A Practical Solution to the California Dyslexia Guidelines

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Introduction

The *California Dyslexia Guidelines* are based on the International Dyslexia Association definition which states that Dyslexia is a Specific Learning Disability (SLD) that is neurobiological in origin manifested by difficulty with word recognition and/or fluency skills, reading decoding, and spelling skills. These reading problems are associated with the phonological aspect of language, occur despite sufficient instruction, and are inconsistent with cognitive ability. The guidelines clearly state, that Dyslexia is one type of a specific learning disability as defined by California's special education regulations. That is, SLD is "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may have manifested itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, *Dyslexia* (italics added), and developmental aphasia". To meet this definition (which is the same as that used in IDEA), we suggest that assessment of Dyslexia should include evaluation of basic psychological processes as well as reading and related skill difficulties despite good instruction.

How to Assess Dyslexia

Several methods for SLD eligibility determination that includes examining the pattern of strengths and weaknesses (PSW) in academics and cognitive processing have been suggested by Naglieri (1999), Hale and Fiorello (2004), and by Flanagan, Ortiz, and Alfonso (2007). These authors have a similar goal: to present a procedure to detect a PSW in scores that can be used to identify an SLD (sometimes referred to as a third option; Zirkel & Thomas, 2010). Despite differences these authors have in their definition of a basic psychological process and how to determine if a student has a "disorder", they all rely on finding a combination of differences as well as similarities in scores. The PSW approach we use is called the Discrepancy/Consistency Method which we have operationalized with the application of A. R. Luria's conceptualization of the basic psychological processes.

Naglieri and Otero (2017) proposed that Luria's (1973, 1980) description of brain function could be used to define the basic psychological processes referenced in the definition of

SLD. There are four basic processes within Luria's description of functional units. The first is *Planning*, which provides cognitive control; intentionality; organization; self-monitoring and self-regulation. Planning is associated with the frontal lobes. *Attention* provides focused, selective, sustained, and effortful activity over time and resistance to distraction and is associated with the brain stem, and targeted cortical areas in the frontal lobes. *Simultaneous* processing provides the ability to integrate stimuli into a coherent whole, and is usually found on tasks with strong visual-spatial demands. Finally, *Successive* processing involves working with stimuli in a specific serial order, including the perception of stimuli in sequence and the linear execution of sounds and movements.

Importantly, it is Successive processing which is the primary cause of difficulties with accurate word recognition, poor phonological, decoding and spelling skills as well as the resulting diminished reading comprehension problems associated with Dyslexia (Naglieri & Otero, 2017). Additionally, Simultaneous processing tends to be the underlying cause of difficulties with text orthography and seeing words as a unique whole, a key process in developing reading fluency. The solution to the Dyslexia conundrum is to measure specific psychological processes that underscore both reading accuracy and reading fluency in a manner that is consistent with both State and Federal mandates. We will describe and illustrate two case studies in order to demonstrate a theoretically sound and psychometrically strong procedure for defining 'basic psychological processes' in State and Federal guidelines, and to provide a defensible approach to both identify and remediate students with Dyslexia.

Determining if a student's difficulty with word recognition, reading decoding, phonological and spelling skills is related to a 'disorder in one or more of the basic psychological processes' can best be accomplished using the Discrepancy / Consistency Method. The presence of Dyslexia can be uncovered through analysis of PASS and achievement test scores (assuming the student has had adequate instruction). The method begins with a systematic examination of variability of PASS scores to determine if there is evidence of a PASS cognitive weakness. Naglieri (1999) defined a cognitive weakness as one of the four PASS scores that is significantly lower than the student's average PASS score *and* that low score is below normal (typically in the 80s or lower). PASS scores are assessed using the *Cognitive Assessment System-Second Edition* (CAS2; Naglieri, Das & Goldstein, 2016)

