Conceptions of giftedness

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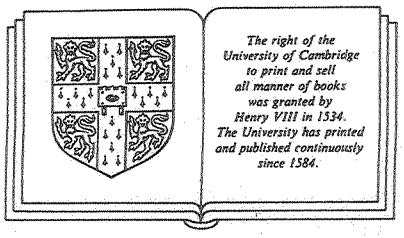

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2 Giftedness: a psychosocial approach

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The power center for giftedness is the human brain, which controls both the magnitude and the diversity of individual potential. It can transport an Einstein into heights of abstraction and a da Vinci into flights of creativity that are so far beyond ordinary accomplishments as to seem almost miraculous. It can also generate nearly endless traces of genius ranging from the esoterica of plasma physics, through the visual spectacle of the Taj Mahal, to the magical cadences of a Miltonic sonnet, the sublime sounds of an *Eroica* symphony, the gustatory delights of gourmet cooking, the intricate beauties of Oriental knot designs, and on and on into every possible domain of individual activity.

But whereas the psyche determines the *existence* of high potential, society decides on the *direction* toward its fulfillment by rewarding some kinds of achievement while ignoring or even discouraging others. Rare brainpower has to fit into its own Zeitgeist in order to be recognized and appreciated. For example, it is virtually unthinkable for a twentieth-century gifted dramatist to write a morality play in medieval style or for a composer to create an *Eine Kleine Nachtmusik* to entertain in the salons of aristocracy, since church-centered medievalism no longer predominates, and the royal court of eighteenth-century Europe is an anachronism in today's Western life.

There has to be a perfect match between a person's particular talent and the readiness of society to appreciate it. Otherwise, genius will remain stillborn or mature to serve an unappreciating audience that may regard it either as passé, if it is a throwback to earlier times, or as too avant-garde if the times are not ready for it. There is always room to speculate whether Einstein would have been able to make a contribution to theoretical physics, or whether the scientific world would have been ready for his kind of contribution, if he had been born only half a century before his actual birth. Perhaps he would not have been capable of creating any spectacular theories at all if he had been born in 1950 and others had formulated the theory of relativity ahead of him. This is pure conjecture, but what is clearly evident is that gifted individuals

An elaboration of ideas presented in this chapter may be found in the author's book *Gifted Children: Psychological and Educational Perspectives* (Macmillan, 1983).

who achieve great breakthroughs in the world of ideas do not operate simply as free spirits detached from the temper of their times.

The hierarchical nature of talent

Attempts have been made to define giftedness from a sociocultural perspective that relies heavily on public tastes. Thus, in Western civilization, the most popular talents may be categorized as moral, social, economic, and educational (Holmes, Lauwerys, & Russell, 1961; Phenix, 1964). Society arranges these domains in a prestige hierarchy in which the distances between them are not necessarily uniform. For example, if the social realm were ranked highest, followed by the economic, educational, and moral, in that order, it is possible that the educational would compare more prestigiously with the moral than would the social with the economic or the economic with the educational. To complicate the picture, distances between them are constantly changing. In fact, realms can change places in the hierarchy from one historical period to the next. There are also subcategories of specialized activity within each realm that have their own prestige hierarchy and are always on the move in the same way that the greater realms relate dynamically to each other. Finally, it is important to note that a specific area of specialization within a realm can be more highly acclaimed publicly than one at the corresponding level of a higher realm. It is therefore possible for the most renowned moralists to be more lionized than their counterparts in the economic sphere, even though economics rates higher than morals in the overall prestige rankings.

The categorical nature of talent

There is no way of knowing what accounts for society's seeming fickleness in preferring one sphere of activity over another. Why is ballet classified among the more celebrated art forms, whereas gymnastics, acrobatics, and figure skating never rise above the level of popular entertainment? What distinguishes between highbrow and lowbrow creativity? Surely not the number of neural connections or size of audiences involved. Playing championship chess is surely no less demanding an intellectual chore than is working with complex chemical formulas; yet, research chemists are often more widely acclaimed as gifted than are international grand masters, despite the fact that chess tournaments attract more appreciative spectators than do chemical laboratories.

Equating excellence with the ability to create beauty or to enhance the human condition is also problematic since it can lead to the logical absurdity that pure mathematics should be excluded for failing to measure up on either count. It is a rare person who is sensitive enough to recognize artistry in mathematical abstractions or trusting enough to believe that what is theoretical and obscure in mathematics today could someday lead to practical

outcomes. Still, the failure of renowned mathematicians to make sense aesthetically or practicably to all but a tiny handful of gifted colleagues has not prevented them from being revered by the masses for their intellect.

It is hard to know precisely why some extraordinary behaviors are considered gifted and others are not. Much depends on popular beliefs that are too subjective and ephemeral to be captured by rules of logic. But even though we rely so often on "gut feelings" rather than on clear rationales in deciding what belongs in the galaxy of high-level talent, there is remarkable consensus in most instances, and inexplicable disagreements in some. The fact is that dramatic theater is universally accepted as a major art form, whereas sports is far more controversial, despite the fact that both work hard at arousing pity and fear in their respective audiences. Pros and cons about the qualifications of athletics are hardly persuasive because they rely more on emotion than on reason. The same can be said about some types of human performance that attract *unanimous* pros *or* cons.

Perhaps the reasons why only some talents are valued as evidence of excellence will never be fully understood, but this lack of understanding does not necessarily mean that such judgments are whimsical. If preferences are governed by any kind of logic, it may be reflected to some extent in the way people classify individual talents as either of a (a) scarcity, (b) surplus, (c) quota, or (d) anomalous type of giftedness.

Scarcity talents

Of the four categories of talent, those referred to here as scarcity talents are forever in short supply. The world is always in need of people inventive enough to make life easier, safer, healthier, and more intelligible. Although it takes only a single Jonas Salk to achieve the breakthrough in conquering polio, there can never be enough talent like his for the great leaps forward that still need to be made in medical science. The same can be said for an Abraham Lincoln in political leadership, a Martin Luther King, Jr., in race relations, and a Sigmund Freud in mental health. Society will always venerate such talents as they appear, while thirsting for more and more because the shortage can never be filled, principally because the public's motives are more self-preserving than self-serving. It makes sense, therefore, to consider these special abilities as symbols of excellence.

Surplus talents

Those who possess surplus talents have the rare ability to elevate people's sensibilities and sensitivities to new heights through the production of great art, literature, music, and philosophy. Few individuals can excel in this category, and some who do achieve celebrity status, which means that they are

the most widely recognizable people in the eyes of the general public. But despite the fame and fortune of a Picasso and a Beethoven, they are treated as "divine luxuries" capable of beautifying the world without guaranteeing its continued existence. Of course, a Michelangelo and a Bach are always welcome as cultural assets; still, the need for such talents represents a *craving* for ways in which to enhance the quality of life rather than a *demand* for finding means of preserving life itself. People are more likely to suppress their cravings than their demands, as evidenced by the vast treasures of art, literature, and music that are widely unappreciated. It is said that multitudes acknowledge the greatness of Dante's *Inferno*, but hardly anyone ever reads it even once in a lifetime. For the nonreaders, such a masterpiece may be considered "surplus" in the sense that it is underutilized as literary fare, although it could never be considered "superfluous," inasmuch as some people, albeit a handful, do read and adore it.

The terms *scarcity talents* and *surplus talents* are not intended to express value judgments, as if one were superior to the other. They are simply different in the *kinds* (rather than the *amounts*) of admiration they elicit from society. Scarcity talents are treated as if they were vital commodities or natural resources that will always be in short supply as long as utopia is yet to be found. Their primary preoccupation is with fathoming the unknown and even the unknowable, and modern Western society has committed itself to investing all it can to further such an enterprise. The physical survival of individuals depends on the existence of scarcity talents, whereas the cultural survival of a civilization depends on surplus-type talents. Alexander Fleming saved countless lives in his and in all subsequent generations through his discovery of penicillin. In ancient Greece, epic poets, dramatists, and philosophers defined the essence of classical civilization through their works; once their voices and voices like theirs were stilled, the distinctive character of Greek civilization died without jeopardizing the physical lives of its people.

There is no doubt that many schools and their supporting communities are more eager to cultivate scarcity talents in order to keep body and soul together rather than to nurture surplus talents for the sake of keeping the human spirit alive.

