What All School Psychologists Should Know About the PSW Method
Model Comparisons, Benefits Beyond Ability-Achievement Discrepancy, and Promising New Research

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St. John’s University, Queens, New York
Yale Child Study Center, School of Medicine, New Haven, CT

Purpose of Presentation

• To present approximately 25 features of PSW models that I believe to be important to understand because they are either
  • Acknowledged in the literature as defining features
  • Used by researchers to evaluate model agreement
  • Used by researchers to determine positive and negative predictive values (i.e., how likely is it that the model “gets it right”) or
  • Not considered by researchers, but should be because they are important distinguishing characteristics or features that would likely change the results of their conclusions
Rationale

• Help practitioners and researchers understand model differences
  • Assists in better informed selection of PSW model for use in schools or private settings
  • Assist researchers in operationalizing PSW models with the benefit of providing results that will lead to better models or better methods of SLD identification

There is not one true model of SLD…because we do not know for sure what SLD actually looks like…

• Competing visions
• Each model captures the authors’ vision of SLD
• Each model identifies different people – there is not a lot of overlap
The greatest problem readers will face will be one of deciding which model(s) to follow, because all are appealing. There are authors of chapters in this work with whom I have had scholarly exchanges, and with whom I vehemently disagree on some issues but with whom I find myself in agreement on others. So I must count myself among those who will experience great dissonance in adopting and recommending a specific model of diagnosis for all children suspected of SLD to others based on the models proffered herein. We have much to learn from the disagreements in this work, and it is indeed such disagreements and lack of compatibility of models and methods on which science thrives. I suspect that as our science moves forward, we will continue to find, as we have since the mid-2000s, that all of these models have merit and utility for accurate and appropriate identification of individuals with SLD but not for the same individuals. Individuals with SLD make up a heterogeneous group, and we truly need different models for their accurate identification (aka different strokes for different folks) that are objective and evidence-based, such as provided in this work. Now, if we can just make them all part of a common, coherent system and stop the search for the one answer to the diagnosis of SLD for all students and the one teaching model that educates them all effectively—that will be our greatest progress!

Think about…

• **What is SLD?**
• **What should a child with SLD look like?**
• **What does a child without SLD look like?**

Then…

• Pick a model that captures it best
• Follow the research
• Use it as a tool to inform diagnostic decisions, not to make those decisions for you
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”

Alternative Research-Based Approaches to SLD Identification

Five PSW Methods

(listed in publication order)

  • Discrepancy/Consistency (CAS2 D/C; used only with the CAS2; PASS score analyzers)
• Flanagan, Ortiz, & Alfonso (2002-Present)
  • Dual-Discrepancy/Consistency (DD/C; automated by the PSW component of the Cross-Battery Assessment Software System – X-BASS)
• Hale & Fiorello, (2004, 2011)
  • Concordance-discordance model (CDM; not automated)
• Dehn & Szasz (2018)
  • Psychological Processing Analyzer (PPA)
• Schultz & Stephens (2018)
  • Core-Selective Evaluation Process (C-SEP; not automated)

Orange = Name of Method
Green = Automation Available
Conceptual Similarities Among PSW Methods

COGNITIVE STRENGTH(S)

Cognitive Ability and/or Processing Weaknesses

ACADEMIC WEAKNESS/DEFICIT
Academic Skills Weaknesses

How Would You Operationalize This Pattern?

Federal Regulations

(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
Important

- All model authors were contacted and asked to review how we represented their model
  - Modifications and corrections were made accordingly
  - Tables are updated from their original presentation at NASP 2019
  - Work being prepared from publication (Engler, Flanagan, & Pata, 2019)
  - Information in this presentation is subject to change

Models are listed in order of publication

<table>
<thead>
<tr>
<th>Feature</th>
<th>Pattern of Strengths and Weaknesses Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, No = positive</td>
<td>CAS2 D/C (Nielsen)</td>
</tr>
<tr>
<td>Yes, No = negative</td>
<td>DD/C (Flanagan, Ortiz, Alfonsi)</td>
</tr>
<tr>
<td>Yes, No = neither pos nor neg, just different</td>
<td>CDM (Hale &amp; Fisello)</td>
</tr>
<tr>
<td>(features and designations provided by Dawn Flanagan and may vary by model author)</td>
<td>WISC-V PSW (with RT, EI, and SMART)</td>
</tr>
</tbody>
</table>

1. Based on theory
   - Yes
   - PAS (and neurocystic)
   - Yes
   - Neurocystic and CHIC
   - Yes
   - Neurocystic and CHIC

2. Exclusionary factors must be considered in identification of SLD
   - Yes
   - Yes
   - Yes
   - Yes
   - Yes
   - Yes

3. Clinical judgment necessary to inform SLD identification
   - Yes
   - Yes
   - Yes
   - Yes
   - Yes
   - Yes

WISC-V PSW aligns with CDM and, therefore, will not be discussed

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<th>D/C (Flanagan, Oriak, Allsopp)</th>
<th>CDM (Raba &amp; Fiotello)</th>
<th>PSW (Greeley &amp; Kameyama)</th>
<th>PPA (Dean &amp; Stano)</th>
<th>C-SEP (Schultz &amp; Stephens)</th>
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<td>Yes, No = positive</td>
<td>Yes</td>
<td>Yes (and neuropsych)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Yes, No = negative</td>
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**Notes:**
- D/C = Discrepancy/Consistency (PASS score analyzer)
- DD/C = Dual Discrepancy/Consistency (PSW-A component of X-BASS software)
- CDM = Concordance-Discrepancy Model (obtain reliabilities and calculate simple differences by hand using formula)
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Ed Shultz
(personal communication, August 2019)

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**Evolution of Psychometric Theories…CHC**

![Evolution of Psychometric Theories](image)

**Figure 1:** Major stages in the evolution of psychometric theories from Spearman’s to Cattell-Horn-Carroll (CHC) theory
Progress in Neuropsychological Theories

The Relationship Between Theories of Intelligence and Intelligence Tests

W. Joel Schneider and Dawn P. Flanagan
Flanagan, Alfonso, Mascolo, & Hale (2010)

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# Exclusionary Factors Form

*Systematic, Comprehensive, Accountability*

## X-BASS

### Index and Main Navigation

For direct navigation to any of the core test tabs, use the quick navigation menu button bar above. This menu bar appears on all tabs and are color-coded for easy reference. Otherwise, select an option below from the drop down menus provided to begin performing the desired action.

<table>
<thead>
<tr>
<th>DATA ENTRY</th>
<th>ANALYSES</th>
<th>PSW MODULE</th>
<th>REFERENCE &amp; HELP</th>
</tr>
</thead>
<tbody>
<tr>
<td>To enter data from a major cognitive or academic battery, select the name of the battery from the menu below.</td>
<td>Click to navigate directly to the major analyses tabs.</td>
<td>Click to navigate directly to the desired tab.</td>
<td>Click to navigate directly to the desired tab.</td>
</tr>
<tr>
<td></td>
<td>XBA Analyzer</td>
<td>PSW-A Data Summary</td>
<td>XBA-CHC Classifications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PSW-QA Data Entry</td>
<td>Test List - Quick Ref</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PSW-Quick Analysis</td>
<td>XBA Analyzer Guide</td>
</tr>
<tr>
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<td>Guide</td>
</tr>
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<td>Help</td>
</tr>
<tr>
<td></td>
<td>C-LIM Module: Click to navigate directly to the desired tab.</td>
<td>PSW Module: Click to navigate directly to the desired tab.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C-LIM Index</td>
<td>Data Organizer</td>
<td>XBA-CHC Classifications</td>
</tr>
<tr>
<td></td>
<td>C-LIM Reference</td>
<td>Data Entry - Other</td>
<td>Test List - Quick Ref</td>
</tr>
<tr>
<td></td>
<td>C-LIM Interpretation</td>
<td>PSW-A Data Summary</td>
<td>XBA Analyzer Guide</td>
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<tr>
<td></td>
<td>C-LIM Statements</td>
<td>g-Value</td>
<td>Guide</td>
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<td></td>
<td>C-LIM Notes</td>
<td>PSW-A Notes</td>
<td>Help</td>
</tr>
<tr>
<td></td>
<td>C-LIM Summary</td>
<td>Selecting PSW-A Scores</td>
<td>Welcome</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exclusionary Factors</td>
<td></td>
</tr>
</tbody>
</table>
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/health, 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 and developmental history, family history, vision/hearing exams, medical records, prior evaluations, and interviews with current or past counselors, psychologists, 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 reason for a student’s academic and learning difficulties to maintain SLD as a viable classification/diagnosis.

Vision (Check All that Apply):
- Vision test recent (within 1 year)
- Vision test recent (> 1 year)
- Passed
- Failed
- Wears Glasses

Additional Notes: Regularly have eye exams. Most recent appointment was within one month of this evaluation. New prescription did not need to be changed.

Hearing (Check All that Apply):
- Hearing test recent (within 1 year)
- Hearing test outdated (> 1 year)
- Passed
- Failed
- Uses Hearing Aids

Additional Notes:

Motor Functioning (Check All that Apply):
- Fine Motor Delay/Difficulty
- Gross Motor Delay/Difficulty
- Improper pencil grip.
  - Specify:
- Assistive devices/ aids used
  (e.g., weighted pens, pencil grip, slant board, etc.)

