Pattern of Strengths and Weaknesses In Specific Learning Disabilities: What’s It All About?

Oregon School Psychologists Association
SLD Pattern of Strengths and Weaknesses Committee
Technical Assistance Paper to the Oregon Department of Education

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Abstract

Because of changes in federal law, school teams can identify and serve children with specific learning disabilities (SLD) earlier and more effectively. The Individuals with Disabilities Education Improvement Act (IDEA 2004) provides a definition of SLD and general conceptual frameworks for identifying and intervening with children. These include Response to Intervention (RTI) and Pattern of Strengths and Weaknesses (PSW). Pattern of Strengths and Weaknesses allows alternative research-based methods to identify and intervene with students with SLD. Since the Oregon Department of Education (ODE) has a technical paper on RTI, this paper concentrates on PSW.

The necessity for using science to inform policy and practice:

Science must inform law. State regulations are based on federal law. In turn Local Educational Agency (LEA) policy is based on state regulations. Identification and intervention in actual schools with actual kids is dictated by LEA policy. Researchers use results from work in the schools. Work in the schools determines the actual effectiveness of research-based methods of identification and intervention, methods that research initially proposed. This is the ideal feedback loop. It is imperative that science not be lost in any step of this process. In the real world, identification at the local level continues to be a significant challenge. If teams are not provided with coherent, concise, and meaningful information on best practices, then no improvements in educational outcomes will be possible. Local practices will not be based on a comprehensive review of new and relevant research. Practices among school districts will vary even more widely than before. Students will not receive assessment that is diagnostically accurate, educationally relevant, or socially and emotionally helpful. This paper is intended to offer solutions to solve these problems by providing the science required to make good decisions about policies.

Operationalizing Pattern of Strengths and Weaknesses (PSW): the basic elements

Generating operational definitions (working models) of PSW forces the Local Educational Agency (LEA) to use both law and research. Most local districts and school psychologists are establishing “tools and rules” in six possible comparison areas:

(a) Achievement related to age;
(b) Performance related to age;
(c) Achievement related to state approved grade-level standards;
(d) Performance related to state approved grade-level standards;
(e) Achievement related to intellectual development;
(f) Performance related to intellectual development.
Most districts used six boxes on a page to visually represent these six areas (e.g., see Eugene 4J, 2008, Redmond, 2008, attached). The Oregon School Psychologists Association (OSPA) PSW Committee’s “Simplified PSW Matrix” is also attached.

Three research-based models of PSW:

Districts/teams may choose among three major research-based PSW models. Each of these three PSW models follows **four general principles**.

1. **First**, the Full Scale IQ is irrelevant except for Mental Retardation (MR) diagnoses.

2. **Second**, children classified as SLD have a pattern in which most academic skills and cognitive abilities are within the average range. However, they have isolated weaknesses in academic and cognitive functioning. This conforms to Sally Shaywitz’ (2003) declaration that dyslexia is “an isolated weakness in a sea of strengths.”

3. **Third**, each model demands that we “match” deficits in specific cognitive processes to the specific area of academic concern without testing children with numerous measures in an attempt to find a deficit.

4. **Fourth**, most cognitive abilities that do not relate to the area of academic concern are average or above.

The first model is called the **Ability-Achievement Consistency model** proposed by Flanagan, Ortiz & Alfonso. (2007)

- This model documents low achievement in a specific area, identifies a deficit in a cognitive ability that is linked by research to the academic weakness, and provides a method to determine that most cognitive abilities are average or above.

- This model is based on Cattell-Horn-Carroll (CHC) intelligence theory. CHC theory has a vast research base. Data sets from over half a million administrations of different cognitive and neuropsychological tests were used to determine what the actual specific human cognitive abilities are. Instead of relying on opinion or observation, CHC has developed a factor structure based on fifty years of research on all kinds of intelligence tests. When using this model, practitioners are not limited to any one test or group of tests. The Essentials of Cross Battery Assessment –Second Edition (EXBA-2) describes CHC theory and provides guidelines for assessment with these different tests.