Quota talents

In this category are included specialized, high-level skills needed to provide goods and services for which the market is limited. The job to be done is fairly clear; there are no creative breakthroughs expected and no way of knowing precisely how long the opportunities for such work will last. Job openings for the relatively few who qualify depend on supply and demand, which can be irregular and geographically bound. Thus, a person with aptitudes for local political leadership has a chance of becoming elected only on

the first Tuesday in November, provided that an appropriate vacancy in public office exists on that day. Physicians, teachers, engineers, lawyers, commercial artists, and business executives are but a few of the kinds of highly skilled people whose work is valuable but sought after only for limited numbers of individuals. Sometimes there are scarcities of such talents, as in the case of physicians needed in poverty-stricken communities, and sometimes there are surpluses, such as liberal arts PhDs who are working at unskilled jobs because they cannot find faculty positions that may have been filled by less capable people hired ahead of them and protected by tenure policies.

Like scarcity and surplus talents, quota talents emerge in response to popular demand, but only up to the point where the public feels that its needs for such productivity are being met. For example, major symphony orchestras are kept alive by appreciative audiences that crave and reward first-rate performances played by first-rate musicians. Sometimes there are vacancies to be filled in orchestral sections, and the search is on for candidates who qualify. But the number of such positions is necessarily limited by the number of orchestras the public is willing to support. Hence, there is a quota system against which to measure shortage and surplus.

Schools are probably most responsive to the public's needs for quota talents. These types of advanced skills are easily understood in terms of shortages and superabundance, and therefore schools can be alerted to areas of specialization where there are many openings and the pay is good for those who are bright enough and trained to qualify. In many schools, the advanced training programs designed to fill quotas in various professions constitute the total effort at differentiating education for the gifted.

Anomalous talents

Finally, there are anomalous talents, which reflect how far the powers of the human mind and body can be stretched and yet not be recognized for excellence. They include many prodigious feats, some having practical value, others being appreciated for the amusement they provide, as in the listings of *The Guinness Book of World Records*. Speed reading, mastery of mountains of trivia, gourmet cooking, trapeze artistry, performance of complex mathematical calculations faster than a computer, and even the numbers of sexual seductions boasted by a Don Juan are examples of such talents. This is the only category that contains socially disapproved skills such as wily interpersonal behavior and demagoguery, which may require as much ingenuity as do leadership skills, except that they are detriments rather than benefits to humanity. In this category there are also "extinct" abilities such as oratory and various types of manual craftsmanship that belong among the scarcity, surplus, or quota talents in another era, but can now be considered anomalous talents because they have become anachronisms.

Schools often emphasize the development of some anomalous talents, especially those that attract crowds and build morale, such as sports, glee clubs, and marching bands. The popularity of such activities among students and alumni is communicated to faculties, who respond by mounting elaborate talent hunts and devoting considerable effort to sharpening these talents.

Thus we see that scarcity, surplus, quota, and anomalous types of giftedness are perceived, and sometimes valued, differently by people involved in the education of able children. In the abstract they may accept all four categories as defining the parameters of giftedness, but in practice they allow their predilections to determine which deserves to receive priority attention.

Psychological perspectives

As indicated earlier, giftedness is a psychological phenomenon that can manifest itself as scarcity, surplus, quota, or anomalous talent. It refers to the powers of the mind as they become actualized in rare and precious human performances or products. To date, a great deal more is known about the extent of its strength than about the essence of its functioning. For example, much of the literature has referred to gifted children in terms of their "intelligence" (Miles, 1954). But the meaning of this term as it applies to such children is not much clearer today than it was more than a half-century ago when Boring (1923) defined intelligence as something that is measured by tests of intelligence. What adds to the confusion is a large body of literature that equates giftedness with high IQ. Most modern writers on the subject deny the association as too simplistic, but many ignore their own denials by generalizing about giftedness on the basis of studies of high-IQ children. Of course, it is not easy to avoid such a trap because much of the published research has been conducted on this kind of population; however, those who attempt to define (rather than measure) giftedness from a psychological perspective are well aware that scores on tests of intelligence are intended to provide clues rather than understandings about superior potential.

Emphasis on genius

When genius became the subject of scientific investigation in the nineteenth century (Galton, 1869), the term denoted a degree of eminence rarely achieved in any individual's lifetime. Galton devised a normal curve of ability ranging from idiocy at the lowest level to genius at the highest, with fewer persons categorized at either extreme than at any other of fourteen intermediate points in the distribution. People were then rated according to the probability that contemporaries could do their jobs as well as they. For example, Galton placed prominent English judges and bishops at a level of eminence reached by no more than one individual in four thousand. The illustrious people, or

geniuses, were those who could be singled out among millions as candidates for immortality.

Galton recognized genius as a matter of reputation for greatness, judged by contemporaries or by posterity, not as something revealed through psychometrics. Even though he was one of the earliest pioneers in formal mental testing, he never used his instruments to understand the nature of genius or to predict its emergence in young people. Still, his insights into persons who had earned renown in science (1874) led him to the conclusion that these people were endowed with superior intellectual ability, tremendous energy, good physical health, a sense of independence and purposefulness, and exceptional dedication to their fields of productivity. He also felt that they had vivid imaginations, strong, quick, and fluent mental associations, and a drive powerful enough to overcome many internal and external constraints. In short, Galton seemed to regard the genius as some kind of inspired mutant possessing exceptional characteristics, albeit in different combinations, according to the respective fields in which greatness is achieved.

It is noteworthy that Galton's description of the personality traits of geniuses has been essentially confirmed by more than a century of subsequent research on biographies of famous historical and contemporary figures (Cox et al., 1926; Roe, 1953; McCurdy, 1960; Goertzel & Goertzel, 1962; Goertzel, Goertzel, & Goertzel, 1978). What his successors have added, however, is a much better understanding of the environmental factors that contribute to career success. They have also devoted considerable attention to the childhood histories of the subjects under study.

Childhood potential and the IQ

As risky as it is to define and describe talent fulfilled, it is far more precarious to speak with assurance about it in its period of promise when predictions have to be made about the child's future development. Studying high-level potential among school-age children is of obvious interest to educators if there is some reason to hope that proper nurturance at school increases the chances of outstanding adult accomplishment. By far the largest-scale test of the hypothesis that such developmental linkages do exist can be found in the multivolume *Genetic Studies of Genius* conducted by Lewis M. Terman and his associates (Terman et al., 1925; Cox et al., 1926; Burks, Jensen, & Terman, 1930; Terman & Oden, 1947; Terman & Oden, 1959). (Although Terman helped to prepare the 1959 volume, he died in 1957. Several additional follow-up studies have been reported by Melita Oden [1968], Pauline S. Sears & Ann Barbee [1977], and Pauline S. Sears [1979].)

Terman felt justified in measuring general intelligence without formulating a theory about mental structure or process, just as physicists of his day thought it useful to measure electricity without knowing its exact nature. His central

argument was that greatness does not reflect a mysterious, freakish mutation; instead, it stems from an extraordinary ability to exercise sensitive judgment in solving problems, to adapt to new situations, and to learn from performing various tasks and experiencing various situations. He felt that all people have these abilities in various degrees, except that the gifted excel in them and are therefore most successful in measuring up to the demands of school and society. He further suggested that these mental traits can be captured in an IQ score and that the gifted are those who rate in the highest percentile on such a measure. So confident was he in equating giftedness with high IQ that he bravely, perhaps brazenly, expressed the view that from the ranks of high-IQ children "and from nowhere else, our geniuses in *every* line are recruited" (Terman, 1924).

The research objectives of Terman and his associates were two-pronged: The first was to identify and conduct a longitudinal study of precocious elementary school age children for the remainder of their life-spans; the second was to conduct a retrospective biographical study of three hundred historical figures judged eminent on the basis of the amount of space they occupied in biographical dictionaries. From the vast amount of data collected over the years, it would appear that some of the original expectations of the study have been verified, whereas others remain doubtful or discredited. One enduring legacy is Terman's insistence that giftedness can be recognized in a continuum of abilities possessed by all people. He saw the gifted and nongifted as having the same organization of abilities but differing in the extent to which they are capable of cultivating some of them. Acceptance of Terman's assumptions about differences in degree rather than in kind means that studies of the nature and measurement of gifted performance can be subsumed under a general investigation of human mentality.

