WISC-IV CDN

WECHSLER INTELLIGENCE SCALE FOR CHILDREN® – FOURTH EDITION

Technical Report #4.1
General Ability Index
Canadian Norms

January 2005

Donald H. Saklofske, PhD
Jianjun Zhu, PhD
Susan E. Raiford, PhD
Lawrence G. Weiss, PhD
Eric Rolfhus, PhD
Diane Coalson, PhD

Overview

This technical report is the fourth in a series intended to introduce the *Wechsler Intelligence Scale for Children–Fourth Edition* (WISC–IV; Wechsler, 2003). This version of Report #4 (4.1) has been created with tables derived from the *Wechsler Intelligence Scale for Children: Fourth Edition: Canadian Manual* (WISC–IV^{CDN}; Wechsler, 2004) and thus all tables contained within this report reflect Canadian norms. Technical Report #1 (Williams, Weiss, & Rolfhus, 2003a) presented the theoretical structure and test blueprint for the WISC–IV, as well as subtest changes from the *Wechsler Intelligence Scale for Children—Third Edition* (WISC–III; Wechsler, 1991). Technical Report #2 (Williams, Weiss, & Rolfhus, 2003b) presented the psychometric properties of the WISC–IV. Technical Report #3 (Williams, Weiss, & Rolfhus, 2003c) addressed the instrument's clinical validity.

This report provides information about the derivation and uses of the General Ability Index (GAI). The GAI is a composite score that is based on 3 Verbal Comprehension and 3 Perceptual Reasoning subtests, and does not include the Working Memory or Processing Speed subtests included in the Full Scale IQ (FSIQ). Detailed information about the GAI, beyond what is covered in this technical report, is available in a chapter by Saklofske, Prifitera, Weiss, Rolfhus, and Zhu in *WISC–IV Clinical Use and Interpretation: Scientist-Practitioner Perspectives* (Prifitera, Saklofske, & Weiss, 2005).

Background and History of the Wechsler Composites and the GAI

The original *Wechsler Intelligence Scale for Children* (WISC; Wechsler, 1949), the *Wechsler Intelligence Scale for Children—Revised* (WISC–R; Wechsler, 1974), and the WISC–III included an FSIQ as well as a Verbal IQ (VIQ) and a Performance IQ (PIQ). The WISC–III introduced four index scores to represent more narrow domains of cognitive function: the Verbal Comprehension Index (VCI), the Perceptual Organization Index (POI), the Freedom from Distractibility Index (FDI), and the Processing Speed Index

(PSI). With the introduction of these index scores, a total of seven composite scores could be derived with the WISC–III: the FSIQ, VIQ, PIQ, VCI, POI, FDI, and PSI.

The introduction of the index scores gave practitioners the ability to select the composite scores that best described verbal and perceptual ability, based on the outcome of the assessment. When necessary to aid in interpretation, the practitioner could describe verbal abilities using the VCI in place of the VIQ, and describe perceptual abilities using the POI in place of the PIQ. This flexibility was particularly useful when scores for certain subtests contributing to the VIQ or PIQ were discrepant at a significant and unusual level. In particular, the index scores were preferable for cases in which the VIQ was considered less descriptive of verbal ability than the VCI because Arithmetic—a subtest from the working memory domain—was discrepant from the verbal comprehension subtests at a level that was unusual in the standardization sample and for cases in which the PIQ was considered less descriptive of perceptual ability than the POI because Coding—a subtest drawn from the processing speed domain—was discrepant from the perceptual organization subtests at a level that was unusual in the standardization sample.

The GAI was first developed for use with the WISC–III by Prifitera, Weiss, and Saklofske (1998) to offer additional flexibility in describing broad intellectual ability. The WISC–III GAI provided a measure of general cognitive ability that did not include the influence of Arithmetic or Coding on FSIQ. The WISC–III GAI was based on the sum of scaled scores for all subtests that contributed to the traditional ten-subtest FSIQ, with the exception of Arithmetic and Coding. The eight contributing subtests were all drawn from the verbal comprehension and perceptual organization domains, and included Picture Completion, Information, Similarities, Picture Arrangement, Block Design, Vocabulary, Object Assembly, and Comprehension. The WISC–III GAI was recommended as a useful composite to estimate overall ability if a great deal of variability existed within VIQ and/or PIQ due to low scores on Arithmetic and/or Coding (Prifitera et al., 1998). The GAI was subsequently applied for use with the WISC–III using Canadian norms (Weiss, Saklofske, Prifitera, Chen, & Hildebrand, 1999), the WAIS–III (Tulsky, Saklofske, Wilkins, & Weiss, 2001), and the WAIS–III using Canadian norms (Saklofske, Gorsuch, Weiss, Zhu, & Patterson, 2005).

The WISC–IV provides an FSIQ and a four-index framework similar to that of the WISC–III. The framework is based on theory and supported by clinical research and factor-analytic results. As noted in the *WISC–IV Technical and Interpretive Manual* (Wechsler, 2003), the WISC–IV^{CDN} Canadian Manual (Wechsler, 2004), and in Technical Report #1 (Williams et al., 2003a), the POI was renamed the Perceptual Reasoning Index (PRI) to reflect more accurately the increased emphasis on fluid reasoning abilities in this index, and the FDI was renamed the Working Memory Index (WMI), which more accurately describes the abilities measured. In addition, the dual IQ and Index score structure was no longer utilized. The elimination of the dual structure reduced concerns about the influence of working memory and processing speed when summarizing verbal comprehension and perceptual reasoning abilities, respectively. The WISC–IV FSIQ, however, includes (to a greater extent than the WISC–III FSIQ) the influence of working memory and processing speed, to reflect research that suggests both working memory and processing speed are important factors that contribute to overall intellectual functioning (Engle, Laughlin, Tuholski, & Conway, 1999; Fry & Hale, 1996, 2000; Heinz-Martin, Oberauer, Wittmann, Wilhelm, & Schulze, 2002; Miller & Vernon, 1996; Vigil-Colet & Codorniu-Raga, 2002). Recent research continues to confirm the importance of working memory and processing speed to cognitive ability and to refine knowledge about the nature of these relations (Colom, Rebollo, Palacios, Juan-Espinosa, & Kyllonen, 2004; Mackintosh & Bennett, 2003; Schweizer & Moosbrugger, 2004).

The FSIQ is used most frequently to describe an underlying, global aspect of general intelligence, or *g*. The FSIQ is utilized for a number of purposes in clinical practice. The FSIQ can serve as a summary of performance across a number of specific cognitive ability domains (i.e., verbal comprehension, perceptual reasoning, working memory, and processing speed). It is used most often in conjunction with other information as part of a diagnostic evaluation in clinics and hospital settings, to determine eligibility to receive special education services in public school settings, or to make decisions about level of care and placement in residential settings.

The FSIQ is an aggregate score that summarizes performance across multiple cognitive abilities in a single number. When unusual variability is observed within the set of subtests that comprise the FSIQ, clinical interpretation should characterize this diversity of abilities in order to be most useful for parents, teachers, and other professionals.

Introduction to the WISC–IV GAI

As with the WISC–III GAI and the WAIS–III GAI, the WISC–IV GAI provides the practitioner a summary score that is less sensitive to the influence of working memory and processing speed. For children with neuropsychological issues such as learning disorders, Attention-Deficit/Hyperactivity Disorder, and other similar issues, difficulties with working memory and processing speed may result in lower FSIQ scores (Wechsler, 2003). In children with intact neuropsychological functioning, the GAI may provide a comparable approximation of overall intellectual ability as represented by the FSIQ (Prifitera et al., 2005; Weiss et al., 1999).

