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### Key Attributes of a Second-Generation Intelligence Test



1. We started with a THEORY of intelligence based on the BRAIN as described by A. R. Luria
2. We selected and created test questions to measure THINKING defined as PASS
3. We did not include test questions that demand KNOWING such as Vocabulary, etc.
4. There is now considerable research to demonstrate that PASS scores from the CAS are equitable, interpretable beyond the total score, yields profiles for strengths and weaknesses, and leads to intervention

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### Neuropsychological Correlates of PASS

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



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### CAS2 Measures Thinking (PASS) not Knowing

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

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

I don't know

I need a PLAN!

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### PASS Neurocognitive Theory

- Planning = THINKING ABOUT HOW YOU DO WHAT YOU DECIDE TO DO
- Attention = BEING ALERT AND RESISTING DISTRACTIONS
- Simultaneous = GETTING THE BIG PICTURE
- Successive = 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 1.1 Three Functional Skills and Associated Brain Structures  
 From: *Essentials of CAS2 Assessment*, Naglieri & Otero, 2017

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## Frankie was struggling in school at age 11



Note: one of the images of students in a picture of the person

- Referred by parents after a history of reading and self esteem problems
- High Level of anxiety
  - he was too anxious to look closely at the words, and he would rather get the task completed and move on.
  - Frankie could not attend to the details of the sequence of letters for correct spelling, and the order of sound-symbol associations



Figure 10.10: Frankie and Frankie

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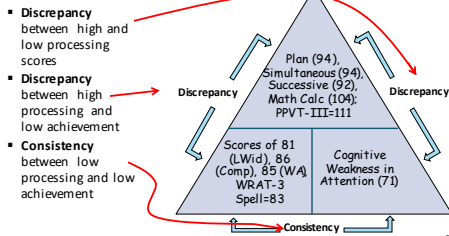
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## Frankie's Discrepancy Consistency Results




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## Frankie: Then and Now

- I informed Frankie of his PASS scores, and everything changed
  - He learned to manage his attention problem by using good Planning which helped him
    - recognize when he is off task
    - Think of possible ways to manage his attention
    - recognize when he needed a change in the environment to reduce distractions
  - Perhaps most importantly: He was given hope – that he could succeed
- Is married and has a Frankie graduated High School and went to college
  - few children
  - He is a graphic designer
  - He uses his knowledge and good Planning, Simultaneous and Successive processing to manage any obstacles he may still have with attention

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### Public Education and the Rest of my Story



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### PASS Theory Based on Brain Function – Planning



Figure 1.3 Three Functional Skills 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

Readiness for Items 1-10: Item location and item will be 000 or additional digits based on design of item to get the 400 and item will be 000 or additional digits only and each category. These are not part of the 000 or additional digits. Also see Readiness table below.

Rating the past month, how often did the child do each?

1. **1.1. Understands a credit or debit card and how to use it?** 0 1 2 3 4  
 2. **1.2. Understands the use of the cash register?** 0 1 2 3 4  
 3. **1.3. Understands and uses the cash register?** 0 1 2 3 4  
 4. **1.4. Knows how to use a debit card to buy things?** 0 1 2 3 4  
 5. **1.5. Knows how to use a credit card to buy things?** 0 1 2 3 4  
 6. **1.6. Knows how to use a debit card to buy things?** 0 1 2 3 4  
 7. **1.7. Knows how to use a credit card to buy things?** 0 1 2 3 4  
 8. **1.8. Knows how to use a debit card to buy things?** 0 1 2 3 4  
 9. **1.9. Knows how to use a credit card to buy things?** 0 1 2 3 4  
 10. **1.10. Knows how to use a debit card to buy things?** 0 1 2 3 4

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### Planning Subtests

Planned Codes

Planned Connections

Planned Number Matching

5176 5761 5167 1576 5176 1567

Cognitive Assessment System  
Assessing Special Needs  
Item Bank 1-100

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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"

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### Planned Codes Page 2 Jack Jr age 10



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### 20 Years Later Planning is the Key to Success



