Cross-Battery Assessment: A Pattern of Strengths and Weaknesses Approach to SLD Identification

Dawn P. Flanagan, Ph.D.
St. John’s University, New York
Yale Child Study Center, School of Medicine

Agenda

• Overview of CHC Theory and the relations between broad and narrow CHC abilities and specific academic skills
• SLD Identification and the utility of the Pattern of Strengths and Weaknesses Analyzer (PSW-A)
• Linking results to intervention
Current and Expanded Cattell-Horn-Carroll (CHC) Model of Cognitive Abilities
(adapted from Schneider & McGrew, 2012)

Sixteen broad and approximately 80 narrow abilities; approximately 9 broad and 35 narrow abilities represented on current batteries

Note. Indicates narrow abilities that were modified or proposed as additions to CHC theory (see Chapter 1 and Appendix A of WJ IV Technical Manual).
Summary of Relations between CHC Abilities and Specific Areas of Academic Achievement

(Berninger, 2013; Flanagan and colleagues, 2006, 2013; McGrew & Wendling, 2010; McGrew et al., 2014)

| Gf | Inductive (I) and general sequential reasoning (RG) abilities play a moderate role in reading comprehension. | Inductive (I) and general sequential reasoning abilities are consistently very important for math problem solving at all ages. | Inductive (I) and general sequential reasoning abilities (RG) are consistently related to written expression at all ages. |
| Gc | Language development (LD), lexical knowledge (VL), and listening ability (LS) are important at all ages for reading acquisition and development. These abilities become increasingly important with age. | Language development (LD), lexical knowledge (VL), and general information (KI) are important primarily after about the 2nd grade. These abilities become increasingly important with age. | Language development (LD), lexical knowledge (VL), and listening abilities (LS) are important at all ages. These abilities become increasingly important with age. |
| Gwm | Memory span (MS) and working memory capacity (WM) or attentional control. Gwm important for overall reading success. | Memory span (MS) and working memory capacity (WM) or attentional control. Gwm important for overall math success. | Memory span (MS) is important to writing, especially spelling skills whereas working memory has shown relations with advanced writing skills (e.g., written expression). Gwm important for overall writing success. |
| Gv | Orthographic Processing (often measured by tests of perceptual speed) – reading fluency | Orthographic Processing (often measured by tests of perceptual speed) – spelling | Orthographic Processing (often measured by tests of perceptual speed) – spelling |
| Ga | Phonetic coding (PC) or “phonological awareness/processing” is very important during the elementary school years for the development of basic reading skills. | Phonetic coding (PC) or “phonological awareness/processing” is very important during the elementary school years for both basic writing skills and written expression (primarily before about grade 5). | Phonetic coding (PC) or “phonological awareness/processing” is very important during the elementary school years for the development of basic reading skills. |
| Glr | Naming Facility (NA) or “rapid automatic naming” (also called speed of lexical access) is very important during the elementary school years. Associative memory (MA) is also important. | Naming Facility (NA; or speed of lexical access). Associative Memory (MA) – rapid retrieval of basic math facts | Naming Facility (NA) or “rapid automatic naming” (also called speed of lexical access) has demonstrated relations with written expression, primarily writing fluency. |
| Gs | Perceptual speed (P) abilities are important during all school years, particularly the elementary school years. | Perceptual speed (P) abilities are important during all school years, particularly the elementary school years. | Perceptual speed (P) abilities are important during all school years, particularly the elementary school years. |

Definitions of CHC Broad and Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid Reasoning (Gf)</td>
<td>The deliberate but flexible control of attention to solve novel, “on-the-spot” problems that cannot be performed by relying exclusively on previously learned habits, schemas, and scripts.</td>
</tr>
<tr>
<td>Induction (I)</td>
<td>The ability to observe a phenomenon and discover the underlying principles or rules that determine its behavior.</td>
</tr>
<tr>
<td>General Sequential Reasoning (RG)</td>
<td>The ability to reason logically, using known premises and principles.</td>
</tr>
<tr>
<td>Quantitative Reasoning (RQ)</td>
<td>The ability to reason, either with induction or deduction, with numbers, mathematical relations, and operators.</td>
</tr>
</tbody>
</table>

Refinements: Piagetian Reasoning (RP) and Reasoning Speed (RE) were deemphasized, primarily because there is little evidence that they are distinct factors.
What is Fluid Reasoning (Gf)?

Fluid Reasoning (Gf) refers to a type of thinking that an individual may use when faced with a relatively new task that cannot be performed automatically.

- forming and recognizing concepts (e.g., how are a dog, cat, and cow alike?)
- identifying and perceiving relationships (e.g., sun is to morning as moon is to night)
- drawing inferences (e.g., after reading a story, answering the question, “What will John do next?”)
- reorganizing or transforming information (e.g., selecting one of several pictures to complete a puzzle).

Relations between Gf and Reading Achievement

**Gf** – Induction (I) and general sequential reasoning (RG) play a moderate role in reading comprehension.
Relations between Gf and Math and Writing Achievement

Quantitative Reasoning (RQ) consistently related to math achievement

Induction (I) and General Sequential Reasoning (RG; Deduction) consistently related to written expression

Definitions of CHC Broad and Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystallized Intelligence (Gc)</td>
<td>The depth and breadth and of knowledge and skills that are valued by one’s culture.</td>
</tr>
<tr>
<td>General Verbal Information (K0)</td>
<td>The breadth and depth of knowledge that one’s culture deems essential, practical, or otherwise worthwhile for everyone to know.</td>
</tr>
<tr>
<td>Language Development (LD)</td>
<td>General understanding of spoken language at the level of words, idioms, and sentences.</td>
</tr>
<tr>
<td>Lexical Knowledge (VL)</td>
<td>Extent of vocabulary that can be understood in terms of correct word meanings.</td>
</tr>
</tbody>
</table>
### Additional Gc Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystallized Intelligence (Gc)</td>
<td>The depth and breadth of knowledge and skills that are valued by one’s culture.</td>
</tr>
<tr>
<td>Listening Ability (LS)</td>
<td>The ability to understand speech.</td>
</tr>
<tr>
<td>Communication Ability (CM)</td>
<td>The ability to use speech to communicate one’s thoughts clearly.</td>
</tr>
<tr>
<td>Grammatical Sensitivity (MY)</td>
<td>Awareness of the formal rules of grammar and morphology of words in speech.</td>
</tr>
</tbody>
</table>

### What is Crystallized Intelligence (Gc)?

- a person’s knowledge base (or general fund of information) that has built up over time, beginning in infancy.
- your own personal library or everything you know.
What is Crystallized Intelligence (Gc)?

- Having well developed or good Crystallized intelligence means that one understands and uses language well, has an average or better vocabulary, has good listening skills, and is able to use language well via verbal expression.

Relations between Gc Abilities and Reading Achievement

- **Gc** – Language development (LD), lexical knowledge (VL), general information (K0) and listening ability (LS) are important at all ages. *These abilities become increasingly important with age*
Relations between Gc Abilities and Math and Writing Achievement

- **Gc** – Language development (LD), lexical knowledge (VL), general information (K0) and listening ability (LS) are important for reading achievement at all ages. *These abilities become increasingly important with age.*

Definitions of CHC Broad and Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory Processing (Ga)</td>
<td>The ability to detect and process meaningful nonverbal information in sound.</td>
</tr>
<tr>
<td>Phonetic coding (PC)</td>
<td>The ability to hear phonemes distinctly.</td>
</tr>
<tr>
<td>Speech Sound Discrimination (US)</td>
<td>The ability to detect and discriminate differences in speech sounds (other than phonemes) under conditions of little distraction or distortion.</td>
</tr>
<tr>
<td>Resistance to Auditory Stimulus Distortion (UR)</td>
<td>The ability to hear words correctly even under conditions of distortion or loud background noise.</td>
</tr>
<tr>
<td>Memory for Sound Patterns (UM)</td>
<td>The ability to retain (on a short-term basis) auditory even as tones, tonal patterns, and voices.</td>
</tr>
</tbody>
</table>
What is Auditory Processing (Ga)?

- Auditory processing (Ga) refers to the ability to perceive, analyze, and synthesize a variety of auditory information (e.g., sounds).
  - auditory processing include listening to words with missing letters and saying the correct word (e.g., hearing “olipop” and saying “lollipop”)
  - listening to piano music and identifying the key in which the piece is being played (e.g., C sharp)

Relations between Ga and Reading Achievement

- **Ga** – Phonetic Coding (PC) or phonological awareness; phonological processing – very important during the elementary school years.
Relations between Ga and Writing Achievement

Spelling isn’t EZ

### Assessing Phonological Processing Related to Reading

- Examples of assessments of phonological processing directly related to reading:
  - PAL-II Rhyming, Syllables, Phonemes, Rimes
  - KTEA-II Phonological Awareness Subtest
  - NEPSY-II Phonological Processing Subtest
  - WJ III Sound Awareness, Sound Blending, and Incomplete Words Subtests
  - DAS-II Phonological Processing Subtest
  - CTOPP-II Blending and Segmenting Subtests
Cognitive Test on WJ IV

- **Phonological Processing**
  - Measures Ga (PC) and some fluency aspects of Glr
  - Comprised of three tasks (Word Access, Word Fluency, and Substitution)
  - Good predictor of reading and writing (part of these scholastic aptitude clusters)

Information from: Institute for Applied Psychometrics; Kevin McGrew 2-04014

Information from: Institute for Applied Psychometrics; Kevin McGrew 2-2014
Definitions of CHC Broad and Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Term Memory (Gsm)</td>
<td>The ability to encode, maintain and manipulate information in one's immediate awareness.</td>
</tr>
<tr>
<td>Memory Span (MS)</td>
<td>The ability to maintain information in primary memory and immediately reproduce the information in the same sequence in which it was represented.</td>
</tr>
<tr>
<td>Working Memory Capacity (MW)</td>
<td>The ability to direct the focus of attention to perform relatively simple manipulations, combinations, and transformations of information within primary memory, while avoiding distracting stimuli and engaging in strategic/controlled searches for information in secondary memory.</td>
</tr>
</tbody>
</table>

What is Short-term Memory (Gsm)?

- Short-term memory (Gsm) is the ability to hold information in one’s mind and then use it within a few seconds.
  - holding a phone number in one's mind long enough to dial it.

- Working memory is also part of the short-term memory system and involves manipulating or transforming information and using it in some way (e.g., saying the months of the year backwards).

<table>
<thead>
<tr>
<th>Item</th>
<th>Correct response</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNS-Forward</td>
<td>9 – A – 6 – J – 3 – P</td>
</tr>
<tr>
<td>LNS-Reordered</td>
<td>1 – 7 – 8 – E – M – R</td>
</tr>
</tbody>
</table>
What is Short-term Memory (Gsm)?

- A child with short-term memory difficulties may have a hard time
  - Following directions
  - Understanding long reading passages (e.g., a story read aloud by the teacher)
  - Spelling
  - Sounding out words
  - And doing math problems (e.g., remembering the steps required to solve long math problems)
- Children who have difficulties with short-term memory do better when they are taught how to use strategies to help them remember things.
  - Mnemonics

Relations between Gsm and Achievement

- **Gsm** – Memory span (MS) and working memory capacity are important at all ages
• Changed Short-term Memory (Gsm) to *Short-term Working Memory (Gwm)*

• **Same definition:** The ability to apprehend and hold information in immediate awareness and then use it within a few seconds

• **Defines Gwm further as:** Efficiency of attentional control

• WJ IV Gwm tasks measure the **capacity limits** of short-term working memory

• There does not appear to be a distinction between the broad Gwm, the narrow WM ability, and the WJ IV author’s definition of attentional control, as discussed in the WJ IV TM.

---

**Short-Term Working Memory (Gwm)**

- **Test 3:** Verbal Attention – requires attentional control or focus

Information from: Institute for Applied Psychometrics; Kevin McGrew 2-2014
## Definitions of CHC Broad and Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Storage and Retrieval (Glr)</td>
<td>The ability to store, consolidate, and retrieve information over periods of time measured in minutes, hours, days, and years.</td>
</tr>
</tbody>
</table>

### Learning Efficiency

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associative Memory (MA)</td>
<td>The ability to remember previously unrelated information as having been paired.</td>
</tr>
<tr>
<td>Meaningful Memory (MM)</td>
<td>The ability to remember narratives and other forms of semantically related information.</td>
</tr>
<tr>
<td>Free Recall Memory (M6)</td>
<td>The ability to recall lists in any order.</td>
</tr>
</tbody>
</table>

## Additional Glr Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Storage and Retrieval (Glr)</td>
<td>The ability to store, consolidate, and retrieve information over periods of time measured in minutes, hours, days, and years.</td>
</tr>
</tbody>
</table>

### Retrieval Fluency

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideational Fluency (FI)</td>
<td>The ability to rapidly produce a series of ideas, words, or phrases related to a specific condition or object.</td>
</tr>
<tr>
<td>Word Fluency (FW)</td>
<td>The ability to rapidly produce words that share a non-semantic feature.</td>
</tr>
<tr>
<td>Figural Fluency (FF)</td>
<td>Ability to rapidly draw or sketch as many things (or elaborations) as possible when presented with a non-meaningful visual stimulus (e.g., a set of unique visual elements).</td>
</tr>
<tr>
<td>Naming Facility (NA)</td>
<td>The ability to rapidly name pictures, letters or objects that are known to the individual.</td>
</tr>
</tbody>
</table>
What is Long-term Storage and Retrieval (Glr)?

• Refers to an individual’s ability to take in and store a variety of information (e.g., ideas, names, concepts) in one’s mind and then retrieve it quickly and easily at a later time by using association.

What is Long-term Storage and Retrieval (Glr)?

• This ability does not represent what is stored in long-term memory or what you know. Rather, it represents the process of storing and retrieving information.
• When someone says, “It’s on the tip of my tongue,” they are having a hard time retrieving something that they know.
Evaluation of Vocabulary Knowledge - Gc (Looking for an Exact Word)

- DAS-II Naming Vocabulary = 79
- CELF-4 Expressive Vocabulary = 75

Retrieval Difficulties - Glr

Evaluation of Vocabulary Knowledge – Gc (Looking for a Definition of a Word)

- DAS-II Word Definitions = 90

Broader parameters; Can give enough information to show understanding
Relations between Glr and Reading Achievement

Glr – Naming facility (NA) or “rapid automatic naming” is very important during the elementary school years. Associative memory (MA) also appears to be important in the early elementary school years.

Schneider and McGrew’s Conceptualization of Gsm and Glr in Contemporary CHC Theory

Figure 4.6. Conceptual map of memory-related abilities in CHC theory.
Information adapted from: Institute for Applied Psychometrics; Kevin McGrew 2-2014

**Definitions of CHC Broad and Narrow Abilities**

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Processing (Gv)</td>
<td>The ability to make use of simulated mental imagery (often in conjunction with currently perceived images) to solve problems.</td>
</tr>
<tr>
<td>Visualization (Vz)</td>
<td>The ability to perceive complex patterns and mentally simulate how they might look when transformed (e.g., rotated, changed in size, partially obscured).</td>
</tr>
<tr>
<td>Speeded Rotation (SR)</td>
<td>The ability to solve problems quickly by using mental rotation of simple images.</td>
</tr>
<tr>
<td>Closure Speed (CS)</td>
<td>The ability to quickly identify a familiar meaningful visual object from incomplete (e.g., vague, partially obscured, disconnected) visual stimuli, without knowing in advance what the object is.</td>
</tr>
</tbody>
</table>
Additional Gv Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Processing (Gv)</td>
<td>The ability to make use of simulated mental imagery (often in conjunction with currently perceived images) to solve problems.</td>
</tr>
<tr>
<td>Visual Memory (MV)</td>
<td>The ability to remember complex visual images over short periods of time (less than 30 seconds).</td>
</tr>
<tr>
<td>Spatial Scanning (SS)</td>
<td>The ability to visualize a path out of a maze or a field with many obstacles.</td>
</tr>
</tbody>
</table>

What is Visual Processing (Gv)?

• Visual processing (Gv) is an individual’s ability to think about visual patterns (e.g., what is the shortest route from your house to school?) and visual images (e.g., what would this shape look like if I turned it upside down?).
What is Visual Processing (Gv)?

- This type of ability also involves generating, perceiving, and analyzing visual patterns and visual information.
  - putting puzzles together
  - completing a maze (such as the ones often seen on children’s menus in restaurants)
  - interpreting a graph or chart.
- Important when doing advanced math (e.g., geometry and calculus).

Relations between Gv Abilities and Achievement

- **Gv** – Orthographic processing
Orthography (Wagner & Barker, 1994)

• The system of marks that make up the English language, including upper and lower case letters, numbers, and punctuation marks

Assessing Visual Processing Related to Reading

• Visual processing must be assessed using orthography (letters, words and numbers) rather than abstract designs or familiar pictures
Relationship Between Gv and Achievement

<table>
<thead>
<tr>
<th>Gv Ability</th>
<th>Reading Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthographic processing (e.g., visual processing using letters and sub-word sound units) is important for reading decoding.</td>
<td></td>
</tr>
</tbody>
</table>

Assessing Orthographic Processing Related to Reading

- Examples of assessments of orthographic processing directly related to reading:
  - Test of Silent Word Reading Fluency-2 (TOSWRF-2)
  - Test of Irregular Word Reading Efficiency (TIWRE)
  - Test of Orthographic Competence (TOC)
  - Process Assessment of the Learner (PAL-II)
  - Early Reading Assessment (ERA)
Cognitive Test on WJ IV

• Letter-Pattern Matching
  – Measures Gs (P) and orthographic processing
  – Examinee locates and circles the two identical letter patterns in a row of six patterns
  – Is similar to Number-Pattern Matching (Visual Matching)
  – LETPAT + NUMPAT = Gs (P; orthographic processing)

Information from: Institute for Applied Psychometrics; Kevin McGrew 2014

Definitions of CHC Broad and Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing Speed (Gs)</td>
<td>The speed at which visual stimuli can be compared for similarity or difference.</td>
</tr>
<tr>
<td>Perceptual Speed (P)</td>
<td>The ability at which visual stimuli can be compared for similarity or difference.</td>
</tr>
<tr>
<td>Rate-of-Test-Taking (R9)</td>
<td>The speed and fluency with which simple cognitive tests are completed.</td>
</tr>
<tr>
<td>Number Facility (N)</td>
<td>The speed at which basic arithmetic operations are performed accurately.</td>
</tr>
<tr>
<td>Reading Speed (RS)</td>
<td>The rate of reading text with full comprehension.</td>
</tr>
<tr>
<td>Writing Speed (WS)</td>
<td>The rate at which words or sentences can be generated or copied.</td>
</tr>
</tbody>
</table>
What is Processing Speed (Gs)?

**FAST THINKING**

• Processing speed (Gs) refers to an individual’s ability to perform simple clerical tasks quickly, especially when under pressure to maintain attention and concentration.

• It can also be thought of as how quickly one can think or how quickly one can take simple tests that require simple decisions.

• Involves sustained/focused and selective attention.

Revisions and Refinements to Gs Domain

- **Gs**: Reading Speed (RS) and Writing Speed (WS) were added (also listed under Grw)
  - Reading and writing speed demand quick, accurate performance and, therefore, are measures of Gs.

- The narrow Gs ability of Semantic Processing Speed (R4) was moved to Gt and Inspection Time (IT) was added to Gt.
Relations between Gs and Achievement

- **Gs** – Perceptual speed (P) abilities are important during all school years, particularly the elementary school years.

