Stanford BINET Intelligence Scales

Stanford-Binet Intelligence Scales, Fifth Edition
Assessment Service Bulletin Number 3

Use of the SB5 in the Assessment of High Abilities

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The features of the Stanford-Binet Intelligence Scales, Fifth Edition *(SB5) make the test useful for the assessment of high abilities in both general and gifted assessment. These features include high ceilings for standard ability scores, continuous testing of abilities in a single instrument from early childhood through old age, Extended IQ scores (with a theoretical upper limit of 225 IQ), and gifted composite scores that optimize assessment for gifted program selection. This bulletin contrasts the modified ratio IQ scores from the* Stanford-Binet Intelligence Scale: Form L-M *(Form L-M) (the third edition of the Stanford-Binet) to the norm-referenced standard scores of the SB5 to provide a crosswalk that allows SB5 users to benefit from decades of clinical experience with the older Form L-M edition.*

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Use of the SB5 in the Assessment of High Abilities

Overview

Since its early days, intelligence testing has been concerned with both extremes of the ability continuum. Although Binet and Simon's early intelligence tests focused on identifying children at the lower range of ability (see Wolf, 1973), others before and after them sought to identify abilities in the higher range. For example, Francis Galton's (1869, 1874) concerns in the 19th century focused on the correlates of genius, and in the 20th century, Lewis Terman, Catherine Cox, Maud Merrill, and their associates (see Terman, 1954/1969) made significant contributions to the study of high ability and giftedness. Much of what we have learned about the development of high ability children came from studies involving the administration of Terman's (1916) adaptation and extension of the *Binet-Simon Intelligence Scale* and its more recent editions. Like its predecessors, the *Stanford-Binet Intelligence Scales, Fifth Edition* (SB5) (Roid, 2003b) may be used to assess high levels of ability.

This assessment service bulletin provides a comprehensive and clinically focused discussion of the appropriate use of the SB5 for assessing children with high abilities, particularly for identifying which children might benefit from special services associated with programs for the gifted and talented in schools. This bulletin is designed to support the use of the SB5 for gifted assessment and will help professionals use the measure to assess any examinees possessing high abilities. It also will help potential SB5 users evaluate the degree to which the test will meet their particular needs in high ability assessment and should support their decision-making as they transition from earlier editions of the Stanford-Binet to the SB5 or consider switching from another test to the SB5.

The SB5 manuals already address the measure's use with high ability and gifted populations. The Examiner's Manual (Roid, 2003c) describes how to administer and score the test and provides basic guidelines for its interpretation, including with high-ability examinees. The Technical Manual (Roid, 2003e) provides information on technical features of the test, including demonstrating the validity of the test for use in gifted assessment by referencing a sample of classified gifted cases included in the norm sample. The Interpretive Manual (Roid, 2003d) provides a case study of a gifted student, a discussion of the Extended IQ (EXIQ) (which at the high end permits scores between 161 and 225 IQ), and introduces two gifted composite scores. This bulletin reviews many of these features, and extends the discussion of them in ways that will interest professionals concerned with the assessment of high abilities in children.

Readers should already have a general familiarity with the design of the SB5 (such as could be obtained through its manuals, or at least through review of materials on the Riverside Publishing website, www.riversidepublishing.com), as well as a general understanding of the issues in gifted education and assessment.

For information on the history of the Stanford-Binet, readers are referred to the SB5 manuals and to SB5 Assessment Service Bulletin Number 1 (Becker, 2003).

IQ Scores Past and Present

The scores of IQ tests are directly comparable only if they are calculated the same way, and even then there may be minor differences across tests. The SB5 Technical Manual (Roid, 2003e) reports differences in mean scores and correlations across the SB5 and the two previous editions, as well as with corresponding scores on the various editions of the Wechsler tests and the *Woodcock-Johnson® III Tests of Cognitive Abilities* (Woodcock, McGrew, & Mather, 2001). The SB5 Technical Manual also provides estimated equating tables that link the SB5 with both the *Stanford-Binet Intelligence Scale: Fourth Edition* (SB IV) (Thorndike, Hagen, & Sattler, 1986) and Form L-M (Terman & Merrill, 1960, 1973). Taking the Flynn effect (related to apparent changes in the intelligence of populations over time) (Flynn, 1987) into account, scores on the SB5 appear generally equivalent to scores on other intelligence tests, with one exception: Scores on Form L-M seem to increase faster than corresponding SB5 scores as they move further from the mean of 100. Because Form L-M has played such an important role in the history of gifted assessment, and because it continues to have its advocates, this issue will be examined in some detail.

There is a big difference between the older ratio-based (or related types of) IQ scores and the more contemporary standard, norm-referenced IQ scores (called “standard score IQ”). Standard score IQs tend to have an upper limit in the 150- to 160-point range, but ratio scores go well past that level. When we hear about Einstein having an IQ near 200, presumably that refers to an estimate of a ratio IQ. However, even Einstein might find it very difficult to achieve a standard score IQ of 200 IQ on a contemporary intelligence test. Although the SB5 does offer an Extended IQ score (discussed later), such scores are exceedingly rare because they must conform to the percentile frequency requirement of a standard score, not a ratio score.

Test developers have moved away from the use of modified ratio IQ scores, which were last offered in Form L-M (Terman & Merrill, 1960, 1973), towards the use of standardized scores, first on group ability tests, including the Army Alpha and Army Beta tests used to screen large groups of GIs, and eventually on individual ability tests, such as the *Wechsler Intelligence Scale for Children®* (WISC®) (Wechsler, 1949) and the SB IV (Thorndike, Hagen, & Sattler, 1986). This transition led to considerable confusion, especially in the identification of intellectually gifted students, because Form L-M (Terman & Merrill, 1960, 1973) was widely accepted as a valid measurement tool until the early 1990s, when the norms and items increasingly were considered too old to be valid. Furthermore, about 60% of the items in Form L-M were in the knowledge and fluid reasoning categories (Becker, 2003), and although this combination of abilities may adequately describe a certain type of intellectual person, it does not necessarily adequately describe the range of abilities needed to succeed in typical school or work settings.

Many gifted coordinators in schools came to view the Form L-M modified ratio IQ scores as highly inflated because the scores were considerably higher than the standard scores reported by every other major test. However, it was not the age of the norms that made the scores appear too high; it was the type of score produced by a ratio formula. Unfortunately, the gifted coordinators were comparing apples and oranges. The value of the ratio and modified ratio IQ scores was obtained from the clinician's ability to differentiate among the levels of highly intelligent children. It was considerably more difficult to distinguish intellectual levels using standard score IQs because most high-ability individuals seemed to score within the third standard deviation above the mean. Assuming a mean (*M*) of 100 and a standard deviation (*SD*) of 15, that would place most high-ability individuals at an IQ between 130 and 144.

The remainder of this bulletin explains how the SB5 has incorporated the advantages of both kinds of scales, and how it helps practitioners identify specific intellectual strengths and weaknesses so that they can make accurate recommendations to individuals, psychologists, and school personnel.

Ratio IQ Scores—The Original Intelligence Quotients

Authors of the early intelligence tests sought to provide scores that would be easily understandable to parents and other laypersons. Although Binet preferred to focus on mental age, the "ratio IQ" quickly caught on, and for decades, it became the standard way of presenting the results of intelligence testing. The ratio IQ is the original IQ. *I* stands for *intelligence* and *Q* stands for *quotient*. A ratio IQ compares a person's chronological age to their tested mental age as exhibited through the assessment process. The mental age is determined through a standardization process by administering each test item to random samples of children at each age level to determine which items half of the children of a specific age pass and half of the children of that same age fail. The mental age (MA) is then divided by the chronological age (CA), and the result is multiplied by 100 to determine the calculation for traditional ratio IQ scores:

$$100\ (\text{MA}/\text{CA}) = \text{IQ} \tag{1}$$

A major problem with this method is that intellectual growth has more or less predictable spurts and plateaus. The ratio IQ does not reflect a smooth progression from one age range to the next. Although early IQ tests (including the first two editions of the Stanford-Binet) used the ratio IQ as the basis for IQ scores, the popularity of such scores began to change with the influence of the Wechsler and other tests in the middle of the 20th century. Wechsler sought to calculate abilities in reference to age-based norms, using standardized data fit to normal curves (i.e., standard score IQs).