The GAI can be used as a substitute for the FSIQ to determine eligibility for special education services and placement classification. The GAI increases flexibility in this respect, because it is sensitive to cases in which working memory performance is discrepant from verbal comprehension performance and/or processing speed performance is discrepant from perceptual reasoning performance at an unusual level. It can also be compared to the FSIQ to assess the effects of working memory and processing speed on the expression of cognitive ability.

Various sources for GAI tables are available; however, those sources differ according to the method by which they were created. Four such sources are (a) the US Technical Report #4 and this Canadian version #4.1, (b) Prifitera et al. (2005), (c) Flanagan and Kaufman (2004), and (d) Dumont and Willis (2004). The GAI tables provided in the US Technical Report #4 and this Canadian Technical Report #4.1, as well as in Prifitera et al. (2005) are the only GAI tables supported by Harcourt Assessment, Inc. (formerly known as The Psychological Corporation). These tables were created using the actual WISC–IV standardization sample (n = 2200 in the US; n = 1100 in Canada), whereas the GAI tables provided in other sources were created using statistical approximation. The calculations in Flanagan and Kaufman (2004), and Dumont and Willis (2004) were based on a statistical technique for linear equating that was developed by Tellegen and Briggs (1967, Formula 4), which allowed the GAI to be calculated based on intercorrelations among the VCI and the PRI. In contrast, tables in this technical report provide values for the GAI based on the standardization sample, and the sum of subtest scaled scores that contribute to the index. The Tellegen and Briggs formula underestimates scores in the upper portion of the distribution and overestimates scores in the lower portion of the distribution. On average, this difference is approximately 2–3 points, but can be as much as 6 points for some children with mental retardation or some gifted children. The Tellegen and Briggs formula is appropriate for use if the actual standardization data are not available: The tables provided by Flanagan and Kaufman (2004) and by Dumont and Willis (2004) were generated while practitioners were waiting for the tables based on the standardization sample to be created. As the tables based on the standardization sample are now available, those GAI tables should be considered out of date. Thus, practitioners are advised to use the GAI tables in Technical Report #4, which are the same (within rounding variance) as the tables in Prifitera et al. (2005), when American norms are required. Canadian practitioners are advised to use the tables included in this Technical Report #4.1 which are based on the Canadian norms described in the *WISC–IV*^{CDN} *Canadian Manual* (Wechsler, 2004).

When to Use the GAI

Established practice currently includes the use of ability–achievement discrepancies (AAD) as general screeners for nonspecific learning problems. *The WISC–IV Integrated Technical and Interpretive Manual* (Wechsler et al., 2004) outlines a number of concerns with the isolated use of the AAD model for identifying learning disabilities. Others have defended the role of cognitive assessment in the evaluation of individuals with brain-based learning disorders, while not necessarily advocating strict adherence to AAD as the only method for classification (Hale, Naglieri, Kaufman, & Kavale, 2004; Scruggs & Mastropieri, 2002).

An ability–achievement discrepancy indicates that some problem exists, as achievement is not at a level commensurate with cognitive ability. The general finding of such a discrepancy should be followed with additional assessment before a formal diagnosis is rendered. A determination that a learning disability is present requires evidence of impairment in the core cognitive processes underlying the specific academic skill of concern, but an AAD alone may be sufficient evidence to obtain special education services in many public school settings. Although several new models for evaluating learning disorders and learning disabilities have been proposed recently (Berninger, Dunn, & Alper, 2005; Berninger & O'Donnell, 2005), diagnostic markers generally have yet to be established clearly in the literature. Some progress has been made in this area, however. For example, pseudoword decoding and rapid automatized naming appear to predict early reading disorders.

Presently, many school district policies continue to require evidence of an AAD in order to obtain special education services. It was largely for this reason that the GAI was first developed. For some children with learning disabilities, attentional problems, or other neuropsychological issues, concomitant working memory and processing speed deficiencies lower the FSIQ. This is evident in Table 4 (see page 9), which shows that FSIQ < GAI profiles were more often obtained by children in the WISC–IV^{CDN} Canadian special group samples who had been diagnosed with Attention-Deficit/Hyperactivity and Reading and Written Disorders. This contrasts with those Canadian children identified as Intellectually Gifted or with Mild and Moderate Mental Retardation who showed the reverse trend towards FSIQ>GAI. In the US special group samples, the trend toward FSIQ <GAI was noted in more than 70% of children diagnosed with Reading Disorder, Reading and Written Expression Disorders, Reading, Written Expression, and Mathematics Disorders, and Learning Disorder and Attention-Deficit/Hyperactivity Disorder. While potentially clinically meaningful, this reduction in the FSIQ may decrease the magnitude of the AAD for some children with learning disabilities and make them less likely to be found eligible for special education services in educational systems that do not allow consideration of other methods of eligibility determination.

It also may be clinically informative in a number of additional situations to compare the FSIQ and the GAI, to assess the impact of reducing the emphasis on working memory and processing speed on the estimate of general cognitive ability for children with difficulty in those areas due to traumatic brain injury or other neuropsychological difficulties. This comparison may inform rehabilitation programs and/or educational intervention planning.

It is important for practitioners to recognize that the GAI is not necessarily a more valid estimate of overall cognitive ability than the FSIQ. Working memory and processing speed are vital to the comprehensive evaluation of cognitive ability, and excluding these abilities from the evaluation can be misleading. The classroom performance of two children with the same GAI score but very different WMI/PSI scores will likely be quite different. In educational situations where evidence of a significant AAD is required to obtain services, the GAI may be used as the ability score; however, the WMI and PSI should still be reported and interpreted. Refer to chapters 2 and 3 of *WISC–IV Clinical Use and Interpretation: Scientist-Practitioner Perspectives* (Prifitera et al., 2005) for additional discussion on the issue.

The practitioner may wish to consider using the GAI in a number of clinical situations, not limited to, but including the following:

- a significant and unusual discrepancy exists between VCI and WMI;
- a significant and unusual discrepancy exists between PRI and PSI;
- a significant and unusual discrepancy exists between WMI and PSI; or
- a significant and unusual intersubtest scatter exists within WMI and/or PSI.

To review index discrepancies, consult the discrepancy comparison critical value and base rate tables B.1–B.6 of the *WISC–IV^{CDN} Canadian Manual* (Wechsler, 2004) using the procedures outlined in chapter 4. The Analysis Page of the WISC–IV^{CDN} Record Form provides space for these pairwise discrepancy comparisons in the Discrepancy Comparisons table. A statistically significant difference between index scores, however, may not indicate that there is a clinically significant difference: The frequency of

occurrence in the standardization sample (base rate), not just the critical value, should be considered. Consult Table B.2 in the *WISC–IV*^{CDN} *Canadian Manual* (Wechsler, 2004) to obtain the base rate for a given discrepancy. Sattler (2001) suggests that differences between scores that occur in less than 10% to 15% of the standardization sample should be judged as unusual. Subtest scatter can be examined within the FSIQ, and within the VCI and PRI, using Table B.6 of the appropriate manual.

The following steps are provided as a guide for calculating the GAI and comparing it to the FSIQ to obtain more information about a child's cognitive ability.

Calculate the General Ability Sum of Scaled Scores

If you have determined that the GAI is important to consider in interpretation, calculate the General Ability Sum of Scaled Scores. The General Ability Sum of Scaled Scores is the sum of scaled scores for three Verbal Comprehension subtests (i.e., Vocabulary, Comprehension, and Similarities) and three Perceptual Reasoning subtests (i.e., Block Design, Matrix Reasoning, and Picture Concepts). Record the General Ability Sum of Scaled Scores.