Additional Notes:
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 G1 and G2)
- □ 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

Additional Notes:

Social-Emotional/Psychological Factors (Check All that Apply):
- □ Diagnosed psychological disorder. Specify:
- □ Family history significant for psychological difficulties:
- □ Disorder presently treated - specify treatment modality (e.g., counseling mediator):
- □ Frequent 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/Effort:
- □ Emotional Stress
- □ Autism
- □ Present Medications (use, dosage, frequency, duration):
- □ Prior Medication Use (type, dosage, frequency, duration):
- □ Hospitalization for psychological difficulties. Specify dates:
- □ Deficits in social, emotional, or behavioral (SEL) functioning (e.g., as assessed by standardized rating scales):

Significant scores from SEL measures:

Additional Notes:

Cultural/Linguistic Factors (Check All that Apply):
- □ Limited Number of Years in the U.S. Specify:
- □ No History of Early or Developmental Problems in the Primary Language (L1):
- □ Current Primary Language Proficiency:

    (Date): 
    Score: 

- □ Current English Language Proficiency:

    (Date): 
    Score: 

- □ Acculturative Knowledge Development (Check one: □ High □ Moderate □ Low):
- □ Parental Educational and Socio-Economic Level (Check one: □ High □ Moderate □ Low)

Additional Notes:

Physical/Health Factors (Check All that Apply):
- □ Limited access to healthcare:
- □ Chronic health condition. Specify:
- □ Migraines:
- □ Temporary health condition (date/beginning):
- □ Hospitalization. Dates:
- □ History of Medical Condition (date-diagnosis):
- □ Repeated visits to the school nurse:
- □ Medical Treatments. Specify:
- □ Repeated visits to a physician:
- □ Medication type, dosage, frequency, duration:

Additional Notes:

Instructional Factors (Check All that Apply):
- □ Interrupted schooling (e.g., mid-year school move). Specify reasons:
- □ New teacher (past 6 months):
- □ Retained or advanced a grade(s):
- □ Nontraditional curriculum (e.g., homescooled):
- □ Accelerated curriculum (e.g., AP classes):
- □ Excessive # Absences:

Additional Notes:
Environmental/Economic Factors (Check All that Apply):

- Limited access to educational materials in the home
- Caregivers unable to provide instructional support
- Economic considerations precluded treatment of identified issues (e.g., filling a prescription, replacing broken glasses, tutoring)
- Temporary Crisis Situation

DD/C = Dual Discrepancy/Consistency (PSW - A component of X-BASS software)

CDM = Concordance-Discordance Model (obtain reliabilities and calculate simple differences by hand using formula)

PPA = Psychological Processing Analyzer (software)

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SLD Cannot be Diagnosed with a Formula

- Diagnosis of SLD can be made based on a systematic, theory- and research-based approach to examining results of a comprehensive evaluation.

- A diagnosis of SLD is *a clinical judgment* that is made by a private independent psychologist or a multi-disciplinary team based on a convergence of data sources that appear to be consistent with the SLD construct.

- Due to federal statutory and regulatory requirements, a classification of SLD is made in the schools following one of three methods – *methods that necessitate quantification for purposes of consistency in identification and accountability* – The third option (i.e., PSW) is one such method.

![Utility of KTEA-3 Error Analysis for the Diagnosis of Specific Learning Disabilities](image)

Dawn P. Flanagan¹, Jennifer T. Mascalco¹, and Vincent C. Alfonso²

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<table>
<thead>
<tr>
<th>Feature</th>
<th>Pattern of Strengths and Weaknesses Method</th>
</tr>
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<tbody>
<tr>
<td>Yes, No = positive</td>
<td>CAS2 D/C (Naglieri)</td>
</tr>
<tr>
<td>Yes, No = negative</td>
<td>Yes PASS</td>
</tr>
<tr>
<td>Yes, No = neither pos. nor neg., just different features and designations provided by Dawn Flanagan and may vary by model author)</td>
<td>1. Based on theory</td>
</tr>
<tr>
<td>CDI = Discrepancy/Consistency (PASS score analyzer)</td>
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</tbody>
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• How many subtests make up a typical SLD evaluation (Cognitive + Achievement + Language + Follow up Assessment)?
  • 20?
  • 25?
  • 30?

• Anytime you have a large collection of tests, you are very likely to have significant variation. Intra-individual discrepancies are commonplace in the general population. Chances are the highest cognitive score will be reliably different from the lowest cognitive and achievement scores
  • Doesn’t seem like the best way to do a PSW analysis
  • Why use only a subset of the data?
    • Cherry picking

• Let’s look at how the WIAT-III Scoring Program uses WISC-V in PSW analysis

### WISC-V PSW Using WIAT-III Scoring

#### Pattern of Strengths and Weaknesses Analysis

<table>
<thead>
<tr>
<th>Area of Achievement Weakness</th>
<th>WJ-III</th>
<th>Basic Reading: 85</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of Processing Weakness</td>
<td>WISC-V</td>
<td>VSI: 81</td>
</tr>
<tr>
<td>Area of Processing Strength</td>
<td>WISC-V</td>
<td>VCI: 100</td>
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</table>

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Relative Strength Score</th>
<th>Relative Weakness Score</th>
<th>Difference</th>
<th>Critical Value #5</th>
<th>Significant Difference Y/N</th>
<th>Supports SLD Hypothesis? Yes/No</th>
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<tbody>
<tr>
<td>A. Processing Strength/Achievement Weakness</td>
<td>100</td>
<td>85</td>
<td>15</td>
<td>9.00</td>
<td>Y</td>
<td>Yes</td>
</tr>
<tr>
<td>B. Processing Strength/Achievement Weakness</td>
<td>100</td>
<td>81</td>
<td>19</td>
<td>12.00</td>
<td>Y</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The PSW model is intended to help practitioners generate hypotheses regarding clinical diagnoses. The analysis should always be used within a comprehensive evaluation that incorporates multiple sources of information.

Pattern of Strengths and Weaknesses Model

- A. Discrepancy?
  - Yes

- B. Discrepancy?
  - Yes

25 subtests in SLD evaluation
PSW Analysis based on
2-subtest VCI
2-subtest VSI
2-subtest BR

6 of 25 subtests used or 24%
CDM Example: Same data as WISC-V PSW/WIAT-III; Same result

<table>
<thead>
<tr>
<th>Processing Strength</th>
<th>VCI</th>
<th>SS=100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant Difference at p &lt; .05?</td>
<td>YES</td>
<td></td>
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<tr>
<th>Processing Weakness</th>
<th>VSI</th>
<th>SS=81</th>
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<tr>
<td>WIAT-III Basic Reading</td>
<td>SS=85</td>
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</tr>
<tr>
<td>Significant Difference?</td>
<td>NO</td>
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</table>

But CDM offers more flexibility than WISC-V PSW

25 subtests in SLD evaluation
PSW Analysis based on
2-subtest VCI
2-subtest VSI
2-subtest BR

6 of 25 subtests used or 24%

---

CDM Example: More flexible than WISC-V PSW/WIAT-III; more confidence when all cognitive tests are part of the analysis

<table>
<thead>
<tr>
<th>Processing Strength</th>
<th>FSIQ</th>
<th>SS=96</th>
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<td>Significant Difference at p &lt; .05?</td>
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<th>VSI</th>
<th>SS=81</th>
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<tbody>
<tr>
<td>WIAT-III Basic Reading</td>
<td>SS=85</td>
<td></td>
</tr>
<tr>
<td>Significant Difference?</td>
<td>NO</td>
<td></td>
</tr>
</tbody>
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25 subtests in SLD evaluation
PSW Analysis based on
2-subtest VCI
2-subtest VSI
2-subtest BR

6 of 25 subtests used or 24%
DD/C is not Battery-Specific and *Uses All Data in Analysis*

- It requires estimates of 7 cognitive domains (estimates may be at the broad or narrow ability level)
  - Fluid Reasoning (*Gf*)
  - Comprehension-Knowledge (*Gc*)
  - Visual Processing (*Gv*)
  - Auditory Processing (*Ga*)
  - Short-term Working Memory (*Gwm* or *Gsm*)
  - Long-term Storage and Retrieval (*Gl* or *Gl* and *Gr*)
  - Processing Speed (*Gs*)

- Also allows for other processes to be included in the PSW analysis (e.g., Executive Functions, Orthographic Processing, Attention, Fine Motor)

- The 7 CHC domains are necessary to determine whether the individual has *at least average ability to think and reason*, despite cognitive processing weaknesses
DD/C Inhibiting Cognitive Composite Offered for Parsimony and to Reduce “Cherry Picking”

Data Organizer and Score Summary

- CRYSTALIZED INTELLIGENCE
  - Indicate which composite(s) you wish to use for PAW analyses. No more than two can be selected for this domain.
  - FLUID REASONING
  - Indicate which composite(s) you wish to use for PAW analyses. No more than two can be selected for this domain.
- LONG-TERM STORAGE AND RETRIEVAL (LSTM)
  - Indicate which composite(s) you wish to use for PAW analyses. No more than two can be selected for this domain.
- SHORT TERM MEMORY (STM)
  - Indicate which composite(s) you wish to use for PAW analyses. No more than two can be selected for this domain.
- VISUAL PROCESSING (VP)
  - Indicate which composite(s) you wish to use for PAW analyses. No more than two can be selected for this domain.
- PROCESSING SPEED (PS)
  - Indicate which composite(s) you wish to use for PAW analyses. No more than two can be selected for this domain.
- DOMAIN SPECIFIC KNOWLEDGE (DSK)
  - Indicate which composite(s) you wish to use for PAW analyses. No more than two can be selected for this domain.
- READING COMPREHENSION (RC)
  - Indicate which composite(s) you wish to use for PAW analyses. No more than two can be selected for this domain.
- SPEECH COMPREHENSION (SC)
  - Indicate which composite(s) you wish to use for PAW analyses. No more than two can be selected for this domain.
**DD/C Uses All Data in Analysis**

**Cognitive Strengths**
- The value here is better than expected: Cognitive Strengths Component (CSC) or a sub-component of Alternate Cognitive Composite (ACC).

**Is the difference statistically significant?**
- Yes, the difference is statistically significant.
- Yes, there is a significant difference.
- Yes, unexpected underachievement.

**Is underachievement unexpected?**
- Yes, if the difference is unusual large and significant.

**Are weaknesses domain specific?**
- Yes, specific.

**Use All Data in Analysis**

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**PPA** = Psychological Processing Analyzer (software)

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**CAS2** D/C: "exceptions for those who hover around the bottom of the normal range" (Naglieri, personal communication, August 2019)

**DD/C:** software flags scores of 90 or higher that have been labeled a weakness by the examiner and suggests clinical judgment in those cases

While there has to be an achievement score below average (<90), there does not need to be a cognitive score below 90 if other scores are exceptionally high (e.g., you can be gifted LD)

Brad Hale
(personal communication, August 2019)

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While there may be an achievement score below average (<90), there does not need to be a cognitive score below 90 if other scores are exceptionally high (e.g., you can be gifted LD)

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<td>CAS2 D/C (Flanagan, Ortiz, Allioto)</td>
<td><strong>CAS2 D/C (Flanagan, Ortiz, Allioto)</strong></td>
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<tr>
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</tr>
<tr>
<td>CDM (Dale &amp; Fiorello)</td>
<td><strong>CDM (Dale &amp; Fiorello)</strong></td>
</tr>
<tr>
<td>PPA (Dinno &amp; Szasz)</td>
<td><strong>PPA (Dinno &amp; Szasz)</strong></td>
</tr>
<tr>
<td>C-SEP (Schultz &amp; Stephen)</td>
<td><strong>C-SEP (Schultz &amp; Stephen)</strong></td>
</tr>
</tbody>
</table>

5. Areas of identified weakness may also be a weakness relative to most people (i.e., < 90; also called a normative weakness)

6. Requires more than one cognitive strength

7. Requires more than one cognitive weakness

8. Requires academic weaknesses and strengths

---

**DD/C** = Discrepancy/Consistency (PASS score analyzer)

**DD/C** = Dual Discrepancy/Consistency (PSW-A component of X-BASS software)

**CDM** = Concordance-Discordance Model (obtain reliabilities and calculate simple differences by hand using formula)

**PPA** = Psychological Processing Analyzer (software)

**C-SEP** = Core-Selective Evaluation Process (no software)

---

While there has to be an achievement score below average (<90), there does not need to be a cognitive score below 90 if other scores are exceptionally high (e.g., you can be gifted LD)

Brad Hale
(personal communication, August 2019)

**Information in this table is a ‘work in progress’ – if you wish to cite this information, please contact me to make sure you have the most current information:** flanagan@stjohns.edu
CAS2 D/C specifies that a weakness must be normative (for CAS2 scores < 90; for FAR scores \( \leq 85 \))

No scores below 90, no weaknesses

No weaknesses, no cognitive explanation for low achievement and, therefore, no SLD

Change of 1 scaled score point – now there is a weakness

Why reading difficulties? Attention

Cut points are problematic in all models and in all methods of SLD identification
DD/C specifies that a weakness must be *normative* (but does not “rule out” SLD at the 90-cut point – Program builds in clinical judgement)

CDM does not specify that a weakness must be *normative*, only relative

The criteria for PSW are met. Is this pattern of strengths and weaknesses consistent with SLD?

