Use of General and Specific Aptitude Measures in Identification: Some Principles and Certain Cautions

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If only *one* test were to be used to identify intellectually talented youths during kindergarten through elementary school, it seems to me that a well-administered Stanford-Binet Intelligence Scale would be best. Next most suitable might be the appropriate-level Wechsler scale: the Wechsler Preschool and Primary Scale of Intelligence (WPPSI, usually pronounced "Wippsy"), the Revised Wechsler Intelligence Scale for Children (WISC-R), or the Wechsler Adult Intelligence Scale (WAIS.) Administering individual intelligence tests such as these requires much time and a highly trained examiner to test each examinee and score and interpret his/her responses. Therefore, it is too slow and costly for full use in most school systems. Requiring individual testing as the chief or only way into a gifted-child program may especially tend to cause the hasty use of poorly prepared testers in order to prevent long delays in identification. Obviously, this is an undesirable situation.

During 1921-22, Lewis M. Terman, the famed founder of the "gifted-child movement" and author of the Stanford-Binet, used a group test to identify 30% of the 1,528 students for his Genetic Studies of Genius (Terman et al., 1925). The other 70% were identified via the Stanford-Binet. "Later follow-up tests indicated that the persons chosen by the group test were as highly selected for mental ability as the Binet-tested group" (Oden, 1968, p. 5). This finding and other evidence suggest that initial screening for high IQ be done with the best available group intelligence test for the age of the child concerned. Those well above the criterion score would be accepted for the gifted-child program; those far below would have to make a special case in order to be tested individually. Binet or Wechsler testing would be reserved mainly for persons close to the cutting score.

For example, a particular state or local school system may require an IQ of 130 or more to qualify for whatever special educational facilitation it provides that group. Those scoring at least 138 on a suitably difficult group test of intelligence would enter the program without being tested individually. Students scoring 123-137 would be tested individually with a Stanford-Binet or Wechsler type scale. The higher the score on the group test, the earlier the child would be tested individually, that is, those scoring 137 would be tested first, those scoring 136 next, etc.

This procedure would tend to minimize both false positives (because of the 130-137 retest band) and false negatives (those scoring 123-129 on the group test who later score 130 or more on the individual test). Of course, there would probably be a *few* false positives among the youngsters scoring 138 or more on the group test—i.e., if they were retested expertly with an individual test they would score somewhat less than 130. Also, there may be a *few* false negatives who scored less than 123 on the group test. If retested individually, they would have IQs of at least 130. A few such errors are inherent in any system, however. Too much effort to avoid all possible misclassifications can be extremely costly and time-consuming, cheating the great bulk of the gifted out of early identification and educational facilitation. A sensible combination of group and individual testing, with proper safeguards, will work to the benefit of virtually all intellectually talented youths.

Identification Based on Several Measures

Whereas scores or IQs from general intelligence tests can be quite useful from kindergarten through junior high school, testing for multiple aptitudes at various ages seems essential. This is also a more democratic procedure. For example, a third grader who cannot qualify via the Binet might do so if administered the Raven Progressive Matrices Test. Alternatively, scores on achievement-test batteries should be inspected carefully to determine whether or not they suggest that a suitably bright person has been overlooked in the formal identification process.

As the student grows older, or if the youngster is highly precocious, a standardized aptitude-test battery such as the Differential Aptitude Test (DAT) may provide a basis for discovering the combination of aptitudes on which the individual excels. The DAT yields 8 scores but no total score. Its tests are Verbal Reasoning, Numerical Ability, Language Usage, Spelling, Mechanical Reasoning, Spatial Relations, Abstract (i.e., nonverbal) Reasoning, and Clerical Speed and Accuracy. It might be administered in the middle of the sixth or seventh grade to all persons who had scored in the top 10% of their age group overall on a battery of achievement tests. A criterion percentile would be set for each of the eight subtests, e.g., the 90th percentile of the lowest grade for which norms are provided in the manual. This illustrates a fundamental concept of seeking talent: administer difficult enough tests, usually those designed for typical students in higher grades (see Hollingworth, 1942; Stanley, 1954).

See Stanley (1976, pp. 156-159) for an illustration of testing highly able boys and girls, chiefly end-of-year seventh graders, with the DAT. In that study, the two reference norm groups consisted of eighth graders of the same sex as the examinees who were tested in the spring.