- CHC has particular utility for discriminating between cases of borderline intellectual functioning (and mild mental retardation) and SLD. CHC discriminates between normally developing English Language Learners (ELL) students and ELL students with SLD. In particular, EXBA-2 includes software
files that allow practitioners to operationalize “an otherwise normal ability profile” (the SLD Assistant) and determine PSW patterns for ELL learners (Culture-Language Interpretive Matrix [C-LIM]).

The second model is the **Consistency-Discrepancy model** proposed by Naglieri (1999, p. 86-94)

This model is described in Essentials of Cognitive Abilities Scale (CAS) Assessment. Consistency-Discrepancy model is founded on PASS theory, a version of the Luria model of intelligence. PASS theory postulates that the four human cognitive abilities are Planning, Attention, Sequential Processing and Simultaneous Processing. It provides research-based definitions of a significant difference. The model provides research linking CAS assessment to effective instruction in cognitive and academic skills.

Consistency-Discrepancy uses the Cognitive Assessment System (CAS) along with various achievement tests to find four relationships or matches: a processing strength to academic strength (no significant difference), a processing strength to academic weakness (significant difference), a processing weakness to academic weakness (no significant difference), and a processing strength to processing weakness (significant difference).

Finally, Hale & Fiorello (2004, p. 180) propose the **Concordance-Discordance model**.

- Concordance-Discordance is a part of Cognitive Hypothesis Testing (CHT). Assessors must demonstrate the ecological validity of cognitive testing results by observing any signs of cognitive weaknesses in the actual learning environment (classroom).

- These “signs” are observed by documenting students’ academic “behavior,” such as writing a paper with vibrant vocabulary (strength) and extremely poor spelling (weakness). The strength would be related to the child’s excellent verbal reasoning and language skills, and the weaknesses would be because of poor phonological awareness ability. Academic “behavior” might be considered another word for “performance” in PSW jargon. There must a concordance (alignment) between cognitive, academic and behavioral strengths. There must also be a concordance (alignment) between cognitive, academic and behavioral weaknesses.

- CHT also (a) requires replicable results among test batteries, (b) demand that assessors analyze the task demands of any subtest they administer if scores vary on tests measuring the same factor, (c) bases any conclusion about a child’s functioning upon what we know about brain function, and (d) provides utility in designing appropriate interventions. Unlike the Consistency-Discrepancy model, it allows the use of almost any appropriate cognitive or neurological assessment battery. However, Hale and Fiorello (p. 135) point out that most single test
instruments are not sufficient to fully understand the abilities of any given student. They recommend a more thorough assessment battery. They write:

Using an intellectual/cognitive measure (e.g., the Woodcock-Johnson III [WJ-III]), a fixed battery (e.g., the Halstead-Reitan), and additional hypothesis-testing measures (e.g., subtests from the Comprehensive Test of Phonological Processing [CTOPP]) might be the ultimate approach for conducting CHT.

PSW model of academics only

There is only one research-based “academics only” model, proposed by Fletcher, Lyon, Fuchs and Barnes (2007). Because the law only requires one of the six possible comparison areas to be used to determine SLD identification, some districts might be tempted to adopt an “academics only” model. They might neglect any assessment related to intellectual development, other than to rule out MR. This would fit the legal requirement but it is not best practice. Fletcher’s categories do not align with federal categories of SLD. The model makes an assumption rather than provides documentation of disorders in basic psychological processes. Therefore, it does not address the federal definition of a learning disability. That definition, found in United States Code (20 U.S.C. §1401 [30]), reads as follows:

"The term 'specific learning disability' means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations.

Other country’s definitions of SLD are even more detailed than that of the United States. The Learning Disabilities Association of Ontario, Canada definition of SLD is consistent with the conception of SLD as isolated weaknesses within a sea of strengths.

“Learning Disabilities refers to a variety of disorders that affect the acquisition, retention, understanding, organization, or use of verbal and/or nonverbal information. These disorders result from impairments in one or more psychological processes related to learning in combination with otherwise average abilities essential for thinking and reasoning. Learning disabilities are specific, not global, impairments and as such are distinct from intellectual disabilities…the term “psychological processes” describes an evolving list of cognitive functions. To date, research has focused on functions such as: phonological processing, memory and attention, processing speed, language processing, perceptual-motor processing, visual-spatial processing, and executive functions (e.g., planning, monitoring, and meta-cognitive abilities).

