WISC®–V

WECHSLER INTELLIGENCE SCALE FOR CHILDREN®– FIFTH EDITION

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Expanded Index Scores

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Overview

This technical report provides information about the derivation and use of two new ancillary WISC–V index scores: the Verbal (Expanded Crystallized) Index (VECI) and the Expanded Fluid Index (EFI). The VECI is derived using the four WISC–V Verbal Comprehension subtest scaled scores, and the EFI is derived using the four WISC–V Fluid Reasoning subtest scaled scores. These scores are designed to be used in situations for which an expanded measure of the Verbal Comprehension or the Fluid Reasoning domain addresses a practical or clinical need. These scores do not replace any existing WISC–V composite score, but expand the options of composites that are already available.

Background

Raiford and Coalson (2014) introduced a four-subtest index score using Verbal Comprehension subtests from the WPPSI–IV (i.e., the Comprehensive Verbal Index). It was created to provide a broad measure of a wide variety of abilities including crystallized intelligence; verbal expression, concept formation, and conceptualization; abstract reasoning; categorical and associative thinking; word/lexical knowledge; vocabulary development; learning; and practical knowledge and judgment. It was proposed as a useful composite score for children with moderate to severe motor delays or impairments (which are commonly observed in very young children) or visual impairments or challenges, because the WPPSI–IV composite scores that are relatively broad with respect to content (e.g., the Full Scale IQ, the Nonverbal Index, and the General Ability Index) require motor responses and involve visual stimuli. Kaufman, Raiford, and Coalson (in press) derived the VECI for the WISC–V that was analogous to the Comprehensive Verbal Index. They additionally developed an analogous score for the Fluid Reasoning domain—the EFI. These scores were included for similar purposes as those cited by Raiford and Coalson (2014), as well as to provide expanded measures of crystallized and fluid reasoning, which are crucial to the assessment of intellectual ability.

Purpose

Since the publication of the WISC–V, practitioners who use the WISC–V to assess special populations (e.g., children who are intellectually gifted, children with motor impairments), to perform various comparisons with achievement scores in some states, or to complete other evaluations for specific purposes (e.g., private school admission) have expressed interest in expanded index scores for the Verbal Comprehension and Fluid Reasoning domains. The verbal comprehension and fluid reasoning domains are of particular interest because from clinical, neurodevelopmental, theoretical, and statistical perspectives, crystallized and fluid reasoning abilities play a central role in cognitive development, intellectual ability, and academic achievement (Colom, Burgeleta, et al., 2013; Gregoire, 2013; Kaufman et al., in press; Langeslag et al., 2013; Schneider & McGrew, 2012; Wechsler, 2014; Weiss, Saklofske, Holdnack, & Prifitera, 2016). **These expanded index scores may be used in various situations. These situations include, but not are not limited to**:

- Ability-achievement discrepancy analyses,
- Pattern of strengths and weaknesses analyses,
- Expanded assessment of crystallized and fluid reasoning abilities in children who are intellectually gifted,
- Expanded assessment of crystallized and fluid reasoning abilities in children with clinical conditions, or
- To provide an estimate of cognitive ability for children with visual or motor impairments or difficulties (using the VECI).

Supporting Information

Standardization and Norms Development

The VECI and the EFI were developed using the WISC–V normative sample described in chapter 3 of the *WISC–V Technical and Interpretive Manual*. The procedures used to derive the normative information also are described in that chapter.

Deriving the Expanded Index Scores

To obtain the sum of scaled scores used to derive the VECI, sum the scaled scores for Similarities, Vocabulary, Information, and Comprehension. To obtain the sum of scaled scores used to derive the EFI, sum the scaled scores for Matrix Reasoning, Figure Weights, Picture Concepts, and Arithmetic. Tables 1 and 2 present the VECI and EFI equivalents of sums of scaled scores, respectively. Each table also includes percentile ranks and confidence intervals.

Table 1 Verbal (Expanded Crystallized) Index Equivalents of Sums of Scaled Scores

Sum of Scaled Scores	VECI	Percentile Rank	90% Confidence Interval	95% Confidence Interval
4	45	<0.1	43–53	42–54
5	47	<0.1	44–55	43–56
6	49	<0.1	46–57	45–58
7	50	<0.1	47–58	46–59
8	52	0.1	49–60	48–61
9	54	0.1	51–62	50–63
10	55	0.1	52–62	51–63
11	57	0.2	54–64	53–65
12	59	0.3	56–66	55–67
13	60	0.4	57–67	56–68
14	62	1	59–69	58–70
15	63	1	60–70	59–71
16	64	1	61–71	60–72
17	66	1	62–73	61–74
18	68	2	64–75	63–76
19	70	2	66–77	65–78
20	71	3	67–78	66–79
21	73	4	69–80	68–81
22	74	4	70–81	69–82
23	75	5	71–81	70–82
24	77	6	73–83	72–84
25	78	7	74–84	73–85
26	79	8	75–85	74–86
27	80	9	76–86	75–87
28	82	12	78–88	77–89
29	83	13	79–89	78–90
30	85	16	81–91	80–92
31	87	19	82–93	81–94
32	88	21	83–94	82–95
33	89	23	84–95	83–96
34	91	27	86–97	85–98
35	93	32	88–99	87–100
36	95	37	90–100	89–101
37	96	39	91–101	90–102
38	98	45	93–103	92–104
39	99	47	94–104	93–105
40	100	50	95–105	94–106
41	102	55	97–107	96–108
42	103	58	98–108	97–109
43	105	63	100–110	99–111
44	106	66	100–111	99–112
45	107	68	101–112	100–113
46	108	70	102–113	101–114
47	110	75	104–115	103–116
48	111	77	105–116	104–117
49	113	81	107–118	106–119
50	114	82	108–119	107–120
51	116	86	110–120	109–121
52	118	88	112–122	111–123
53	119	90	113–123	112–124
54	120	91	114–124	113–125
55	122	93	116–126	115–127
56	124	95	118–128	117–129
57	125	95	119–129	118–130
58	127	96	120–131	119–132
59	128	97	121–132	120–133
60	130	98	123–134	122–135
61	131	98	124–135	123–136
62	133	99	126–137	125–138
63	134	99	127–138	126–139
64	136	99	129–139	128–140
65	137	99	130–140	129–141
66	138	99	131–141	130–142
67	140	99.6	133–143	132–144
68	141	99.7	134–144	133–145
69	143	99.8	136–146	135–147
70	144	99.8	137–147	136–148
71	146	99.9	138–149	137–150
72	147	99.9	139–150	138–151
73	149	99.9	141–152	140–153
74	151	>99.9	143–154	142–155
75	153	>99.9	145–156	144–157
76	155	>99.9	147–157	146–158

