Pediatric Neuropsychological Evaluation with the CAS-2

Sam Goldstein, Ph.D.
Assistant Clinical Professor
University of Utah School of Medicine
www.samgoldstein.com
info@samgoldstein.com

Disclosure

• Co-author of the CAS 2.
• Editor in Chief Journal of Attention Disorders.
• Co-author of the Comprehensive Executive Functioning Inventory.
• Author, Co-author, Editor, Co-editor of multiple textbooks.

The Developing Brain

Addition, Subtraction, and Reorganization
Normal or Not?

The Developmental Course of Human Brain Development

American Psychologist, January 2001
Neurological development is not a simple process of gradual growth from simple to complex.

Development occurs from conception through childhood.

- Additive processes involve proliferation of neurons, development of synaptic connections and myelination.
- Subtractive processes involve programmed cell death prenatally and synaptic pruning postnatally.
- Development is more than overproduction followed by cutting back, substantial functional reorganization takes place.

Differences in the ways the brain of the young child differs from the adult.

- Increased metabolic activity peaking at 150% by two years of age
- Focal or localized brain functions in adults are carried out by diffuse regions in children
- Adults utilize inhibitory processes, children do not as routinely
- Less automatization of brain mediated functions in children
Compared with the brain of the child, representation of function in the adult brain is likely to be more focal, to make greater use of inhibitory processes, and to implicate non-cortical regions associated with the automatization of skills.

Who are we, what do we do and why?

Psychology: the scientific study of the human mind and its functions, especially those affecting behavior in a given context.
Neuropsychology: the scientific study of the relationship between behavior, emotion, and cognition on the one hand, and brain function on the other.

Clinical Neuropsychology: the scientific evaluation of the relationship between behavior, emotion, and cognition on the one hand, and brain function on the other.

Clinical Neuropsychology
The organized assessment of ability, knowledge, and skill.
Neuropsychological assessment begins with the collection and measurement of brain-based abilities responsible for thinking, learning, feeling, and behavior.

Neuropsychological assessment then involves developing an understanding of the complex interaction of these abilities with each other and with environmental factors.

Finally, neuropsychological assessment concludes with etiological opinions and prescriptive interventions.
Neuropsychological Assessment Follows a Logical Course

- Knowledge of the brain and body
- Educational history
- Vocation history if relevant
- Personal and psychiatric history
- Nature of trauma if relevant
- Immediate and subsequent symptom course
- The integration of historical, qualitative and quantitative data as a means of testing hypotheses and prescribing intervention

Critical Issues

- Demographics
- Symptoms vs. consequences
- Categories vs. dimensions
- Developmental pathways: accept a moment in time
- There are no shortcuts
- Assess the environment

Critical Issues

- Assess for intervention
- Understand sensitivity vs. specificity
- Begin with the disruptive/non-disruptive continuum
- Keep low incidence disorders in mind
- Resilience factors
Four Waves of Resilience Research
- Identifying person and variable-focused factors that make a difference.
- Identifying and understanding the operation of these factors within systems with a process focus.
- Intervening to foster resilience.
- Creating systems that foster resilience.

Person Attributes Associated With Successful Coping*
- Affectionate, engaging temperament.
- Sociable.
- Autonomous.
- Above average IQ.
- Good reading skills.
- High achievement motivation.
- Positive self-concept.
- Impulse control.
- Internal locus of control.
- Planning skills.
- Faith.
- Humorous.
- Helpfulness.

* Replicated in 2 or more studies

Environmental Factors Associated With Successful Coping*
- Smaller family size.
- Maternal competence and mental health.
- Close bond with primary caregiver.
- Supportive siblings.
- Extended family involvement.
- Living above the poverty level.
- Friendships.
- Supportive teachers.
- Successful school experiences.
- Involvement in pro-social organizations.

*Replicated in 2 or more studies.
The pathways that lead to positive adaptation despite high risk and adversity are complex and greatly influenced by context therefore it is not likely that we will discover a magic (generic) bullet.

Resilient children are not simply born that way nor are they made from scratch by their experiences. Genetic and environmental experiences loom large as protectors against a variety of risks to healthy development ranging from resistance to bacteria and viruses to resilience to maltreatment and rejection.