The academics-only model ignores new research into the utility of neurological assessment and represents a refusal to acknowledge and use all branches of current knowledge. A higher-level integration of all branches of current knowledge is essential
for school teams to help kids most efficiently. The “academics only” model’s “categories” are based upon old neurological research (Morris & Fletcher, 1998; Fletcher, Morris, & Lyon, G.R., 2003), research whose own authors (Fletcher, Lyon, Fuchs, & Barnes, 2007) stipulate, “Must be viewed with caution.”

The Fletcher et al. model establishes patterns of strengths and weaknesses in several academic areas and implies associated neurological deficits. Fletcher cautions that “these patterns are prototypes; the rules should be loosely applied.” (p. 81) The patterns are:

1) Word recognition & spelling that are <90 standard score on standardized achievement testing. (This assumes but does not document that the student’s phonological awareness are poor and his/her spatial & motor skills are good);

2) Reading fluency <90, accuracy good (This assumes but does not document that a student’s automaticity is a problem and his/her Rapid Automatic Naming [RAN] is poor);

3) Reading comprehension <90, 7 points below word reading (vocabulary, working memory & attention poor, phonics good);

4) Math computations <90, all reading good (executive functioning, working memory & attention poor, phonics and vocabulary good);

5) Spelling <90 (residuals of poor phonics, fluency often impaired); and

6) Word recognition, fluency, comprehension, spelling & math <90 (language and working memory poor).

Although well known, the Fletcher et al model has serious flaws and it is not recommend for use on Oregon schoolchildren. RTI, and RTI with the addition of an “academics only” model is a step forward from the IQ/Achievement Discrepancy Model RTI plus PSW with any of the three recommended cognitive/achievement models is a step forward from RTI with the “academics only” model.

Recommendations for PSW model selection

The Aptitude-Achievement Consistency model and CHC theory are the most immediately useable to current practitioners, the most representative of abilities relating to achievement, and the best researched. When using CHC theory, practitioners usually choose the WJ-III or the KABC-II/KTEA-II for assessment purposes because these tests have the most extensive representation of CHC abilities. The DAS-II and CAS also have many advantages. The WISC-IV and the SB-5 must be supplemented with other tests to measure all CHC critical abilities for early reading and math achievement (see attachment and Flanagan, Ortiz & Alfonz, 2007, as summarized below).
CHC theory has determined that there are several critical cognitive factors (broad abilities) related to reading achievement. These include:

- Auditory Processing (Ga), including Phonetic Coding (PC)
- Comprehension-Knowledge (Gc), including Lexical Knowledge (VL) and General Information (K0),
- Long-Term Storage and Retrieval (Glr), including Associative Memory (MA) and Naming Facility (NA) or Rapid Automatic Naming (RAN)
- Processing Speed (Gs), and
- Short-Term Memory (Gsm), including Working Memory (MW).

The Working Memory Clinical Cluster and Phonemic Awareness-3 Cluster have proved more powerful in predicting reading achievement than their respective broad abilities.

CHC theory has also determined that there are several critical cognitive abilities for math calculation and reasoning. These include:

- Fluid Reasoning (Gf), including Induction (I) and General Sequential Reasoning (RG),
- Gc,
- Glr (including NA and MA),
- Gs,
- Gsm, and WM.

Since written expression is such a complex academic behavior, we do not have sufficient space to address its neurology. For writing and spelling information, please see the guidance in EXBA-2, and the work of Virginia Berninger at the University of Washington. (see references)

**CHC: Framework for non-discriminatory assessment**

Although assessors may be mandated by IDEA to conduct nondiscriminatory assessments, psychometric and curriculum-based models are not sophisticated enough to factor out the roles that race, culture, and social class play on students’ responses to test stimuli. School teams need a framework for selecting, administering, and interpreting standardized cognitive assessment data from English and native language tests. Such a framework must include research on the cultural and linguistic impact on test performance. Flanagan and Ortiz (2001) developed a framework that holds promise for
nondiscriminatory assessment and interpretation of results when ELL students are assessed in English.