Another outcome of Terman's work that still endures is his conclusion that potential giftedness reveals itself even in childhood. "Early ripe, early rot" is a once popular platitude that has been turned into a canard by his studies of gifted children growing up. There are, to be sure, many case histories written about aborted genius, but they are exceptions to the rule that children with ample mental abilities, reasonably stable personalities, and proper nurturance tend eventually to excel in their careers. And since greatness does not materialize suddenly and unaccountably in adulthood, but instead has roots in its early years of growth, schools are in a key position to help gifted children realize their potential. It suggests the need for special educational programs for the gifted, an idea that would be irrelevant if there were no developmental connection between early promise and later fulfillment.

Other outcomes of Terman's research have not fared so well. Besides creating what promises to become an endless debate over the value of IQ measures in distinguishing between gifted and nongifted children, he contributed to the field two major ideas that have since fallen into disfavor. One

of them has to do with the consistency of IQ scores and the inference that giftedness is basically a hereditary phenomenon. There is ample evidence from major longitudinal investigations, including the Harvard Growth Study (Dearborn & Rothney, 1941), the Berkeley Studies (Honzik, MacFarlane, & Allen, 1948), and the Fels Institute research (Sontag, Baker, & Nelson, 1958), that show dramatic shifts in IQ among individual children. Another of Terman's legacies that has fallen into disfavor is his apparent belief in the indivisibility of the organization of mental powers. He never pretended to advocate a theory of intelligence, but his need for a single score and the way in which he obtained it implies an assumption that intelligence consists of one general factor. In more recent years, factor analytic studies of intellectual functioning (Thurstone, 1947; Guilford, 1967) have demonstrated that mental powers may be multifaceted, consisting of special aptitudes that seem to be distinguishable from each other, not part of a single, overall intellectual power.

Differentiated talents

There are many who follow the Terman tradition of defining giftedness as general intellectual superiority that the individual channels into one of many possible areas of specialization on the basis of personal interests, encounters with inspiring teachers, or encouraging job opportunities. For purposes of locating such a gifted pool among children who are too young to choose specific life careers, there is no single, more valid measure than the IQ. But there are others who disagree strongly with the tendency to equate giftedness with high IQ. For example, Robinson (1977) charges that "in the post-Terman era, it has indeed become possible to become a 'gifted' individual without having any noticeable gift at all. We routinely categorize children as 'gifted' if their IQ scores are above 125, 130, 140, or whatever cutoff score we happen to choose, in spite of the fact that they do not do better than average work in school or demonstrate in any other fashion an exceptional degree of talent" (p. 2).

Generally speaking, the movement away from exclusive reliance on IQ and its correlates to define giftedness is not intended simply to devalue the IQ. Instead, the argument is that IQ limits giftedness to traditional academics and is not helpful in distinguishing among different kinds of intellectual functioning. According to Taylor and Ellison (1971), intelligence tests encompass only about 8 intellectual talents, which represent a small fraction of the well over 100 that are known to exist. Taylor and Ellison suggest a "multiple talent" approach to seek out children who are not only learners and reproducers but also thinkers, producers, decision makers, communicators, forecasters, and creators.

So influential has been the multiple talent approach to defining giftedness

that the U.S. Commissioner of Education (Marland, 1971) incorporated it into his federal policy statement, as follows:

> Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas, singly or in combination: (1) general intellectual ability, (2) specific academic aptitude, (3) creative or productive thinking, (4) leadership ability, (5) visual or performing arts, (6) psychomotor ability. (p. IX)

Although the federal definition has been popular in schools throughout the country, it has been subjected to some vigorous criticism. Renzulli (1978) argues that it omits the nonintellective factors that are vital in characterizing giftedness. He also points to the nonparallel nature of the six categories of giftedness in which two (i.e., specific academic aptitude and visual and performing arts) denote fields of accomplished performance, whereas the other four refer to cognitive processes that may be necessary to bring about superior achievement in many fields. Finally, there is a tendency for practitioners to treat the six categories as if they were independent of each other, and this tendency results in the development of separate identification systems for each category. Gallagher (1979) also sees a possible overlap among the six types of giftedness. In addition, he argues that the listing of leadership and psychomotor abilities is not yet justified because we do not know precisely what they mean and we are not able to identify high potential in either one. Despite these reservations, the federal definition emphasizing various kinds of talent is accepted in many programs for the gifted. Psychomotor ability, however, has been dropped from the list.

Theory without psychometrics

Despite the influence of Terman and the mental testing movement, attempts have been made to capture the essence of genius without relying on measurement instruments. For example, Ashby and Walker (1968) characterize the creative mind as a superintricate information processor. To them, a work of genius seems to have some kind of preexistence that awaits conceptualization and discovery. The great product or performance is actualized by a process of *selection*, or the appropriate means to attain a goal that can be treasured for all time. Successful selection is accomplished through information processing, whereby every alternative that is less than "the perfect" solution to the problem is eliminated. Thus, for example, Bach's *Well-Tempered Clavier* consists of notes, phrases, and rhythms selected by the composer from a universe of possibilities to make up the finished masterpiece. Bach could be regarded as a genius because only he had the ability to select the "bits" of information needed to solve his "problem."

The theory of genius expressed by Ashby and Walker is purely speculative, and these investigations make no use of formal tests to verify it. A somewhat

similar departure from the use of psychometrics is also apparent in Sternberg's (1981) "componential" theory of intellectual giftedness. Instead of dealing with stable factors of promise or performance, he emphasizes an understanding of how the organism responds conceptually to external stimuli. Intellectual giftedness may be understood in terms of superior functioning of what he calls "metacomponents," "performance components," and "acquisition," "retention," and "transfer components."

Intellective and nonintellective attributes

Most theories of giftedness from a psychological perspective, including those presented thus far, refer strictly to human abilities of one kind or another. Yet it obviously takes more than brainpower to be an exceptional producer or performer. Without the support of nonintellective traits, such as the capacity and willingness to work hard in achieving excellence, it is impossible to rise above mediocrity. Renzulli (1978) recognized the need for *both* inspiration and perspiration, and he defined giftedness as consisting of three factors representing "above-average abilities," "task commitment," and "creativity," all of which are brought to bear on a large number of general and specific performance areas (see Chapter 3 of this volume for an elaboration of his theory).

Although Renzulli does not specify that giftedness requires the interplay of all three attributes in his model, Lamkins (undated) insists that the three attributes are necessary. However, she also labels children as "talented" if they possess the necessary above-average skills and knowledge and motivational characteristics even while lacking creativity. According to her, the academically talented are hard-working, well-organized high achievers whose performance lacks evidence of innovative ideas. The talented in visual and performing arts are able to perfect their technical skills but with little imagination or daring. Those possessing the necessary skills and creativity while lacking appropriate nonintellective traits for developing high potential are likely to become underachievers, and those combining creativity with the necessary personal drive are unlikely to succeed for want of higher-level thinking skills.

In another approach to the understanding of giftedness through its intellective and nonintellective dimensions, Piechowski (1979) advances the concept of developmental potential (DP), defined as "the original endowment which determines what level of development a person may reach under optimal conditions" (p. 28). DP is made up of special talents and abilities plus what Piechowski calls "overexcitability," an intense visceral reaction to experience that expresses itself in five forms: (a) the *psychomotor* mode, characterized by excessive physical energy, movement, restlessness, and action; (b) the *sensual* mode, of comfort and sensory delectation; (c) the *intellectual*

mode, of logic, questioning, and the search for truth; (d) the *imaginational* mode, of dreams, fantasies, and images; and (e) the *emotional* mode, of attachments to other people, empathy, and love. These forms of personal experience are the main channels of human perception and conception. Piechowski likens them to "color filters through which the various external impingements and internal stirrings reach the individual. They determine to what occurrences and in what way one is capable of responding" (p. 29).

A proposed psychosocial definition

The various theories of giftedness discussed thus far seem more additive than alternative in the sense that each regards previous approaches as insufficient, not inappropriate. Those who emphasize the importance of special aptitudes often concede that there is a place for exceptional general ability in the makeup of giftedness, except that it tells only part of the story. Likewise, advocates of nonintellective traits want them as companion factors alongside general and special abilities in their definitions, without compromising the importance of extraordinary intellectual powers.

