DOCUMENT RESUME

ED 392 825 TM 024 480

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TITLE	Varieties of Giftedness.
PUB DATE	20 Apr 95
NOTE	60p.; Based on an invited address presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 18-22, 1995).
PUB TYPE	Information Analyses (070) -- Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Speeches/Conference Papers (150)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	Ability Grouping; *Academically Gifted; Academic Aptitude; Aptitude Tests; *Children; Elementary Secondary Education; *Evaluation Methods; Exceptional Child Research; *Gifted; Grouping (Instructional Purposes); Intelligence; Intelligence Quotient; *Mathematics Achievement; Talent; *Talent Identification
IDENTIFIERS	*Study of Mathematically Precocious Youth

ABSTRACT

What giftedness really means has been discussed over centuries. This exploration, by a researcher involved in the study of mathematically talented youth, considers that giftedness may take many forms. The construct of general intelligence is probably the most widely studied psychological construct, but it is apparent that the IQ is not an ideal measure to use in grouping school children for instruction in specific subjects, since the IQ is the aggregate of many cognitive abilities. The Study of Mathematically Precocious Youth at Johns Hopkins University is one research project that has attempted to define giftedness in its several domains. Mathematically talented students have been identified at early ages through achievement tests. However, specialists in gifted children research are beginning to look at more subjective ways of evaluating giftedness, consistent with theories of multiple intelligences. In fact, all that can be done for gifted children, however defined, is to provide them the special, supplemental, and perhaps accelerative educational experiences appropriate to their abilities and interests. Commentaries by Howard Gardner ("Six After Thoughts: Comments on J. Stanley, 'Varieties of Giftedness'") and Joyce VanTassel-Baska ("Response to Julian Stanley's Invited Address at AERA Entitled 'Varieties of Giftedness'") are attached. (Contains 3 tables, 1 figure, and 89 references.) (SLD)

Varieties of Giftedness

Julian C. Stanley

Each of us is the fantastically improbable result of an unbroken ancestral line going back over eons, apparently to a one-celled animal. Unimaginably complex evolutionary forces have shaped us as homo sapiens and individually. It is becoming clear that our genes result in many predispositions that interact with various influences during the gestation period and after birth (e.g., Plomin, In Press; Rowe, 1995).

Because of the almost infinite possible number of combinations of genes, augmented by mutations, each of us is unique. Not in the long history of hominids, stretching back perhaps four million years, has anyone exactly like you ever existed. Every person's individuality is at least a little different from anyone else's. This uniqueness may have led a number of gifted-child specialists to assume that, via a combination of nature and nurture, every person is in some way "gifted." That might be stretching the meaning of the term too much for it to be useful. Perhaps, however, nearly every individual's uniqueness is valuable biodiversity as conditions in the world change. For example, during wars some civilian ne'er-do-wells find their niches as drill sergeants and tough fighters. Also, leaders in one culture may be followers in another.

Origins of Giftedness

What, anyway, are the denotations of the words "gifted" and "giftedness"? I turned to the Oxford English Dictionary for guidance. There, "gifted," in the sense of being talented, is traced back to 1644: "It is one thing to say a gifted man may preach, but another thing to say a ruling elder . . . by virtue of his office may do it." In 1677: "Such of the women as were gifted at knitting and sewing . . ." In 1794: "No patriot weeps, when gifted villains die." In 1875: "The most gifted minds, when they are ill-educated, become the worst."

"Giftedness" was traced to Paracelsus, the Swiss physician and alchemist who died in 1541. The quaint word "giftishness" dates back to 1654. It seems likely that the concept itself may be about as old as mankind. Individual differences at the high and low ends of various physiological, cognitive, affective, and conative continua must have been apparent to keen observers and conceptualizers millenia before Francis Galton, James McKeen Cattell (1890), and Joseph M. Rice (1897a, 1897b) experimented with formal comparative tests during the last half of the nineteenth century.

With his Hereditary Genius, Galton (1869) helped launch a number of movements. The *Zeitgeist* was right, especially because Galton's cousin, Charles Darwin, had shaken the foundations of theocratic society. Gregor Mendel's creation in 1865 of the science of genetics, a crucial missing link in Darwin's and Galton's arguments, did not become known to scientists until it was rediscovered at the turn of the twentieth century. Arguably, Galton's ideas started the gifted-child movement, the heredity versus environment argument, and eugenics. Truly, he opened Pandora's box, as the raging controversy about Herrnstein and Murray's The Bell Curve volume (1994) indicates.

Binet Leads to Terman

The French psychologist Alfred Binet (Binet and Simon, 1905) may have been the grandfather of the gifted-child movement in the United States, even though he was interested mainly in slow-learning school children. His and Simon's 1905, 1908, and 1911 work on the construction of the first effective intelligence test was seized upon by Goddard (1910a, 1910b, 1911) to test thousands of mentally retarded and normal children even before the concept of "mental quotient" was proposed by a German, Wilhelm Stern, in 1912 (Stern, 1914). It also soon led psychologist Lewis M. Terman at Stanford University to produce the famed Stanford-Binet Intelligence Scale (Terman, 1916). That individually administered test enabled Terman to start his Genetic Studies of Genius in 1921 (see Oden, 1968; Bayley and Oden, 1955; Holahan and Sears, 1995). Recently, the research has been renamed "The Terman Life Cycle Study" (Friedman, Tucker, Schwartz, Tomlinson-Keasey, Martin, Wingard, and Criqui, 1995).

Over the years, identification of intellectually talented persons via IQ and mental age probably also owes much to the British psychologist Charles Spearman (1904). For a long time, Arthur Jensen (1994) and others have striven to validate and extend Spearman's construct, "general intelligence," which is usually referred to as _g_. Intelligence testing originated in France, England, and Germany but quickly found its home chiefly in the U.S.A.

Terman was fascinated by students with high IQs. I was, too, until much experience with such persons moderated my enthusiasm. When other qualities--interests, motivations, curiosities, sense of self, for example--are optimal, a Richard Feynman, John von Neumann, Donald Campbell, Lee Cronbach, or Howard Gardner may emerge. Often, though, those essential other qualities are below necessary thresholds, so a paradigm shifter does not result. I'll say more about this later.

Certainly, intelligence is by no means entirely at the mercy of genes, even though environmental influences are likely to be over-estimated (see Scarr, 1992). Neither is a high IQ per se a guarantee of anything, especially not the achievements of an Einstein, Gauss, Mozart, or Kant. "For fifty cents and a high IQ, you can buy a fifty-cent cup of coffee." Those students who try to "major in IQ" are likely to discover that the demands of their studies eventually stop the free ride their high mental ages have given them over the years. For example, one of my protégés whose IQ at age seven was over 200 flunked out of a highly selective university. He wouldn't study or attend classes regularly. Another super-IQ seven-year-old went on after college playing the cocktail-music circuit. This person might make it big there, but not because of one-in-a-million IQ.