Modified Ratio IQ's—*The Stanford-Binet Intelligence Scale: Form L-M*

It is desirable to have an IQ score represent the same general ability level across different ages. The inconsistency of the ratio IQ formula across age levels was the primary reason that test publishers began using standard score IQs. Terman and Merrill (1960, 1973) tried to maintain the use of age levels when calculating IQ scores for Form L-M. They designed their norm tables to maintain an average standard deviation of 16 to reflect the relative differences in general intellectual ability for the population sample, stating that the standard deviation would facilitate comparisons to other tests. The formula that Terman and Merrill

(1973, p. 339) used to calculate the deviation or “revised IQ” (referred to in this bulletin as the “modified ratio IQ”) is:

$$\text{Revised IQ} = (\text{conventional IQ} - \text{mean})\,K + 100 \quad (2)$$

Where conventional IQ is the ratio IQ, mean is the average conventional IQ for individuals of the examinee’s chronological age (always close to 100), and K is a value close to 1. The mean and K values are provided in Appendix A in Terman and Merrill (1973, p. 339). Thus, the modified ratio IQ incorporates a ratio IQ score at its heart. As those familiar with Form L-M know, the test does indeed “spread the children out” by ability in the gifted range, thereby differentiating between children who are moderately, highly, exceptionally, or profoundly gifted. However, the modified ratio IQ will necessarily result in a different metric of scores than the methods involved in creating standard score IQs.

The Form L-M manual (Terman & Merrill, 1973, p. 358) reports tremendous variability across the age ranges in both the mean score and the number of children whose scores were at the different percentile levels listed. The authors smoothed the means and standard deviations to show a more consistent variability across ages. The standard deviation of 16 was derived and reported, new formulas were employed to standardize the normative charts, and some consistency across age levels was established. Although no additional percentiles were reported for the resulting scores, there was an implied assumption that ability levels within a population fit a normal curve distribution (Terman and Merrill, 1973, p. 359). Terman and Merrill went on to add that “an IQ of 116 represents the performance one standard deviation above average or at about the 84th percentile of his age group” (p. 361).

However, years of subsequent testing and analysis by practitioners in the gifted field who used Form L-M have revealed a far greater occurrence of high test scores than would be predicted by the typical use of standard deviations and percentiles. As a result, the scores have most likely been reflective of the intellectual variability among the examinees, but frequency could not be correctly attributed to either the scores or the standard deviations. So modified ratio IQ scores effectively show how different a person’s intellectual ability is from the average, but they do not necessarily provide useful information about the percentage of people who function at that intellectual level.

Gifted Assessment With the *Stanford-Binet Intelligence Scale: Form L-M*

Specialists who work with the intellectually gifted population may be familiar—through their experience with Form L-M—with what different modified ratio IQ score levels mean in terms of a child’s abilities and performance levels. Most of the literature associated with high-ability students, or at least the literature based on the work of Form L-M users, employs modified ratio IQ scores to describe the various levels of gifted intellect as follows:

Moderately Gifted	125+
Highly Gifted	145+
Exceptionally Gifted	160+
Profoundly Gifted	180+

It is not just that Form L-M has a higher ceiling or that other and more recently published IQ tests have lower ceilings; rather, a completely different kind of score reporting exists between these various tests. Although the differences between Form L-M and successive editions of the Stanford-Binet are described in some of the technical literature of the various tests, the difference in purpose and intention between ratio and standard score IQs does not appear to have been addressed in the materials that educators and psychologists typically encounter when training to use ability instruments.

To clarify the distinction between ceiling effects and standardized score effects, it is important to note that the term “test ceiling” refers to how difficult the test items are for measuring the brightest or oldest people. Form L-M does not necessarily have a very high ceiling but instead offers a high range of available scores. Depending on the intelligence level of the child taking the test, Form L-M can “run out of ceiling” for an exceptionally gifted 10- or 11-year-old child or even sooner for a profoundly gifted (younger) child. Even though the norm tables span ages 2 to age 20, very few clinicians have been able to make practical use of the test for bright children over the age of 10.

Specialists in the field of gifted assessment who have relied on Form L-M have identified far more children at high score ranges than would have been anticipated by frequencies predicted by norm-driven percentiles. Percentiles should really refer to rate of occurrence, and if too many children are identified as highly and exceptionally gifted on Form L-M, the attributed percentiles clearly are not correct. Nonetheless, higher scores on Form L-M do indicate higher abilities, and children identified at the exceptionally and profoundly gifted levels generally do appear highly gifted compared to average children their ages. The problem for gifted specialists has been that much of that discriminatory ability is lost with standardized tests. The SB5 recaptures some of that discriminatory ability through the use of age-equivalent scores, change-sensitive scores (CSS), and an Extended IQ formula.

Standard Score IQ Tests

Standard score IQs are derived from what is called a normalized bell curve. A child’s performance is ranked and percentiles are used to reveal the frequency, or in the case of high scores, the rarity at each score level. As new testing theories and practices developed throughout the last century, the ability to compare scores on different tests became important. For example, when a test had a different number of items or a different scale, assessment professionals needed to know relatively how well, or how poorly, a child’s performance on one instrument was compared to his or her performance on another instrument.

Most major intellectual assessments now use a mean of 100 and a standard deviation of 15. All major tests also have normalized their scores by fitting the results from their normative sample into a normal bell curve and assigning standard deviations and percentiles. This allows assessment professionals to more confidently compare ability scores across tests. For example, if a child achieves an 84th percentile score on one test and a 58th percentile score on another, it indicates that his or her ranking among others taking the test differs from one test to the next. Assessment professionals should be able to deduce that first, the tests are probably measuring two very different things, and that second, the child is not as capable in whatever the second test measures as he or she is on the first. The most common and obvious example is when we use tests that compare intellectual ability with academic achievement. If a child is performing at his or her ability level, the IQ percentile generally will be close to the child's achievement test percentile.

Scores on the SB5

The SB5 differs from other ability measures in a variety of ways. First, the same instrument can be used to assess examinees ages 2 through 85 and older. Aside from the benefits of pricing, training, and storage space gained from needing just one test for all age groups, the continuity of the test across all ability levels provides great advantages for high ability and gifted assessment. In the past, there have been numerous problems with gifted identification due to ceiling effects. There were no normative tables for very young, highly intelligent children on most standard score tests because the primary objective of these tests was to assess children within the normal or low range. As a result, there were not enough difficult items for young children of very high ability. In the case of high ability assessment, the clinician was often left with the dilemma of which test to use or how to interpret and estimate a child's actual ability level based on ceiling scores. Furthermore, even tests that were designed for school-aged children and adolescents did not have enough high-end items to avoid test-ceiling problems for high-ability students (and especially high-ability adolescent students). Finally, none of the tests designed for use with adults had enough ceiling to adequately discriminate among high ability adults. As a result, clinicians generally needed at least three tests for three different age levels, and they were still not able to adequately evaluate highly able preschool-aged children or adults. Therefore, as Stanford-Binet Form L-M users examined newer tests to adopt, they found that none of the existing standard score tests was specifically designed to accommodate high-ability assessment. However, the designers of the SB5 intended to include gifted assessment for all age levels from the beginning.