Furthermore, most theorists tend to agree on some basic issues regarding the nature of giftedness. First and foremost, there is no hesitation to focus on children, since precocity among the young is seen as a fairly valid forerunner of their future distinction. These children are not considered a "breed apart," with unfathomable mental powers or mind-sets for finding and solving problems in ways that seem miraculous for others of their age group. Rather than being characterized as qualitatively different, they are singled out for having quantifiable gifts such as accomplishing unusual and important things *faster*, at a *younger* age than expected, with *greater* efficiency, and *more* imaginatively in comparison to their peers. Finally, the fact that precocious children are heterogeneous in the talents they possess is generally accepted without controversy, although schools still nurture academic skills more ardently than any others.

There is a growing appreciation of diversity even within a particular talent domain. As Nobel Prize–winning zoologist Sir Peter Medawar (1979) suggests, scientists come in a variety of temperaments. There are what he calls collectors, classifiers, and compulsive tidiers-up; detectives and explorers; artists and artisans; poet-scientists and philosopher-scientists; and even mystic-scientists. On the basis of a study of young high achievers in mathematics, Blum-Zorman (1983) hypothesizes the existence of budding mathematicians capable of deep, systematic penetration into complex problems, in contrast to others capable of brilliant leaps of imagination in mathematics. It is therefore reasonable to suspect that, whatever traits are associated with the way in which people create great science or mathematics in their peak years, these

syndromes insinuate themselves into the personality structures of such people long before they become renowned, even as early as childhood.

Because childhood precocity frequently leads to adult giftedness, a clear distinction has to be made between them. Work accomplished during a person's maturity can be evaluated by objective standards if its aim is, for example, to prevent rejection of transplanted human organs. Or it can be subjected to critical review, as in the case of poetic composition, to determine whether it deserves to be disseminated and treasured. Not so with children's achievements. Children who are identified as potentially gifted would mostly fail to quality for renown if they were judged on the basis of universal criteria. Instead, they have to be compared with others of their age for early signs of talent that is amenable to nurturance and that promises to live up to high expectations in the future.

Because there can never be any assurance that precocious children will fulfill their potential, defining giftedness among them is necessarily risky. One set of criteria may be *ineffective* because it excludes too many children who may grow up to be gifted; other qualifying characteristics may prove *inefficient* by including too many who turn out to be nongifted. There is inevitably a trade-off between effectiveness and efficiency, and educators invariably opt for a definition that enables them to cast the widest possible net at the outset to be sure not to neglect children whose high potential may be all but hidden from view.

Keeping in mind that developed talent exists only in adults, a proposed definition of giftedness in children is that it denotes their potential for becoming critically acclaimed performers or exemplary producers of ideas in spheres of activity that enhance the moral, physical, emotional, social, intellectual, or aesthetic life of humanity.

Outstanding contributors to the arts, sciences, letters, and general well-being of fellow humans tend often to show signs of promise in childhood. It is therefore reasonable to identify precocious children as the pool from which the most highly gifted are likely to emerge. But precocity only signifies rapid learning of ideas or about people, the ability to grasp abstractions quickly and efficiently, and generally to display skills far beyond those expected at the child's age level. Early schooling is reserved mainly for encountering, distilling, synthesizing, and *consuming* knowledge. *Producing* knowledge with great inventiveness and impact, which is a sign of giftedness, comes later in a person's growth cycle.

Frequently, even voracious young consumers remain that way without ever becoming producers; instead, they grow up as superannuated precocious children. At cocktail parties they are easily recognizable as glib, superficial bores who have ready-made and forceful opinions about any issue under discussion and are always ready to unload their vast storehouses of trivia on audiences of almost any size. Truly gifted children, on the other hand, are sometimes

far more limited in what they are capable of absorbing, and their marks on standardized and teacher-made tests show it. Yet, they could someday prove capable of making important contributions to the world of ideas. Generally speaking, renowned producers tend to have a history of extraordinary consumption, and they use their storehouse of understandings to great advantage in making original contributions.

Factors linking promise and fulfillment

Those who have the potential for succeeding as gifted adults require not only the personal attributes often mentioned in definitions of giftedness, but also some special encounters with the environment to facilitate the emergence of talent. The internal qualities of the individual need to interact in a special way with appropriate external conditions in order to produce the magical mix of giftedness. Altogether, there are five psychological and social linkages between promise and fulfillment, each of which deserves clarification independently and in relation to the others. They include: (a) superior general intelligence, (b) exceptional special aptitudes, (c) nonintellective facilitators, (d) environmental influences, and (e) chance, or luck.

The five factors combine in a rare blend to produce great performance or productivity. Each of them has a fixed threshold that represents the minimum essential for giftedness in *any* publicly valued activity. Whoever achieves some measure of eminence has to qualify by *all* of these standards, and the person who is unable to measure up to just *one* of them cannot become truly outstanding. In other words, success depends upon a *combination of facilitators*, whereas failure results from even a *single deficit*. Furthermore, for each of the five intellective, personological, and social-situational factors connecting potential with high-level accomplishment, there is also a threshold level that varies according to *specific* areas of excellence. Thus, for example, the talented artists of Getzels' (1979) sample were able to demonstrate their exceptional talent in various art forms even though their general academic abilities were no better than most other college students'. On the other hand, without high academic promise, no college students could become as distinguished as Roe's (1953) creative scientists. It is therefore reasonable to speculate that the IQ, along with spatial and scientific aptitude thresholds, have to be different for artists and for scientists. Those who fail to measure up to any of these minimum essentials for their respective fields of endeavor could never compare with the Getzels and Roe populations. By virtue of its "veto" power, then, every one of the qualifiers is a *necessary* requisite of high achievement, but none of them has *sufficient* strength to overcome inadequacies in the others.

In essence, it seems as if the causes of extraordinary accomplishment can be described best as resembling some kind of not so clear, complex moving [illegible]. The number and variety of antecedent variables preclude any easy

designation of a child as gifted on the basis of a few performance measures. Besides, the causes are not the same for all kinds of giftedness. Every area of excellence has its own mix of requisite characteristics, even though general ability, special aptitudes, nonintellective, environmental, and chance factors under which they are subsumed apply to all kinds of talent. These categories could be viewed as "common denominators" that are always associated with giftedness, no matter how it manifests itself. Yet, within each of the categories, the threshold levels, below which outstanding achievement is impossible, have to be adjusted to fit every talent domain, and the need to consider this "goodness of fit" adds to the difficulty of making predictions about the fulfillment of promise.

General ability

General ability can be defined roughly as the *g* factor, which is itself defined roughly as some kind of mysterious intellectual power common to a variety of specific competencies. The *g* factor, reflected in tested general intelligence, figures on a sliding scale in all high-level talent areas. This means that different threshold IQs are required for various kinds of accomplishment, higher in academic subjects than, for example, in the performing arts. There is no basis for making extreme assertions about the IQ such as discounting its relevance to giftedness entirely or claiming that all those destined to become great producers or performers in any area of human activity need to score at the 99th percentile or better. Instead, positions along this continuum should be adjusted according to the talent area, which means taking a stance closer to one extreme for some kinds of giftedness and nearer the opposite extreme for others.

Terman's longitudinal studies of high-IQ children show that those scoring in the highest percentile on a Stanford–Binet-type measure are more likely to become high achievers in school and in the world of work than are age-mates with scores closer to average. There is even evidence to show that the higher the IQ within the upper decile, the higher is the likelihood for outstanding scholastic achievement. For example, in a follow-up study of children with superior tested intelligence, Lorge and Hollingworth (1936) found that those who scored at about Terman's cutoff point of IQ 140 had college records roughly comparable to the highest 25% of the collegiate population of the country. Those with IQs of 160 and above tended to win honors at first-rate colleges, and children who tested at and above 180 IQ were often at the top of their graduating classes in college. It is therefore safe to assume that the mental processes assessed in the measure of general intelligence figure significantly, at least in some areas of accomplishment.

On the other hand, it would be naïve to suggest that only IQ makes the difference between giftedness and mediocrity. Obviously, children with high

IQs possess other attributes that can make or break their chances for success. Reinforcing traits were undoubtedly present even in Terman's sample, for as Hughes and Converse (1962) point out, if Terman had selected the children strictly on the basis of IQ, many more would have qualified. Instead, he chose children from a list nominated by teachers as particularly accelerated in their schooling, and undoubtedly many high-IQ children were left off the list of nominees because they lacked the scholastic and personality attributes that attracted teachers' votes.