What Combinations of Abilities Are Important for Different Achievements

- Fluid Reasoning – *Gf*
- Crystallized Knowledge – *Gc*
- Short-term Memory – *Gsm*
- Long-term Storage and Retrieval – *Glr*
- Visual Processing – *Gv*
- Auditory Processing – *Ga*
- Processing Speed – *Gs*
Putting the Abilities Together

• Students who Learn Quickly and Excel Academically
  – Gc (good fund of knowledge; good vocabulary; communicate well)
  – Glr (learning is efficient; info is retrieved fluently)
  – Gsm + Gf (able to hold retrieved info; transform it; interact it with new info and draw conclusions based on inductive and deductive reasoning)

See Flanagan, Ortiz, and Alfonso (2013). Essentials of Cross-Battery Assessment, 3e

Top Four Most Important Abilities for Learning and Academic Success

• 1. Fluid Reasoning (Gf)
• 2. Crystallized Knowledge (Gc)
  – Weaknesses in these abilities constrain learning and achievement
• (Executive Functions – weaknesses lead to inconsistencies in Learning and Achievement)
• 3. Short-Term Memory (Gsm) – Working Memory
• 4. Long-Term Storage and Retrieval (Glr)
  – Working Memory, Retrieval Fluency, and Learning Efficiency
  – Weaknesses in these abilities obstruct learning and achievement, but can be improved upon, bypassed, or compensated for at least to some degree

• Important Processes (related to reading)
  – Ga – Phonological Processing (encompasses many skills)
  – Visual Processing/Processing Speed – Orthographic Processing
    • Train processing deficits to point where they become skill

See Flanagan, Ortiz, and Alfonso (2013). Essentials of Cross-Battery Assessment, 3e
IDEIA – Federal Definition of SLD

“A disorder in one or more of the basic psychological processes involved in understanding or using language, spoken or written, which manifests itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Such terms include such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia”

Federal Regulations Permit the Use of a PSW Model (Alternative Research-based Approach)

(34 CFR 300.311(a)(5)), (34 CFR 300.309(a)(2(ii)).

• Evaluation documentation must consider whether the student exhibits a pattern of strengths and weaknesses
  – In performance, achievement or both
  – Relative to age, State approved grade levels standards, or intellectual development
  – That is determined by the group to be relevant to the identification of SLD using appropriate instruments
OSEP allows Teams to Choose

• §300.309(a)(2)(ii) permits, but does not require, consideration of a pattern of strengths or weaknesses, or both, relative to intellectual development, if the evaluation group considers that information relevant to an identification of SLD.

Main Elements of PSW – Inclusionary Criteria

• Specific academic weakness(es)
• Specific cognitive weakness(es)
• Cognitive abilities and processes in the average range (or higher) – particularly those least related to the area(s) of academic weakness
  – “otherwise normal ability profile”
  – Pattern of cognitive strengths suggests at least average overall cognitive ability
• May have some academic skills in the average range (or higher)
• Research-based (or ecologically valid) links between the academic and cognitive weaknesses
• The “SLD pattern” is only supportive of SLD when other data sources converge in a manner consistent with what is known about SLD
AMERICAN ACADEMY OF SCHOOL PSYCHOLOGY SURVEY ON THE INDEPENDENT EDUCATIONAL EVALUATION FOR A SPECIFIC LEARNING DISABILITY: RESULTS AND DISCUSSION

FREDRICK A. SCHRANK
The Woodcock-Matiz Foundation, Olympia, WA

JEFFREY A. MILLER
Duquesne University

LINDA C. CATERINO
Arizona State University

JOHN DESROCHERS
New Canaan Public Schools, New Canaan, CT

This article reviews the results of a survey of the Fellows of the American Academy of School Psychology (Academy; AASP) regarding the independent educational evaluation (IEE) for a specific learning disability (SLD). Academy Fellows were asked about important components of the IEE, desirable evaluator qualifications, and recommended criteria for a diagnosis of SLD in

| Endorsed and Most Important (in bold) Evaluator Qualifications to Conduct an IEE for SLD (N = 50) |
|--------------------------------------------------|------------------|------------------|------------------|
| Evaluator qualification                          | Endorsed | %   | Importance | %   | Rank |
| Assessment experience with children with specific learning disabilities | 50      | 100 | 25     | 50  | 3    |
| **Current knowledge of the nature of SLD**       | 49      | 98  | 30     | 60  | 1    |
| Training with a broad variety of cognitive assessment instruments | 49      | 98  | 27     | 54  | 2    |
| Professional-level ability to communicate assessment results in written form | 48      | 96  | 19     | 38  | 4    |
| Understanding of special education law           | 43      | 86  | 8      | 16  | 9    |
| Availability to attend due process hearings or otherwise defend their assessment report | 42      | 84  | 8      | 16  | 9    |
| Training with a broad variety of academic achievement assessment instruments | 41      | 82  | 14     | 28  | 6    |
| Understanding of APA and/or NASP ethics codes    | 40      | 80  | 12     | 24  | 8    |
| Experience in direct school psychological services | 38      | 76  | 14     | 28  | 6    |
| Understanding of local education agency special education policies | 36      | 72  | 4      | 8   | 16   |
| Classroom observation skills                      | 34      | 68  | 5      | 10  | 15   |
| State department of education certification as a school psychologist | 34      | 68  | 7      | 14  | 13   |
| Licensure for independent practice by state department of health or board of psychologist examiners | 33      | 66  | 16     | 32  | 5    |
“Third Method” Alternative Research-Based Approaches to SLD Identification (PSW Methods)

- **Approaches and “PSW-ready” batteries:**
  - *Flanagan, Oritz, Alfonso, & Mascolo (2002-2013)*
    - Dual-Discrepancy/Consistency (within the context of an Operational Definition of SLD and a broader approach to “best practices” in CHC-based assessment)
  - *Naglieri, 1999, 2013*
    - Discrepancy/Consistency (PASS Model; CAS-2 battery)
  - *Hale & Fiorello, 2004, 2011*
    - Concordance-discordance model (based on neuropsych theory within the context of an hypothesis testing approach)
  - *Milton Dehn*
  - *WJ IV, WISC-V, KTEA-III*
An Operational Definition of SLD
Flanagan, Ortiz, Alfonso, and Mascolo

- Definition first presented in 2002
- Revised and updated in 2006
- Updated in 2007
- Revised and updated in 2011
- Updated and Renamed in 3e of Essentials of XBA3: Dual Discrepancy/Consistency (DD/C)

<table>
<thead>
<tr>
<th>IV</th>
<th>The specific learning disability is a discrete condition differentiated from generalized learning difficulties by generally average or better ability to think and reason and a learning skill profile exhibiting significant variance, indicating processing areas of strength and weaknesses.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pattern of Strengths and Weaknesses Marked by a Dual Discrepancy-Costancy (D-D-C) Determination of whether academic skill weaknesses or deficits are related to specific cognitive area(s) of weakness or deficit, patterns of data reflect a below-average achievement consistency with otherwise average or better ability to think and reason.</td>
</tr>
<tr>
<td></td>
<td>Data gathered at all previous levels as well as any additional data following a review of initial evaluation methods (e.g., data gathered for the purpose of hypothesis testing; data gathered via demand analysis and limits testing).</td>
</tr>
<tr>
<td></td>
<td>Circumstantial below-average achievement consistency (i.e., related cognitive processes and academic skills are generally about ISD below the mean or lower), circumstantial ability achievement and ability-cognitive strength discrepancy, with cognitive areas of strength represented by standard scores that are generally 2 SDs below the mean. Clinical judgment supports the impression that the student's overall ability to think and reason will enable him or her to benefit from tailored or specialized instruction, interventions, compensatory strategies, and accommodations, such that the or her performance at the level will likely approximate more typical achievement, non-classified peers. The PWT-4 &amp; D software programs on the CD that accompanies Essentials of Cross-Battery Assessment: 3rd Edition are to be used to determine if the individual's a D-D-C pattern of strengths and weaknesses is consistent with the SLD construct.</td>
</tr>
<tr>
<td>V</td>
<td>Specific learning disability has an adverse impact on educational performance.</td>
</tr>
<tr>
<td></td>
<td>Special Education Eligibility Determination of Least Restrictive Environment (LRE) for delivery of instruction and educational resources.</td>
</tr>
<tr>
<td></td>
<td>Data from all previous levels and MDT meeting, including parents.</td>
</tr>
<tr>
<td></td>
<td>Student demonstrates significant difficulties in daily academic activities that cannot be remediated, accommodated, or otherwise compensated for without the existence of individualized special education services. Necessary for Special Education Eligibility.</td>
</tr>
</tbody>
</table>

---


---

Conceptual Similarities Among Alternative Research-based Approach to SLD

- **COGNITIVE STRENGTHS**
  - Average or better overall ability
  - Supported by strengths in academic skills

- **Cognitive Weakness Deficit**
  - Cognitive Ability or Processing Disorder
  - Consistent
  - Performance approximately 1 SD below the mean or lower (cognitive and academic areas of weakness are related empirically and relationship is ecologically valid)

- **Academic Weakness/Failure**
  - Academic Skills/Knowledge Deficits
  - Unexpected, because overall cognitive ability is at least average (and other factors were ruled out, such as inadequate instruction)

---

A PSW-A Example

Joe
Grade 1
**Cross-Battery Pattern of Strengths and Weaknesses Analyzer (XBA PSW-A® v1.0)**

**Conceptualization by D.F. Flanagan, S.O. Ortiz, V.C. Alfonso; Programming by S.O. Ortiz and A.M. Dyna**

**Copyright © 2013 Wiley. All Rights Reserved**

Details on the conceptualization, use, and interpretation of the information and values produced by XBA PSW-A® are found in Essentials of Cross-Battery Assessment, Third Edition (Flanagan, Ortiz & Alfonso, 2013). Begin by following the steps outlined below. After entering the required information, click on the "Go to g-Value Data Entry Tab" button to move to the next tab.

### IDENTIFYING INFORMATION

You must select the student’s grade from the drop down menu to begin analysis. Entering additional data is optional.

<table>
<thead>
<tr>
<th>Step 1: Student Name</th>
<th>Joe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2: Date of Birth</td>
<td>[Enter date of birth in mm/dd/yyyy format]</td>
</tr>
<tr>
<td>Step 3: Date of Evaluation</td>
<td>[Enter date of evaluation in mm/dd/yyyy format]</td>
</tr>
<tr>
<td>Step 4: School Grade</td>
<td>1</td>
</tr>
<tr>
<td>Step 5: Examiner Name</td>
<td>[Enter name of examiner]</td>
</tr>
</tbody>
</table>

**g-Value Data Entry Tab**

- **Chronological Age:** [Enter chronological age] (The student’s chronological age is calculated automatically.)
- **g Value Summary:** Use the buttons in this section to navigate to any tab in the program quickly.

**Optional**

- **Save data file:** [Save Data and File As...]
- **Clear Data on All Tabs:** [Clear Data on All Tabs]
- **Go to Notes, Instruction, and Development Tab:** [Go to Notes, Instruction, and Development Tab]

### DATA ENTRY for g-Value

**Name:** Joe  
**Grade:**

#### Step 1: Enter Composite Scores

In the left-hand column below enter the obtained standard score for each of the seven broad ability composite listed (see Appendix A for guidelines).

**CHC ABILITY COMPOSITES**

<table>
<thead>
<tr>
<th>Composite</th>
<th>Enter Standard Scores (Range: 40–160)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gc: Crystalized Knowledge</td>
<td>92</td>
</tr>
<tr>
<td>Gr: Fluid Reasoning</td>
<td>79</td>
</tr>
<tr>
<td>Gq: Long-Term Storage &amp; Retrieval</td>
<td>93</td>
</tr>
<tr>
<td>Gm: Short Term Memory</td>
<td>100</td>
</tr>
<tr>
<td>Gv: Visual Processing</td>
<td>97</td>
</tr>
<tr>
<td>Ga: Auditory Processing</td>
<td>89</td>
</tr>
<tr>
<td>Gs: Processing Speed</td>
<td>102</td>
</tr>
</tbody>
</table>

#### Step 2: Indicate "Yes" or "No"

In the right-hand column below indicate whether ability is "sufficient" by clicking on either the "Yes" or "No" button.

**Standard Score Range**

- **< 30:** Extremely Below Average/Severe Deficit
- **30–49:** Well Below Average/Severe Deficit
- **50–69:** Below Average/Weakness
- **70–109:** Average
- **110–119:** Above Average/Strength
- **120–159:** Proficient
- **> 160:** Extremely Above Average/Extreme Strength

**Functional Description**

- **Markedly insufficient**
- **Insufficient**
- **Insufficient to Sufficient**
- **Sufficient**
- **Efficient**
- **Proficient**
- **Markedly Proficient**

---

*Note: Using T-scores, convert them to standard scores (Deviation IQ metric).<ref id="t-scoreuellement" />

Go to Main Tab
Based on data entered in prior tabs, a g-Value is computed and displayed here. Users are advised to refer to the Notes, Instruction, and Development tab and to the relevant text in *Essentials of Cross-Battery Assessment, Third Edition* for a detailed discussion regarding the full meaning and proper use of the g-Value.

**CHC Broad Abilities**

The g VALUE = 0.86 reflects overall cognitive ability based on the broad CHC Abilities judged by the evaluator to be “sufficient.” The g-value is interpreted according to the likelihood that an individual possesses at least average overall cognitive ability.

*Note:* An asterisk (* *) next to a broad ability code indicates that the ability was judged as “Insufficient” by the evaluator.

### Interpretation of g VALUE = 0.86

How likely is it that the individual’s pattern of strengths indicates at least average overall cognitive ability? Likely.

Despite the presence of weaknesses in one or more cognitive ability domains, this individual displays average or better functioning in cognitive ability domains considered important for acquiring the academic skills typical for this grade level. The individual’s overall cognitive ability is very likely to be average or better and, therefore, ought to enable learning and achievement, especially when specific cognitive weaknesses are minimized through compensatory efforts, accommodations, and the like.

### Pattern of Strengths and Weaknesses Data Entry

The composite represents the individual’s overall cognitive ability without the alternating effects of the CHC abilities subject to be area of weakness or deficit.

The Percentile Ranks indicate the individual’s composite abilities, expressed in comparison to a normative sample. The Percentile Rank is the percentage of the normative sample scoring at or below the individual’s performance on the composite.

The Individual Percentiles represent the individual’s scores in comparison to the normative sample. The Individual Percentile is the percentage of the normative sample scoring at or below the individual’s performance on the composite.

**1. Intact Ability Estimate**

This composite is calculated using median residuals, residuals, and mean residuals among the individual’s subtest and scale scores to indicate the individual’s overall cognitive ability.

**2a. Cognitive Weakness**

The composite represents the individual’s overall cognitive ability without the alternating effects of the CHC abilities subject to be area of weakness or deficit.

**2b. Frequency of Difference**

Select the initial probabilities to evaluate the reliability (i.e., frequency) of the size of the difference between actual and predicted optimal performance. The default starting value is 0.05, meaning a difference should occur about 5% of the time or less. The final value, however, will be corrected statistically to account for test unreliability.

**3a. Academic Weakness**

Enter a scaled foundation (regardless of the name of the student or composite) in the box above, or enter the second composite data on a subject (if individual).

**3b. Frequency of Difference**

Select the initial probability levels to evaluate the reliability (i.e., frequency) of the size of the difference between actual and predicted optimal academic performance. The default starting value is 0.05, meaning a difference should occur about 5% of the time or less. The final value, however, will be corrected statistically to account for test unreliability.
Did the individual's observed cognitive and academic performances meet criteria for a PSW consistent with SLD?
Yes. Based on the data entered into the PSW Analyzer, specific criteria for establishing a PSW consistent with SLD have been met. However, this pattern of results does not automatically confirm the presence of SLD. This pattern must be considered within the context of the entire case history of the individual. In addition, other data sources, gathered through multiple methods need to be considered (e.g., exclusionary factors) when identifying or diagnosing SLD (see chapter 4).

Is there evidence of domain specific weaknesses in cognitive functioning?
Yes. The difference between the individual’s estimate of intact cognitive abilities and the score representing the area of specific cognitive weakness (e.g., a specific cognitive process or ability) is statistically significant. This finding means that there is likely a true or real difference between the estimate of overall cognitive strengths and the identified area of specific cognitive weakness for the individual. In addition, there is an unusually large difference between actual performance in the specific cognitive area and expected performance (as predicted by overall cognitive strengths). This is based on the individual’s estimate of cognitive strengths. It was predicted that the individual would perform much better in the specific cognitive area. In fact, the size of the difference between the individual’s actual and predicted performance in the specific cognitive area occurs very infrequently. The results of these analyses suggest that the individual’s PSW consists of a domain-specific cognitive weakness (particularly when the actual S-2 and 185-165, an inclusionary criterion for SLD).

Is there evidence of unexpected underachievement?
Yes. The difference between the individual’s estimate of intact cognitive abilities and the score representing the area of specific academic weakness (e.g., a specific academic skill) is statistically significant. This finding means that there is likely a true or real difference between the estimate of overall academic strengths and the identified area of specific academic weakness for the individual. In addition, there is an unusually large difference between actual performance in the specific academic area and expected performance (as predicted by overall cognitive strengths). This is based on the individual’s estimate of cognitive strengths. It was predicted that the individual would perform much better in the specific academic area. In fact, the size of the difference between the individual’s actual and predicted performance in the specific academic area occurs very infrequently. The results of these analyses suggest that the individual’s PSW is marked by unexpected underachievement (particularly when the actual S-2 and 185-165, an inclusionary criterion for SLD).

Is there evidence of a below average aptitude-achievement consistency?
Yes. The scores representing the areas of specific cognitive and academic weaknesses are below average (15-66) and are indicative of normative deficits. These scores provide evidence of a below average aptitude-achievement consistency and may be used to support an overall SLD pattern of strengths and weaknesses. However, additional evidence is necessary to verify that there is an empirical or ecologically valid relationship between the areas of specific cognitive and academic weaknesses.
Cross-Battery Pattern of Strengths and Weaknesses Analyzer (XBA PSW-A® v1.0)

Conceptualization by D.P. Flanagan, S.O. Ortiz, and V.C. Allalomo

Are weaknesses domain specific?
Using the t-ratio as the predictor of the difference between Actual and Predicted specific cognitive performance scores or exceeds the Critical Value, then the size of the difference is unusually large and infrequent and the cognitive weaknesses are domain specific.

<table>
<thead>
<tr>
<th>Difference</th>
<th>Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.76</td>
<td>9.24</td>
</tr>
</tbody>
</table>

Yes, domain specific
Critical Value Set at 5%

AGGREGATE OF COGNITIVE STRENGTHS
The aggregate is either the Intact Ability Estimate (IAE) or a user-entered alternative value that represents the individual's overall ability.

g-Value = 0.86

Is underachievement unexpected?
Using the t-ratio as the predictor of the difference between Actual and Predicted specific academic performance scores or exceeds the Critical Value, then the size of the difference is unusually large and infrequent and underachievement is unexpected.

<table>
<thead>
<tr>
<th>Difference</th>
<th>Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.40</td>
<td>16.50</td>
</tr>
</tbody>
</table>

Yes, unexpected underachievement
Critical Value Set at 5%

Cognitive Weakness
Below are the individual's Actual and Predicted performances in the area of:
XBA Gen. Working Memory

Actual | Predicted
-------|--------|
78     | 97     

Is there a BELOW AVERAGE aptitude-achievement consistency?
The box above addresses this component of learning disability. Through consideration of the degree to which the meaning of the scores is similar (e.g., indicative of weakness or deficit) and the position of the scores consistent.

