Chapter 5
Conceptions of Giftedness

Scott Barry Kaufman[1] and Robert J. Sternberg[2]
[1] *Yale University*
[2] *Tufts University*

Johnny, a 9-year-old elementary school student, has an IQ of 140, which would qualify him as "gifted" by virtually any IQ-based definition of giftedness anyone might use. Johnny has few friends, in large part because he has very poor social skills. Johnny has no hobbies to speak of, and is unengaged in significant extracurricular activities outside of school. And despite his IQ, Johnny is a good, but not great, student.

Davy is also 9 and is in the same school as Johnny. He has an IQ of 120, which would quality him as "gifted" by some, but not other IQ-based definitions of giftedness. Davy is very active in sports and is the best soccer player of any age in his school. He also is a highly talented trombonist, and is first trombone in the elementary-school orchestra. His teacher believes he has the potential for a career in musical performance, should he wish to follow that path. Davy is very popular and is one of the top three academic performers in his class.

Who is gifted? Johnny? Davy? Both? Or neither? In answering this question, four things must be kept in mind.

First, "giftedness" is a label—nothing more. We are frequently asked whether such-and-such or so-and-so child is gifted. The answer depends on the criteria one sets. But there is no one absolute or "correct" set of criteria. Criteria for such labeling are a matter of opinion, nothing more, and there are many disagreements as to how the label should be applied.

Second, the label can be applied in either a more general or a more specific way. The more general way implies that giftedness is relatively general across many domains—that is, someone is either gifted or not. On this view, someone who is gifted is gifted very broadly. The more specific way implies that giftedness is something that is potentially limited to one or several narrow domains—for example, verbal skills; or within the verbal domain, writing skills; or within the writing domain, fiction-writing skills. Indeed, relatively few successful fiction writers are also successful nonfiction writers, and vice versa.

Third, conceptions of giftedness can and do change over time and place. At times in the past, a child's ability rapidly to learn classical Greek and Latin might be viewed as an important sign of giftedness. Today, such an ability generally would be relatively less valued. Similarly, the skills that lead a child to be labeled as gifted might be different in a hunting and gathering village in rural Tanzania than in urban Los Angeles.

Fourth, conceptions of giftedness can be based on either explicit theories or implicit theories of giftedness. An explicit theory is one proposed by a scientist or educator who has studied giftedness and has arrived at a conception of giftedness that has been subject to some kind of empirical test. An implicit theory is simply a layperson's conception of a phenomenon. It has no explicit scientific basis. It might be looked at as a "pragmatic" conception rather than as one based on rigorous research.

As we review conceptions of giftedness, keep in mind the four constraints above. The chapter does not provide final "answers," because there are no such answers. Rather, each reader will have to decide for him- or herself which conception or conceptions he or she finds to be compelling.

First Wave: Domain-General Models

Many of the earliest giftedness researchers investigated the scientific basis of giftedness from a domain-general perspective, using the words "gifted," "genius," and "talented" almost interchangeably. It is completely reasonable to begin a scientific investigation of a topic in this manner, and the work of these "first wave" pioneers laid an important foundation for future research on the nature of giftedness and talent.

Francis Galton's book *Hereditary Genius* (1869) was one of the first public outlets to present a theory of genius. Galton conceptualized genius as "an ability that was exceptionally high and at the same time inborn" (Galton, 1892, p. viii). He garnered support for his theory by analyzing the family lineage of distinguished European men. He found that genius ran in families, and concluded from this that genius must be genetically inherited, in much the same way as physical attractiveness. Galton's *estimation* (as opposed to measurement) of genius was ostensibly subjective, using indices such as enduring reputation. Galton's technique had limited effectiveness for an understanding of giftedness in young people (in part because he focused on genius-level individuals), but he nonetheless set the gears in motion for the scientific study of giftedness.

At the turn of the twentieth century, English psychologist Charles Spearman (1904) noticed that a wide variety of cognitive tests tend to positively correlate with each other. Using his newly developed statistical technique of factor analysis, he determined that there is a significant amount of common variance across all of the tests, with some variance specific to each test. He called the pervasive ability *g*, or general intelligence, and each of the specific abilities *s*. Spearman viewed *g* as general and innate (i.e., as having a strong physical substrate), much in line with Galton's view on the hereditary basis of genius. He later proposed that the general factor was a result of "mental energy" (Spearman, 1927).

Around the same time Spearman discovered the *g* factor, Alfred Binet and Theodore Simon (1916) were developing a mental scale to identify students in need

of alternative education. The scale comprised a variety of tasks that were thought to be representative of a typical child's ability at various ages (Siegler, 1992). Binet and Simon's scale was one of the first tests to include an assessment of higherlevel cognitive skills. Galton thought the best way to measure intelligence was through sensory-discrimination tasks, and indeed many of the tests that Spearman first put into his factor analysis were tests that could hardly be considered higher-level cognition. Such tests included keenness of sight and hearing, color sense, breathing power, strength of pull and of squeeze, force of blow, span of arms, height, and weight (Galton, 1908).