As children, the 1528 "Termites," all of them Californians, had an average IQ of about 151. All were at 135 or more. Most had IQs of at least 140 on Terman's 1916 scale. They were in the upper part of the top one percent of the general population. One unfortunate consequence of Terman's work was to encourage use of the word "genius" to label all persons with IQ 140 or more. Although many of his subjects did achieve well as students and adults, few of their contributions were world-shaking. At least two became presidents of the American Psychological Association, however, and one of those also of the American Educational Research Association. Some others led routine lives, seeming to have far more mental ability than mental energy. Causes of such "underachievement" are still poorly understood, although there is some evidence that family variables and education were involved (Holahan and Sears, 1995).

Terman was interested chiefly in the high-IQ child in his or her "native habitat." His stated aim was to study them as they grew older, not to facilitate their development. He could not, however, refrain from serving as informal adviser and mentor to a number of them. Somehow, from his longitudinal observational study arose the gifted-child movement. Terman's efforts at Stanford University in California were augmented greatly, but largely independently, by the concurrent pioneering work of Leta Hollingworth at Teachers College of Columbia University in New York City (L. S. Hollingworth, 1926, 1942; H. L. Hollingworth, 1943).

IQ as the Criterion for Giftedness

In the early days, a child's selection into programs for gifted children was often almost entirely on the basis of an IQ above a certain qualifying point: 140, 132, and 130 were common minima. The top one to three percent of an age group qualified; they in turn were labeled "gifted." Provisions for them varied greatly: special schools or classes, pull-out programs a few hours weekly to discuss whatever the special teacher desired, attempts to strengthen "creativity" and problem-solving ability, etc. (e.g., VanTassel-Baska, 1994a, 1994b).

Until recent years, however, academic aspects of such programs were not usually commensurate with the speed with which high-IQ youth can learn subject matter. Many, perhaps most, programs strove not to interfere with the level and rhythm of the regular classes or make less-gifted students uncomfortable.

A major defect of this IQ-grouping dates from the concept of general intelligence (g) proposed by the Englishman Charles Spearman in 1904, a year before Binet's first test appeared. While g is probably the most extensively validated psychological construct, the IQ is not an ideal measure to use in grouping school children for instruction in specific subjects, say, English versus mathematics. This is primarily because IQ is an aggregate of many cognitive abilities.

For example, a child with an IQ of 150 may have verbal ability corresponding to 130 and mathematical ability corresponding to 170, which average 150. In regular classes, the demands of the subject may be so slight that the high-IQ student appears to be equally able in English and mathematics, A+ in each. Put that same child into a fast-paced, high-level math class, however, where other 150-IQers have math aptitude at level 170, and he or she probably won't be able to keep up. In such a special English class, the student could do well without great effort.

An illustration may make this clearer. One of the participants in my Study of Mathematically Precocious Youth (SMPY) had an IQ considerably exceeding 200. We tutored this person in mathematics intermittently, from ages 7 to 14. Then the student took the College Board Advanced Placement Program examination in two semesters of college calculus and scored 4, where 5 is the highest possible. This individual also took English and Music AP exams, without special preparation, and scored 4s.

Another of our extremely bright students, who was a far faster and more retentive learner of mathematics than the above, took, without much help from us, the two-semester Advanced Placement Program Calculus college exam at age 12 and scored 5. The point is clear: equal IQ does not necessarily mean equal learning ability in a particular subject area (Lohman, 1993). The 5-scorer went on to become a math professor in a great university. The 4-scorer is making a career in music. Despite the 200+ IQ, there was never any likelihood that the latter could become an outstanding mathematician or physicist.

Beyond the IQ Criterion

Many other objections to using a measure of g as the sole basis for choosing gifted children have been made. There are several available individually administered psychometric instruments meant to get around some of the problems. Among the oldest (Wechsler, 1939) are the several Wechsler batteries, originally called the Wechsler Preschool and Primary Scale of Intelligence (WPPSI), the Wechsler Intelligence Scale for Children (WISC), and the Wechsler Adult Intelligence Scale (WAIS). Each of these yields a verbal IQ, based on five subtests; a performance IQ, based on another five subtests; and a full-scale IQ, which is closely related to the average of the verbal and performance IQs (Stanley, 1953). Many investigators have tried to milk additional information from the subtests, but with limited success. Due to the modest reliability of subtest scores, and because they intercorrelate substantially, interpretation of subtest-score profiles is fraught with error. Only quite large differences are meaningful. Also, in academic contexts the value of the performance IQ may still be unclear.

For group-administered "aptitude" tests I could start with J. P. Guilford's Structure of Intellect, conceptualizing 120 or more at least slightly different abilities. It has not fared well, however, among psychometricians (e.g., Horn and Knapp, 1973; Clarizio and Mehrens, 1985). Therefore, I shall discuss instead a more modest test battery.

The Differential Aptitude Test (DAT)[1] can be useful in finding youth scoring high, such as at the 95th percentile or above on one or more of its eight tests: Abstract Reasoning, Clerical Speed and Accuracy, Language Usage, Mechanical Reasoning, Numerical Ability, Space Relations, Spelling, and Verbal Reasoning. These high scorers can then be retested with a more difficult test of the same ability in order to spread them out from excellent to superb.

For example, all the examinees at the 95th percentile or more on the DAT Mechanical Reasoning test could be given a difficult level of the Bennett Mechanical Comprehension Test. Then supplemental instructional opportunities that take into account this special ability might be devised (Woodcock, 1995). The studies of Cronbach and Snow (see Snow and Swanson, 1992) on the weak interaction of aptitudes with instructional treatments should, however, make us somewhat cautious about the educational possibilities of this approach. Some of my work (e.g., Stanley and Benbow, 1986) and that of Sternberg and Clinkenbeard (1995) are cause for optimism.

The DAT tests are not all equally loaded on g, and their relevance for standard school curricula varies. Overall, the scores probably relate fairly closely to IQ (McNemar, 1964). For high scorers there is, nevertheless, probably some differential validity that may be useful diagnostically and pedagogically (e.g., Detterman and Daniel, 1989; Deary and Pagliari, 1991; Detterman, 1991; Gustafsson and Balke, 1993; Achter, Lubinski, and Benbow, 1995).[2] At the end of the first fast-paced mathematics sequence that my Study of Mathematically Precocious Youth (SMPY) conducted for math-talented boys and girls, upper 1 percent in ability, we tested the 16 finishers with the DAT. Most of them had completed the seventh grade. Individually, on norms for spring of the eighth grade they ranged from a low of 25th percentile on Clerical Speed and Accuracy to five who scored perfectly on Numerical Ability (Stanley, 1976, p. 158).

In my opinion, the DAT and similar "aptitude"-test batteries may be a fairer and more effective way to locate intellectual talent than an intelligence test is. Especially, further "testing the limits" of the high scorers on DAT subtests provides valuable additional information.

In-school achievement-test batteries such as the Iowa Test of Basic Skills yield information about school skills at or near the grade level of the examinee. These are usually too easy to identify highly gifted boys and girls; they need above-grade-level testing (Stanley, 1954, 1990).