Table 2 Expanded Fluid Index Equivalents of Sums of Scaled Scores

Sum of Scaled Scores	EFI	Percentile Rank	90% Confidence Interval	95% Confidence Interval
4	45	<0.1	43–53	42–54
5	46	<0.1	43–54	42–55
6	48	<0.1	45–56	44–57
7	49	<0.1	46–57	45–58
8	51	0.1	48–59	47–60
9	53	0.1	50–61	49–62
10	55	0.1	52–62	51–63
11	57	0.2	54–64	53–65
12	59	0.3	56–66	55–67
13	60	0.4	57–67	56–68
14	62	1	59–69	58–70
15	63	1	60–70	59–71
16	64	1	61–71	60–72
17	66	1	62–73	61–74
18	67	1	63–74	62–75
19	69	2	65–76	64–77
20	70	2	66–77	65–78
21	71	3	67–78	66–79
22	72	3	68–79	67–80
23	73	4	69–80	68–81
24	74	4	70–81	69–82
25	75	5	71–81	70–82
26	77	6	73–83	72–84
27	78	7	74–84	73–85
28	79	8	75–85	74–86
29	81	10	77–87	76–88
30	82	12	78–88	77–89
31	84	14	80–90	79–91
32	86	18	81–92	80–93
33	87	19	82–93	81–94
34	89	23	84–95	83–96
35	91	27	86–97	85–98
36	93	32	88–99	87–100
37	94	34	89–100	88–101
38	96	39	91–101	90–102
39	98	45	93–103	92–104
40	100	50	95–105	94–106
41	102	55	97–107	96–108
42	104	61	99–109	98–110
43	105	63	100–110	99–111
44	107	68	101–112	100–113
45	109	73	103–114	102–115
46	110	75	104–115	103–116
47	112	79	106–117	105–118
48	114	82	108–119	107–120
49	116	86	110–120	109–121
50	117	87	111–121	110–122
51	119	90	113–123	112–124
52	120	91	114–124	113–125
53	122	93	116–126	115–127
54	124	95	118–128	117–129
55	126	96	119–130	118–131
56	127	96	120–131	119–132
57	128	97	121–132	120–133
58	130	98	123–134	122–135
59	132	98	125–136	124–137
60	133	99	126–137	125–138
61	135	99	128–138	127–139
62	136	99	129–139	128–140
63	138	99	131–141	130–142
64	140	99.6	133–143	132–144
65	142	99.7	135–145	134–146
66	143	99.8	136–146	135–147
67	144	99.8	137–147	136–148
68	146	99.9	138–149	137–150
69	148	99.9	140–151	139–152
70	150	>99.9	142–153	141–154
71	152	>99.9	144–155	143–156
72	153	>99.9	145–156	144–157
73	154	>99.9	146–157	145–158
74	155	>99.9	147–157	146–158
75	155	>99.9	147–157	146–158
76	155	>99.9	147–157	146–158

Reporting and Describing the Expanded Index Scores

The expanded index scores are age-corrected standard scores. They can be interpreted similarly to other composite scores, as outlined in chapter 6 of the *WISC–V Technical and Interpretive Manual*. Age-based percentile ranks are provided for the expanded index scores and indicate a child's standing relative to other children the same age. Percentile ranks reflect points on a scale at or below which a given percentage of scores lie, based on the normative sample. The percentile ranks for the expanded index scores are interpreted as are other percentile ranks, as described in chapter 6 of the *WISC–V Technical and Interpretive Manual*.

Scores on measures of cognitive ability are based on observational data and represent estimates of a child's true scores. They reflect a child's true abilities combined with some degree of measurement error. Confidence intervals provide another means of expressing score precision and serve as a reminder that measurement error is inherent in all scores. Refer to chapter 6 of the *WISC–V Technical and Interpretive Manual* for additional information about confidence intervals and their use in interpretation.

The expanded index scores can be described in qualitative terms according to the child's level of performance. Refer to chapter 6 of the *WISC–V Technical and Interpretive Manual* for qualitative descriptors to describe the expanded index scores.

The VECI

The VECI provides a broad measure of the child's ability to access and apply acquired word knowledge and general knowledge. The application of this knowledge involves verbal concept formation and expression; abstract verbal reasoning; and long-term retrieval. All of the items on the subtests that contribute to these index scores, even the Vocabulary picture items, require a verbal response from the child.

High VECI scores indicate strong crystallized abilities, a well-developed verbal reasoning system and fund of acquired general factual and practical knowledge. High scores also imply strong word knowledge acquisition, effective information retrieval, good ability to reason and solve verbal problems, and effective communication of learned material. Low VECI scores may occur for a number of reasons, including poorly developed word knowledge, factual knowledge, and/or practical knowledge and judgment; difficulty retrieving acquired information; problems with verbal expression; or general difficulties with reasoning and problem solving.

The EFI

The EFI provides a broad measure of the child's ability to detect underlying conceptual relationships, extract important information, and use reasoning to identify and apply rules. Identification and application of conceptual relationships in the EFI requires inductive and quantitative fluid reasoning, simultaneous and sequential processing, and abstract thinking.

High EFI scores indicate strong fluid intelligence, a well-developed ability to abstract conceptual information from visual and auditory details, extract relevant information, and effectively apply knowledge about semantic, visual, or quantitative relationships. Low EFI scores may occur for a number of reasons, including difficulties identifying important information, difficulties linking information to abstract concepts, difficulties understanding and applying conceptual or quantitative concepts, or general low reasoning ability.