Every student attaining the set percentile of his or her age group (e.g., 90th) on one or more of the 8 DAT tests might be called intellectually talented in that respect. Because all the youths tested would already have scored in the top 10% of their age group on an achievement-test battery, probably only a few of them would fail to attain the top 10% of a grade or two higher on at least one of the 8 DAT tests. The degree of intellectual talent could be stated roughly on a 0, 1,..., 8 scale. Not all the talents are equally helpful academically or vocationally, of course. For typical school work the most important are probably Verbal Reasoning, Numerical Ability, Language Usage, and perhaps Spelling. For vocational purposes the other four may be useful.

One could go further and retest with a more difficult test the persons qualifying in any aptitude. For example, those scoring at the 95th percentile or higher on VR, NA, or LU might take the College Board's Scholastic Aptitude Test in a regular national testing after carefully studying the official practice booklet, "Taking the SAT."

The chief reason for identifying intellectually talented children is usually to help them get a better education than they probably would otherwise. It will take considerable ingenuity on the part of coordinators of special educational experiences for the intellectually talented (I prefer that type person to the usual "teacher of the gifted") to provide educational opportunities concordant with their special talents. Focusing on aptitudes rather than general mental ability, usually symbolized by an IQ, makes this search for "fit" of procedures to the major talents and interests of the students imperative. That seems salutary. Often, the math-talented youth is given something else while he/she remains bored and frustrated in the age-in-grade mathematics course. Likewise, the high-IQ child whose verbal reasoning ability greatly exceeds his or her mathematical aptitude may be far beyond the appropriate cognitive depth in a fast-paced, advanced mathematics course thought to be excellent for all "gifted" children. If I am hungry, give me food. If I am thirsty, give me water. A steak will not save the person dying of thirst, nor will water save the one in the last throes of starvation.

The Three-Score SAT As Optimum Screening Instrument

Ever since its first talent search in March of 1972, the Study of Mathematically Precocious Youth (SMPY) at The Johns Hopkins University has preferred the College Board's Scholastic Aptitude Test (SAT) for determining which seventh graders reason especially well mathematically and/or verbally. More recently, SAT added a test of the mechanics of English, its Test of Standard Written English. TSWE is a helpful supplement to SAT-Verbal, especially for admission to fast-paced, high-level courses in writing skills and foreign languages. The rationale behind SMPY and its later partner, the Johns Hopkins Center for the Advancement of Academically Talented Youth (CTY), as well as their results thus far are so widely reported that it would not be a beneficial use of space here to repeat it. Some of the principal treatments are Stanley (1977, 1979a b, 1980); Stanley, Keating, and Fox (1974); Keating (1976); Solano (1979); George (1979); George, Cohn, and Stanley (1979); Benbow and Stanley (1983 a b); Bartkovich and George (1980); Fox and Durden (1982); Fox, Brody, and Tobin (1980); and Stanley and Benbow, (1982; in press).

Precautions

1. Identifying intellectually talented youths before age 7 or so is more difficult and less valid than at later ages, but one does need to get started early on a properly tentative basis.

2. IQ is based upon a composite of various abilities. Two students may have exactly the same IQ, on the same test, administered by the same tester, and yet be quite different in, say, mathematical reasoning ability and in verbal reasoning ability. One might have a "math IQ" of 175 vs. the other's 125, and vice versa for "verbal IQ," yet both have Stanford-Binet IQs of 150. Putting the two into the same mathematics class would be pitting 175 against 125. This 50-point difference is equivalent to having persons who are average in mathematical reasoning ability (IQ 100) in class with those quite superior (150). In courses requiring verbal reasoning ability, the discrepancy between the two students' ability would be the same, 125 vs. 175, but the math-weak student would have a decided advantage. MORAL: Don't group for instruction on the basis of IQs. Instead, use special-ability scores relevant to the subject being studied.

3. Be sure the test is difficult enough for the child being tested. For example, if a child already known to be bright is only a few months younger than the minimum age for which WISC-R is recommended, don't test him/her with WPPSI. SMPY has had great success administering the SAT to 12-year-olds of upper-3% ability, even though that difficult test is designed mainly for 17- or 18-year-old high school juniors and seniors applying to selective colleges and universities. A 7-year-old has scored 670 on SAT-M and an 8-year-old 760!

4. Feed the intellectually talented youth's specific academic hunger directly. For example, if he/she reasons exceptionally well mathematically, allow the student to forge ahead better and more rapidly in the mathematics sequence along with related subjects such as physics, computer science, and chemistry. Don't impose your own favorite "enrichment" subject on the youth, rather than these appropriate subjects, thinking yours will meet the youth's needs equally as well.