The Study of Mathematically Precocious Youth (SMPY)

It was in the context of this psychometric history that Lynn H. Fox, Daniel P. Keating, and I began SMPY in 1971 (Stanley, In press). We looked for the top two or three percent scorers on the mathematical part of a standardized achievement-test battery administered by schools. Then we administered to these high-scoring seventh-graders the mathematical part of the College Board Scholastic Aptitude Test, abbreviated SAT-M (Keating and Stanley, 1972; Stanley, 1973; Stanley, Keating, and Fox, 1974). Of course, SAT-M is meant chiefly for high school seniors applying to fairly selective colleges. Thus, one might assume that it would be far too difficult for any seventh-graders. In the early days of SMPY, two irate mothers called to tell me I must be insane or sadistic to expect twelve-year-olds to take the SAT-M. Even their older siblings were terrified of it, the mothers said.

We were lucky or prescient, however, because about 18 percent of the boys and 8 percent of the girls we tested scored as well on SAT-M, 500, as the average college-bound male high school senior. Some scored far higher than that. The above-level testing model (see Figure 1) works.

(Please put Fig. 1 about here.)

A seven-year-old scored 670, two eight-year-olds 760, and a nine-year-old 800, the highest possible. A partial analogy is with the coelacanth, a primitive fish long thought extinct that was discovered in considerable numbers a few years ago. No one knew the coelacanth still existed, just as only a fool would expect such SAT-M scores from any kids still in the primary grades. Actually, in those early days even I did not have the temerity to test below the sixth or seventh grade. Fortunately, a few school principals and guidance counselors did. Like the old story, they did not know that the task they imposed was almost surely impossible, so they did it, anyway. I learned much from them.

And what happened to those extremely young super-scorers? (See Table 1.) At present, all of them are educationally accelerated, high-

(Please put Table 1 about here.)

achieving doctoral students in the nation's top graduate schools. SAT-M, used for above-grade-level testing, proved powerfully predictive for them and many other mathematically precocious boys and girls.

Although we remained interested in extremely high scorers at an early age, and created a flourishing "700-800 on SAT-M Before Age 13 Group," our main concern was about those boys and girls who before age 13 were in the top 1 percent of their age group in mathematical <u>reasoning</u> ability. This meant a score of at least 500 on SAT-M. Our annual talent search began with 450 students in 1972 and progressed nowadays to at least 200,000 young takers of both parts of the SAT or the American College Test (ACT) all over the United States, though no longer under SMPY's auspices.

Beyond SMPY

During the 1970s we of SMPY at Johns Hopkins University experimented in many ways. We developed models for providing mathematically talented boys and girls the special, accelerative, supplemental academic opportunities they sorely needed to avoid boredom, frustration, stultification, and turning away from school pursuits (Stanley, 1977; Stanley and Benbow, 1986). These led especially to the extensive academic summer programs offered by many centers and colleges across the nation. The largest of these are conducted by four private universities: the Center for Talented Youth (CTY) at Johns Hopkins, the Talent Identification Program (TIP) at Duke University, the Center for Talent Development (CTD) at Northwestern University, and the Rocky Mountain Talent Search (RMTS) at the University of Denver.

There are also many other somewhat related programs, such as those at Iowa State University, the University of Iowa, California State University at Sacramento, Arizona State University, the University of Washington, the University of Wisconsin, the University of North Texas, the University of Minnesota, and Carnegie Mellon University, as well as in several foreign countries.

Since the late 1970s about a dozen state residential high schools for talented youth have been created, starting with the North Carolina School of Science and Mathematics. Also, a few colleges have set up special programs that enable under-age students to become full-time college students and yet maintain some of the social and emotional advantages of high school. Simon's Rock Early Entrance College of Bard College was created in 1964 to admit students a year or two younger than usual and perhaps without having completed high school. Some others are the one-year Clarkson School of Clarkson University; the two-year Texas Academy of Mathematics and Science (TAMS) at the University of North Texas (Stanley, 1991); the radical-acceleration Early Entrance Program (EEP) at the University of Washington (Robinson, 1983); the Program for the Exceptionally Gifted (PEG) for girls at Mary Baldwin College in Virginia; and the one- or two-year Advanced Academy at West Georgia College. See Table 2. For further background about such programs, see Brody and Stanley (1991) and Southern, Jones, and Stanley (1993).

(Please put Table 2 about here.)

Most of these programs have been facilitated by SMPY to a greater or a lesser extent, but without our retaining any control. The result is a vast set of effective independent efforts to locate and help boys and girls who reason exceptionally well mathematically and/or verbally. Unfortunately, however, as far as national educational policy is concerned, their existence is a well-kept secret. They work largely at the grass-roots level, via talented students and their parents. They grow by example, envy, and imitation, however, at local and state levels.

Gender Differences

An unexpected offshoot of SMPY's talent searches has been our interest in and concern about gender differences of able youth on aptitude and achievement tests, evaluative attitudes (values), and interests (Benbow, 1988, 1990; Stanley, Benbow, Brody, Dauber, and Lupkowski, 1992; Stanley, 1993, 1994; Stumpf and Stanley, 1995; Stanley, Stumpf, and Cohn, 1995). Girls and young women tend to excel boys and young men somewhat in most language-usage areas. The opposite is true for most other school subjects, especially physics, computer science, European history, and political science.

The good news is that nowadays far more female high school students are scoring well on the College Board achievement tests in Physics and Mathematics II (precalculus) than in 1982. Table 3 contains details.

(Please put Table 3 about here.)

Beyond Psychometrics

Thus far, as those who know me might expect, I have emphasized psychometric approaches for finding intellectually talented persons and for assessing what they have already learned and still need to learn. We of SMPY have done this because we wanted to help such individuals speed up their learning in their areas of greatest intellectual ability.

But, as my friend Howard Gardner said to me during the discussion at a recent symposium, "Your presentation was a nice demonstration of how much one can find by playing with numbers. You have found lots of interesting things, some of them, I think, important. However, there is a danger of what I would call test 'idolatry'" (Stanley, 1993, p. 137). *Touché*, but his comment cuts both ways. There is, indeed, more to life than just numbers, words, or even values. Approaches that are too quantitative may miss the mark, as also may those that are too qualitative and unrestrained by need for precision. A nice balance of objectivity and subjectivity seems desirable. Human beings cannot live by impression, verbalizing, anecdotes, metaphor, or analogy alone, nor merely by counting, measuring, and statisticizing.

Part, however, of the gifted-child specialists' flight from the IQ to various kinds of subjective nominations by which to choose presumably gifted children may be motivated by considerations of political correctness. An appreciable number of members of those groups that tend to score low on objective tests can--indeed, must--be labeled "gifted" in other ways. Partly to get socially approved proportional representation of gender, race, socio-economic level, and ethnicity, the searchers devise alternative ways of qualifying. Some searches involve nominations by teachers, principals, guidance counselors, parents, fellow students, and even the youth being evaluated for inclusion in a program. Elaborate check lists of characteristics and qualities presumably indicating "giftedness" of some sort abound. Perhaps more cogently, portfolios of student work, writing samples, and other performance criteria such as auditions are used.