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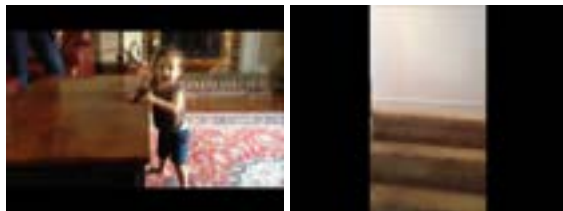
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### A 13 month old's Plan At 19 months Planning & Knowledge



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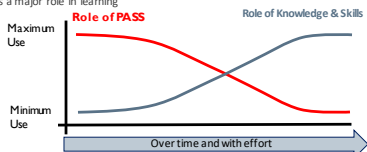
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## Planning Learning Curves

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



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

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## Math strategies stimulate thinking



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

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

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## The Case of Rocky

Strengths with Specific Learning Disability and ADHD



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## The case of Rocky

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

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

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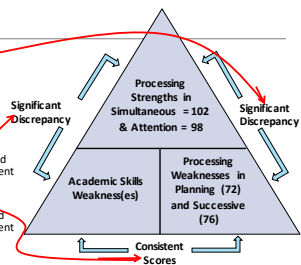
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• The Discrepancy Consistency Method (DCM) was first introduced in 1999 (most recently in 2017)



- 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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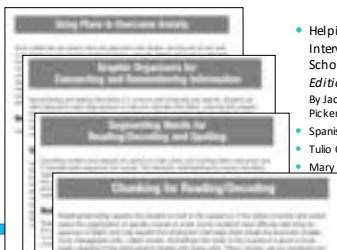
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## Interventions for Rocky



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




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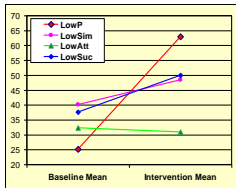
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Pre-Post Changes for the Students with LD and ADHD

- 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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## Jessica

- Previous diagnoses of ADHD, ODD, Anxiety and Depression.
- Received OT since 1st grade.
- Since 3rd grade the OT focus was helping the teacher to teach strategies for self monitoring, attention, visual sequencing, and organization
- Problems following verbal directions, inefficient work, struggles to work in a noisy setting, is distractable, fiddles with objects, inflexible, and frustrates easily.
- She receives speech and language services for language processing issues.
- Currently takes medications to manage her diagnoses, she takes Clonidine 0.2 mg to help with sleep and anger issues. She also takes Ritalin 40 mg ER in the am and 10 mg booster at lunch time.



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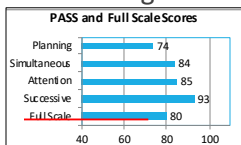
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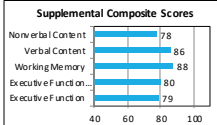
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## Jessica 4th grade



Category	Score
Nonverbal Content	78
Verbal Content	86
Working Memory	88
Executive Function	80
Executive Function	79



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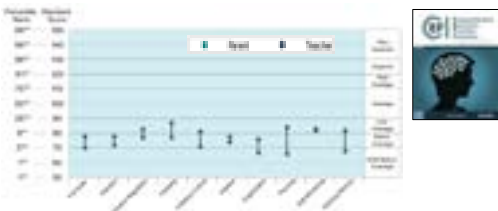
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## Comprehensive Executive Function Inventory- CEFI



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### FREE PASS and KTEA-III Score Analyzer



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### Impressions

- This case is an example of the behaviors (CEFI) that are consistent with a low planning score on CAS2.
- Based on the data and teacher reports/observations, I see her low performance is driven by Low planning, EF, and Attention. She can't get to the point where she can fully recruit Simultaneous and Successive processes.

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### Core Group Activity

- **QUESTIONS:**
- We have looked at a few case studies, what is your impression of this approach to assessment?
- What are the possible advantages?



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## PASS Theory Based on Brain Function -- Attention

Figure 1.1 Three Functional Units and Associated Brain Regions  
From: Essentials of CAS2 Assessment, Naglieri & Otero, 2017

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### Attention Subtests

- Expressive Attention
- Number Detection
- Receptive Attention

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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

PASS Theory & CAS2  
66

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**Attention**

READING COMPREHENSION IS DIFFICULT BECAUSE OF THE SIMILARITY OF THE OPTIONS

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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 19, Reading 2.8, Writing 3.5.