The updated electronic version of the matrix is available in EXBA-2. Flanagan and Ortiz organized tests of cognitive ability according to three characteristics:

(a) The broad and narrow abilities they measure according to CHC abilities;

(b) The degree of cultural loading; and

(c) The degree of linguistic demand.

They called these groupings the Culture-Language Test Classifications (C-LTC).

In addition to assisting in non-biased test selection with the C-LTC, these researchers concurrently developed the Culture-Language Interpretive Matrix (C-LIM), a framework for evaluating the relative influence of cultural and linguistic factors on test performance. The C-LIM was designed to address the fundamental question in the evaluation of diverse learners: whether the measured performance is a primary reflection of actual ability or simply one of cultural or linguistic difference.

**PSW for ELL students**

After the assessment is complete, the individual subtest scores are recorded into one of the nine cells on the C=LIM (Ortiz’s matrix). If tests from more than one assessment battery are used, the computer program converts the scores into a common metric \([X=100, SD=15]\). When interpreting an ELL student’s pattern of strengths and weaknesses, assessors examine the average of each cell on the C-LIM and compare them across cells from left to right, and down cells from top to bottom. It is not the normative position of the scores (high, moderate, low) but the relationships between the scores and the degree to which they form a pattern that is significant.

Three general patterns may emerge:

(a) Scores decrease as they move down the cells in the matrix (the effect of cultural loading only),

(b) Scores decrease as they move across the cells from left to right in the matrix (the effect of linguistic demand only), or

(c) Scores in or near the upper left corner of the matrix may be higher than scores at or near the bottom right corner (the overall effect of both culture and language).

When patterns emerge from the data that are not consistent with the expected general pattern of performance for ELL students, then practitioners should base interpretation on intra-cognitive analysis: when the patterns diverge from the expected pattern, attenuated
scores may not simply reflect an individual’s cultural and linguistic difference, but may reflect an inherent neurological weakness in a basic psychological process, and thus, a learning disability.

Cautions for native language cognitive assessment

Many assessors use native language cognitive tests believing that they are not biased against students when the students are assessed in their native language. It is critical to understand, however, that US bilingual students often do not have a solid language foundation in their native language or English. These students live in two linguistic worlds. At present, these students are not adequately represented in the normative samples of either English or native language tests. It is unlikely that they can ever be adequately represented in normative samples given the variety of factors such as language proficiency levels, acculturation levels, educational experiences, immigration patterns and so forth. Assessors are required to use tests whose normative samples include children from the cultural and linguistic group of the child being assessed. Therefore, assessors must pay close attention to emerging research on English Language Learning. Fortunately, research on the assessment of ELL students is currently underway. Recommendations for using native language tests are forthcoming. Brown (2008) studied the patterns of performance of ELL (dual language) students assessed using the Bateria Woodcock-Johnson III Pruebas de habilidades cognitivas (Tests of Cognitive Abilities). In her study, she found that as a group, the ELL students scored thirteen points lower in General Intellectual Ability (GIA) when compared to the normative sample (mean = 100), a pattern found when students are assessed in English (Sanchez, 1934; Vukovich & Figueroa, 1982). Brown also found that the ELL group scored significantly lower on three broad ability factors (Gc, Glr, Gsm) than the normative (single-language/culture) comparison group and significantly higher on one factor (Ga). When she compared the patterns found to the WJ III (the English parallel of the Bateria III) C-LIM, the patterns were not entirely similar. Brown proposes a Bateria III C-LIM for use in interpreting the Spanish score patterns.

Formulating decision rules (cut-off points) for special education eligibility

When a school district chooses a particular PSW model, it usually follows the model’s recommendation for cut off points for eligibility. For example, the cut-off points for age relative to intellectual development are included within each of the three recommended models. The cut-off points for Aptitude-Achievement Discrepancy are described in EXBA-2 and operationalized in the SLD Assistant. The cut-off points in Consistency-Discrepancy are in Essentials of CAS Assessment. The cut-off points for Concordance-Discordance are within the statistical tables of the actual tests used.