A strength of the psychometric approach to labeling a child as being gifted is its relative freedom from subjectivity and bias. Some would say that its weaknesses are inadequate coverage of emotional, social, and motivational factors and special talents. Yet, even today, reliable and valid assessment of such factors is difficult. Often, assertions and anecdotes replace experimental rigor.

This raises an important point: how much subjectivity one can tolerate in a program for gifted children depends largely on the product goals of that program. For example, false positives become a serious problem if (as SMPY does) one tries to find students so mathematically able that at ages 13-14 they can learn an entire school year of introductory algebra well in just three intensive weeks during summer programs.

On the other hand, if the program is mainly process-oriented, various kinds of "enrichment" can be offered to a wide range of talent. Where there are no rigorous outcome standards to be met or failed, selection can be about as subjective and socially and politically correct as the talent searchers desire. Usually, they need not be concerned about subject-matter acceleration as a substitute for in-grade academic work the bright youth is finding unchallenging. For instance, the math-talented student may be given a little mathematical enrichment that makes him or her even more overqualified for the regular mathematics class. A major goal of SMPY and its many offshoots is to prevent this retardation in subject-matter placement by covering a school year of mathematics quickly but thoroughly and then permitting the student to move into the next school level of mathematics.

Four of the main tenets of SMPY-type instructional programs are the following:

1) Curricular flexibility

2) Use of SMPY's model for "diagnostic testing followed by prescribed instruction" (Stanley, 1978; Benbow, 1986)

3) Close tutor-tutee mentoring between dyadic partners well matched for aptitudes, interests, and values

4) Effective articulation of the student's special educational experiences with his or her subject-matter placement in school.

We started with mathematics because of its hierarchic nature, but these principles are applicable to most other school subjects, also. In 1982 my wife and I pioneered their use with the first year of high school biology and chemistry. Each subject was learned well in three intensive weeks by bright, well motivated young students. The majority of them went on quickly to master the introductory college year of the subject in their high schools (Stanley and Stanley, 1986; Lynch, 1992).

Adult Paradigm Shifters

Gardner (1983), Sternberg (1985), and others have insisted repeatedly that there are qualitatively different kinds of "intelligence" and ways to use them. Gardner prefers seven intelligences, Sternberg three. Both of these approaches excite much interest. They have heuristic value and suggest ways to improve classroom instruction, exemplified by Sternberg and Clinkenbeard (1995). They have gone far beyond the many efforts to use Bloom's (1956) famed six-level Taxonomy of Educational Objectives for instructional purposes. Operationalizing such concepts is difficult, however. Reliably and validly assessing the Gardner and Sternberg "intelligences" differentially in individuals is likely to require much time and effort, without assured results (Brody, 1992).

Gardner (1993a, 1993b) has extended his ideas about different kinds of intelligence into the area of adult "genius." He studied the development of seven persons acknowledged to have influenced their fields greatly, each an example of one of his seven "intelligences": T.S. Eliot (linguistic), Albert Einstein (logical and mathematical), Sigmund Freud (intrapersonal), Mahatma Gandhi (interpersonal), Martha Graham (bodily and kinesthetic), Pablo Picasso (spatial), and Igor Stravinsky (musical). What common threads tie together these diverse masters who were active between 1885 and 1935? Gardner tried, in penetratingly literary and intuitive fashion, to discern them. He noted several similarities, including need for regular, intimate contact with a confidant and the "Faustian bargain struck by each creator, who sacrificed normal relationships in the personal sphere" (p. 386).

Gardner's Creating Minds is a "must" for all persons interested in genius, talent, and creativity. It is exceedingly readable and challenging. Be warned, however, about Gardner's strong preference for literary and artistic sources and, therefore, his not covering many scientific works that, to others interested in studies such as those of Roe (1952) and Zuckerman (1977), might seem relevant.

This brings up the whole matter of adult genius and eminence, which often are not the same. Cox (1926) studied both in the large second volume of Terman's Genetic Studies of Genius, but almost wholly from the standpoint of the childhood versus the adult IQ of each of 300 great historical figures. For estimating the childhood IQ she was all too dependent on the available data. This may have exaggerated the difference between childhood and adult IQ in a number of cases.

Several psychologists, especially Simonton (1994) in an admirably comprehensive recent book, have made prolonged studies of genius and eminence. Even then, they remain rather elusive. Given extensive information about their childhoods, could anyone have predicted the later accomplishments of Gregor Mendel, Albert Einstein, Charles Darwin, Isaac Newton, or even Senator Phil Gramm, who reportedly failed three grades in school and yet became a full professor of economics at a good university by age 30? In all of these, opportunism and a favorable Zeitgeist appear to have played a part, but there must have been much more.

One of my favorite sets of informal studies of great men is the novelist C. P. Snow's (1966) anecdotal book, Variety of Men. Snow was trained as a physicist but made his mark chiefly as the author of the eleven-volume academic "Strangers and Brothers" novel-sequence. Perhaps he is best known for his theory about two contrasting cultures, the humanistic versus the scientific. This book features what Snow calls "a set of personal impressions" about nine men, all but one of whom (Stalin) he had known personally to some extent: the physicist Rutherford, the pure-mathematician Hardy, the writer H. G. Wells, Einstein, the statesmen Lloyd George and Winston Churchill, the poet Robert Frost, the diplomat Dag Hammarskjold, and the dictator Stalin. Only Einstein overlaps Gardner's seven.

Biographers of greatness face a problem akin to that of the editors of Who's Who in America, i.e., how large a net to fling. That directory of newsworthy persons includes two types, those whose substantial achievements merit inclusion, and those who have somehow acquired a title such as "Congressman" that, for awhile, makes them of reference interest. This Who's Who screens names for each subsequent volume, however. Those whose luster has tarnished are likely to be dropped.

In that tradition, the Goertzels (Goertzel and Goertzel, 1962; Goertzel, Goertzel, and Goertzel, 1978) included a wide variety of famous persons. They developed case studies of their leadership, personality, and other characteristics. Gardner does not cite the Goertzels' work, perhaps because it does not deal in depth with the level of person he studied. Also, of course, Gardner's (1993a) book devoted to only seven surpassingly eminent persons provides the opportunity for far more penetrating analyses than if three hundred are covered. It suffers, however, from the problems of N = 1 studies; e.g., Picasso may not be representatiave of Cezanne, nor Gandhi of other "interpersonal" leaders.

Then there is the field of psychohistory (e.g., Strozier and Offer, 1985), pioneered partly by the psychoanalyst Erik Erikson with his studies of Martin Luther, Gandhi, Thomas Jefferson, Einstein, and many others. Erikson began as an artist and then was drawn into analysis with Anna Freud, Sigmund's daughter. Gardner gives much attention to his work.