In addition to standard scores and percentiles, age-equivalent (AE) scores have been included in the SB5 score reports because they may have more inherent meaning for interpreting the test taker's relative intellectual standing compared to others the same age. Age-equivalent scores are useful for comparing a child's ability to the abilities of children of different ages, such as when instructional grouping decisions are needed. However, age-equivalent scores cannot fully explain the relative intelligence of adults, because different cognitive ability factors hit maximums (on average in the population) at different points in adulthood, followed by a period of decline. For example, general knowledge and vocabulary can and do increase in most people throughout much of their adult lives, while other (fluid) abilities, such as working memory and visual-spatial processing, typically reach a peak in early to mid-adulthood (see Roid, 2003e, pp. 103–105).

Gifted Categories Then and Now

Clinicians and others who specialize in both gifted children and adults must become familiar with the SB5 before new, commonly accepted classifications of giftedness levels will emerge. It is desirable to compare score information from the SB5 with the large body of literature available on gifted children and adults, much of it generated from Form L-M testing. As mentioned earlier, many people (including practitioners) have apparently not understood that there was a difference in what the scores meant on ratio IQ (or modified ratio IQ) tests and standard score IQ tests. As a result, when educators or parents saw standard score IQs that were in the 130 to 145 IQ range (even when generated through a modified-ratio IQ test such as Form L-M), they assumed the child was moderately to highly gifted, levels that corresponded to the charts in the giftedness literature (e.g. Webb, Meckstroth, & Tolan, 1982; Gross, 1993). After all, most people in the general population have been tested only on standard score IQ tests, if at all. In addition, school officials had a difficult time knowing precisely what to make of the very high scores that might emerge from use of Form L-M.

Table 1 presents guidelines for classification and comparison of scores on the old (modified ratio-based) Form L-M scores and the standard score IQs offered by the SB5. Ruf (in press) provides examples of the differences in characteristics of children at each of these ability levels, particularly in terms of academic performance.

As Table 1 shows, the score ranges for corresponding categories are quite different. The first column (Form L-M levels and scores) refers to modified ratio scores, and no tests based on current norms use such scores. Table 2 (reprinted from Roid, 2003e, p. 85) provides the estimated equating between selected Form L-M scores and SB5 FSIQ scores and illustrates how the standard score IQ tests compress the tails of the bell curve continuum, relative to the modified ratio scores used in Form L-M.

Tables 1 and 2 show that the Full Scale IQ (FSIQ) scores for very bright children are lower than the corresponding scores from older IQ score tests, such as Form L-M. The average FSIQ for the gifted sample of the SB5 norm group was 123.7 (Roid, 2003e, p. 97). Considering that many people think that an IQ score of 130 at the second standard deviation is the official gifted cutoff, this may appear somewhat unexpected. However, it serves to illustrate some important issues. First, the gifted sample was comprised of a representative group of children who were identified by their school districts for participation in gifted programs. The IQ score is not the only factor most schools consider. Second, the well-known Flynn effect (1987) predicts that the average national IQ score rises steadily over time. That is one of the primary reasons that IQ tests need to be renormed regularly; their norms become outdated and may no longer provide accurate percentiles. However, it is also possible that the major

Table 1

Comparison of Form L-M and SB5 Gifted Categories and IQ Scores

Form L-M		SB5	
Levels of Giftedness	**IQ Score Ranges**	**Levels of Giftedness**	**IQ Score Ranges**
Moderately Gifted	125–144	Superior	120–129
Highly Gifted	145–159	Gifted or Very Advanced	131–144
Exceptionally Gifted	160–179	Very Gifted or Highly Advanced	145–160
Profoundly Gifted	180+	Extremely Gifted or Extremely Advanced	161–175 (via EXIQ)
		Profoundly Gifted or Profoundly Advanced	176–225 (via EXIQ)

Note. Form L-M and SB5 categories are not directly equivalent.
EXIQ = Extended IQ (see Roid, 2003d)

Table 2

Estimated Equating Table: Expected SB5 Full Scale IQ Ranges for Selected SB Form L-M IQ Scores

Form L-M IQ Score	SB5 FSIQ
55	63–74
70	75–82
85	86–91
100	96–100
115	105–110
130	114–121
145	122–133

Reprinted from Roid (2003e), p. 85.

cause of the Flynn effect lies in advances in the middle range of ability, in which case the Flynn effect could not in itself account for this phenomenon. The most likely explanation is, therefore, that many schools use criteria other than an IQ cutoff of 130 for selection into gifted programs.

Table 3 is a list of hypothesized learning differences between individuals at various ability levels and ages. (See Gottfredson, 1997, for further discussion of the relationship between intelligence and success in different facets of daily life.) Note that the highest level, which starts at the relatively low (compared to past gifted categories) IQ level of 120, recommends teaching and classroom approaches that are radically different from those provided by most inclusion classrooms grouped only by age. In fact, the gifted literature (much of which is based on experience with Form L-M) is particularly relevant to the children who score from about 118 and above on the SB5—roughly equivalent to an IQ score range of 130 to 132 on Form L-M.

Table 3

Hypothesized Relationships Between FSIQ Scores and Recommended Methods of Instruction

Ability Level and FSIQ	Method of Instruction
Borderline Delayed (70 to 79)	Ensure that learning is at an appropriate speed: slow, simple, and supervised. A teacher or assistant may provide ongoing support for learning through an inclusion setting.
Low Average (80 to 89)	Provide very direct, hands-on instruction. At lower end of this range, the student may benefit from plenty of direct supervision.
Average (90 to 109)	Provide plenty of time for the student to master assignments (mastery learning) and allow hands-on learning. Especially in elementary grades, the student can benefit from direct instruction. At the upper level of this range, and especially at older ages, the student can learn well from reading written materials and practice.
High Average (110 to 119)	In general, the student can thrive in learning in a traditional classroom format with mixed lecture, reading, and group and individual review. At higher levels, the student can more readily acquire skills by researching and collecting information.
Superior (120 to 129) and Above	Create opportunities for this student to seek and find information independently. Provide instruction as needed, particularly about developing research skills. This individual may enjoy reasoning things through alone. A teacher or assistant may use more direct methods as needed, but should remember that traditional classroom teaching methods may become boring for this student.

Note. FSIQ = Full Scale IQ.
Reprinted from Roid (2003d), p. 51.

What Does the SB5 Tell Us About Intelligence?

How can the standard score results from the SB5 be used to determine levels of high ability in children and adults who take the test? In children especially, intelligence testing is valued for its predictive ability concerning educational performance. But exactly what is intelligence, and how is it able to predict educational performance? Jensen (1998), a leading theorist on intelligence, wrote that there is no general agreement on what the term "intelligence" means. Scientists talk about "*g*" or "general intelligence" and debate over whether there is a core element in people called intelligence (*g*) or whether the ability to perform is an amalgam of characteristics. It seems likely that abilities are only one class of underlying psychological traits that affect quality of performance in real-world tasks such as school performance. Other traits, such as motivation (or interests) and personality (the style with which one approaches a given situation), are also likely to affect performance. In school as in other important areas of life, the quality of performance represents a mixture of abilities, motivation, and personality. Other important human characteristics, such as identity, leadership, creativity, and values, probably require particular combinations of these three broad aspects of the mind (abilities, motivation, and personality), in addition to developed skills and information acquired through others in society. Carson and Lowman (2002) have referred to such constructs as aspects of character. Intelligence is best understood as the basic set of abilities (including knowledge) that an individual can use to support performance, but it needs to be combined with the appropriate motivation and personality traits to produce an aptitude for learning. Aptitude, according to Roid (2003d) and following the tradition of Bingham (1937), is an aspect of character and "refers to the degree to which abilities combine with motivation and personality traits to affect learning and performance. Thus, the SB5 is more directly a measure of intelligence and abilities than of aptitude" (Roid, 2003d, pp. 47–48).