Kirby Deater-Deckard

Component Skills Traditionally Measured in a Neuropsychological Assessment

- Attention
- Language
- Intellect
- Sensorimotor Functions
- Visuospatial Functions
- Memory and Learning
- Executive Functions
- Achievement
- Pain, Emotional state and personality style
A Proposed New Framework for Pediatric Neuropsychological Assessment

- Measurement of abilities.
- Measurement of knowledge.
- Assessment of skillful behavior across emotional, behavioral, interpersonal, educational contexts.

CAS2 (Ages 5-18 yrs.)

CAS2 Development Goals

- **CAS2**
  - New norms
  - Strengthen reliability of the scales by modifying subtest formats
  - Improve factor structure
  - Add/delete items
  - Add a visual Successive subtest
  - Add new scales beyond PASS
  - Retain Administration format of
    - Examiner demonstrates,
    - Child does a sample
    - Directions for remaining items is given
    - And opportunity to Provide Help is given
Census Matched

Empirically Derived

Gender and Race Fair
Carefully Developed

Relationship Between Strategy Use and Standard Scores
The relationship between reported and observed strategy use and simulated scores earned by the students in the simulation study is summarized for each of the Planning schemes in Table 3.10. The mean simulated scores were computed for those students who used and who did not use each strategy on each subtest. With the exception of the General Concepts scheme, results show that the mean simulated scores for those who used strategies were slightly higher than the mean simulated scores obtained by those who did not use strategies. These findings were based on the overall strategy score, indicating that students who used strategies were associated with modest improvements in planning scores.

![Graph]

Figure 3.5: Percentage of the total scores correct by age, sex, and strategy type.

CAS2

- Flexibility with special populations
- Strategy assessment
- Guidelines for providing help.

Provide Help

The examiner can explain the demands of the task in any manner deemed appropriate and in any language.

Note Set 1

Explain item by item:

- Look at this page. There are many bars for you to fill in. Prior to the practice of the page with the empty bars, but do not show a scoring section or the score or columns. Fill in one response space at a time or more, as fast or as slow as you can, using the number given in the earlier lines, and place the bar 1-5 seconds to allow for error. You have 70-90 seconds, use the bar in any way you want. Let's see how much you can do.

- Briefly (briefly, a brief explanation if necessary)
- Begin, then rating, allow 45 seconds, record for time to completion and strategy use.
- If the examinee stops or spends more than 1-2 seconds on any immediate bar, keep going.
- If the examinee is still working after the time limit expires, say something.
- Record the time 3 seconds. Note strategy use.
CAS2

- Same 8 (40 minutes) or 12 (60 minutes) subtest versions
- PASS and Full Scales provided (100 & 15) subtests (10 and 3)

CAS2 Scale and Subtest Structure

- Planning
- Attention
- Simultaneous
- Successive

- Full Scale

- CAS2 Scale

- Subtest Structure

CAS2

- All subtests modified
- Planning subtests have more items
- Speech Rate deleted
- New: Visual Digit Span
CAS2

• Supplementary Scales: Executive Function, Working Memory, Verbal, Nonverbal
• Added: A Visual and Auditory Comparison

Supplemental Composite Scores

| Subject | Raw | T | Norm | Rel | Int
|---------|-----|---|------|----|----
| Coding  | 1   | 1 |      |    |    
| Picture Span | 8  | 8 |      |    |    
| Verbal Memory: Digit Span | 7  | 7 |      |    |    
| Verbal Memory: Mother Son | 7  | 7 |      |    |    
| Verbal Memory: Native Language | 7  | 7 |      |    |    
| Visual-Motor: Drawing | 7  | 7 |      |    |    

CAS2 Online Score & Report


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

CAS2 Online Score & Report

• Narrative report can be obtained in Word or PDF
CAS2 Subtests

- Planned Codes
- Planned Connections
- Planned Number Matching
- Matrices
- Visual Spatial Relations
- Figure Memory
- Expressive Attention
- Number Detection
- Receptive Attention
- Word Series
- Sentence Repetition/Questions
- Visual Digit Span

CAS2: Brief for Ages 4-18 years
• Give in 20 minutes
• Yields PASS and Total standard scores (Mn 100, SD 15)
• All items are different from CAS2
  – Planned Codes
  – Simultaneous Matrices
  – Expressive Attention
• New Subtest
  – Successive Digits
    (forward only)

CAS2: Brief

CAS2: Brief Simultaneous Matrices

CAS2: Brief Planned Codes & Successive Digits
  • Planned Codes has 8 items using numbers not letters and has different patterns
  • Successive Digits uses numbers (not words)
CAS2: Brief Scale

- Expressive Attention (Stroop) used
- Big/Little Animals (ages 4-7 years)
- Color Words (ages 8-18)

CAS2 Rating Scales (Ages 4-18 yrs.)