Attempting to understand extreme precocity and adult genius, such as that of the boy who scored 670 on SAT-M at age 7 or the startling accomplishments of largely untutored Mendel, many persons have concocted theories. A recent one might, if it holds up under scrutiny, help explain some unexpected idiosyncrasies and super-traits. It is the concept of "emergenesis" (Lykken, 1982; Lykken, McGue, Tellegen, and Bouchard, 1992): "Traits that are influenced by a configuration--rather than by a simple sum--of polymorphic genes may not be seen to be genetic unless one studies monozygotic twins . . . because such 'emergenic' traits will tend not to run in familes. Personal idiosyncrasies that have been found to be surprisingly concordant among MZ twins separated in infancy and reared apart may be emergenic traits. More speculatively, important human traits like leadership, genius in its many manifestations, being an effective therapist or parent, as well as certain psychopathological syndromes may also be emergenic" (p. 1565).

Other Theories

Sternberg's (1985) well-known three-part ("triarchic") theory of analytic, practical, and creative intelligence seems less concerned with genius and eminence than in Gardner's conceptualization. There are levels of talent even among Nobel Laureates (e.g., Roe, 1952; Zuckerman, 1977). I am reminded of the comment that C. P. Snow (1971) made about two famous physicists, both of them Nobel Laureates. "Einstein was a man of overwhelming genius, [Max] Born one of great talent," analogous to the

Mozart versus Salieri contrast in the fictional play and film Amadeus.

Actually, many theories of intelligence are not about giftedness or genius *per se*. They aim to encompass most persons. The word "intelligence" has different connotations for psychometricians than for the lay public, which values intelligent behavior more than test-derived IQ itself. Even sociologists of science may, for scientific or political reasons, make little or no use of test-measured intelligence when discussing great achievements. For example, Zuckerman (1977) did not invoke IQ or *g* when studying factors related to Nobel Laureates in the United States. Her theory of cumulative educational advantage parallels Gardner's child-master relationship: apprenticeships, mentorships, internships, early identification with the great, successively more sophisticated levels of development.

This is somewhat akin to Ericsson's (Ericsson, Krampe, and Heizmann, 1993) insistence that the main factor in the development of concert-level performance on the piano or the violin or star status in a sport such as tennis is unremitting, focused practice of component skills under expert tutelage. For example, to become an accomplished solo music performer, it may be almost essential to begin at about age four and practice ten thousand hours. To start at age eight and practice just eight thousand hours may relegate the person to achieving only a place in a symphony orchestra. In his emphasis on the acquisition of expertise, Ericsson says, "I have nothing in principle against accepting the role of basic talent factors, but, from my reading of the literature, there is no conclusive evidence that they are related to the acquisition of expert performance" (p. 235). He and his associates do qualify this, however: "We believe that motivation is a necessary prerequisite for effective practice, because when the goal to improve is given up, individuals cease deliberate practice. At the same time, we recognize that remarkably little is known about the development and maintenance of the motivation to practice over the long preparational period" (pp. 230-231).

As one might suspect, this negation of the talent concept is distinctly a minority viewpoint. None of the other twenty-four participants in the Ciba Foundation symposium where Ericsson presented his paper agreed with him (see Bock and Ackrill, 1993, pp. 232-249). Our barrage of criticism did not seem to shake his confidence. Probably, development of expertise deserves far more attention than it usually receives from gifted-child specialists, perhaps partly in the context of mastery learning and overlearning in order to improve retention (see Bloom, 1985). For a modern theory of giftedness, see Sternberg & Zhang (1995).

Further Discussion

Thus, it is obvious that there are many different ways to define "giftedness." The noun suggests a single continuum ranging from extremely ungifted to extremely gifted, but of course there are many dimensions of giftedness and talent. For children there are natural and facilitated precocity, genetic and environmental predispositioning ("aptitude"), "noncognitive" characteristics such as dogged determination ("motivation"), basic temperament, and many other cognitive, affective, and conative influences. These are facilitated or inhibited by environmental influences such as parents, the Zeitgeist, sheer luck, serendipity, and, more generally, all those intra- and inter-individual main effects and interactions that depend partly on how fortunate the individual was in where, when, and to whom he or she was born.

For success as adults, the picture is even more complex. Many promising children do not become highly successful adults, whereas some who seemed less able and promising achieve much. At each stage, some drop out of the race and others speed up. Studies such as those of Kerr (1992), Albert (1994), and Arnold (1995) make this clear. Most of us could tell both cheering and depressing stories about our former classmates. For example, the valedictorian of my 200-student high school graduating class in 1934 could read fourth-year Latin at sight. She went on to earn, four years later, a Bachelor's degree in classics, Phi Beta Kappa. Yet in her seventies she drove a beat-up taxi in her home town, not ever having had much of a career. Family life and finances had been stacked against her too heavily during the Great Depression of the 1930s. Also, after college, she had made unfortunate vocational choices.

About all we can do for gifted children, however defined, is to provide them special, supplemental, perhaps accelerative educational experiences appropriate to their abilities and interests. Intellectual challenge and high expectations will usually be part of this extra package. For schools, key concepts are curricular flexibility and effective articulation of out-of-school academic learning (formal or informal) with in-school experiences. Try not to teach students what they already know or move them too slowly or too fast through what they don't yet know.

Even with the best planning, however, outcomes will be variable (e.g., Gardner, 1993b). We know only a little about how to "produce" Max Borns, and almost nothing about how to produce Einsteins, Mozarts, or Gandhis. That should not deter us from doing the very best we possibly can to help all youth live up to, or beyond, their presumed potential.

As Browning wrote, in the male-chauvinistic language of his day, "Ah, but a man's reach should exceed his grasp, Or what's a heaven for?" And Keats equated aesthetic orientation with theoretical orientation (Spranger, 1928) in his "'Beauty is truth, truth beauty;'-- that is all Ye know on earth, and all ye need to know." I have not quoted these familiar lines simply to end with a literary flourish. Buried deep in them lies much wisdom about the nurturing of giftedness and creativity.

Notes

This paper is based on an invited address at the annual meeting of the American Educational Research Association (AERA) in San Francisco, California, on 20 April 1995. I thank Robert S. Albert, Robert A. Gordon, Barbara S. K. Stanley, and Joyce VanTassel-Baska for valuable suggestions, and William C. McGaghie for the title of this article.

[1] Published by the Psychological Corporation, San Antonio, Texas.

[2] For comprehensive factor-analysis treatment of cognitive abilities, see Carroll (1993).

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Table 1

Some Record SAT-M Scorers at Young Ages, and

Where They Are Graduate Students Now

Score	Age	School	Major
540	7	Harvard	Math
580	7	Penn.	Math
670	7	Harvard	Physics
760	8	Princeton	Math
800 (twice)	10	Harvard[1]	Math
800	11	Harvard	Econ.
800	12	Harvard	Comp. Sci.
		Stanford[2]	Elec. Eng.
		MIT[3]	Physics
		Etc.	

[1]Undergraduate, but began with graduate-level math courses

[2]Harvard <u>summa cum laude</u> in three years

[3]Harvard <u>summa cum laude</u>

Table 2

A Unique Early-Entrance Program:

The New Advanced Academy of State-supported West Georgia College

Become a full-time college student after the tenth or eleventh grade.

Fully accredited West Georgia College, located in Carrollton (30118), 50 miles west of Atlanta, has about 5600 undergraduates.