5. Recognize degrees of intellectual talent. For instance, some students will require only a little acceleration in the mathematics sequence, such as being allowed to take first-year algebra a year early, whereas a few others will be delving into calculus prior to the age of 10. Therefore, don't

think that moving ahead one year in a subject is enough for everyone, however highly math-apt they might be.

6. Avoid talking about a student's agemates as his/her "peers," except in a political sense. One's true *intellectual* peers are those individuals on one's intellectual level. By definition, the mental age of a high-IQ student considerably exceeds that person's chronological age. Using an adjective before the word "peer" is probably good strategy, as in "athletic peer," "social peer," or "musical peer," if one wishes to use the word "peer" at all in such contexts.

7. There is no upper limit to the potential ability or precocity of a child. It is *not* true that after an IQ of 120 or so extra points don't matter, except in the unfortunate sense that the academic work being presented may be too little a challenge to warrant much effort from the pupil. We are accustomed to seeing typical participants in CTY's three-week residential summer program in precalculus learn 2 years of mathematics. The fastest learn more than 4½ years, and all but a few of the slowest learn at least 1. At ages 12-15 many of the 300 students in SMPYs special "700-800 on SAT-M Before Age 13" group earn the highest possible grade (5) on the College Board's Advanced Placement Program higher-level (BC) examination in the first year of college calculus, quite a few of them on the basis of the three summer weeks followed immediately by one school year of calculus.

Able students 11-15 years old learn biology, chemistry, or physics, with laboratory, better in three intensive summer weeks than most students do in an entire school year devoted to the subject.

A six-year-old in California learned the first two years of algebra well. At age 7 he completed a regular course in geometry in high school before Christmas and also taught himself trigonometry. Eric Robert Jablow taught himself calculus at age 8. At age 11 he completed the sixth grade and entered Brooklyn College as a regular, full-time student. He skipped the first semester of calculus and made a final grade of "A" on Calculus II. By age 20 he had a Ph.D. degree in mathematics from Princeton University. Soon thereafter he became an assistant professor of mathematics at a leading university (see Nevin, 1977).

The moral of these and other stories seems clear: don't hold the student back in his/her area of special aptitude.

8. "Curricular flexibility" and "appropriate articulation" are key concepts in providing simple, straightforward, cost-effective ways to help specially talented youths forge ahead faster and better. Use what you already have, rather than building up expensive, politically vulnerable special programs. For example, the best way to "enrich" Algebra I for students who already know it, or could learn the rest of it in a few hours, is probably to help them get smoothly into the best-available Algebra II class.

9. Diagnostic testing, followed by prescribed instruction (Stanley, 1978), can work wonders. Ascertain what the talented student does not yet know about the subject and help him/her learn just that directly, without having to wade through the parts already known. For example, the child who already knows 90% of the subject matter would probably be inattentive when the other 10% came around during a regular course and, therefore, as a result not learn it. Concentrating on the 10% itself can be highly effective with youths already so advanced in the subject that they know most of it before the class begins.

As the above-cited article sets forth, SMPY uses a 50th-percentile criterion on an appropriate standardized test as the basis for deciding which examinees merit intensive, short-term interaction with a skilled mentor.

10. Isn't it about time we reconsidered some of the language of the field? "Gifted child" itself has, for me, an uncomfortably elitist ring. I'd settled for something else less easily attacked. No ideal terms occur to me, but perhaps the heightened specificity of the DAT-type search would prove desirable. For example, we of SMPY continue determinedly to call our protégés "youths who reason exceptionally well mathematically." Sometimes we shorten this to "mathematically apt youths," but that omits the all-important emphasis on mathematical reasoning ability.

Even more troublesome for our public image is the ingrained jargon inherent in expressions such as "gifted education," "gifted program" or, especially, "gifted teacher," the last-named meaning a teacher of the gifted, not a teacher who is intellectually gifted. Isn't it time we substituted "education of the gifted" or "gifted-child education," "program for the gifted" or "gifted-child program," and the like? Then, perhaps we won't be asked by outsiders whether specialists in the identification and educational facilitation of gifted children are near-illiterates or, instead, merely careless about how they use nouns as adjectives.

We have a great responsibility to be worthy of the bright and brilliant students with whom we deal. The field has come a considerable distance during the more than a dozen years I have been observing it from the vantage ground of SMPY. It has far to go yet, of course, but many of the ingredients for further improvement are already at hand. Perhaps by 2001 A.D., 80 years after Terman's search began, we shall have broken the stranglehold of the IQ on our thinking and practice. Of course, one need not throw out the beautiful baby along with the dirty bath water. Let's keep what's best about the Binet-Spearman concept of general intelligence but supplement it appropriately.

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