More frequently heard is the charge that Terman's children never represented the full spectrum of giftedness, nor are any of them likely to achieve immortality. Typical of such objections are those expressed by Laycock (1979), who argues that the sample succeeded primarily in fields that are tied to schooling but is notoriously underrepresented in equally important careers for which success hardly depends on high scholastic aptitude. But despite the limitations in Terman's methodology, his data are so abundant and the message they carry about the high-IQ individual over much of the life-span is so powerfully consistent that it would be naïve to gainsay the importance of high intellectual abilities as measured by the IQ test in the development of at least some kinds of giftedness.

However, more equivocal conclusions about the predictive validity of extremely high IQ were drawn by Feldman (1984) after his follow-up study of all individuals (19 men and 7 women) in Terman's sample whose IQ scores were 180 or above when they were tested as children some 60 years earlier. Comparing them with a random sample of 26 persons (15 men and 11 women) taken from the remaining Terman population and representing the IQ 150 range, Feldman reports the following information: For the women above IQ 180, 5 out of 7 pursued some kind of professional career, as compared to only 3 out of 11 in the IQ 150 group, most of whom reported having served as housewives. In contrast to the women, however, most men in both groups pursued careers as professionals or as business executives. Yet, despite the fact that 4 out of the IQ 180 men (versus none of the IQ 150 men) are described by Feldman as "distinguished," he suggests that "the overall impression is one of lower achievement than the traditional view of IQ would have predicted for both groups" (p. 520). Feldman discloses little about the men he labels as "distinguished," referring to them only as "an internationally known academic psychologist, a highly honored landscape architect, a judge, a promising pollster . . . " [p. 520]. Hitting the mark in only 4 out of 19 cases may not seem impressive, but considering the facts that (a) distinguished men are rarities by any definition, and (b) the 70-year-olds who were subjects of this study were classified on the basis of IQ scores obtained when they were about age 10, Terman probably deserves more credit than he is given as a talent scout. In other words, Feldman's data can be interpreted to *reinforce* rather than disparage the predictive power of the IQ on grounds that it enabled Terman to locate a small pool of only 19 boys, age 10, as many as 4 of whom were destined to earn reputations as "distinguished" and to retain such a level of esteem 60 years later!

As for the failure of the IQ to lead Terman to a budding Shakespeare or Newton, perhaps he could not find any because there was none to be found in the state of California when he collected his sample of precocious children in 1921 and 1922. A full listing of the longitudinal study population has never been published, but a few names have been leaked through word of mouth and into publications. They include Henry Cowell, one of the greatest American composers of the twentieth century, and Lee Cronbach and Robert Sears, two famous psychologists who have published widely. Even if their renown fades in years to come, it would be difficult to find a Californian of their generation who achieved comparable stature in the arts or sciences and yet was overlooked in Terman's search for high potential. Nevertheless, the popular feeling is that general intelligence, as depicted by the IQ, is too narrowly conceived to capture the full range of talents at school.

There is no end in sight to the debate over the meaning of IQ, its measurement, and the nature–nurture issues that revolve about it, all of which arouse powerful emotions as well as scientific interest. Some behavioral scientists (Estes, 1976; Voss, 1976) have foreseen a decline in the concept of intelligence as a useful description of higher-level cognitive powers and expect it to be replaced by more diagnostic analyses of the patterns and processes of human functioning. This kind of orientation to describing intellectual functioning conforms to the pioneering approach taken by Piaget (1952) in monitoring clinically the development of children's problem-solving behavior.

Thus far, there is little evidence about precocious children's movement through the Piagetian periods of cognitive development. One major effort in this direction is reported by Keating (1975) in a study of preadolescents (fifth- and seventh-graders), with each age group divided into subsamples of bright and average pupils, based on scores obtained on the Raven Standard Progressive Matrices. When Piagetian tasks were administered to the four groups, results showed that the brighter children outperformed their average peers on the formal operational exercises. No significant difference on total score was obtained between the bright seventh- and fifth-graders, but the important fact is that the bright fifth-graders outperformed the average seventh-graders. Keating suggests that, where growth is tied more closely to physiological maturation, as in the child's moving from one developmental period to another, there is less evidence of precocity than where growth depends more on interaction with the environment.

In a more recent study comparing 125 high-IQ (130+) children with 98 age-mates within the normal IQ range of 90 to 115, Carter and Ormrod (1982)

produced unexpected results on the relationship of IQ and Piagetian tasks. Unlike previous researchers, they discovered that high-IQ children acquired formal-operational thought at an earlier age than did those with normal IQs, thus indicating a quicker transition from one Piagetian stage to the next. They explained their unusual discovery as resulting from the use of more sensitive instrumentation in assessing thought processes. These beginning efforts to examine ways of thinking, not just powers of intellect, may help considerably in the understanding of giftedness.

Also worth mentioning as important beginnings in the study of cognitive processes are works of Getzels and Csikszentmihalyi (1976) on tactics for problem finding, Feldman (1980) on reaching beyond universals in mental development, and Borland (1981) and Blum-Zorman (1983) in their investigations of differential leveling/sharpening problem-solving styles among potentially gifted children. These are only promising probes of what may someday develop into major contributions to defining the essence of individual differences in cognition.

Special abilities

The idea of a general factor in intelligence has stirred up considerable controversy, some of it concerning its very existence. Spearman (1927) recognized the *g* factor as an intellectual force necessary for every kind of problem solving. He also discovered specific abilities that share common variance with the *g* factor and are partly independent of it. These aptitudes presumably relate to narrow areas of specialization. Later, his data convinced him that special abilities combine into clusters, each of which shares a common variance, and he called them *group factors*. This three-tier pyramid consisting of general, group, and specific factors was eventually confirmed by Vernon's (1950) investigations, and he likewise emphasized the importance of the *g* factor in various kinds of human performance. However, Guilford (1973) is less "even-handed" when he asserts "that the 'group' factors that Spearman relegated to minor roles, are the most significant components of intelligence and the existence of a *g* component is extremely doubtful" (p. 632). To support his contention, he cites more than 7,000 correlations among numerous measures of intellect with as many as 17% of the coefficients hovering around zero. These outcomes seem to be in line with Anastasi's (1970) report of low correlations between tests of general intelligence and various special abilities.

Guilford's (1959, 1967) multifactor theory of intelligence defines *intellect* as information processing and *information* as anything the organism can discriminate in its field of perception. *Intelligence* is a qualitative tag referring to the proficiency with which the intellect functions. His structure-of-intellect model is usually presented in the form of a cube to show three dimensions:

operations, contents, and products. Operations is the engineering dimension denoting the alternative ways in which the organism can process any kind of informational content and develop out of it products that take any form. There are five categories under operations, five under contents, and six under products. Altogether, 150 factors are identified, and they consist of every possible combination of categories representing the three rubrics.

The Guilford model is not without its critics. Carroll (1968) and Horn and Knapp (1973) concede that it has considerable heuristic value but are doubtful about the empirical supports. They express skepticism over what they call a "Procrustean" approach to factor analysis, which confirms hypotheses in as many as 93% of the tests. McNemar (1964) is even sharper in his attack on what he calls the practice of fragmentizing ability into "more and more factors of less and less importance" (p. 875). Nevertheless, Guilford's conceptual framework is particularly valuable for the educator who wants a clear perspective on the range of special aptitudes that ought to be cultivated at school, and who also needs to inventory those that are and those that are not neglected. In all probability, only a few of Guilford's 150 special abilities receive more than just passing attention in any curriculum, even in special ones for the gifted.

A question arises as to how early in a child's life aptitudes become differentiated and measurable. In one of the earliest attempts to assess and cultivate special abilities in children as young as 4 1/2 to 5 1/2, Davis, French, and Lesser (1959) developed the Hunter Aptitude Scales for the Gifted and experimented with them at Hunter College Elementary School in New York City. The tests focused separately on Vocabulary, Number, Reasoning, Science, and Space. When the battery was administered to a sample of 110 children, the average correlation among the subtests was .44, an indication that the five intellectual abilities are related only loosely to each other. A group of 27 preschoolers selected on the basis of high scores on the aptitude tests enrolled in the Hunter College Elementary School and constituted an experimental class. The average IQ for these children was 132. Another preschool class, admitted on the basis of the Stanford–Binet with an average IQ of about 153, served as the control class. Testing on the Thurstone Primary Mental Abilities Test (PMA) was conducted on the experimental and the control groups, and the results generally favored the experimentals on all measures, except Number, despite a 21.1-point difference in IQ favoring the controls. These outcomes demonstrate that IQ and special aptitude scores are fairly independent of each other at the upper extreme of either type of battery.