The cut-off points for using measures such as the BRIEF to document observable “behaviors” related to the performance of intellectual tasks (performance relative to intellectual development) are included in the BRIEF scoring program and technical manual.
When teams are using boxes other than age/performance related to intellectual development, the cut-off points are determined differently.

- **When determining performance relative to age**, most districts use report cards and/or classroom observations. Most LEAs are determining As and Bs to be strengths and Ds and Fs to be weaknesses. Many school psychologists also use structured observations to determine students’ rates of on-task behavior compared to same-sex peers.

- **For achievement relative to state standards**, most districts use state grade-level achievement test (OAKS) scores. “Meets” and “Exceeds” are strengths and “Does Not Meet” is a weakness, with “Conditionally Meets” requiring more data.

- **For performance relative to state grade level standards**, many districts use standards-based report cards. Others use portfolio assessments of specific standards-based skills taught in general education classes. Others use the Oregon State Standards Matrix, attached. The matrix is a device based on the actual skills required for proficiency for K-2 students. It allows teams to use a variety of sources, including progress monitoring, teacher tests, standardized academic/cognitive/language tests, portfolios, and work samples to determine students’ current skill levels when they are not taking state testing that year.

- **For determining achievement relative to age**, teams must use more technically adequate measures than report cards, observations, and group achievement test scores. Teams usually use individually administered standardized tests with adequate technical properties. These tests require a greater degree of knowledge to administer and interpret. In addition to meeting the requirements set for in the test publishers’ guidelines, qualified assessors must also be familiar with measurement issues listed below.

**Critical measurement issues in PSW (Red Flags):**

When using standardized tests in their model of PSW, school districts must know what scores to use and how to quantify what “strength” means and what “weakness” means.

**First**, teams must distinguish between normative and relative strengths and weaknesses. (ODE, Form 581-5148i-P [Rev 6-07] Page 6A) A **normative weakness** is reflected in a standard score below 85, or below 90 if using the recommended educational descriptors. (Mather & Woodcock, 2001, p. 73) PSW models require that students must demonstrate a normative weakness in achievement and in a related cognitive ability. A **relative weakness**, in contrast, is a weakness in achievement or a cognitive ability compared to (a) the average of a student’s other achievement or cognitive scores, or (b) compared to another
specific achievement or cognitive score. Both normative and relative weaknesses are important to consider in SLD identification. (Reynolds & Shaywitz, in press)

Practitioners must often use references to normative and relative weaknesses in explaining assessment results. Nevertheless, school districts must sometimes establish cut off scores to prioritize service delivery based on available resources. If LEAs use normative weaknesses as a requirement for SLD identification, however, they must also take responsibility for determining how to serve their very bright dyslexic students who have a PSW based on relative weaknesses (e.g., a student with Gc, Gf and Gv in the very superior range, MW [working memory] in the average to low average range, and average to low average reading achievement. This is the student who struggles to understand and keep up with reading assignments in the classroom).

Second, teams must be very aware that standard scores are not the most descriptive and ecologically valid statistical evidence derived from norm-referenced tests. Equal interval scores (Jaffe, in press) provide a better method of determining the need for supplemental reading instruction in early grades than do standard scores. The WJ-III W Score and Relative Proficiency Index (RPI) of the WJ-III are examples of Rasch equal interval scoring. (Mather & Woodcock, 2001, p. 68-70)

The RPI describes students’ mastery of age or grade-level academic material. The RPI indicates that K-2 students scoring up to a Standard Score of 92, and with deficits in a basic psychological process, might require accommodations and/or additional instruction.

Third, teams must consider if a strength or a weakness is clinically meaningful, even if it is statistically significant. For example, if a student has a statistically significant weakness in visual-spatial thinking on the WJ III COG, this weakness does not relate to early reading achievement and is not clinically meaningful. To determine that a student has a pattern of strengths and weaknesses in intellectual development relevant to the identification of SLD based on a low Gv score would be a misapplication.