Lewis Terman adapted Binet's scale and created the Stanford-Binet Intelligence Scale, one of the first intelligence tests used to identify gifted schoolchildren (Terman, 1916). Even though Terman adapted Binet's test, he also adapted Galton's theory of the nature of genius, and viewed giftedness as a single entity, equating giftedness with a high IQ. He created a classification scheme in the schools (which is sometimes still used today) in which a student with an IQ score above 135 is described as "moderately gifted" (Terman, 1925), above 150 as "exceptionally gifted," and above 180 as "severely and/or profoundly gifted" (Webb, Meckstroth, & Tolan, 1982). As for how these tests would be used, he suggested that:

> Teachers should be better trained in detecting the signs of superior ability. Every child who consistently gets high marks in his school work with apparent ease should be given a mental examination, and if his intelligence level warrants it he should either be given extra promotions, or placed in a special class for superior children where faster progress can be made. The latter is the better plan, because it obviates the necessity of skipping grades; it permits rapid but continuous progress (Terman, 1916, p. 14).

The nature of general intelligence is still a highly researched area (Detterman, 2002; Gottfredson, 2002; Jensen, 1998; Kyllonen, 2002; Petrill, 2002). In addition, a few giftedness researchers today do still equate general intelligence with giftedness (e.g., Gallagher & Courtright, 1986), and many identification procedures in the United States rely heavily on full-scale IQ scores (see Implications for Education section).

Second Wave: Domain-Specific Models

Not everyone was content with equating high general intelligence with giftedness. One of the earliest researchers to emphasize the variety of ways an individual can be gifted was Louis Thurstone (1938). Using a different method of factor analysis than Spearman, he identified seven primary mental abilities that he claimed were statistically independent of each other: (a) Verbal comprehension (involved in the ability to understand verbal material), (b) Verbal fluency (involved in the ability to rapidly generate a large number of words or concepts with specific characteristics), (c) Number (involved in rapid arithmetic computation), (d) Perceptual speed (involved in rapid recognition of symbols), (e) Inductive reasoning (involved in reasoning from the specific to the general), (f) Spatial visualization (involved in mentally visualizing and rotating objects), and (g) Memory (involved in remembering information).

The debate between Spearman and Thurstone could not be reconciled on purely theoretical grounds, but accumulating evidence supported hierarchical factor models of intelligence, with general ability at the very top, more nearly general intellectual

abilities near the top, and various more specific forms of intelligence further down in the hierarchy. Two hierarchical theories that have had considerable influence on modern intelligence tests are the theory of fluid and crystallized general intelligences (Horn & Cattell, 1966) and Carroll's (1993) three-stratum theory of cognitive abilities.

In early versions of their model, Horn and Cattell (1966) proposed that general intelligence consists of two major parts: fluid intelligence (g_f) and crystallized intelligence (g_c). Fluid intelligence is thought to be dependent on the efficient functioning of the central nervous system, rather than on prior experience and cultural context. Crystallized intelligence, on the other hand, is thought to be more dependent on experience and cultural context.

The more recent model and the one that has arguably gained the widest acceptance in the psychometric community is Carroll's (1993) three-stratum theory. Carroll proposed this model after an extensive analysis of more than 460 data sets from the psychometric literature. In Carroll's model, Stratum I reflects highly specialized skills, some of which represent Thurstone's primary mental abilities. Stratum II reflects somewhat specialized abilities that occur in broad domains of intelligent behavior. They include (in order of decreasing relatedness to *g*): fluid intelligence, crystallized intelligence, general memory and learning, broad visual perception, broad auditory perception, broad retrieval ability, broad cognitive speediness, and processing speed. Stratum III has only one ability, the *g* factor, which allegedly underlies all aspects of intellectual activity.

Recently, Carroll's model and the Horn–Cattell model have been synthesized into the Cattell–Horn–Carroll (CHC) theory (Flanagan & Harrison, 2005). Even though the CHC model still incorporates a *g* factor, its main emphasis is on the measurement of middle-stratum factors. The CHC theory has been influential in the development of a variety of IQ tests, including the fifth edition of the Stanford-Binet (Roid & Barram, 2004), the second edition of the Kaufman Assessment Battery for Children (KABC-II; Kaufman, Lichtenberger, Fletcher-Janzen, & Kaufman, 2005), and the third edition of the Woodcock-Johnson Cognitive Abilities Assessment (WJ III; Mather, Wendling, & Woodcock, 2001).

Hierarchical psychometric definitions of intelligence have deepened our understanding of a statistically derived structure of human abilities. Such theories are not theories of giftedness per se, but have played an important role in our understanding of giftedness by suggesting that beneath *g*, there are hierarchically related abilities that contribute to intellectual gifts.

This idea was expanded upon and brought to public attention when Howard Gardner (1983) published his first edition of *Frames of Mind*. This and subsequent editions of his book (Gardner, 1983, 1993, 1999) described the Multiple Intelligences model of intellectual ability, which stresses the need for educators and psychologists to broaden their definitions of human intelligence. In this model, multiple intelligences are not static abilities hierarchically nested under a general factor, but rather are each an independent cognitive system in its own right.