In the Davis, French, and Lesser (1959) study, efforts were made to provide special emphasis in the five areas in which the experimental class was selected. It was hypothesized that, by matching educational experience to each child's special strengths, there would be an increase in general participation and

productivity in the areas in which the children demonstrated exceptional ability. Again, the PMA was administered as a posttest at the end of the year, and again the experimentals outperformed the controls on all but the Number tests. The results add credence to the idea that, within a restricted range in tested intelligence, where IQs are mostly in the upper 2% or 3% of the general distribution, discrepancies of as many as 21 IQ points reveal little about rates and directions of intellectual growth, whereas special ability tests apparently do. Robinson (1977) adds support to the idea that aptitude structures of high-IQ children may be measurable even in the preschool years. In his experiments, children as young as age 2 demonstrated extraordinary special abilities. Some had highly developed verbal skills even before reaching their second birthdays; there were also two- and three-year-olds capable of assembling complex puzzles, drawing maps of their immediate surroundings, and capable of recalling minute details of events they had experienced.

It is therefore apparent that, at high-IQ levels, special aptitudes can be differentiated sharply, perhaps more so than near the middle of the IQ range. This discrepancy is important to consider in characterizing giftedness, because it is meaningless to be talented in general intelligence. The ability to score well on an IQ test is not a productive act comparable, for example, to solving a math problem that has stumped mathematicians for generations or to dealing successfully with pollution in the atmosphere. High potential has to be related to a particular area of productivity or performance that, in turn, is reflected in special aptitudes and reinforced by general intelligence.

Nonintellective facilitators

Conceptually, it is easy to distinguish between intellective and nonintellective factors in human functioning. One denotes the mental powers and processes needed to master or create ideas; the other refers to the social, emotional, and behavioral characteristics that can release or inhibit the full use of a person's abilities. Problems in separating both psychological domains do arise, however, when they have to be assessed. Mental measurement, for example, is accomplished inferentially, through tests of performance, which are always "contaminated" by nonintellective factors.

It may seem possible to determine the level of a child's potential from a score on a cognitive measure, when in reality the score is partially affected by the child's feelings about self, success, the examiner, the test, and the testing situation. It also appears that measures of divergent thinking, which require alternative responses to problems having more than one solution, address different types of abilities than those assessed by convergent thinking measures, which deal with problems having only single solutions. Yet, both instruments could be measuring similar intellective functions, except that one is more comfortable in the hands of an examinee whose *personal tastes* favor

playfulness with ideas, a sense of humor, brainstorming, and tinkering with ambiguities, whereas the other type of test is welcomed by a serious-minded, straightforward examinee who prefers to strip a problem of its complexity rather than savor it for a while.

Perhaps the most serious difficulty in determining how personological traits figure in high-level achievement is that nobody can tell which of these attributes are *responsible*, even in part, for human excellence, which are merely *associated* with it, and which are *by-products* of it.

Of all the nonintellective facilitators, none has drawn more attention than motivation to achieve. There is a Yiddish proverb to the effect that a person with determination is more likely to succeed than is one with ability. Renzulli (1978) counts task commitment as one of only three major factors that characterize giftedness, the other two being above-average ability and creativity. There is also research evidence to show that precocity often goes hand in hand with a powerful desire for self-advancement. When Terman's (1925) elementary school sample was evaluated by parents and teachers on 25 traits, the ratings favored the high-IQ children over the controls on each criterion. As might be expected, the greatest discrepancy was on intellectual attributes, followed by volitional, emotional, moral, physical, and social traits, in that order. Similar evidence showing the high-IQ child's striving toward success was noted in a follow-up study with this group five years later (Burks et al., 1930).

High levels of motivation can likewise be found among adults who have achieved renown for their accomplishments. After studying biographical data on 300 geniuses, Cox et al. (1926) concluded that these geniuses distinguished themselves not only through their extraordinary accomplishments but also in three aspects of personality: (a) persistence of motive and effort, (b) confidence in their abilities, and (c) strength of character.

But although motivation is clearly evident in exemplary performance among children and adults, it is by no means the only nonintellective factor. Among others that deserve attention is self-concept, since those who *think* of themselves as gifted will try to *act* as though they were in order to match their projections with their self-perceptions. To some extent, though, the effects are circular: The quality of performance influences the self-image of the performer and the self-image of the performer affects performance. It is therefore important to examine empirical evidence on the relationship between the two. In a large-scale study of 1,050 seventh-graders in four junior high schools, Brookover, Peterson, and Thomas (1962) found a significant correlation between self-concept and achievement (males .42, females .39) when IQ was partialed out (held constant) and a low correlation (.17) between self-concept and IQ when achievement was partialed out. This shows that measures of self-concept and of IQ assess different aspects of human potential. What remains to be determined is whether such a generalization can be made

for children who rate at the upper extremes on measures of general and specific abilities.

One cautionary note should be considered in relating self-concept to achievement. Some people who think well of their own abilities tend to "play it safe" and avoid opportunities to prove themselves again and again for fear of failure and the consequent threat to their self-images. Beery (1975) and Covington and Beery (1976) proposed a theory of achievement behavior in which students protect their self-concepts of high ability by exercising little effort to learn. They refuse to submit themselves to a test where the demands are high, to avoid the risk of failure and the implication that their potential is not as high as they think it is. In a study of 360 college freshmen, Covington and Omelich (1979) presented evidence to support the theory that school achievement behavior is affected by feelings of personal competency and efforts to preserve a sense of self-worth. In pressured problem-solving situations, the students tended to give up their pursuit of solutions with the familiar refrain, "nothing ventured, nothing lost." The investigators concluded:

> Little wonder that excuses are such a permanent part of the school scene. There emerges from this complex interplay among students, peers, and teachers a "winning" formula when risking failure which is designed to avoid personal humiliation and shame and to minimize teacher punishment: try, or at least *appear* to try, but not too energetically and with excuses always handy. It is difficult to imagine a strategy better calculated to sabotage the pursuit of personal excellence. (p. 178)

Other personal idiosyncrasies play their parts in the fulfillment of potential. Nichols (1966), for example, reported a large-scale follow-up study of National Merit Scholarship Finalists and Scholars who had reached their senior year in college. They were then compared on a number of characteristics with a group of representative college seniors coming from similar socioeconomic backgrounds. The differences were extensive and dramatic. Within the experimental sample there were larger percentages of males, Jews, firstborn, and members of small families; on the other hand, there were smaller percentages of Catholics and blacks. The two groups also differed in their interests and career plans, with the more able students leaning more in the direction of intellectual and artistic activities and away from social activities. Their career choices probably reflected the temper of the times, as they frequently expressed the desire to become scientific researchers, college professors, writers, attorneys, and physicians, while their less able counterparts opted more often for careers as businessmen and as elementary- or secondary-school teachers. However, if such a study were repeated periodically, changes in the labor market might bring about other differences in career choices, and it is conceivable that at times the two groups would resemble each other in their choices.

Self-ratings and assessments by teachers and peers all agreed in characterizing Merit Finalists more frequently than less able students as independent,

assertive, idealistic, unconventional, cynical, rebellious, and argumentative. They were less frequently seen as friendly, sociable, easygoing, obliging, cooperative, and submissive. Yet, they were described as more mature, dependable, well-adjusted, and honest than average students. The Merit Finalists tended to be extremely involved in campus political activities, they held more than their share of organizational leadership positions, and they conducted more discussions of political, social, and religious issues with teachers and peers than did the control group. This involvement in idealistic strivings apparently diminished their interest in dating, parties, and socializing with peers. Again, as with career differences, contrasts in personal traits may be a reflection of life on campus in the mid-1960s.