Technical Properties

Reliability and Standard Errors of Measurement

The methods and the samples used to obtain the reliability information and *SEM*s for the expanded index scores are the same as those described in chapters 3 and 4 of the *WISC–V Technical and Interpretive Manual*. Table 3 presents the reliability coefficients and *SEM*s of the expanded index scores. The reliability coefficients

are shown by age group and overall sample. The *SEM*s of the expanded index scores are shown by age group and averaged across all ages.

Table 3 Reliability Coefficients of Subtest, Process, and Composite Scores

Index Score		Age Group											Overall Average[a b]
		6	7	8	9	10	11	12	13	14	15	16	
VECI	Reliability	.93	.95	.94	.95	.95	.94	.96	.95	.96	.95	.96	.95
	SEM	3.97	3.35	3.67	3.35	3.35	3.67	3.00	3.35	3.00	3.35	3.00	3.38
EFI	Reliability	.95	.94	.95	.94	.95	.94	.96	.94	.95	.95	.95	.95
	SEM	3.35	3.67	3.35	3.67	3.35	3.67	3.00	3.67	3.35	3.35	3.35	3.44

[a] Average reliability coefficients were calculated with Fisher's *z* transformation.

[b] The average *SEM*s were calculated by averaging the squared *SEM*s for each age group and obtaining the square root of the result.

As the data in Table 3 indicate, the overall average reliability coefficients for the expanded index scores are both excellent. These values are slightly higher than those of the corresponding 2-subtest primary index scores, the WISC–V VCI (.92) and FRI (.93), because only two subtests contribute to the primary index scores, whereas four subtests contribute to the expanded index scores. These values are similar to the reliability estimates for other WISC–V composite scores that provide estimates of broad ability (shown in Table 4.1 of the *WISC–V Technical and Interpretive Manual*) based on more than two subtests, namely, the WISC–V FSIQ (.96), Nonverbal Index (NVI; .95), and General Ability Index (GAI; .96).

Factor-Analytic Studies

The confirmatory factor-analytic studies in chapter 5 of the *WISC–V Technical and Interpretive Manual* provide evidence of validity for the expanded index scores. The study conducted on the 16 primary and secondary subtests indicate that the four subtests that contribute to the VECI and the four subtests that contribute to the EFI load primarily on the factors that correspond with these expanded index scores (i.e., Verbal Comprehension and Fluid Reasoning). Refer to pp. 77–84 of the *WISC–V Technical and Interpretive Manual* for full details.

Analyses for the Identification of a Specific Learning Disability

The WISC–V provides two types of analyses with the KTEA–3 and the WIAT–III to aid in the identification of specific learning disabilities: the traditional ability-achievement discrepancy (AAD) analysis and the pattern of strengths and weaknesses (PSW) discrepancy analysis. Both of these models incorporate the results from a cognitive ability measure (in this case, the WISC–V) and an achievement measure (in this case, the KTEA–3 or the WIAT–III). Guidelines for professional practice suggest that results from an analysis for the identification of a specific learning disability (SLD) be presented in the context of a complete assessment, including input from tests, teacher and home observations, clinical observations, and/or medical and academic history. A thorough review of the child's behaviors and performance by a team that includes parents, educators, assessment professionals, and other relevant contributors should also be included. The use of a single analysis for the identification of learning disabilities is not recommended (Flanagan & Alfonso, 2011; Hale et al., 2010; Kavale, Holdnack, & Mostert, 2005).

Ability-Achievement Discrepancy Analysis

The VECI and the EFI can be used in a similar manner as many of the composite scores from the WISC–V to perform an ability-achievement discrepancy (AAD) analysis. There are two primary methods for conducting an AAD analysis: the predicted-difference method and the simple-difference method. The predicted-difference method uses the obtained intellectual ability score to predict an achievement score, and the predicted and obtained achievement scores are compared. The simple-difference method compares the obtained intellectual ability and achievement scores. In both methods, the statistical significance and the base rate of the discrepancies should be considered. The formulas for calculating the critical values and the processes for producing the base rate information for the predicted-difference and simple difference methods of AAD analysis are available through published references (e.g., Pearson, 2009). The procedures for performing an ability-achievement discrepancy comparison are outlined in chapter 6 of the *WISC–V Technical and Interpretive Manual*. The same procedures are used with the VECI and the EFI.

The information necessary for performing the AAD analyses is provided in Tables 4–8 of this technical report. The analysis for the AAD model can be conducted using these tables, or using the Q-global™ web-based scoring and reporting platform. The Q-global functionality will be available within the WISC–V score reports in the future, but the AAD analyses can be conducted by hand until that time using the information in this technical report.

Steps for Conducting the AAD Analysis

For Q-global: Select age norms for scoring the KTEA–3 or WIAT–III, as appropriate. If the WISC–V was hand scored, manually enter the expanded index score when creating a KTEA–3 or a WIAT–III score report, and then select the AAD method that you want to use. If the WISC–V was scored using Q-global, the expanded index score can be selected when creating a KTEA–3 or WIAT–III score report.

For hand scoring: For the simple-difference method, use the simple-difference portions of Table 7 (comparing KTEA–3 scores) and Table 8 (comparing WIAT–III scores) in this report. They each show the sizes of differences between the achievement test standard scores and the expanded index scores that are statistically significant or unusually large. The base rates are one-tailed because they represent the percentage of the population having an achievement score that is lower than the ability score by the specified amount or more. Ability-achievement discrepancy comparisons typically are of interest only when the student's achievement is lower than would be expected.

For the predicted-achievement method, follow the steps below.

1. Refer to the predicted-difference portions of Tables 4 (KTEA–3) and 5 (WIAT–III) to obtain the rounded observed correlation value for the expanded index score and achievement score of interest. For each pair of scores, the observed correlation value has been rounded to the closest correlation value, resulting in the rounded correlation values shown in Table 4 or 5. For example, .38–42 are already rounded to .40, and .43–47 are already rounded to .45.
2. Using that rounded correlation value, refer to Table 6 to obtain the predicted-achievement score corresponding to the expanded index score.
3. If the actual achievement score is lower than the predicted score, compute the difference between the predicted and actual achievement scores.
4. Refer to the predicted-difference portions of Tables 7 (KTEA–3) and 8 (WIAT–III) to find the values of the difference required for statistical significance. Find the column for the preferred significance level and compare the critical value in that column to the difference obtained in step 3.
5. If the difference between the predicted and actual achievement scores is statistically significant, refer again to Tables 7 (KTEA–3) and 8 (WIAT–III) to determine whether the difference is unusual.