In some situations, you may choose to substitute a supplemental subtest for a core subtest that contributes to the GAI. Follow the same subtest substitution rules that are outlined in the *WISC–IV Administration and Scoring Manual* (Wechsler, 2003) or *WISC–IV*^{CDN} *Canadian Manual* (Wechsler, 2004) for the FSIQ if you choose to substitute a supplemental subtest for a core subtest that contributes to the GAI. Follow the standard administration order of subtests listed in chapter 2 of the *WISC–IV Administration and Scoring Manual* (Wechsler, 2003) even when you expect to substitute a supplemental subtest for a core subtest.

Determine the GAI Composite Score

Locate the General Ability Sum of Scaled Scores in the extreme left column of Table 1. Read across the row to determine the GAI composite score. Continue to read across the row to find the corresponding percentile rank and confidence intervals. Record the composite score, the percentile rank, and the confidence interval (90% or 95%).

Table 1. Canadian WISC4 GAI Equivalents of Sums of Scaled Scores

Sum of Scaled Scores	GAI	Percentile Rank	Confidence Level		Sum of Scaled Scores	GAI	Percentile Rank	Confidence Level	
			90%	95%				90%	95%
6	40	<0.1	38-48	37-49	60	100	50	95-105	94-106
7	40	<0.1	38-48	37-49	61	101	53	96-106	95-107
8	40	<0.1	38-48	37-49	62	102	55	97-107	96-108
9	40	<0.1	38-48	37-49	63	103	58	98-108	97-109
10	40	<0.1	38-48	37-49	64	104	61	99-109	98-110
11	40	<0.1	38-48	37-49	65	105	63	100-110	99-111
12	40	<0.1	38-48	37-49	66	106	66	100-111	99-112
13	40	<0.1	38-48	37-49	67	107	68	101-112	100-113
14	42	<0.1	40-50	39-51	68	108	70	102-113	101-114
15	43	<0.1	41-51	40-52	69	110	75	104-115	103-116
16	44	<0.1	42-52	41-53	70	111	77	105-116	104-117
17	46	<0.1	43-54	42-55	71	113	81	107-118	106-119
18	47	<0.1	44-55	43-56	72	115	84	109-119	108-120
19	48	<0.1	45-56	44-57	73	116	86	110-120	109-121
20	50	<0.1	47-58	46-59	74	117	87	111-121	110-122
21	51	0.1	48-59	47-60	75	119	90	113-123	112-124
22	52	0.1	49-60	48-61	76	120	91	114-124	113-125
23	54	0.1	51-62	50-63	77	121	92	115-125	114-126
24	55	0.1	52-62	51-63	78	123	94	117-127	116-128
25	56	0.2	53-63	52-64	79	124	95	118-128	117-129
26	58	0.3	55-65	54-66	80	125	95	119-129	118-130
27	59	0.3	56-66	55-67	81	127	96	120-131	119-132
28	60	0.4	57-67	56-68	82	128	97	121-132	120-133
29	62	1	59-69	58-70	83	129	97	122-133	121-134
30	63	1	60-70	59-71	84	131	98	124-135	123-136
31	64	1	61-71	60-72	85	132	98	125-136	124-137
32	66	1	62-73	61-74	86	133	99	126-137	125-138
33	67	1	63-74	62-75	87	135	99	128-138	127-139
34	68	2	64-75	63-76	88	136	99	129-139	128-140
35	70	2	66-77	65-78	89	137	99	130-140	129-141
36	71	3	67-78	66-79	90	139	99.5	132-142	131-143
37	72	3	68-79	67-80	91	140	99.6	133-143	132-144
38	73	4	69-80	68-81	92	141	99.7	134-144	133-145
39	75	5	71-81	70-82	93	143	99.8	136-146	135-147
40	76	5	72-82	71-83	94	144	99.8	137-147	136-148
41	77	6	73-83	72-84	95	145	99.9	138-148	137-149
42	78	7	74-84	73-85	96	147	99.9	139-150	138-151
43	80	9	76-86	75-87	97	148	99.9	140-151	139-152
44	81	10	77-87	76-88	98	149	99.9	141-152	140-153
45	82	12	78-88	77-89	99	151	>99.9	143-154	142-155
46	83	13	79-89	78-90	100	152	>99.9	144-155	143-156
47	85	16	81-91	80-92	101	153	>99.9	145-156	144-157
48	86	18	81-92	80-93	102	155	>99.9	147-157	146-158
49	87	19	82-93	81-94	103	156	>99.9	148-158	147-159
50	88	21	83-94	82-95	104	157	>99.9	149-159	148-160
51	90	25	85-96	84-97	105	159	>99.9	151-161	150-162
52	91	27	86-97	85-98	106	160	>99.9	152-162	151-163
53	92	30	87-98	86-99	107	160	>99.9	152-162	151-163
54	93	32	88-99	87-100	108	160	>99.9	152-162	151-163
55	95	37	90-100	89-101	109	160	>99.9	152-162	151-163
56	96	39	91-101	90-102	110	160	>99.9	152-162	151-163
57	97	42	92-102	91-103	111	160	>99.9	152-162	151-163
58	98	45	93-103	92-104	112	160	>99.9	152-162	151-163
59	99	47	94-104	93-105	113	160	>99.9	152-162	151-163
					114	160	>99.9	152-162	151-163

Analyze the FSIQ–GAI Discrepancy

Calculate the difference between the FSIQ and the GAI by subtracting the GAI composite score from the FSIQ composite score. Record this value. Table 2 provides the required differences between the FSIQ and the GAI to attain statistical significance (critical values) at the .15 and .05 levels for each age group. Select the desired level of statistical significance and note it for your records. Using Table 2, find the age group of the child and the desired level of significance. Read across the row to the appropriate column to determine the critical value and record this critical value. The absolute value of the child's difference score must equal or exceed that critical value to be statistically significant. Determine whether or not the absolute value of the child's difference score equals or exceeds the corresponding critical value.

Table 2 Differences Between FSIQ and GAI Scores Required for Statistical Significance (Critical Values), by Age Group and Overall Standardization Sample: Canadian norms.

Age Group	Level of Significance	Composite Pair FSIQ–GAI
6:0–11:11	.15	7
	.05	9
12:0–16:11	.15	6
	.05	8
All Ages	.15	6
	.05	9

Note. Differences required for statistical significance are based on the standard errors of measurement of each composite for each age group and are calculated with the following formula:

$$\text{Critical Value of Difference Score} = Z\sqrt{SEM_a^{\,2} + SEM_b^{\,2}}$$

where Z is the normal curve value associated with the desired two-tailed significance level and SEM_a and SEM_b are the standard errors of measurement for the two composites.

Table 3 provides the percentage of children in the WISC–IV Canadian standardization sample that obtained the same or greater discrepancy between the FSIQ and the GAI (base rate). The values reported in Table 3 are provided for the overall standardization sample and by ability level, and are separated into "-" and "+" columns, based on the direction of the difference. Locate the absolute value of the child's difference score in the Amount of Discrepancy column to the extreme left or right, and read across the row to the column that corresponds to the direction of the difference score (e.g., FSIQ < GAI) either by the overall sample or by ability level, if desired. Record this value.