Fourth, if teams use standard scores, they must determine the relationship among scores, and what the pattern means. The relevancy and irrelevancy of specific cognitive abilities to specific achievement areas must be addressed by knowledge of the applicable research. The responsibility for determining what patterns are relevant to the identification of SLD might fall to the school-based evaluation team. The federal statute states: a team of qualified professionals, including the student’s parent, must make eligibility determination. Such determinations should take into consideration all relevant tests and other evaluation materials compiled as a part of the evaluation processes. Teams might find it much easier to justify their eligibility decision in due process or court hearings if they have not ignored the past fifty years of research into the relevancy of neurological/cognitive factors in SLD identification, and if they have included these measures in their compilation of relevant data.
Multiple data sources required

Teams must be fluent with their knowledge of child neuropsychology and statistics. They must also be fluent in their knowledge of the relevancy and the limits of all assessment measures, particularly standardized test scores. Over-reliance on standard scores might overshadow the other components necessary for a comprehensive evaluation. Moreover, over-reliance on standard scores and set cut-off points might be statistically problematic no matter how refined the measure. Suhr (2008) emphasizes that SLD diagnosis goes far beyond examining numbers:

Extensive and integrated psychological assessment training is well beyond simply learning to administer tests in a standardized fashion and following the manual to score them and look for statistical discrepancies. It requires that information gathered through behavioral observation, collateral report, school records, medical and neurological records, and administration of standardized tests be integrated and applied, based on psychological and neuropsychological science, to the test patterns seen in a given evaluation. Concretely, it requires more than a quarter- or semester-long course focused on administration and scoring of intellectual and achievement tests.

A comprehensive evaluation includes a developmental history. One of the best resources for school psychologists is Sally Shaywitz’ Overcoming Dyslexia. This book details how to take good developmental histories, family histories, and medical histories. It provides many of the details teams need to know to diagnose and treat SLD. School teams must also examine cumulative and classroom records and additional information provided by the teacher and parent.

Histories, interviews, and school records are particularly important when considering if a student with an “executive functioning” disorder has a learning disability, or instead, if problems like working memory or processing speed deficits are manifestations of Attention-Deficit/Hyperactivity Disorder (ADHD) or Autism Spectrum Disorder (ASD). Students with ADHD and ASD often have executive functioning deficits similar to those of students with SLD. (Gioia et al., 2000, pp. 2-3) Only a sufficient developmental, family, medical, and school history-and further assessment for other IDEA disabilities-can help teams make accurate diagnostic decisions and use appropriately prioritized interventions.

A comprehensive PSW evaluation helps teams reduce identifying students with SLD when they are not SLD (Type I errors). Some students do not respond to intervention and do not demonstrate a weakness in one of the basic psychological processes. If the testing were valid and wide enough in scope to measure all salient factors, the team must examine exclusionary factors or another IDEA disability that might more adequately explain the student’s lack of progress. Some practitioners report that up to one-third fewer children are being identified as having a SLD under a combined RTI/PSW model because either exclusionary factors (attendance, environmental factors, etc.) or
other disabilities (ADHD, emotional disturbances) are the primary reason for a student’s underachievement.

Interventions based on PSW: Current status of research-based third-tier interventions:

Third Tier PSW evaluation is linked to instruction. In short, if a child has:

A. Phonological deficits, teach phonemic awareness;
B. Associative Memory problems, teach phonics with mnemonics;
C. Working Memory problems, use multi-sensory instruction;
D. Verbal difficulties, teach vocabulary and verbal reasoning;
E. Fluid Reasoning difficulties, provide explicit instruction in problem-solving approaches;
F. Rapid Automatic Naming deficits, teach fluency;
G. Processing Speed deficits, teach fluency.

This short list is not a cookbook or a prescription. Each student’s PSW must be interpreted with good data and excellent clinical team judgment in order to be of use. Although it is a more complex process than just using the list above, using PSW to guide third-tier interventions allow teams to select interventions that are individualized to the child’s neurological functioning. Therefore, interventions stand a better chance of success. In fact, some research shows that appropriate, targeted instruction can improve both achievement and some cognitive abilities. (Shaywitz, 2003, pp. 71-89) Using the intervention with the best chance of quick success is critical. Other methods of selecting interventions do not allow the precision of problem solving that PSW provides. RTI alone uses either (a) a standard protocol (if students does not succeed, teams must use a standard intervention) or (b) a problem solving approach (teams must make educated guesses at what will work based on students’ past academic performance).