Find the column that shows a value that is equal to or less than the observed difference (computed in Step 3) and record that value as the base rate. For example, in the predicted-difference portion of Table 7, if 15 is the obtained difference between the VECI and Reading Comprehension, the base rate associated with a difference of 13 (i.e., 10%) is reported.

Pattern of Strengths and Weaknesses Discrepancy Analysis

The expanded index scores may be used together (and along with the other WISC–V standard scores if a wider selection of ability scores is desired) to perform a pattern of strengths and weaknesses discrepancy (PSW) analysis. Refer to the *WISC–V Technical and Interpretive Manual* for a full description of PSW analysis. The PSW model requires the identification of a processing weakness, which is a fundamental component of the federal definition of an SLD. Identifying or ruling out a relative processing weakness as contributing to a child's achievement weakness is a critical step towards differentiating between a child with an SLD and a child who is underachieving for other reasons. A child with an SLD requires individualized instruction that is responsive to his or her processing strengths and weaknesses. In contrast, a child who is underachieving for other reasons likely will benefit from individualized instruction, but may also respond well to general instruction at a greater intensity (Hale et al., 2008).

Children with SLDs are a heterogeneous group, and using the PSW model to understand a child's individual pattern of strengths and weaknesses promotes accurate and reliable identification, differential diagnosis, and effective intervention planning (Hale et al., 2008). This determination is especially critical given that the response to intervention approach alone is insufficient for diagnosing SLDs (Flanagan, Fiorello, & Ortiz, 2010; Hale et al., 2010; Hale, Kaufman, Naglieri, & Kavale, 2006).

Methodological and Statistical Requirements for the PSW Analysis

The PSW score analysis identifies a potential learning disability by statistically evaluating two score comparisons. The scores within each of the following comparisons must be significantly different (discrepant) to fit the model's criteria for SLD identification:

- processing strength vs. achievement weakness
- processing strength vs. processing weakness

A third score comparison requiring consistency between the achievement weakness and the processing weakness is discussed by Hale and Fiorello (2004). This comparison is not included, however, because it is not a statistical requirement of the model for identifying an SLD. As Hale and colleagues (2008) explain, however, it should be plausible that the cognitive processing weakness is related to the achievement weakness, thereby providing an explanation for the SLD. References are available that document empirically proven links between cognitive processes and achievement domains (e.g., Fiorello, Hale, & Snyder, 2006; Flanagan, Alfonso, & Ortiz, 2012; Flanagan, Ortiz, Alfonso, & Mascolo, 2006; Hale, Fiorello, Bertin, & Sherman, 2003; Hale, Fiorello, Kavanagh, Hoeppner, & Gaither, 2001).

Following the method recommended by Hale and Fiorello (2004), the score comparisons are evaluated using the simple-difference method rather than the predicted-score (regression) method. The rationale for this method is that (a) there is not an implicit causal relationship, as there is in an ability-achievement comparison, and (b) it is preferable to use the same method of calculation for both comparisons for the sake of consistency and simplicity. If one or both comparisons are not statistically significant, the child does not demonstrate a pattern of strengths and weaknesses typical of a child with an SLD. Practitioners, however, should rely not only on statistical comparisons, but also upon clinical judgment and a careful evaluation of multiple sources of information when diagnosing SLDs (Hale & Fiorello, 2004).

Scoring Software Requirements for the PSW Analysis

The analysis for the PSW model is calculated using the Q-global web-based scoring and reporting platform; tables for calculating PSW by hand are not included in this technical report. In order to obtain the PSW analysis using Q-global, you must have the expanded index score(s) (and standard scores from the WISC–V if a wider selection of standard scores is desired) and either the KTEA–3 or the WIAT–III. You must manually enter the expanded index scores (and potentially the other WISC–V standard scores) when creating a KTEA–3 or a WIAT–III score report to conduct the PSW analysis.

Steps for Conducting the PSW Analysis

If the child is underachieving in more than one area, the analysis may be conducted once for each area of weakness. It is important, however, to select the processing strength and weakness carefully each time, according to the achievement weakness selected.

1. Select the achievement weakness (i.e., KTEA–3 or WIAT–III subtest or composite score that corresponds to the child's primary achievement weakness).
    a. Consider selecting an achievement weakness score that is below average (i.e., standard score less than 85) because this criterion is well accepted in most settings. Selecting a weakness with a standard score at or above 85 may also be acceptable in some settings for evaluating special cases, such as the identification of learning disabilities in children with high ability.
    b. Consider selecting a subtest or composite score that corresponds to one of the IDEA-specified areas of achievement for identifying an SLD, as such a selection may be preferred in many settings.
    c. Examine subtest variability within a composite score before selecting the composite as the achievement weakness. If discrepancies are found between subtest scores that make up a KTEA–3 or WIAT–III composite, it may be preferable to use a subtest score within that composite rather than the composite score.
2. Select the expanded index score or other WISC–V standard score that represents the processing weakness.
    a. Consider relevant theory and research to ensure that the processing weakness is generally associated with the achievement weakness (see Fiorello et al., 2006; Flanagan, Alfonso, & Mascolo, 2011; Hale et al., 2001; Hale et al., 2012; Hale, Wycoff, & Fiorello, 2011).
    b. Examine subtest variability within the expanded index scores and/or other WISC–V standard scores before selecting a processing weakness. If a significant discrepancy is found between subtests that contribute to a standard score, it is preferable to use a different standard score; however, this may not always be feasible. If discrepancies are found between scores that contribute to an index score, the discrepant index score may be used or additional testing may be conducted to identify a more unitary index score. Research suggests that even when an intellectual ability index score is derived from subtests with significant discrepancies, it still has predictive validity (Daniel, 2007; Watkins, Glutting, & Lei, 2007). If the index score with discrepant subtests is used, however, it is important to be aware of this variability when interpreting the PSW model and reporting results.
3. Select the expanded index score or other WISC–V standard score that represents the processing strength.
    a. Consult relevant theory and research to ensure that the processing strength used in the model is not typically related to the achievement weakness (see Fiorello et al., 2006; Flanagan et al., 2011; Hale et al., 2003; Hale et al., 2001; Hale et al., 2011).