Types of Scores Available With the SB5

The SB5 offers 10 subtest scores (M = 10, SD = 3, range 1–19) that combine in several ways to create factor and composite scores. There are 2 subtests for each of five factors, and within each factor there is one verbal subtest and one nonverbal subtest. Thus, there are five factor index scores. The five nonverbal and five verbal subtests combine to provide two domain composite scores: the Nonverbal IQ (NVIQ) and the Verbal IQ (VIQ) composite scores. Each domain composite incorporates one subtest from each of the five factors. Finally, all 10 subtests combine to yield the Full Scale IQ composite score. The factor indexes and the composite scores all have a population mean of 100 and a standard deviation of 15.

The SB5 also provides change-sensitive scores (CSS), a value based on the Rasch model for each of the five factors. The CSS scales are criterion-referenced and standardized with 500 as an average score for an individual age 10 years, 0 months. The observed maximum score range on the SB5 is from 376 to 592 (for the Full Scale IQ CSS score), although most observed CSSs fall into the range of approximately 420 to 530. Age-equivalent scores are identified in reference to the mean CSSs for individuals of different ages. CSSs also make it possible to compare ability scores across individual children on an absolute scale. Table 4 (reproduced from Roid, 2003d, p. 21) links particular CSS levels to SB5 task

Table 4

Criterion-Referenced Interpretation of the CSS Full Scale IQ Scores

CSS Scale	Age Equivalent	Selected Tasks (SB5 Activity, Item and Level, Subtest Abbreviation)
530	> 21 years	Vocabulary, defines a difficult word (Item 44, VKN)
525	> 21 years	Verbal Analogies, completes a difficult analogy (Item 2, Level 6, VFR)
520	> 21 years	Vocabulary, defines a difficult word (Item 34, VKN)
515	> 21 years	Position & Direction, correctly answers story of someone walking a direction, then turning left, etc. (Item 1, Level 6, VVS)
510	16 years, 2 months	Verbal Quantitative, answers word problem about bringing correct amount of water in pint cans (Item 2, Level 5, VQR)
505	12 years, 9 months	Verbal Absurdities, finds absurdity about icebergs (Item 3, Level 4, VFR)
500	10 years, 0 months	Picture Absurdities, identifies error in position of continents (Item 4, Level 4, NVKN)
495	8 years, 8 months	Verbal Quantitative, counts blocks in three-dimensional model (Item 2, Level 4, VQR)
490	7 years, 8 months	Verbal Absurdities, finds absurdity in story of injury (Item 2, Level 4, NVFR)
485	6 years, 10 months	Last Word, recalls last word in sentences about cars and dogs (Item 2c, Level 4, VWM)
480	6 years, 1 month	Picture Absurdities, identifies absurdity in picture of envelope (Item 2, Level 4, NVKN)
475	5 years, 6 months	Form Patterns, forms the “walking person” pattern (Item 1, Level 3, NVVS)
470	5 years, 0 months	Vocabulary, defines the word for a common fruit (Item 16, VKN)
465	4 years, 6 months	Verbal Quantitative, points to a specified number (Item 2, Level 3, VQR)
460	4 years, 0 months	Memory for Sentences, repeats sentence about child (Item 2, Level 3, VWM)
455	3 years, 8 months	Block Span, taps two blocks correctly (Item 3, Level 2, NVWM)
450	3 years, 3 months	Vocabulary, identifies the action in a picture (Item 14, VKN)
445	2 years, 11 months	Position & Direction, puts block on highest clown (Item 5, Level 2, VVS)
440	2 years, 7 months	Object Series, matches length of short counting rod (Item 5, Level 2, NVFR)
435	2 years, 3 months	Memory for Sentences, repeats two-word sentence (Item 1, Level 2, VWM)
430	< 2 years, 0 months	Vocabulary, identifies toy duck (Item 8, VKN)
425	< 2 years, 0 months	Delayed Response, car under cup (Item 2, Level 1, NVWM)

Note. Abbreviations are as follows: CSS = Change-sensitive score, FR = Fluid Reasoning, KN = Knowledge, NV = Nonverbal, QR = Quantitative Reasoning, V = Verbal, VS = Visual-Spatial Processing, WM = Working Memory.
Reprinted from Roid (2003d), p. 21.

accomplishments. Clinicians may find it helpful to show this table to clients (or parents) who do not understand what different facets of the SB5 mean in practical terms.

High Ability Profiles

This section examines five cases of individuals with high ability scores on the SB5 (see Table 5). This discussion will emphasize the kinds of commentary the examiner can add to either the *SB5 Scoring Pro*™ computer-generated reports or a personalized report. So this section is an extension of three chapters from the Interpretive Manual (Roid, 2003d) and deals with case studies, writing reports, and use of the *SB5 Scoring Pro* software. These samples were drawn from more than 60 SB5 case studies of high-ability children. The set of sample cases includes a bright child in the high average range, a moderately gifted child in the superior range with fairly even abilities, a highly gifted child, a high-ability (gifted) child whose abilities are uneven, and an exceptionally gifted young adult. Bear in mind that, although the SB5 is effective at assessing high ability throughout the life span, the interpretation and report for an adult client must typically address adult issues and concerns rather than the primarily educational issues related to childhood high ability.

Table 5

SB5 Scores for Five Gifted Cases

	Giftedness Types for Five Cases									
Score	1 Melanie High Average	AE	2 Mary Ann Moderately Gifted	AE	3 Marissa Highly Gifted	AE	4 Adam Uneven High Ability	AE	5 Tyler Exceptionally Gifted Young Adult	AE
IQ Composites										
FSIQ	118	19-0	123	13-8	131	9-9	128	16-7	146	*
NVIQ	112	14-10	123	14-3	126	8-11	119	14-1	145	*
VIQ	124	*	121	13-3	134	10-3	135	42-0	143	*
ABIQ	100	13-7	127	20-2	130	9-8	115	15-6	130	*
Factor Indexes										
FR	106	15-3	118	12-8	123	8-11	118	24-0	141	*
KN	123	28-0	131	15-5	128	10-0	128	16-2	123	*
QR	125	*	119	11-8	136	11-4	133	*	149	*
VS	120	*	117	12-6	123	9-2	132	*	152	*
WM	106	13-4	115	11-4	123	9-1	112	11-4	132	*
Nonverbal Subtests		**Percentiles**		**Percentiles**		**Percentiles**		**Percentiles**		**Percentiles**
FR	7	16	13	84	13	84	11	63	15	95
KN	15	95	15	95	13	84	16	98	13	84
QR	13	84	15	95	15	95	14	91	19	99.9
VS	13	84	12	75	14	91	13	84	19	99.9
WM	11	63	13	84	15	95	11	63	19	99.9
Verbal Subtests										
FR	15	95	13	84	15	95	15	95	19	99.9
KN	13	84	16	98	17	99	14	91	15	95
QR	16	98	12	75	18	99.6	18	99.6	19	99.9
VS	14	91	14	91	14	91	18	99.6	19	99.9
WM	11	63	12	75	13	84	13	84	12	75
Age and Sex		11F		8F		6F		9M		17M

Note. * Performance level was beyond the highest average score for mature adults.
Abbreviations are as follows: AE = age equivalent, FSIQ = Full Scale IQ, NVIQ = Nonverbal IQ, VIQ = Verbal IQ, ABIQ = Abbreviated Battery IQ, FR = Fluid Reasoning, KN = Knowledge, QR = Quantitative Reasoning, VS = Visual-Spatial Processing, WM = Working Memory, F = female, M = male.

