

## Who Are the Gifted Using the New WISC-IV?

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Each generation of IQ tests by the various test publishers is eventually revised and renormed, with a test possibly being completely reformulated. We are in the transition phase now, using a whole new series of tests and finding what works and doesn't work, or which portions to utilize to satisfy various needs. As always, the tests represent both improvements and losses for the gifted. We have seen some extension of test ceilings, which benefits the gifted, and increased emphasis on processing skills, which does not.

Wechsler tests continue to be good initial IQ tests for the gifted. Although they rarely yield scores above the 140s, they offer good diagnostic information, and indications of ability beyond their limits. *The Wechsler Intelligence Scale for Children-Fourth Edition* (WISC-IV), released in August of 2003, replaces the WISC-III. School districts usually have one year, according to American Psychological Association (APA) standards, to begin using a newer version of an IQ test. Therefore, most school districts that employ Wechsler tests should have begun using the new edition this fall.

Compared to the WISC-III, the WISC-IV is a substantial reformulation. While the highest IQ score possible is still 160, the WISC-IV does offer additional harder questions at the upper ends of a number of subtests. The Verbal IQ and Performance IQ scores of its predecessors have been eliminated. The 10 required subtests yield a Full Scale IQ score and four Composite scores: Verbal Comprehension, Perceptual Reasoning, Working Memory and Processing Speed. The Verbal Comprehension and Perceptual Reasoning Composites are very good indicators of giftedness. They do an admirable job of assessing verbal abstract reasoning and provide very useful tests of visual reasoning with less timing emphasis. Working Memory and Processing Speed are less correlated with giftedness. The five supplementary tests add flexibility; two substitutions are allowed in different composite areas in deriving Full Scale IQ scores.

The Dumont-Willis Indices (<http://alpha.fdu.edu/psychology/>) offer another approach to evaluating WISC-IV scores besides the Full Scale IQ when Verbal Comprehension and Perceptual Reasoning Composite scores are higher than Working Memory and Processing Speed (the WISC-IV Technical Manual suggests this will usually be the case). The Dumont-Willis Index-1 (DWI-1) score can be computed for the combination of Verbal Comprehension and Perceptual Reasoning, while a DWI-2 score can be computed for the combination of Working Memory and Processing Speed. These computations, based on the Tellegen and Briggs formula, could be helpful to schools. **The DWI-1 score would be an excellent identifier of gifted children for school programs, and only six subtests of the WISC-IV are needed to produce it.**

The WISC-IV is yielding many gifted-level scores at the Gifted Development Center. However, some of the Full Scale IQ scores are excessively lowered by Working Memory and Processing Speed scores. As intelligence is primarily abstract reasoning ability, emphasizing short-term auditory memory and processing speed on paper-and-pencil tests is less helpful. Two Working Memory subtests (only one was required on the WISC-III) and two Processing Speed subtests (only one was required on the WISC-III) place more weight on these processing skills in the Full Scale IQ score. This is unfortunate for gifted children and confounds the Full Scale IQ Score (FSIQ) as a gifted identifier.

In the normative sample for the WISC-IV, the gifted group (which had scored at least 130 previously) earned a Full Scale IQ score of 123.5 on the WISC-IV. Their Verbal Comprehension score was 124.7 and Perceptual Reasoning score was 120.4. However, in line with our experience, their Working Memory averaged only 112.5 and their Processing Speed was 110.6 (WISC-IV Technical Manual, p. 77).

### **The Increased Emphasis on Processing Skills**

Perhaps the inclusion of more processing skills measures is appropriate for lower functioning children. If the child's processing speed on paper-and-pencil tasks is so slow that he or she cannot complete work in a reasonable amount of time in the classroom, processing speed may be such a limiting factor that it should be included in IQ scores. Likewise, if short-term auditory memory is so poor that the teacher's instructions can't be retained at all, this is a significant problem. However, gifted children rarely perform extremely poorly in these areas on an absolute scale. It makes much more sense to identify them as gifted based on assessments emphasizing reasoning, provide them gifted learning experiences, and then add any accommodations based on relative weaknesses to the gifted accommodations.

**A Full Scale IQ score that averages *gifted* reasoning and *average* processing skills fails to identify either the giftedness or the relative weaknesses.** Test authors have wrongly assumed that gifted children are fast processors. Some are very quick; others are reflective or perfectionistic, slowing their speed. Gifted children also show a preference for meaningful test materials, and may not perform well on short-term memory tests or other tasks that utilize non-meaningful material. They usually perform so much better with meaningful material that their scores with non-meaningful material are difficult to interpret.