<table>
<thead>
<tr>
<th>Difference</th>
<th>Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Basic Reading
Below are the individual's Actual and Predicted performances in the area of:

Actual | Predicted
-------|--------|
75     | 97     

Summary of g-Value
Interpretive Summary Statement and Values

Name: Joe
Grade: 1

CHC Broad Abilities

g-Value

*Note: An asterisk next to a broad ability code indicates that the ability was judged as "insufficient" by the evaluator.

Interpretation of g-Value = 0.86
How likely is it that the individual’s pattern of strengths indicates at least average overall cognitive ability?
Likely, despite the presence of weaknesses in one or more cognitive ability domains, this individual displays average or better functioning in cognitive ability domains considered important for achieving the academic skills typical for this grade level. The individual's overall cognitive ability is very likely to be average or better and, therefore, ought to enable learning and achievement, especially when specific cognitive weaknesses are minimized through compensatory efforts, accommodations, and the like.
Formulae Used in PSW-A
(see “Notes, Instructions, and Development” tab for More Information)

- Default value for statistical significance is set at 95% \((p < .05)\), which is the recommended value (Reynolds, 1985; Wright, 2002)

- When difference between IA-e and cognitive or academic weakness score is statistically significant, then the program evaluates the magnitude of the difference between actual and predicted performance and its degree of rarity.
  - Program uses default value for rarity – i.e., size of difference occurs in about 5% (or less) of the population (one tailed – weakness is assumed to be lower than IA-e)

- Program employs a regression-based prediction discrepancy procedure that **guards against false negatives**
  - Critical value is adjusted statistically to correct for inherent test unreliability and imperfect correlation so as to not exclude student’s whose difference was insufficient to meet or exceed the target value due to measurement error (Reynolds, 1985; Wright, 2002)

PSW-A v1.0
Flanagan, Ortiz, and Alfonso (2013)

- Based on the most psychometrically defensible analyses of score differences
Evaluation of Below Average Aptitude-Achievement Consistency

• Three ranges
  – < 85
  – 85-89
  – > 90

• Does the pattern include consistency?
  – both scores < 85 = yes
  – Both scores > 90 = no
  – One score < 85; one score 85-89 = likely
  – Both scores 85-89 = possibly
  – One score < 85; one score > 90 = possibly
  – One score 85-89; one score > 90 = unlikely

• Final determination based on clinical judgment, which is bolstered by empirical evidence supporting the relationship and ecological validity

McCloskey’s Representation of a Cognitive Neuropsychological Discrepancy Model for SLD Identification

Identification of SLD

- **Involves more than just examining scores from standardized tests**
  - A convergence of data sources is necessary
  - Data should be gathered via different methods
  - Exclusionary factors must be considered and examined systematically

Exclusionary Factors Form
Flanagan et al.’s Operational Definition: Level II – Review of Exclusionary Factors

**Evaluation and Consideration of Exclusionary Factors for SLD Identification**

An evaluation of specific learning disability (SLD) requires an evaluation and consideration of factors, other than a disorder in one or more basic psychological processes that may be the primary cause of a student’s academic skill weaknesses and learning difficulties. These factors include (but are not limited to), vision/hearing, or motor disabilities, intellectual disability (ID), social/emotional or psychological disturbance, environmental or economic disadvantage, cultural and linguistic factors (e.g., limited English proficiency), insufficient instruction or opportunity to learn and physical/health factors. These factors may be evaluated via behavior rating scales, parent and teacher interviews, classroom observations, attendance records, social/developmental history, family history, vision/hearing exams, medical records, prior evaluations, and interviews with current or past counselors, psychiatrists, and paraprofessionals who have worked with the student. Noteworthy is the fact that students with (and without) SLD often have one or more factors (listed below) that contribute to academic and learning difficulties. However, the practitioner must rule out any of these factors as being the primary cause of a student’s academic and learning difficulties to maintain SLD as a viable classification/diagnosis.

Orientation to the PSW-A v1.0
PSW Data Entry Tab

• It is not necessary to use more than one area of cognitive weakness or more than one area of academic weakness.
  – You may do so, but it is not necessary once the pattern is established
  – Do not run multiple comparisons for a student because the program does not control for multiple comparisons

• Evaluate the areas in which there are the most concerns, the most relevance to the referral, and the most compelling evidence of deficiency

• Form diagnostic impressions prior to using the program

• Select comparisons a priori

---

g-Value =

• **Sum of g-weights** for each of the CHC ability domains
  – Program uses average g-weights from four sources (WJ III Technical Manual and three separate Cross-Battery joint factor analysis studies – all included the seven main cognitive domains)

• The abilities and their corresponding g-weights in the order in which they are listed in the g-Value Data Entry tab (which generally follows from highest to lowest) are as follows:
  • $G_c = .2355$
  • $G_f = .1870$
  • $G_{lr} = .1572$
  • $G_{sm} = .1152$
  • $G_v = .1167$
  • $G_a = .1029$
  • $G_s = .0864$
  • SUM = 1.0009
Abilities that are Considered Most Important to Learning and Academic Success in School are Given More Weight in the Calculation of the $g$-Value

- Grades K-2
  - $Gc$ – Crystallized Intelligence
  - $Glr$ – Long-term Storage and Retrieval
  - $Gsm$ – Short-term Memory
  - $Gs$ – Processing Speed

- Grades 3+
  - $Gc$ – Crystallized Intelligence
  - $Glr$ – Long-term Storage and Retrieval
  - $Gsm$ – Short-term Memory
  - $Gf$ – Fluid Reasoning

$g$-Value Data Entry Tab

- “Yes” selected for all seven CHC ability domains
  - $g$-Value = 1.0
- “No” selected for all seven CHC ability domains
  - $g$-Value = 0
Example of “Yes” Selected for All Areas

<table>
<thead>
<tr>
<th>CHC ABILITY COMPOSITES</th>
<th>Enter Standard Scores (Range: 40 - 160)*</th>
<th>Select Yes or No</th>
<th>Determine Suficiency:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ga - Crystallized Knowledge</td>
<td>100</td>
<td>Yes</td>
<td>An ability is considered “sufficient” when it is judged by the evaluator to contribute meaningfully to the individual’s overall cognitive functioning, particularly for the purpose of facilitating academic performance (e.g., acquisition and development of academic skills). Typically, standard scores around 96 or higher are sufficient, as abilities associated with scores in this range (≥ 96) often contribute meaningfully to the individual’s overall cognitive functioning and, therefore, support learning. When standard scores are around 95 or lower, clinical judgment is necessary to determine if the broad ability constrains or inhibits learning and achievement.</td>
</tr>
<tr>
<td>Gf - Fluid Reasoning</td>
<td>98</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gm - Long-Term Storage &amp; Retrieval</td>
<td>104</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gm - Short-Term Memory</td>
<td>97</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gv - Visual Processing</td>
<td>99</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ga - Auditory Processing</td>
<td>102</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ga - Processing Speed</td>
<td>109</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

“Yes” Selected for All Areas – g-Value = 1.00

Analysis and Interpretation of g-Value

Based on data entered in prior tabs, a g-value is computed and displayed here. Users are advised to refer to the Notes, Instruction and Development tab and to the relevant text in Essentials of Cross-Battery Assessment, Third Edition for a detailed discussion regarding the full meaning and proper use of the g-Value.

The g-value reflects overall cognitive ability based on the broad CHC abilities judged by the evaluator to be “sufficient.” The g-value is interpreted according to the likelihood that an individual possesses at least average overall cognitive ability:

- ≤ 60 = average overall ability is very likely
- 51 - 59 = more information needed
- 50 = average overall ability is unlikely

Note: An asterisk (*) next to a broad ability code indicates that the ability was judged as “insufficient” by the evaluator.

Interpretation of g-Value = 1.00

How likely is it that the individual’s pattern of strengths indicates at least average overall cognitive ability?

Very likely. According to the data provided, there are no cognitive weaknesses indicated in this individual’s performance. The individual displays average or better functioning in seven broad cognitive ability domains, including those considered most important for acquiring the academic skills typical for this grade level. The individual’s overall cognitive ability is at least average and, therefore, is expected to facilitate learning and achievement.
Example of “No” Selected for All Areas

DATA ENTRY for \( g \) - Value

**Step 1: Enter Composite Scores**

In the left-hand column below enter the obtained standard score for each of the seven broad ability composites listed (see Appendix 1 for guidelines).

**Step 2: Indicate “Yes” or “No”**

In the right-hand column below indicate whether ability is “sufficient” by clicking on either the “Yes” or “No” button.

<table>
<thead>
<tr>
<th>CHC ABILITY COMPOSITES</th>
<th>Enter Standard Scores (Range: 40 - 160)</th>
<th>Select Yes or No</th>
<th>Determining Sufficient:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gc - Crystallized Knowledge</td>
<td>80</td>
<td>No</td>
<td>An ability is considered “sufficient” when it is judged by the evaluator to contribute meaningfully to the individual’s overall cognitive functioning, particularly for the purpose of facilitating academic performance (e.g., acquisition and development of academic skills). Typically, standard scores around 90 or higher are sufficient, as abilities associated with scores in this range (≥ 90) often contribute meaningfully to the individual’s overall cognitive functioning and, therefore, support learning. When standard scores are around 90 or lower, clinical judgment is necessary to determine if the broad ability constrains or inhibits learning and achievement.</td>
</tr>
<tr>
<td>GI - Fluid Reasoning</td>
<td>79</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Gt - Long-Term Storage &amp; Retrieval</td>
<td>84</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Gm - Short-Term Memory</td>
<td>77</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gv - Virtual Processing</td>
<td>83</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Ga - Auditory Processing</td>
<td>80</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gs - Processing Speed</td>
<td>85</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**Analysis and Interpretation of \( g \) - Value**

Based on data entered in prior tabs, a \( g \) - Value is computed and displayed here. Users are advised to refer to the Notes, Instruction, and Development tab and to the relevant text in *Essentials of Cross-Battery Assessment, Third Edition* for a detailed discussion regarding the full meaning and proper use of the \( g \) - Value.

\[ g \text{-Value} = 0.00 \]

- The \( g \) - Value reflects overall cognitive ability through the broad CHC abilities judged by the evaluator to be “sufficient.” The \( g \) - Value is interpreted according to the likelihood that an individual possesses at least average overall cognitive ability.
  - ≥ 0.50 = average overall ability is very likely
  - 0.50 - 0.79 = more information needed
  - ≤ 0.50 = average overall ability is unlikely

**Interpretation of \( g \) - Value = 0.00**

*How likely is it that the individual’s pattern of strengths indicates at least average overall cognitive ability?*

VERY UNLIKELY: According to the data provided, there are no cognitive strengths indicated in this individual’s performance. The individual displays below average or lower functioning in all seven broad cognitive ability domains, including those considered most important for acquiring the academic skills typical for this grade level. The individual’s overall cognitive ability cannot be considered to be at least average and, therefore, is not expected to facilitate learning and achievement.
g-Value and IA-e

- When g-Value is .60 or higher (reported in the color green), then
  - The IA-e is almost always in the average range or higher (and reported in the color green)
Example of Relationship between g-Value and IA-e

### DATA ENTRY for g-Value

**Step 1: Enter Composite Scores**
In the left-hand column below enter the obtained standard score for each of the seven broad ability composites listed (see Appendix for guidelines).

**Step 2: Indicate "Yes" or "No"**
In the right-hand column below indicate whether ability is "sufficient" by clicking on either the "Yes" or "No" button.

<table>
<thead>
<tr>
<th>CHC ABILITY COMPOSITES</th>
<th>Enter Standard Scores (Range 40 - 160)*</th>
<th>Select Yes or No</th>
<th>Determining Sufficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gc - Crystallized Knowledge</td>
<td>92</td>
<td>Yes/No</td>
<td>An ability is considered &quot;sufficient&quot; when it is judged by the evaluator to contribute meaningfully to the individual's overall cognitive functioning, particularly for the purpose of facilitating academic performance (e.g., acquisition and development of academic skills). Typically, standard scores around 90 or higher are sufficient, as abilities associated with scores in this range (≥ 90) often contribute meaningfully to the individual's overall cognitive functioning and, therefore, support learning. When standard scores are around 90 or lower, clinical judgment is necessary to determine if the broad ability constrains or inhibits learning and achievement.</td>
</tr>
<tr>
<td>Gf - Fluid Reasoning</td>
<td>98</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>Gk - Long-Term Storage &amp; Retrieval</td>
<td>82</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>Gm - Short-Term Memory</td>
<td>97</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>Gv - Visual Processing</td>
<td>99</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>Ga - Auditory Processing</td>
<td>84</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>Gs - Processing Speed</td>
<td>109</td>
<td>Yes/No</td>
<td></td>
</tr>
</tbody>
</table>

Example of Relationship between g-Value and IA-e

### Analysis and Interpretation of g-Value

Based on data entered in prior tabs, a g-Value is computed and displayed here. Users are advised to refer to the Notes, Instruction, and Development tab and to the relevant text in *Essentials of Cross-Battery Assessment, Third Edition* for a detailed discussion regarding the full meaning and proper use of the g-Value.

**g-Value = 0.74**

- The g-Value reflects overall cognitive ability based on the broad CHC abilities judged by the evaluator to be "sufficient." The g-Value is interpreted according to the likelihood that an individual possesses at least average overall cognitive ability.
  - ≥ 60 = average overall ability is very likely
  - 51 - 59 = more information needed
  - ≤ 50 = average overall ability is unlikely

**Note:** An asterisk (*) next to a broad ability code indicates that the ability was judged as "insufficient" by the evaluator.
Example of Relationship between \(g\)-Value and IA-e

- When \(g\)-Value is .60 or higher (reported in the color green), then
  - The IA-e is almost always in the average range or higher (and reported in the color green)

- \(g\)-Value may be .60 or higher (reported in the color green)
  - IA-e may be in the low average range and appear in the color yellow
### Example of Relationship between g-Value and IA-e

**DATA ENTRY for g-Value**

<table>
<thead>
<tr>
<th>CHC ABILITY COMPOSITES</th>
<th>Enter Standard Scores (Range 40 - 150)**</th>
<th>Select Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ga - Crystallized Knowledge</td>
<td>89</td>
<td>Yes</td>
</tr>
<tr>
<td>Gf - Fluid Reasoning</td>
<td>90</td>
<td>Yes</td>
</tr>
<tr>
<td>Glr - Long-Term Storage &amp; Retrieval</td>
<td>82</td>
<td>Yes</td>
</tr>
<tr>
<td>Gsm - Short-Term Memory</td>
<td>92</td>
<td>Yes</td>
</tr>
<tr>
<td>Gv - Visual Processing</td>
<td>80</td>
<td>Yes</td>
</tr>
<tr>
<td>Ga - Auditory Processing</td>
<td>84</td>
<td>Yes</td>
</tr>
<tr>
<td>Go - Processing Speed</td>
<td>88</td>
<td>No</td>
</tr>
</tbody>
</table>

**Determining Sufficiency:**

An ability is considered "sufficient" when it is judged by the evaluator to contribute meaningfully to the individual's overall cognitive functioning, particularly for the purpose of facilitating academic performance (e.g., acquisition and development of academic skills). Typically, standard scores around 90 or higher are sufficient, as abilities associated with scores in this range (≥ 90) often contribute meaningfully to the individual's overall cognitive functioning and, therefore, support learning. When standard scores are around 90 or lower, clinical judgment is necessary to determine if the broad ability constrains or inhibits learning and achievement.

---

### Example of Relationship between g-Value and IA-e

**Analysis and Interpretation of g-Value**

Based on data entered in prior tabs, a g-Value is computed and displayed here. Users are advised to refer to the Notes, Instruction, and Development tab and to the relevant text in *Essentials of Cross-Battery Assessment, Third Edition* for a detailed discussion regarding the full meaning and proper use of the g-Value.

**Interpretation of g-Value = 0.74**

- The g-Value reflects overall cognitive ability based on the broad CHC abilities judged by the evaluator to be "sufficient." The g-Value is interpreted according to the likelihood that an individual possesses at least average overall cognitive ability.
  - ≥ 50 = average overall ability is very likely
  - 51 - 59 = more information needed
  - ≤ 50 = average overall ability is unlikely

**Note:** An asterisk (*) next to a broad ability code indicates that the ability was judged as "insufficient" by the evaluator.
Don’t Forget:

- $g$-Value is based on the $g$-weights associated with the CHC abilities that were judged to be sufficient.

- IA-e is based on the CHC obtained scores that were judged to be sufficient.

More on the Relationship between the $g$-Value and the IA-e
How is IA-e Calculated?

• PSW-A uses a standard formula that incorporates median inter-correlations among and reliabilities of those CHC domains that were judged to be “sufficient”
• Median inter-correlations among each broad ability and every other broad ability were derived from an investigation of over 250 coefficients reported in the technical manuals of cognitive batteries and included in within-battery and cross-battery independent factor analysis research.
• Median reliability coefficients were derived from over 50 coefficients gathered from the technical manuals of cognitive batteries

Reliability and Use of the IA-e

• The reliability of the IA-e (needed for the formula used to generate the predicted score) is calculated based on the reliabilities and inter-correlations among the CHC abilities that are reported to be sufficient
• To use the IA-e to generate a predicted cognitive or academic score, approximately 500 inter-correlations among specific cognitive and academic areas (broad and narrow) and general cognitive ability (e.g., FSIQ and other total test composites from cognitive batteries) were gathered and medians were obtained
Example of Relationship between g-Value and IA-e: When “yes” is selected for scores that are in high 80’s and low 90’s

<table>
<thead>
<tr>
<th>CHC ABILITY COMPOSITES</th>
<th>Enter Standard Scores (Range 40 - 160)*</th>
<th>Select Yes or No</th>
<th>Determining Sufficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ge - Crystallized Knowledge</td>
<td>88</td>
<td>Yes</td>
<td>It's considered sufficient when it is judged by the evaluator to contribute meaningfully to the individual’s overall cognitive functioning, particularly for the purpose of facilitating academic performance (e.g., acquisition and development of academic skills). Typically, standard scores around 90 or higher are sufficient, as abilities associated with scores in this range (≥90) often contribute meaningfully to the individual’s overall cognitive functioning and, therefore, support learning. When standard scores are around 90 or lower, clinical judgment is necessary to determine if the broad ability constrains or inhibits learning and achievement.</td>
</tr>
<tr>
<td>Gf - Fluid Reasoning</td>
<td>87</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gv - Long-Term Storage &amp; Retrieval</td>
<td>80</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ga - Short-Term Memory</td>
<td>92</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ga - Visual Processing</td>
<td>91</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gs - Auditory Processing</td>
<td>88</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gs - Processing Speed</td>
<td>87</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Example of Relationship between g-Value and IA-e: When “yes” is selected for scores that are in high 80’s and low 90’s

Based on data entered in prior tabs, a g-Value is computed and displayed here. Users are advised to refer to the Notes, Instruction, and Development tab and to the relevant text in Essentials of Cross-Battery Assessment, Third Edition for a detailed discussion regarding the full meaning and proper use of the g-Value.

The g-Value reflects overall cognitive ability based on the broad CHC abilities judged by the evaluator to be “sufficient.” The g-Value is interpreted according to the likelihood that an individual possesses at least average overall cognitive ability.

- ≥.60 = average overall ability is very likely
- .51 - .59 = more information needed
- ≤.50 = average overall ability is unlikely

Note: An asterisk (*) next to a broad ability code indicates that the ability was judged as "insufficient" by the evaluator.
Example of Relationship between g-Value and IA-e: When “yes” is selected for scores that are in high 80’s and low 90’s

1a. Intact Ability Estimate
This composite is calculated using median reliabilities and intercorrelations among the CHC-based ability scores judged as sufficient on the g-Value tab.