Whether the examiner uses the *SB5 Scoring Pro* or not, the resulting report must address the audience for which it is intended. For example, if the child is in elementary school, the general understanding and expertise of the typical teacher, principal, and (depending on the circumstances) parent must be considered. Many educators do not have much familiarity with either testing and measurement or high intelligence and its impact on the classroom needs of the student. It is advisable to integrate such information into the report. If the parents have sufficient background in statistics, testing, or measurement, more of the information provided by the *SB5 Scoring Pro* can remain in the report to the parents. Sometimes it makes sense to provide two separate reports: one that is fairly technical and one that might be more understandable for lay people. Then the clinician can provide the most appropriate report for each audience.

Case Study 1—High Average Ability

Case 1 is 11-year-old Melanie (FSIQ 118), whose profile typifies a child with high abilities who has nevertheless not qualified for a gifted program. Melanie's parents are aware that she is generally advanced compared to the typical children her age, and the results of the SB5, especially the age-equivalent scores, make that very clear. Three of her factor scores, marked with asterisks, are at an adult level. Overall, Melanie's abilities (based on FSIQ) are at the 88th percentile. She is well beyond the average for her age and may be able to take advantage of learning opportunities considerably more easily than her less able agemates, especially when able to rely on her verbal strengths in such activities. One of the issues when identifying high ability students may be determining whether or not they are "gifted." Data available through research on the SB5 makes it clear that a wide range of age-equivalent scores and intellectual abilities exist within any age group and that such a range in abilities can also occur within individuals. The examiner's report can emphasize that the child has high ability that requires educational attention. In this case, as with others, the "gifted" label often proves more a hindrance than a benefit, because it tends to demand a rigid, black or white classification of individuals into one category (gifted) or the other (not gifted), where in fact a less rigid approach may serve children better. At the very least, students like Melanie can benefit from individualized methods offered in regular classes, perhaps as recommended by gifted specialists. Some schools also offer special programs for "talented" students.

Melanie's abilities in the Verbal domain are actually in the Superior range at the 95th percentile. As noted earlier, the average SB5 score for the gifted sample was 123.7. If the clinician makes that point in the report, it is more likely that school personnel will recognize that this child merits some form of ability grouping or accelerated learning opportunities. Refer also to Table 3 for a description of the needs of the high average child in the classroom.

The report can address the strong and weak points in the examinee's profile and explain what some subtest or composite scores really mean. In the following example, results of school achievement tests are combined with the interpretation of the ability test.

> Melanie's school achievement test results show that math is not her strongest academic area at this time. Keep in mind that Melanie has high quantitative reasoning abilities and most elementary-level instruction and achievement tests are more specific to calculation and knowing the number facts and operations instead of to figuring out what problem really needs to be solved. Melanie states that she is not good at math. Many very bright children believe they are not good at math because they confuse calculation with reasoning. Melanie should be encouraged to continue through the many levels of math instruction as she gets into the higher grades so that she can keep many career options open for herself. Math is one subject that is much harder to take later in life if you don't already have a good background.

For the children whose scores are below the usual gifted cutoff range—customarily between 125 and 130 on many older ability tests—the assessor may find it useful to include enough interpretation to show how different from average the child is. For example, in Case 1, the report for Melanie explains that

> age-equivalent scores help make it clear that each IQ point above average may translate into an appreciable increase in a child's performance and achievement ability. Melanie, who is 11 years old, is considerably advanced compared to average children her age. In fact, on her Verbal IQ, she is already on a par with average adults. This ability shows itself in her writing, her reading interests, and her speaking ability. Her schools need to attend to the very wide ability range that is present in most classes and provide opportunities for very bright children like Melanie to work well beyond typical grade-level instruction so they will not learn to underachieve or lose their confidence in what they can do when challenged.

Case 2—Moderately Gifted Ability (Superior)

Mary Ann is a moderately gifted, 8-year-old child, with an FSIQ of 123, placing her at the 94th percentile. Mary Ann's score on this test is in the range of children who participate in gifted programs (averaging 123.7, based on Roid, 2003e), although presumably not in the highest 2 percent of the general population.

When parents are concerned about their child's level of intelligence and whether or not the child's school curriculum and pacing are appropriate, the report needs to be clear about how the child fits in intellectually compared to typical agemates. Reference to the age-equivalent scores helps to provide perspective on relative weaknesses, as follows:

> Working Memory represents Mary Ann's relatively poorest area of performance. As you examine the age-equivalent scores, you will notice that her Working Memory is nevertheless 3 years more advanced than the average child her age, so this is only a relative weakness in her own profile.

Once the experienced clinician understands the information available from the SB5 and its accompanying manuals, he or she should use an examinee's individual expertise to tailor the report to explain the relevance of the scores. For example, an assessor used to writing reports from the perspective of Form L-M might write:

> According to the SB5 Technical Manual, a score of 122 to 133 compares to a score of at least 145 on the Form L-M. Mary Ann's age-equivalent scores also support the evidence presented by Mary Ann's mother in the Developmental Milestones intake form that she completed before assessment. Mary Ann's early milestones are commensurate with children whose ratio IQs are between 150 and 165—in the highly gifted range—and much of the literature on gifted children is based on ratio IQ scores rather than standard scores. Mary Ann, therefore, appears to be moderately to highly gifted compared to other children her age.

Developmental Milestones (Ruf, 2000) is an assessment of life history relevant to reporting the development of abilities and skills. When possible, it is helpful to make comparisons to other familiar ability tests so the reader can get a sense of how the examinee's abilities compare to children who have higher scores on some other, older tests. The age-equivalent scores help anchor that understanding in a very direct way.

Case 3—Highly Gifted Child (Very Advanced)

Marissa, a 6-year-old girl, earned a Full Scale IQ score of 131 on the SB5. Her current overall intelligence is classified as Very Advanced (gifted) and is ranked at the 98th percentile. Almost any school will recognize Marissa, and her test scores, as “gifted,” but it is reference to the factor score percentiles and age-equivalent scores that make her advanced abilities most tangible. The following is an example of how the clinician can guide follow-up services for this examinee.

> Marissa’s Quantitative Reasoning score is 136—a very advanced level, especially in the theoretical, Verbal domain. Although still in first grade, Marissa’s age equivalency is 11 years, 4 months—an AE more typical of the average sixth-grade student. Quantitative reasoning is not about memorizing the tools of arithmetic. Mathematics, unlike reading-based subjects, is difficult to self-instruct. Marissa may benefit from opportunities to advance into at least fourth- or fifth-grade level math this school year. She should prove an excellent candidate for programs such as a university’s talented youth math program by the time she is in sixth or seventh grade. Her gift for math may show itself more in some aspects of math and science than in others, so it would be advantageous to support her exploration of various directions in math and science. If her school does not provide her with these opportunities, a tutor or on-line math program should be considered.

The differences between Marissa’s learning ability and that of most of her classmates can be underscored as follows:

> The meaning of age-equivalent scores is that the average child of any given age will have an age equivalency that is the same age as their actual chronological age at the time of assessment. If Marissa were average, her AE would be 6-6. Instead, all of her AEs are much higher than her actual age. In fact, a typical age-based “graded” classroom will have a huge ability spread in it each year, which obviously greatly complicates a teacher’s ability to attend to the learning needs of all the students. Schools also vary in typical levels of ability represented by their students, so a standardized test score that is “average” (compared to national norms) may be a good bit lower, or higher, than the scores of most of the students in the class. In any given year, and unless she skips a grade (only one viable option), Marissa will be either the smartest or one of the smartest students in her class. The effect this will have on her depends on a number of factors, but it could prove to be a significant disadvantage to her in achieving both educational progress and social-emotional connections and satisfaction, because teachers typically do not teach to the most highly capable student in the class.

Of course, there may potentially be some negatives associated with being the youngest student in a class, advanced other otherwise, and such issues should also be addressed.