*No cut point for “weakness” may also be problematic*
Should There be a Cut-point for “Weakness”?

The Threshold Effect

• Individuals of high ability often perform *relatively* lower on measures of working memory and processing speed

• the best explanation for the PSI < FSIQ, WMI < FSIQ, and CPI < GAI patterns in individuals of high intellectual ability as compared to lower levels of ability is related to a *threshold effect*.
  • Working memory capacity and speed of information processing are necessary processes for higher level thinking and reasoning. These processes have a threshold.
    • Performance below the threshold will impede learning
    • Performance at the threshold is sufficient for learning
    • Performance above the threshold is not necessarily value added
Example of Threshold Effect
Data From Intellectual Gifted Sample in WISC-V Technical and Interpretive Manual (Wechsler, 2014) (N = 95)

- **VCI** (128) > **VSI** (121) > **FRI** (120) > **WMI** (118) > **PSI** (113)

- **VCI – PSI difference** = 15 points (statistically significant; *p* < .01)
  - Often considered evidence for "processing weakness" in learning disability evaluations
  - Difference occurs in almost 20% of the population and is not considered unusual

- **FSIQ (128) – PSI difference** = 15 points (statistically significant; *p* < .01)
  - Often considered evidence for "processing weakness" in learning disability evaluations
  - Difference occurs in about 15% of the population, which is sometimes considered unusual

- This information (i.e., base rate critical values) is based on **group (normative) data**.
- The pattern of performance is consistent across groups of intellectually gifted individuals, but the critical values for base rate differ.

---

Example of Threshold Effect
Mario (N = 1), Age 10

- **VCI** (131) > **FRI** (130) > **VSI** (119) > **WMI** (111) > **PSI** (107)

- **VCI – PSI difference** = 24 points (statistically significant; *p* < .01)

- **Base Rate for Overall Standardization Sample**: VCI-PSI difference occurs in 9% of the population and is considered unusual
  - "Unusual" or "rare" is almost always interpreted as evidence for "processing weakness" (e.g., this is a profile that is often described as "Gifted LD")

  - Threshold effect **argues strongly against this classification**

  - The 68th percentile (PSI) is not a normative weakness, regardless of how far it deviates from higher scores in the profile

  - Base rates of < 10% - 15% of the normative sample do not automatically imply "impairment". What is very unusual in this profile is how **high** Mario performed on measures of Gc and Gf, not how low he performed on Gs. In fact, Gs is expected performance, whereas Gc and Gf are unexpected
Example of Threshold Effect
Mario (N = 1), Age 10

- **VCI (131) > FRI (130) > VSI (119) > WMI (111) > PSI (107)**

- **VCI – PSI difference** = 24 points (statistically significant; p < .01)

  - Base Rate in Sample of Individuals with FSIQ > 120: VCI-PSI difference occurs in about 25% of the population and, therefore, is relatively common
    - Supports the threshold effect
    - Argues against “Gifted LD” classification

- Comparisons to Overall Sample are Quite Different from Comparisons to Ability Level Samples

Example of Threshold Effect
Mario (N = 1), Age 10

- **VCI (131) > FRI (130) > VSI (119) > WMI (111) > PSI (107)**

- **FSIQ (127) – PSI difference** = 20 points (statistically significant; p < .01)

  - Base Rate in Sample of Individuals with FSIQ > 120: Difference occurs in about 20% - 25% of the population and, therefore, is not considered unusual
    - Supports the threshold effect
    - Argues against “Gifted LD” classification
Example of Threshold Effect
Mario (N = 1), Age 10

- VCI (131) > FRI (130) > VSI (119) > WMI (111) > PSI (107)

- **Cut point for Gifted services is an ability score of 130:** FSIQ (127) and GAI (132)
  - Difference of 5 points between FSIQ and GAI is statistically significant (p < .01)
  - **Base Rate for Overall Sample:** difference occurs in approximately 14% of the population, which is sometimes considered unusual
  - **Base Rate in Sample of Individuals with FSIQ > 120:** difference occurs in at least 18% of the population and, therefore, is not considered unusual
    - A reliable difference between FSIQ and GAI supports the threshold effect (i.e., Digit Span and Coding performance attenuated FSIQ, even though these processes have surpassed the threshold)
    - Argues for use of GAI, not FSIQ, in gifted placement decisions to ensure that the threshold effect does not deny gifted students services

  Use of GAI reduces number of Type 2 errors or false negatives

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Rapid Reference 4.17

Standard Score Differences Between Selected Composites Occurring in ≤ 10% of the WISC-V Normative Sample

<table>
<thead>
<tr>
<th>FSIQ Ability Level</th>
<th>PSI &lt; FSIQ</th>
<th>WMI &lt; FSIQ</th>
<th>GAI &gt; CPI</th>
<th>GAI &gt; FSIQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 79</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>80–89</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>90–109</td>
<td>15</td>
<td>14</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>110–119</td>
<td>21</td>
<td>17</td>
<td>24</td>
<td>7</td>
</tr>
<tr>
<td>≥ 120</td>
<td>30</td>
<td>23</td>
<td>28</td>
<td>6</td>
</tr>
<tr>
<td><strong>Overall Sample</strong></td>
<td><strong>18</strong></td>
<td><strong>15</strong></td>
<td><strong>18</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>


The higher your IQ, the more common it is to find SUBSTANTIALLY LOWER PSI and WMI as compared to FSIQ. This is consistent with the threshold effect.
### Feature | Pattern of Strengths and Weaknesses Method
--- | ---
Yes, No = positive | CAS2 D/C (Flanagan & Ortiz, 2014)
Yes, No = negative | DD/C (Flanagan, Ortiz, Allione)
Yes, No = neither pos. nor neg., just different | CDM (Hale & Fiorello) | PPA (Demir & Szent)
(feature and designations provided by Dawn Flanagan and may vary by model author) | Yes | No | No | No | Yes | Yes
5. Areas of identified weakness must also be a weakness relative to most people (i.e., < 90; also called a normative weakness) | Yes | Yes | No | No | Yes | Yes
6. Requires more than one cognitive strength | No | Yes | No | No | No | No | Not clear
7. Requires more than one cognitive weakness | No | No | No | No | No | No | Not clear
8. Requires academic weaknesses and strengths | No or No | No or No | No or No | No or No | No or No | Yes or Yes | Yes or Yes

D/C = Discrepancy/Consistency (PASS score analyzer)
DD/C = Dual Discrepancy/Consistency (PSW-A component of X-BASS software)
CDM = Concordance-Disconcordance Model (obtain reliabilities and calculate simple differences by hand using formula)
PPA = Psychological Processing Analyzer (software)
C-SEP = Core-Selective Evaluation Process (no software)

**Recent answer is “NO”**: Because evidence of a student being able to “think and reason” must be demonstrated in an academic area. For example, a student who cannot read, but is a math whiz is able to think and reason mathematically but may not be able to as well in verbal tasks. All of our processes are interdependent, so we have to infer that multiple cognitive processes are “strengths.”

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**DD/C and the Facilitating Cognitive Composite (FCC)**

- Does evaluator consider the CHC domain a strength?
- Eliminates a cut score

---

Ed Shultz (personal communication, August 2019)
DD/C and the Facilitating Cognitive Composite (FCC)

- g – value will suggest “at least average overall ability
- FCC is an estimate of overall ability to think and reason – w/o the attenuating effects of cognitive processing weaknesses (aggregate of strengths)
- Inhibiting Cognitive Composite (ICC) will also be calculated (aggregate of weaknesses)
Development and meaning of the g-Value: The g-value definitions of SLD presume that the individual has at least average overall cognitive ability, marked by a pattern of cognitive strengths (in the presence of specific cognitive weaknesses). Practitioners are instructed to make this determination in the course of their evaluation. Previous versions of this program provided a value (called a g-Value) that served as a proxy for the first attempt to operationalize the g-Value through an "intuitive average ability profile." The g-Value assigns to the overall average overall ability profile (g-Value) the g-value assigned to the overall average overall ability profile (g=0.5). The value is the greater the likelihood that the individual's overall cognitive ability is, that is, average overall, above average overall, average overall, below average overall, average overall. The g-value is calculated via the use of g-weights for each SC component abilities — values that indicate the relative contributions of each component to overall cognitive functioning. The g-weights were calculated for each of seven principal BC component abilities using cross battery data sets (for ages 5-18). Three different cross battery data sets were used, including KAI and HFI (Flanagan & McGonigal, 1998), KAI and WJIII (Keith, Flanagan, & Flanagan, 1993), and WAIS and WJIII (data provided by Pearson, Inc., used with permission and published by Reynolds, et al., 2015). All data sets were constrained to the same seven battery factors so that the g weights would remain comparable. The resulting g-weights from these data sets were then aggregated to form mean g-weights for each of the seven component abilities routinely measured by current batteries. The abilities and their corresponding g-weights are as follows: SC (1.2555), Of (1.5786), Cb (1.9755), Dam (1.3152), Os (2.1634), Ga (1.3029), and Gs (0.2664).

The g-value is sensitive to the abilities that are considered most important for academic achievement at two different grade levels (6th and 9th). This value takes into account how many of the seven major broad cognitive abilities are "strengths" and then uses a sum of the g-weights associated with these areas of strength along with an additional weighting applied to the four most important abilities among the seven that are related to academic success at each grade level (e.g., Ge, Oc, Gs, and Gs). The additional weighting only applies to the areas among the four that were considered by the examinee to be a strength for the individual. In all cases, the g-value will range from 0.0 (in cases where no strengths are indicated) to 4.0 (in cases where no weaknesses are indicated).