In some situations, practitioners may wish to determine how unusual the same or greater FSIQ–GAI discrepancy was in a particular special group sample (e.g., children identified as intellectually gifted, children diagnosed with mental retardation, children diagnosed with various learning disorders) that is relevant to the child being evaluated. Table 4 provides the percentage of children from various special groups described in the *WISC–IV Canadian Manual* (Wechsler, 2004) who obtained the same or greater discrepancy between the FSIQ and the GAI (base rate). The values are provided for children identified as intellectually gifted, children with mild or moderate mental retardation, children with Reading and Written Expression Disorders, and children with Attention-Deficit/Hyperactivity Disorder. The values reported in Table 4 are separated by special group and into "-" and "+" columns for each special group, based on the direction of the difference. Locate the absolute value of the child's difference score in the Amount of Discrepancy column to the extreme left or right, and read across the row to the column that corresponds to the desired special group of comparison and to the direction of the difference score (e.g., FSIQ < GAI). Record this value.

Table 3 Cumulative Percentages of Canadian WISC–IV^{CDN} Standardization Sample (Base Rates) Obtaining Various FSIQ–GAI Score Discrepancies, by Overall Sample and Ability Level

	Overall Sample		GAI ≤ 79		80 ≤ GAI ≤ 89		90 ≤ GAI ≤ 109		110 ≤ GAI ≤ 119		GAI ≥ 120		
Amount of Discrepancy	FSIQ<GAI (-)	FSIQ>GAI (+)	FSIQ<GAI (-)	FSIQ>GAI (+)	FSIQ<GAI (-)	FSIQ>GAI (+)	FSIQ<GAI (-)	FSIQ>GAI (+)	FSIQ<GAI (-)	FSIQ>GAI (+)	FSIQ<GAI (-)	FSIQ>GAI (+)	Amount of Discrepancy
18	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.0	0.0	0.0	18
17	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.0	0.0	0.0	17
16	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.0	0.0	0.0	16
15	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.8	0.6	0.0	0.9	0.9	15
14	0.6	0.8	0.0	0.0	0.0	0.0	0.2	1.0	1.9	0.0	2.8	2.8	14
13	1.5	1.2	0.0	1.1	0.0	0.0	0.3	1.5	4.3	0.0	6.5	2.8	13
12	1.8	1.7	0.0	4.3	0.0	0.0	0.5	2.0	4.9	0.0	8.3	2.8	12
11	2.9	3.0	0.0	7.6	0.7	2.2	1.7	3.3	6.8	0.0	9.3	2.8	11
10	4.5	4.5	0.0	12.0	1.5	4.4	2.7	4.5	11.1	1.9	12.0	2.8	10
9	6.5	6.6	2.2	15.2	2.9	6.6	3.7	6.8	13.6	3.1	19.4	3.7	9
8	9.3	9.0	2.2	19.6	4.4	11.7	7.2	8.8	16.7	3.7	22.2	5.6	8
7	12.7	12.3	4.3	28.3	5.1	16.1	10.8	11.6	21.6	5.6	26.9	7.4	7
6	16.9	16.5	4.3	38.0	5.1	21.9	15.1	14.6	27.8	9.9	36.1	11.1	6
5	22.2	22.2	4.3	47.8	5.1	27.0	21.3	20.8	35.8	14.8	43.5	13.0	5
4	26.2	27.2	6.5	52.2	6.6	35.8	25.3	25.8	42.6	19.1	48.1	14.8	4
3	33.7	32.5	8.7	57.6	13.1	45.3	33.4	31.3	50.6	21.0	57.4	18.5	3
2	39.0	38.3	9.8	64.1	17.5	55.5	39.1	37.4	58.0	23.5	62.0	21.3	2
1	45.6	45.7	15.2	71.7	21.9	67.2	45.8	44.6	66.0	30.2	70.4	25.9	1
Mean	4.9	4.9	3.8	5.8	3.8	4.4	4.5	4.9	5.5	4.4	6.1	5.3	Mean
SD	3.2	3.3	3.0	3.2	3.0	2.8	2.8	3.5	3.7	2.7	3.8	4.0	*SD*
Median	4.0	4.0	3.0	6.0	3.0	4.0	4.0	4.0	5.0	4.0	6.0	4.5	Median

Table 4 Cumulative Percentages of Various Canadian Special Group Samples (Base Rates) Obtaining Various FSIQ–GAI Score Discrepancies

	Clinical Group								
	GT (N = 25)		MR (N = 25)		LDRW (N = 25)		ADHD (N = 35)		
Amount of Discrepancy	FSIQ<GAI (-)	FSIQ>GAI (+)	FSIQ<GAI (-)	FSIQ>GAI (+)	FSIQ<GAI (-)	FSIQ>GAI (+)	FSIQ<GAI (-)	FSIQ>GAI (+)	Amount of Discrepancy
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18
17	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	17
16	0.0	0.0	0.0	0.0	4.3.	0.0	0.0	0.0	16
15	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	15
14	0.0	0.0	0.0	0.0	8.7	0.0	3.0	0.0	14
13	0.0	0.0	0.0	0.0	8.7	0.0	3.0	0.0	13
12	0.0	0.0	0.0	0.0	8.7	0.0	6.1	0.0	12
11	4.0	0.0	0.0	0.0	8.7	0.0	6.1	0.0	11
10	4.0	4.0	0.0	0.0	13.0	0.0	9.1	0.0	10
9	16.0	8.0	8.0	0.0	21.7	4.3	15.2	0.0	9
8	16.0	12.0	8.0	4.0	26.1	8.7	15.2	6.1	8
7	16.0	20.0	12.0	12.0	30.4	13.0	18.2	9.1	7
6	16.0	24.0	12.0	28.0	34.8	17.4	21.2	12.1	6
5	20.0	36.0	12.0	32.0	39.1	17.4	30.3	18.2	5
4	28.0	36.0	20.0	40.0	43.5	17.4	39.4	18.2	4
3	32.0	36.0	20.0	40.0	52.2	21.7	51.5	21.2	3
2	36.0	40.0	20.0	40.0	56.5	30.4	60.6	27.3	2
1	48.0	48.0	20.0	48.0	56.5	39.1	63.6	30.3	1
Mean	4.9	5.5	6.6	5.1	7.5	4.3	5.4	4.7	Mean
SD	3.7	3.0	2.5	2.2	4.4	3.2	3.5	2.6	*SD*
Median	4.0	5.5	7.0	6.0	7.0	3.0	4.0	5.0	Median

Note. GT = Intellectually Gifted; MR = Mental Retardation; LDRW = Reading and Written Expression Disorders; ADHD = Attention-Deficit/Hyperactivity Disorder.

Reporting and Describing the GAI

Standard Score

The GAI is an age-corrected standard score. It can be interpreted similarly to other composite scores, as outlined in chapter 6 of the *WISC–IV Technical and Interpretive Manual* (Wechsler, 2003) and the *WISC–IV^{CDN} Canadian Manual* (Wechsler, 2004).

Percentile Rank

Age-based percentile ranks are provided for the GAI that 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 standardization sample. The percentile ranks for the GAI are interpreted as are other percentile ranks, as described in chapter 6 of the *WISC–IV Technical and Interpretive Manual* (Wechsler, 2003) and *WISC–IV^{CDN} Canadian Manual* (Wechsler, 2004).

Standard Error of Measurement and Confidence Interval

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–IV Technical and Interpretive Manual* (Wechsler, 2003) or the *WISC–IV^{CDN} Canadian Manual* (Wechsler, 2004) for additional information about confidence intervals and their use in interpretation.

Descriptive Classification

Composite scores, including the GAI, can be described in qualitative terms according to the child's level of performance. Refer to chapter 6 of the *WISC–IV Technical and Interpretive Manual* (Wechsler, 2003) and the *WISC–IV^{CDN} Canadian Manual* (Wechsler, 2004) for qualitative descriptions of the WISC–IV composite scores, which also may be used to describe the GAI.