Gardner defined intelligence as "an ability or set of abilities that permit an individual to solve problems or fashion products that are of consequence in a particular cultural setting" (Ramos-Ford & Gardner, 1997). Instead of solely relying on factor analysis, Gardner based his conclusions on a selective analysis of the research literature using eight criteria, namely, (a) potential isolation by brain damage, (b) the existence of idiot

savants, prodigies, and other exceptional individuals, (c) an identifiable core operation or set of operations, (d) a distinctive development history, (e) an evolutionary history and evolutionary plausibility, (f) support from experimental psychological tasks, (g) support from psychometric findings, and (h) susceptibility to encoding in a symbol system, and concluded that there were eight separate intelligences. The eight intelligences he has proposed are linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, intrapersonal, and naturalist. Additional intelligences are currently being considered, such as existential intelligence.

Although Gardner's theory has had an important influence in the broadening of educators' views of intelligence, various criticisms have been proposed. First, there currently exists no published empirical test of the theory as a whole. Second, the intelligences that Gardner proposes are based on a somewhat selective review of the literature that largely supports his theory. Also, the literature he used is distinctly different from the conventional psychometric literature, much of which has been used to support the theory of general intelligence (e.g., Jensen, 1998). Third, even though assessments exist to test the various intelligences (e.g., Gardner, Feldman, & Krechevsky, 1998), they have not been proven to be of adequate psychometric validity. The ones that have been tested (with the exception of kinesthetic intelligence) all show a strong influence of the *g* factor (Visser, Ashton, & Vernon, 2006). There is some evidence to suggest, however, that they are of acceptable reliability (Plucker, Callahan, & Tomchin, 1996). Without demonstrably valid tests, however, it is difficult to evaluate the success of interventions.

Gardner is not the only researcher to have considered abilities in a more domain-specific way. Julian Stanley's experiences with precocious youth also led him to develop a domain-specific conception of giftedness. In fact, Stanley chose to avoid the word "gifted" in favor of "precocious" (Brody & Stanley, 2005), to emphasize that giftedness is not domain general, but instead is precocity demonstrated in a specific domain.

Stanley established tthe Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins University in 1971 with the purpose of identifying youths with precocious specific abilities, especially in mathematics, and of supplying them with the educational resources they need to achieve their full potential. So far, SMPY has primarily focused on the identification and nurturance of students who exhibit exceptional verbal, spatial, mechanical, and mathematical abilities (McGin, 1976; Shea, Lubinski, & Benbow, 2001; Stanley, 1994). This has taken the form of challenging summer courses and distance learning (see Linking Theory to Practice section).

Third Wave: Systems Models

Researchers holding a domain-specific conception of giftedness emphasize specific areas of aptitude, and focus on the needs of those who are precocious in those areas to receive the acceleration or enrichment they need to progress at the appropriate skill level. Therefore, the focus is on acquiring a knowledge base and the development of intellectual abilities in a specific domain. The domain-specific modelers often do not include additional psychological processes in their model of giftedness, nor do they see them as necessary (Brody & Stanley, 2005; VanTassel-Baska, 2005). In their view, other psychological variables such as creativity are an output of giftedness,

not an input, and can only come about after a significant amount of content has been mastered (VanTassel-Baska, 2005).

"Third Wave" giftedness researchers view giftedness as a system—the total operation which is dependent on a confluence of psychological processes operating together. This tight network of interacting psychological variables is posited to play a role across a wide range of creative behavior, but these conceptions do not exclude the importance of domain-specific abilities.

Joseph Renzulli's (1978, 2005) Three-Ring Definition views giftedness as the interaction of three characteristics: well-above-average ability, creativity, and task commitment. According to Renzulli, each characteristic plays an important role in the development of gifted behavior. Well-above-average ability is defined by Renzulli as either general ability that can be applied across all domains and/or specific ability, which consists of the ability to perform at a high level within a specific domain. Renzulli defines well-above-average ability as that possessed by those individuals performing in the top 15–20% of any domain. This view differs from the traditional view of giftedness as comprising those scoring in the top 3–5% on a standardized measure of intelligence (i.e., Marland, 1972).

Renzulli also has made a major impact on the field of giftedness by proposing that there are two types of giftedness: "schoolhouse giftedness" and "creative-productive giftedness." Schoolhouse giftedness is test-taking or lesson-learning giftedness, and is the form of giftedness most often emphasized in school. Creative-productive giftedness differs from schoolhouse giftedness: Those who display creative-productive giftedness are excellent producers of knowledge, whereas those high in schoolhouse giftedness are superior consumers of knowledge. According to Renzulli:

> History tells us it has been the creative and productive people of the world, the producers rather than consumers of knowledge, the reconstructionists of thought in all areas of human endeavor, who have become recognized as 'truly gifted' individuals. History does not remember persons who merely scored well on IQ tests… (Renzulli, 2005, p. 256)

There is research evidence supporting the components of Renzulli's model. Delisle and Renzulli (1982) found that nonintellective factors are just as important for creative production as are intellectual factors. The model is also supported by the work of Gubbins (1982), who showed through stepwise multiple regression that above-average ability is a necessary but not sufficient condition for high-level creative productivity. Also of importance are factors such as task commitment, time commitment, as well as student interest, which are factors that are directly related to Renzulli's model.