Pattern of Strengths and Weaknesses Data Entry

1b. Alternative Ability Estimate
You may enter an alternative value if desired or when the IA-e is not believed to be a good estimate of general ability.

85 ± 5 (80-90)

90-110 = Average

Example of Relationship between g-Value and IA-e: When “yes” is selected for scores that are in high 80’s and low 90’s

Gc is now and 86, not 88 (all other scores are the same as last example)
IA-e is likely 84 or 83

(upper end of CI does not touch or extend into the Average range)

Even with a liberal Confidence Interval, this individual’s pattern of strengths does not suggest at least average overall cognitive ability

Pattern Suggests **General** Learning Difficulty, Not **Specific** Learning Disability
$g$-Value in Perspective

$g$-Value = 0.79

The $g$-Value reflects overall cognitive ability based on the broad CHC abilities judged by the evaluator to be "sufficient." The $g$-Value is interpreted according to the likelihood that an individual possesses at least average overall cognitive ability.

- $g$-Value $≥ .60$ = average overall ability is very likely
- $.51 - .59$ = more information needed
- $≤ .50$ = average overall ability is unlikely

Note: An asterisk (*) next to a broad ability code indicates that the ability was judged as "insufficient" by the evaluator.

Most of the time a $g$-Value $≥ .60$ will yield an Average or better IA-e

Most of the time a $g$-Value of $.51-.59$ will yield an IA-e that is low average to average or better, depending on the obtained scores

IA-e in Perspective

- The IA-e appears in **green** when it is $≥ 90$ and the $g$-Value is $≥ .60$.
- The IA-e appears in **yellow** when it is between 85-89, inclusive, or the $g$-Value is between $.51 -.59$, inclusive.
- "**N/A**" appears if the IA-e is $< 85$ or the $g$-Value is $≤ .50$, or if there are too few abilities judged to be sufficient (i.e., $≤ 3$, depending on age and ability domains).
Interpretation of PSW

Below Average Aptitude-Achievement Consistency
(scores approximately 1SD below the mean or lower)

Evaluation of consistency is not determined by a non-significant difference between the cognitive and academic weaknesses


Interpretation of PSW

Below Average Aptitude-Achievement Consistency
(when scores for related cog-ach areas are approximately 1SD below the mean or lower - whether or not there is a statistically significant difference between them is irrelevant with regard to meeting the “consistency” criterion in the DD/C model)

Difference between related cognitive areas of weakness or deficit and academic areas of weakness or deficit are statistically significant

Students may be using compensatory strategies or benefiting from accommodations or curricular modifications

Interpretation of PSW

Below Average Aptitude-Achievement Consistency
(when scores for related cog-ach areas are approximately 1SD below the mean or lower - whether or not there is a statistically significant difference between them is irrelevant with regard to meeting the “consistency” criterion in the DD/C model)

Difference between related cognitive areas of weakness or deficit and academic areas of weakness or deficit are statistically significant

There may be one or more exclusionary (or other) factors inhibiting performance


Factors that may affect learning

1. Executive functioning (e.g., time management skills, organizational skills)
2. Ability to complete tasks within a specified time period (e.g., classwork, tests, homework)
3. Sensory-motor integration (e.g., visual-motor coordination)
4. Ability to attend and concentrate on academic tasks in school
5. Match between student’s learning needs and instructional environment
6. Relationships with same age and grade peers
7. Receptive to corrective feedback
8. Uses educational supports in school (e.g., before/after school programs)
9. Uses educational supports outside of school (e.g., tutoring, community programs)
10. Familial support (e.g., parent involvement, assistance from family members)
11. Self-esteem or self-concept
12. School climate (e.g., safety, peer group)
13. Motivation and level of effort
Level IV of Flanagan et al.’s DD/C Operational Definition of SLD: Pattern of Strengths and Weaknesses

**Pattern not consistent with SLD construct**

Domain-specific aspect of SLD is not present.

Similar to traditional ability-achievement discrepancy

Ken, like many children who function in the below average range, may never have been taught at his instructional level, creating this type of pattern by the 5th grade.

**Cognitive Strengths**
- Average or better overall ability

**Relative Academic Weakness**
- Cognitive Ability or Processing Disorder

**Cognitive Weakness**
- Below is the individual’s actual and predicted performance in the area of
- WJ III General Factor:
  - Actual: 80
  - Predicted: --

**Academic Weakness**
- Below is the individual’s actual and predicted performance in the area of
- WJ III Passage Comprehension:
  - Actual: 75
  - Predicted: 90

**Not Discrepant**

**Pattern not consistent with SLD construct:**

- Unexpected underachievement is not present.

- Area of cognitive weakness or deficit is likely not particularly important for academic skill acquisition and development at this age/grade level.

- Alternatively, student compensates well for area of cognitive weakness or deficit (history is important in making SLD determination)

- SS = 85

Level IV of Flanagan et al.’s DD/C Operational Definition of SLD: Pattern of Strengths and Weaknesses

Level IV of Flanagan et al.’s DD/C Operational Definition of SLD: Pattern of Strengths and Weaknesses

*Pattern not consistent with SLD construct, although scores appear to suggest “the pattern”*

Unexpected underachievement is not present.

Domain-specific cognitive weakness as a primary contributing factor to poor achievement not present

All performances are similar – expected achievement

Likely *general learning difficulty* (slow learner), especially in an average to high achieving school

General Learning Difficulty

- Overall cognitive ability
  - In the 80s – low 90’s range
- Academic Performance
  - In the 80s range
- **Pervasive** below average performance
- May have splinter skills (relative strengths)

**Program Planning:**
*Remediate academic deficits at Tiers II and III of an RTI service delivery model
*Small group; ample time to practice skills; emphasize need for several error-free repetitions of newly taught information, etc.

Guidelines for Differential Diagnosis:
Cognitive Ability and Adaptive Behavior

<table>
<thead>
<tr>
<th>Intellectual Disability (ID)</th>
<th>General Learning Difficulty (Slow Learner)</th>
<th>Specific Learning Disability (SLD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General ability ≤ 70-75</td>
<td>General ability ≥ 75 and ≤ 89</td>
<td>General ability ≥ 90</td>
</tr>
<tr>
<td>Little variation in cognitive ability and processing profile</td>
<td>Little to moderate variation in cognitive ability and processing profile</td>
<td>Moderate to high (or statistically significant) variation in cognitive ability and processing profile</td>
</tr>
<tr>
<td><strong>All or nearly all cognitive areas may be &lt; 75</strong></td>
<td>May have normative deficits in one or more cognitive and academic areas (≤ 85)</td>
<td>Normative deficits (≤ 85) in specific cognitive abilities and processes; Normative deficits (≤ 85) in specific academic area(s); Empirical or ecologically between cognitive and behavioral abilities and possible relative academic strengths</td>
</tr>
</tbody>
</table>

*DSM 5 Code* based on degree of severity reflecting level of intellectual impairment:

- **317 Mild Mental Retardation: IQ level 50-55 to approximately 70**
- 318.0 Moderate Mental Retardation: IQ level 35-40 to 50-55
- 318.1 Severe Mental Retardation: IQ level 20-25 to 35-40
- 318.2 Profound Mental Retardation: IQ level below 20 or 25

*IDEA*  
People scoring below 70 to 75 are thought to have an intellectual disability.
### Differential Diagnosis: Etiology

<table>
<thead>
<tr>
<th>Intellectual Disability (ID)</th>
<th>General Learning Difficulty (Slow Learner)</th>
<th>Specific Learning Disability (SLD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normative cognitive deficits are explained by genetic conditions (e.g., PKU, chromosomal abnormalities, such as Down syndrome and fragile X syndrome); problems during pregnancy (e.g., use of alcohol or drugs, illnesses of the mother); problems at birth (prematurity, low birth weight); problems after birth (e.g., childhood diseases, head injuries; lead and mercury exposure); or poverty and cultural deprivation (e.g., malnutrition, inadequate medical care, environmental health hazards; under-stimulation). Note: in approximately 1/3 of individuals with ID, the cause is not known.</td>
<td>Underlying causes of generally low average cognitive and academic abilities are typically not known</td>
<td>SLD has a neurobiological basis. The pattern of generally average or better overall cognitive ability and below average performance in related cognitive and academic areas cannot be explained by exclusionary factors (e.g., poor instruction, social/emotional factors; psychological disturbance; cultural or language differences, environmental deprivation, etc.), although one or more of these factors may contribute to weak academic performance.</td>
</tr>
</tbody>
</table>

### Differential Diagnosis: Response to Instruction/Intervention and Programming

<table>
<thead>
<tr>
<th>Intellectual Disability (ID)</th>
<th>General Learning Difficulty (Slow Learner)</th>
<th>Specific Learning Disability (SLD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progress Monitoring (or other performance indicators) demonstrates very slow rate of response/learning; will not meet typical grade level benchmarks in any academic area</td>
<td>Progress Monitoring (or other performance indicators) demonstrates slow rate of response/learning; may meet typical grade level benchmarks in some, but not all, academic areas</td>
<td>Following a comprehensive evaluation and resultant provisions of tailored interventions, accommodations, compensatory strategies, and/or modifications, Progress Monitoring (or other performance indicators) demonstrates rate of response/learning similar to same grade peers; may approximate or meet typical grade level benchmarks</td>
</tr>
<tr>
<td>Special Education</td>
<td>Tier II and Tier III interventions in General Education; Remedial Programs</td>
<td>Special Education; Remedial Programs; Inclusion (Tier II and Tier III interventions)</td>
</tr>
<tr>
<td><strong>Primary Focus:</strong> Self-Help Skills; Functional Academics; Social Skills</td>
<td><strong>Primary Focus:</strong> Functional Academics; Vocational Training; Accommodations; Compensatory Strategies; Social Skills and Self-Esteem</td>
<td><strong>Primary Focus:</strong> Grade Level Performance; College Preparation; Accommodations; Compensatory Strategies; Self-Esteem; Self-Advocacy</td>
</tr>
<tr>
<td>Use data from strength-based assessment for intervention planning</td>
<td>Use data from strength-based assessment for intervention planning</td>
<td>Use data from strength-based assessment for intervention planning</td>
</tr>
</tbody>
</table>
Differential Diagnosis

• PERVERSIVE and SPECIFIC DEVELOPMENTAL DISABILITIES MUST BE RULED OUT IN MAKING AN SLD DIAGNOSIS

• Environmental factors such as poverty/low income, language differences, cultural differences, family stressors ARE SOURCES OF DIVERSITY, WHICH DO NOT RULE OUT SLD DIAGNOSES BUT SHOULD BE TAKEN INTO ACCOUNT IN INSTRUCTIONAL/TREATMENT PLANS.

(Berninger, May 10, 2013; 5th Annual Assessment Conference, Fordham University, NY)

Biological Bases of Individual Differences: Genetic Variables
(Berninger & Niedo, 2014)

• “For students with more constraining developmental disabilities, instruction may result in varying degrees of developmental change and learning, but at a rate and on a trajectory limited by underlying genetic abnormalities that make full normalization unrealistic (Berninger & Miller, 2011).”

A diagnosis identifies the nature of a specific learning disability and has implications for its probable etiology, instructional requirements, and prognosis. Ironically, in an era when educational practitioners are encouraged to use evidence-based instructional practices, they are not encouraged to use evidence-based differential diagnoses of specific learning disabilities.

Is At Least Average Overall Ability Consistent with the SLD Construct?

Individuals with SLD have At Least Average Overall Ability

• The children often have average or above intelligence and good memory in other respects
• Hinshelwood, 1902

“Historical Perspective” Information from Nancy Mather, NYASP 2011
Individuals with SLD have At Least Average Overall Ability

Many of the children have a high degree of intelligence

Orton, 1937

“Historical Perspective” Information from Nancy Mather, NYASP 2011

Individuals with SLD have At Least Average Overall Ability

“it seems probably that psychometric tests as ordinarily employed give an entirely erroneous and unfair estimate of the intellectual capacity of these children” (p. 582)

Orton, 1925

“Historical Perspective” Information from Nancy Mather, NYASP 2011
Individuals with SLD have At Least Average Overall Ability

• Remedial training must continue until reading is in harmony with the child’s other capacities and achievement
• Some children of superior intelligence struggle to learn to read
• Monroe, M. (1932)

“Historical Perspective” Information from Nancy Mather, NYASP 2011
Individuals with SLD have At Least Average Overall Ability

“The clearest expression of a special disability is consistently low scores on a series of tests in a given subject conjoined with average or superior scores on tests in other subjects. Such scores can be arranged in an ‘educational profile.’ For example, in case of a reading disability, a child might obtain scores placing him in the ninth grade in arithmetic...and in the third grade in reading. Here we would have evidence of a striking reading disability.” (p. 43).


“Historical Perspective” Information from Nancy Mather, NYASP 2011

Overall Ability and RTI


**Implications for Research and Practice**

So, findings from our review suggest that IQ frequently predicts responsiveness to reading instruction, and it can explain important variance in such responsiveness. Put differently, IQ often mediates or influences the effectiveness of reading instruction such that it is more or less effective for children with higher versus lower IQ scores. By
Overall Ability and RTI

The rate of progress under remedial instruction was found to be a function of:

- the child’s intelligence
- how early intervention is provided
- number of hours of training
- severity of the disability
- behavior and personality difficulties
- supervision of the remedial techniques

(Source: Monroe, 1932, p. 157)

“Historical Perspective” Information from Nancy Mather, NYASP 2011

Level IV of Flanagan et al.’s DD/C Operational Definition of SLD: Pattern of Strengths and Weaknesses

All Scores/CHC Domains Approximately 85-90 or Lower

May be suggestive of a more pervasive impairment, not Specific learning disability

Important question: was instruction delivered at student’s instructional level?

Level IV of Flanagan et al.’s DD/C Operational Definition of SLD: Pattern of Strengths and Weaknesses

Many/Most Scores Suggestive of Deficiency (generally 70-75 or lower)

Pattern is Not Consistent with SLD—
All scores suggestive of deficiency

Consider Intellectual Disability
—Assess adaptive behavior

OVERALL COGNITIVE ABILITY
Well Below Average

ACADEMIC ABILITY
Academic Skills/Knowledge Deficits

SS = 70 or lower

SS = 65-75

SPECIFIC COGNITIVE ABILITY
Cognitive Ability or Processing Disorder

Not Discrepant

Not Discrepant


---

Name: Anthony
Grade: 7

DATA ENTRY for g-Value

Step 1: Enter Composite Scores
In the left-hand column, enter the obtained standard score for each of the seven broad ability composites listed (see Appendix I for guidelines).

Step 2: Indicate "Yes" or "No"
In the right-hand column below indicate whether ability is "sufficient" by clicking on either the "Yes" or "No" button.

CHC ABILITY COMPOSITES

<table>
<thead>
<tr>
<th>Composite</th>
<th>Standard Scores (Range: 40 - 100)*</th>
<th>Select Yes or No</th>
<th>Determining Sufficiency:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ge - Crystallized Knowledge</td>
<td>71</td>
<td>Yes</td>
<td>An ability is considered &quot;sufficient&quot; when it is judged by the evaluator to contribute meaningfully to the individual's overall cognitive functioning, particularly for the purpose of facilitating academic performance (e.g., acquisition and development of academic skills). Typically, standard scores around 90 or higher are sufficient, as abilities associated with scores in this range (≥ 90) often contribute meaningfully to the individual's overall cognitive functioning and, therefore, support learning. When standard scores are around 90 or lower, clinical judgment is necessary to determine if the broad ability constraint inhibits learning and achievement.</td>
</tr>
<tr>
<td>Gl - Fluid Reasoning</td>
<td>70</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Glr - Long-Term Storage &amp; Reasoning</td>
<td>72</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gsm - Short-Term Memory</td>
<td>68</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gvi - Visual Processing</td>
<td>60</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gao - Auditory Processing</td>
<td>89</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gps - Processing Speed</td>
<td>79</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

*Note: if using T-Scores, convert them to Standard Scores (Deviation IQ metric) here: T-Score + Std. Score ->

---

---

* Scores between 85-115 (inclusive) fall within the normal limits of functioning.
Level IV of Flanagan et al.'s DD/C Operational Definition of SLD: Pattern of Strengths and Weaknesses

Not consistent with SLD –
No Below Average Cognitive Aptitude-Achievement Consistency

COGNITIVE STRENGTHS
Average or better overall ability

RELATIVE COGNITIVE WEAKNESS

RELATIVE ACADEMIC WEAKNESS

More likely to see this pattern in older students (and adults) who were identified early and who either compensate for their weaknesses, overcame their weaknesses, or receive accommodations and modifications in the educational setting

All Scores/Areas Approximately 90 or higher with Significant Variation

LIKELY SUGGESTS NORMAL VARIATION

*Average Gs is not uncommon among students who score in the superior range on Gf, Gc or Total Test Composites (e.g., FSIQ).

*Did the student have an opportunity for an accelerated curriculum and academic enrichment?

*History of academic performance and experience is critical for making a determination of SLD in a student of this age, with average academic performance.

Normal Variation: To Err is Human

- **To Err is Human: “Abnormal” Neuropsychological Scores and Variability are Common in Healthy Adults**
  
  – Binder, Iverson, and Brooks (2009)

- At least two statistically significant differences in one’s cognitive ability profile is common in the general population
  
  
  – Oakley (2000) – WJ III Standardization Data
Don’t Forget

• *There is no LD litmus test*; the more well-versed you are in different approaches and methods, the more information you will gain about the child (including how to best help him or her)

---

Determining Which CHC Ability Scores to Enter into the PSW-A v1.0

• Use Information about the referral
• Use other data sources (e.g., observations) to aid in interpretation and to support decisions
• Use research to aid in interpretation and to support decisions
• Use your own clinical experience to aid in interpretation and to support decisions
• *Use the “decision flowchart” for guidance (see X-BASS®)*
The PSW-A

• Psychometrically Sound
• Brings Consistency and Accountability to the Decision-Making Process for SLD Identification
• Clinical Tool
  – Clinical judgment is involved
    • Determining what scores to enter
    • Judgment is bolstered by support from converging data sources
  – Final analysis must be viewed within the context of the entire case (e.g., exclusionary factors)

Chapter 1. *A Systematic Method of Analyzing Assessment Results for Tailoring Intervention (SMAARTI)*
What’s First? Evidence-based Intervention

• Evidence-based remedial programs often used first
  – Subject to rigorous evaluation
  – Found to be effective
  – Lead to positive outcomes

• What about when they don’t work?
  – Not all evidence-based interventions address academic needs of every student effectively
  – Must then move on from planning to tailoring interventions

Planning vs. Tailoring

• Planning: process of identifying evidence-based interventions that are most often used in standard service deliver models to address manifest academic difficulties that are revealed via universal screening and progress monitoring

• Tailoring: understanding the student’s pattern of cognitive and academic strengths and weaknesses and how this pattern interacts with the instructional materials, classroom instructional factors, environmental factors, and other factors that may facilitate or inhibit learning
  – Goals:
    • Use information about a variety of intrinsic and extrinsic factors to tailor specific interventions
    • Ensure student has appropriate access to the curriculum by minimizing or bypassing adverse affects that weaknesses have on student’s learning
Methods of Tailoring Interventions: MARC

- **Modification**: Changes content of material to be taught or measured. Changes the depth, breadth, and complexity of learning and measurement goals. For example:
  - Reducing the amount of material that a student is required to learn
  - Simplifying test instructions and content or the material to be learned

- **Accommodation**: changes conditions under which learning occurs or is measured, but does not change or reduce learning or assessment expectations. For example:
  - Extending time on exams
  - Providing separate room to work
  - Aligning math problems vertically, as opposed to horizontally
Methods of Tailoring Interventions: \textit{MARC}

- \textbf{Remediation}: techniques or programs used to ameliorate cognitive and academic deficits. For example:
  - Techniques and materials from the \textit{Reading Rockets} and \textit{What Works Clearinghouse} websites
  - \textit{CogMed} (from Pearson) – intervention designed to improve working memory capacity

- \textbf{Compensation}: procedures, techniques, and strategies intended to bypass or minimize the affects of a cognitive or academic deficits: For example:
  - Teaching the use of mnemonic devices
  - Teaching a student to outline or use graphic organizers
  - Providing the student with guided notes
SMAARTI
A Systematic Method of Analyzing Assessment Results for Tailoring Interventions
(Mascolo, Flanagan, & Alfonso, 2014; Mascolo, 2008)

• Involves the organization, analysis, and synthesis of assessment data to aid in understanding the cognitive basis of students’ learning difficulties
• Based on multiple data sources
• Assists in tailoring interventions to make instruction more accessible to the student
• Used when a student does not respond as expected to evidence-based interventions
• Or whenever a comprehensive evaluation is necessary

Evidence-based Interventions

• Work for most students, but not all students (e.g., Reading Recovery)
• Students with specific learning disabilities should respond to interventions
  – Many cognitive capabilities
• Failure to RTI is not a diagnostic model for SLD
  – Students fail to respond as expected for many reasons
“At the current state of scientific knowledge, it is only through a comprehensive evaluation of a student’s cognitive and psychological abilities and processes that insights into the underlying proximal and varied root causes of [academic] difficulties can be ascertained and then specific interventions be provided targeted to each student’s individual needs, a process long advocated.”