The CAS-2 can be used as a comprehensive measure of basic psychological processes for learning, and paired with the *Feifer Assessment of Reading* (FAR; Feifer, 2015) as a comprehensive measure of academic and linguistic processes used for reading. Together they can help determine a child's learning needs, as well as target specific recommendations. Figure 1 provides an overview of the Discrepancy/Consistency Method. For instance, a cognitive weakness on the Successive Scale from the CAS2 would be placed in the lower right side of the triangle. Conversely, good scores, for example on the Planning, Attention and Simultaneous scales from the CAS2 would be placed in the top portion of the triangle. Similarly, lower scores on, for example, the Phonological Index of the Feifer Assessment of Reading would be placed in the bottom left triangle, and stronger reading scores in the top portion of the triangle. Figure 1 illustrates the discrepancies among the four PASS scores and the differences between PASS and academic scores. Importantly, there is a consistency between the lower cognitive score (Successive) and the lower academic process (Phonological Index). This set of data provides evidence for dyslexia characterized by poor processing and academic difficulty.

Insert Figure 1 here

Two Types of Dyslexia

According to Peterson and colleagues (2013) review of various computational models of reading, both the "dual route" model and the "connectionist" model describe reading deficits as a breakdown in either (1) the phonological assembly of words or (2) the orthographic representation of words or both. For instance, children with *phonological dyslexia* often struggle with the "sub-lexical" components of reading, meaning that sequencing individual sounds to recognize the entire printed word form is impaired. Therefore, reading pseudowords are especially difficult for students who have difficulty with the phonological assembly of words because this task places such a high demand on Successive processing. In contrast, children with *surface dyslexia* struggle at the lexical level and have difficulty with reading fluency and speed. In other words, the orthographic representation of words is compromised, and the student has difficulty taking in the entire printed word form as a Simultaneous whole. These readers tend to have difficulty on phonologically irregular words *(I.e. debt, yacht, onion, etc.)* because these

words cannot be decoded in a sequential manner, and must be recognized as an orthographical unit.

There are three important points when analyzing the interplay between phonological and orthographical processes that children use to recognize the printed word form. First, children at different ages may rely on different processes at different points of time in their reading development. For instance, younger children tend to rely on phonological processes whereas older children on more orthographic ones (Borleffs et al., 2017). Since the IDA definition of dyslexia reiterates that reading difficulties may entail both accuracy and/or fluency deficits, examiners should assess for both *phonological* (Successive) and *orthographic* (Simultaneous) processes. Second, the interplay of orthography and phonology is greatly influenced by the child's native language. For instance, dyslexics in transparent orthographic systems, such as Spanish, German, Italian, Greek often have more difficulty with reading speed; whereas dyslexics in more opaque languages such as English, struggle more with reading accuracy (Suarez-Coalla et al., 2014). Therefore, the relative contributions of phonology and orthography varies depending upon the demands of the language that a student is reading. Third, knowledge of the semantic value of the word can be a mitigating factor to trigger word recognition that is not accounted for in each model. Therefore, strong vocabulary knowledge can be a compensatory factor that children use to mask weaknesses in a particular psychological process. In other words, it is much easier to use phonological and orthographic processes when there is some familiarity with what the word means, and in what context the word is being read. Consequently, it is incumbent among examiners to measure psychological processes independent of language skills in order to obtain a more ecologically valid score. The CAS2 provides clinicians with the ability to measure psychological processes in a relatively language free format, and thus should yield a more valid indicator of true performance.

ILLUSTRATIVE CASES:

Case 1- Phonological Dyslexia. Jacob is an 8-year-old 3rd grade student currently attending White Oak Elementary School. He was referred for a comprehensive psychological evaluation due to concerns regarding his poor reading progress, difficulty with decoding skills, and failure to respond to targeted interventions.

Insert Table 1 here

CAS2 Scores: Jacob's earned Average scores on the Planning, Attention, and Simultaneous processing scales, although a significant weakness was observed on the Successive processing scale. This suggested difficulty remembering information in a serial order, as well as sequencing symbols when problem solving. Successive processing is very important for academic tasks such as decoding words when reading, sounding out words when spelling, and remembering the algorithm or series of steps when solving longer math equations.