The higher a child's intelligence, the more reasonable it would be to assume that the child would score well in all four of the indices. However, as noted above, the gifted group in the normative sample scored in the superior ranges on Verbal Comprehension and Perceptual Reasoning, but considerably lower in Working Memory and Processing Speed. Presumably some group other than the gifted scored in the superior ranges in these two strands, but this introduces a confounding variable into the Full Scale IQ score. The two lower indices do not reflect the abilities of the gifted and tend to lower their Full Scale scores. Given these issues, it will be a challenge for testers of the gifted to choose

tests appropriate to document gifted strengths and diagnose weaknesses, without eliminating children from gifted program entrance requirements.

Dawn Flanagan and Alan Kaufman (2004), in *Essentials of WISC-IV Assessment*, argue that the Full Scale IQ (FSIQ) should *not* be reported if the variance from the highest to lowest composite score is 23 points or greater. The gifted group in the WISC-IV normative sample showed a 13-point discrepancy, suggesting the likelihood of many gifted children whose FSIQs should not be used.

The Gifted Development Center’s (GDC) research with 103 children (Falk, Silverman & Moran, 2004) yielded even larger discrepancies. Their significance is evident when the results are compared with those of a control group in the normative sample:

	<b>GDC</b>	<b>Control Group in Norm Sample</b>
Verbal Comprehension Index	131.7	106.6
Perceptual Reasoning Index	126.4	105.6
Working Memory Index	117.7	103.0
Processing Speed Index	104.3	102.8
<b>Full Scale</b>	<b>127.2</b>	<b>106.7</b>

(WISC-IV Technical Manual, p. 77)

There is little variation in the indices of the control group: less than 4 IQ points between highest and lowest subtest scores. Note that the Working Memory and Processing Speed Indices do not deflate the Full Scale IQ scores. On the contrary, the Full Scale mean is actually higher than the highest index. By comparison, the mean discrepancy between highest and lowest subtest scores in the gifted sample was **27.4** points. *Nearly 60%* of the sample had discrepancies between the Verbal Comprehension Index and the Processing Speed Index of 23 points. Discrepancies ranged as high as 69 points—over 4 standard deviations. It is also revealing that while the gifted group demonstrated a 25-point advantage over the control group in verbal abstract reasoning, their differences in Processing Speed were negligible: less than 2 points. It is obvious that gifted students do not perform faster on these processing speed tasks than average students.

Of the four indices, the Verbal Comprehension Index is clearly the best indicator of giftedness and the Perceptual Reasoning Index is the second best indicator. The mean Full Scale IQ score of the gifted sample was definitely depressed below the gifted range, even though the mean Verbal Comprehension Index was high enough to qualify these students for gifted services. By these scores, a general rule might be to eliminate consideration of the Full Scale IQ for gifted identification.

Flanagan and Kaufman (2004) suggest using the General Ability Index (GAI) instead, which, like the DWI-1 of Dumont and Willis, utilizes only the Verbal Comprehension and Perceptual Reasoning scores. This is now being supported by trainers for Harcourt

Assessments (PsychCorp). If the GAI table from Flanagan and Kaufman’s book were used to combine the mean Verbal Comprehension and Perceptual Reasoning Indices from the Gifted Development Center study (131.7 + 126.4), the resulting mean GAI of the gifted group would be 132, which qualifies for gifted services.

### **Subtests Most Appropriate for Gifted Assessment**

The following chart indicates the strongest subtests for the gifted population in two different studies. (Subtests in parentheses are optional.)

#### **WISC-IV Subtest Means of 63 Gifted Children in the Norm Sample compared with 103 Gifted Children from GDC**

	<b>Gifted Norm Group</b>	<b>GDC</b>
<b>Similarities</b>	<b>14.1</b>	<b>15.8</b>
<b>Vocabulary</b>	<b>14.6</b>	<b>15.4</b>
<b>Comprehension</b>	<b>14.1</b>	<b>14.8</b>
<b>Matrix Reasoning</b>	<b>13.4</b>	<b>14.7</b>
<b>Picture Concepts</b>	<b>12.7</b>	<b>14.6</b>
<b>(Arithmetic)</b>	<b>14.2</b>	<b>14.1</b>
<b>(Information)</b>	<b>13.9</b>	<b>14.1</b>
<b>Block Design</b>	<b>13.8</b>	<b>13.2</b>
<b>(Word Reasoning)</b>	<b>13.2</b>	<b>12.9</b>
<b>Letter-Numb. Sequencing</b>	<b>12.6</b>	<b>12.9</b>
<b>(Picture Completion)</b>	<b>13.0</b>	<b>12.5</b>
<b>Symbol Search</b>	<b>12.1</b>	<b>11.5</b>
<b>Digit Span</b>	<b>12.0</b>	<b>12.3</b>
<b>(Cancellation)</b>	<b>11.0</b>	<b>10.3</b>
<b>Coding</b>	<b>11.5</b>	<b>9.9</b>