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

PASS Theory & CAS2  
68

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**CAS2 and KTEA-III Scores (January 2020)**

Category	Score
Planning	105
Spelling	91
Attention	79
Spelling	94
Full Scale	90

Category	Score
Spelling	80
Math Composite	85
Applied Math Problems	85
Calculation	85
Reading Composite	80
Reading Comprehension	75
Letter & Word Recognition	75

PASS Theory & CAS2  
69

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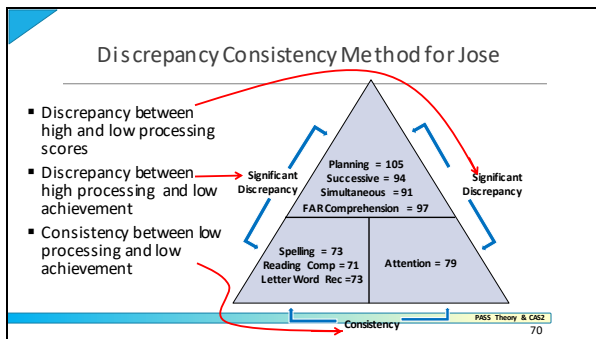
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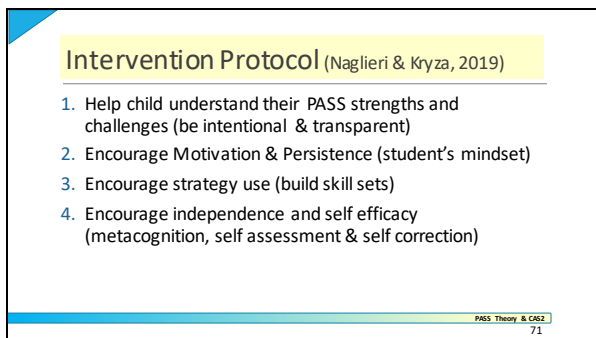
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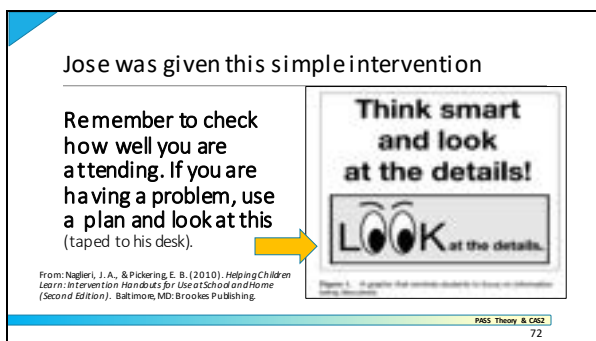
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Two weeks later!

- 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* Nagleri & Otero, 2017

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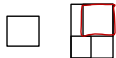

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**Simultaneous Subtests**

- Matrices
- Verbal Spatial Relations
- Figure Memory

PASS Theory & CAS2  
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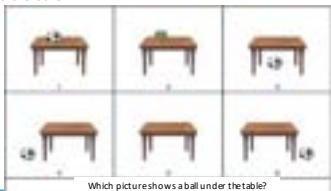
## PASS Theory: Simultaneous

➤ **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



Which picture shows a ball under the table?

76

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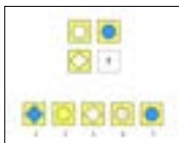
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## Thinking vs Knowing

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

PASS Theory & CASE  
77

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## And Consider this...

Why do different tasks use the same PASS process?



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

PASS Theory & CASE  
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### Case: Neil (Wagler & Faller, 2012, Intervention Chapter 5)

- Neil (9 year-old 4<sup>th</sup> 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.