Insert Table 2 here

FAR Scores: Jacob's overall FAR Total Index was *86,* which was in the *Below Average* range of functioning, and at the *14th* percentile compared to peers. A significant weakness was observed on the Phonological Index, as he scored *75,* which was in the *Moderately Below Average* range and at the *5th* percentile compared to peers. His phonemic awareness skills were very inconsistent, as he struggled to blend, segment, and manipulate sounds in words. Jacob also had difficulty when applying decoding skills to both familiar and unfamiliar words in isolation. His overall passage comprehension skills were a relative strength. Using the Discrepancy/Consistency Method, Jacob presented the academic and cognitive processing profile of a student with Phonological Dyslexia.

Insert Figure 2 here

Case 2- Orthographic Dyslexia: Nelson is a 4th grade student attending Stoney Brook Elementary School. He has been receiving targeted academic interventions since 1st grade due to early reading difficulty, poor work completion, and difficulty with spelling and written

language skills. He has continued to struggle keeping pace with his peers and often failed to complete his work in a timely manner.

Insert Table 3 here

CAS2 Scores: Nelson earned Average scores on the Planning, Attention and Successive processing scales, however, a significant weakness was found on the Simultaneous processing scale. This scale measures the ability to work with information that is organized into groups and requires an understanding of how shapes, as well as words and verbal concepts, are inter-related. Lower Simultaneous processing can directly hinder a variety of academic skills such as spelling (difficulty conjuring up a visual spatial image of a word), reading fluency (poor text orthography), and mathematics (visualizing amounts).

Insert Table 4 here

FAR Scores: Nelson's overall FAR Total Index was *84,* which was in the *Below Average* range of functioning, and at the *14th* percentile compared to peers. A significant weakness was observed on the Fluency Index, as he scored *73,* which was in the *Moderately Below Average* range and at the *4th* percentile compared to peers. He worked slowly and laboriously when rapidly identify letters, struggled on most orthographic processing tasks, and was very inconsistent when reading a list of phonologically irregular words. In summary, Nelson's poor Simultaneous processing abilities are manifested in reading by his struggles with text orthography and difficulty processing the entire printed word form as a unique whole, thereby rendering him more of a sound-by-sound or letter-by-letter reader. Using the Discrepancy/Consistency Method (Figure 3) Nelson presented the academic and cognitive processing profile of a student with Orthographic Dyslexia.