b. Examine subtest variability within the WISC–V standard scores (including the expanded index scores) before selecting the processing strength (see 2b).

c. Avoid using the WMI, the PSI, the AWMI, any of the Naming Speed process or subtest scores, or the SRI as the strength in the PSW model when possible. These scores are not as theoretically well supported as processing strengths as other scores. Working memory, processing speed, and naming facility generally have lower (psychometric) *g*-loadings than most other cognitive abilities (Flanagan & Kaufman, 2009; Prifitera, Saklofske, & Weiss, 2008). As a result, they are less representative of the true nature of an SLD (i.e., unexpected underachievement). While it is possible for a child with an SLD to show strength in one of these areas, these areas are not typically the only strengths that are characteristic of a child with an SLD (Prifitera & Dersh, 1992). As a result, selection of one of these constructs as the processing strength within the PSW model is allowable but not recommended. If the user selects one of these scores as the processing strength, the scoring software will print a warning below the results. Selecting a WISC–V standard score in any other area is recommended.

Comparing the PSW and AAD Analyses

Both the PSW and AAD analyses are intended to help practitioners generate hypotheses regarding educational referral questions and are not intended for use in isolation to diagnose an SLD or other clinical condition. All available information, including the child's developmental, medical, family, social, and academic history; information gained from observations of the child's behavior in the classroom and his or her behavior and motivation during testing; information gained from a response to intervention approach; other test results, including information obtained from teachers, parents, or other family members; and any unusual characteristics or disabilities should be considered in conjunction with the results of the model and all of the child's scores.

Table 4 Correlations Between WISC–V Expanded Index Scores and KTEA–3 Subtest and Composite Scores

	WISC–V Expanded Index Score	
KTEA–3 Subtest/Composite Score	**VECI**	**EFI**
LWR	.65	.60
RC	.75	.65
NWD	.45	.50
PP	.55	.55
WRF	.55	.45
DF	.45	.40
SRF	.40	.40
RV	.70	.60
MCA	.75	.80
MC	.50	.60
MF	—	.45
WE	.60	.50
SP	.50	.55
LC	.70	.50
OE	.55	.40
Reading	.75	.65
Math	.70	.75
Written Language	.60	.60
Academic Skills Battery	.80	.75
Sound-Symbol	.55	.60
Decoding	.60	.55
Reading Fluency	.55	.50
Reading Understanding	.75	.65
Oral Language	.75	.55
Oral Fluency	.45	—
Comprehension	.80	.65
Expression	.70	.55
Orthographic Processing	.55	.50
Academic Fluency	—	.40

Note. KTEA–3 subtest abbreviations are: LWR = Letter & Word Recognition, RC = Reading Comprehension, NWD = Nonsense Word Decoding, PP = Phonological Processing, WRF = Word Recognition Fluency, DF = Decoding Fluency, SRF = Silent Reading Fluency, RV = Reading Vocabulary, MCA = Math Concepts & Applications, MC = Math Computation, MF = Math Fluency, WE = Written Expression, SP = Spelling, LC = Listening Comprehension, OE = Oral Expression. All correlations were corrected for the variability of the WISC–V normative sample (Guilford & Fruchter, 1978). Correlations were computed separately for the two age bands (6:0–9:11 and 10:0–16:11) and then averaged using Fisher's *z* transformation.

Table 5 Correlations Between WISC–V Expanded Index Scores and WIAT–III Subtest and Composite Scores

	WISC–V Expanded Index Score	
WIAT–III Subtest/Composite Score	**VECI**	**EFI**
LC	.75	.50
ERS	.60	.40
RC	.65	.50
MPS	.60	.65
SC	.55	.45
WR	.60	.45
PD	.50	.40
NO	.45	.50
OE	.75	.50
ORF	.50	—
SP	.60	.55
Oral Language	.80	.55
Total Reading	.70	.50
Basic Reading	.60	.45
Reading Comprehension and Fluency	.65	.45
Written Expression	.60	.55
Mathematics	.55	.65
Math Fluency	—	.55
Total Achievement	.80	.65

Note. WIAT–III subtest abbreviations are: LC = Listening Comprehension, ERS = Early Reading Skills, RC = Reading Comprehension, MPS = Math Problem Solving, SC = Sentence Composition, WR = Word Reading, PD = Pseudoword Decoding, NO = Numerical Operations, OE = Oral Expression, ORF = Oral Reading Fluency, SP = Spelling. All correlations were corrected for the variability of the WISC–V normative sample (Guilford & Fruchter, 1978). Correlations were computed separately for the two age bands (6:0–9:11 and 10:0–16:11) and then averaged using Fisher's *z* transformation.

Table 6 KTEA–3 and WIAT–III Standard Scores Predicted from WISC–V Expanded Index Scores