Renzulli's model benefits from its inclusion of multiple interacting factors and the broadening of the criteria used in selection of gifted students. However, the model does have its criticisms. Renzulli first proposed the three aspects of giftedness based on data from accomplished adults (Renzulli, 1978). Renzulli has been criticized for not demonstrating correlations between these later-life achievements and the traits or experiences of children with various levels of IQ (Delisle, 2003). Another criticism of the model, coming from those supporting the domain-specific view, is that motivation, task commitment, and creativity should be secondary considerations, because they are not part of giftedness, but rather are born out of the talent-development process (VanTassel-Baska, 2005). Renzulli has made an attempt to respond to various criticisms, by emphasizing the need to develop creative productive skills in addition to knowledge

acquisition, and presenting evidence that his broadened identification procedures do indeed reduce inequalities such as a disproportionate representation of minorities in gifted education programs and gender equity (Renzulli, 1999).

Another important systems model of giftedness is Sternberg's WICS model of giftedness, in which giftedness is conceptualized as a synthesis of wisdom, intelligence, and creativity (Sternberg, 2003, 2005).

The basic idea of the WICS model is that, in life, people need creative skills and attitudes to produce new and original ideas; analytical skills and attitudes (academic intelligence) to evaluate the quality of these ideas; practical skills and attitudes (practical intelligence) to execute ideas and to persuade others of their value; and wisdom-related skills and attitudes in order to ensure that one's ideas help to foster a common good, rather than only the good of oneself and those closely associated with oneself. Gifted people, in this view, are not necessarily extremely strong in all of these aspects. Rather, they recognize and capitalize on their strengths, and recognize and compensate for or correct their weaknesses, in order to adapt to, shape, and select real-world environments. Evidence in support of this view is summarized in Sternberg (2003). There is also some evidence for cross-cultural generalization of at least parts of the theory (Sternberg, 2004a).

The WICS model has also received various criticisms [see Sternberg (2004b) for a response to these criticisms]. One criticism is that the WICS model does not address the relationship between creativity and psychiatric disorders (Dai, 2003; Kaufman & Baer, 2003). Another criticism is that the WICS model does not specify prediction of all aspects of all kinds of giftedness, such as elite athleticism (Baker & Cote, 2003). Another criticism is that the WICS model does not provide a readily purchasable detailed assessment procedure for identifying or instructing gifted children (Feldhusen, 2003; Heller, 2003). To be sure, though, these three criticisms could be applied to many of the conceptions of giftedness reviewed in this chapter. Lastly, the construct of wisdom has been called "overloaded" and "heterogeneously operationalized" (Heller, 2003).

Fourth Wave: Developmental Models

Developmental models were formulated in response to overemphasis on the genetic determinants of giftedness. Indeed, the word "giftedness" does imply that someone was bestowed with a special "gift" that must be harnessed for the good of humankind, although, at least in theory, the gift need not be genetic. Developmental theories of giftedness emphasize the constantly changing nature of these so-called "gifts," and broaden the net even wider than the systems model by including various *external* factors that might interact with the *internal* factors of the individual to produce gifted behavior.

One of the first steps to include the environment in a model of giftedness was taken by Mönks (1992), who modified Renzulli's three-ring model to come up with the Multifactor model of giftedness. He essentially took Renzulli's model, and added environmental factors such as the school, family, and peers to the three psychological variables (motivation, creativity, and exceptional abilities) already posited by Renzulli.

Françoys Gagné (2005) proposed a theory of giftedness that emphasizes the talent-development process. He noted that the words "gifted" and "talented"

are often used interchangeably in the field of gifted education; he proposed the Differentiated Model of Gifted and Talented (DMGT) to highlight the difference in these terms. The major aim of Gagné's model is to uncover the important environmental influences (home, school, parents, activities, encounters, etc.), nonintellective variables (motivation, temperament), and learning, training, and practicing, that transform basic, genetically determined "gifts" (intellectual, creative, sensorimotor, etc.) into specific talents (language, science, mathematics, art, music, leadership, etc.) in everyday life.

Abraham Tannenbaum (1986) proposed a related theoretical model that also attempts to delineate the contributing factors linking gifted potential to talent fulfillment. He suggested five psychological and social linkages between promise and fulfilment: (a) superior intelligence, (b) exceptional special aptitude, (c) nonintellective facilitators, (d) environmental influences, and (e) chance, or luck. These five factors are thought to interact to produce high levels of productivity, and are all necessary to become a "gifted" individual. Whereas Gagné uses the word "giftedness" as a potential, Tannenbaum uses the word as an outcome.