- The CAS2: Rating measures behaviors associated with PASS constructs
- Normed on a nationally representative sample of 1,383 students rated by teachers
The CAS2: Rating form contains 40 items
- 10 items for each PASS scale
- PASS and Total scales are set to have a mean of 100 and standard deviation of 15

The rater is given a description of what each scale is intended to measure.
- This informs teachers about PASS

Directions for Items 1–18: These questions ask how well the child or adolescent decides how to do things to achieve a goal. They also ask how well the child or adolescent thinks before acting and avoids impulsivity. Please rate how well the child or adolescent makes plans and strategies to solve problems.

Directions for Items 19–26: These questions ask how well the child or adolescent organizes things together. They also ask about working with diagrams and how ideas fit together. The questions involve seeing the whole without getting lost in the parts. Please rate how well the child or adolescent visualizes things as a whole.

Directions for Items 27–34: These questions ask how well the child or adolescent pays attention and resists distractions. The questions also ask about how well someone attends to one thing at a time. Please rate how well the child or adolescent pays attention.

Directions for Items 35–40: These questions ask how well the child or adolescent remembers things in order. The questions ask about working with numbers, words, or a dot in a circle. Please rate how well the child or adolescent works with things in a specific order.

The CAS2: Rating Scale scores can be used as part of a larger comprehensive evaluation or for instructional planning.
PASS: Across the Three Measures

<table>
<thead>
<tr>
<th>CAS2 Rating Scale</th>
<th>CAS2</th>
<th>CAS2 Brief</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Planned Codes</td>
<td>Planned Coding</td>
</tr>
<tr>
<td>Attention</td>
<td>Expressive Attention</td>
<td>Expressive Attention</td>
</tr>
<tr>
<td>Simultaneous</td>
<td>Matrices</td>
<td>Simultaneous Matrices</td>
</tr>
<tr>
<td>Successive</td>
<td>Works with numbers, words, or letters that are arranged in a specific series.</td>
<td></td>
</tr>
</tbody>
</table>

PASS Comprehensive System

(Naglieri, Dai, & Goldstein, 2014)

Race Differences
Table 20.1 Mean score differences in standard scores by race on traditional IQ and second-generation intelligence tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td></td>
</tr>
<tr>
<td>SB-IV (matched)</td>
<td>12.6</td>
</tr>
<tr>
<td>WISC-IV (normative sample)</td>
<td>11.5</td>
</tr>
<tr>
<td>WJ-III (normative sample)</td>
<td>10.9</td>
</tr>
<tr>
<td>WISC-IV (matched)</td>
<td>10.0</td>
</tr>
<tr>
<td>Second generation</td>
<td></td>
</tr>
<tr>
<td>KABC (normative sample)</td>
<td>7.0</td>
</tr>
<tr>
<td>KABC (matched)</td>
<td>6.1</td>
</tr>
<tr>
<td>KABC-2 (matched)</td>
<td>5.0</td>
</tr>
<tr>
<td>CAS2 (normative sample)</td>
<td>6.3</td>
</tr>
<tr>
<td>CAS2 (demographic controls)</td>
<td>4.8</td>
</tr>
<tr>
<td>CAS2 (demographic controls)</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Hispanic ELL Students with Reading Problems
Bilingual Hispanic Children’s Performance on the English and Spanish Versions of the Cognitive Assessment System

Jack A. Naglieri
George Mason University
Health Sciences Campus
Fairfax, VA 22030
Ph.D., Professor of Psychology
naglieri@gmu.edu

This study compared the performance of referred bilingual Hispanic children on the Planning, Attention, Simultaneous, Successive (PASS) scores in two versions of the Cognitive Assessment System (CAS: Naglieri & Das, 1997a). The results suggest that children scored similarly on both English and Spanish versions of the CAS. Within each version of the CAS, the bilingual children earned their lowest scores in Successive processing regardless of the language used during test administration. Small mean differences were noted between the means of the English and Spanish versions for the Simultaneous and Successive processing scores; however, mean Full Scale scores were similar. Specific subtests within the Simultaneous and Successive scales were compared between the English and Spanish versions of the CAS. Comparisons of the children’s profiles of cognitive weaknesses on both versions of the CAS showed that these children performed similarly despite the language differences.