Suggested Procedure for Basic Interpretation of the GAI

Note that this procedure is supplemental and does not replace any portion of the 10-step procedure outlined in chapter 6 of the *WISC–IV Technical and Interpretive Manual* (Wechsler, 2003) and *WISC–IV^{CDN} Canadian Manual* (Wechsler, 2004).

Evaluate the Overall Composite Scores

The FSIQ and the GAI are composite scores that should always be evaluated in the context of the subtests that contribute to that composite score. Extreme variability within the subtests that comprise the FSIQ or the GAI indicates that the score represents a summary of diverse abilities. Practitioners should examine closely the relative performance on subtests that contribute to the composite score when interpreting that score. Part of the decision to use the GAI also typically involves reviewing the discrepancies among the four index scores.

Evaluate the FSIQ–GAI Discrepancy

The first step in performing a pairwise comparison is aimed at determining whether the absolute value of the score difference is significant. Table 2 provides the minimum differences between the FSIQ and the GAI required for statistical significance (critical values) at the .15 and .05 levels of confidence by age group. When the absolute value of the obtained difference between the FSIQ and the GAI is equal to or

larger than the critical value, the difference is considered a true difference rather than a difference due to measurement error or random fluctuation. If the two scores are not significantly different, this implies that reducing the influence of working memory and processing speed on the estimate of overall ability resulted in little difference.

If comparison of the FSIQ and the GAI indicates a significant difference, the practitioner should then judge how rare the difference is in the general population. Table 3 provides the cumulative frequency of discrepancies between the FSIQ and the GAI in the WISC–IV^{CDN} standardization sample (base rates). The base rate provides a basis for estimating how rare or common a child's obtained score difference is compared to the general population. Table 4 provides the cumulative frequency of discrepancies between the FSIQ and the GAI in various WISC–IV^{CDN} special group samples. Refer to chapter 6 of the *WISC–IV Technical and Interpretive Manual* (Wechsler, 2003) for additional information.

Ability–Achievement Discrepancy

When ability–achievement discrepancy assessment is present as part of the learning disability determination process, there are two methods for comparing intellectual ability and academic achievement: the predicted-difference method and the simple-difference method. Although both methods are used, the predicted-difference method is generally preferred because the formula accounts for the reliabilities and the correlations between the two measures. Use of the predicted-difference method requires that the ability and achievement measure were co-normed on the same national sample. The predicted-difference method uses the ability score to predict an achievement score, and then compares the predicted and observed achievement scores. The simple-difference method merely compares the observed ability and achievement scores. The *WIAT–II Examiner's Manual* (Harcourt Assessment, Inc., 2002) and the *WIAT–II^{CDN}: Canadian Scoring and Normative Supplement for Grades K-16* (Harcourt Assessment formerly known as The Psychological Corporation, 2003) provides additional details related to the rationale for choosing these methods and the statistical procedures involved.

Predicted-Difference Method

Table 5 provides WIAT–II^{CDN} subtest and composite scores, employing Canadian standardization data, predicted from WISC–IV^{CDN} GAI scores that are also based on Canadian standardization data. Locate the GAI score in the extreme left or right column, and read across the row to obtain the child's predicted WIAT–II^{CDN} subtest and composite scores. Record the predicted scores. For each subtest or composite, subtract the child's predicted score from the obtained score to obtain the difference score. Record these difference scores.

Table 5 WIAT–II[CDN] Subtest and Composite Scores Predicted from WISC–IV[CDN] GAI Score: Canadian norms

	WIAT–II[CDN]														
	Subtest Scores									Composite Scores					
WISC–IV[CDN] GAI	WR	NO	RC	SP	PD	MR	WE	LC	OE	RD	MA	WL	OL	TA	WISC–IV[CDN] GAI
40	60	54	58	57	58	53	64	66	65	54	50	60	59	52	40
41	60	55	59	58	59	54	65	66	66	55	51	60	60	53	41
42	61	56	59	58	59	55	65	67	66	55	52	61	61	54	42
43	62	57	60	59	60	56	66	68	67	56	53	62	61	54	43
44	62	57	61	60	61	56	66	68	68	57	54	62	62	55	44
45	63	58	62	60	62	57	67	69	68	58	54	63	63	56	45
46	64	59	62	61	62	58	68	69	69	58	55	64	63	57	46
47	64	60	63	62	63	59	68	70	69	59	56	64	64	58	47
48	65	60	64	63	64	59	69	70	70	60	57	65	65	58	48
49	66	61	64	63	64	60	69	71	70	61	58	66	65	59	49
50	67	62	65	64	65	61	70	72	71	62	59	67	66	60	50
51	67	63	66	65	66	62	71	72	72	62	59	67	67	61	51
52	68	64	66	65	66	63	71	73	72	63	60	68	67	62	52
53	69	64	67	66	67	63	72	73	73	64	61	69	68	62	53
54	69	65	68	67	68	64	72	74	73	65	62	69	69	63	54
55	70	66	69	68	69	65	73	74	74	65	63	70	69	64	55
56	71	67	69	68	69	66	74	75	74	66	63	71	70	65	56
57	71	67	70	69	70	66	74	75	75	67	64	71	71	66	57
58	72	68	71	70	71	67	75	76	76	68	65	72	71	66	58
59	73	69	71	70	71	68	75	77	76	68	66	73	72	67	59
60	73	70	72	71	72	69	76	77	77	69	67	73	73	68	60
61	74	70	73	72	73	70	77	78	77	70	68	74	73	69	61
62	75	71	73	73	73	70	77	78	78	71	68	75	74	70	62
63	75	72	74	73	74	71	78	79	79	72	69	75	75	70	63
64	76	73	75	74	75	72	78	79	79	72	70	76	76	71	64
65	77	73	76	75	76	73	79	80	80	73	71	77	76	72	65
66	77	74	76	76	76	73	80	81	80	74	72	77	77	73	66
67	78	75	77	76	77	74	80	81	81	75	73	78	78	74	67
68	79	76	78	77	78	75	81	82	81	75	73	79	78	74	68
69	79	76	78	78	78	76	81	82	82	76	74	79	79	75	69
70	80	77	79	78	79	77	82	83	83	77	75	80	80	76	70
71	81	78	80	79	80	77	83	83	83	78	76	81	80	77	71
72	81	79	80	80	80	78	83	84	84	78	77	81	81	78	72
73	82	79	81	81	81	79	84	85	84	79	78	82	82	78	73
74	83	80	82	81	82	80	84	85	85	80	78	83	82	79	74
75	83	81	83	82	83	81	85	86	86	81	79	83	83	80	75
76	84	82	83	83	83	81	86	86	86	82	80	84	84	81	76
77	85	83	84	83	84	82	86	87	87	82	81	85	84	82	77
78	85	83	85	84	85	83	87	87	87	83	82	85	85	82	78
79	86	84	85	85	85	84	87	88	88	84	83	86	86	83	79
80	87	85	86	86	86	84	88	89	88	85	83	87	86	84	80
81	87	86	87	86	87	85	89	89	89	85	84	87	87	85	81
82	88	86	87	87	87	86	89	90	90	86	85	88	88	86	82
83	89	87	88	88	88	87	90	90	90	87	86	89	88	86	83
84	89	88	89	88	89	88	90	91	91	88	87	89	89	87	84
85	90	89	90	89	90	88	91	91	91	88	88	90	90	88	85
86	91	89	90	90	90	89	92	92	92	89	88	91	90	89	86
87	91	90	91	91	91	90	92	93	92	90	89	91	91	90	87
88	92	91	92	91	92	91	93	93	93	91	90	92	92	90	88
89	93	92	92	92	92	91	93	94	94	92	91	93	93	91	89
90	93	92	93	93	93	92	94	94	94	92	92	93	93	92	90
91	94	93	94	94	94	93	95	95	95	93	93	94	94	93	91
92	95	94	94	94	94	94	95	95	95	94	93	95	95	94	92
93	95	95	95	95	95	95	96	96	96	95	94	95	95	94	93
94	96	95	96	96	96	95	96	97	97	95	95	96	96	95	94
95	97	96	97	96	97	96	97	97	97	96	96	97	97	96	95
96	97	97	97	97	97	97	98	98	98	97	97	97	97	97	96
97	98	98	98	98	98	98	98	98	98	98	98	98	98	98	97
98	99	98	99	99	99	98	99	99	99	98	98	99	99	98	98
99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note. WR = Word Reasoning, NO = Numerical Operations, RC = Reading Comprehension, SP = Spelling; PD = Pseudoword Decoding, MR = Math Reasoning, WE = Written Expression, LC = Listening Comprehension, OE = Oral Expression, RD = Reading, MA = Mathematics, WL = Written Language, OL = Oral Language, TA = Total Achievement.