Through his studies of prodigies, David Henry Feldman, another developmental theorist, proposed a model of how talent grows or develops in young people (Feldman, 1992, 2000). According to Feldman, seven dimensions of development are particularly important for the development of giftedness: (a) cognitive processes, (b) social/emotional processes, (c) family aspects (i.e., birth order and gender within the family), (d) education and preparation (informal and formal), (e) characteristics of the domain and field, (f) social/cultural contextual aspects, and (g) historical forces, events, and trends.

John Feldhusen further formulated a developmental model of giftedness based on talent development that attempts to synthesize the various models of giftedness presented in this chapter (Feldhusen, 1998). For instance, he incorporated domain-specific abilities (Carroll, 1993; Gardner, 1983) with the idea that these basic abilities are in part genetically determined (Galton, Gagné), while also acknowledging that specific abilities emerge and develop through facilitating experiences, and within a particular sociocultural context (Csikszentmihalyi, Rathunde, & Whalen, 1993). Like other "Fourth Wave" researchers, Feldhusen attempted to elucidate the transition from genetically determined abilities to the display of specific talents.

At the base of his model are "genetically determined abilities" that predetermine the nature and rate of intellectual, physical, and emotional development. When the child enters preschool and then primary school, stimulating conditions that foster intellectual, physical, and emotional growth are important, such as peers and teachers. With instruction, there may emerge rapid growth of knowledge and evidence of precocity. The next stage is elementary school, where precocious children may start to display evidence of their special talent. The next stage (ages 12 to 16) involves the learning of knowledge and skills under the tutelage of excellent teachers. During this stage, a range of personality factors also become important, including internal locus of control, intrinsic motivation, and a sense of self-efficacy. Also during this stage, both commitment to talent development and career goals start to emerge, and personal interests become more clear. The final stage involves integration through appropriate educational experiences, such as profiting from high-powered and highly able mentors, resisting peer pressure to be normal, and finding the career opportunities that open doors to high-level and creative achievement.

Common and Uncommon Ground: The Evolution of Conceptions of Giftedness

It should be evident by this point that there are numerous and diverse conceptions of giftedness available (for even more conceptions see Stenberg & Davidson, 2005). It may seem overwhelming sifting through them all. If the fine details are ignored temporarily, a big picture does emerge. Modern conceptions of giftedness are a result of an evolution of ideas. Each generation of giftedness theories is built on earlier ones, incorporating the previous generation's ideas and adding extra components that reflect the current state of research.

First-wave researchers laid the foundation by asking the question, "what is giftedness?" in the first place, and introducing intelligence tests to measure it. Second-wave researchers built on the foundation of intelligence theory by discovering multiple, distinct ways to be gifted. Third-wave researchers recognized the importance of both domain-general and domain-specific proclivities, but also added other psychological variables they felt were important components of giftedness. Fourth-wave researchers widened the lens even more, taking many of the ideas of the first three generations of giftedness researchers, but placing talent within a developmental context that includes variables external to the individual such as the environment.

Looking at the big picture, it is clear that modern giftedness researchers share the same goal: the identification and nurturance of specific talents. No serious giftedness researcher today believes that general intelligence is the whole picture, or believes that gifted abilities are solely the result of innate, genetic endowment. If anything, the trend over the past 20 years has been to emphasize external factors over internal factors. There seems to be a shift toward *explaining* the talent-development process (fourth wave) instead of merely listing static traits that are important to achieve giftedness (third wave).

When the fine details *are not* ignored, however, differences between the various conceptions of giftedness do emerge. Three main areas of contention include the importance of nonintellective abilities, the role of creativity in giftedness, and whether giftedness is a potential or an achievement. Domain-specific researchers such as Julian Stanley have tended to argue that precocious students need to build up their base of expertise in a particular domain. As a result, they view giftedness as, in large part, an achievement. They downplay the importance of nonintellective abilities and view creativity as part of the end product instead of part of the process. Systems researchers such as Renzulli and Sternberg place creativity on equal footing with intelligence, and emphasize the need to teach creativity-based skills in addition to critical-thinking skills. Indeed, Renzulli has downplayed the role of conventional intellectual abilities, proposing less stringent criteria for scores on standardized measures of intelligence for inclusion of children in gifted programs. Systems researchers agree with the domain-specific researchers, however, that giftedness is achievement. Developmental theorists such as Gagné view giftedness as potential, and talent as the end product. In addition, developmental theorists emphasize, to a large extent, the role of nonintellective abilities and creativity for talent to emerge. For both systems and developmental giftedness theorists, intelligence and expertise are important, but are one piece of a large network of interconnected elements.

Implications for Education

The particular conception of giftedness that is adopted has important implications for educational practice. First we look at implications for the identification of gifted students, and then we look at some examples of actual programs based on modern conceptions of giftedness.