English Spanish CAS

Means, S.D., t-ratios, Obtained and Correction Correlations Between the English Spanish Version of the CAS (N = 55).

<table>
<thead>
<tr>
<th></th>
<th>CAS English</th>
<th>CAS Spanish</th>
<th>t-ratio</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>92.6</td>
<td>92.6</td>
<td>.00</td>
<td>.96</td>
</tr>
<tr>
<td>S.D.</td>
<td>13.1</td>
<td>13.8</td>
<td>.39</td>
<td>.50</td>
</tr>
<tr>
<td>Planning</td>
<td>90.0</td>
<td>95.0</td>
<td>-1.40</td>
<td>.12</td>
</tr>
<tr>
<td>Attention</td>
<td>78.0</td>
<td>83.6</td>
<td>.44</td>
<td>.62</td>
</tr>
<tr>
<td>Successive</td>
<td>84.6</td>
<td>87.6</td>
<td>.22</td>
<td>.56</td>
</tr>
<tr>
<td>Full Scale</td>
<td>63.6</td>
<td>63.6</td>
<td>.74</td>
<td>.63</td>
</tr>
</tbody>
</table>

English Spanish CAS Summary

• The PASS cognitive weakness profiles on both the Spanish and English versions of the CAS were studied
• The percentage of children who had a cognitive weakness on the English AND Spanish versions of the CAS:
  – Planning 92.7%
  – Simultaneous 89.1%
  – Attention 100%
  – Successive 78.2%
Otero, Gonzales, Naglieri (2012)

- “Fagan (2000) as well as Suzuki and Valencia (1997) suggested that a cognitive processing approach like that used in the CAS would avoid the knowledge base required to answer verbal and quantitative questions found on most traditional IQ tests and would be more appropriate for culturally and linguistically diverse populations. The results of this study support the assertion (p. 8).”

Otero, Gonzales, Naglieri (2012)

- "SLD and PASS scores

Table 2

<table>
<thead>
<tr>
<th>CAS Subtests</th>
<th>CAS English</th>
<th>CAS Spanish</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Naming</td>
<td>94.05</td>
<td>8.78</td>
<td>94.06</td>
</tr>
<tr>
<td>Simultaneous</td>
<td>92.78</td>
<td>11.94</td>
<td>92.63</td>
</tr>
<tr>
<td>Attention</td>
<td>94.45</td>
<td>6.85</td>
<td>94.78</td>
</tr>
<tr>
<td>Sequencing</td>
<td>94.84</td>
<td>12.27</td>
<td>79.27</td>
</tr>
<tr>
<td>Set Scale</td>
<td>94.44</td>
<td>7.77</td>
<td>94.25</td>
</tr>
</tbody>
</table>

Naglieri, Rojahn, Matto (2007)

Hispanic and non-Hispanic children’s performance on PASS cognitive processes and achievement

Hispanic White difference on CAS Full Scale of 4.8 standard score points (matched)
Why PASS works across race, ethnicity, language, and culture

- It measures important basic neurocognitive processes
- It does not measure ability by tests that involve academic skills, that is no
  - Vocabulary
  - Arithmetic
- All traditional IQ tests with verbal and quantitative tests are contaminated by knowledge
- IS VERBAL IQ REAL?

Take Away Message

- The brain-based approach to defining important neuropsychological abilities is very different from traditional IQ.
  - CAS2 yields profiles for students with different exceptionalities
  - CAS2 yields the smallest race/ethnic differences
  - CAS2 scales are useful for instructional planning
  - CAS2 helps us better understand gender differences

A Brain-based view of neuropsychological ability called PASS
Learning and Intelligence (PASS)

- Teachers know a lot about instructional methods
- But to help children learn, we have to know HOW CHILDREN LEARN
  – Difference instructional methods have different learning demands
- We have to understand how the brain functions to understand learning, and the role of PASS learning styles

IQ defined by BRAIN function

- **PASS** theory is a modern way to define ‘ability’ based on measuring neurocognitive abilities
- **Planning** = THINKING ABOUT THINKING
- **Attention** = BEING ALERT
- **Simultaneous** = GETTING THE BIG PICTURE
- **Successive** = FOLLOWING A SEQUENCE

Brain, Cognition, & Intelligence

- The brain is the seat of abilities called PASS
- These neurocognitive processes are the foundation of learning (Naglieri & Otero, 2011)
More on PASS and its Assessment

The Cognitive Assessment System

Jack A. Naglieri, Case Center

How to define neuropsychological abilities?