WISC–V Expanded Index Score	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	WISC–V Expanded Index Score
45	78	75	73	70	67	64	62	59	56	53	51	45
46	78	76	73	70	68	65	62	60	57	54	51	46
47	79	76	74	71	68	66	63	60	58	55	52	47
48	79	77	74	71	69	66	64	61	58	56	53	48
49	80	77	75	72	69	67	64	62	59	57	54	49
50	80	78	75	73	70	68	65	63	60	58	55	50
51	80	78	76	73	71	68	66	63	61	58	56	51
52	81	78	76	74	71	69	66	64	62	59	57	52
53	81	79	77	74	72	69	67	65	62	60	58	53
54	82	79	77	75	72	70	68	66	63	61	59	54
55	82	80	78	75	73	71	69	66	64	62	60	55
56	82	80	78	76	74	71	69	67	65	63	60	56
57	83	81	79	76	74	72	70	68	66	63	61	57
58	83	81	79	77	75	73	71	69	66	64	62	58
59	84	82	80	77	75	73	71	69	67	65	63	59
60	84	82	80	78	76	74	72	70	68	66	64	60
61	84	82	81	79	77	75	73	71	69	67	65	61
62	85	83	81	79	77	75	73	72	70	68	66	62
63	85	83	82	80	78	76	74	72	70	69	67	63
64	86	84	82	80	78	77	75	73	71	69	68	64
65	86	84	83	81	79	77	76	74	72	70	69	65
66	86	85	83	81	80	78	76	75	73	71	69	66
67	87	85	84	82	80	79	77	75	74	72	70	67
68	87	86	84	82	81	79	78	76	74	73	71	68
69	88	86	85	83	81	80	78	77	75	74	72	69
70	88	87	85	84	82	81	79	78	76	75	73	70
71	88	87	86	84	83	81	80	78	77	75	74	71
72	89	87	86	85	83	82	80	79	78	76	75	72
73	89	88	87	85	84	82	81	80	78	77	76	73
74	90	88	87	86	84	83	82	81	79	78	77	74
75	90	89	88	86	85	84	83	81	80	79	78	75
76	90	89	88	87	86	84	83	82	81	80	78	76
77	91	90	89	87	86	85	84	83	82	80	79	77
78	91	90	89	88	87	86	85	84	82	81	80	78
79	92	91	90	88	87	86	85	84	83	82	81	79
80	92	91	90	89	88	87	86	85	84	83	82	80
81	92	91	91	90	89	88	87	86	85	84	83	81
82	93	92	91	90	89	88	87	87	86	85	84	82
83	93	92	92	91	90	89	88	87	86	86	85	83
84	94	93	92	91	90	90	89	88	87	86	86	84

(*continued*)

Table 6 KTEA–3 and WIAT–III Standard Scores Predicted from WISC–V Expanded Index Scores (*continued*)

WISC–V Expanded Index Score	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	WISC–V Expanded Index Score
85	94	93	93	92	91	90	90	89	88	87	87	85
86	94	94	93	92	92	91	90	90	89	88	87	86
87	95	94	94	93	92	92	91	90	90	89	88	87
88	95	95	94	93	93	92	92	91	90	90	89	88
89	96	95	95	94	93	93	92	92	91	91	90	89
90	96	96	95	95	94	94	93	93	92	92	91	90
91	96	96	96	95	95	94	94	93	93	92	92	91
92	97	96	96	96	95	95	94	94	94	93	93	92
93	97	97	97	96	96	95	95	95	94	94	94	93
94	98	97	97	97	96	96	96	96	95	95	95	94
95	98	98	98	97	97	97	97	96	96	96	96	95
96	98	98	98	98	98	97	97	97	97	97	96	96
97	99	99	99	98	98	98	98	98	98	97	97	97
98	99	99	99	99	99	99	99	99	98	98	98	98
99	100	100	100	99	99	99	99	99	99	99	99	99
100	100	100	100	100	100	100	100	100	100	100	100	100
101	100	100	101	101	101	101	101	101	101	101	101	101
102	101	101	101	101	101	101	101	102	102	102	102	102
103	101	101	102	102	102	102	102	102	102	103	103	103
104	102	102	102	102	102	103	103	103	103	103	104	104
105	102	102	103	103	103	103	104	104	104	104	105	105
106	102	103	103	103	104	104	104	105	105	105	105	106
107	103	103	104	104	104	105	105	105	106	106	106	107
108	103	104	104	104	105	105	106	106	106	107	107	108
109	104	104	105	105	105	106	106	107	107	108	108	109
110	104	105	105	106	106	107	107	108	108	109	109	110
111	104	105	106	106	107	107	108	108	109	109	110	111
112	105	105	106	107	107	108	108	109	110	110	111	112
113	105	106	107	107	108	108	109	110	110	111	112	113
114	106	106	107	108	108	109	110	111	111	112	113	114
115	106	107	108	108	109	110	111	111	112	113	114	115
116	106	107	108	109	110	110	111	112	113	114	114	116
117	107	108	109	109	110	111	112	113	114	114	115	117
118	107	108	109	110	111	112	113	114	114	115	116	118
119	108	109	110	110	111	112	113	114	115	116	117	119
120	108	109	110	111	112	113	114	115	116	117	118	120
121	108	109	111	112	113	114	115	116	117	118	119	121
122	109	110	111	112	113	114	115	117	118	119	120	122
123	109	110	112	113	114	115	116	117	118	120	121	123
124	110	111	112	113	114	116	117	118	119	120	122	124

(*continued*)

Table 6 KTEA–3 and WIAT–III Standard Scores Predicted from WISC–V Expanded Index Scores (*continued*)

WISC–V Expanded Index Score	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	WISC–V Expanded Index Score
125	110	111	113	114	115	116	118	119	120	121	123	125
126	110	112	113	114	116	117	118	120	121	122	123	126
127	111	112	114	115	116	118	119	120	122	123	124	127
128	111	113	114	115	117	118	120	121	122	124	125	128
129	112	113	115	116	117	119	120	122	123	125	126	129
130	112	114	115	117	118	120	121	123	124	126	127	130
131	112	114	116	117	119	120	122	123	125	126	128	131
132	113	114	116	118	119	121	122	124	126	127	129	132
133	113	115	117	118	120	121	123	125	126	128	130	133
134	114	115	117	119	120	122	124	126	127	129	131	134
135	114	116	118	119	121	123	125	126	128	130	132	135
136	114	116	118	120	122	123	125	127	129	131	132	136
137	115	117	119	120	122	124	126	128	130	131	133	137
138	115	117	119	121	123	125	127	129	130	132	134	138
139	116	118	120	121	123	125	127	129	131	133	135	139
140	116	118	120	122	124	126	128	130	132	134	136	140
141	116	118	121	123	125	127	129	131	133	135	137	141
142	117	119	121	123	125	127	129	132	134	136	138	142
143	117	119	122	124	126	128	130	132	134	137	139	143
144	118	120	122	124	126	129	131	133	135	137	140	144
145	118	120	123	125	127	129	132	134	136	138	141	145
146	118	121	123	125	128	130	132	135	137	139	141	146
147	119	121	124	126	128	131	133	135	138	140	142	147
148	119	122	124	126	129	131	134	136	138	141	143	148
149	120	122	125	127	129	132	134	137	139	142	144	149
150	120	123	125	128	130	133	135	138	140	143	145	150
151	120	123	126	128	131	133	136	138	141	143	146	151
152	121	123	126	129	131	134	136	139	142	144	147	152
153	121	124	127	129	132	134	137	140	142	145	148	153
154	122	124	127	130	132	135	138	141	143	146	149	154
155	122	125	128	130	133	136	139	141	144	147	150	155