Each fall the Academy admits about 30 carefully selected young men and women from anywhere and gives them special treatment, including helping them complete their high school requirements via college courses. They may then continue at West Georgia College or transfer elsewhere.

<u>TOTAL</u> COST: About $8500 per year for out-of-staters, much less for Georgians.

<u>Minimum</u> SAT scores (recentered scale) required of applicant, 580V <u>and</u> 1100 V + M, or ACT-Verbal 27 <u>and</u> ACT-Composite 25.

Table 3

Number of Examinees Scoring 700-800 on Certain College Board High School Achievement Tests in 1982 Versus 1994

PHYSICS

Year	Women	Men	Ratio of Men to Women
1982	200	2567	12.84 to 1
1994	485	3318	6.84 to 1
Change:	+142%	+29%	-47%

MATHEMATICS II (precalculus)

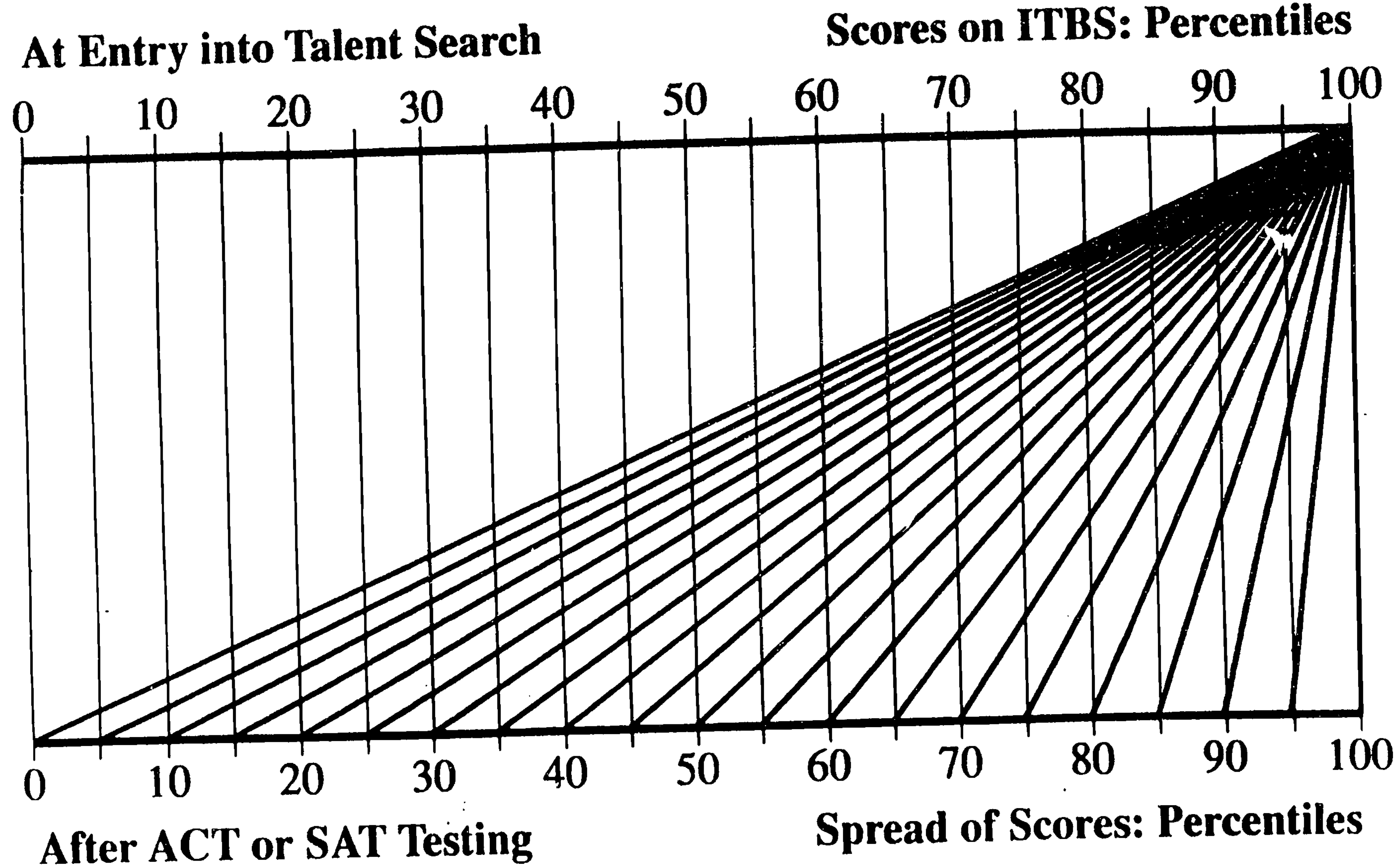
Year	Women	Men	Ratio of Men to Women
1982	3429	10451	3.05 to 1
1994	8585	17179	2.00 to 1
Change:	+150%	+64%	-34%

MATHEMATICS I (chiefly algebra and geometry)

Year	Women	Men	Ratio of Men to Women
1982	2423	6154	2.54 to 1
1994	2826	5027	1.78 to 1
Change:	+17%	-18%	-30%

FIGURE 1. <u>Retesting highly selected students with a much more difficult test spreads them out all along the score range.</u>

Differentiation of Talent



(Constructed by Professor Camilla P. Benbow, Iowa State University)

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Six After Thoughts: Comments on J. Stanley, "Varieties of Giftedness"

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May 1995

Though Julian Stanley and I come from distinctly different scientific traditions, I find myself in considerable sympathy with his review. I endorse his historical perspective, his recognition of the strengths and limitations of the psychometric approach, his skepticism about IQ and "g" as sufficient to account for extraordinary human accomplishments. His focus on differential aptitudes is consonant with my own belief in multiple intelligences (Gardner, 1993a). His work on the identification and long-term follow-up of mathematically precocious youth is remarkable and will take pride of place in future annals that chronicle this domain of investigation. I must also applaud his modest tone. Stanley recognizes that we are still in the early stages of our understanding of these complex domains. His humility in the face of the phenomena and the data of giftedness stands in admirable contrast to the overblown rhetoric to which we have become accustomed in this era of <u>The Bell Curve</u> (Herrnstein and Murray, 1994)

Rather than quibble with (or further applaud) specific points, I would like to use this occasion to mention six thoughts which were stimulated by my study of this paper.

1. Further distinctions. In my own work I have found it useful to distinguish among five forms of exceptional promise and achievement. Intelligence, whether one adopts a unitary or pluralistic perspective, involves the ability to solve problems and/or to fashion products that are valued in one or more cultural settings. People differ in their intellectual potentials and achievements, for many reasons.

In creativity, the emphasis falls on coming up with solutions (or products or works or questions) that are novel, but which sooner or later are accepted as genuine additions to a domain. An individual may be highly creative without being especially intelligent. More important, an individual may exhibit the highest intelligence without showing the slightest ability or inclination to be creative.

We speak of expertise when an individual is able to achieve a high level of performance in a domain. Expertise generally is thought to reflect the amount of practice carried out by an individual. High intelligence or high creativity may be neither necessary nor sufficient for the attainment of expertise.