- How are the abilities identified?
  - Use factor analysis to discover ability?
  - Assign new labels to traditional IQ test subtests
  - Use the experimental literature to define the constructs of interest?
  - Rely on neuropsychological constructs
What is a Neuropsychological Ability?

- The term neuropsychological ability is a modern term for concepts like cognition or intelligence
- The term neuropsychological ability is synonymous with cognitive ability
  - Neuropsychological abilities lead to the acquisition of knowledge and skills
    - Knowledge, like reading decoding or math calculation, are not examples of ability
      - These are sets of specific knowledge that are acquired and/or performed by the application of cognitive abilities.

What is a Neuropsychological Ability?

- A specific neuropsychological ability provides a unique kind of function
- A variety of neuropsychological abilities are needed to meet the many demands of our complex environment
- A variety of neuropsychological abilities gives us a means of achieving the same goal using different types of or different combinations of abilities and knowledge (this is important for intervention planning).

What is a Neuropsychological Ability?

- We must assess ability, achievement (knowledge) and skill separately.
- Assess achievement with tests that adequately evaluate the domain of interest (e.g., reading, math, etc.).
- Assess neuropsychological abilities using tasks free of academic content and related knowledge.
- Assess skill in real world activities.
Ability or Knowledge?

• What does the student have to know to complete a task?
  – This is dependent on instruction
• How does the student have to think to complete a task?
  – This is dependent on the brain – PASS
• We must assess ability and achievement separately

The Brain as PASS

PASS: A neuropsychological approach to the Brain based on three Functional Units described by A. R. Luria (1972)

PASS Theory: Planning

- Planning is a neurocognitive ability that a person uses to determine, select, and use efficient solutions to problems
  – problem solving
  – developing plans and using strategies
  – retrieval of knowledge
  – impulse control and self-control
  – control of processing
Planned Codes

- Child fills in the codes in the empty boxes
- Children are encouraged to think of a good way to complete the page

---

Planned Codes

- Page 2
- What is a good plan to complete this page?
- Note orientation

---

Knowledge and Planning Learning Curves

- Learning depends upon instruction and intelligence (PASS)
- At first, PASS plays a major role in learning
- When a new task is learned and practiced it becomes a skill and execution requires less PASS

<table>
<thead>
<tr>
<th>Role of Planning</th>
<th>Role of Knowledge and Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Use</td>
<td>Maximum Use</td>
</tr>
</tbody>
</table>

![Learning Curve Diagram]

---

Knowledge and Planning Learning Curves

- Learning depends upon instruction and intelligence (PASS)
- At first, PASS plays a major role in learning
- When a new task is learned and practiced it becomes a skill and execution requires less PASS

<table>
<thead>
<tr>
<th>Role of Planning</th>
<th>Role of Knowledge and Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Use</td>
<td>Maximum Use</td>
</tr>
</tbody>
</table>

![Learning Curve Diagram]
PASS Theory: Planning

Planning
- Evaluate a task
- Select or develop a strategy to approach a task
- Monitor progress during the task
- Develop new strategies when necessary

Examples of classroom problems related to Planning:
- Using the same strategy even if it is not effective
- Struggling with how to complete tasks
- Not monitoring progress during a task
- Misinterpretation of what is read

PASS Theory

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

Poorn planning
Expressive Attention: 5-7 years

The child tells if the animal is large or small, regardless of the relative size on the page.

Number Detection

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

Attention

This sheet has a strong Attention demands because of the similarity of the options.

1. A began studying at 5:00 a.m. and finished 1 hour and 22 minutes later. What time did he finish?
   - A 6:22 a.m.
   - B 5:24 a.m.
   - C 6:12 a.m. (D 6:22 a.m.)