The interpretive schema for the g-Value is as follows:

- g = 0.5 + average over all abilities very likely
- 0.3 - 0.5 = more information needed
- ≤ 0.3 = average overall ability is likely

In cases where the examinee has both a strength and weakness in one of the seven broad CMC domains, an X-ASSA adjusts the contribution of the g-value weight given by assigning only 0.7 of the value that would ordinarily be assigned to that domain. This rule applies to all seven domains so that an individual with "split" abilities in all seven domains, where one is a strength and one is a weakness, would result in a g-Value of 0.7 instead of 1.0. This system maintains the proportional and hierarchical contribution of the corresponding g-weights from each domain and provides a reasonable degree of ascertainment of the g-value rather than assigning the total weight in determining the g-value. When purging the g-value in this manner, the overall ability of an examinee is tempered appropriately rather than being assigned the full weight. This adjustment will be important primarily in cases where the g-value would ordinarily fall in the intermediate range (0.5 to 0.8) in which case, it may cause the g-value to fall below the minimum threshold of 0.5.

If the g-value is found to be substantial (≥ 0.60), it can be presumed that any identified deficits are circumstantial (i.e., not pervasive, affecting all or nearly all aspects of cognitive functioning). The value of ≥ 0.60 was selected because it is high enough to allow for a conservative estimate of "strength," i.e., including cognitive abilities most closely associated with academic skills, that would seemingly enable at least an average level of academic learning and production (keeping in mind, of course, that analytic-type ability or g-value would not explain all of the variance in academic performance). When the g-Value is found less than or equal to 0.60, it can be assumed that the individual's pattern of cognitive performance is marked by more pervasive impairment, rather than a circumscribed weakness. If the g-Value falls in between these ranges (i.e., from 0.55 to 0.60), it is difficult to accentuate the individual's level of overall cognitive ability beyond this value alone. Additional data sources that may assist in determining whether the student's pattern of cognitive strengths is consistent with generally average or better overall cognitive ability include, but are not limited to the following: 1) performance in academic areas not related to the referral; 2) by SC, PPA, and FCI scores; 3) by results of SC, PPA, and FCI performance on sub-level achievement tests.

Development and meaning of the Facilitating Cognitive Composite (FCC). The FCC is an aggregate of the abilities that were judged by the examiner to be "strengths" for the individual, and when calculated and reported in the color green on the PSWA Data Summary tab, it is assumed to represent an "intuitive average (or normal) cognitive ability profile." In other words, a g-value of 0.6 indicates a pattern of generally average or better cognitive abilities within the current domain model. As noted, the FCC is an estimate of the individual's overall cognitive ability (i.e., g) without the attenuating effects of the CHC abilities judged by the examiner to be "weaknesses." The value helps resolve the problems that occur when an ability scale score, such as a T-Score, is used as an indicator of general ability (e.g., in discrepancy analysis for SLD identification), even when it is attenuated by the presence of specific cognitive deficits.

Ed Shultz (personal communication, August 2019)

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<thead>
<tr>
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<th>DD/C</th>
<th>CDM</th>
<th>WISC-IV</th>
<th>PPA</th>
<th>C-SEP</th>
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<tbody>
<tr>
<td>Areas of identified weakness must also be a weakness relative to most people (i.e., ≤ 90; also called a normative weakness)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes (implied, not specifically stated)</td>
</tr>
<tr>
<td>Requires more than one cognitive strength</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Not clear</td>
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<tr>
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<td>No</td>
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### Feature

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5. Areas of identified weakness must also be a weakness relative to most people (i.e., < 90; also called a normative weakness) |

6. Requires more than one cognitive strength |

7. Requires more than one cognitive weakness |

8. Requires academic weaknesses and strengths |

**D/C** = Discrepancy/Consistency (PASS score analyzer)  
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Are Academic Strengths A Necessary Component of PSW?

- **Do area of cognitive weakness and severity of weakness play a role?**
  - Deficit in EF or Working Memory may result in more pervasive academic difficulties

- **Does failure to meet student on his/her instructional level over time play a role?**
  - The longer a student remains “unidentified,” the greater the likelihood that all or nearly all academic areas will problematic (and performance across academic areas may be below average)
  - Would it make more sense to review early education history to determine this, especially beginning in about the 4th grade

- **Do contributing factors play a role?** Many things interfere with academic performance
  - Is it possible for a student be SLD when contributory factors result in pervasive academic difficulties?
Exactly how these total test scores are used to determine whether the PSW pattern is present is not clear. They are not used for the purpose of establishing at least average ability to think and reason.

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### Which Total Test Score?

- **WJ IV**: GIA, Gf-Gc composite
- **WISC-V**: FSIQ, GAI, NVI
CHC Factors on the WJ IV COG

WJ IV COG includes 18 Tests; 14 comprise seven CHC factors

Gf/Gc Composite

Gf

Gc

Gwm

Glv

Ga

Gv

Gs

Processing Strength
GIA
SS=95

Achievement Deficit
Math Reasoning
SS=77

Processing Deficit
Short-term WM
SS=80

Why was the GIA selected as the processing strength?

Significant Difference? NO

Significant Difference? YES

The diagnosis of SLD is not met for this student. Cognitive scores in the low 90s may not be strong enough to result in a statistically significance difference.

(Derived from Daniel C. Miller, PhD)
By selecting a different estimate of overall ability, the CDM model would identify this case as SLD. Can you defend selecting Gf-Gc Composite over the GIA? How?

(Derived from: Daniel C. Miller, PhD)
In Most Models, a Pattern of Strengths and Weaknesses May be Found When Overall Ability is Low

- Things to consider
  - Unexpected underachievement is the hallmark of SLD
  - Is a single cognitive strength among a sea of weaknesses SLD?
  - Is it possible to have a pattern of strengths and weaknesses that looks more like “expected” underachievement?

**CAS2 D/C Model**

Is this unexpected underachievement? Similar patterns emerge in other models
What do the authors say?

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Distinguishes between SLD and general learning difficulties or borderline intellectual functioning

- Naglieri – “The CAS2 does this very well” (personal communication, August 2019)
  - Not part of the PSW model
**CAS2 D/C** specifies that a weakness must be *normative*  
(for CAS2 scores < 90; for FAR scores \( \leq 85 \))

**PASS mean = 84**

**CAS2 Matrices (Gf) is Average**  
**FAR Semantic Concepts (Gc) is Average**

**FAR shows weaknesses in Ga:PC and Gr:NA**

**No weaknesses, no cognitive explanation for low achievement and, therefore, no SLD and no further guidance**

**Distinguishes between SLD and general learning difficulties or borderline intellectual functioning**

- Flanagan – DD/C provides a pop-up message when at least average overall ability is unlikely due to more pervasive weaknesses
DD/C assists in differentially diagnosing SLD from other conditions that also result in low achievement

- **Intellectual Disability (ID)**
- **General Learning Difficulty (Slow Learner)**
  - Also referred to as, Low General Ability or Borderline Intellectual Functioning (BIF)

Should PSW models differentially diagnosing SLD from other conditions that also result in low achievement?

---

**Rapid Reference 15.1**

**Serving Students with BIF**

Students with BIF (IQs between 71 and 84) often have low academic skills, but there is often no need to label such students as SLD. The S in SLD argues against inclusion of students with low global learning ability, and instead there are other ways of serving such students:

- Many students with BIF will qualify as speech or language impaired due to deficits in expressive or receptive language skills. Including a comprehensive language assessment by a speech-language pathologist is often helpful in these cases.
- Students with BIF can often be detected and remediated by multilevel systems of academic support—systems that are part of RTI service-delivery models. Careful monitoring of progress during Tier 1 instruction will detect problems, and Tier 2 interventions can be used to improve basic academic skills (e.g., decoding) in these students.
- An effective general curriculum (perhaps serving as Tier 1 within an RTI model) can prevent deficits in academic skills in many students with BIF. We particularly recommend the Reading for Meaning curriculum as a way of preventing reading problems.

---

Typical Characteristics of and Educational Foci for Individuals with Learning Difficulties – Guidelines for Differential Diagnosis

<table>
<thead>
<tr>
<th>Intellectual Disability (ID)</th>
<th>General Learning Difficulty (formerly Slow Learner)</th>
<th>Specific Learning Disability (SLD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General ability range ≤ 70-75</td>
<td>General ability typically &gt; 75 and ≤ 89</td>
<td>General ability typically ≥ 90</td>
</tr>
<tr>
<td>May have little variation in cognitive ability and processing profile</td>
<td>May have little to moderate variation in cognitive ability and processing profile</td>
<td>Typically, has moderate to high variation in cognitive ability and processing profile that are statistically significant and often unusual</td>
</tr>
<tr>
<td>Many cognitive areas may be ≤ 80 (threshold abilities, such as Gs and Gm may be higher than higher level thinking and reasoning abilities, such as Gd)</td>
<td>May have normative deficits in one or more cognitive and academic areas (≤ 85)</td>
<td>Normative deficits (approximately ≤ 85) in specific cognitive abilities and processes; Normative deficits (approximately ≤ 85) in specific academic areas(s); Empirically or ecologically valid relationship between cognitive and academic deficits</td>
</tr>
<tr>
<td>Possible relative strengths in one or more processes or abilities that are not highly g saturated, such as Gs (e.g., phonemic awareness) and Gm (e.g., simple clerical-type tasks)</td>
<td>May have relative strengths in one or more processes or abilities</td>
<td>Intact functioning (approximately ≥ 90 and ≤ 115) in many processes and abilities and possible normative cognitive and academic strengths (&gt; 115)</td>
</tr>
<tr>
<td>Deficits (≤ 75) in Adaptive Behavior; may have little variation in performance across adaptive behavior domains</td>
<td>May have one or more deficits in Adaptive Behavior (but not in all domains)</td>
<td>Minimal, but more typically, no deficits in Adaptive Behavior</td>
</tr>
<tr>
<td>Normative cognitive deficits are explained by genetic conditions (e.g., PKU)</td>
<td>Underlying causes of generally low average cognitive and academic abilities are typically</td>
<td>SLD has been linked to specific cognitive processing weaknesses that have a</td>
</tr>
</tbody>
</table>