PARS Theory & CAS2  
79

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### Case: Neil 4<sup>th</sup> grade –CAS2

CAS-2	STANDARD SCORE	RANGE
Planning:	94	Average
Attention:	98	Average
Simultaneous <small>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.</small>	74	Very Low
Successive	90	Average
<b>CAS-2 Full Scale</b>	<b>86</b>	<b>Below Average</b>

FSR Index	Standard score
Phonological Index	90
Fluency Index	79
Mixed Index	80
Comprehension Index	97
<b>FSR Total Index</b>	<b>84</b>

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### Case: Neil- FAR Subtest Interpretation

KEY INTERPRETATION	Score	Percentile	Descriptor
<b>Isolated Word Reading Fluency</b> – the student reads a list of phonologically regular words arranged in order of increasing difficulty in 60 seconds.	86	18%	Below Average
<b>Irregular Word Reading Fluency</b> – the student reads a list of phonologically irregular words arranged in order of increasing difficulty in 60 seconds.	71	3%	Moderately Below Average

➢ He can apply decoding skills to familiar words but lacks an effective strategy when reading phonologically irregular words.

KEY INTERPRETATION	Score	Percentile	Descriptor
<b>Visual Perception</b> – requires the student to identify letters printed backwards that are embedded within an array of words. A direct measure of fast perception.	75	5%	Moderately Below Average
<b>Orthographic Processing</b> – the student must recall a group of letters in the correct order that are embedded within a target word presented for 1 second. A measure of orthographic working memory skills.	72	4%	Moderately Below Average

➢ He struggles with both text perception, as well as orthographic processing, both of which are hindering his reading pace and fluency.

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### Case: FAM Scores for Neil

FAM Index	Standard Score	Percentile	Range
<b>Procedural Index</b> – measures the ability to count, order, and/or sequence numbers.	94	34%	Average
<b>Verbal Index</b> – measures the ability to automatically identify numbers, retrieve facts, and understand math terminology.	86	18%	Below Average
<b>Semantic Index</b> – measures the ability to determine magnitude representations, estimation, pattern recognition, and quantitative reasoning.	72	3%	Moderately Below Average
<b>FAM TOTAL INDEX</b>	79	8%	Moderately Below Average

*Like Verbal Spatial Relations subtest*

*Simultaneous*

PKSS Theory & CASE 82

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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

PKSS Theory & CASE 83

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### Case: FAM Report Writer Websites and Apps

1. **Khan Academy** <https://www.khanacademy.org/>  
The Khan Academy is full of helpful videos explaining a variety of math topics, as well as other academic topics. There is an initial pre-test upon first logging in that determines appropriate starting levels.
2. **Hooda Math** <http://www.hoodamath.com/>  
Hooda Math is geared toward helping kids practice and learn through games and computer activities. Specific math topics include addition, subtraction, multiplication, addition, geometry, basic physics, fractions, integers, and algebra.
3. **Estimation 180** <http://www.estimate180.com>  
Estimation 180 is a website that presents a new estimation challenge every day of the school year.
4. **Patrick JMT** <http://patrickjmt.com/>  
The "JMT" in Patrick JMT stands for "Just Math Tutorials." This website has clear math videos on a variety of math related topics.
5. **Cool Math 4 Kids** <http://www.coolmath4kids.com>  
A highly entertaining and interactive website offering games, activities, puzzles, and challenges for a variety of math topics for children.



PKSS Theory & CASE 84

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PASS Theory Based on Brain Function –  
Successive Processing




Figure 1.2 Three Frontal Skills 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?*

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## CAS2: Rating Scale Successive

Directions: For each of the 10 items, you will see an illustration of the child's response to the item. The illustration shows the child's response to the item. The illustration shows the child's response to the item.

Example: The child is asked to draw a line. The illustration shows the child's response to the item.

Item	1	2	3	4	5
1. The child is asked to draw a line.					
2. The child is asked to draw a line.					
3. The child is asked to draw a line.					
4. The child is asked to draw a line.					
5. The child is asked to draw a line.					
6. The child is asked to draw a line.					
7. The child is asked to draw a line.					
8. The child is asked to draw a line.					
9. The child is asked to draw a line.					
10. The child is asked to draw a line.					