In addition to using PSW-based third-tier interventions, we must gauge students’ responses to those interventions. RTI does not stop with PSW. In addition to using our progress monitoring methods, we must observe our relationship to students and the students’ relationships with us. The feelings the child has toward the teacher, and the teacher to the student, are critically important in fostering a safe and effective learning environment. (Suldo et al., 2008) Students also have a relationship with the learning material. Students tell us by their behavior and by their interests what instruction, pace, and accommodations work for them. Even when using high interest materials, it is important for students to maintain a high level of success. Research from Bethel School District (Brown & Kowalko, 2008) indicates that students in intervention groups learn most rapidly when their mastery level is between ninety-two and ninety-four percent. Research on accommodations is also being conducted.

Further literature of interest is below:

1. Das et al. (1994), Naglieri & Gottling (1995), and Naglieri & Johnson (2000) demonstrate that improving reading and mathematics is possible by improving
Simultaneous and Successive Processing scores using the PASS Remedial Program (PREP). On page 529, Naglieri and Johnson summarize their 2000 study:

Data showed that children with a Planning weakness benefited from the instruction designed to help them be more planful. Those children who received the planning-based instruction who were not low in planning did not show the same level of improvement.

2. A recent meta-analysis of Aptitude-Treatment Intervention Effect research (Kearns and Fuchs, 2008) offered the following conclusions:

(a) Cognitive interventions may improve cognitive outcomes for students with cognitive deficits,

(b) Academic outcomes for students with cognitive deficits were higher when cognitive interventions were in place,

(c) Academic outcomes for students using cognitive interventions were better than when the students received academic interventions alone, and

(d) Academic outcomes were greater for students with particular cognitive deficits.

3. Other studies link PSW evaluation with features of curricula, teaching techniques, and educational environments:

(a) Feifer (2008) demonstrates that teaching monitoring/self-monitoring of “top down” meaning-making strategies such as morphology, prefixes, suffixes, and context cues improves reading outcomes. Students work from the word level to the sentence/paragraph level in order to de-emphasize the temporal-parietal system and emphasize visual word-form association areas. If a student has PSW deficits in these brain areas, the meta-cognitive strategies will be particularly useful.

(b) Keene & Zimmerman (1997) write that students with poor reading comprehension and adequate decoding, who often demonstrate problems with oral language, crystallized intelligence and fluid reasoning, profit from training in meta-cognition, accessing visual-spatial imagery skills, linking old to new information, and explicit teaching of Theme Identification.

(c) Berninger et al. (2007) suggest that multi-sensory instruction that includes hand movement (e.g., PAL, Slingerland, Orton-Gillingham) improve reading outcomes for children with memory deficits. Berninger & Richards (2002, pp. 320-321) provide a comprehensive review of how to teach reading based on students’ cognitive abilities. The basic principals
are (a) developmentally appropriate instruction, (b) working around working memory deficits, (c) establishing mastery for fluency, (d) integrating codes of information so the child can learn through associations and connections, and (e) provide concrete activities and strategies for monitoring/self-regulation.

(d) Berninger et al. (2008) provide evidence that genetics, brain, and behavior are linked in the expression of dyslexia. They recommend that teachers of students with executive functions and working memory deficits focus mainly on morphological word form.

(e) Swanson & Saez (2003) write that in-depth training in self-monitoring, generalization skills, integration of cognitive strategies within the academic curriculum, and frequent teacher feedback improve reading in children with memory span deficits. Swanson (2008, p. 48) recommends online reading comprehension for student with working memory deficits.

(f) Fletcher et al. (2003) write that students with phonemic awareness, RAN, and memory span deficits had to learn sight words first and then internal phonological structure.

(g) Phonological awareness can be taught by a number of research-based methods.

(h) Students with deficits in associative memory profit from explicit teaching in the alphabetic principle (PAL Alphabet Retrieval Games, Rewards, Phonics for Reading, Corrective Reading, Early Reading Intervention, etc.)