Etiology

<table>
<thead>
<tr>
<th>Intellectual Disability (ID)</th>
<th>General Learning Difficulty (formerly 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; illness 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. Conditions such as fetal alcohol spectrum disorder (FASD) are widespread. It is estimated that 1 in 10 children in the U.S. may have FASD, which can cause cognitive impairment.</td>
<td>SLD has been linked to specific cognitive processing weaknesses that have a neurological, constitutional, and/or biological base. The pattern of generally Average or better overall cognitive ability and Below Average performance in related cognitive and academic areas cannot be explained by exchoninary 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>

## Response to Instruction, Intervention, and Programming

<table>
<thead>
<tr>
<th>Intellectual Disability (ID)</th>
<th>General Learning Difficulty (formerly 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>Primary Focus: Self-Help Skills; Functional Academics; Social Skills</td>
<td>Primary Focus: Functional Academics; Vocational Training; Career Counseling; Accommodations; Compensatory Strategies; Social Skills and Self-Esteem; Self-Advocacy</td>
<td>Primary Focus: Grade Level Performance; College Preparation; Accommodations; Compensatory Strategies; Social/Emotional issues; Self-Esteem; Self-Advocacy</td>
</tr>
</tbody>
</table>

Use data from strength-based assessment for developing educational strategies and planning interventions


### Distinguishes between SLD and general learning difficulties or borderline intellectual functioning

- **Hale** – “Of course, but you can have some kiddos with borderline intellectual functioning based on the composite score who still has SLD” (personal communication, August 2019)
  - No guidance on what scores to use and how to make the distinction
  - Conceptually, consistent with DD/C
Distinguishes between SLD and general learning difficulties or borderline intellectual functioning

- **Dehn** — “There must be at least one cognitive score or strength that is within the average range to be considered as an SLD, and not borderline intellectual functioning. Must be at least one intra-individual cognitive weakness and strength to be considered as an SLD and not general learning difficulties” (personal communication, August 2019)
  - Must have a cognitive score of 90 or higher
  - Must have significant intra-individual variation
    - intra-individual cognitive strength
    - intra-individual cognitive weakness
  - This means that if there is only one cognitive score of 90 or higher, it must also be identified as an intra-individual strength to be consistent with SLD
    - Differs from all other models
    - Most consistent with DD/C (but program is flexible and allows you to use clinical judgement to guide decisions)

- **Schultz** — “Policy-all weaknesses, pervasive weakness (no SLD)” (personal communication, August 2019)
  - May be referring to TX state guidelines
**DD/C accounts for attenuation of total test score due to processing areas of weakness**

- **g – value** will suggest “at least average overall ability”
- **FCC** is an estimate of overall ability to think and reason – w/o the attenuating effects of cognitive processing weaknesses (aggregate of strengths)
- **Inhibiting Cognitive Composite (ICC)** will also be calculated (aggregate of weaknesses)
### Feature

<table>
<thead>
<tr>
<th>Yes, No = positive</th>
<th>Pattern of Strengths and Weaknesses Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, No = negative</td>
<td>D/C (Flanagan, Ortiz, Allfonso)</td>
</tr>
</tbody>
</table>

13. Emphasizes composites over subtest scores when designating cognitive area as a weakness: Yes, Yes, Yes, Yes, Yes.

14. Emphasizes composites over subtest scores when designating cognitive area as a strength: Yes, Yes, Yes, Yes, Yes.

15. Emphasizes composites over subtest scores when designating academic area as a weakness: No, No, No, No, Yes.

16. Emphasizes composites over subtest scores when designating academic area as a strength: No, No, No, No, Yes.

**D/C** = Discrepancy/Consistency (PASS score analyzer)

**DD/C** = Dual Discrepancy/Consistency (PSW-A component of X-BASS software)

**CDM** = Concordance-Discrepancy Model (obtain reliabilities and calculate simple differences by hand using formula)

**PPA** = Psychological Processing Analyzer (software)

**C-SEP** = Core-Selective Evaluation Process (no)

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42
CORE SELECTIVE EVALUATION PROCESS (C-SEP) AND DUAL DISCREPANCY/CONSISTENCY (DD/C) MODELS FOR SLD IDENTIFICATION

A Case Study Approach

Gail M. Cheramie
G. Thomas Schanding Jr.
Kristin Streich

<table>
<thead>
<tr>
<th>Feature</th>
<th>Pattern of Strengths and Weaknesses Method</th>
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<tbody>
<tr>
<td>CAS2 D/C (Naglieri)</td>
<td>No</td>
</tr>
<tr>
<td>DD/C (Flanagan, Ortiz, Allione)</td>
<td>No</td>
</tr>
<tr>
<td>CDM (Eale &amp; Fuevilo)</td>
<td>No</td>
</tr>
<tr>
<td>WJ IV (Drinks &amp; Staun)</td>
<td>No</td>
</tr>
<tr>
<td>PPA (Devin &amp; Stran)</td>
<td>Yes</td>
</tr>
<tr>
<td>C-SEP (Oshlutz &amp; Stephens)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- Manifest construct
- Many sources of data (gathered via different methods): 
  - Work samples
  - Teacher/Parent/Student reports
  - Observations
  - Progress Monitoring Data/CBM
  - Grades
  - State level tests
- Not considered necessary

WJ IV is main emphasis and RPIs yield valuable information; standardized achievement tests recommended.
<table>
<thead>
<tr>
<th>Feature</th>
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<tbody>
<tr>
<td>Many sources of data (gathered via different methods)</td>
<td></td>
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<tr>
<td>• Work samples</td>
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<tr>
<td>• Grades; State level tests</td>
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</tr>
<tr>
<td>• Not considered necessary</td>
<td></td>
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</tbody>
</table>

PPA program allows all areas to be represented by a single subtest

---

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<th>CAS2 D/C (Naglieri)</th>
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<th>CDM (State &amp; Frenodo)</th>
<th>WisC-A PSW (Suggested)</th>
<th>PPA (Dehn &amp; Strace)</th>
<th>C-SEP (Schultz &amp; Stephens)</th>
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<tr>
<td>Yes</td>
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15. Emphasizes composites over subtest scores when designating academic area as a weakness

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17. Provides guidelines related to composite cohesion

18. Allows for a significant difference between the related cognitive and academic weaknesses – related to the consistency analysis

19. Uses base rate data to inform the meaningfulness of statistically significant differences (i.e., how unusual or rare the difference is in the population)

20. PSW analysis includes information about cognitive-achievement relationships

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Noncohesive Composites Are Not Invalid!

They may obscure important information, but that does not change the psychometrics of the score in terms of reliability and validity.

Clinical judgement determines whether a noncohesive composite is a good description of the underlying construct for the child.

XBA revised to be consistent with current research on composite cohesion.

Fine-Tuning Cross-Battery Assessment Procedures: After Follow-Up Testing, Use All Valid Scores, Cohesive or Not

W. Joel Schneider
Illinois State University

Zachary Roman
University of Kansas

We used data simulations to test whether composites consisting of cohesive subtest scores are more accurate than composites consisting of divergent subtest scores. We demonstrate that when multivariate normality holds, divergent and cohesive scores are equally accurate. Furthermore, excluding divergent scores results in biased estimates of construct scores. We show that divergent scores should prompt additional testing under some conditions. Although there are many valid reasons to exclude scores from consideration (e.g., malingering, fatigue, and misunderstood directions), no score should be discarded simply because it is different from other scores in the composite.
Consistency – Don’t Assume a Perfect Prediction

When scores are < 90 indicating weaknesses...
A significant difference should NOT rule out SLD

Difference is statistically significant – DD/C allows this

Facilitators
- Parent Support
- Tutor/intervention
- Good parent-student relationship
- Motivation
- Access to resources
Consistency – Don’t Assume a Perfect Prediction

When scores are < 90 indicating weaknesses...
A significant difference should NOT rule out SLD

Consistent

Difference is statistically significant – DD/C allows this

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<td>WISC-IV (with STRATEGIC and WMH)</td>
</tr>
<tr>
<td></td>
<td>PPA (Delt &amp; Szam)</td>
</tr>
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<td></td>
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<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>19. Uses base rate data to inform the meaningfulness of statistically significant differences (i.e., how unusual or rare the difference is in the population)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>No (includes nonoverlap component from analysis)</td>
</tr>
<tr>
<td></td>
<td>Not addressed</td>
</tr>
<tr>
<td>20. PSW analysis includes information about cognitive-achievement relationships</td>
<td>Yes (only for CAS and PAM)</td>
</tr>
<tr>
<td></td>
<td>Yes (available in draft 2004 Handbook)</td>
</tr>
<tr>
<td></td>
<td>No</td>
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<td></td>
<td>Yes</td>
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DD/C Uses Base Rates in Analysis

**Cognitive Strengths**
The value here is taken that featuring Cognitive Components (C/C) or an endorsed Alternative Cognitive Composite (ACC).

**Supporting Academic Strengths**
Assessed in the first 30 days, areas have been identified as academic strengths for the individual.

**Academic Weaknesses**
The first weakness is either selected by default. You may select a different area of academic weakness from the drop down menu for analysis.

**Pattern of Strengths and Weaknesses Method**

<table>
<thead>
<tr>
<th>Feature</th>
<th>CAS2</th>
<th>DD/C (Flanagan, Ortiz, Alliano)</th>
<th>CDM (Hare &amp; Fornasiero)</th>
<th>WISC-PSW (Carlton &amp; Frisbie, 2006)</th>
<th>PPA (Devin &amp; Szasz)</th>
<th>C-SEP (Santulli &amp; Stephens)</th>
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<td>No</td>
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<tr>
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<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>20. PSW analysis includes information about cognitive-achievement relationships</td>
<td>Yes (tools for CAS and PPA2)</td>
<td>Yes</td>
<td>Yes (available in their 2004 Handbook)</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Notes**
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- DD/C = Dual Discrepancy/Consistency (PSW-A component of X-BASS software)
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- C-SEP = Core-Selective Evaluation Process (no)

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WISC-V/WIAT-III/KTEA-III Does not Address Consistency

Consistent Empirically? Ecologically valid?

<table>
<thead>
<tr>
<th>Area of Achievement Weakness</th>
<th>WIAT-III Basic Reading: 85</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of Processing Weakness</td>
<td>WISC-V VSI: 81</td>
</tr>
<tr>
<td>Area of Processing Strength</td>
<td>WISC-V VCI: 100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Relative Strength Score</th>
<th>Relative Weakness Score</th>
<th>Difference</th>
<th>Critical Value .05</th>
<th>Significant Difference</th>
<th>Supports SLD hypothesis?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Processing Strength/</td>
<td>100</td>
<td>85</td>
<td>15</td>
<td>9.00</td>
<td>Y</td>
<td>Yes</td>
</tr>
<tr>
<td>Achievement Weakness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B Processing Strength/</td>
<td>100</td>
<td>81</td>
<td>19</td>
<td>12.00</td>
<td>Y</td>
<td>Yes</td>
</tr>
<tr>
<td>Processing Weakness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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The PSW model is intended to help practitioners generate hypotheses regarding clinical diagnoses. The analysis should always be used within a comprehensive evaluation that incorporates multiple sources of information.