In our celebrity-oriented society, we encounter all too many examples of success. Success is measured solely by the amount of acclaim received by an individual-- it is a reflection of the market alone. Individuals may achieve much success by virtue of intelligence, expertise, creativity, misfortune, luck, or any combination thereof. One can only tell in retrospect whether an individual crowned by success is also creative.

Finally, I think it is worth demarking an area termed genius. I reserve this term for the works of individuals (or, rarely, of groups) that discover or produce fundamental truths about the world--truths that add to the sum of human knowledge and can be appreciated universally. One may attain genius in the arts or in the sciences, but geniuses are quite rare. I have attempted to study genius in my book Creating minds (1993b).

2. The roles of domain and field. There has been a tendency in the study of giftedness to treat gifts as if they exist in the mind--possibly from birth-- in immaculate disconnection with the rest of the world. A person is seen as gifted or intelligent or creative, without modification.

Important work carried out by Csikszentmihalyi and Feldman throws this perspective into doubt (Feldman, Csikszentmihalyi, and Gardner, 1994). Whatever the facts of the biological matter, it makes no sense to consider achievements apart from the existence in a society of two elements: 1) different domains or spheres of human accomplishment; 2) fields of human beings and institutions that make judgments about quality. Even the simplest items on an intelligence test are drawn from domains of practice within a given culture (vocabulary use, completing a jigsaw puzzle) and are only included because, in the view of experts, they represent proper samplings of a domain called intellect. And when one attends to issues of creativity, it makes little sense to think of human production apart from the domains in which it can take place and the individuals who make tentative and ultimate judgments about uniqueness and appropriateness.

3. <u>The ubiquity of environmental and cultural factors</u>. As Stanley wisely notes at the beginning of his essay, environmental factors begin to interact with genetic ones from the moment of conception. Discussion of "pure" genetic or "pure" hereditary or "pure" environmental factors simply does not make sense from a contemporary biological perspective. By the time an individual can take a standard intelligence test, he or she has already been exposed to many thousands of environmental events that have affected competence as well as self-concept. Any discussion of individual or group differences must take this fact into account.

I find it useful to contrast two youngsters, one raised in a benevolent environment, the second in a punishing one. Suppose that child A has undergone twenty positive environmental experiences per day (ones that are physically or psychologically strengthening), while child B has undergone twenty negative experiences each day. By the time of birth, the box score is 5400 positive events for child A, 5400 negative events for child B. By the age of five, child A has had over 30,000 positive events, child B has had over 30,000 negative events. One cannot possibly interpret differences in performance on any psychometric measure without taking these radically different life experiences into account.

4. Cross-cultural conceptions. Again, just as we tend to think of intelligence as something which a person is born with, we tend to regard our notions of extraordinariness as universal, rather than as a product of Western-- indeed, in some instances, of recent American-- history. In fact, however, attitudes toward giftedness differ widely across cultures. In Japan, for example, there is a strong tradition of denying (or radically minimizing) differences in abilities across youngsters. Practice is considered to be the crucial factor. If an individual does not perform well, he or she is thought to be insufficiently disciplined or motivated, rather than intellectually incapable. (Stevenson and Stigler, 1992) When an individual feels that he can perform better than others, he is likely to hide this feeling (and possible fact) from the group (Hatano, 1995).

Even more dramatic differences are noted when one moves beyond modern industrial society. Anthropologist Mary Romero (1992) has studied conceptions of talent among the Keres group of the Pueblo

Indians. These individuals do not have an explicit word for giftedness. But they do recognize four areas of individual strengths: language and story-telling; motor activity and creativity with the hands; knowledge and lore about the society; humanistic qualities, such as compassion. When an individual possesses all of these characteristics, he or she is considered blessed or "an ideal citizen". The blessed person is expected to contribute to his or her community; that, indeed, is the mark of a blessed individual.

5. Potential markers vs actual achievements Our concern with early identification has led to a prizing of tests that purport to indicate who is likely to attain great heights. But precocity is not the same as the capacity to achieve great heights; the race does not always go to the swiftest. Moreover, it is possible that those traits that differentiate youngsters from one another may not be those that prove most crucial for ultimate accomplishment. While it is notable that some youngsters can achieve a very high score on a mathematics examination like the SAT, this may not be the best marker for who will ultimately make important mathematical contributions. It might be that the future mathematician of distinction stands out because of her interest in knots, her ability to make up new games, or her curiosity about the history of mathematics.

For such reasons, I favor mechanisms that allow individuals to show what it is that they can already accomplish in a domain and to indicate what it is that they would like to accomplish, particularly if they were given additional (and often precious) resources. I am suspicious of measures that claim to be "proxies" for talent or potential, particularly when one can look directly at the "real accomplishment." But I quite agree with Julian Stanley that we cannot afford to provide enrichment for selected individuals unless we have a motivated reason for doing so, and I do not endorse interpretations of the theory of multiple intelligences as claiming that "everyone is gifted."

6 Mathematics as a questionable model for other domains. Having just criticized an excessive reliance on tests, I have to concede that standardized tests can provide reasonable measures for mathematical talent. One cannot score 600 on an SAT-M in middle school unless one has accomplished a lot in the area of mathematics; and such high achievement, as Stanley has shown, is a good prognosticator of future accomplishment. at least to the level of the Ph. D.

Yet I caution against the ready adoption of mathematics as a model for other domains. First of all, more of the substance of mathematics (below the professional level) can be approached through short answer instruments than is the case with most other subject matters and domains. Second, mathematics stands out from other domains in the extent to which it is sequential and cumulative. While there is an agreed upon order of accomplishment in the early years of mathematics, no comparable consensus appears in other disciplinary areas, ranging from history to literature to science.

I note, in conclusion, that after many years of relative stagnation, the fields of intelligence, creativity, and giftedness have recently been rejuvenated. I am pleased to participate in a discipline that has progressed more in the last decade than it had in the previous half century. We have indeed gone beyond the giants of the past and are establishing promising new lines of investigation. In his paper Julian Stanley has proved a reliable guide to our past. Let me note that he has been instrumental as well in launching some of the most promising new lines of investigation.

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HD (JVT-B)

Response to Julian Stanley's Invited Address at AERA Entitled Varieties of Giftedness

Joyce VanTassel-Baska

"Between the idea and the reality falls the shadow."
--T.S. Eliot

I could comment on several issues raised in this wide-ranging and interesting paper such as: the differences between uniqueness or individuality and giftedness hinted at early in the paper; the intriguing issue of differential learning profiles of students who are scoring at the same level on intelligence and other tests; the relationship of current conceptions of giftedness to much older ones, including the definitional history provided by Dr. Stanley; or the difficulties in the use of off-level testing to find talent and to plan curriculum experiences for high level functioning in various areas.

I could dwell on the positive effects of accelerative experiences at all stages of development so apparent in all of Dr. Stanley's work; or the need for a clear relationship between selection paradigms and program goals in gifted programs (you don't need 180 IQ to study dinosaurs); or the relative role of quantitative and qualitative studies (including those of an N of 1) in understanding giftedness; or the central role of effort and particularly the role of sustained focused practice in the development of high level talent (and as all parents of children who have taken piano lessons know, the related importance of individual motivation as the catalyst for meaningful effort); or the future of old classicists being relegated to driving beat-up taxis.