2. A drove a car for 5 hours and 30 minutes. How long did he drive?
   - A 5 hours
   - B 5 hours and 15 minutes
   - C 5 hours and 45 minutes
   - D 6 hours and 45 minutes

Jack A. Naglieri, Ph.D.
George Mason Univ, Fairfax, VA 22030.
naglieri@gmu.edu
PASS Theory: Attention

Attention
• Focus on one thing and ignore others
• Resist distractions in the learning environment

Examples of classroom problems related to Attention
• Trouble focusing on what is important
• Difficulty resisting distractions
• Difficulty working on the same task for very long
• Unable to see all the details
• Providing incomplete or partially wrong answers

PASS Theory

• Simultaneous processing is a basic neurocognitive ability which we use to integrate stimuli into groups
  – Stimuli are seen as a whole
  – Each piece must be related to the others
  – Wechsler Nonverbal Scale
  – KABC Simultaneous Scale

• Simultaneous processing is what Gestalt psychology was based on
• Seeing the whole
CAS2 Matrices

Child selects one of the options that best completes the matrix:

```
 3  
 0  
 0  
 0  
 0  
```

CAS2 Verbal-Spatial Relations

Which picture shows a boy behind a girl?

Simultaneous Verbal Task

- Simultaneous processing using verbal content
- Who is this song about?

*My momma's daddy was his oldest son.*
Numbers from 1 to 100

How is ... Simultaneous processing facilitated by this worksheet?

Simultaneous Processing at Work!

Simultaneous Processing at Work!
PASS Theory: Simultaneous

Simultaneous Processing
• Relate separate pieces of information into a group
• See how parts related to whole
• Recognize patterns

Examples of classroom problems related to Simultaneous Processing
- Difficulty comprehending text
- Difficulty with math word problems
- Trouble recognizing sight words quickly
- Trouble with spatial tasks
- Often miss the overall idea

PASS Theory: Successive

Successive processing is a basic neurocognitive ability which we use to manage stimuli in a specific serial order
– Stimuli form a chain-like progression
– Stimuli are not inter-related

Word Series

The child repeats a series of words in the same order the examiner says them

1. Wall-Car
2. Shoe-Key
...
10. Cow-Wall-Car-Girl
11. Dog-Car-Girl-Shoe-Key
...
27. Cow-Dog-Shoe-Wall-Man-Car-Girl-Key-Book
Sentence Repetition (Ages 5-7) or Sentence Questions (Ages 8-17)

- 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 red greened the blue with a yellow. Who got greened?

CAS2

- Visual Digit Span subtest allows for a Visual Auditory comparison

Visual-Auditory Comparison

<table>
<thead>
<tr>
<th>Scale</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Series</td>
<td>______</td>
</tr>
<tr>
<td>Visual Digit Span</td>
<td>______</td>
</tr>
<tr>
<td>Difference between serials</td>
<td>______</td>
</tr>
<tr>
<td>Serial recall</td>
<td>55, 40, 45</td>
</tr>
</tbody>
</table>

Successive

The sequence of the sounds is emphasized in this worksheet
Learning Math Facts

\[
\begin{align*}
8 + 9 &= 17 \\
8 + 9 &= 17 \\
8 + 9 &= 17
\end{align*}
\]

PASS Theory: Successive

Successive Processing

- Use information in a specific order
- Follow instructions presented in sequence

Examples of classroom problems related to Successive Processing:
- Trouble blending sounds to make words
- Difficulty remembering numbers in order
- Reading decoding problems
- Difficulty remembering math facts when they are taught using rote learning (\(4 + 5 = 9\)).


The Case of Larry – Age 8 Years 8 months

Linda M. Einhorn-Marcoux, M.A., Examiner & Intervention Instructor
Case of Larry

• Larry is a third grader who was evaluated at the request of his parents because of their concern about his chronic problems with spelling and written language
• Larry likes to read but he has spelling problems
• Larry frequently confused the letters b and d and often writes his numbers backwards and reads words backwards (mop as pom)
• Larry says certain words within his sentences out of order

Larry’s PASS scores

<table>
<thead>
<tr>
<th>Standard Score</th>
<th>Difference from Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>100</td>
</tr>
<tr>
<td>Simultaneous</td>
<td>119</td>
</tr>
<tr>
<td>Attention</td>
<td>98</td>
</tr>
<tr>
<td>Successive</td>
<td>84</td>
</tr>
<tr>
<td>Mean</td>
<td>100.75</td>
</tr>
</tbody>
</table>

Larry

• Low achievement test scores
  – Letter Word Recognition 83
  – Written Expression 81
  – Word Attack 86
  – Decoding Fluency 81

• Meets the definition of SLD
  – “...a disorder in 1 or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations.”
PREP Intervention
- Larry attended nine one-hour sessions three times a week over the course of approximately 3 weeks
- During this time Larry received individualized instruction designed to improve the use of Successive processing strategies.
- Larry completed several homework assignments as a way of practicing the various rules and skills being taught.