Pattern of Strengths and Weaknesses Model

CDM Does not Address Consistency (in the Method) – Consistency IS addressed in the writings of Hale and Fiorello
DD/C is Guided in Part by Relations between CHC Abilities, Neuropsychological Processes, and Achievement and in Reading, Math, and Writing

<table>
<thead>
<tr>
<th>CHC Broad Ability</th>
<th>Reading Achievement</th>
<th>Etiology of Reading Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gf</td>
<td>Inductive (I) and general sequential reasoning (RG) abilities play a moderate role in reading comprehension. Executive functions such as planning, organization, and self-monitoring are also important.</td>
<td>Several cortical and subcortical structures are frequently implicated in basic reading skills and word reading accuracy. Recent work appears to identify dysfunction in a left hemispheric network that includes the occipitotemporal region, inferior frontal gyrus, and inferior parietal region of the brain (Stiles et al., 2006; Shaywitz et al., 2000; Fletcher, Simos, Papanicolaou, &amp; Denton, 2004; Richlan et al., 2009; Richlan, 2012). Numerous imaging studies have also found that dysfunctional responses in the left inferior frontal and temporo-parietal cortices play a significant role with regard to phonological deficits (Skrede et al., 2015). Similar brain regions are activated on tasks involving reading fluency, but additional activation is observed in areas involved in eye movement and attention (Jones, Ashby, &amp; Birangan, 2013). Further, there is also evidence for increased activation in the left occipitotemporal region, in particular, the occipitotemporal sulcus, which is important for rapid processing of letter patterns (Shaywitz et al., 2004; Dehaene &amp; Cohen, 2011).</td>
</tr>
<tr>
<td>Gc</td>
<td>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. Oral Language, Listening Comprehension, and EF (planning, organization, self-monitoring) also important for reading comprehension.</td>
<td>Brain regions often associated with reading comprehension include the anterior temporal lobe, inferior temporal gyrus, inferior frontal gyrus, inferior frontal sulcus, and middle and superior frontal and temporal regions (Fensel et al., 2008; Germbsbacher &amp; Kaschak, 2003). More recent research has revealed a relationship between listening and reading comprehension and activation along the left superior temporal sulcus, which has referred to by some as the “comprehension cortex” (Berti et al., 2010). However, broader pathways are also activated in reading.</td>
</tr>
<tr>
<td>Qsm</td>
<td>Memory span (MS) and working memory capacity (WMC) or attentional control are important for overall reading success. Phonological memory or WM for verbal and sound-based information may also be important. WM is important for reading comprehension, which involves holding words and sentences in awareness, while integrating prior knowledge with incoming information.</td>
<td></td>
</tr>
<tr>
<td>Qx</td>
<td>Orthographic processing (often measured by tests of perceptual speed that use orthographic units as stimuli) is related to reading rate and fluency. Orthographic processing involves the ability to process units of words based on visual long-term memory representations, which is critical for automatic word recognition.</td>
<td></td>
</tr>
<tr>
<td>Gs</td>
<td>Phonetic coding (PC) or phonological awareness / processing is very important during the elementary school years for the development of basic reading skills and word reading accuracy. Phonological memory or WM for verbal and sound-based information may also be important.</td>
<td></td>
</tr>
</tbody>
</table>

Note: Information in this table was culled from the following sources: Flanagan, Ortiz, Alfonso, & Mascaro, 2006; Flanagan, Ortiz, & Alfonso, 2013; McDonough, Flanagan, Sy, & Alfonso, 2017; McGrew & Wendling, 2016; McGrew, 2014.)
DD/C is Guided in Part by Relations between CHC Abilities, Neuropsychological Processes, and Achievement and in Reading, Math, and Writing

<table>
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<th>CHC Broad Ability</th>
<th>Math Achievement</th>
<th>Etiology of Math Functions</th>
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<tbody>
<tr>
<td>Gr</td>
<td>Reasoning inductively (I) and deductivity with numbers (R) is very important for math problem solving. Executive functions such as set shifting and cognitive inhibition are also important.</td>
<td>The intraparietal sulcus in both hemispheres is widely viewed as crucial in processing and representing numerical quantity (number sense), although there may be differences in activation as a function of age (Ansari &amp; Dhatt, 2006; Ansari, Garcia, Lucas, Haman, &amp; Dhatt, 2005; Deloehne et al., 2004; Kaufmann et al., 2006; Kucian, van der Meer, Lemm, &amp; Martin, 2008; Price &amp; Ansari, 2013; Musiol et al., 2010). Regions of the left frontal-parietal cortex, including the intraparietal sulcus, angular gyrus, and supramarginal gyrus have been consistently associated with math calculation (Ansari, 2008; De Smedt, Holmes, &amp; Ansari, 2011; Deloehne, Molko, Cohen, &amp; Wilson, 2004; Deloehne et al., 2004). The dorsolateral prefrontal cortex has also been found to show increased activation during calculating, implying that executive functioning and working memory may be playing a role in this process (Dawis et al., 2009). A left hemisphere network that includes the precentral gyrus, inferior parietal cortex, and intraparietal sulcus, is often implicated in math fact retrieval (Deloehne &amp; Cohen, 1992; Deloehne &amp; Cohen, 1997; Deloehne et al., 1999). Further, some researchers believe that role math facts are retrieved from verbal memory, thereby requiring activation of the angular gyrus and other regions associated with linguistic processes (Deloehne, 1992; Deloehne &amp; Cohen, 1999, Deloehne et al., 1999). The presence of math disabilities is about 10 times higher in those with family members who had math disabilities (Shalev et al., 2001). Environmental factors, including motivation, emotional functioning (e.g., math anxiety), and suboptimal or inadequate teaching may also contribute to math difficulties (Sieg &amp; Gesswein, 2013; Urdov et al., 2013). Further, math achievement may be associated with cultural or gender-based attitudes that may be transmitted in the family environment (e.g., Chi &amp; Nastasi, 2010; Gunderson et al., 2011).</td>
</tr>
<tr>
<td>Qr</td>
<td>Language development (LD), lexical knowledge (VL), and listening ability (LS) are important at all ages for math problem solving. These abilities become increasingly important with age.</td>
<td></td>
</tr>
<tr>
<td>Gw</td>
<td>Memory span (MS) and working memory capacity (WM) or attentional control are important for math problem solving and overall success in math (including math calculation).</td>
<td></td>
</tr>
<tr>
<td>Gv</td>
<td>Visualization (V2), including mental rotation, is important primarily for higher level math (e.g., geometry, calculus) and math problem solving.</td>
<td></td>
</tr>
<tr>
<td>Qa</td>
<td>Naming facility (NA); also called speed of lexical access. Associative memory (MA) is important for memorization and rapid retrieval of basic math facts and for accurate and fluent calculation.</td>
<td></td>
</tr>
<tr>
<td>Gx</td>
<td>Perceptual speed (P) is important during all years, especially the elementary school years for math calculation fluency.</td>
<td></td>
</tr>
<tr>
<td>Gr/Gs</td>
<td>Number representation (e.g., quantifying sets without counting, estimating relative magnitude of sets) and number comparisons are related to overall number sense.</td>
<td></td>
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<table>
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<tr>
<th>CHC Broad Ability</th>
<th>Writing Achievement</th>
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<tr>
<td>Gr</td>
<td>Inductive (I) and general sequential reasoning (RG) are consistently related to written expression at all ages. Executive functions such as attention, planning, and self-monitoring are also important.</td>
<td>Neural correlates of writing are less understood, but some studies have suggested that the cerebellum and parietal cortex, particularly the left superior parietal lobe, may be involved (Kataoka et al., 2001; Matsumoto et al., 2010). In addition, the frontal lobes have also been implicated and are considered crucial in planning, brainstorming, organizing, and goal setting, which are important for written expression (Shah et al., 2013). Functional neuroimaging studies have provided substantial evidence for the role of the ventral-temporal inferior frontal gyrus and the posterior inferior frontal gyrus in spelling (Rapp et al., 2015; van Hoon et al., 2013). Other areas that have been identified include the left ventral cortex, bilateral lingual gyrus, bilateral fusiform gyrus (Planton et al., 2015; Purcell et al., 2014; Richards et al., 2005; Richards et al., 2006). However, many of these regions have also been associated with reading and are not distinct to spelling / writing disorders. While there is a significant genetic component involved in the development of writing skills, this etiology is often shared with a broad variety of reading and language skills (Olson et al., 2013).</td>
</tr>
<tr>
<td>Qc</td>
<td>Language development (LD), lexical knowledge (VL), and general information (RG) are important primarily after 2nd grade and become increasingly important with age. Level of knowledge of syntax, morphology, semantics, and VL has a significant impact on clarity of written expression and text generation ability.</td>
<td></td>
</tr>
<tr>
<td>Gw</td>
<td>Memory span (MS) is important to writing, especially spelling skills whereas working memory (WM) has shown relations with advanced writing skills (e.g., written expression, synthesizing multiple ideas, ongoing self-monitoring).</td>
<td></td>
</tr>
<tr>
<td>Gv</td>
<td>Orthographic processing (often measured by tests of perceptual speed that use orthographic units as stimuli) is particularly important for spelling.</td>
<td></td>
</tr>
<tr>
<td>Qa</td>
<td>Phonological coding (PC) or phonological awareness / processing is very important during the elementary school years (primarily before 5th grade) for both basic writing skills and written expression.</td>
<td></td>
</tr>
<tr>
<td>Qr</td>
<td>Naming facility (NA); also called speed of lexical access has demonstrated relations with writing fluency. Storing and retrieving commonly occurring letter patterns in visual and motor memory are needed for spelling.</td>
<td></td>
</tr>
<tr>
<td>Gx</td>
<td>Perceptual speed (P) is important during all school years for</td>
<td></td>
</tr>
<tr>
<td>Qr</td>
<td>Basic writing skills and is related to written expression at all ages.</td>
<td></td>
</tr>
</tbody>
</table>

Note: Information in this table was culled from the following sources: Flanagan, Orfitz, & Mascolo, 2006; Flanagan, Orfitz, & Asfren, 2013; McDonough, Flanagan, Sy, & Asfren, 2017; McGlew & Handling, 2010; McGlew et al., 2014.
Cognitive-Achievement Relations

DD/C Provides the Strength of the Relationship Between Cognitive Weakness and Academic Skill Weakness

Cognitive Weakness

Is the difference statistically significant? 