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All of these ideas are inherent in the paper and perhaps worthy of greater comment. But my primary response to the paper will not be grounded in any of these, but rather in the educational implications of the talent development enterprise for schools based on the best model we have available to study it, namely the talent search programs.

The famous lines of T.S. Eliot "Between the idea and the reality falls the shadow" frame the subtext of my commentary.

As an educator of the gifted, I find little comfort in identifying high level talent in any domain without some sense of how to nurture it. Our field has been far more enamored of the phenomenon of giftedness than its development, more concerned with both nomenclature and numbers than meaningful education.

As documented in the paper just delivered, the conceptions of the varieties of giftedness abound, yet translations of these varieties into programs and services have been spotty and limited. The one exception to this is the talent search concept pioneered by Julian Stanley. For twenty-three years, talent searches have successfully found high level talent in academic areas and offered programs matched to student ability with well-researched results, both short term at the individual course level and long term in more longitudinal studies of impact.

Why has the talent development concept worked with gifted students with extraordinary levels of ability? The underlying philosophy that bright students can handle much more at earlier ages than has been thought possible, that finding their challenge level is more important than paying attention to age/grade considerations, is the driving force behind the successful implementation of talent search. Also, the clear focus on using tests to improve curriculum and instruction for students is a primary focus of the program. Tests are not used to pigeon-hole students, but rather to indicate readiness for advanced and challenging work. Additionally, the tight relationship between what is tested and what instruction follows to insure higher level understanding of important concepts is a staple of the model. The careful use of diagnostic-prescriptive approaches insures that students are neither bored nor frustrated by the level of work. Moreover, the setting out of specific procedures for program development and implementation insures that administrators have sufficient guidance at both the conceptual and operational phases of talent search programs to guarantee effectiveness.

It is also not incidental that extended-year models are used to implement the talent search. Summer programs, Saturday programs, and after-school programs have proliferated in the past twenty years to provide appropriate learning experiences for students from grades five through grade twelve. Many of these extended-year models are creative and flexible in their scheduling and effectively use shorter timeframes for basic work and longer timeframes for more challenging learning opportunities, not unlike the recent recommendations emanating from the Department of Education "Prisoners of Time" study.

Also central to the success of the model is the use of instructors knowledgeable in their disciplines and committed to the proposition that bright students can learn more in a shorter period of time than our traditional models of education have provided. The on-going research agenda to support or refute talent search practices has also continued to overlay the entire process.

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What are the implications for the current paradigm shift from giftedness to talent development, given what we know about the success of the talent search program model? Much of the current reform agenda in many ways matches up with the talent search success story:

- Using tests as diagnostic tools to help place students in curriculum (tests don't tell us everything about students, but what they do tell should be appropriately used);
- Using high curriculum standards to set appropriately high challenge levels in curriculum for each student;
- Assessing learning in nontraditional ways that capture the maximum capacity of students to perform;
- Emphasizing core domains of learning;
- Using action research coupled with longitudinal approaches; and
- Establishing meaningful collaboration between universities and K-12 education.

Thus, the key components of current talent development models for all learners map very well on the effective talent search efforts of twenty years. Yet the talent development shift in schools is occurring without a clear appreciation of the complexity of the process of building a web of connected acts that are coherent with appropriate levels of learning at the core. It is occurring in school contexts where social-political considerations and agendas take precedence over intellectual ones and where administrative restructuring constitutes the reform measures without ever touching the core elements of classroom learning. It is occurring in schools where there is little understanding of maximum levels of functioning, only minimum levels or even failure, where administrators have frequently been trained in administration, supervision, facilities, public relations, and finance, but not curriculum and instruction; trained in programs of remediation, not talent development.

Then, how does the talent development paradigm stand a chance of success? Are there elements from the talent search model that might apply? I believe there are three core considerations that are highly relevant to the successful transformation of schooling from its current form to one that emphasizes the development of student talent, and all of them may be found in the talent search model.

One of these considerations is appreciating and responding to individual differences. The talent search model implies greater, not lesser, consideration of learning differences in making it work. For example, talent search classrooms frequently work out of three different textbooks in mathematics with dyadic groups actively engaged in solving problems appropriate to individual students' understanding of a variety of math concepts. Why? Because differences between bright students are profound enough in the learning process to require intra-classroom modifications. Current reform efforts, however, show little of this flexibility and, in fact, in many settings employ a rigid definition of grouping and instructional pacing as well as the use of the same materials with students learning the same thing at the same time.

A second area that would need attention is the emphasis on cultivating the intellect, recognizing that students require intellectual nurturance for their abilities to grow and develop. Exposure to the world of ideas and the ability to articulate a tentative understanding of those ideas are crucial learning opportunities at all stages of development. For example, talent search programs employ seminar discussion models for seventh graders to discuss the power of myth in selected stories, economic theories of supply and demand, and the concept of systems in scientific thought. Talent search teachers demand intellectual discussion as a part of the learning process and test for its presence and application. Therefore, students rise to meet those expectations. Superimposed on the current schooling pattern, such an emphasis would require teachers to be focused on students' constructing meaning for themselves about issues and ideas that matter. It would imply that administrators view the educational enterprise as a chance to develop minds as the primary mission, not to prepare students for a narrow conception of work or future schooling or as cogs in the wheel of economic dominance. Yet, evidence from works such as Stevenson and Stigler's (1992) The Learning Gap shows our inability to focus on intellectual effort as the main staple of schools, on learning substance over mere skill mastery, and on student understanding over being docile. And schools that see themselves as visionary because they focus on the rhetoric of world class skills and technology-relevant processes without underlying intellectual richness are also sadly misguided. In nurturing the intellect, active involvement of the learner grappling with meaningful material is essential.

The last consideration central to the talent development transformation in schools involves an appreciation for coherence, in how talent development processes need to work together. For example, in talent search programs, curriculum choices, instructional emphases, materials selection, and appropriate assessment tools are thought of in concert. Staff development for teachers in these programs is aimed at helping them implement the desired curriculum and maximize student learning. Administrators in talent search programs engage in weekly monitoring that curriculum is being implemented according to the desired model, that the instruction is appropriate, and that students are learning at maximum levels. In regular school contexts, these elements are rarely treated as part of an integrated whole; rather, new curriculum often is adopted without consideration for modifying materials. New methodology is advocated without consideration for variation in content disciplines; assessment protocols are laid on top of existing faulty curriculum and instruction models; and staff development planning geared to desired innovations is frequently missing from the equation. Moreover, as Goodlad has frequently noted, there is no monitoring system to ensure curriculum implementation. Fundamentally, then, the talent development paradigm must employ systemic processes at the implementation level if success is to result.

To return to Eliot, if the idea of varieties and degrees of talent being recognized and served in our schools is to come together into reality, then our current conceptions of giftedness have much to learn from our past successes with a narrower range of students, but a tighter model of effectiveness.

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