(i) Interventions for poverty, the home environment’s value of literacy, and the teacher’s pedagogical style (Grigorenko, 2007) should be considered if they are impairing a student’s reading outcomes regardless of RTI or PSW status.

More research on the links between neuroscience, cognitive science, dyslexia, and intervention is being conducted presently. There is currently a great need for further research on third tier interventions. Nevertheless, we must use all of the best current research in RTI and PSW if we expect our students to make adequate academic progress.

Conclusions

OSPA and other organizations recommend that LEAs develop integrated RTI/PSW models of SLD identification and intervention. This approach includes:
1) Scientifically based core reading curricula for all students and universal academic and/or functional screenings to help determine student performance and growth in core skills,

2) Additional interventions for students who have been identified by universal screenings or other methods for being at risk for academic failure along with more frequent progress monitoring that allows for changes in the intensity, frequency and content of instruction, and

3) Comprehensive evaluation including standardized achievement and cognitive testing for students who do not respond to interventions. Cognitive testing may be used in order to determine why the student is not responsive to instruction, to determine if a pattern of strengths and weaknesses relevant to the identification of a learning disability exists, and to develop more targeted and effective interventions.

As educators, we have the responsibility to be aware of the strengths and weaknesses of RTI and PSW approaches, and to use both for the benefit of our students.

Limitations of PSW and directions for further research:

- PSW that is based on cognitive abilities alone does not address the sensory input or motor output requirements of students’ academic performance, as it relates to intervention. For a fuller discussion, see School Neuropsychology. (Hale & Fiorello, 2004)

- As mentioned, current comprehensive cognitive test batteries do not measure visual processing in a way that relates to reading. We might therefore under-identify students with orthographic dyslexia. More research is currently underway on visual processing, its relationship to achievement and instruction (Eden, 2005; Hoein and Lundberg, 2000, McCallum et al., 2006).

- Although some combined RTI/PSW models may reduce the number of students identified SLD by about one-third, some models of PSW might not. This might affect identification rates and district funding allocation.

- PSW requires expertise and courage. Scott L Decker (Personal Communication, October 16, 2008) writes:

  As we move toward a more "expert" model of diagnosis, meaning you have to think critically about numerous variables that may not always be perfectly captured by criteria, novices who begin using the system might fall prey to testing until they find a deficit, thus increasing Type 1 errors, and they might use information that is not clinically meaningful in order to justify eligibility and provide services. This practice was common with the IQ/achievement discrepancy and provided critics of norm-referenced
assessment fodder for their arguments. We have the responsibility to speak up when an exclusionary factor is the main reason for a student’s lack of progress, even when the school district reports it does not have the funds or partnerships, for example, to intervene in matters of cultural or economic disadvantage.

- Finally, PSW requires well-trained evaluators and IEP teams to implement with fidelity. This necessitates increased professional development and increased recruitment and retention of qualified personnel. OARS (581-015-2170 [2], 581-015-2110 [4] [a] [D] & [E]) require that the eligibility team includes a person qualified to conduct individual diagnostic evaluations using instruments that meet OAR requirements, such as a school psychologist or speech pathologist, and that assessments and other evaluation materials must be administered by trained and knowledgeable personnel in accordance with any instructions provided by the producer of the assessments. Finding such people might prove more difficult than expected.

Advantages of PSW

- (a) Addresses the “psychological processing” component of the SLD definition that is not identified by RTI,
- (b) Constructs are scientifically based,
- (c) Provides information about cognitive abilities that are relevant to the identification of a learning disability,
- (d) Helps teams meet the requirement for a “comprehensive” evaluation,
- (e) Allows for differential diagnosis,
- (f) Might guide more effective interventions than RTI alone,
- (g) Can explain what functions can be remediated versus what functions require accommodations, and
- (h) Might provide more convincing information in court cases that end in litigation. (Feifer & Della Toffalo, 2007)

Finally, PSW lets teachers, parents and students know why an academic problem exists. It lets them know why a student does not respond to intervention. This information can be emotionally as well as educationally relevant. As Suhr (2008) writes,

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

References


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