Table 5 WIAT–II[CDN] Subtest and Composite Scores Predicted from WISC–IV[CDN] GAI Score: Canadian norms

	WIAT–II[CDN]														
	Subtest Scores									Composite Scores					
WISC–IV[CDN] GAI	WR	NO	RC	SP	PD	MR	WE	LC	OE	RD	MA	WL	OL	TA	WISC–IV[CDN] GAI
101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
102	101	102	101	101	101	102	101	101	101	102	102	101	101	102	102
103	102	102	102	102	102	102	102	102	102	102	102	102	102	102	103
104	103	103	103	103	103	103	102	102	102	103	103	103	103	103	104
105	103	104	104	104	104	104	103	103	103	104	104	103	103	104	105
106	104	105	104	104	104	105	104	103	103	105	105	104	104	105	106
107	105	105	105	105	105	105	104	104	104	105	106	105	105	106	107
108	105	106	106	106	106	106	105	105	105	106	107	105	105	106	108
109	106	107	106	106	106	107	105	105	105	107	107	106	106	107	109
110	107	108	107	107	107	108	106	106	106	108	108	107	107	108	110
111	107	108	108	108	108	109	107	106	106	108	109	107	107	109	111
112	108	109	108	109	108	109	107	107	107	109	110	108	108	110	112
113	109	110	109	109	109	110	108	107	108	110	111	109	109	110	113
114	109	111	110	110	110	111	108	108	108	111	112	109	110	111	114
115	110	111	111	111	111	112	109	109	109	112	112	110	110	112	115
116	111	112	111	112	111	112	110	109	109	112	113	111	111	113	116
117	111	113	112	112	112	113	110	110	110	113	114	111	112	114	117
118	112	114	113	113	113	114	111	110	110	114	115	112	112	114	118
119	113	114	113	114	113	115	111	111	111	115	116	113	113	115	119
120	113	115	114	114	114	116	112	111	112	115	117	113	114	116	120
121	114	116	115	115	115	116	113	112	112	116	117	114	114	117	121
122	115	117	115	116	115	117	113	113	113	117	118	115	115	118	122
123	115	117	116	117	116	118	114	113	113	118	119	115	116	118	123
124	116	118	117	117	117	119	114	114	114	118	120	116	116	119	124
125	117	119	118	118	118	120	115	114	115	119	121	117	117	120	125
126	117	120	118	119	118	120	116	115	115	120	122	117	118	121	126
127	118	121	119	119	119	121	116	115	116	121	122	118	118	122	127
128	119	121	120	120	120	122	117	116	116	122	123	119	119	122	128
129	119	122	120	121	120	123	117	117	117	122	124	119	120	123	129
130	120	123	121	122	121	123	118	117	117	123	125	120	120	124	130
131	121	124	122	122	122	124	119	118	118	124	126	121	121	125	131
132	121	124	122	123	122	125	119	118	119	125	127	121	122	126	132
133	122	125	123	124	123	126	120	119	119	125	127	122	122	126	133
134	123	126	124	124	124	127	120	119	120	126	128	123	123	127	134
135	123	127	125	125	125	127	121	120	120	127	129	123	124	128	135
136	124	127	125	126	125	128	122	121	121	128	130	124	124	129	136
137	125	128	126	127	126	129	122	121	121	128	131	125	125	130	137
138	125	129	127	127	127	130	123	122	122	129	132	125	126	130	138
139	126	130	127	128	127	130	123	122	123	130	132	126	127	131	139
140	127	130	128	129	128	131	124	123	123	131	133	127	127	132	140
141	127	131	129	130	129	132	125	123	124	132	134	127	128	133	141
142	128	132	129	130	129	133	125	124	124	132	135	128	129	134	142
143	129	133	130	131	130	134	126	125	125	133	136	129	129	134	143
144	129	133	131	132	131	134	126	125	126	134	137	129	130	135	144
145	130	134	132	132	132	135	127	126	126	135	137	130	131	136	145
146	131	135	132	133	132	136	128	126	127	135	138	131	131	137	146
147	131	136	133	134	133	137	128	127	127	136	139	131	132	138	147
148	132	136	134	135	134	137	129	127	128	137	140	132	133	138	148
149	133	137	134	135	134	138	129	128	128	138	141	133	133	139	149
150	134	138	135	136	135	139	130	129	129	139	142	134	134	140	150
151	134	139	136	137	136	140	131	129	130	139	142	134	135	141	151
152	135	140	136	137	136	141	131	130	130	140	143	135	135	142	152
153	136	140	137	138	137	141	132	130	131	141	144	136	136	142	153
154	136	141	138	139	138	142	132	131	131	142	145	136	137	143	154
155	137	142	139	140	139	143	133	131	132	142	146	137	137	144	155
156	138	143	139	140	139	144	134	132	132	143	146	138	138	145	156
157	138	143	140	141	140	144	134	132	133	144	147	138	139	146	157
158	139	144	141	142	141	145	135	133	134	145	148	139	139	146	158
159	140	145	141	142	141	146	135	134	134	145	149	140	140	147	159
160	140	146	142	143	142	147	136	134	135	146	150	140	141	148	160

Note. WR = Word Reasoning, NO = Numerical Operations, RC = Reading Comprehension, SP = Spelling; PD = Pseudoword Decoding, MR = Math Reasoning, WE = Written Expression, LC = Listening Comprehension, OE = Oral Expression, RD = Reading, MA = Mathematics, WL = Written Language, OL = Oral Language, TA = Total Achievement.

The practitioner must take into account the statistical significance and the base rate of the difference scores. Table 6 provides the required differences between the predicted and obtained WIAT–II^{CDN} subtest and composite scores to attain statistical significance (critical values) at the .05 and .01 levels for two age groups (ages 6:0–11:11 and ages 12:0–16:11). Select the desired level of statistical significance and note it for your records. Using Table 6, find the age group of the child and the desired level of significance. For each subtest or composite, read across the row to the appropriate column to determine the critical value, and record it. The absolute value of the child's difference score must equal or exceed that critical value to be statistically significant. Determine whether or not the absolute value of the child's difference score equals or exceeds the corresponding critical value.