The next example of an approach to tell parents and educators what the test results mean can apply to most examinees who score above about 130 on the SB5. Keep in mind that it is the combination of scores, not just the FSIQ, that points toward what academic or placement adjustments are warranted.

The difference between Marissa's chronological age and her intellectual age equivalency is likely to widen with each passing year, because, simply put, high intelligence saves time. Highly intelligent individuals require fewer repetitions to learn new material. Also, the learning gap between average and highly intelligent children continues to grow with every passing year because the brighter individual keeps building upon an ever-increasing foundation.

Many parents also want an estimate of how their child compares to others. This helps parents know how to encourage and guide the child while not expecting too much or too little. In Marissa's case, she is likely the smartest, or one of the smartest, students in any of her elementary classes. If she attends a larger middle school, there may be more competition for the top spot, but she will continue to be among the brightest. This intellectual ability does not necessarily always translate into the highest or most perfect grades. If Marissa attends a rural or small high school, there will be some other students as bright as she is and one or two students who may be significantly brighter. In a suburban high school or elite prep school, she will be in the highest classes, usually one of the best students, and there will be only an occasional classmate who consistently outperforms Marissa. Finally, if she goes to a highly competitive, hard-to-get-into college or university, Marissa will probably be average and find the coursework quite demanding. If she selects a top-notch, but less competitive school, she will probably find her academic load easier to manage, and may therefore have sufficient time (should she have the interest) to try to take on leadership roles and maintain many activities along with her coursework. This will be discussed more in the follow-up consultation session.

Marissa may require numerous adjustments to her educational course to maximize her intellectual potential and to find meaning, purpose, and connection in her life. Generally, Marissa's school and parents can work toward a flexible approach that incorporates a combination of the following: some same-grade and same-age activities, some above grade-level instruction and grouping, some ability grouping within her age range, and some partial home school or separately configured opportunities. By the time Marissa enters high school and college, most classes are ability grouped through self-selection opportunities, and Marissa should be prepared for those opportunities when they arrive.

Case 4—High Ability Child With Very Uneven Abilities

Adam, a 9-year-old boy in fifth grade, earned a Full Scale IQ score of 128 on the SB5. His current overall intelligence is classified as Superior and is ranked at the 97th percentile. At 135, Adam's Verbal IQ is 16 points higher than his Nonverbal IQ of 119. A difference of this magnitude is both statistically significant (at .05 level) and practically significant (that is, infrequent, occurring in less than 8% of the norm sample). It is therefore reasonable to consider his Verbal IQ score as the more relevant score applicable to Adam's real learning and ability level, particularly in contexts in which verbal communication is important. Such a conclusion is also consistent with the interpretation process recommended by the SB5 manuals.

Adam appears to have some relative strengths in quantitative reasoning and visual-spatial processing, particularly when mediated through verbal communication. Among adults, such an ability pattern might be expected among individuals with careers in technology and engineering (as well as other fields). However, engineers typically combine strong nonverbal with specific verbal strengths. Nevertheless, Adam may find it enjoyable to explore educational opportunities in the areas of technology, engineering, and science, or at least to read about these areas.

Adam's profile lends itself well to the explanatory benefits of the change-sensitive scores. Through use of change-sensitive scores, one may contrast the measured ability of people who are currently different ages and abilities. Adam's CSSs are all above 500, the average score for a 10-year-old (typically a fifth-grade student in this country). Adam's age-equivalent scores make it clear that he is a very gifted youngster, and the FSIQ score below 130 should not restrict him from the educational services he needs, especially if the assessor highlights his strengths in a report, and emphasizes the importance of his Verbal IQ relative to his FSIQ.

Case 5—Exceptionally Gifted Young Adult (Highly Advanced)

The final high-ability case study is a representative example of an exceptionally gifted person whose needs went unrecognized despite his high ability. Tyler, a nearly 18-year-old young man, has an FSIQ of 146 on the SB5, putting him at the 99.9 percentile. Tyler turned 18 the day after his assessment on the SB5, as he was finishing his senior year of high school. Like many highly gifted boys, Tyler experienced difficulties conforming to the expectations and requirements of his teachers during his late-elementary and middle-school years. Few adaptations had been made for his very high ability and the kinds of interests he had. It is, therefore, perhaps not a surprise he turned in less and less of his work and showed an obvious disdain, if not outright hostility, toward many of his teachers. He qualified for advanced classes in high school and grew more and more cooperative in the improved and more suitable environment of high-ability classes. Although Tyler routinely achieved 98th and 99th percentile scores on school-administered achievement tests throughout his school years, students of far lesser ability were also able to do the same. As discussed earlier, standard score tests often conceal the ability and achievement differences among examinees in the highest ranges of the tests. As a result, Tyler's school saw him more as oppositional and underachieving in school classes than as particularly exceptional.

Analysis of the case studies reveals that a rather surprising number of the exceptionally gifted—and boys in particular—score lower on Knowledge (KN), and especially Verbal KN (Vocabulary), than on the other factors. Although merely speculative at this stage, it may be fruitful to investigate whether or not video game or computer use might have cut into the reading time of the generation (particularly boys) now in school. Tyler is actually well read and factually knowledgeable, but his immediate grasp of out-of-context vocabulary was relatively low for his overall ability. The report includes this explanation:

Knowledge represents an examinee's accumulated fund of general information acquired at home, school, or work. In research, this factor has often been called crystallized ability. Although still above average, the Knowledge factor score was relatively lower than his other factor scores. Additionally, the Verbal Knowledge subtest Vocabulary contributes half of the score to the Abbreviated Battery IQ (ABIQ), explaining his relatively lower ABIQ of 130 (that is, lower relative to his FSIQ).

Note that this case highlights the risks in relying exclusively on the Abbreviated Battery (ABIQ), which incorporates only two subtests for a primary indicator of intellectual giftedness. Although the ABIQ does provide a good screening indicator of general ability and correlates highly with FSIQ, it nevertheless incorporates only two subtests. A low (or high) score on one of the subtests may give a very different impression of overall ability than would be the case if more diverse subtests were included in the assessment.

All of Tyler's scores are at the adult level, and beyond the point for which age-equivalent scores are offered. He scored the highest possible scaled score (19) on 6 of the 10 subtests. To understand what this means in practical terms, his pattern of change-sensitive scores should be examined along with additional information. Tyler's parents completed an intake form about his early developmental milestones and provided copies of previous school achievement testing. A high percentage of exceptionally gifted people of all ages thoroughly enjoy the challenges of standardized tests. Tyler approached his second test the same way, but he perhaps had become more concerned about showing what he could do during the second assessment. If Tyler's ability level is compared to the modified ratio IQ scores of Form L-M, he compares favorably to others in the profoundly gifted range (between 180 and 200). Any children or adults who earn an FSIQ, Nonverbal IQ, or Verbal IQ score over 140 have very special abilities and needs. It may be very helpful to direct the parents or the individual toward the appropriate background literature and available programs or services.

Extended Scores for the Unusually Highly Intelligent

Extended IQ (EXIQ) scores may be available for those who achieve FSIQ scores above 150. Chapter 2 of the Interpretive Manual (Roid, 2003d) explains how to calculate extended scores. The two highest categories of IQ Scores shown in Table 1 are available only through EXIQ. The normative sample included at least a few individuals whose Form L-M scores (completed separately from the standardization project) were above 200, but none of them scored beyond 148 on the SB5 Standardization Edition. This does not mean that the individuals tested do not have extremely high abilities; it only suggests that in terms of standard score IQs, their scores are within three or, at most, four standard deviations of the mean.