A "YES" in these boxes indicates that the difference between the facilitating Cognitive Composites (FCC or Alternative Cognitive Composite (ACC) scores is selected below to depict their effect sizes. The difference is represented in the drop down menu for analysis.

FCC = 100

Academic Weakness

Is underachievement unexpected? Using the T-value as the predictor, if the difference between actual and predicted specific academic achievement scores is statistically significant, the critical value is exceeded and a remedial intervention is recommended.

T-value

p-value

Strength of relationship

Work with Weaknesses? 

Likely

Possibly

Use Clinical Judgment

10/28/2019
CAS2 D/C Provides Guidance on PASS-Achievement Relationships

<table>
<thead>
<tr>
<th>Correspondence of FAR and PASS</th>
<th>Planning</th>
<th>Attention</th>
<th>Simultaneous</th>
<th>Successive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonemic Awareness - measures rhyming, blending, segmenting, and manipulating sounds.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning Sounds - a phonemic localization task determining sound positions.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonword Decoding - the student decodes a series of nonsense words</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Isolated Word Reading Fluency - the student reads a list of words in 60 seconds</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Silent Reading Fluency - the student reads a passage composed of the same words as the Isolated Word Reading Fluency test</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Rapid Automatic Naming - the student names either objects, letters, or digits</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Visual Perception - the student identifies letters or words printed backwards from an array.</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Verbal Fluency - the student retrieves words from a category, or items that start with a letter.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthographic Processing - the student recalls a letter, or group of letters, from a target word.</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Irregular Word Reading Fluency - the student reads a list of phonologically regular words</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Semantic Concepts - the student identifies the correct antonym or synonym of a target word</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Word Recall - the student repeats back a list of words over two trials</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Morphological Processing - the student selects the correct prefix, suffix, or stem that completes a target word</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Silent Reading Fluency - the student answers questions after reading a passage silently</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The correspondence of PASS with FAR and FAM needs to be carefully examined for each student. The table above is a starting point and should be used flexibly. For example, whereas Planning is anticipated to play a key role for some subscales on the FAR and FAM, it could also have a greater influence on many of these measures if the student’s reaction when having difficulty is to withdraw or impulsively choose an answer (i.e., use a bad plan).

CAS2 D/C Model and Consistency

CAS2 D/C Subtest Extended Battery

**Box #1** Is there a PASS Pattern of Strengths and Weaknesses (Discrepancy)?

<table>
<thead>
<tr>
<th>Cognitive Assessment System 2</th>
<th>PASS Mean</th>
<th>PASS Standard Score</th>
<th>Strength or Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning 79</td>
<td>96.3</td>
<td>Significant Difference (p &lt; .05)</td>
<td>Weakness</td>
</tr>
<tr>
<td>Attention 79</td>
<td>91.3</td>
<td>Significant Difference (p &lt; .05)</td>
<td>Weakness</td>
</tr>
<tr>
<td>Simultaneous 190</td>
<td>93.8</td>
<td>Significant Difference (p &lt; .05)</td>
<td>Weakness</td>
</tr>
<tr>
<td>Discourse 183</td>
<td>12.0</td>
<td>Significant Difference (p &lt; .05)</td>
<td>Weakness</td>
</tr>
</tbody>
</table>

Notes:
1. A weakness is defined as a PASS standard score that is significantly below the child's average PASS score (relative comparison at the 5th level) and the PASS score is below 50 (i.e., below the Average range).
2. A strength is defined as a PASS standard score that is significantly above the child's average PASS score (relative comparison at the 95th level) and the PASS score is above 100 (i.e., above the Average range).
3. See Essentials of CAS2 Assessment Interpretation Chapters for more details and examples. Refer. Competencies at p. 36.

**Box #3** Are the PASS scores significantly different from low achievement scores? Are the PASS scores similar to low achievement scores (Consistency)?

<table>
<thead>
<tr>
<th>Subtest Assessment of READING</th>
<th>PASS Scores from CAS2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Memory</td>
</tr>
<tr>
<td>79</td>
<td>102</td>
</tr>
</tbody>
</table>

Standard scores:
- Normal
- Low
- High
- Average
- Discrepancy
- Consistent
- Decreased
- Consistent
- Decreased
- Consistent
- Decreased
- Consistent
- Decreased
Consistency? No, not as defined by empirically established relationships

While a nonsignificant difference is considered a “consistency,” it is also important to understand whether an empirically established (or ecologically valid) relationship supports it – in this example, it appears that consistency is not supported.

### Feature
- **Yes, No** = positive
- **Yes, No** = negative
- **Yes, No** = neither pos. nor neg. just different

### Pattern of Strengths and Weaknesses Method

<table>
<thead>
<tr>
<th>Feature</th>
<th>CAS2</th>
<th>DD/C</th>
<th>CDM</th>
<th>WISC-IV</th>
<th>PPA</th>
<th>C-SEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Uses “cognitive” areas as “achievement” – not really a fair term (b/c no one really knows – “slicing smoke” – Horn) but important to think about</td>
<td>Yes (when FAS is used. phonological and orthographic processing area considered “achievement”)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>22. Allows “verbal ability” or Gc (as defined by lexical knowledge/vocabulary and general information) to be considered as a “cognitive process”</td>
<td>No</td>
<td>No</td>
<td>Information not available</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>23. Flexible in organization of tests used in evaluation</td>
<td>No (need use CAS2; cannot use portion behind CAS2 is not considered necessary)</td>
<td>Yes</td>
<td>Yes</td>
<td>No (need to have portion of CAS2)</td>
<td>Yes</td>
<td>Yes (possible; used with WJ IV in 2020)</td>
</tr>
</tbody>
</table>

D/C = Discrepancy/Consistency (PASS score analyzer)

DD/C = Dual Discrepancy/Consistency (PSW-A component of X-BASS software)

CDM = Concordance-Discrepancy Model (obtain reliabilities and calculate simple differences by hand using formula)

PPA = Psychological Processing Analyzer (software)

C-SEP = Core-Selective Evaluation Process (no)

Information in this table is a “work in progress” – if you wish to cite this information, please contact me to make sure you have the most current information: flanagad@stjohns.edu

Consistency? Yes, Yes, As defined by nonsignificant differences
### Feature | Pattern of Strengths and Weaknesses Method
--- | ---
Yes, No = positive | CAS2 (Fagnoli)
Yes, No = negative | DD/C (Flanagan, Ortiz, Allfonso)
Yes, No = neither pos. nor neg., just different (features and designations provided by Dawn Flanagan and may vary by model author) | CDM (Faure & Fiorelli)

#### 21. Uses “cognitive” areas as “achievement” – not really a fair term (b/c no one really knows – “slicing smoke” – Horns, but important to think about)
- Yes (when JAR is used, phonological and orthographic processing and reading are considered “achievement”)
- No

#### 22. Allows “verbal ability” or Gc (as defined by lexical knowledge/vocabulary and general information) to be considered as a “cognitive process”
- No
- Information not available

#### 23. Flexible in organization of tests used in evaluation
- No
- CAS; double assessment behind CASS considered necessary

---

**D/C = Discrepancy/Consistency (PASS score analyzer)**

**DD/C = Dual Discrepancy/Consistency (PSW-A component of X-BASS software)**

**CDM = Concordance-Discordance Model (obtain reliabilities and calculate simple differences by hand using formula)**

**PPA = Psychological Processing Analyzer (software)**

**C-SEP = Core-Selective Evaluation Process (no)**

---

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**DD/C Model and Gc**

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118

119
**DD/C Model and Gc**

Cognitive Weakness
If calculated, the Inhibiting Cognitive Composite (ICC) is selected below by default. You may select a different area of cognitive weakness from the drop down menu for analysis.

<table>
<thead>
<tr>
<th>Crystalized Intelligence (Gc) Alt.Comp 1 - 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Predicted by</td>
</tr>
<tr>
<td>80    93</td>
</tr>
</tbody>
</table>

*Use of Gc as a cognitive processing weakness may only be defensible when it represents language processes (e.g., CM, LS), rather than stores of acquired knowledge (e.g., VI, KO).*

<table>
<thead>
<tr>
<th>Feature</th>
<th>Pattern of Strengths and Weaknesses Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, No</td>
<td>positive</td>
</tr>
<tr>
<td>Yes, No</td>
<td>negative</td>
</tr>
<tr>
<td>Yes, No</td>
<td>neither pos. nor neg., just different</td>
</tr>
<tr>
<td></td>
<td>(features and designations provided by Dawn Flanagan and may vary by model author)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CAS2</th>
<th>DD/C (Flanagan, Ortiz, Allmon)</th>
<th>CDMA (Kraus &amp; Forrester)</th>
<th>PHSA (Defran &amp; Srazik)</th>
<th>C-SEP (Kraus &amp; Stephens)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Uses “cognitive” areas as “achievement” – not really a fair term (b/c no one really knows – “slicing smoke” – Horn), but important to think about</td>
<td>Yes (when FAM is used, phonological and orthographic processing are considered “achievement”)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>22</td>
<td>Allows “verbal ability” or Gc (as defined by lexical knowledge/vocabulary and general information) to be considered as a “cognitive process”</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>23</td>
<td>Flexible in organization of tests used in evaluation</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes (primarily used with ADHD in OEE)</td>
</tr>
</tbody>
</table>

D/C = Discrepancy/Consistency (PASS score analyzer)
DD/C = Dual Discrepancy/Consistency (PSW-A component of X-BASS software)
CDM = Concordance-Discrepancy Model (obtain reliabilities and calculate simple differences by hand using formula)
PPA = Psychological Processing Analyzer (software)
C-SEP = Core-Selective Evaluation Process (no)

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D/C = Discrepancy/Consistency (PASS score analyzer)
DD/C = Dual Discrepancy/Consistency (PSW-A component of X-BASS software)
CDM = Concordance-Discordance Model (obtain reliabilities and calculate simple differences by hand using formula)
PPA = Psychological Processing Analyzer (software)
C-SEP = Core-Selective Evaluation Process (no program/software)

PSW and SLD in Perspective

• Do these models need to change?
  • Yes. They all have weaknesses that can be improved upon
  • Address cut points; continuous variables

• These comparison show fundamental differences
  • All historical approaches to SLD emphasize the spared or intact abilities that stand in stark contrast to the deficient abilities
    • Is one cognitive strength enough?
    • Are we fundamentally altering the definition of SLD through the use of some of these models?
  • Are achievement strengths necessary, regardless of contributory factors?
PSW and SLD in Perspective

• There are a number of sophisticated intelligence and cognitive ability tests that provide information on cognitive processes that aid in SLD identification and treatment planning
• All PSW methods have strengths and weaknesses
• Without a viable alternative, PSW is among the best methods for assisting in SLD identification, especially when implemented in the manner in which they are intended
• PSW methods should continue to be researched in a manner that addresses the methodological issues and faulty assumptions of previous research
• There is much work to be done before the conversation is over