PASS Theory & CAS2  
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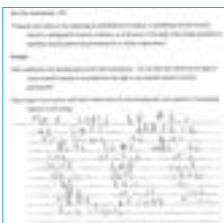
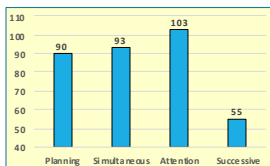
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## PASS and Handwriting

### ➤ Acquisition of handwriting demands Successive processing



PASS Theory & CAS2  
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### CASE by Tulio Otero: Alex (C.A. 6-7 GRADE 1)

#### REASON FOR REFERRAL

Is classified as Intellectual Disability. Team is interested in changing eligibility

- > Academic:
  - Limited skill to identify letters sounds
  - Possible ASD
- > Conversationally Bilingual
- > Behavior:
  - Difficulty following directions
  - Attention concerns



Note: this is not picture of Alex

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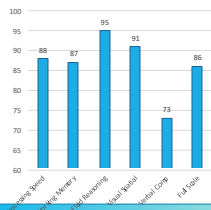
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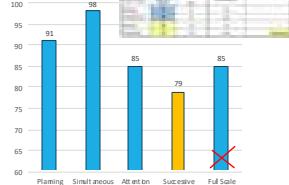
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### WISC-V and CAS2 Scores Alex (C.A. 6-7 Grade 1)

#### WISC-V



#### CAS2




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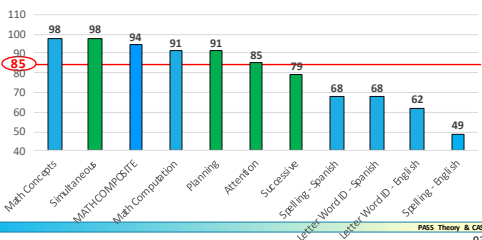
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### KTEA 3 and CAS2 Scores for Alex




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### PASS Strengths & Weakness with KTEA

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### Alex and PASS (by Dr. Otero)

- ▶ Alex's profile is revealing
- ▶ He has good processing scores:
  - ▶ Simultaneous = 91 and Planning = 98
- ▶ He has a "disorder in one or more of the basic psychological processes"
  - Attention = 85 and Successive = 79
- ▶ Using the Discrepancy Consistency Method (1999, 2017) he meets criteria for SLD (see Naglieri & Otero, 2017).

PASS Theory & CASE 95

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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)

PASS Theory & CASE 96

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## Be Intentional and Transparent

- Give Alex the PASS handouts
  - *"The test showed that your brain is strong in seeing the BIG PICTURE (Simultaneous Processing) and*
  - *Recognizing strategies to use. (Planning 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 helps pay close attention, not get distracted by things around you, and keep all kinds of information in sequence (in order).
  - We're going to work on using your strengths and helping you develop more skills.



PASS Theory & CAS2  
97

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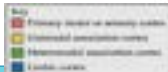
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## Heteromodal Association Cortex (Goldberg, 2006)

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



<https://goo.gl/images/cyphg7>

PASS Theory & CAS2  
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## Core Group Activity

- **QUESTIONS:**
- What are the advantages of using PASS theory as measured by the CAS2
- What are the obstacles?



PASS Theory & CAS2  
99

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**PASS → CAS2**

- 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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100

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**PASS Comprehensive System**  
(Nagleri, Das, & Goldstein, 2014)

**Ways to Measure PASS**

- CAS2 Core & Supplemental English & Spanish for Comprehensive Assessment**
- CAS2 Brief Form**
- CAS2 Brief Form (Spanish)**
- CAS2 Core & Supplemental**
- CAS2 Core & Supplemental (Spanish)**
- CAS2 Brief Form**
- CAS2 Brief Form (Spanish)**
- CAS2 Brief Form**
- CAS2 Brief Form (Spanish)**
- CAS2 Brief Form**
- CAS2 Brief Form (Spanish)**

PASS Theory & CAS2  
101

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**CAS2 for (Ages 5-18 yrs.)**

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

40 min

PASS Theory & CAS2  
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### CAS2 Online Score & Report