As for mental health status, it seems that studies reporting on such issues refer to individuals who have no pretensions toward immortality. Most of Terman's high-IQ children went on to excel at college and in their subsequent careers and showed signs of better psychosocial development than did members of their group whose promise was never entirely fulfilled (Terman & Oden, 1947, 1959). A more clinically oriented follow-up study of successful college students (Vaillant, 1977) produced similarly encouraging results. Unlike the Terman sample that was originally selected on the basis of high-IQ, Vaillant's 268 male Harvard graduates qualified for the long-range study on account of their apparent emotional stability and academic records as undergraduates. Their tested intelligence was only slightly higher than their classmates'; yet, 61% of them graduated with honors, in contrast to only 26% of their fellow graduates. Also, more than three-quarters of them went on to graduate school, and by the time they reached their middle 40s, their average income and social standing equaled that of a successful businessman or professional, as did those of Terman's group. They also compared favorably with the Terman sample with respect to their representation in *Who's Who in America* and in *American Men of Science*.

However, Witty and Lehman (1930) questioned the relationship of high-IQ and superior mental health on the grounds of psychoanalytic evidence that, according to these researchers, depicts the genius as being often neurally unstable, supersensitive, overresponsive to stimuli, and a marvelously complex and delicately vulnerable organism. Indeed, Gilchrist (1982) cites considerable evidence of emotional disorders among creative scientists, literary figures, artists, and architects. This may be true of the mature genius who is either destined to achieve greatness or has already achieved it. But those who are a cut or two below the genius level and a cut or two above their peers in accomplishment probably rate exceptionally high in mental health.

Among the important traits that tend to be overlooked in precocious children are their mental sets in dealing with problems. These may be regarded as "metalearning" habits or intellectual impulses that are advantageous in the earliest preparation for accomplishment. Metalearning precedes action.

It is a mental pose or stance that enables the learner to tune in to the task ahead with the adaptiveness of a homing pigeon returning to base. Teachers recognize this characteristic as an "intellectual killer instinct" among children who not only keep their wits sharp but have their wits about them at all times, as they focus carefully on the name and rules of the game in which success, even renown, can be won.

In the process of fine-tuning their readiness for success, the potentially gifted realize quickly and clearly that before they initiate problem finding or solving, they should determine in advance whether they are dealing with semantic, symbolic, or figural material. They see the advantages of making preliminary estimates about the parameters within which solutions will be located and beyond which there can only be bizarre or impossible solutions. They have to assume in advance that, in the case of solving differential equations, for example, single, exact, or multiple relevant solutions are expected, not general approximations. They understand that it is helpful to try to reduce data to manageable proportions by eliminating facts and ideas that can only delay or spoil outcomes. They also develop the habit of deferring judgment until all the relevant data are sifted, rather than jumping to hasty solutions. In other words, they are aware of the need to know the road to excellence before testing whether they can make the journey.

All of the metalearning adaptive postures are necessary, though insufficient, for achieving excellence. That is, if metalearning rituals are followed, achievement will depend on whether the student has the requisite kinds and amounts of cognitive power; if they are not, then cognitive power alone cannot mobilize a person toward high-level productivity or performance. Sometimes it is tragic that children with exceptional mental strength, particularly those coming from socially disadvantaged backgrounds, are denigrated for cognitive deficits when in reality the fault is traceable to poor metalearning habits that prevent proper release of potential.

Environmental influences

Human potential cannot flourish in an arid cultural climate; it needs nurturance, urgings, encouragement, and even pressures from a world that cares. The child lives in several worlds, the closest of which are the family, peer group, school, and community, while the remotest are the various economic, social, legal, and political institutions. These environments all help to determine the *kinds* of talent that society is willing to honor as well as the *amount* of investment it is willing to make in cultivating them. Societal conditions are therefore critical in stimulating the gifted child's pursuit of excellence.

Giftedness today is in some ways different from that of preceding or succeeding eras because it is shaped by the special needs and sanctions of a

society existing in the last two decades of the twentieth century. Every social structure and every period in history responds differently to human potential, and many individuals earn renown as a result of the special "chemistry" between their talent and the milieu that nurtures it. That milieu is transitory to some extent, but it also reflects long-standing traditions that are often as contradictory as they are pervasive. For example, in America, Laski (1948) detected a social legacy that he called "the quintessence of a secularized Puritanism" (p. 42). This has otherwise been referred to as the "Protestant ethic" (Weber, 1948), but it is applied singularly to the American condition. It extols effort and the belief that success is its inevitable consequence. In a pioneering society, it is praiseworthy to take risks, show courage, innovate and adapt, and even engage in "rugged individualism" to build and maintain a modern society. It takes so much ingenuity and hard work to get the job done that there is hardly much time to cultivate the arts. Indeed, artistic life is a luxury that few can afford when so many shoulders have to be put to the wheel.

Only later – when the pioneering days are over and political, social, and economic institutions are established – can increasing numbers of people allow themselves to turn to the life of the mind. Great political theory and science flourish earliest in the postpioneer years because they are rooted in the necessities of the pioneer period; great drama and music begin to appear much later, also as symbols of hard work and self-perfection in conformance with the Protestant ethic. Thus there is the tradition of the perfectability of human beings and their constant need to prove it through productivity and performance. On the other hand, there is the restraining idea that the precious human attributes of talent and effort should be dedicated to the betterment of the masses and not to self-indulgence through creative arts and literature.

Even though there is a pervasive cultural climate in America affecting all inhabitants, it is transmitted in different ways according to social class and family traditions. Wolf (1966) hypothesized a positive correlation between what he called "process variables" and performance on measures of scholastic ability and suggested that these coefficients are higher than the ones between "status variables" and scholastic performance. Status variables are conventional indices of socioeconomic levels, which, according to Wolf, correlate only about .40 with children's IQ scores. Process variables, on the other hand, refer to various means through which parents encourage and provide opportunities for children to engage in learning experiences outside of school. There are three such variables, each having several specific subcomponents:

1. *Press for Achievement Motivation*
   (a) Nature of the Child's Intellectual Expectations
   (b) Nature of Parents' Intellectual Aspirations for the Child

(c) Amount of Information Parents Have Regarding the Child's Intellectual Development
(d) Nature of Parental Rewards for the Child's Intellectual Development

2. *Press for Language Development*
   (a) Emphasis on Use of Language in Various Situations
   (b) Opportunities Provided for Enlarging the Child's Vocabulary
   (c) Emphasis on Correct Usage of Language
   (d) Quality of Language Models Available in the Home
3. *Conditions for General Learning*
   (a) Opportunities Provided for the Child to Learn at Home
   (b) Opportunities for Learning Outside the Home and School
   (c) Availability of Learning Materials at Home
   (d) Availability of Books at Home and a Public Library Nearby and Parents' Encouragement to Use Them
   (e) Nature and Amount of Assistance in Learning Provided by the Parents

Wolf measured the process variables through a questionnaire administered to mothers of his sample population. Results showed a startlingly high correlation, .69, between mothers' response to the total instrument and the targeted children's Henmon–Nelson IQ scores. An even more impressive coefficient of .80 was obtained in relation to Metropolitan Achievement Test results. In a subsequent replication of this study, Trotman (1977) noted similarly high correlations between the process variables and IQ for white as well as black ninth-graders in a middle-class suburban school system. The studies of Wolf and Trotman focused on children ranging widely in ability, not on the precocious among them.

However, studies of the gifted do not yield consistent results. Most of the available evidence on eminent men and women derives from biographical material relating to their grown-up years (Pressey, 1955; McCurdy, 1960; Goertzel & Goertzel, 1962; Goertzel et al., 1978; Bloom & Sosniak, 1981). All that could be said about children destined for greatness is that they vary widely in their relationships with parents. In some instances, the home provides them with enthusiastic encouragement and opportunities to develop their talents; in other cases, they have to overcome the ill effects of living with "smothering" or dominating mothers, failure-prone fathers, or generally troubled families. From their review of relevant research literature, Colangelo and Dettman (1983) conclude that although there are influences in the "home environment and family relations on the later achievement of high-ability youngsters . . . there is still considerable confusion in terms of what the major family influences are" (p. 25).

In general, therefore, whatever seems *logically* essential in child-rearing practices for the nurturance of giftedness often fails to be confirmed *empirically*. The inconsistency of the picture suggests that perhaps there are no generalizations, except that much depends on the special chemistry between person and parent. For one child, a particular nurturance at home may inspire creative work; for another child, the same parental influence may have an adverse effect, or none at all. This would imply a need to determine what kinds of home environments and childhood individualities constitute the best matches in fostering extraordinary potential in children.