Identification of Gifted Students

Each conception of giftedness brings with it its own set of implications for education. Those still working within the domain-general framework set up by Terman will be advocates of using a global IQ score as a cutoff for identification. Those adopting a domain-specific perspective will be advocates of using the results of the group factor scores on intelligence tests, as well as other demonstrations of high achievement in a specific domain. Those adopting a systems view believe in identifying students through a combination of assessments of analytical, creative, wisdom, and task-commitment skills in a specific domain or across the board. These researchers emphasize alternative assessments that do not rely solely on intelligence tests. Lastly, those adopting a developmental view emphasize the malleability of giftedness, and its constantly changing nature. Therefore, they argue for different types of assessments at different ages, starting with intelligence tests at a very early age, and ending up focusing on achievement at the later stages of talent development.

What is the dominant model in the United States today? When all is said and done, what conception of giftedness is the dominant model in practice in the United States? First-wave giftedness researchers have had, to date, the most enduring impact on modern-day education. Modern conceptions of giftedness receive little attention in the typical school setting. In the United States, a global IQ score is still the dominant criterion used for acceptance into gifted programs at the grade-school level (Abeel, Callahan, & Hunsaker, 1994; Feldhusen & Jarwan, 2000; Tannenbaum, 1986). In fact, several states still prescribe a minimum score on an intelligence test in order for a gifted program to be eligible for funding (U.S. Department of Education, 1993). This is curious, because modern giftedness researchers emphasize domain-specific notions of giftedness.

There are at least two probable reasons why educators still rely so heavily on measures of IQ. The first is simply a matter of availability. Educators want to use a test that is cheap, reliable, and valid. Most IQ tests meet these criteria (Gottfredson, 1997; Jensen, 1998; Walberg, 1984). Furthermore, IQ tests are often grounded in CHC theory, which has gained wide acceptance by psychometrically oriented intelligence researchers. No modern theory of giftedness has received such widespread acceptance among intelligence researchers, or has produced a test that is as quick, reliable, and valid as the IQ test. Because modern conceptions of giftedness go way beyond intelligence, they have likewise (and rightfully so) insisted on going beyond quick simple tests to measure giftedness (see Linking Theory to Practice section). This poses a problem, because most schools still operate on the first wave model initiated by Terman, which equates giftedness with general intelligence. Until educators enter the twenty-first century of theories of giftedness, they will stay in the intelligence testing frame of mind and modern theories of giftedness will not be widely adopted.

The second probable reason why educators still rely so heavily on the IQ measure is because IQ tests actually do match the generality of most gifted education programs. The identification procedure should match the intervention program, and in many schools, that i s what IQ tests do. IQ tests are moderately effective predictors of academic achievement *in general*. In addition, most gifted-education programs take students who are achieving at a high level in general, and put them all in the same room, where they teach the students general critical-thinking skills. Luckily, modern conceptions of giftedness are starting to link their conceptions to practice, and are implementing programs to do so. Hopefully educators will start to see which of these programs are most successful, and will start to switch over from general gifted programs to specific programs that identify and nurture specific abilities.

There are new assessments on the horizon that may eventually change the assessments we use (e.g., Sternberg & the Rainbow Project Collaborators, 2006). One new test, the Rainbow assessment, has been found roughly to double prediction of SAT for freshman college grades in a diverse sample of students, and substantially to reduce ethnic-group differences in test scores. The assessment measures creative and practical in addition to analytical skills. The creative measures were the most useful in increasing prediction.

In the next section, we review examples of some of these "new wave" programs, [Au1] both in the United States and abroad (for a more complete listing see Chapter 13, this volume).

Linking Theory to Practice

Programs Based on the Theory of Successful Intelligence. To validate the relevance of the theory of successful intelligence (the WICS theory without the wisdom component) in the classroom, we have carried out a number of instructional studies. In one study (Sternberg, Ferrari, Clinkenbeard, & Grigorenko, 1996; Sternberg, Grigorenko, Ferrari, & Clinkenbeard, 1999), we used the Sternberg Triarchic Abilities Test. The test was administered to 326 children around the United States and in some other countries who were identified by their schools as gifted by any standard whatsoever. Children were selected for a summer program in (college-level) psychology if they fell into one of five ability groupings: high analytical, high creative, high practical, high balanced (high in all three abilities), or low balanced (low in all three abilities). Students who came to Yale were then divided into four instructional groups. Students in all four instructional groups used the same introductory-psychology textbook [a preliminary version of Sternberg (1995)] and listened to the same psychology lectures. What differed among them was the type of afternoon discussion section to which they were assigned. They were assigned to an instructional condition that emphasized either memory, analytical, creative, or practical instruction. For example, in the memory condition, they might be asked to describe the main tenets of a major theory of depression. In the analytical condition, they might be asked to compare and contrast two theories of depression. In the creative condition, they might be asked to formulate their own theory of depression. In the practical condition, they might be asked how they could use what they had learned about depression to help a friend who was depressed.

Students in all four instructional conditions were evaluated in terms of their performance on homework, a midterm exam, a final exam, and an independent

project. Each type of work was evaluated for memory, analytical, creative, and practical quality. Thus, all students were evaluated in exactly the same way.