(WISC-IV Technical Manual, p. 77)

Similarities, Vocabulary and Comprehension make up the three required subtests to derive the Verbal Comprehension Index. Please note that, in both studies, these three subtests emerged among the highest scores for the gifted groups. Matrix Reasoning, Picture Concepts and Block Design, which make up the three required subtests to derive the Perceptual Reasoning Index, appear to be among the next strongest set of required (not optional) subtests. Picture Concepts fared considerably better with the Gifted Development Center sample than with the gifted group in the norm sample.

In the norm sample, Arithmetic surpassed all but Vocabulary, and in the Gifted Development Center sample, it ranked in sixth place. Additional information about Arithmetic can be found in the factor loadings on general intelligence. Note that it holds the highest rank as a measure of general intelligence.

<b>Good Measures of g</b>	
Arithmetic	.768
Vocabulary	.751
Information	.748
Similarities	.733
<b>Fair Measures of g</b>	
Matrix Reasoning	.687
Block Design	.672
Word Reasoning	.648
Comprehension	.646
Letter-Number Seq.	.621
Picture Completion	.616
Picture Concepts	.582
Symbol Search	.568
Digit Span	.525
<b>Poor Measure of g</b>	
Coding	.454
<b>Poorest Measure of g</b>	
Cancellation	.209

(Keith, Fine, Taub, Reynolds, & Kranzler, 2004)

Combining information from the performance of two sets of gifted students with the factor loadings on general intelligence, it becomes clear that Arithmetic is a much stronger measure of giftedness than Letter-Number Sequencing or Digit Span, the two required subtests for deriving the Working Memory Index. While Letter-Number Sequencing has a higher rank than Digit Span in loading on general intelligence, Digit Span produces more predictable and interpretable responses from students. Letter-Number Sequencing involves listening to a random list of letters and numbers, separating them and manipulating them in a prescribed way. An occasional response to the task is, “You want me to do *what?*” One boy took over 3 minutes each for the last few items and stated that he felt nauseated afterward.

Therefore, at the Gifted Development Center, we substitute Arithmetic for Letter-Number Sequencing in most assessments. If a child appears to be mathephobic, we do not do the substitution. Two substitutions are allowable to derive a Full Scale IQ score, as long as they reflect an *a priori* judgment before the test is administered (or unless a subtest becomes spoiled in administration).

The new Cancellation item is not particularly useful in assessing giftedness, as can be seen from both the performance of the two gifted groups and its extremely low standing as a measure of general intelligence. It is even less correlated with general intelligence than the Mazes subtest, which was removed from the WISC-IV. The Gifted

Development Center uses this optional subtest only on rare occasions for diagnostic purposes. Unfortunately, the Coding subtest, which has never been a good predictor of giftedness in previous versions of the WISC (Kaufman, 1992), continues to be a required subtest on the WISC-IV. As can be seen from both studies and the factor loadings, Coding is a poor measure of general intelligence and serves to diminish scores of gifted students, whose speed of performance on clerical paper and pencil tasks is rarely as well developed as their conceptual abilities. This asynchrony in development is typical of the gifted population (Silverman, 1993), and another reason why processing speed should not play a role in the assessment of giftedness.

### Conclusion

The studies conducted to date on the WISC-IV suggest that two of the four indices, the Verbal Comprehension Index and the Perceptual Reasoning Index, provide the best measures of giftedness. Therefore, it seems prudent to administer only 6 subtests of the WISC-IV for selection to gifted programs: Vocabulary, Similarities, Comprehension, Matrix Reasoning, Picture Concepts and Block Design. The General Ability Index (GAI) can be derived from these six subtests, and is recommended by both the test publisher and the new *Essentials of WISC-IV Assessment* by Flanagan and Kaufman (2004). They advise using the GAI, instead of the Full Scale IQ, if the 4 composite scores vary by 23 or more points, and if the Verbal Comprehension Index and the Perceptual Reasoning Index vary by **less** than 23 points. Dumont and Willis also advise that their DWI-1 and DWI-2 should only be calculated if the scores that go into them are relatively close. This short form of the WISC-IV will be less expensive to administer, less time consuming, more efficient and will yield more accurate estimates of the abilities of gifted students, without the confounding variables of Working Memory and Processing Speed.

### References

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