Larry’s Problem with Successive

• Teach him to use his strength in Planning

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 step 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.

Larry’s Problem with Successive

• Teach him to recognize sequences

How to Teach Successive Processing Ability

Think smart and follow the sequence!

1 2 3

Follow the order.

Note: 1. A pogo stick helps student understand successive patterns.
Larry's Problem with Successive

• Teach him to recognize sequences

How to Teach Successive Processing Ability

1. Teach children that most information is presented in a specific sequence so that it makes sense.
2. Encourage children by asking, “Can you see the sequence of events here?” or “Did you see how all of this is organized into a sequence that must be followed?”
3. Remind the students to think of how information is sequenced in different content areas, such as reading, spelling, and arithmetic, as well as in sports, playing an instrument, driving a car, and so forth.
4. Teach children that the sequence of information is critical for success.
5. Remind students that seeing the sequence requires careful examination of the serial relationships among the parts.

Ben's Problem with Successive

Using Plans to Overcome Anxiety

Graphic Organizers for Connecting and Remembering Information

Another type of graphic organizer is a Venn diagram, which can be used to demonstrate how concepts are related. Figure 1 shows a Venn diagram for a subject in the form of a Venn diagram.

How to Teach Graphic Organizers

Graphic organizers are very simple to create. They need not be learned by heart. Information can be used for activities such as exploring concepts, organizing writing, and developing language skills. The following four steps can be used to create a graphic organizer:

1. Select information that you want to organize in the chart.

Larry's Problem with Successive

• Teach him to use strategies

Chunking for Reading/Decoding

Segmenting Words for Reading/Decoding and Spelling

Decoding a written word requires the person to make sense of printed letters and words to translate letter sequences into sounds. This demands understanding the sounds that letters represent and how letters work together to make sounds. Sometimes sounds can be separated into parts for easier and faster reading. The word into is a good example because it contains words that a child may already know in and to. Segmentation words can be a helpful strategy in reading as well as spelling.
Larry's Pre-Post skills scores

Teach Children about their Abilities

- 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.
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 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, 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.

Step 1 – Talk with Students

How Can You Be Smarter?

"You can’t 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!

It is smart to have a plan for doing all schoolwork. When you read, you should have a plan. One plan is to look at the questions you have to answer about the story first. Then read the story to find the answers. Another plan is to make a picture of what you read so that you can see all the parts of the story. When you write you should also have a plan. Students who are good at writing plan and organize their thoughts first. Then they think about what they are doing as they write. Using a plan is a good way to be smarter about your work.
Step 1 – Talk with Students

How to Be Smart: Attention

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?

Attention is a very important ability that everyone has. Everything we do requires the ability to focus on some things and ignore others. The ability to pay attention is what makes us able to focus our thoughts on one thing and resist distractions. No one can learn without the ability to attend. We cannot attend to all the information our brain is receiving, in order to focus, we must resist attending to some things so we can focus on others. In school there is much to attend to and many things that are distracting. Students hear others talking, a noise in the hallway, or the beep of a computer; they see a flash of light from the window, and so forth. Schoolwork requires a lot of focus of attention.

---

Step 1 – Talk with Students

How Can You Be Smarter?

You can be smarter if you carefully use your ability to attend. Remember to be aware of how well you are attending. Be sure to notice if you are being distracted. If you are having a problem, do something to help you pay attention. You will be able to do more if you remember to think smart and look at the details (see Figure 1). Remember to think about how well you are attending when you do your work.

Think smart and look at the details!

It is smart to be aware of your level of attention. Also remember to notice if you are being distracted. Ask yourself, “Am I losing my ability to focus?” or “Am I getting distracted?” If so, change your seat, take a short break, stand up and stretch, or do something to help you attend better. Remember that you can’t learn if you can’t pay attention.