Finally, there are influences of peers and the school curriculum. Empirical evidence shows an association of negative stereotypes with academic brilliance among schoolchildren (Coleman, 1960; Mitchell, 1974; Solano, 1977), provided academic brilliance is combined with other unpopular traits such as lack of interest in sports (Tannenbaum, 1962). Moreover, Coleman (1960) discovered that gifted high school students are less likely to underachieve in school settings where students have relatively positive feelings about scholastic pursuits.

Peer supports can be further reinforced by special educational provisions at school. Daurio (1979) summarizes a considerable amount of research to show that accelerating rapid learners through the conventional curriculum can have a beneficial effect on their achievement at all grade levels. Perhaps the most comprehensive evaluation of special programs for the gifted was reported by Martinson (1961) and involved children in grades 1 through 12 with a mean IQ of 143. The subjects came from rural, semirural, and urban areas in various geographic locations, and nearly all were from the middle and upper socioeconomic classes. All had benefited from some kind of enrichment or acceleration and were matched with control groups on the basis of age, IQ, sex, and social class. A battery of criterion measures contained 16 indicators of how the subjects grew intellectually, emotionally, and socially.

Results were impressive in every way. In comparison with the controls, children exposed to special programs performed better on scholastic achievement tests without penalty to their popularity at school or to the number of friendships they enjoyed. Those who participated in special senior and junior high school programs showed better gains in personal and social maturity than did nonparticipants. It would therefore appear that teachers can make a difference along with the home, the community, and the peer group in helping precocious children fulfill their early promise.

Chance factors

Elements of luck, or chance factors in the environment, are usually ignored in discussions of talent and its fruition. Instead, social scientists focus on influences that are more easily observable, measurable, and perhaps eventually controllable. This bias is understandable, because what is there to say about luck, except that it exists and that it can make the difference between success and failure? Nobody knows what forms it will take or when or how often it will strike. It is treated almost as if it were a supernatural force, inscrutable and therefore outside the pale of science. Yet, Atkinson (1978),

a social scientist, seems to ascribe all of human behavior and accomplishment to

> two crucial rolls of the dice over which no individual exerts any personal control. These are the accidents of birth and background. One roll of the dice determines an individual's heredity; the other, his formative environment. Race, gender, time and place of birth in human history, a rich cultural heritage or not, the more intimate details of affluence or poverty, sensitive and loving parents and peers, or not, all of them beyond one's own control, have yielded the basic personality: a perspective on the life experience, a set of talents, some capacities for enjoyment and suffering, the potential or not of even making a productive contribution to the community that could be a realistic basis for self-esteem. (p. 221)

In a follow-up study of 24 art students five to six years after their graduation from art school, Getzels (1979) discovered that 8 had abandoned art as a career and 7 were only marginally involved in it. He found that the careers of his subjects were profoundly influenced by what he called "idiosyncratic accidents and exigencies determining each artist's life and achievement" (p. 385). Obviously, whatever information that could be gathered about these subjects as individuals during their years at art school revealed only a little about the prospects for future success in the field. Too much depended on events in the lives of the budding artists that the researcher could not have anticipated.

The existence of chance factors may help to explain why it is easier to predict success at school than at work in the years after graduation. In the school world, the rituals and requirements for success are fairly straightforward. There are few surprise changes in the rules of the game, and the children know who calls the shots along the way. Life in the world of work is far more complex, with surprises happening all the time to boost the chances of some and to distract and discourage others from making it successfully. The unexpected can originate anywhere, in the economy, the social milieu, the workplace, the family, and even within the body itself when there is a sudden change in a person's health status that can affect a career. Therefore, both the knowable and unknowable in a person's self and environment interact in a mutually dependent way: Without intimations of high potential, no amount of good fortune can help the person achieve greatness; conversely, without some experience of good fortune, no amount of potential can be truly realized.

Summary and conclusions

Giftedness is generated by either of two broad categories of ability: (a) skills in *producing* important new ideas or material inventions, or (b) skills in *performing* brilliantly before appreciative audiences or in service to various kinds of clientele who benefit from such services. In one sense this definition is broadly inclusive, embracing a wide range of talents; from another perspective it is restrictive because there is no place in it for rapid learners of

existing ideas or for admirers of great performance. It further reserves the label "gifted" only for those with *demonstrated* exceptional abilities, excluding even the young "hopefuls" who show early signs of someday producing or performing with distinction. Children may excel in some meaningful ways, but they usually shine in comparison to their age-mates, rarely by universal adult standards; they should therefore be regarded as *potentially* gifted, not as *manifestly* gifted. Still, those who demonstrate promise in childhood stand a good chance of realizing it as they mature to adulthood, given the right combination of circumstances that allow their talents to incubate.

There are five factors that have to mesh in order for a child to become truly gifted: (a) superior general intellect, (b) distinctive special aptitudes, (c) the right blending of nonintellective traits, (d) a challenging environment, and (e) the smile of good fortune at crucial periods of life. Each of these facilitators is necessary, though not sufficient, for achieving excellence in *any* area of activity. Thus, no combination of four qualifiers is adequate to compensate for the absence or inadequacy of the fifth. And the minimal essentials, or threshold levels, for all five vary with every talent domain. For example, giftedness in theoretical physics requires higher tested intelligence and fewer interpersonal skills than do the social service professions. Obviously, then, no single set of measurement criteria can be equally effective for identifying, say, potential scientists and politicians. Nor is it meaningful to suggest that either the scientist or the politician is the "smarter" of the two because of differences in their general intelligence or in their special aptitudes. The five factors interact in different ways for separate talent domains, but they are *all* represented in some way in *every* form of giftedness.

Conspicuously missing in this discussion of linkages between promise and fulfillment is the concept of creativity. Why not place it alongside general intelligence, special aptitudes, nonintellective facilitators, environmental influences, and chance or luck? The answer is that it is not an additive to these factors but rather is integrated in each of them. In fact, creativity is synonymous with giftedness, which is defined as the potential for becoming an outstanding producer or performer, not just a consumer, spectator, or amateur appreciator of ideas. To the best of our knowledge, creativity (or giftedness) consists of a not yet known combination of general and specific abilities and personality traits associated with high potential that can be realized in a stimulating environment with the help of good fortune. Creativity, like giftedness, is judged by two criteria: the *extent* and *quality* of its innovativeness. Too often, the quality dimension is overlooked in favor of the offbeat and the profuse, and we forget that what is rare is not necessarily valued. Because it denotes rare *and* valued human accomplishment, creativity should be conceptualized as interchangeable with giftedness. For after all, giftedness is reflected in the ability to be an innovator of what is new and treasurable, not just a curator of what is old and treasured.

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3 The three-ring conception of giftedness: a developmental model for creative productivity

Joseph S. Renzulli

Outwitted

He drew a circle to shut us out
Heretic, rebel, a thing to flout.
But love and I had the wit to win
We drew a circle that took him in.
Edwin Markham, *Quatrains*

Throughout recorded history and undoubtedly even before records were kept, people have always been interested in men and women who have displayed superior ability. As early as 2200 B.C. the Chinese had developed an elaborate system of competitive examinations to select outstanding persons for government positions (DuBois, 1970), and down through the ages almost every culture has had a special fascination for its most able citizens. Although the areas of performance in which one might be recognized as a "gifted" person are determined by the needs and values of the prevailing culture, scholars and laypersons alike have debated (and continue to debate) the age-old issue of "what makes giftedness."

This chapter will attempt to shed some light on this complex and controversial question by describing a broad range of theoretical issues and research studies that have been associated with the study of gifted and talented persons. Although the information reported here draws heavily on the theoretical and research literature, it is clearly written from the point of view of an educational practitioner who respects both theory and research, but who also has devoted a major amount of his efforts to translating these types of information into what he believes to be defensible identification and programming practices. Those in the position of offering advice to school systems that are faced with the reality of identifying and serving highly able students must also provide the types of underlying research that lend credibility to their advice. Accordingly, this chapter might be considered a theoretical and research rationale for a separate publication that describes a plan for identifying and programming for gifted and talented students (Renzulli, Reis, & Smith, 1981).

The chapter is divided into three sections. The first section deals with several