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Comparison of Three Empirical Processing Strengths and Weaknesses Models for the Identification of Specific Learning Disabilities

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1. Objective and Introduction

The most recent reauthorization of the Individuals with Disabilities Education Act (IDEA; 2004) allowed states to use one of three methods for identifying and diagnosing specific learning disability (SLD) in children. One of the methods schools can use is any alternative research-based third method which analyzes cognitive and academic strengths and weaknesses (Flanagan & Alfonso, 2011). However, the ambiguity and flexibility of federal regulations regarding the third-method approach for SLD identification has led debate to ensue in the field of school psychology regarding which method is the most appropriate for accurately diagnosing SLD (Flanagan & Alfonso, 2011). The three methods of interest in this current study use a pattern of processing strengths and weaknesses (PSW) approach (i.e., cognitive strengths are discrepant from domain-specific cognitive weaknesses/deficits, but the cognitive weaknesses/deficits are consistent with academic weaknesses/deficits; Hale, Flanagan, & Naglieri, 2008; Stuebing, Fletcher, Branum-Martin, & Francis, 2012). Where the PSW models tend to differ is in how they define and measure cognitive strengths and weaknesses and low academic achievement (Stuebing et al., 2012). The current study compared the following three PSW models for SLD identification: 1.) the Cross-Battery Assessment Pattern of Strengths and Weaknesses Analyzer (X-BASS; Flanagan, Ortiz, & Alfonso, 2015), 2.) the Concordance-Discordance Model of SLD Identification (Hale & Fiorello, 2004; Hale, Wycoff, & Fiorello, 2010), and 3.) the Psychological Processing Analyzer (Dehn, 2015).

2. Method

This study incorporated a common set of 11 clinical case study examples culled from an archival data set. These case studies were intended to reflect the presence or absence of SLD across one or more of the eight areas of SLD as defined by IDEA. The *initial* phase of the study was to obtain consensus from a group of practitioners for the case studies of cognitive processing and academic achievement scores indicating the presence or absence of SLD. Participants included 18 practitioners (45% response rate) randomly selected from the KIDS, Inc. School Neuropsychology Post-Graduate Certification Program. Participants have terminal degrees that include MS/MA (*N* = 6), Ed.S. (*N* = 5), Ed.D. (*N* = 1), PsyD (*N* = 4), and Ph.D. (*N* = 2), and practice across 11 states. Participants reviewed the data sets via an online survey. In the *second* phase of the study, the data sets from the case studies were used in the three PSW models of SLD Identification: 1.) Cross-Battery Assessment Software System (X-BASS; Flanagan, Ortiz, & Alfonso, 2015), 2.) Concordance-Discordance Model of SLD Identification (C-DM; Hale & Fiorello, 2004; Hale, Wycoff, & Fiorello, 2010), and 3.) Psychological Processing Analyzer (PPA 3.1; Dehn, 2015). Flanagan et al. (2015) and Hale et al. (2010) proposed PSW models that focus on identifying significant discrepancies between cognitive strengths and cognitive weaknesses/deficits and between cognitive strengths and academic weaknesses/deficits; both models also identify consistent or non-significant discrepancies between cognitive weaknesses/deficits and academic weaknesses/deficits as described in the neuropsychological literature. Dehn's PPA 3.1 (2015) does not identify the global cognitive measure and academic weakness discrepancy.

3. Phase I Results

Case	Correctly Identified Achievement Deficit Area(s)	Correctly Identified Cognitive Processing Deficit Area	SLD? (Yes/No)
1	Math Reasoning (100%)	Fluid Reasoning (88.9%)	Yes: 88.9%
2	Reading Decoding (94.4%) Listening Comprehension (72.2%)	Auditory Processing (100%)	Yes: 72.2%
3	Gifted with average achievement (control)		No: 88.9%
4	Reading Decoding (72.2%) Math Calculations (83.3%)	Long-Term Memory (83.3%)	Yes: 88.9%
5	Reading Fluency (88.8%) Oral Expression (88.8%)	Processing Speed (94.4%)	Yes: 72.2%
6	Low average cognitive abilities and academic achievement (control)		No: 94.4%
7	Math Calculations (94.4%)	Visual-Spatial Processing (94.4%)	Yes: 72.2%
8	Math Reasoning (88.8%) Written Expression (88.8%)	Short-Term Memory (88.8%)	Yes: 88.8%
9	Intellectually disabled (control)		No: 88.9%
10*	Reading Comprehension (100%) Listening Comprehension (100%)	Attention Problems (100%)	Yes: 61.1%
11	Written Expression (94.4%)	Executive Functions (100%)	Yes: 77.7%