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

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



PASS Theory & CAS2  
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### CAS2: Brief

- ▶ Yields PASS and Total standard scores (Mn 100, SD 15)
- ▶ Directions for administration are in the Record Form
- ▶ For Re-evaluations and Screening
- ▶ All items are different from CAS2
  - Planned Codes
  - Simultaneous Matrices
  - Expressive Attention
  - Successive Digits

PASS Theory & CAS2  
105

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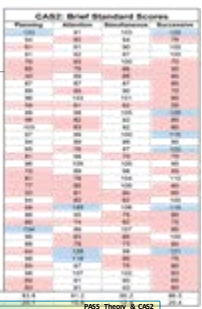
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### CAS2: Brief

- ▶ CAS2: Brief takes 20 minutes to administer
- ▶ It is intended to be used for instructional planning during Tier 2
- ▶ It is also used as a screening tool for a fast evaluation of PASS neurocognitive ability scores
- ▶ Also helpful for re-evaluations

PASS Theory & CAS2  
105

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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



PASS Theory & CAS2  
106

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### CAS2, CAS2 Online Score and Report Write, CAS2-Espanol, CAS2: Brief, CAS2 Rating Scale

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



PASS Theory & CAS2  
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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 notog
Administration and Interpretation Issues	• Test order, subtest interpretation, etc.
Reasons To Change	• Validity of PASS Theory

PASS Theory & CAS2  
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### 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

PASS Theory & CAS 112

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### Measuring Thinking using CAS

- White children earned similar scores on the Verbal and Performance scales
- Black children earned lower VIQ than PIQ scores due to language / achievement tasks → low Full Scale
- Black children earned higher Full Scale scores on CAS than whites
- Fewer Black children would be identified as having intellectual disability based on Full Scale scores using CAS than WISC-III
- THIS IS A SOCIAL JUSTICE ISSUE.



PASS Theory & CAS 113

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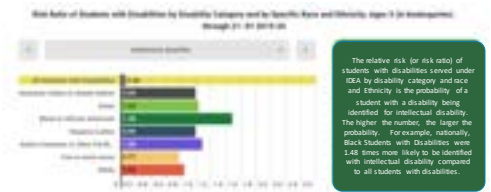
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### IDEA Part B and Part C Identification of Children with Disabilities: Annual Report 2013-2014

Most Rates of Students with Disabilities by Disability Category and by Specific Race and Ethnicity: Ages 3 to Kindergarten



The relative risk (or risk ratio) of students with disabilities served under IDEA by disability category and 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. For example, nationally, Black students with disabilities were 1.48 times more likely to be identified with intellectual disability compared to all students with disabilities.

https://sites.ed.gov/idea/our-work/assessment-and-evaluation/idea-part-b-and-part-c-identification-of-students-with-disabilities-served-under-idea-part-b/

identification of students of color in special education/

PASS Theory & CAS 114

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## Research on Interpretation of Test Scores and PSW

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### 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, & Boujean, (2015); and Canivez, Dombrowski, & Watkins (2015).
- 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.

PASS Theory & CAS2  
116

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## Research Supports 'g' but little More

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

Canivez, G. L., Watkins, M. W., & Dombrowski, S. C. (2017). Structural validity of the Wechsler Intelligence Scale for Children-Fifth Edition: Confirmatory factor analyses with the primary and secondary subtests. *Psychological Assessment*, 29, 438-472.

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. <http://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 WIJ IV Cognitive at school age. *Psychological Assessment*, 29, 394-407.

McGill, R. J., & Canivez, G. L. (2017, October). Confirmatory factor analysis of the WISC-V 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*.

PASS Theory & CAS2  
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### 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 Theory & CAS 118

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PASS

➤ Given that PASS scales CAN be interpreted it is important to know

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

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### PASS Scales can be Interpreted and SHOULD be: Profiles

PASS Theory & CAS 120

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Profiles across tests reveal the power of PASS

### Patterns of Strengths & Weaknesses

ADHD (Low Planning)  
ASD – Low Attention  
Dyslexia – Low Successive

Otero, T. M., & Naglieri, J. A. (2022). PASS neurocognitive assessment of children with autism spectrum disorder. *Psychology in the Schools*, 1–8. <https://doi.org/10.11002/ps.22738>

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### Research on PASS Profiles

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

“Ten core profiles from a regular education sample (N = 1,692) and 12 profiles from a sample of students with LD (N = 367) were found.”