Table 6 Differences Between Predicted and Obtained WIAT–II^{CDN} Subtest and Composite Scores Required for Statistical Significance (Critical Values): Predicted-Difference Method Using WISC–IV^{CDN} GAI: Canadian norms.

Subtest/Composite	Significance Level	Ages 6–11	Ages 12–16
Word Reading	.05	6	9
	.01	8	12
Numerical Operations	.05	11	9
	.01	15	12
Reading Comprehension	.05	9	9
	.01	12	12
Spelling	.05	9	10
	.01	12	13
Pseudoword Decoding	.05	6	7
	.01	8	10
Math Reasoning	.05	12	11
	.01	15	14
Written Expression	.05	12	12
	.01	15	16
Listening Comprehension	.05	14	15
	.01	18	19
Oral Expression	.05	12	12
	.01	15	15
Reading	.05	6	7
	.01	8	9
Mathematics	.05	10	9
	.01	13	11
Written Language	.05	8	10
	.01	11	13
Oral Language	.05	11	12
	.01	15	15
Total	.05	7	7
	.01	9	9

If comparison of the predicted and obtained WIAT–II^{CDN} subtest and composite scores indicates a significant difference, the practitioner should then judge how rare the difference is in the general population. Table 7 provides the cumulative frequency of discrepancies between the predicted and obtained WIAT–II^{CDN} subtest and composite scores in the WISC–IV^{CDN} standardization sample (base rate). Locate the subtest or composite of interest in the extreme left column, and read across the row to locate the child's difference score. The column header above the child's difference score indicates the percentage of the theoretical normal distribution (base rates) that represents the percentage of the sample that obtained WIAT–II^{CDN} scores lower than their WISC–IV^{CDN} GAI scores by the specified amount or more.

Table 7 Differences Between Predicted and Obtained WIAT–II^{CDN} Subtest and Composite Scores for Various Percentages of the Theoretical Normal Distribution (Base Rates): Predicted-Difference Method Using WISC–IV^{CDN} GAI: Canadian norms.

	Percentage of Theoretical Normal Distribution (Base Rates)								
Subtest/Composite	**25**	**20**	**15**	**10**	**5**	**4**	**3**	**2**	**1**
Word Reading	8	10	12	15	19	20	21	23	26
Numerical Operations	7	9	11	13	17	18	19	21	23
Reading Comprehension	8	10	12	14	18	19	21	23	25
Spelling	8	9	11	14	18	19	20	22	25
Pseudoword Decoding	8	10	12	14	18	19	21	23	25
Math Reasoning	7	8	10	13	16	17	18	20	22
Written Expression	9	11	13	16	20	22	23	25	28
Listening Comprehension	9	11	13	16	21	22	24	26	29
Oral Expression	9	11	13	16	21	22	23	26	29
Reading	7	9	10	13	16	17	19	20	23
Mathematics	6	8	9	11	14	15	16	18	20
Written Language	8	10	12	15	19	20	21	23	26
Oral Language	8	10	12	15	19	20	21	23	26
Total	7	8	10	12	15	16	17	19	21

Note. Percentages in Table 7 represent the theoretical proportion of WIAT–II^{CDN} scores lower than WISC–IV^{CDN} GAI scores by the specified amount or more.

Simple-Difference Method

Table 8 provides the required differences between WISC–IV^{CDN} GAI scores and WIAT–II^{CDN} subtest and composite scores to attain statistical significance (critical values) at the .05 and .01 levels for two age groups (ages 6:0–11:11 and ages 12:0–16:11). Select the desired level of statistical significance and note it for your records. Using Table 8, find the age group of the child and the desired level of significance. For each subtest or composite, read across the row to the appropriate column to determine the critical value, and record it. The absolute value of the child's difference score must equal or exceed that critical value to be statistically significant. Determine whether or not the absolute value of the child's difference score equals or exceeds the corresponding critical value.

Table 8 Differences Between WISC–IV^{CDN} GAI Scores and WIAT–II^{CDN} Subtest and Composite Scores Required for Statistical Significance (Critical Values): Simple-Difference Method, by Age Group: Canadian norms.

Subtest/Composite	Significance Level	Ages 6–11 GAI	Ages 12–16 GAI
Word Reading	.05	8	10
	.01	11	13
Numerical Operations	.05	12	10
	.01	16	13
Reading Comprehension	.05	10	10
	.01	13	13
Spelling	.05	10	11
	.01	13	14
Pseudoword Decoding	.05	8	8
	.01	11	11
Math Reasoning	.05	12	11
	.01	16	15
Written Expression	.05	13	12
	.01	18	16
Listening Comprehension	.05	15	15
	.01	20	20
Oral Expression	.05	13	13
	.01	17	17
Reading	.05	8	8
	.01	10	10
Mathematics	.05	11	9
	.01	14	12
Written Language	.05	10	10
	.01	13	13
Oral Language	.05	12	12
	.01	16	16
Total	.05	8	7
	.01	11	9

If comparison of the WISC–IV^{CDN} GAI score and the WIAT–II^{CDN} subtest and composite scores indicates a significant difference, the practitioner should then judge how rare the difference is in the general population. Table 9 provides the cumulative frequency of discrepancies between the WISC–IV^{CDN} GAI and WIAT–II^{CDN} subtest and composite scores in the WISC–IV^{CDN} standardization sample (base rates). Locate the subtest or composite of interest in the extreme left column, and read across the row to locate the child's difference score. The column header above the child's difference score indicates the percentage of the theoretical normal distribution (base rate) that represents the percentage of the sample that obtained WIAT–II^{CDN} scores lower than their WISC–IV^{CDN} GAI scores by the specified amount or more.

Table 9 Differences Between WISC–IV^{CDN} GAI Scores and WIAT–II^{CDN} Subtest and Composite Scores for Various Percentages of the Theoretical Normal Distribution (Base Rates): Simple-Difference Method: Canadian norms.

	Percentage of Theoretical Normal Distribution (Base Rates)								
Subtest/Composite	**25**	**20**	**15**	**10**	**5**	**4**	**3**	**2**	**1**
Word Reading	9	11	13	16	21	22	23	26	29
Numerical Operations	8	9	11	14	18	19	20	22	25
Reading Comprehension	8	10	13	15	20	21	22	24	28
Spelling	8	10	12	15	19	20	22	24	27
Pseudoword Decoding	8	10	13	15	20	21	22	24	28
Math Reasoning	7	9	11	13	17	18	19	21	24
Written Expression	10	12	14	18	23	24	26	28	32
Listening Comprehension	10	12	15	18	23	25	27	29	33
Oral Expression	10	12	15	18	23	25	26	29	32
Reading	7	9	11	14	17	18	20	21	24
Mathematics	6	8	10	12	15	16	17	18	21
Written Language	9	11	13	16	21	22	23	26	29
Oral Language	9	11	13	16	20	22	23	25	28
Total	7	8	10	13	16	17	18	20	23

Note. Percentages in Table 9 represent the theoretical proportion of WIAT–II^{CDN} scores lower than WISC–IV^{CDN} GAI scores by the specified amount or more.

Conclusion

This technical report has provided an overview of the GAI, historical context for the development of the GAI, and recommended procedures for determining and interpreting the GAI. Of particular relevance is that the Canadian standardization data were used to create the GAI tables reported in this Technical Report 4.1. This report also has provided recommended procedures for the use of the GAI in ability–achievement comparisons, again using WIAT–II^{CDN} Canadian standardization data. The GAI provides important information regarding a child's cognitive functioning, but it should never be interpreted in isolation. It is best interpreted in conjunction with a thorough history and careful clinical observations of the child. Many additional sources of information are typically available to the practitioner: medical, educational, and psychosocial history gathered from both the child and collateral informants, when appropriate; direct behavioral observations; previous test scores; qualitative aspects of test performance; and results from other relevant instruments given in a battery. In addition, the practitioner should evaluate results within the context of the referral question or purpose of the evaluation.