Just because the SB5 offers extended IQ (EXIQ) scores, practitioners should not expect to see a large number of test scores above 160. Table 1 also shows the two hypothetical intellectual categories, available only through use of the EXIQ, for scores between 161 and 225. Theoretically, the people who require an extended score calculation are exceptionally rare. The assumptions of the normal curve, combined with the population of the United States, suggest that there would be only approximately 933 individuals in the entire nation (across all ages) with an IQ above 160. Assuming that this number is evenly distributed across all ages, at any given time there would be roughly 11 to 15 individuals in any given grade level *across the entire nation* able to obtain an EXIQ above 160. The EXIQ is an experimental scoring device intended to reduce the range-constraining effects of standardization and normalized scoring, but among the specialists in the field of high-level giftedness who use the SB5, early experience confirms that there will indeed be very few examinees whose scores qualify them to use the EXIQ score. These preliminary results, therefore, suggest that clinicians and specialists should not hold their breath waiting to test an individual above 160 IQ, but should instead be alert to *other* indications of intelligence and aptitude among the high ability individuals they assess. Such information could complement the information provided through assessment using the SB5.

Other SB5 Scores of Interest for Use With High-Ability Clients

Change-Sensitive Scores and Age-Equivalent Scores

Factor indexes and IQ composite scores differ in the maximum AE scores they provide, from a low of 20 years for the Visual-Spatial Processing and Quantitative Reasoning factor indexes to a high of 55 years for VIQ. Practitioners seeking to interpret change-sensitive scores should be aware of the maximum age-equivalent scores afforded across the different scores. Exceptionally high-functioning individuals may begin to surpass the maximum possible age-equivalent scores while still in their early teens. For them, change-sensitive scores become a means for further interpreting the functioning level of such individuals. Change-sensitive score interpretation is critical to recognizing the exceptional nature of many individuals who score above 130 on the SB5 and certainly those who score above 140. Table 6 shows the change-sensitive scores and related age-equivalent scores for four gifted 5-year-olds. The scores for the four children can be compared to Table 4 to see the developmental levels related to each CSS.

All four children are 5 years old and in the first grade. The first two children shown in Table 6 are the same age—5 years, 6 months. Their different measured ability scores create a different trajectory in the CSS and the AE. If a gifted coordinator were able to group these two first graders for instruction, it would be important to note that, although both easily qualified for services, Joseph is far more ready for advanced instruction than is Albert. In fact, Joseph is profoundly gifted and is probably capable of compacting 6 years of elementary school into less than 2 years. Albert is moderately gifted in the Nonverbal domain and highly to exceptionally gifted in the Verbal domain. In other words, although both boys are very gifted, it would be inappropriate to place them in the same instructional circumstances and expect them both to thrive equally. It is important to remember, too, that the average child their age has an AE of 5-6. Because of the way elementary classrooms are typically configured, it is reasonable to assume that the AEs in either boy’s class range from about 3-6 to 8-0. Joseph is so unusual that he will almost assuredly be the smartest in his class every year until at least high school advanced courses. Albert is more likely to encounter one or two others in his

Table 6

Age-Equivalent and Change-Sensitive Scores for Four 5-Year-Olds

Joseph (5 years, 6 months) FSIQ: 145, NVIQ: 140, VIQ: 146	Change-Sensitive Scores	Age Equivalent	Albert (5 years, 6 months) FSIQ: 132, NVIQ: 122, VIQ: 140	Change-Sensitive Scores	Age Equivalent
IQ Scores			**IQ Scores**		
Full Scale IQ (FSIQ)	497	9-2	Full Scale IQ (FSIQ)	490	7-8
Nonverbal IQ (NVIQ)	494	9-7	Nonverbal IQ (NVIQ)	481	6-9
Verbal IQ (VIQ)	500	10-0	Verbal IQ (VIQ)	495	8-5
Abbreviated IQ (ABIQ)	498	9-3	Abbreviated IQ (ABIQ)	486	7-1
Factor Index Scores			**Factor Index Scores**		
Fluid Reasoning (FR)	495	8-11	Fluid Reasoning (FR)	480	6-6
Knowledge (KN)	498	9-4	Knowledge (KN)	492	8-2
Quantitative Reasoning (QR)	503	10-6	Quantitative Reasoning (QR)	487	7-10
Visual Spatial (VS)	495	9-2	Visual Spatial (VS)	495	9-2
Working Memory (WM)	494	8-4	Working Memory (WM)	487	7-5
Vanessa (5 years, 7 months) FSIQ: 139, NVIQ: 128, VIQ: 146	**Change-Sensitive Scores**	**Age Equivalent**	**Sally (5 years, 3 months) FSIQ: 140, NVIQ: 130, VIQ: 146**	**Change-Sensitive Scores**	**Age Equivalent**
IQ Scores			**IQ Scores**		
Full Scale IQ (FSIQ)	494	8-5	Full Scale IQ (FSIQ)	493	8-3
Nonverbal IQ (NVIQ)	488	7-8	Nonverbal IQ (NVIQ)	485	7-3
Verbal IQ (VIQ)	499	9-6	Verbal IQ (VIQ)	499	9-6
Abbreviated IQ (ABIQ)	498	9-3	Abbreviated IQ (ABIQ)	496	8-9
Factor Index Scores			**Factor Index Scores**		
Fluid Reasoning (FR)	498	9-7	Fluid Reasoning (FR)	491	8-2
Knowledge (KN)	493	8-4	Knowledge (KN)	500	10-0
Quantitative Reasoning (QR)	496	8-11	Quantitative Reasoning (QR)	481	7-3
Visual Spatial (VS)	490	8-3	Visual Spatial (VS)	490	8-3
Working Memory (WM)	489	7-8	Working Memory (WM)	489	7-8

Note. Change-sensitive scores are derived from item response theory (Rasch) scaling and are presented in the form of *W* scores. *W* scores range from approximately 375 to 575, with a score of 500 anchored at 10 years, 0 months. Age-equivalent scores are based on mean *W* scores at each age level in the normative sample.

grade level each year who are as able as he. The difference between their chronological age and their AE will most likely grow as they grow. For example, if the age equivalency is now 3 years older than the chronological age, the ratio will remain about the same. Old modified ratio IQs were so popular for estimating relative ability levels because they were calculated using chronological and mental ages, and could provide an indicator of what a child was intellectually ready to learn, because teachers could readily recover mental age from the IQ score. It seems likely that AEs on the SB5 may be used in somewhat the same way, although until research examines such uses, it remains an experimental approach.

The second two children in Table 6 have IQs that are very close in magnitude, but they are 4 months apart in age. The SB5 scores help the clinician and the educator know how to proceed with each girl's grouping and instruction. Parents, too, gain a better understanding of their children's strengths and weaknesses, which allows them to offer the appropriate support and opportunities. Sometimes a unitary ability score can mislead educators and parents as to what the child should be able to do. Most parents are reluctant to push their children, yet they worry about their child possibly "falling through the educational cracks." All four of these children are ready for instructional levels well beyond those provided in a typical first grade, and the scores represented here make that fact more concrete and easy to understand.

Gifted Composite Scores and Form L-M Scores

The final sets of scores to review are the experimental SB5 composite scores for gifted and the Form L-M scores for a set of examinees. Form L-M, known for its capacity to find high levels of giftedness, is heavily weighted on vocabulary (i.e., knowledge) and conceptual (or fluid) reasoning. The SB5 is an ability test designed to recapture what had been lost with most standardized IQ tests, namely, the ability to differentiate levels of giftedness among very high-ability individuals. One way to achieve this would be to increase the relative concentration of knowledge and fluid reasoning in a composite score. Chapter 4 in the Interpretive Manual (Roid, 2003d) explains how to calculate two such composite scores—the Gifted Composite and the Nonverbal Gifted Composite—that may uncover levels of giftedness better than the FSIQ, Nonverbal IQ, or Verbal IQ alone. Roid (2003d, p. 42) provides the rationale:

> The gifted sample collected for the validity studies showed a profile of mean factor index scores that included a lower mean for the Working Memory factor index (115.8 versus a median factor index score of about 121 and an FSIQ mean of 123.7). Gifted children who have a reflective thinking style are often slower to respond and do poorly on the highly timed subtests such as offered through some intelligence tests (Kaufman, 1994). Experts in gifted assessment who tested individuals for the SB5 validity studies reported that gifted examinees who were "meticulous" performed particularly poorly on the Working Memory subtests. Carroll (1993) showed that factors other than short-term memory and processing speed had higher *g* loadings and were more central to the concept of reasoning in general cognitive ability, as originally defined by Spearman (1927).