Table 7 Comparison of Differences Between KTEA–3 Subtest and Composite Scores and WISC–V Expanded Index Scores, Using Predicted- and Simple-Difference Methods

KTEA–3 Subtest/ Composite Score	VECI													
	Predicted Difference							Simple Difference						
	Significance Level		Base Rate					Significance Level		Base Rate				
	.05	.01	≤25%	≤15%	≤10%	≤5%	≤2%	.05	.01	≤25%	≤15%	≤10%	≤5%	≤2%
LWR	7	9	7	11	14	18	23	8	11	8	13	15	20	25
RC	11	14	7	10	13	17	21	12	15	7	11	14	18	22
NWD	6	8	9	14	17	22	27	8	11	10	16	20	26	32
PP	9	12	8	13	16	20	25	11	14	9	14	18	23	28
WRF	12	15	8	13	16	20	25	13	17	9	14	18	23	28
DF	12	16	9	14	17	22	27	13	18	10	16	20	26	32
SRF	12	16	9	14	17	22	28	13	18	11	16	20	26	33
RV	9	12	7	11	14	18	22	10	13	8	12	15	19	24
MCA	8	10	7	10	12	16	20	9	12	7	11	13	17	21
MC	7	10	9	13	16	21	26	9	12	10	15	19	24	30
MF	10	13	9	14	18	23	29	11	15	11	17	21	28	35
WE	12	16	8	12	15	20	25	13	17	9	14	17	22	28
SP	7	9	9	13	16	21	26	9	12	10	15	19	24	30
LC	12	16	7	11	14	18	22	13	17	8	12	15	20	24
OE	14	18	8	13	16	21	26	15	19	9	15	18	23	29
Reading	8	10	6	10	12	16	20	9	12	7	11	13	17	21
Math	7	9	7	11	14	18	22	8	11	8	12	15	19	24
Written Language	8	11	8	12	15	19	24	10	13	9	13	17	21	27
Academic Skills Battery	7	9	6	10	12	15	19	8	10	7	10	13	16	20
Sound-Symbol	7	9	8	13	16	20	25	9	12	9	14	18	23	29
Decoding	6	7	8	13	15	20	25	8	10	9	14	17	22	28
Reading Fluency	9	11	8	13	16	21	26	10	13	9	15	18	23	29
Reading Understanding	8	11	7	10	12	16	20	9	12	7	11	13	17	21
Oral Language	12	16	7	10	13	17	21	13	17	7	11	14	18	22
Oral Fluency	15	20	9	14	17	22	27	16	22	10	16	20	25	32
Comprehension	10	13	6	10	12	15	19	11	14	7	10	12	16	20
Expression	11	15	7	11	14	18	22	12	16	8	12	15	20	24
Orthographic Processing	10	13	8	13	16	21	26	11	14	9	15	18	23	29
Academic Fluency	9	12	9	14	18	23	29	11	14	11	17	21	28	35

Note. KTEA–3 subtest abbreviations are: LWR = Letter & Word Recognition, RC = Reading Comprehension, NWD = Nonsense Word Decoding, PP = Phonological Processing, WRF = Word Recognition Fluency, DF = Decoding Fluency, SRF = Silent Reading Fluency, RV = Reading Vocabulary, MCA = Math Concepts & Applications, MC = Math Computation, MF = Math Fluency, WE = Written Expression, SP = Spelling, LC = Listening Comprehension, OE = Oral Expression.

(*continued*)

Table 7 Comparison of Differences Between KTEA–3 Subtest and Composite Scores and WISC–V Expanded Index Scores, Using Predicted- and Simple-Difference Methods (*continued*)

KTEA–3 Subtest/ Composite Score	EFI													
	Predicted Difference							Simple Difference						
	Significance Level		Base Rate					Significance Level		Base Rate				
	.05	.01	≤25%	≤15%	≤10%	≤5%	≤2%	.05	.01	≤25%	≤15%	≤10%	≤5%	≤2%
LWR	6	8	8	13	15	20	25	8	11	9	14	17	22	28
RC	11	14	8	12	15	19	23	12	15	8	13	16	21	26
NWD	6	8	9	13	17	21	27	8	11	10	15	19	25	31
PP	9	12	8	13	16	20	25	11	14	9	14	18	23	28
WRF	11	15	9	14	17	22	27	13	17	10	16	20	26	32
DF	12	16	9	14	17	22	28	13	18	11	17	20	26	33
SRF	12	16	9	14	17	22	28	13	18	11	17	21	27	33
RV	9	11	8	12	15	20	24	10	13	9	14	17	22	27
MCA	8	10	6	10	12	15	19	9	12	7	10	12	16	20
MC	8	10	8	12	15	19	24	9	12	9	13	17	21	27
MF	10	13	9	14	17	22	27	11	15	10	16	19	25	31
WE	12	16	9	13	16	21	26	13	17	10	15	19	24	30
SP	7	9	8	13	16	21	26	9	12	10	15	18	24	30
LC	12	16	9	13	17	21	27	13	17	10	15	19	25	31
OE	13	18	9	14	17	22	28	15	19	11	17	20	26	33
Reading	7	10	8	12	14	18	23	9	12	8	13	16	20	25
Math	7	9	6	10	12	16	20	8	11	7	11	13	17	21
Written Language	8	11	8	13	15	20	25	10	13	9	14	17	22	28
Academic Skills Battery	6	8	7	10	13	16	20	8	10	7	11	13	17	22
Sound-Symbol	7	9	8	12	15	19	24	9	12	9	13	17	21	27
Decoding	6	7	8	13	16	20	25	8	10	9	14	18	23	28
Reading Fluency	8	11	9	13	17	21	27	10	13	10	15	19	25	31
Reading Understanding	8	10	7	11	14	18	23	9	12	8	13	15	20	25
Oral Language	12	15	8	13	16	20	25	13	17	9	14	18	23	29
Oral Fluency	15	20	9	14	18	23	28	16	22	11	17	21	28	34
Comprehension	9	12	8	12	15	19	23	11	14	8	13	16	21	26
Expression	11	14	8	13	16	20	25	12	16	9	15	18	23	29
Orthographic Processing	9	12	9	13	16	21	26	11	14	10	15	19	24	30
Academic Fluency	9	12	9	14	17	22	28	11	14	11	17	21	27	33