Reynolds and Shaywitz (2009)

---

**Rapid Reference 1.5 General and Specific Manifestations of Fluid Reasoning (Gf) Weaknesses**

<table>
<thead>
<tr>
<th>CHC Broad Cognitive Abilities/ Neuropsychological Functions</th>
<th>Brief Definition</th>
<th>General Manifestations of Cognitive/ Neuropsychological Weakness</th>
<th>Specific Manifestations of Cognitive/ Neuropsychological Weakness</th>
</tr>
</thead>
</table>
### Rapid Reference 1.6 General and Specific Manifestations of Crystallized Intelligence (Gc) Weaknesses

<table>
<thead>
<tr>
<th>General Manifestations of Cognitive/Neuropsychological Weakness</th>
<th>Specific Manifestations of Cognitive/Neuropsychological Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulties with:</td>
<td>Reading Difficulties:</td>
</tr>
<tr>
<td>Vocabulary acquisition</td>
<td>Decoding (e.g., word student is attempting to decode is not in his/her vocabulary)</td>
</tr>
<tr>
<td>Knowledge acquisition</td>
<td>Comprehending (e.g., poor background knowledge about information contained in text)</td>
</tr>
<tr>
<td>Comprehending language or understanding what others are saying</td>
<td></td>
</tr>
<tr>
<td>Fact-based/informational questions</td>
<td></td>
</tr>
<tr>
<td>Using prior knowledge to support learning</td>
<td></td>
</tr>
<tr>
<td>Finding the right words to use</td>
<td></td>
</tr>
</tbody>
</table>

**Crystallized Intelligence (Gc)**

- Breadth and depth of knowledge and skills that are valued by one's culture.
- Developed through formal education as well as general learning experiences.
- Stores of information and declarative and procedural knowledge.
- Reflects the degree to which a person has learned practically useful knowledge and mastered valued skills (Schneider & McGrew, 2006).

### Rapid Reference 1.7 General and Specific Manifestations of Auditory Processing (Ga) Weaknesses

<table>
<thead>
<tr>
<th>General Manifestations of Cognitive/Neuropsychological Weakness</th>
<th>Specific Manifestations of Cognitive/Neuropsychological Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulties with:</td>
<td>Reading Difficulties:</td>
</tr>
<tr>
<td>Hearing information presented orally, initially processing oral information</td>
<td>Acquiring phonics skills</td>
</tr>
<tr>
<td>Paying attention especially in the presence of background noise</td>
<td>Sounding out words</td>
</tr>
<tr>
<td>Discerning the direction from which auditory information is coming</td>
<td>Using phonetic strategies</td>
</tr>
<tr>
<td>Discriminating between simple sounds</td>
<td>Math Difficulties:</td>
</tr>
<tr>
<td>Foreign language acquisition</td>
<td>Reading word problems</td>
</tr>
</tbody>
</table>

**Auditory Processing (Ga)**

- Ability to analyze and synthesize auditory information.
- One narrow aspect of Ga is a precursor to oral language comprehension (i.e., parsing speech sounds or Phonetic Coding).
- In addition to Phonetic Coding, other narrow Ga abilities include Speech Sound Discrimination, Resistance to Auditory Stimulus Distortion, Memory for Sound Patterns (and others related to music).
### Rapid Reference 1.8 General and Specific Manifestations of Long-Term Retrieval (Glr) Weaknesses

<table>
<thead>
<tr>
<th>CHC Broad Cognitive Abilities/Neuropsychological Functions</th>
<th>Brief Definition</th>
<th>General Manifestations of Cognitive/Neuropsychological Weakness</th>
<th>Specific Manifestations of Cognitive/Neuropsychological Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Retrieval (Glr)</td>
<td>Ability to store information (e.g., concepts, words, facts), consolidate it, and fluently retrieve it at a later time (e.g., minutes, hours, days, and years) through association. In Glr tasks, information leaves immediate awareness long enough for the contents of primary memory to be displaced completely. In other words, Glr tasks (unlike Gm tasks) do not allow for information to be maintained continuously in primary memory (Schneider &amp; McGrew, 2012). Glr abilities may be categorized as either “learning efficiency” or “fluency.” Learning efficiency narrow abilities include Associative Memory, Meaningful Memory, and Free Recall Memory. Fluency narrow abilities involve either the production of ideas (e.g., Ideational Fluency, Associational Fluency), the recall of words (e.g., Naming Facility, Word Fluency), or the generation of figures (e.g., Figure Fluency, Figure Flexibility) (Schneider &amp; McGrew, 2012).</td>
<td>Difficulties with: Learning new concepts, Retrieving information by using association, Performing consistently across different task formats (e.g., recognition versus recall format), Rapid retrieval of information, Learning information quickly, Paced learning (visual-auditory), Retrieving specific information (words, facts), Generating ideas rapidly</td>
<td>Reading Difficulties: Accessing background knowledge to support new learning while reading, Slow to access phonological representations during decoding, Retelling or paraphrasing what one has read, Math Difficulties: Memorizing math facts, Recalling math facts and procedures, Writing Difficulties: Accessing words to use during essay writing, Specific writing tasks (compare and contrast, persuasive writing), Note-taking, Idea generation/production, Language Difficulties: Inexpressiveness—circumlocutions, speech filler, “interrupted” thought, pauses, Receptive—making connections throughout oral presentations (e.g., class lecture).</td>
</tr>
</tbody>
</table>

### Rapid Reference 1.9 General and Specific Manifestations of Processing Speed (Gs) Weaknesses

<table>
<thead>
<tr>
<th>CHC Broad Cognitive Abilities/Neuropsychological Functions</th>
<th>Brief Definition</th>
<th>General Manifestations of Cognitive/Neuropsychological Weakness</th>
<th>Specific Manifestations of Cognitive/Neuropsychological Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing Speed (Gs)</td>
<td>Speed of processing, particularly when required to focus attention for 1-3 minutes. Usually measured by tasks that require the ability to perform simple repetitive cognitive tasks quickly and accurately. Narrow abilities include Perceptual Speed, Rate-of-Test-Taking, Number Facility, Reading Speed, and Writing Speed (note that the latter two abilities are also listed under other broad CHC domains, including Glr).</td>
<td>Difficulties with: Efficient processing of information, Quickly perceiving relationships (similarities and differences between stimuli or information), Working within time parameters, Completing simple, rote tasks quickly</td>
<td>Reading Difficulties: Slow reading speed, which interferes with comprehension, Need to reread for understanding, Math Difficulties: Automatic computations, Computational speed is slow despite accuracy, Slow speed can result in reduced accuracy due to memory decay, Writing Difficulties: Limited output due to time factors, Language Difficulties: Cannot retrieve information quickly—slow, disrupted speech; cannot get thoughts quickly enough, Is slow to process incoming information, puts demands on memory store that can result in information overload and loss of meaning.</td>
</tr>
</tbody>
</table>
# Rapid Reference 1.10 General and Specific Manifestations of Visual Processing (Gv) Weaknesses

<table>
<thead>
<tr>
<th>CHC Broad Cognitive Abilities/Neuropsychological Functions</th>
<th>Brief Definition</th>
<th>General Manifestations of Cognitive/Neuropsychological Weakness</th>
<th>Specific Manifestations of Cognitive/Neuropsychological Weakness</th>
</tr>
</thead>
</table>
| Visual Processing (Gv) | Ability to analyze and synthesize visual information. The ability to make use of simulated mental imagery (often in conjunction with currently acquired images) to solve problems (Schneider & McGrew, 2012). There are many narrow Gv abilities, some of which include Visualization, Spatial Rotation, Closure Speed, Flexibility of Closure, Visual Memory, and Spatial Scanning. | Difficulties with Recognizing patterns | Reading Difficulties: Orthographic coding (using visual features of letters to decode)  
Sight word acquisition  
Using charts and graphs within a text in conjunction with reading  
Comprehension of text involving spatial concepts (e.g., social studies text describing physical boundaries movement of troops along a specified route)  
Math Difficulties: Number alignment during computations  
Reading and interpreting graphs, tables, and charts  
Writing Difficulties: Spelling right words  
Spatial planning during writing tasks (e.g., no attention to margins, words that overhang a line)  
Inconsistent size, spacing, position, and slant of letters |

---

# Rapid Reference 1.11 General and Specific Manifestations of Short-Term Memory (Gsm) Weaknesses

<table>
<thead>
<tr>
<th>CHC Broad Cognitive Abilities/Neuropsychological Functions</th>
<th>Brief Definition</th>
<th>General Manifestations of Cognitive/Neuropsychological Weakness</th>
<th>Specific Manifestations of Cognitive/Neuropsychological Weakness</th>
</tr>
</thead>
</table>
| Short-Term Memory (Gsm) | Ability to hold information in immediate awareness and use or transform it within a few seconds. | Difficulties with: Following multistep oral and written instructions  
Remembering information long enough to apply it  
Remembering the sequence of information  
Rote memorization  
Maintaining one’s place in a math problem or train of thought while writing. | Reading Difficulties: Reading comprehension (i.e., understanding what is read)  
Decoding multisyllabic words  
Orally retelling or paraphrasing what one has read  
Math Difficulties: Rote memorization of facts  
Remembering mathematical procedures  
Multistep problems and regrouping  
Extracting information to be used in word problems  
Writing Difficulties: Spelling multisyllabic words  
Redundancy in writing (word and conceptual levels)  
Identifying main ideas of a story  
Note-taking |

---
### Rapid Reference 1.12 Manifestations of Attention Weaknesses and Examples of Recommendations and Interventions

<table>
<thead>
<tr>
<th>CHC Broad Cognitive Abilities/Neuropsychological Functions</th>
<th>Brief Definition</th>
<th>General Manifestations of Cognitive/Neuropsychological Weakness</th>
<th>Specific Manifestations of Cognitive/Neuropsychological Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attention</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Easily distracted</td>
<td>Reading Difficulties:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Loses his or her place easily</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Easily distracted while reading</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Does not pick up important details in text</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Math Difficulties:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Does not consistently attend to math signs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Frequent mistakes on word problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Writing Difficulties:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Has difficulty completing long assignments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Difficulty following timelines</td>
</tr>
</tbody>
</table>

### Rapid Reference 1.13 Manifestations of Executive Functioning Weaknesses and Examples of Recommendations and Interventions

<table>
<thead>
<tr>
<th>CHC Broad Cognitive Abilities/Neuropsychological Functions</th>
<th>Brief Definition</th>
<th>General Manifestations of Cognitive/Neuropsychological Weakness</th>
<th>Specific Manifestations of Cognitive/Neuropsychological Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Executive Functioning</strong></td>
<td></td>
<td>Difficulty with</td>
<td>Reading Difficulties:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learning new activities, generating concepts, and solving problems</td>
<td>Sequencing a story chronologically</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(G4): problem solving (G3): attentional shifting (G3): planning organizing working memory (Gm) and retrieval fluency (G3): The behavioral/attentional aspects of executive functioning include: lack of organization, impulsivity, and emotional control.</td>
<td>Prioritizing: extracting main ideas and other important information; Problem solving: drawing inferences from text.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planning (e.g., begins project without necessary materials; does not allocate sufficient time to complete task)</td>
<td>Sequencing (e.g., may skip steps in multi-step problems)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sequencing (e.g., may skip steps in multi-step problems)</td>
<td>Prioritizing (e.g., not sure what's important when taking notes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prioritizing (e.g., not sure what's important when taking notes)</td>
<td>Organization (e.g., loses important papers; fails to turn in completed work; creates unrealistic schedule)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Organization (e.g., loses important papers; fails to turn in completed work; creates unrealistic schedule)</td>
<td>Initiation (e.g., has difficulty getting started on tasks, assignments, etc.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Initiation (e.g., has difficulty getting started on tasks, assignments, etc.)</td>
<td>Pace (e.g., often runs out of time on artwork and exams; has difficulty completing homework due to unrealistic timelines)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pace (e.g., often runs out of time on artwork and exams; has difficulty completing homework due to unrealistic timelines)</td>
<td>Shifting between activities (e.g., coping with unannounced events)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shifting between activities (e.g., coping with unannounced events)</td>
<td>Self-monitoring (e.g., doesn’t check to ensure that each step was completed; doesn’t check work before submitting it)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self-monitoring (e.g., doesn’t check to ensure that each step was completed; doesn’t check work before submitting it)</td>
<td>Emotional control (e.g., may exhibit inappropriate or over-reactive response to situations)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emotional control (e.g., may exhibit inappropriate or over-reactive response to situations)</td>
<td>Writing Difficulties:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Writing Difficulties:</td>
<td>Sequencing events:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sequencing events:</td>
<td>Prioritizing: writing about a story; Sequencing a story; Prioritizing main events in a story</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prioritizing main events in a story</td>
<td>Writing Difficulties:</td>
</tr>
</tbody>
</table>

Source: Adapted from Leslie E. Packer (Schoolbehavior.com); see also Packer and Pratt’s book, Challenging Kids, Challenged Teachers (Woodbine Press, 2010).
A Case Study: Ayden Murphy

- **Background information**
  - Lives with mother, stepfather, grandmother, younger sister and gets along well with them
  - Seems to be in good health; wears glasses for nearsightedness
  - Had trouble with reading in all grades except for first grade in which he had a “strict” teacher that the mother thinks was helpful to him
  - Currently receives pull-out services (meeting with remedial reading teacher for one period 3 times a week for 30 minutes) – teacher helps with incomplete seatwork assignments
  - Described as cooperative, even-tempered, friendly, happy, affectionate
  - Enjoys playing football, soccer, and X-box; least favorite activities are reading independently and social studies homework
  - Attends Operation Exodus, which is an after-school program to help him complete his homework and explore various educational activities

---

**Table 1.2 DOTI Form for Ayden with Primary Data Only**

<table>
<thead>
<tr>
<th>CHC Cognitive/Academic Ability or Processing Domain</th>
<th>Normative Weaknesses and Information About Intervention</th>
<th>Within Normal Limits</th>
<th>Normative Strengths and Information About Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid Reasoning (Gf)</td>
<td>Fluid Reasoning Factor: 88 ± 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cephalic Intelligence (Ge)</td>
<td>Comprehension Knowledge Factor: 59 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-Term Retentional (Ga)</td>
<td>Long-term Storage and Retrieval Factor: 77 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-Term Memory (Gm)</td>
<td>Short-term Memory Factor: 96 ± 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual Processing (Gv)</td>
<td>Visual Processing Factor: 107 ± 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auditory Processing (Ga)</td>
<td>Auditory Processing Factor: 72 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing Speed (Gp)</td>
<td>Processing Speed Factor: 84 ± 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Comprehension (Gw-R)</td>
<td>Passage Comprehension: 70 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing Fluency (Gw-W)</td>
<td>Letter Word Identification: 90 ± 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spelling Fluency (Gw-W)</td>
<td>Spelling: 87 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing Fluency (Gw-W)</td>
<td>Writing Fluency: 95 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Skill Targeted</td>
<td>Writing Sample: 74 ± 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics (Ga)</td>
<td>Spelling: 87 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied Problems (Ga)</td>
<td>Calculation: 107 ± 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmony: 80 ± 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Step 2: Review Relations between Cognitive and Achievement Areas

<table>
<thead>
<tr>
<th>Cognitive/Academic Ability or Processing Domain</th>
<th>Reading Achievement</th>
<th>Math Achievement</th>
<th>Writing Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gf</strong> Inductive (I) and general sequential reasoning (RG) abilities play a moderate role in reading comprehension.</td>
<td>Inductive (I) and general sequential reasoning abilities are consistently very important for math problem solving at all ages.</td>
<td>Inductive (I) and general sequential reasoning abilities (RG) are consistently related to written expression at all ages.</td>
<td></td>
</tr>
<tr>
<td><strong>Gc</strong> Language development (LD), lexical knowledge (VL), and listening ability (LS) are important at all ages for reading acquisition and development. These abilities become increasingly important with age.</td>
<td>Language development (LD), lexical knowledge (VL), and listening abilities (LS) are important at all ages. These abilities become increasingly important with age.</td>
<td>Language development (LD), lexical knowledge (VL), and general information (KI) are important primarily after about the 2nd grade. These abilities become increasingly important with age.</td>
<td></td>
</tr>
<tr>
<td><strong>Gwm</strong> Memory span (MS) and working memory capacity (WM) or attentional control. Gwm important for overall reading success.</td>
<td>Memory span (MS) and working memory capacity (WM) or attentional control. Gwm important for overall math success.</td>
<td>Memory span (MS) is important to writing, especially spelling skills whereas working memory has shown relations with advanced writing skills (e.g., written expression). Gwm important for overall writing success.</td>
<td></td>
</tr>
<tr>
<td><strong>Gv</strong> Orthographic Processing (often measured by tests of perceptual speed) – reading fluency.</td>
<td>Visualization (V2) is important primarily for higher level or advanced mathematics (e.g., geometry, calculus).</td>
<td>Orthographic Processing (often measured by tests of perceptual speed) – spelling.</td>
<td></td>
</tr>
<tr>
<td><strong>Ga</strong> Phonetic coding (PC) or “phonological awareness/processing” is very important during the elementary school years for the development of basic reading skills.</td>
<td>Phonetic coding (PC) or “phonological awareness/processing” is very important during the elementary school years for both basic writing skills and written expression (primarily before about grade 5).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Glr</strong> Naming facility (NA) or “rapid automatic naming” (also called speed of lexical access) is very important during the elementary school years. Associative memory (MA) is also important.</td>
<td>Naming Facility (NA; or speed of lexical access).</td>
<td>Naming Facility (NA) or “rapid automatic naming” (also called speed of lexical access) has demonstrated relations with written expression, primarily writing fluency.</td>
<td></td>
</tr>
<tr>
<td><strong>Gs</strong> Perceptual speed (P) abilities are important during all school years, particularly the elementary school years.</td>
<td>Perceptual speed (P) abilities are important during all school years, particularly the elementary school years.</td>
<td>Perceptual speed (P) abilities are important during all school years for basic writing and related to all ages for written expression.</td>
<td></td>
</tr>
</tbody>
</table>

### Step 3: Review Manifestations and Organize Secondary Data

**Table 1.3 DOTI Form for Ayden Murphy With Primary and Secondary Data**

<table>
<thead>
<tr>
<th>CHC Cognitive/Academic Ability or Processing Domain</th>
<th>Normative Weakness and Information About Intervention</th>
<th>Within Normal Limits</th>
<th>Normative Strength and Information About Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fluid Reasoning (Gf)</strong></td>
<td>Fluid Reasoning Factor = P (Computation)</td>
<td>Teacher Report: sometimes has difficulty generalizing what he has learned</td>
<td></td>
</tr>
<tr>
<td><strong>Target for Intervention?</strong></td>
<td><strong>Crystallized Intelligence (Gc)</strong></td>
<td>Comprehension-Knowledge = 95 ± 4</td>
<td></td>
</tr>
<tr>
<td><strong>Target for Intervention?</strong></td>
<td><strong>Long Term Retrieval (Gl)</strong></td>
<td>Long-term Storage and Retrieval = 77 ± 5</td>
<td></td>
</tr>
<tr>
<td><strong>Target for Intervention?</strong></td>
<td><strong>Short-Term Memory (Gm)</strong></td>
<td>Short-term Memory = 96 ± 6</td>
<td></td>
</tr>
<tr>
<td><strong>Target for Intervention?</strong></td>
<td><strong>Visual Processing (Gv)</strong></td>
<td>107 ± 4</td>
<td></td>
</tr>
</tbody>
</table>

**Teacher Report:** seems to do better on multiple-choice tests as compared to essays; difficulty remembering previously taught information.