References

Berninger, V. W., Dunn, A., & Alper, T. (2005). Integrated multilevel model for branching assessment, instructional assessment, and profile assessment. In A. Prifitera, D. H. Saklofske, & L. G. Weiss (Eds.), *WISC–IV clinical use and interpretation: Scientist-practitioner perspectives* (pp. 151–185). New York: Academic Press.

Berninger, V. W., & O'Donnell, L. (2005). Research-supported differential diagnosis of specific learning disabilities. In A. Prifitera, D. H. Saklofske, & L. G. Weiss (Eds.), *WISC–IV clinical use and interpretation: Scientist-practitioner perspectives* (pp. 189–233). New York: Academic Press.

Colom, R., Rebollo, I., Palacios, A., Juan-Espinosa, M., & Kyllonen, P. C. (2004). Working memory is (almost) perfectly predicted by *g*. *Intelligence, 32*, 277–296.

Dumont, R., & Willis, J. (2004). *Use of the Tellegen and Briggs formula to determine the Dumont-Willis Indexes for the WISC–IV*. Retrieved December 1, 2004 from http://alpha.fdu.edu/psychology/WISCIV_DWI.htm

Engle, R. W., Laughlin, J. E., Tuholski, S. W., & Conway, A. R. A. (1999). Working memory, short-term memory, and general fluid intelligence: A latent-variable approach. *Journal of Experimental Psychology: General, 128*, 309–331.

Flanagan, D. P., & Kaufman, A. S. (2004). *Essentials of WISC–IV assessment*. Hoboken, NJ: Wiley.

Fry, A. F., & Hale, S. (1996). Processing speed, working memory, and fluid intelligence: Evidence for a developmental cascade. *Psychological Science, 7*, 237–241.

Fry, A. F., & Hale, S. (2000). Relationships among processing speed, working memory, and fluid intelligence in children. *Biological Psychology, 54*, 1–34.

Hale, J. B., Naglieri, J. A., Kaufman, A. S., & Kavale, K. A. (2004). Specific learning disability classification in the new Individuals with Disabilities Education Act: The danger of good ideas. *The School Psychologist, 58*, 6–13, 29.

Harcourt Assessment Inc. (2002). *Wechsler Individual Achievement Test–Second Edition*. San Antonio, TX: Author.

Harcourt Assessment, Inc. (2003). *Wechsler Individual Achievement Test-Second Edition: Canadian Scoring and Normative Supplement for Grades K-16.* Toronto, Ontario, Canada: PsychCorp.

Heinz-Martin, S., Oberauer, K., Wittmann, W. W., Wilhelm, O., & Schulze, R. (2002). Working-memory capacity explains reasoning ability—and a little bit more. *Intelligence, 30*, 261–288.

Mackintosh, N. J., & Bennett, E. S. (2003). The fractionation of working memory maps onto different components of intelligence. *Intelligence, 31*, 519–531.

Miller, L. T., & Vernon, P. A. (1996). Intelligence, reaction time, and working memory in 4- to 6-year-old children. *Intelligence, 22*, 155–190.

Prifitera, A., Saklofske, D. H., & Weiss, L. G. (Eds.). (2005). *WISC–IV clinical use and interpretation: Scientist-practitioner perspectives*. New York: Academic Press.

Prifitera, A., Weiss, L. G., & Saklofske, D. H. (1998). The WISC–III in context. In A. Prifitera & D. H. Saklofske (Eds.), *WISC–III clinical use and interpretation: Scientist-practitioner perspectives* (pp. 1–38). New York: Academic Press.

Saklofske, D. H., Gorsuch, R. L., Weiss, L. G., Zhu, J. J., & Patterson, C. A. (2005). General ability index for the WAIS–III: Canadian norms. *Canadian Journal of Behavioural Science, 37*, 44–48.

Saklofske, D. H., Prifitera, A., Weiss, L. G., Rolfhus, E., & Zhu, J. (2005). Clinical interpretation of the WISC–IV FSIQ and GAI. In A. Prifitera, D. H. Saklofske, & L. G. Weiss (Eds.), *WISC–IV clinical use and interpretation: Scientist-practitioner perspectives* (pp. 33–65). New York: Academic Press.

Sattler J. M. (2001). *Assessment of children: Cognitive applications* (4th ed.). San Diego, CA: Author.

Schweizer, K., & Moosbrugger, H. (2004). Attention and working memory as predictors of intelligence. *Intelligence, 32*, 329–347.

Scruggs, T. E., & Mastropieri, M. A. (2002). On babies and bathwater: Addressing the problems of identification of learning disabilities. *Learning Disability Quarterly, 25,* 155–168.

Tellegen, A., & Briggs, P. (1967). Old wine in new skins: Grouping Wechsler subtests into new scales. *Journal of Consulting Psychology, 31*, 499-506.

Tulsky, D. S., Saklofske, D. H., Wilkins, C., & Weiss, L. G. (2001). Development of a general ability index for the Wechsler Adult Intelligence Scale—Third Edition. *Psychological Assessment, 13*, 566–571.

Vigil-Colet, A., & Codorniu-Raga, M. J. (2002). How inspection time and paper and pencil measures of processing speed are related to intelligence. *Personality and Individual Differences, 33*, 1149–1161.

Wechsler, D. (1949). *Wechsler Intelligence Scale for Children*. New York: The Psychological Corporation.

Wechsler, D. (1974). *Wechsler Intelligence Scale for Children—Revised.* San Antonio, TX: The Psychological Corporation.

Wechsler, D. (1991). *Wechsler Intelligence Scale for Children—Third Edition*. San Antonio, TX: The Psychological Corporation.

Wechsler, D. (2003). *Wechsler Intelligence Scale for Children–Fourth Edition*. San Antonio, TX: Harcourt Assessment, Inc.

Wechsler, D. (2004). *Wechsler Intelligence Scale for Children–Fourth Edition: Canadian Manual.* Toronto, Ontario, Canada: PsychCorp.

Wechsler, D., Kaplan, E., Fein, D., Kramer, J., Morris, R., Delis, D., & Maerlender, A. (2004). *Wechsler Intelligence Scale for Children–Fourth Edition–Integrated*. San Antonio, TX: Harcourt Assessment, Inc.

Weiss, L. G., Saklofske, D. H., Prifitera, A., Chen, H. Y., & Hildebrand, D. K. (1999). The calculation of the WISC–III general ability index using Canadian norms. *The Canadian Journal of School Psychology, 14*, 1–9.

Williams, P. E., Weiss, L. G., & Rolfhus, E. (2003a). *Theoretical model and test blueprint* (WISC–IV Technical Report No. 1). Retrieved December 8, 2004, from http://harcourtassessment.com/hai/Images/pdf/wisciv/WISCIVTechReport1.pdf

Williams, P. E., Weiss, L. G., & Rolfhus, E. (2003b). *Psychometric properties* (WISC–IV Technical Report No. 2). Retrieved December 8, 2004, from http://harcourtassessment.com/hai/Images/pdf/wisciv/WISCIVTechReport2.pdf

Williams, P. E., Weiss, L. G., & Rolfhus, E. (2003c). *Clinical validity* (WISC–IV Technical Report No. 3). Retrieved December 8, 2004, from http://harcourtassessment.com/hai/Images/pdf/wisciv/WISCIVTechReport3.pdf