PSW Models: The Controversy

• Given its increasing popularity, research on the PSW approach is emerging.
• One emerging body of research indicates that there is a lack of agreement among PSW models.
  • This research also suggests that PSW models are effective at determining who is not SLD, but they are not as effective at determining who is SLD.
  • Valid points are made about potential weaknesses of PSW models in this literature (e.g., Stuebing, Fletcher, Branum-Martin, & Francis, 2012).
• Another emerging body of research provides support for a neuropsychological/cognitive processing PSW approach (Hale et al., 2010 White Paper).
  • This research shows the relevance of PSW methods for differential diagnosis of learning disability in
    • reading (e.g., Feifer, Gerhardstein, Flanagan, Fitzer, & Hichs, 2014),
    • math (e.g., Kubas, Drefs, Poole, Schmid, Holland, & Fiorello, 2014), and
    • written expression (e.g., Fenwick, Kubas, Witzke, Fitzer, Miller, Maricle, & Hale, 2015).
  • Valid points are made about the potential strengths of PSW models in this literature.
• While valid points are made both for and against the use of PSW models, the results of the studies that have been published to date are impacted by methodological preferences used to analyze the data as well as the accuracy/inaccuracy of the assumptions made about each PSW model.
Major Problems with SLD Identification

1. Lack of agreement on how to operationalize methods
2. Polarization
   • Two Camps
   • RTI or PSW
3. Impatience – Throwing the baby out with the bathwater
   • Quick to jump to the conclusion, “abort mission”
   • After only a handful of studies, many of which have significant flaws, the search for the holy grail goes in a new direction
4. The naïve belief that there is a panacea
5. Far too many articles and research studies saying what not to do; not enough that offer suggestions for improvement of current practice
   • Those in the trenches do not want to hear what they should not be doing; they want to hear how they can improve upon what they are already doing
   • Telling practitioners that RTI doesn’t work and that PSW doesn’t work (when they are the two main methods being used in the schools) is not helpful
     • It undermines the important work that practitioners and educators are doing, despite limitations of identification methods
     • It hinders the pursuit of successive approximations to the intended purpose and goal of SLD identification methods

Misinterpretations Abound in the Literature on PSW
Beaujean, Benson, McGill, and Dombrowski’s (2018)

• These authors opine that DD/C is not supported; that PSW is not supported (based on research with numerous methodological issues, misrepresentation of models, and faulty assumptions)
• They do not critically evaluate the research
  • Major problem
• They incorrectly report ALL criteria of DD/C
• Numerous strawman arguments
  • DD/C is valid b/c it is allowable under the law (DD/C authors make no such claim)
  • DD/C is valid b/c case studies have been published (DD/C authors make no such claim)
  • DD/C assumes a perfect correlation between cognitive and academic achievement (DD/C authors make no such claim)
  • Etc.
• They spend a good deal of time talking about what they believe to be a flaw in DD/C. Converting scaled scores to standard scores. DD/C Doesn’t do that. XBA does. However, XBA is not used in the way they claimed. Therefore, this entire section of their “review” is irrelevant
  • It’s not about DD/C
  • It inaccurately represents XBA
• Based on inaccuracies, strawman arguments, and simply parroting conclusions of problematic research, they end the conversation on the utility of PSW for SLD identification
  • Premature? Most certainly

A Summary of the Literature on the Pattern of Strengths and Weaknesses Approach to Identification of Specific Learning Disabilities

<table>
<thead>
<tr>
<th>Data-Based</th>
<th>Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supports PSW</td>
<td>Fails to Support PSW</td>
</tr>
</tbody>
</table>
### What Does the Research Say About PSW?

<table>
<thead>
<tr>
<th>Allegedly Bad News</th>
<th>Our Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSW is inaccurate.</td>
<td>Not really true.</td>
</tr>
<tr>
<td>PSW is pointless.</td>
<td>Really not true!</td>
</tr>
</tbody>
</table>

---

**How Accurate is the Dual Discrepancy/Consistency (DD/C) Method?**
Evaluation of the Technical Adequacy of Three Methods for Identifying Specific Learning Disabilities Based on Cognitive Discrepancies

Karla K. Stuebing, Jack M. Fletcher, Lee Branum-Martin, and David J. Francis
University of Houston

• Used simulation data
• Used single subtests to represent constructs
• Method: When you pluck people randomly from the general population
  • DD/C (PSW) excellent at identifying who is NOT SLD (.90+)
  • Poor at identifying who is SLD (.32)
• Base rate set at 1% to 10% of the population
• Need to use base rates that are more consistent with the population with whom we work

Simulation of LD Identification Accuracy Using a Pattern of Processing Strengths and Weaknesses Method With Multiple Measures

Jeremy Miciak¹, W. Pat Taylor¹, Karla K. Stuebing¹, and Jack M. Fletcher¹

• Used simulation data
• Used multiple measures to represent constructs
• Method: When you pluck people randomly from the general population
  • DD/C (PSW) excellent at identifying who is NOT SLD (.90+)
  • Better at identifying who is SLD (.62)
• Base rate set at 1% to 10% of the population
• By increasing the base rate to more accurately reflect a diagnosis in a referred sample (i.e., 30%-70%), the positive predictive value (PPV) will approach respectable levels
But What About the Kid I Just Tested?

Using WISC-V and PSW for SLD Identification Amidst the Controversy

Dawn P. Flanagan, Ph.D.
Vincent C. Alfonso, Ph.D.
W. Joel Schneider, Ph.D.

Presented at the National Association of School Psychologists (February, 2018)
We Don’t Randomly Select People from the Population to Determine if they Meet Criteria for SLD; We Conduct a Comprehensive Evaluation of Students Referred for Suspected SLD (Likelihood of Identifying SLD is Somewhere Between 30% - 70%)

<table>
<thead>
<tr>
<th>Ability</th>
<th>Score</th>
<th>Reliability</th>
<th>P(Correct)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abilities in General</td>
<td>96</td>
<td>.96</td>
<td>.98</td>
</tr>
<tr>
<td>Specific Processing Ability</td>
<td>71</td>
<td>.92</td>
<td>.996</td>
</tr>
<tr>
<td>Achievement</td>
<td>78</td>
<td>.90</td>
<td>.92</td>
</tr>
</tbody>
</table>

Abilities in General = 96  
P(Latent Score > 90) = 0.98

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Exclusionary Criteria Met</td>
<td></td>
</tr>
<tr>
<td>Abilities in General at least average</td>
<td>G &gt; 90</td>
</tr>
<tr>
<td>Low Achievement</td>
<td>A &lt; 85</td>
</tr>
<tr>
<td>Low Specific Processing Ability</td>
<td>S &lt; 85</td>
</tr>
<tr>
<td>Achievement substantially lower than Abilities in General</td>
<td>G − A &gt; 10</td>
</tr>
<tr>
<td>Specific Processing Ability substantially lower than Abilities in General</td>
<td>G − S &gt; 10</td>
</tr>
</tbody>
</table>

Achievement = 78  
P(Latent Score < 85) = 0.92

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Exclusionary Criteria Met</td>
<td></td>
</tr>
<tr>
<td>Abilities in General at least average</td>
<td>G &gt; 90</td>
</tr>
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<td>Low Achievement</td>
<td>A &lt; 85</td>
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</tr>
<tr>
<td>Specific Processing Ability substantially lower than Abilities in General</td>
<td>G − S &gt; 10</td>
</tr>
</tbody>
</table>
Comparison of Three Empirical Processing Strengths and Weaknesses Models for the Identification of Specific Learning Disabilities

Daniel C. Miller, Ph.D., ABPP  
Denise E. Maricle  
Principal Investigators  
Alicia Jones  
Research Assistant  
Texas Woman's University  

Grant Funded by the  
Learning Disabilities Foundation of America
Purpose of the Research Study

The goal of the project is to compare three processing strengths and weakness (PSW) models for the identification of specific learning disabilities (SLD) using a common set of clinical case examples.

Methodology

These three PSW approaches are:

1. DD/C and the Cross-Battery Assessment Software System (X-BASS) (Ortiz, Flanagan, & Alfonso, 2015),
2. Concordance-Discordance Model of SLD identification (Hale & Fiorello, 2004; Hale, Wycoff, & Fiorello, 2010) and,
3. Psychological Processing Analyzer (Dehn, 2015).
Overall Results

- The DD/C in X-BASS (Flanagan, Ortiz, & Alfonso, 2015) approach had a 100% agreement with the expert panel in the identification of SLD and the identification of non-SLD.

- The X-BASS requires some level of training and expertise to make sure it is being used properly, but it is conceptualized and operationalized well and yields the best results of the three approaches.


Overall Results

- The Concordance-Discordance Model (C-DM) was more conservative in the identification of SLD.
  - This model only identified 54% of the expert-identified SLD cases.
  - The differences had to do with the calculations of cognitive strengths and weaknesses and academic weakness comparisons. Differences were due to the lower reliability of some of the measures used for the cognitive weaknesses.


The Difference Lies Under the Hood

• The PPA does not analyze the cognitive strength – academic weakness discrepancy.

• The PPA relies on composite scores only.

• The PPA is more inclusive of what constitutes a cognitive process.


The Difference Lies Under the Hood

• The C-DM allows the user to enter any score, but relies on the expertise of the examiner to know the neurocognitive literature – *usually a big assumption*.

• The most conservative approach to SLD identification.


The Difference Lies Under the Hood

- **X-BASS is the most reliable PSW method of SLD diagnosis and the most sophisticated.**
- X-BASS users will require some advanced training to ensure that the program is being used appropriately.


PSW is Not the Whole Picture: It’s a Piece to a Larger Puzzle

Simply because we see cognitive and academic deficits together in the same child does not mean that our work as psychologists is done. Cognitive abilities are indeed extremely important causal determinants of academic abilities. However, there is a host of other factors that can in aggregate be much more important than cognitive abilities in influencing academic outcomes, though their effects may be small individually. Psychologists need to give cognitive abilities their proper consideration, but must also weave together all the evidential threads into a coherent narrative of the child’s academic difficulties. Only then can psychologists be in the position to give truly helpful advice to parents and teachers trying to help children who have fallen behind.
Profiles of Strengths and Weaknesses in Dyslexia and Other Learning Difficulties

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The present evidence suggests that a profile of cognitive and educational development, including areas of strength and weakness, would better identify the nature of an individual’s difficulties and provide the most effective way to inform educational programs.

Allow the Models to be Further Tested and Revised Based on Research Before Discarding Them