**Parent Report:** spends hours studying—more than his friends; often has difficulty getting out what he wants to say.
### Step 3: Review Manifestations and Organize Secondary Data

#### Table 1.3 (Continued)

<table>
<thead>
<tr>
<th>CHC Cognitive/Academic Ability or Processing Domain</th>
<th>Normative Weakness and Information About Intervention</th>
<th>Within Normal Limits</th>
<th>Normative Strength and Information About Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory Processing (Ga)</td>
<td>Reading: Specialist does not use phonemic strategies consistently; relies more on visual features and contextual cues to decode. Teacher Report: mishears words frequently.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target for Intervention?</td>
<td>R (Remediation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing Speed (Gs)</td>
<td>Processing Speed: 86.4 ± 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target for Intervention?</td>
<td>A (Accommodation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M (Modification)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading (Gw-R)</td>
<td>Passage Comprehension: 70 ± 5</td>
<td>Letter-Word Identification: 90 ± 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teacher Report: has difficulty reading what he has read for monthly book reports. Reading Fluency: 83 ± 5. Reading Specialist and School Psychologist Observations: oral reading is slow and laborious. Ayden: &quot;I can’t read fast.&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Gv Continued**

Teacher Report: seems to do better with visual information (e.g., charts and graphs in math and science).

Ayden: "I love to draw." Emphasize in program planning to the extent possible.

### Step 3: Identify Targets for Intervention (Cognitive)

#### Table 1.3 DOTI Form for Ayden Murphy With Primary and Secondary Data

<table>
<thead>
<tr>
<th>CHC Cognitive/Academic Ability or Processing Domain</th>
<th>Normative Weakness and Information About Intervention</th>
<th>Within Normal Limits</th>
<th>Normative Strength and Information About Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid Reasoning (Gd)</td>
<td>Fluid Reasoning Factor: 88 ± 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target for Intervention?</td>
<td>Teacher Report: sometimes has difficulty generalizing what he has learned. C (Compensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crystallized Intelligence (Gc)</td>
<td>Comprehension-Knowledge: 95 ± 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target for Intervention?</td>
<td>Long-term Storage and Retrieval: 77 ± 5. Teacher Report: seems to do better on multiple-choice tests as compared to essay tasks; difficulty remembering previously taught information. Parent Report: spends hours studying—more than his friends; often has difficulty getting out what he wants to say. M (Modification) A (Accommodation) C (Compensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-Term Retrieval (Gc)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target for Intervention?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-Term Memory (Gm)</td>
<td>Short-term Memory: 96 ± 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target for Intervention?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual Processing (Gv)</td>
<td>107 ± 4</td>
<td>TOC Orthographic Ability: 103 ± 3</td>
<td>(continued)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Step 3: Identify Targets for Intervention (Cognitive)

**Table 1.3 (Continued)**

<table>
<thead>
<tr>
<th>CHC Cognitive/Academic Ability or Processing Domain</th>
<th>Normative Weakness and Information About Intervention</th>
<th>Within Normal Limits</th>
<th>Normative Strength and Information About Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target for Intervention:</strong></td>
<td></td>
<td></td>
<td>Teacher Report: seems to do better with visual information (e.g., charts and graphs in math and science)</td>
</tr>
<tr>
<td>Auditory Processing (Ga)</td>
<td>Auditory Processing = 72 ± 5</td>
<td></td>
<td>Ayden: &quot;I love to draw,&quot; Emphasize in program planning to the extent possible</td>
</tr>
<tr>
<td></td>
<td>Reading Specialist does not use phonetic strategies consistently; relies more on visual features and contextual cues to decode</td>
<td></td>
<td>Teacher Report: mishears words frequently</td>
</tr>
<tr>
<td>Processing Speed (Gs)</td>
<td>Processing Speed = 84 ± 4</td>
<td></td>
<td>Parent Report: takes a long time to complete homework</td>
</tr>
<tr>
<td><strong>Target for Intervention:</strong></td>
<td></td>
<td></td>
<td>A (Accommodation)</td>
</tr>
<tr>
<td></td>
<td>R (Remediation)</td>
<td></td>
<td>M (Modification)</td>
</tr>
<tr>
<td>Reading (Gw-R)</td>
<td>Passagte Comprehension 70 ± 5</td>
<td></td>
<td>Letter-Word Identification</td>
</tr>
<tr>
<td></td>
<td>Teacher Report has difficulty remembering what he has read for monthly book reports</td>
<td></td>
<td>90 ± 4</td>
</tr>
<tr>
<td></td>
<td>Reading Fluency 83 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reading Specialist and School Psychologist Observation: oral reading is slow and laborsious</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ayden: &quot;I can’t read fast.&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Step 3: Identify Targets for Intervention (Achievement)

**Table 1.3 (Continued)**

<table>
<thead>
<tr>
<th>CHC Cognitive/Academic Ability or Processing Domain</th>
<th>Normative Weakness and Information About Intervention</th>
<th>Within Normal Limits</th>
<th>Normative Strength and Information About Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target for Intervention:</strong></td>
<td></td>
<td></td>
<td>Teacher Report: seems to do better with visual information (e.g., charts and graphs in math and science)</td>
</tr>
<tr>
<td>Auditory Processing (Ga)</td>
<td>Auditory Processing = 72 ± 5</td>
<td></td>
<td>Ayden: &quot;I love to draw,&quot; Emphasize in program planning to the extent possible</td>
</tr>
<tr>
<td></td>
<td>Reading Specialist does not use phonetic strategies consistently; relies more on visual features and contextual cues to decode</td>
<td></td>
<td>Teacher Report: mishears words frequently</td>
</tr>
<tr>
<td>Processing Speed (Gs)</td>
<td>Processing Speed = 84 ± 4</td>
<td></td>
<td>Parent Report: takes a long time to complete homework</td>
</tr>
<tr>
<td><strong>Target for Intervention:</strong></td>
<td></td>
<td></td>
<td>A (Accommodation)</td>
</tr>
<tr>
<td></td>
<td>R (Remediation)</td>
<td></td>
<td>M (Modification)</td>
</tr>
<tr>
<td>Reading (Gw-R)</td>
<td>Passagte Comprehension 70 ± 5</td>
<td></td>
<td>Letter-Word Identification</td>
</tr>
<tr>
<td></td>
<td>Teacher Report has difficulty remembering what he has read for monthly book reports</td>
<td></td>
<td>90 ± 4</td>
</tr>
<tr>
<td></td>
<td>Reading Fluency 83 ± 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reading Specialist and School Psychologist Observation: oral reading is slow and laborsious</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ayden: &quot;I can’t read fast.&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Step 3: Identify Targets for Intervention (Achievement)

#### Reading Continued

<table>
<thead>
<tr>
<th>Type of Skill Targeted</th>
<th>Writing (Gw-W)</th>
<th>Mathematics (Gq)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Teacher Report: does not use vocabulary words in writing assignments; note-taking is difficult for him—verbal/stationary note-taking as opposed to paraphrasing</td>
<td>Parent and Teacher Report: difficulty with word problems</td>
<td>Ayden has recently begun to avoid reading for pleasure and seems to be developing anxiety related to reading aloud in school</td>
</tr>
<tr>
<td></td>
<td>H (Higher Level Application)</td>
<td>Applied Problems 81±4</td>
<td>Ayden is highly motivated to learn and puts forth considerable effort in all educational activities; does well with hands-on activities</td>
</tr>
<tr>
<td></td>
<td>E (Fluency)</td>
<td>B (Basic Skill) - spelling</td>
<td>Capitalize on his motivation and incorporate interests into remedial activities</td>
</tr>
<tr>
<td></td>
<td>Spelling 8.7±5</td>
<td>Calculation 1.07±4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Writing Fluency 95±5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Consider Tertiary Data, Which Are Comprised of Information About Factors That Affect Learning and Achievement and That Are Largely External to the Student**

- Already have good understanding of nature of Ayden’s learning difficulties, but need to consider other important data sources to meet his unique needs

- **Other data sources:**
  - Classroom instruction
  - Instructional materials
  - Environmental factors
  - Strategies
Other data sources...

• These data gathered via **classroom observations** and teacher/parent/student interviews

• May be prudent to conduct additional classroom observations or interviews after practitioner has more complete understanding of presumed causes of student’s learning difficulties
  – Practitioners should also familiarize themselves with relevant instructional materials to give guidance on how to facilitate learning

• See Rapid References 1.14 to 1.20
### Rapid Reference 1.15 Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Crystallized Intelligence (Gc) Deficit

<table>
<thead>
<tr>
<th>Classroom Instructional Factors</th>
<th>Instructional Materials</th>
<th>Environmental Factors</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides an environment rich in language and experiences</td>
<td>Contains chapter Glossaries</td>
<td>Word-of-the-day calendar</td>
<td>Use KWL strategy to increase background knowledge</td>
</tr>
<tr>
<td>Incorporates frequent practice with and exposure to words</td>
<td>E-Glossaries available</td>
<td>Word walls</td>
<td>Use context when reading to ascertain meaning</td>
</tr>
<tr>
<td>Reads aloud to children</td>
<td>Provides vocabulary building activities (print or online)</td>
<td></td>
<td>Capitalize on opportunities to practice new words (listening for their use in television shows and other media, purposely using them in conversation)</td>
</tr>
<tr>
<td>Varies reading purpose (leisure, information)</td>
<td>Contains tools for priming background knowledge (e.g., Harcourt)</td>
<td>Distraction-free seating</td>
<td>Engage in activities such as word searches containing related terms (e.g., travel terms) and crosswords (note: puzzlemaker.com can create customized puzzles)</td>
</tr>
<tr>
<td>Works on vocabulary building</td>
<td>Includes story starters</td>
<td>Closed door</td>
<td>Write a new word and its definition along with a drawing</td>
</tr>
<tr>
<td>Teaches morphology</td>
<td>Includes text features (boldface, italics)</td>
<td>Closed windows</td>
<td></td>
</tr>
<tr>
<td>Capitalizes on opportunities to define words within instruction (e.g., “the composition of igneous rock, that is, what it is made of, is…”</td>
<td>Availability of video clips</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Puzzlemaker

**Welcome to Puzzlemaker!**

Puzzlemaker is a puzzle generation tool for teachers, students and parents. Create and print customized word search, criss-cross, math puzzles, and more using your own word lists.

**Make a puzzle now! It's free!**

Choose a type of puzzle from the list below and make your own puzzle online for classroom or home use:

- Word Search
- Criss-Cross
- Double Puzzles
- Fallen Phrases
- Math Squares
- Mazes
- Letter Tiles
- Cryptograms
- Number Blocks
- Hidden Message

**Try a Pre-Made Puzzle**
Rapid Reference 1.16 Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of an Auditory Processing (Ga) Deficit

<table>
<thead>
<tr>
<th>Classroom Instructional Factors</th>
<th>Instructional Materials</th>
<th>Environmental Factors</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emphasizes sounds in words in an emphatic manner when teaching new words for reading or spelling</td>
<td>Video clips</td>
<td>Rules for talking and listening</td>
<td>Use comprehension monitoring (e.g., Does the word I hear/heard make sense in context?)</td>
</tr>
<tr>
<td>Uses instructional techniques (e.g., word preview or preview) to clarify unfamiliar words</td>
<td>Read aloud text/lecture</td>
<td>Spelling lists</td>
<td>Engage in self-advocacy (e.g., asking for information to be repeated and/or clarified in regard to the misheard part)</td>
</tr>
<tr>
<td>Provides instructional supports (e.g., guided notes) during note-taking activities</td>
<td>Audio glossaries</td>
<td>Closed doors</td>
<td>Physically position oneself toward/close to the speaker</td>
</tr>
<tr>
<td>Builds in time for clarification questions related to “missed” or “misheard” items during lecture</td>
<td>Supplement oral instructions with written instructions</td>
<td>Closed windows</td>
<td>Attending to speaker’s mouth and/or gestures, facial expressions, and delivery of information</td>
</tr>
<tr>
<td>Shortens instruction</td>
<td>Phonemic awareness activities</td>
<td>Distraction-free seating</td>
<td>Recording notes via audio methods to allow a mechanism for being able to fill in notes for completeness</td>
</tr>
<tr>
<td>Makes an effort to minimize background noise via the use of instructional commands (e.g., work quietly, refrain from talking with your neighbor)</td>
<td>Electronic textbooks</td>
<td>Noise minimizers (carpet, noise-reducing headphones)</td>
<td>Following along with written directions while the provision of oral instruction</td>
</tr>
<tr>
<td>Repeats or rephrases questions asked by other students to ensure that all students “hear” the question that is associated with the teacher’s given response</td>
<td>Guided notes, graphic organizers</td>
<td>Preferential seating (close to teacher, away from heater, fan)</td>
<td>Practicing spelling lists with visually-based techniques</td>
</tr>
<tr>
<td>Emphasizes sight-word reading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pauses when delivering oral instruction to allow time for student to process auditory information</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use visualization strategies to remember things

Use written mediums (e.g., email, test) to preserve content/innovation communicated

*The CULTURE of ancient Egypt has been studied perhaps more than any in mankind’s history.
*It is in most CULTURED to be nice to your fellow man.
*A CULTURED person often reads great literature, appreciates fine art, and eats good food.
Rapid Reference 1.17 Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Long-Term Retrieval (Glr) Deficit

<table>
<thead>
<tr>
<th>Classroom Instructional Factors</th>
<th>Instructional Materials</th>
<th>Environmental Factors</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses close-ended questions, yes/no, true/false</td>
<td>Guided lists for implementing procedures, formulas</td>
<td>Procedural charts</td>
<td>Organizes material to be learned using visual aids (e.g., diagrams, flowcharts, auditory aids (e.g., chunking), or other tangibles (e.g., flash cards)</td>
</tr>
<tr>
<td>Uses consistent instructional routines</td>
<td>Practice guides</td>
<td>Word walls</td>
<td>Makes connections by relating material to be learned to oneself</td>
</tr>
<tr>
<td>Offers repeated practice with and review of newly presented information</td>
<td>Online review</td>
<td>Desk organizers</td>
<td>Relates concepts to be learned to one another via tools such as a concept map</td>
</tr>
<tr>
<td>Teaches memory strategies and encourages their use (verbal rehearsal, support encoding, use of mnemonic devices: Dehn, 2010)</td>
<td>Glossaries (electronic, audio, printed)</td>
<td>External memory aids (lists, audible timers)</td>
<td>Creates a schedule for distributed practice of material to be learned</td>
</tr>
<tr>
<td>Uses multiple modalities when teaching new concepts (pair-written or visual with verbal information) to support dual encoding (Dehn, 2010)</td>
<td>Study guides</td>
<td>Calendars with visual references to due dates</td>
<td>Plans for regular review of material</td>
</tr>
<tr>
<td>Limits the amount of new material to be learned; introduces new concepts gradually and with a lot of context</td>
<td>Review sheets</td>
<td>Visual reminders (Post-its, color-coded systems)</td>
<td>Rehearses material to be learned via recitation, repetition</td>
</tr>
</tbody>
</table>

(continued)

Glr Continued

Rapid Reference 1.17 Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Long-Term Retrieval (Glr) Deficit

(continued)

Is mindful of when new concepts are presented

Dictionaries (to support word retrieval)

Quiet environment or noise-reduction aids (headphones, cubicles, study carrels)

Studies and completes homework in a designated location with necessary materials

Makes associations between newly learned and prior information explicit

Thesauruses (to build vocabulary and minimize impact of retrieval weaknesses)

Preferential seating to minimize distractions when encoding

Uses active learning strategies (note-taking, flash cards, concept maps, chunking, in review sessions)

Uses lists to facilitate recall (prompts)

Expands vocabulary to minimize impact of word retrieval deficits

Builds in wait-time for student when fluency of retrieval is an issue

Uses test previews to “prime” knowledge

Provides background knowledge first before asking a question to “prime” student for retrieval

Uses organizational strategies such as semantic clustering (Dehn, 2010)

Uses verbal association strategies (e.g., elaboration, Dehn, 2010)

Implements dual coding strategies (visual to verbal and vice versa)

Engages in self-testing

Uses specific strategies for academic tasks (e.g., PQ/ST, for reading comprehension; Dehn, 2010)
### Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Processing Speed (Gs) Deficit

<table>
<thead>
<tr>
<th>Classroom Instructional Factors</th>
<th>Instructional Materials</th>
<th>Environmental Factors</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focusses on features of work products that are unrelated to time parameters (e.g., quality or accuracy of a response)</td>
<td>Practice guides</td>
<td>Clocks</td>
<td>Plan for long-term projects by using a realistic schedule that allows for consistent movement toward completion</td>
</tr>
<tr>
<td>Repeated practice</td>
<td>Online review</td>
<td>Written schedules</td>
<td>Preview important parts of text (end-of-chapter questions, title, subtitles, glossary of terms) to facilitate reading speed</td>
</tr>
<tr>
<td>Offers speed drills</td>
<td>Use computer activities that require quick, simple decisions</td>
<td>Desk organizers</td>
<td>Apply planning and time management strategies</td>
</tr>
<tr>
<td>Extended time</td>
<td>Use online activities/games (e.g., <a href="http://www.arcademicians.com/games/">http://www.arcademicians.com/games/</a>)</td>
<td>Books on tape</td>
<td>Use techniques such as skimming and scanning for reading activities</td>
</tr>
<tr>
<td>Reduces the quantity of work required (including homework)</td>
<td></td>
<td></td>
<td>Use an outlining strategy for note-taking</td>
</tr>
</tbody>
</table>

Increases wait times both before questions are asked and after responses are given

Choral repeated reading

---

[www.arcademicians.com](http://www.arcademicians.com)

---

**Academics + Arcade = Fun Learning!**

Boost student engagement with our free multiplayer educational games, math games, language arts games, and much more.