PASS Theory & CAS 122

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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”

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

PASS Theory & CAS 123

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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 prediction and explanation of specific academic success and failure

PASS Theory & CAS2  
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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)



Intelligence Measure	Reading	Mathematics
Full Scale	.60	.61
Verbal	.58	.59
Nonverbal	.62	.63
Processing Speed	.64	.65
Working Memory	.66	.67
Fluid Reasoning	.68	.69
Crystalline	.70	.71
Quantitative Reasoning	.72	.73
Reading Comprehension	.74	.75
Math Problem Solving	.76	.77
Math Computation	.78	.79
Math Fluency	.80	.81
Math Accuracy	.82	.83
Math Speed	.84	.85
Math Persistence	.86	.87
Math Engagement	.88	.89
Math Confidence	.90	.91
Math Anxiety	.92	.93
Math Self-Efficacy	.94	.95
Math Mindset	.96	.97
Math Growth Mindset	.98	.99
Math Fixed Mindset	.99	.99

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## PASS Research



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

- "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., 2019)...(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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## Twice Exceptional

- Tests of general ability are **not** sufficient for assessment of students who may be gifted and have a specific learning disability (SLD), autism, ADHD, etc.
- Most defensible way to assess for a SLD, for example, is to use the *Cognitive Assessment System-Second Edition (CAS2)* for the following reasons
  - CAS2 measures 'basic psychological processes' – the key to uniting the definition of SLD with the method of detecting it, it yields the smallest race difference, yields profiles for special populations, predicts achievement better than any other tests and has implications for instruction

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## A Study of Gifted Students

- N = 142
  - Similar numbers of girls and boys in Grade 4, 5 and 6.
  - all native speakers of English
  - came from families of middle to upper-middle socioeconomic background
- Identified according to this definition:
  - "Giftedness is exceptional potential and/or performance across a wide range of abilities in one or more of the following areas: general intellectual, specific academic, creative thinking, social, musical, artistic and kinesthetic" (Alberta Education, 2012, p. 6).

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## A Study of Gifted Students

- Tests given
  - WASI –II (Vocabulary and Matrix Reasoning)
  - Woodcock-Johnson III (WJ-III; Woodcock, McGrew, & Mathers, 2001) Broad Reading score from: Letter-Word Identification, Reading Fluency, and Passage Comprehension
  - Cognitive Assessment System (CAS; Naglieri & Das, 1997) to measure PASS neurocognitive processes

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## A Study of Gifted Students

- 54% of gifted students had a PASS score that was significantly different from that student's average PASS score
  - That means the students has a specific neurocognitive processing strength or weakness (i.e., learning profile)

Table 3.  
Percentages of Gifted Students with Significant Variability in PASS Standard Scores  
(N = 242)

	Planning	Simultaneous	Attention	Successive	PASS
PASS Weakness	n = 25	4	18	28	75
	% = 10%	2%	7%	11%	30%
PASS Strength	n = 7	58	12	12	90
	% = 3%	24%	5%	5%	37%

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## A Study of Gifted Students

- The number of gifted students who have a PASS score that is significantly different from that student's average PASS score AND the score is < 90, and with low achievement score.

These students have a specific PASS processing weakness less than 90, suggesting instructional modifications

Percentages of Gifted Students with Significant Variability in PASS and Achievement Test Scores (N = 242)

	Planning	Simultaneous	Attention	Successive	PASS
PASS < 90	n = 4	0	0	0	11
	% = 1%	0%	0%	0%	4%
PASS < 90 and WJ-III Achievement	n = 0	0	0	0	1
	% = 0%	0%	0%	0%	0%

These students with low PASS scores AND low WJ-III achievement indicates a Specific Learning Disability

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WE CAN DO BETTER

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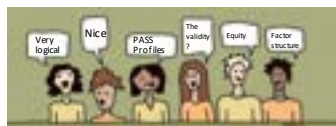
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## Core Group Activity

QUESTION:

- Which research findings was most impactful?
- What research questions do you still have?