Several relevant results came out of this study. First, we observed that when the students arrived at Yale, the students in the high creative and high practical groups were much more diverse in terms of racial, ethnic, socioeconomic, and educational backgrounds than were the students in the high analytical group, suggesting that correlations of measured intelligence with status variables such as these may be reduced by using a broader conception of intelligence.

Second, all three ability tests significantly predicted course performance. Also, students who were placed into an instructional condition that matched their pattern of successful intelligence abilities performed better than those who were poorly matched. In other words, when students are taught in a way that fits how they think, they do better in school. Children with creative and practical abilities, who are almost never taught or assessed in a way that matches their pattern of abilities, may be at a disadvantage in course after course, year after year.

A follow-up study (Sternberg, Torff, & Grigorenko, 1998) examined learning of social studies and science by third graders and eighth graders. The 225 third graders were students in a very-low-income neighborhood in Raleigh, North Carolina. The 142 eighth graders were students who were largely middle to upper middle class studying in Baltimore, Maryland, and Fresno, California. In this study, students were assigned to one of three instructional conditions. In the first condition, they were taught the course that basically they would have learned had there been no intervention. The emphasis in the course was on memory. In a second condition, students were taught in a way that emphasized critical (analytical) thinking. In the third condition, they were taught in a way that emphasized analytical, creative, and practical thinking. All students' performance was assessed for memory learning (through multiple-choice assessments) as well as for analytical, creative, and practical learning (through performance assessments).

As expected, students in the successful-intelligence (analytical, creative, practical) condition outperformed the other students in terms of the performance assessments. One could argue that this result merely reflected the way they were taught. Nevertheless, the result suggested that teaching for these kinds of thinking succeeded. More important, however, was the result that children in the successful-intelligence condition outperformed the other children even on the multiple-choice memory tests. In other words, to the extent that one's goal is just to maximize children's memory for information, teaching for successful intelligence is still superior. It enables children to capitalize on their strengths and to correct or to compensate for their weaknesses, and it allows children to encode material in a variety of interesting ways.

We have now extended these results to reading curricula at the middle-school and the high-school level. In a study of 871 middle-school students and 432 high-school students, we taught reading either triarchically or through the regular curriculum. At the middle-school level, reading was taught explicitly. At the high-school level, reading was infused into instruction in mathematics, physical sciences, social sciences, English, history, foreign languages, and the arts. In all settings, students who were taught triarchically substantially outperformed students who were taught in standard ways (Grigorenko, Jarvin, & Sternberg, 2002).

Thus, the results of these studies suggest that the theory of successful intelligence is valid as a whole. Moreover, the results suggest that the theory can make a difference

not only in laboratory tests, but in school classrooms and even the everyday life of adults as well.

Programs Based on the Three-Ring Model

Renzulli's Three-Ring conception of giftedness has served as the basis for a series of practical models [see Renzulli & Reis (1994) for a full description of the models as well as their research findings]. First, Renzulli (1977) proposed the Enrichment Triad programming model and then the revolving door identification model (Renzulli, Reis, & Smith, 1981).

The Enrichment Triad offers three types of enrichment experiences for students. Type I Enrichment involves general exploratory experiences for students, such as field trips and guest speakers. Type II Enrichment includes instructional methods and materials designed to promote the development of thinking, feeling, research, communication, and methodological processes. Type III Enrichment is the most advanced level and allows the students to participate in investigative activities and artistic production. Type III was designed to allow gifted students to work at as advanced a professional level as possible.

Using a population of 1162 students in grades 1–6 in 11 school districts, Reis and Renzulli (1982) examined several variables related to an identification process based on the Enrichment Triad programming model and the revolving door identification model. Above-average-ability students at each grade level were divided into two groups. Group A consisted of students scoring in the top 5% of standardized tests of intelligence and achievement. Group B consisted of students who scored from 10 to 15 points below the top 5% on a standardized intelligence test or were rated highly by teachers using the Scales for Rating the Behavioral Characteristics of Superior Students (Renzulli, Smith, White, Callahan, & Hartman, 1976; Renzulli, Smith, White, Callahan, Hartman, & Westberg, 2002). Both groups participated in all program activities.

The Student Product Assessment Form (SPAF) was used to compare the quality of products from each group. The instrument provided ratings for eight characteristics of product quality and seven factors relating to overall quality. There was no significant difference between the two groups with respect to the quality of students' products. The results from this study supported the effectiveness of a model that focuses on creative productivity, in addition to lending support to the Three Ring Conception of giftedness as comprising students who represent larger proportions and different populations than the traditional top-5% approach.

In addition, questionnaires and an interview were administered to assess feelings about the program. Many classroom teachers reported that high involvement in the program influenced their teaching practices in a positive way. Also, the opinions of the parents of children who were placed into gifted programs based on traditional criteria did not differ from the opinions of parents of children who were selected under the expanded Three Ring criteria. Finally, special-education teachers indicated their preference for the expanded talent pool approach compared to the strict reliance on IQ scores.