You should remember that attention can be disrupted by loud noises or seeing something distracting. It is important to notice when your ability to attend is good or bad. If you are having trouble attending, figure out what you need to do to attend better.

---

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. Yet, 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. This ability 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 seems to about 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.
Step 1 – Talk with Students

Think smart and put the pieces together!

See how things fit together.

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 recite your store show name or your address, you are using this ability. Successive ability is the ability to say 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 this 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.

Step 1 – Talk with Students

How Can You Be Smarter?

You can be smarter if you pay attention to the sequences in which things must be done. There are ways of seeing the sequence easier to remember. For example, you can use spellings and numbers. For example, if the word is an 1, 2, 3, 4, then you can remember it with those numbers. You might forget to look at the order in which information is presented. When you see that you are not using your ability to say the numbers, “Think smart and follow the sequence!” (see Figure 1). Looking closely at the sequences of things will make you smarter!
Step 1 – How to Teach about Planning

Ability Test Profiles

Do Students with SLD Have a Pattern of Cognitive Strengths and Weaknesses?

This is essential for intervention planning

Resources
1. We need to know if intelligence tests yield distinctive profiles

2. Subtest profile analysis is unsupported so use scale profiles instead.
SLD Profiles on CAS (Huang, Bardos, D’Amato, 2010)

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

Lorna K. Huang, Achille N. Bardos, and Riki Carl D’Amato

Abstract

The detection of cognitive patterns in children with learning disabilities (LD) has been a priority in the identification process. Subtest profile analysis from traditional cognitive batteries has shown varying criteria for accurate identification and weak correlations to educational abilities. Therefore, the purpose of this study is to create a new generation of cognitive tests with regular or analytic patterns in the instructional process. The Cognitive Assessment System (CAS) was used to generate subtest profile displays. The most consistent characteristics among the profiles were used for profile analysis. Ten core profiles from a larger student sample (N = 442), and 12 performance counts of students with LD (N = 170) were used. The majority (82) of profiles were unique compared with profiles obtained from the general education sample. The analytic patterns that contribute to the differential diagnosis of the profiles are presented in this study.

Johnson, Bardos & Tayebi, 2003

• “this study suggests that the CAS...yields information that contributes to the differential diagnosis of students suspected of having a learning disability in writing”
Canivez & Gaboury (2010)

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

Ability & Achievement

- IQ scores correlate about .5 to .55 with achievement Intelligence (Brody, 1992)
- But traditional tests have achievement in them
- Naglieri (1999) summarized the correlations between several tests and achievement
  - The median correlation between each test’s overall score and all achievement variables was obtained

Ability & Achievement (Naglieri, 1999)

<table>
<thead>
<tr>
<th>Test</th>
<th>FSIQ</th>
<th>GCA</th>
<th>Cog</th>
<th>MPC</th>
<th>FS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median r</td>
<td>.590</td>
<td>.600</td>
<td>.625</td>
<td>.630</td>
<td>.700</td>
</tr>
<tr>
<td>% of Var</td>
<td>35%</td>
<td>36%</td>
<td>39%</td>
<td>40%</td>
<td>49%</td>
</tr>
<tr>
<td>Increase over WISC-III</td>
<td>- 3% 12% 14% 41%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>1,284 2,400 888 2,636 1,600</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WISC-3: WIAT Manual Table C.1 ages 6-16; WJ-R Technical Manual; CAS Interpretive Handbook; K-ABC Interpretive Manual; DAS Handbook. Increase = \( r_1^2 - r_2^2 \), where \( r_1^2 = \) WISC-3 WIAT correlation
CAS and Achievement

Construct Validity of the PASS Theory and CAS: Correlations With Achievement

Neil A. Spring and Charles Bechtel

The results of this study demonstrate the construct validity of the PASS Theory and CAS. The study was conducted with a sample of 100 students from a high school. The students were asked to complete a PASS inventory and a CAS scale. The results showed a significant correlation between the two measures. The correlation coefficient was 0.7, indicating a strong relationship between the two variables.

www.samgoldstein.com
www.MHS.com

TEDx

Sam Goldstein, Ph.D.
sam@samgoldstein.com

The Power Of Resilience

https://www.youtube.com/watch?v=4kUbWxExm1A