Note. KTEA–3 subtest abbreviations are: LWR = Letter & Word Recognition, RC = Reading Comprehension, NWD = Nonsense Word Decoding, PP = Phonological Processing, WRF = Word Recognition Fluency, DF = Decoding Fluency, SRF = Silent Reading Fluency, RV = Reading Vocabulary, MCA = Math Concepts & Applications, MC = Math Computation, MF = Math Fluency, WE = Written Expression, SP = Spelling, LC = Listening Comprehension, OE = Oral Expression.

Table 8 Comparison of Differences Between WIAT–III Subtest and Composite Scores and WISC–V Expanded Index Scores, Using Predicted- and Simple-Difference Methods

WIAT–III Subtest/ Composite Score	VECI													
	Predicted Difference							Simple Difference						
	Significance Level		Base Rate					Significance Level		Base Rate				
	.05	.01	≤25%	≤15%	≤10%	≤5%	≤2%	.05	.01	≤25%	≤15%	≤10%	≤5%	≤2%
LC	13	17	7	10	12	16	20	14	18	7	11	13	17	21
ERS	12	15	8	12	15	19	24	13	17	9	13	17	21	27
RC	12	16	8	12	14	19	23	13	17	8	13	16	21	26
MPS	10	13	8	12	15	20	25	11	14	9	14	17	22	28
SC	11	15	8	13	16	20	25	12	16	9	15	18	23	29
WR	7	9	8	12	15	19	24	8	11	9	13	17	21	27
PD	6	8	9	13	16	21	26	8	11	10	15	19	24	30
NO	8	11	9	14	17	22	27	10	13	10	16	20	25	32
OE	12	15	7	10	13	17	21	12	16	7	11	14	18	22
ORF	8	11	9	13	16	21	26	10	13	10	15	19	24	30
SP	8	10	8	12	15	19	24	9	12	9	13	17	21	27
Oral Language	10	14	6	9	11	14	18	11	14	6	9	12	15	18
Total Reading	7	9	7	11	14	18	22	8	11	8	12	15	20	24
Basic Reading	6	8	8	12	15	20	24	8	10	9	14	17	22	27
Reading Comprehension and Fluency	9	12	8	12	14	18	23	10	13	8	13	16	20	25
Written Expression	8	11	8	12	15	19	24	10	13	9	14	17	22	27
Mathematics	8	10	8	13	16	20	25	9	12	9	14	18	23	28
Math Fluency	8	10	9	14	18	23	28	10	13	11	17	21	28	34
Total Achievement	7	9	6	10	12	15	19	8	10	7	10	13	16	20

Note. WIAT–III subtest abbreviations are: LC = Listening Comprehension, ERS = Early Reading Skills, RC = Reading Comprehension, MPS = Math Problem Solving, SC = Sentence Composition, WR = Word Reading, PD = Pseudoword Decoding, NO = Numerical Operations, OE = Oral Expression, ORF = Oral Reading Fluency, SP = Spelling.

(*continued*)

Table 8 Comparison of Differences Between WIAT–III Subtest and Composite Scores and WISC–V Expanded Index Scores, Using Predicted- and Simple-Difference Methods (*continued*)

WIAT–III Subtest/ Composite Score	EFI													
	Predicted Difference							Simple Difference						
	Significance Level		Base Rate					Significance Level		Base Rate				
	.05	.01	≤25%	≤15%	≤10%	≤5%	≤2%	.05	.01	≤25%	≤15%	≤10%	≤5%	≤2%
LC	13	17	9	13	17	21	27	14	18	10	15	19	25	31
ERS	11	15	9	14	17	22	28	13	17	11	17	21	27	33
RC	11	15	9	13	16	21	26	13	17	10	15	19	24	30
MPS	10	13	8	12	14	18	23	11	14	8	13	16	20	25
SCP	11	15	9	14	17	22	27	12	16	10	16	20	25	32
WR	6	8	9	14	17	22	27	8	11	10	16	19	25	31
PD	6	8	9	14	17	22	28	8	11	11	17	20	26	33
NO	8	11	9	13	16	21	26	10	13	10	15	19	24	30
OE	11	15	9	13	16	21	26	12	16	10	15	19	24	30
ORF	8	11	9	15	18	23	29	10	13	12	18	23	29	36
SP	7	10	8	13	16	21	26	9	12	9	15	18	23	29
Oral Language	10	13	8	13	16	20	25	11	14	9	15	18	23	29
Total Reading	6	8	9	13	16	21	26	8	11	10	15	19	24	30
Basic Reading	5	7	9	14	17	22	27	8	10	10	16	19	25	31
Reading Comprehension and Fluency	8	11	9	14	17	22	27	10	13	10	16	20	26	32
Written Expression	8	11	8	13	16	20	25	10	13	9	15	18	23	29
Mathematics	8	10	8	12	14	19	23	9	12	8	13	16	21	26
Math Fluency	8	11	8	13	16	21	26	10	13	9	15	18	23	29
Total Achievement	6	8	8	12	14	19	23	8	10	8	13	16	21	26

Note. WIAT–III subtest abbreviations are: LC = Listening Comprehension, ERS = Early Reading Skills, RC = Reading Comprehension, MPS = Math Problem Solving, SC = Sentence Composition, WR = Word Reading, PD = Pseudoword Decoding, NO = Numerical Operations, OE = Oral Expression, ORF = Oral Reading Fluency, SP = Spelling.

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