Three case study examples of a single achievement deficit along with a single cognitive processing deficit (i.e., SLD present) were identified by participants. Four case study examples of dual achievement deficits along with a single cognitive processing deficit (i.e., SLD present) were identified by participants. Three case study examples with no SLD (i.e., control cases) were identified by participants. Case study #10 was removed from further analyses due to the low consensus rate of the presence of SLD.*

4. Phase II Results

Case	Cognitive Deficit	Academic Deficit	SLD Experts	X-BASS			C-DM			PPA 3.1		
				1	2	3	1	2	3	1	2	3
1	*Gf*	Math Reasoning	88.9% - Yes	Y	Y	N	N	Y	N	Y	n/a	N
2a	*Ga*	Reading Decoding	72.2% - Yes	Y	Y	N	Y	Y	N	Y	n/a	N
2b	*Ga*	Listening Comprehension	72.2% - Yes	Y	Y	N	Y	N	N	Y	n/a	N
3	Gifted with average achievement (control)		88.9% - No	N	N	N	N	Y	N	N	n/a	N
4a	*Glr*	Reading Decoding	88.9% - Yes	Y	Y	N	Y	Y	N	Y	n/a	N
4b	*Glr*	Math Calculation	88.9% - Yes	Y	Y	N	Y	Y	N	Y	n/a	N
5a	*Gs*	Reading Fluency	72.2% - Yes	Y	Y	N	N	N	N	Y	n/a	N
5b	*Gs*	Oral Expression	72.2% - Yes	Y	Y	N	N	N	N	Y	n/a	N
6	Low average cognitive abilities and academic achievement (control)		94.4% - No	N	N	N	N	N	N	N	n/a	N
7	*Gv*	Math Calculation	72.2% - Yes	Y	Y	N	N	Y	N	Y	n/a	N
8a	*Gwm*	Math Reasoning	88.8% - Yes	Y	Y	N	Y	Y	N	Y	n/a	N
8b	*Gwm*	Written Expression	88.8% - Yes	Y	Y	N	Y	Y	N	Y	n/a	N
9	Intellectually disabled (control)		88.9% - No	N	N	N	N	N	N	N	n/a	N
11	*EF*	Written Expression	77.7% - Yes	Y	Y	N	Y	Y	N	Y	n/a	N

In order to accurately diagnose SLD using the data from the case study examples, the three PSW models considered the following statistical significance of differences noted in the table above:

1 = Cognitive strength vs. Cognitive weakness ("Yes" for SLD diagnosis)

2 = Cognitive strength vs. Academic weakness ("Yes" for SLD diagnosis)

3 = Cognitive weakness vs. Academic weakness ("No" for SLD diagnosis)

5. Conclusions

- The Cross-Battery PSW approach (i.e., X-BASS; Flanagan et al., 2015) had a 100% agreement with the expert participants in SLD identification and non-SLD identification. This study found that it was the most reliable third method approach.
- Although a PSW pattern of results found in the X-BASS may be consistent with the presence of SLD, it is imperative that practitioners and clinicians are properly trained and consider the results within the context of the entire case history of the individual student.
- The Concordance-Discordance Model (C-DM; Hale & Fiorello, 2004) was more conservative in SLD identification. This model only identified 54% of the expert-participant identified SLD cases.
- Differences from the CD-M were most likely due to lower reliability of some of the measures used to indicate cognitive weaknesses.
- The PPA 3.1 software does not identify the discrepancy between overall cognitive ability/strength and an academic weakness, so the third component of SLD identification is not possible.
- Since the PPA 3.1 relies more on composite scores as opposed to individual subtest scores, this particular software may be better used for identifying broad-based strengths and weaknesses but not SLD.
- Each PSW model uses varying underlying statistics, calculations, and expertise of cognitive strengths and weaknesses and academic weaknesses comparisons to explain the differences in SLD identification.

6. References

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