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Figure 1. Conceptual Method

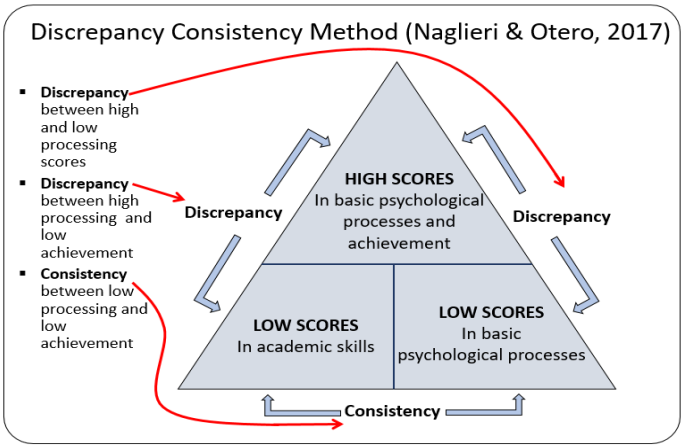

Figure 2. Jacob

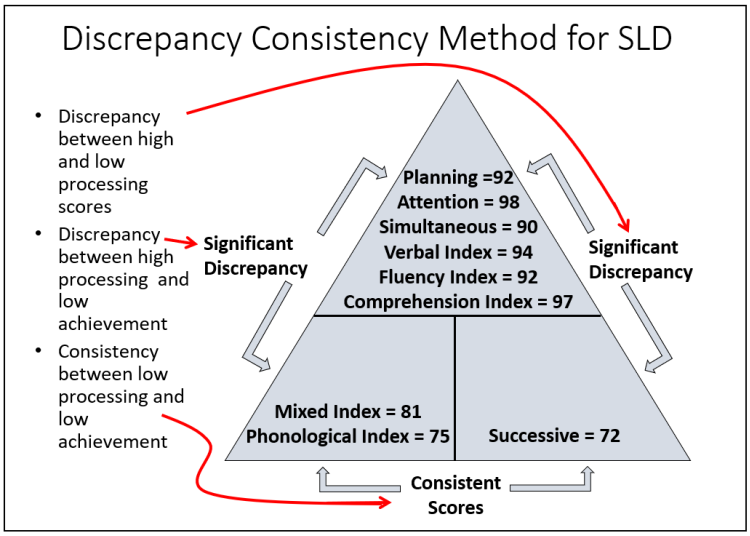

Figure 3. Nelson

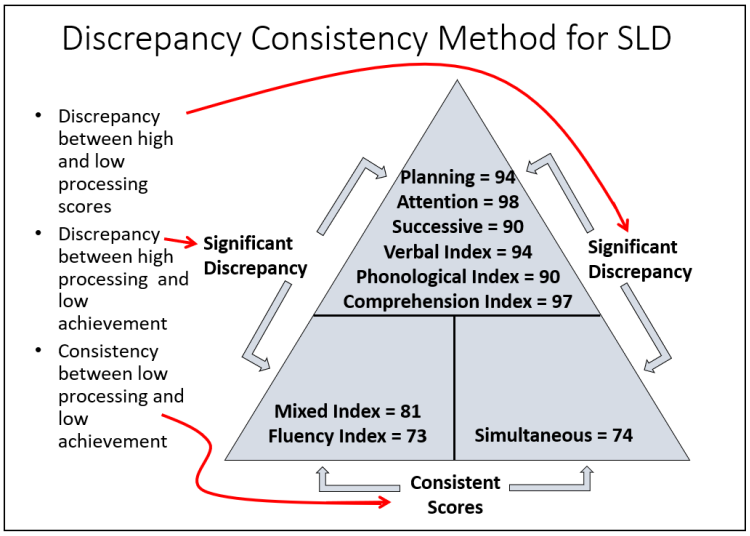

Table 1. Jacob's Cognitive Assessment System Second Edition (CAS-2) Results.

	Standard Score	Percentile Rank	Qualitative Descriptor
CAS-2 Planning	92	30%	Average
CAS-2 Attention	98	45%	Average
CAS-2 Simultaneous	90	25%	Average
CAS-2 Successive	72	3%	Very Low
CAS-2 Full Scale*	86	18%	Below Average

*Note: CAS2 Full Scale scores such as these are de-emphasized because of the significant variability of PASS scores which provide more valuable information. See Naglieri and Otero (2017) for more information.

Table 2. Jacob's Scores on the Feifer Assessment of Reading (FAR).

	Standard score	Percentile	Qualitative descriptor
Phonological Index	75	5%	Moderately Below Average
Fluency Index	92	30%	Average
Mixed Index	81	10%	Below Average
Comprehension Index	97	42%	Average
FAR Total Index	84	14%	Below Average

Table 3. *Nelson's Cognitive Assessment System Second Edition (CAS-2) Results.*

	Standard Score	Percentile Rank	Qualitative descriptor
CAS-2 Planning	94	34%	Average
CAS-2 Attention	98	45%	Average
CAS-2 Simultaneous	74	4%	Very Low
CAS-2 Successive	90	25%	Average
CAS-2 Full Scale	89	23%	Below Average

Table 4. Nelson's Scores on the Feifer Assessment of Reading (FAR).

	Standard score	Percentile	Qualitative descriptor
Phonological Index	90	25%	Average
Fluency Index	73	4%	Moderately Below Average
Mixed Index	81	10%	Below Average
Comprehension Index	97	42%	Average
FAR Total Index	84	14%	Below Average