PASS Theory & CAS2  
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CAS2 is Different

- 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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# 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 (<25<sup>th</sup> %tile) *supports designation as SLD*

Subtest	PASS Profile	PASS Disorder
Planning	114	104
Attention	129	85
Simultaneous	118	85
Successive	108	95

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### Online Scoring and Report Writer

Subtest	Score	SD	Age	Strength	%ile
Planning	108	21.7	7q3		6.9
Simultaneous	79	4.3	5q1		71.2
Attention	95	24.2	7q3	54	1.4
Successive	77	21.1	5q1		76.1
PASS Index	79.2				

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### CAS2 Achievement Analyzer for PSW

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

PASS Theory & CAS2 141

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### CAS2 PSW Analyzer for WJ4, KTEA3, FAR, FAM, Bateria

Enter PASS and Achievement test standard scores and all comparisons are evaluated

PASS Strengths & Weaknesses Identified

Discrepancies & consistencies Identified

PASS and Achievement Weaknesses

Strengths

FREE - on [www.jacknaglieri.com](http://www.jacknaglieri.com)

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### Administration Details

- Core Battery is the first 2 subtests in each of the PASS scales
- Order of administration is IMPORTANT
  - Why is Planning first and Successive last?
- Should you use parts of the CAS2?
- Demonstration, Example, and Provide Help option

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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 - Is misleading if there is PASS scale variability

You may want to exclude the Full Scale completely

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**Interpretation Details**  
 PASS SCALE –  
 IPSATIVE AND  
 NORMATIVE  
 COMPARISONS



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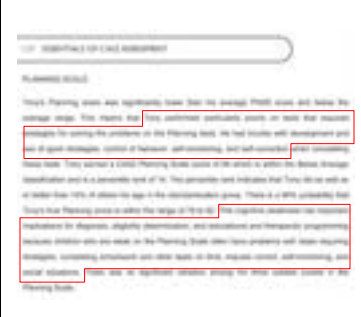
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**Interpretation Details**  
 INTERPRET EACH SCALE FROM  
 PASS THEORY



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A Theory Based on Brain Function	• Thinking 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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## NASP Professional Standards 2020

**GUIDING PRINCIPLE 1: FAIRNESS, EQUITY AND JUSTICE**

In their work and practice, school psychologists promote fairness and social justice. They consider opportunities and barriers to learning for all students and work to ensure that all students have an equal and quality education, including social, academic, cultural, linguistic, sensory, communication, organizational, economic, technological, and physical. They ensure that all students have an equal and quality education, including social, academic, cultural, linguistic, sensory, communication, organizational, economic, technological, and physical.

**Standard 1.1.1: Promoting Discriminatory Practices**

School psychologists are aware of all forms of social and cultural oppression and discrimination and work to ensure that all students have an equal and quality education, including social, academic, cultural, linguistic, sensory, communication, organizational, economic, technological, and physical. They work to ensure that all students have an equal and quality education, including social, academic, cultural, linguistic, sensory, communication, organizational, economic, technological, and physical.

School psychologists function as change agents, using their skills in communication, collaboration, and leadership to promote the necessary change in the educational system, classroom, building, district, state, and national levels.

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

- 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.
- 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.)
- PASS results are easy for teachers, parents and the students themselves to understand because the concepts can be explained in non-technical language.
- 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.
- The PASS scores are strongly correlated to achievement, show distinct patterns of strengths and weaknesses, are very useful for intervention planning.
- The CAS2 in combination with achievement (especially the FAR, FAM and/or FAW) provides examiners with a reliable and defensible Discrepancy/Consistency Method to identify students with SLD.
- Research has shown that PASS scores have relevance to instruction and intervention.

PASS Theory & CAS2  
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**WE CAN DO BETTER**  
**We Must do Better**

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Questions and Thoughts Please



PMS Theory & C&B  
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