---

**Today's Top Scores**

- Grand Prix Multiplication:
  - Watt: 45.59 sec
  - Sparky: 45.94 sec
  - play453321: 46.63 sec
  - Player529: 46.18 sec
  - Gill: 46.13 sec
  - Ringard: 46.12 sec

---

**Arcademians PLUS**

Custom games, data reports, video lessons, and achievements!
Gs weakness – Build Accuracy and Rate

Play Free Games

All Subjects Shapes Counting Addition Subtraction Multiplication Division Integers Money Time
Decimals Fractions Ratio & Proportion Algebra Language Arts Spelling Typing Geography

All Grades Grade 1 Grade 2 Grade 3 Grade 4 Grade 5 Grade 6

Demolition Division Division Derby Drag Race Division Pony Division
10/15/2014

Game Results

2nd: 51.31 sec  Lacrosse
3rd: 59.48 sec  Computer 11
4th: 59.75 sec  Sparks
5th: 60.50 sec  Computer 9
6th: Computer 5

Accuracy: 88%  Rate: 22/min

Missed Questions:
49 ÷ 7 = 7
24 ÷ 6 = 4
36 ÷ 3 = 12
Game Results

1st:
56.73 sec
Mmmeeeeeeeee

2nd:
57.17 sec
Sparks

3rd:
57.37 sec
MysteryGirl

4th:
57.43 sec
Computer 7

5th:
Computer 10

Accuracy: 91%
Rate: 23/min

Missed Questions:
24 + 8 = 3
36 + 3 = 12

Data Tracking with Arcademics PLUS

Customize Game Content
Customize game content to fit your lesson plans and assign different content to different students.

Data Tracking Reports
Monitor student progress and zoom in on problem areas with our performance reports.

Video Lessons
If students struggle with a specific problem, they can watch a video that shows a lesson on the problem.

Try One Month Free
Rapid Reference 1.19  
Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Visual Processing (Vg) Deficit

<table>
<thead>
<tr>
<th>Classroom Instructional Factors</th>
<th>Instructional Materials</th>
<th>Environmental Factors</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide oral explanation for visual concepts</td>
<td>Video clips</td>
<td>Color-coded Information</td>
<td>Uses orthographic strategies for decoding (e.g., word length, shape of words); Uses &quot;cover-copy-compare&quot; techniques—go to: <a href="http://www.amblesideprimary.com/amb/teweb/lookcoverlookcover.html">http://www.amblesideprimary.com/amb/teweb/lookcoverlookcover.html</a></td>
</tr>
<tr>
<td>Reviews spatial concept and supports comprehension through use of hands-on activities and manipulatives (e.g., using models to demonstrate the moon's orbital path)</td>
<td>Enlarged text (via online zoom feature or alternative print copy of textbook, worksheet)</td>
<td>Preferential seating aimed at allowing the student to access visual material (e.g., smart board), manipulatives, visual aids, and other materials to support learning</td>
<td>Capitalizes on intact or strong auditory skills during learning/studying (e.g., uses phonemic skills for decoding tasks)</td>
</tr>
<tr>
<td>Provides verbal label for visual representations (e.g., &quot;The shaded red bars represent women's votes, the green bars represent men's votes&quot;)</td>
<td>Highlights margins during writing tasks</td>
<td>Assigned note-taking buddy</td>
<td>Pairs visual information with verbal (mnemonics)</td>
</tr>
<tr>
<td>Provides written copies of oral instructions, lectures</td>
<td>Provides direct handwriting practice</td>
<td>Readers or scribes, where needed</td>
<td>Labels visual charts/graphs with verbal labels</td>
</tr>
<tr>
<td>Auditory cueing to supplement visual information/uses (e.g., &quot;Look at the bar graph for weekly sales&quot;)</td>
<td>Provides visual supports (graphic organizers, graph paper)</td>
<td>Reduce visual distraction</td>
<td>Highlights or color codes important information</td>
</tr>
</tbody>
</table>
Rapid Reference 1.19 Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Visual Processing (Gv) Deficit

- Provides graph paper to assist with number alignment
- Books on tape
- Text-to-speech technology (screen and text readers)
- Reading/scanning pens
- Alternative lighting (natural, non-fluorescent lighting)
- Uses aids to support visual tracking (fingers, index cards, rulers)
- Spaces items on a page
- Uses applications or supports that allow for enhancement of fonts
- Uses note-taking strategies (e.g., Cornell, outlining)
### Cornell Notes Template

**Topic:**

**Name:**

**Date:**

**Chapter #, Section #:**

**Period:**

<table>
<thead>
<tr>
<th>Questions / Main Ideas / Vocabulary</th>
<th>Notes / Answers / Definitions / Examples / Sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Terms</strong></td>
<td>&quot;Write the definition for each &quot;Key Term&quot;. Then use the &quot;Key Term&quot; in a sentence (underline the &quot;Key Term&quot;) or give an example that shows your understanding of the term in correct historical context.&quot;</td>
</tr>
<tr>
<td><strong>Key People</strong></td>
<td>&quot;Explain the importance of each &quot;Key Person&quot;. Include the major events they were involved with and the impact they had on history.&quot;</td>
</tr>
<tr>
<td><strong>Academic Vocabulary</strong></td>
<td>&quot;For any &quot;Academic Vocabulary&quot; words you find in the section, write the definition for the &quot;Academic Vocabulary&quot; word and use it in a sentence (underline the &quot;Academic Vocabulary&quot; word) that shows your understanding of the word.&quot;</td>
</tr>
<tr>
<td><strong>Reading Check Questions</strong></td>
<td>&quot;In complete sentences and with sufficient details, answer each &quot;Reading Check&quot; question in the section.&quot;</td>
</tr>
</tbody>
</table>
| **Section Assessment**             | "At the end of each section, answer the section assessment questions. Use complete sentences with sufficient details."

---

### Rapid Reference 1.20 Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Short-Term Memory (STM) Deficit

<table>
<thead>
<tr>
<th>Classroom Instructional Factors</th>
<th>Instructional Materials</th>
<th>Environmental Factors</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offers repetition of information</td>
<td>Practice guides</td>
<td>Color-coded information</td>
<td>Apply rote strategies (e.g., basic rehearsal, simple repetition) for information to be learned in the short-term</td>
</tr>
<tr>
<td>Reviews information and newly presented concepts often</td>
<td>Guided study</td>
<td>Math-facts tables (e.g., multiplication)</td>
<td>Encourage use of relational strategies (e.g., mnemonics)</td>
</tr>
<tr>
<td>Deliver information in manageable parts</td>
<td>Online review</td>
<td>Written schedules</td>
<td>Use elaborative rehearsal (associating new information with prior knowledge)</td>
</tr>
<tr>
<td>Evidences use of consistent instructional routines</td>
<td>Flash cards</td>
<td>Visual schedules (e.g., pictures)</td>
<td>Semantic rehearsal (creating a sentence using things to be remembered)</td>
</tr>
<tr>
<td>Uses meaningful stimuli to assist with encoding and allow for experiential learning (i.e., learning while doing)</td>
<td>Multisensory materials to facilitate encoding</td>
<td>Written reminders (homework)</td>
<td>Chunking</td>
</tr>
<tr>
<td>Provides opportunities for repeated practice and review</td>
<td></td>
<td></td>
<td>Paraphrasing</td>
</tr>
<tr>
<td>Provides supports (e.g., lecture notes, guided notes, study guides, written directions) to supplement oral instruction</td>
<td></td>
<td></td>
<td>Visual mnemonics (imagery, pegwords, loci, keyword method; Dehn)</td>
</tr>
</tbody>
</table>
A Review of Ayden’s DOTI Form - Example

- Consult Rapid Reference 1.17, which includes information on students whose learning difficulties are affected adversely by a deficit in Long-term Storage and Retrieval
  - Must tailor instruction specifically for Ayden
- Consider strengths
  - Ayden has strength in Gv, so should use the following relevant recommendations for Glr from RR 1.17:
    - Pairing verbal information with visuals
    - Organizing materials to be learned using visual aids
    - Providing visual reminders
### Rapid Reference 1.17 Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Long-Term Retrieval (Glr) Deficit

<table>
<thead>
<tr>
<th>Classroom Instructional Factors</th>
<th>Instructional Materials</th>
<th>Environmental Factors</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses close-ended questions, yes/no, true/false</td>
<td>Guided lists for implementing procedures, formulas</td>
<td>Procedural charts</td>
<td>Organizes material to be learned using visual aids (e.g., diagrams, flowcharts), auditory aids (e.g., chunking), or other tangibles (e.g., flash cards)</td>
</tr>
<tr>
<td>Uses consistent instructional routines</td>
<td>Practice guides</td>
<td>Word walls</td>
<td>Makes connections by relating material to be learned to oneself</td>
</tr>
<tr>
<td>Offers repeated practice with and review of newly presented information</td>
<td>Online review</td>
<td>Desk organizers</td>
<td>Relates concepts to be learned to one another via tools such as a concept map</td>
</tr>
<tr>
<td>Teaches memory strategies and encourages their use (verbal rehearsal to support encoding, use of mnemonic devices) (Dehn, 2010)</td>
<td>Glossaries (electronic, audio, printed)</td>
<td>External memory aids (lists, audible timers)</td>
<td>Creates a schedule for distributed practice of material to be learned</td>
</tr>
<tr>
<td>Uses multiple modalities when teaching new concepts (pair-written or visual with verbal information) to support dual encoding (Dehn, 2010)</td>
<td>Study guides</td>
<td>Calendars with visual references to due dates</td>
<td>Plans for regular review of material</td>
</tr>
<tr>
<td>Limits the amount of new material to be learned; introduces new concepts gradually and with a lot of context</td>
<td>Review sheets</td>
<td>Visual reminders (Post-its, color-coded systems)</td>
<td>Rehearses material to be learned via recitation, repetition</td>
</tr>
</tbody>
</table>

(continued)

### Rapid Reference 1.17 Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Long-Term Retrieval (Glr) Deficit

(continued)

| Is mindful of when new concepts are presented | Dictionaries (to support word retrieval) | Quiet environment or noise-reduction aids (headphones, cubicles, study carrels) | Studies and completes homework in a designated location with necessary materials |
| Makes associations between newly learned and prior information explicit | Thesaurus (to build vocabulary and minimize impact of retrieval weaknesses) | Preferential seating to minimize distractions when encoding | Uses active learning strategies (note-taking, flash cards, concept maps, chunking) in review sessions |
| Uses lists to facilitate recall (prompts) | Expands vocabulary to minimize impact of word retrieval deficits | Builds in wait-time for student when fluency of retrieval is an issue | Studies and reviews learning material immediately prior to sleeping |
| Uses text previews to “prime” knowledge | Provides background knowledge first before asking a question to “prime” student for retrieval | Uses verbal association strategies (e.g., elaboration) (Dehn, 2010) | Uses organizational strategies such as semantic clustering (Dehn, 2010) |
| Uses specific strategies for academic tasks (e.g., PQFST, for reading comprehension) (Dehn, 2010) | | Uses dual coding strategies (visual to verbal and vice versa) | Engages in self-testing |
Step 5: Integrate Data From All Previous Steps, Design and Implement an Intervention, and Monitor Its Effectiveness

- **Integrate all data** from Steps 1 through 4 to design and implement interventions (MARC)
- **Use information** from DOTI form to assist in selecting or developing educational strategies and tailoring interventions
- **Develop a plan** for monitoring interventions and evaluating their benefit
  - Summarize outcome of recommendations and suggest next steps
  - Use one of three actions
    - Retain (RT)
    - Refine (RF)
    - Reduce/Eliminate (RD/E)

MARC = Modification, Accommodation, Remediation, Compensation
DOTI = Data Organization and Targets for Intervention

<table>
<thead>
<tr>
<th>Academic Targets for Intervention (Step 1)</th>
<th>Suggested Remedial Program</th>
<th>Related Cognitive Weakness(es) (Step 2)</th>
<th>Manifestations of Cognitive Weakness(es) (Step 3)</th>
<th>Suggested MARC Interventions and Recommendations (Step 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Decoding</td>
<td>Great Leaps</td>
<td>Ga—Phonetic Coding</td>
<td>Does not use phonetic strategies consistently</td>
<td>Audio glossaries Preferential seating</td>
</tr>
<tr>
<td></td>
<td>Month-by-Month Phonics and Vocabulary, Grade 5 (Cunningham, Loman &amp; Arens, 2007)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Fluency</td>
<td>Great Leaps</td>
<td>Gs, Gr</td>
<td>Reading is slow and laborious</td>
<td>Shortened passages Text preview Think-alouds</td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>Great Leaps</td>
<td>Gf</td>
<td>Has difficulty retelling what he has read in monthly book reports</td>
<td>Cooperative reading Cause/effect graphic organizers</td>
</tr>
<tr>
<td></td>
<td>Supplement with activities designed to build sight words</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math Fluency</td>
<td>Arcadeics</td>
<td>Gs</td>
<td>Is accurate but slow</td>
<td>Abbreviated math minutes with charting</td>
</tr>
</tbody>
</table>
Find 5th grade sight words at: **www.tarpy.cusd.com**
Go to **www.dolchsightwords.org** for all grade levels

**Fifth Grade Sight Words**

**Must know 5 words in a sentence.**

<table>
<thead>
<tr>
<th>LIST #1</th>
<th>LIST #2</th>
<th>LIST #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>antique</td>
<td>fir</td>
<td>quotient</td>
</tr>
<tr>
<td>equivalent</td>
<td>toe</td>
<td>unique</td>
</tr>
<tr>
<td>qualify</td>
<td>capitol</td>
<td>it’s</td>
</tr>
<tr>
<td>quantity</td>
<td>weather</td>
<td>knight</td>
</tr>
<tr>
<td>quite</td>
<td>enquire</td>
<td>brake</td>
</tr>
<tr>
<td>request</td>
<td>equator</td>
<td>fur</td>
</tr>
</tbody>
</table>
Supplement Reading Interventions with activities designed to build sight words

Sight words

- Speed of word recognition is an important marker for reading skill (Perfetti, 1985)
- Development of rapid word recognition skills is primary factor when distinguishing skilled from less skilled reading performance (Chabot et al 1984)
- Sight word efficiency is primary reason for decreased reading fluency (Torgeson, 2002)

Activities to build sight words (and more)

1. **Gaming Wonderland**
   - [Gaming Wonderland](http://www.gamewonderland.com)

2. **Oh Yes! It's FREE**
   - [Oh Yes! It's FREE](http://www.ohyesfree.com)

Related Games

- Ancient Jewels
- Plants vs. Zombies
- Rise of Atlantis
- Jewel Match
- Collapse
- 4 Elements
- Electri Truck
- 7 Wonders

[Game Images]
Currently receives pull-out services (meeting with remedial reading teacher for one period 3 times a week for 30 minutes) – **teacher helps with incomplete seatwork assignments**

Replace Homework/seatwork Help With........

---

<table>
<thead>
<tr>
<th>Academic Targets for Intervention (Step 1)</th>
<th>Suggested Remedial Program</th>
<th>Related Cognitive Weakness(es) (Step 2)</th>
<th>Manifestations of Cognitive Weakness(es) (Step 3)</th>
<th>Suggested MARC Interventions and Recommendations (Step 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Decoding</td>
<td>Great Leaps</td>
<td>Gs—Phonetic Coding</td>
<td>Does not use phonetic strategies consistently</td>
<td>Audio glossaries (C) Preferential seating (A)</td>
</tr>
<tr>
<td></td>
<td>Month-by-Month Phonics and Vocabulary, Grade 5 (Cunningham, Loman, &amp; Arens, 2007)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Fluency</td>
<td>Great Leaps</td>
<td>Gs, Gf</td>
<td>Reading is slow and laborious</td>
<td>Shortened passages (M) Text preview</td>
</tr>
</tbody>
</table>
| Reading Comprehension                     | Great Leaps               | Gf, Gf                                | Has difficulty retaining what he has read in monthly book reports | Think-alouds (M) Cooperative reading
| Supplement with activities designed to build sight words |                                     |                                      |                                             | Cause/Effect graphic organizers (C) |
| Math Fluency                              | Arcadeomics               | Gs                                     | Is accurate but slow                       | Abbreviated math (M) minutes with charting     |
|                                           |                           |                                       |                                             | (continued)                                  |
**Academic Targets for Intervention (Step 1)**

<table>
<thead>
<tr>
<th>Math Problem Solving</th>
<th>Suggested Remedial Program</th>
<th>Related Cognitive Weakness(es) (Step 2)</th>
<th>Manifestations of Cognitive Weakness(es) (Step 3)</th>
<th>Suggested MARCH Interventions and Recommendations (Step 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(continued)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spelling</td>
<td>Folding-in techniques: cover-copy-compare</td>
<td>Ga—Phonetic Coding</td>
<td>Mishears words frequently</td>
<td>Math mnemonics, Math concept card, Procedural chart, Word wall, Spellchecker, Spelling dictionary with graph, Preferential seating</td>
</tr>
<tr>
<td>Written Expression</td>
<td>Inspiration</td>
<td>Gl, Gf</td>
<td>Does not use newly learned vocabulary in writing assignments; note-taking is verbatim</td>
<td>Sentence strips, Word bank, Word wall, Thesaurus, Feedback, Guided notes</td>
</tr>
</tbody>
</table>

**Recommendations for Ayden: Reading Decoding**

- “Does not apply phonetic coding strategies; instead, relies on visual features of words”
  - Fairly successful, but struggles in areas where terms do not lend themselves easily to visuals
  - Use **audio glossaries** so he can hear words and definitions read to him before a new lesson (compensatory strategy for Ga-PC weakness)
  - **Preferential seating** will give him access to help more readily and teacher can monitor need for help (general accommodation)
Recommendations for Ayden: Reading Decoding and Fluency

• “Does not apply phonetic coding strategies; instead, relies on visual features of words”
  – *Great Leaps program* recommended for continued use to address difficulties with reading fluency, in particular (remediation of Ga-PC and Glr/Gs Fluency weaknesses)
  • Add *supplemental phonemic awareness activity* (remediation of Ga-PC weakness)
Recommendations for Ayden: Reading Comprehension

- **Great Leaps Program**
- Continue to use **cooperative reading groups**, but pair Ayden with a student with strong reasoning skills who can serve as model during guided **think-alouds**; use **graphic organizers**, specifically those that allow for relationships to be readily seen
  (compensatory strategies – minimize the affects of Gf weakness on reading comprehension)

www.uen.org

### Compare and Contrast Graphic Organizers

- **Item 1**
- **Item 2**
- **Similarities**
- **Differences**
- **Facts only about Item 1**
- **Facts about both items**
- **Similarities**
- **Differences**
- **Facts only about Item 2**
Cause and Effect
Graphic Organizers

Problem and Solution
Graphic Organizer
Recommendations for Ayden: Reading Comprehension

- Use shortened passages to build confidence by allowing him to finish work at similar rate to his peers, facilitate comprehension, and makes homework time similar to that of most peers (modification of some class work and homework – minimizes the effect of Gs-Fuency weakness)
- Use text preview to review information in a chapter prior to reading passages in class – facilitates comprehension

See Also...