Chapter 4 of the Interpretive Manual also provides evidence of consequential validity for the gifted composites through the examination of classification hit rates. Both of the gifted composites showed adequate validity in this respect.

Table 7 presents scores for 23 children and young adults, ages 4-6 to 23, all of whom were previously identified as gifted. The individuals are listed in descending order by their FSIQ on the SB5. The table also includes the formulas for how to calculate the two experimental composite scores. The second, third, and fourth columns of Table 7 list the SB5 Nonverbal, Verbal, and Full Scale IQs for each examinee. During the standardization phase of the SB5, some examiners with extensive experience in gifted assessment reported that the Form Patterns activity of the Nonverbal Visual-Spatial Processing subtest might lower the overall score of their gifted examinees, and that the subtest did not appear to be as related to giftedness as were most other subtests. The gifted composite removes the two Working Memory and one Nonverbal Visual-Spatial Processing subtest scores, and the resulting composite IQ is a full point or more higher for 12 of the 23 cases, 4 of which received more than 4 additional points with this formula. The assessor might consider making routine use of the gifted composite but still administer the entire battery, and then use the Working Memory and Nonverbal

Table 7

SB5 Gifted Composite Scores and Form L-M Scores

Case	NVIQ	VIQ	FSIQ	Gifted Composite	NV Gifted Composite	Form L-M	Sex
1	145	143	146	145.7	141.54	n/a	M
2	146	138	144	144.77	147.92	203	M
3	145	136	142	140.12	141.54	176	M
4	132	148	142	142.91	131.96	138	M
5	143	135	140	137.32	138.34	n/a	M
6	128	146	139	139.18	130.36	145	F
7	139	132	137	137.32	139.94	147	M
8	134	136	136	141.05	136.75	177	F
9	128	135	133	135.46	128.77	n/a	M
10	131	131	132	134.52	135.15	130	M
11	126	136	132	133.9	127.17	152	F
12	126	134	131	136.39	128.77	180	M
13	119	135	128	133.59	122.38	138	M
14	121	129	126	128	122.38	181	M
15	126	124	126	124.27	127.17	n/a	M
16	128	120	125	119.61	120.79	146	M
17	118	126	123	125.2	120.79	178	F
18	123	120	122	124.27	122.38	145	F
19	114	119	117	123.34	119.19	138	F
20	113	119	116	116.82	111.21	155	F
21	114	112	114	114.02	112.81	130	F
22	106	117	112	116.82	108.02	143	M
23	104	111	108	110.29	104.83	124	M

		Reliability	Conversion Equation
Gifted Composite	NFR + NKN + NQR + VFR + VKN + VQR + VVS	0.97	0.932Sum + 34.8
Nonverbal Gifted	NFR + NKN + NQR + NVS	0.95	1.596Sum + 36.2

Note. Abbreviations are as follows: NVIQ = Nonverbal IQ, VIQ = Verbal IQ, FSIQ = Full Scale IQ, NFR = Nonverbal Fluid Reasoning, NKN = Nonverbal Knowledge, NQR = Nonverbal Quantitative Reasoning, VRF = Verbal Fluid Reasoning, VKN = Verbal Knowledge, VQR = Verbal Quantitative Reasoning, VVS = Verbal Visual-Spatial Processing, NVS = Nonverbal Visual-Spatial Processing.

Visual-Spatial Processing scores as a way to fine-tune recommendations for classroom instruction.

The Nonverbal Gifted Composite takes out all verbal subtest scores and the Nonverbal Working Memory. The same issues that might steer the assessor to focus on the use of Nonverbal IQ in general use of the SB5—including a history of communication disorders, learning disabilities, autism, or non-English background (see Roid, 2003c, p. 134)—might lead to a decision to rely on the use of the Nonverbal Gifted Composite. However, in this particular sample, only two individuals had significantly elevated scores with the Nonverbal Gifted Composite. Again, these experimental scores are designed to help the experts in gifted assessment isolate the factors and scores that adequately describe unusually gifted individuals. This sort of documentation is often needed to secure appropriate acceleration or enrichment opportunities for an examinee. Such scores can also help the individual and the individual's family to understand some apparent, but often confusing, relative gaps in intellectual performance.

Not shown here, but worth mentioning, is an alternative gifted composite that one could create by simply administering all eight subtests except for the two

Working Memory subtests. There are at least two reasons for considering this option. The first addresses the issue of the need to eliminate the Nonverbal Visual-Spatial Processing subtest from the gifted composite. A threshold level of ability may exist among the gifted where puzzles and mazes go from being enjoyable to the youngster to being a near obsession. Such interest in puzzles and mazes usually develops before age 2. For such individuals, omitting the Form Patterns activity would exclude evidence of an ability of signal importance for some of the most gifted children. Separate analyses, not reported here, indicates that most of the brightest children in the cases reported in Table 7 did have higher prorated composite scores when the information on Nonverbal Visual-Spatial Processing was retained. There may be some additional advantages of this approach as well. In particular, some gifted programs have considered a selection system in which they would use whichever of the three major composite scores (NVIQ, VIQ, or FSIQ) was highest. This would be especially useful for fair assessment of examinees for whom English was not the first language. Such programs might benefit from use of a gifted composite that maintained equal construct representation between the sets of Verbal and Nonverbal tests administered.

Finally, Table 7 permits an examination of the discrepancies in some of the comparisons between the SB5 and Form L-M scores. Case 4 had a 138 on Form L-M. His mother did not believe the results and brought him for additional assessment once the SB5 became available. She was right, and the SB5 picked up on the boy's relatively more exceptional ability. Two other boys, cases 12 and 14, received Form L-M scores in the profoundly gifted range when they were each about 6 years old. Neither boy's mother thought the scores could be accurate and kept questioning the results. Both boys took achievement tests that showed much more modest achievement than their very high IQs predicted. Each boy then completed testing with the SB5 and received scores in the moderately to highly gifted ranges. Neither mother was upset with the SB5 results because the scores reflected what they were seeing in their children's abilities and accomplishments.

Any test, no matter how carefully designed, is still only one way of assessing a person's abilities. There is always a danger that the estimate obtained from just one source, such as an IQ test, might be inaccurate and lead to consequences that are unfavorable to the individual. As Roid (2003d) states, "responsible use of the SB5 or any IQ battery requires the collection of extensive, corroborative information on each individual that is evaluated before important classification decisions, such as those in special education or giftedness education, can be made" (p. 45).

Conclusions

The SB5 offers a number of advantages for assessing intelligence among individuals with high ability. First, it provides a single set of ability tests that can continuously and efficiently assess all levels of ability in individuals from preschool through old age. This solves problems when using tests that impose ceilings—for example, a children's battery with a ceiling at the late teens, which is a serious impediment in the assessment of high abilities in children and adolescents. Second, the SB5 can measure multiple dimensions of ability, both in terms of norm-referenced standard score IQs and criterion-referenced, change-sensitive scores, which provide sensitivity in the measurement of changes in absolute levels of ability, even at the high end of the bell curve tail. The information provided in this bulletin should allow users of both Form L-M (and its modified ratio IQ) and the SB IV to make immediate and full use of the SB5 for high-ability assessment, while at the same time providing the means to translate the insights derived from research on older IQ data into contemporary terms.

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