Recommendations for Ayden: Processing Speed

- **Modify** Math minutes (i.e., less problems) to build confidence and facilitate engagement in task
  - Have him **graph his progress** to build confidence and focus on individual progress
- Encourage repeated practice at home through web-based program, called **Arcademics**
  - Math games presented in arcade-like format
  - Available on apps to increase mobility of intervention
  - Provide visual feedback
Recommendations for Ayden: Reasoning and Long-term Storage and Retrieval

- Teach **mnemonics** to assist with retrieving steps or sequences needed to compute problems
- Externalize the reasoning process: Use **math concept cards**
- Allow time to practice strategies until they are internalized

Recommendations for Ayden: Gf, Glr, and Writing

- Use **Inspiration software** during independent writing tasks (externalizes reasoning; facilitates learning through use of visuals)
  - Allows him to see relationships between concepts/ideas given graphic organizer type format
- Provide Ayden with **word banks** (minimizes the affects of retrieval fluency weakness)
- Remind him to reference classroom **word wall**, which contains cumulative listing of weekly vocabulary words
- Important to build vocabulary
  - Have teacher provide **feedback** on writing by circling specific words and offering synonym as well as circling one or two words for Ayden to offer alternative
  - Allow him to use **thesaurus**
  - Build vocabulary through the use of multiple associations (e.g., vocabulary cartoons, vocabulary word maps) – assists with encoding information more effectively, which in turn facilitates retrieval at a later time
Recommendations for Ayden: Writing

• Allow him to use sentence strips during writing tasks
  – Can write discrete thoughts or facts and then physically manipulate strips into organized, cohesive sentence
• Provide him with guided notes (if feasible)

Recommendations for Ayden: Spelling

• Remind him of word wall
• Allow him to use spellchecker function
• Have him build a spelling dictionary, with a new entry for each newly mastered word
• Use folding-in technique to build sight-word reading/spelling skills
  – Present 10 words, 7 of which are known and 3 of which are “unknown”
  – Reinforce with repeated practice via cover-copy-compare web-based program
Ayden in Perspective

• Academic difficulties
• Intrinsic factors that may be related to academic difficulties (e.g., Ga-PC, Gs-Fluency and rate, Glr-fluency and learning efficiency, relative weakness in Gf)
• Extrinsic factors – no remediation or tailored intervention; only help with homework
• MARC interventions carefully selected to meet Ayden’s educational needs
• Implement interventions and monitor effectiveness
• One question not addressed – Does Ayden have a specific learning disability?
Cross-Battery Pattern of Strengths and Weaknesses Analyzer (XBA PSW-A® v1.0)
Conceptualization by D.P. Flanagan, S.O. Ortiz, V.C. Alfonso; Programming by S.O. Ortiz and A.M. Dyna
Copyright © 2013 Wiley. All Rights Reserved

Details on the conceptualization, use, and interpretation of the information and values produced by XBA PSW-A® are found in Essentials of Cross-Battery Assessment, Third Edition (Flanagan, Ortiz & Alfonso, 2013). Begin by following the steps outlined below. After entering the required information, click on the “Go to g-Value Data Entry Tab” button to move to the next tab.

IDENTIFYING INFORMATION
You must select the student’s grade from the drop-down menu to begin analysis. Entering additional data is optional.

Step 1. Student Name: Aydan
Step 2. Date of Birth: Enter date of birth in mm/dd/yyyy format
Step 3. Grade of Evaluation: Enter date of evaluation in mm/dd/yyyy format
Step 4. Student Grade: Enter students current grade level (e.g., 12-15 is selected here).
Step 5. School Name: Enter name of the institution
Step 6. Grade of Evaluation: Enter the name of the evaluator

Step 7. Data Entry: Go to g-Value Data Entry Tab

The student’s chronological age is calculated automatically.

Quick Access Navigation:
- g Value Data Entry
- g Value Summary
- PSW Data Entry
- PSW Summary

Optional Save Data/Files:
- Save Data and File As...
- Clear Data on All Tabs
- Go to Notes, Instruction, and Development Tab

DATA ENTRY for g-Value

Step 1: Enter Composite Scores
Step 2: Indicate “Yes” or “No”

CHC ABILITY COMPOSITES

Gc - Crystallized Knowledge
Gf - Fluid Reasoning
Gw - Long-Term Storage & Retrieval
Gn - Short-Term Memory
Gv - Visual Processing
Gd - Auditory Processing
Gp - Processing Speed

Enter Standard Scores (Range 40-600)*
Select Yes or No
Determining Sufficiency:

An ability is considered “sufficient” when it is judged by the evaluator to contribute meaningfully to the individual’s overall cognitive functioning, particularly for the purpose of facilitating academic performance (e.g., acquisition and development of academic skills). Typically, standard scores around 90 or higher are sufficient, as abilities associated with scores in this range (≥ 90) often contribute meaningfully to the individual’s overall cognitive functioning and, therefore, support learning. When standard scores are around 90 or lower, clinical judgment is necessary to determine if the broad ability constraints inhibit learning and achievement.

Functional Description:

Extreme Below Average/Normal Deficit
Below Average/Weakness
Average
Above Average/Strength
Well Above Average/Normal Strong
Extremely Above Average/Normal Strength

Markedly Deficient
Insufficient
Sufficient
Efficient
Profound
Markedly Proficient

*Note: If using T-Scores, convert them to Standard Scores (Deviation IQ) metric here

Standard Score Range | 70 - 79 | 80 - 89 | 90 - 100 | 110 - 119 | 120 - 129 | ≥ 130
--- | --- | --- | --- | --- | --- | ---
Percentile Range | 2nd to 8th | 9th to 24th | 25th to 74th | 75th to 89th | 90th to 97th | ≥ 98th
Classification | Extremely Below Average/Normal Deficit | Well Below Average/Normal Deficit | Below Average/Weakness | Average | Above Average/Strength | Well Above Average/Normal Strong
Functional Description | Markedly Deficient | Insufficient | Sufficient | Efficient | Profound | Markedly Proficient

Clair独自に必要と判断される場合、得点がこの区間に入ると学習と達成を阻害すると考えられる。

Scores between 85-115 (inclusive) fall within the normal limits of functioning.

Return to Identifying Info
Continue to g-Value
Based on data entered in prior tabs, a g-Value is computed and displayed here. Users are advised to refer to the Notes, Instruction, and Development tab and to the relevant text in Essentials of Cross-Battery Assessment, Third Edition for a detailed discussion regarding the full meaning and proper use of the g-Value.

The g-Value reflects overall cognitive ability, based on the broad CHC abilities judged by the evaluator to be "sufficient." The g-Value is interpreted according to the likelihood that an individual possesses at least average overall cognitive ability.

- 0.60 g-Value: average overall ability is very likely
- 0.50 - 0.59: more information needed
- 0.49 g-Value: average overall ability is unlikely

Note: An asterisk (*) next to a broad ability code indicates that the ability was judged as "insufficient." by the evaluator.

**Interpretation of g-Value = 0.71**

How likely is it that the individual's pattern of strengths indicates at least average overall cognitive ability?

**Likely:** Despite the presence of weaknesses in one or more cognitive ability domains, this individual displays average or better functioning in cognitive ability domains considered important for acquiring the academic skills typical for this grade level. The individual's overall cognitive ability is very likely to be average or better and, therefore, sought to enable learning and achievement, especially when specific cognitive weaknesses are minimized through compensatory efforts, accommodations, and the like.

1. **Intact Ability Estimate**
   This composite is utilized in obtaining median represents and item correlations among the CHC broad ability scores judged as sufficient on the g-value tab.

2. **Alternative Ability Estimate**
   You may enter an alternative value if desired or if the level is not believed to be a good estimate of general ability.

3. **Cognitive Weakness**
   Enter the scaled (standard) score and select or composite name in the boxes on the right that best represent the student's cognitive weakness or deficit. If using T-Score, convert to Standard Scores before entering (see Tab 2A).

4. **Frequency of Difference**
   Select the level to be used in the PSSW analysis for determining if the size of a difference is significant, irrespective, or non-significant. The default value is 5% and will be adjusted for test unstandardization. If more concordant or discordant value is selected, it is used with the concordant and discordant proportions being made or a subset is used, considering using a better value.

5. **Academic Weakness**
   Enter a scaled (standard) score and select the subject or composite (optional) in the boxes on the right that represents a significant area of academic weakness or deficit for the individual.

---

**Long-term Storage and Retrieval**

**Reading Comprehension**

---

**Note:** For additional information or assistance, please refer to the user manual or contact support services.
Flanagan et al.’s Operational Definition: Level II – Review of Exclusionary Factors

Evaluation and Consideration of Exclusionary Factors for SLD Identification

An evaluation of specific learning disability (SLD) requires an evaluation and consideration of factors, other than a disorder in one or more basic psychological processes that may be the primary cause of a student’s academic skill weaknesses and learning difficulties. These factors include (but are not limited to), vision/hearing1, or motor disabilities, intellectual disability (ID), social/emotional or psychological disturbance, environmental or economic disadvantage, cultural and linguistic factors (e.g., limited English proficiency), insufficient instruction or opportunity to learn and physical/health factors. These factors may be evaluated via behavior rating scales, parent and teacher interviews, classroom observations, attendance records, social/developmental history, family history, vision/hearing exams1, medical records, prior evaluations, and interviews with current or past counselors, psychiatrists, and paraprofessionals who have worked with the student. Note worthy is the fact that students with (and without) SLD often have one or more factors (listed below) that contribute to academic and learning difficulties. However, the practitioner must rule out any of these factors as being the primary cause of a student’s academic and learning difficulties to maintain SLD as a viable classification/diagnosis.


Form downloadable on CD that accompanies Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alfonso, 2013)
### Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

**Vision (Check All that Apply):**

- [x] Vision test recent (within 1 year)  
- [ ] Vision test outdated (> 1 year)  
- [ ] Passed  
- [ ] Failed  
- [x] Wears Glasses

Name of disorder: **nearsighted**

**NOTES:** Ayden wears glasses throughout the school day; glasses were worn throughout the evaluation

---

**Form downloadable on CD that accompanies Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alfonso, 2013)**

### Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

**Hearing (Check All that Apply):**

- [x] Hearing test recent (within 1 year)  
- [ ] Hearing test outdated (> 1 year)  
- [ ] Passed  
- [ ] Failed  
- [ ] Uses Hearing Aids

**NOTES:** Information obtained from education records

---

**Form downloadable on CD that accompanies Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alfonso, 2013)**
Flanagan et al.’s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

Motor Functioning (Check All that Apply):

- [ ] Fine Motor Delay/Difficulty
- [ ] Gross Motor Delay/Difficulty
- [ ] Improper pencil grip (Specify type: __________) Name of disorder: __________
- [ ] History of motor disorder
- [ ] Diagnosed motor disorder
- [ ] Assistive devices/aids used (e.g., weighted pens, pencil grip, slant board)
- [ ] Motor difficulties suggested in the referral (e.g., illegible writing; issues with letter or number formation, size, spacing; difficulty with fine motor tasks such as using scissors, folding paper)

NOTES: No observed or reported difficulties

Form downloadable on CD that accompanies Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alfonso, 2013)

Flanagan et al.’s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

Cognitive and Adaptive Functioning (Check All that Apply):

- [ ] Significantly “subaverage intellectual functioning” (e.g., IQ score of 75 or below)
- [ ] Pervasive cognitive deficits (e.g., weaknesses or deficits in many cognitive areas, including Of and Ge)
- [ ] Deficits in adaptive functioning (e.g., social, communication, self-care)

Areas of significant adaptive skill weaknesses (check all that apply):

- [ ] Motor Skill
- [ ] Communication
- [ ] Socialization
- [ ] Daily Living Skills
- [ ] Behavior/Emotional Skills
- [ ] Other

NOTES: Current evaluation ruled out subaverage intellectual functioning; no deficits in adaptive functioning based on parent/teacher reports and observations

Form downloadable on CD that accompanies Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alfonso, 2013)
Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

Social-Emotional/Psychological Factors (Check All that Apply):

☐ Diagnosed psychological disorder (Specify: __________________________)
☐ Date of Diagnosis
☐ Family history significant for psychological difficulties
☐ Disorder presently treated - specify treatment modality (e.g., counseling, medication): __________________________
☐ Reported difficulties with social-emotional functioning (e.g., social phobia, anxiety, depression)
☐ Social-Emotional/Psychological issues suspected or suggested by referral
☐ Home-School Adjustment Difficulties
☐ Lack of Motivation
☐ Emotional Stress
☐ Autism
☐ Present Medications (type, dosage, frequency, duration) __________________________
☐ Prior Medication Use (type, dosage, frequency, duration) __________________________
☐ Hospitalization for psychological difficulties (date(s): __________________________
☐ Deficits in social, emotional, or behavioral (SEB) functioning (e.g., as assessed by standardized rating scales)

Significant scores from SEB measures:

NOTES: No evidence of social-emotional difficulties or psychological disorder based on parent and teacher
BASC and interview with Ayden; Ayden is beginning to feel frustrated with school because “he can’t keep up” with all of his assignments.

Form downloadable on CD that accompanies Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alfonso, 2013)

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

Environmental/Economic Factors (Check All that Apply):

☐ Limited access to educational materials in the home ☐ History of educational neglect
☐ Caregivers unable to provide instructional support ☐ Frequent transitions (e.g., shared custody)
☐ Economic considerations precluded treatment ☐ Environmental space issues (e.g., no space
  of identified issues (e.g., filling a prescription, for studying, sleep disruptions due to shared
  replacing broken glasses, tutoring) sleeping space)
☐ Temporary Crisis Situation

NOTES: There are currently no environmental or economic factors that interfere with
Ayden’s academic performance as per parent interview

Form downloadable on CD that accompanies Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alfonso, 2013)
Flanagan et al.’s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

### Cultural/Linguistic Factors (Check All that Apply):

- [ ] Limited Number of Years in U.S. (___)
- [ ] Language(s) Other than English Spoken in Home
- [ ] No History of Early or Developmental Problems in Primary Language (# of years ___)
- [ ] Current Primary Language Proficiency: (Dates: __________ Scores: __________) (Date: __________ Scores: __________)
- [ ] Aculturative Knowledge Development (Circle one: High – Moderate – Low)
- [ ] Parental Educational and Socio-Economic Level (Circle one: High – Moderate – Low)

NOTES: There are currently no cultural and linguistic factors that interfere with Ayden’s academic performance as per parent/teacher interview and observation

---

Flanagan et al.’s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

### Physical/Health Factors (Check All that Apply):

- [ ] Limited access to healthcare
- [ ] Minimal documentation of health history/status
- [ ] Chronic health condition (Specify: _____________) [ ] Migraines
- [ ] Temporary health condition (Date/Duration: _____________) [ ] Hospitalization (Dates: __________)
- [ ] History of Medical Condition (Date Diagnosed _____________)
- [ ] Medical Treatments (Specify: _____________)
- [ ] Repeated visits to the school nurse [ ] Repeated visits to doctor
- [ ] Medication (type, dosage, frequency, duration: _____________)

NOTES: There are currently no physical/health factors that interfere with Ayden’s academic performance as per parent interview
Flanagan et al.’s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

**Instructional Factors (Check All that Apply):**

- Interrupted schooling (e.g., mid-year school move) Specify why: __________________________
- New teacher (past 6 months) □ Retained or advanced a grade(s)
- Nontraditional curriculum (e.g., homeschooled) □ Accelerated curriculum (e.g., AP classes)
- Days Absent _______

**NOTES:** There are currently no instructional factors that interfere with Ayden’s academic performance as per teacher interview and observation. However, Ayden’s time in supplemental remedial reading instruction is spent on completing in-class assignments, rather than instruction in reading.

**Determinations of Primary and Contributory Causes of Academic Weaknesses and Learning Difficulties (Check One):**

- Based on the available data, it is reasonable to conclude that one or more factors is primarily responsible for the student’s observed learning difficulties. Specify: __________________________________________
- Based on the available data, it is reasonable to conclude that one or more factors contribute to the student’s observed learning difficulties. Specify: __________________________________________

[□] No factors listed here appear to be the primary cause of the student’s academic weaknesses and learning difficulties

---

Federal Regulations Permit the Use of a PSW Model

(34 CFR 300.311(a)(5)), (34 CFR 300.309(a)(2)(ii)).

- Evaluation documentation must consider whether the student exhibits a pattern of strengths and weaknesses
- In performance, achievement or both
- Relative to age, State approved grade levels standards, or intellectual development
- That is determined by the group to be relevant to the identification of SLD using appropriate instruments

**Ayden is a student with a Specific Learning Disability**
Academic and Cognitive Tests Inform Intervention

• Cognitive tests assist in understanding why a student is struggling
• Knowing why helps with figuring out how
• Many accommodations, modifications, compensatory strategies, and remedial programs suggested here will help all students in Ayden’s grade – without them, most students will not struggle; without them, Ayden will struggle

Individual differences are important

Individual Differences ARE Important

• **Why do some children fail to respond?**
  – Perhaps because interventions are being applied “blindly” as a one size fits all method without understanding whether or not specific cognitive deficits exist

• A neuropsychological process that is important to reading skills development is working memory – it is a crucial process for early reading recognition and later reading comprehension. **One must assess it if one is to develop the most appropriate method of intervention** (Teeter et al., 1997).

• Given the findings from the neuroimaging and neuropsychological fields of deficient performance on measures of working memory, processing speed, auditory processing ability, and executive functions, evaluation of these skills is necessary to determine the most appropriate program to fit the individual child’s need.

  Semrud-Clikeman (2005)
Individual Difference ARE Important

• The danger with not paying attention to individual differences is that we will repeat the current practice of simple assessments in curricular materials to evaluate a complex learning process and to plan for interventions with children and adolescents with markedly different needs and learning profiles (Semrud-Clikeman, 2005).

The Value of Assessing Cognitive Abilities and Processes...

Even if a student never enters the special education system, the general education teacher, the student’s parents, and the student him- or herself would receive valuable information regarding why there was such a struggle in acquiring academic content, to the point of possibly needing special education.

Kavale, Holdnack, & Mostert (2005, p. 12) – comment on Flanagan et al. ’s approach to SLD identification
The Value of Understanding Strengths and Weaknesses

Identification of (children's) overall pattern of cognitive strengths and weaknesses is in itself therapeutic, especially when coupled with exploration of their feelings about their particular information processing weaknesses… and in my clinical experience has been crucial to the academic and psychological health of those whom I have assessed. (Suhr, 2008)

Comprehensive Assessment Drives Intervention

… there is a demand for the comprehensive assessment to drive intervention. This is the way it has always been, and this is the way it will always be because the referral questions for children with SLD have always asked, What is wrong? And how can we help? These questions demand differential diagnosis, a large part of which is determined by the cognitive abilities present in the individual child (p. 211).

Why Do So Many of our Colleagues Question the Utility of Cognitive Measures?

“If these tests will give us a basis from which we can start to understand a child’s difficulties, they will have justified the time spent on them. Anything which helps educators or parents to understand any phase of development or lack of development is of immeasurable value” (p. 189).

Source:

THE LD INTERVENTION INSTITUTE
Earn up to 12 CEUs online!

Learn Evidence-based Educational Strategies and Interventions from Leading Experts!

Four 3-hour Practical “How To” Sessions

Linking Assessment Results to Instructional Modifications, Accommodations, Remedial Programs, and Compensatory Strategies
– Dawn P. Flanagan, Ph.D.

Understanding the Best Available Strategies and Interventions for Reading Comprehension Difficulties
– Steve Feifer, Ed.D.

Practical Strategies and Interventions for Students with Memory Difficulties
– Milton Dehn, Ed.D.

Interventions that Improve Academic Outcomes for Students with Difficulties in Executive Functions
– George McCloskey, Ph.D.

Benefits

Professional Development for All School Personnel When You Want It!

Unlimited Access to All Webinar Sessions for Six Months

Downloadable Handouts and Transcripts

Affordable Continuing Education for Educators and All Assessment Specialists

Cost

Individual Sessions: $65/session

For Individuals, all four sessions: $250

Special Discounted Rates Are Available for group in-service training!

Supplement Your On-line Training with This Intervention Book – Get a 30% Discount When You Register!

For Details about Each Session and to Register, go to: www.schoolneuropsych.com