Most recently, Renzulli combined the Enrichment Triad Model and the Revolving Door Identification Model with the Schoolwide Enrichment Triad Model (SEM; Renzulli & Reis, 1985, 1997). A central aim of the SEM model is to apply the general enrichment techniques that were used in the Triad/Revolving Door Identification Model to help *all* students, not just those identified as gifted.

The SEM model offers educators three service-delivery components (Renzulli & Reis, 1994). The first component is the Total Talent Portfolio (TTP), which is used as a way of gathering and recording students' abilities, interests, and learning style preferences. The second component involves a series of Curriculum-Modification Techniques that are designed to (a) assess each student's mastery of material, (b) adjust the pace and level of required material to accommodate variations in learning, and (c) provide enrichment and acceleration alternatives for students who master material at a faster rate. The third component involves a set of strategies designed to promote active engagement in learning.

The SEM model has been implemented in several hundred school districts across the United States (Burns, 1998), and has demonstrated effectiveness under widely differing socioeconomic levels and program organization patterns (Olenchak, 1988; Olenchak & Renzulli, 1989). In addition, over 600 educators are trained on the model each summer at the University of Connecticut.

SMPY Program

The SMPY program uses content-specific criterion-reference measures for identification instead of standardized measures of intelligence that measure general reasoning abilities. The main emphasis is on an optimal match between a student's particular cognitive abilities and the educational program.

The SMPY program has developed the Diagnostic Testing-Prescriptive Instruction Model, which gives high-achieving students pretests that diagnose specific content that has not yet been mastered, and structures a program to teach only that content (Stanley, 2000). SMPY then counsels students to help develop challenging individualized programs. This approach, which is part of CTY's Study of Exceptional Talent Program, helps students before the age of 13 with high math or verbal ability to find opportunities to accelerate and/or supplement their regular school programs (Brody, 2004; Brody & Blackburn, 1996). Interventions have taken the form of academic summer programs, distance education, and extracurricular opportunities. A series of longitudinal studies have been implemented to test the effectiveness of Stanley's model. Based on the results of these studies, Swiatek (1993) concluded that acceleration is an educational option that is inexpensive to implement, requires little specialized training for teachers, and can be used in most educational settings to meet the learning needs of many gifted students. In addition, it was concluded that acceleration does little harm to willing students academically or psychosocially, and may help gifted individuals establish a foundation for advanced learning, maintain interest and involvement in academic activities, and earn extra time that can be used for the development of a career.

In addition, a 50-year follow-up study (1972–2022) is in progress at Iowa State University and includes over 6000 students (Lubinski & Benbow, 1994). It is hoped that the results of the longitudinal study will not only help to validate Stanley's model, but also will increase our understanding of the talent-development process.

Russian Programs

In Russia, Olympiads are a time-honored tradition for showcasing gifted youth (Jeltova & Grigorenko, 2005). Olympiads are a series of festivals related to various

scholastic disciplines that involve competitions allowing children to show their creativity and talent. Selection into the Olympiads is a statewide process that involves multiple levels. At each level, at the same time, students take the same written assignments, which are then scored by a panel of judges. Finalists participate in a national competition, and winners of that round represent Russia in the international Olympics (Karp, 2003).

While the Olympiads tend to focus more scholastic abilities, the annual Festival *Isskustvo i Deti* ("Art and Children") is geared toward young musicians, artists, poets, and other artistic children. Other festivals include the Odarennye Deli ("Gifted Children") program (Bogoyavlenskaya & Shadrikov, 2000) that is geared toward gifted computer scientists, engineers, and architects. Such festivals allow children to share their achievements with others who share their gifts and interests. They also allow the children an opportunity for networking (Jeltova & Grigorenko, 2005).

In addition to these festivals, there are also a number of specialized schools set up to develop talent in children. At the secondary level (age 12 and up), there are various boarding schools for scholastic disciplines where students essentially are working from 7:30 a.m. to 11 p.m. (Evered & Nayer, 2000). These programs follow an acceleration model, and in addition to a compensatory core group of classes, students must attend special seminars in their major. These students are expected to participate in Olympiads specific to their area of giftedness (Jeltova & Grigorenko, 2005). As a result of their hard work, they typically enter very prestigious schools in Russia.

In addition to Olympiads and specialized schools, there are also multidisciplinary educational programs for children between the ages of 4 and 15. Moscow School 1624, *Sozvezdie*, has a different model than the acceleration model. Instead, it is an interdisciplinary program based on a systems conception of giftedness. The curriculum focuses on major philosophical themes, each theme defined in broad terms. Through the learning of these themes, the program hopes to instill in children skills that they can independently use within a given subject area outside of learning situations (Repkin & Repkina, 1997). General thinking skills are taught across a variety of subject matters, along with strategies for creative thinking. Students are expected to combine a variety of strategies when discussing interdisciplinary generalizations (Jeltova & Grigorenko, 2005).

So far, *Sozvezdie* has been a success. All children identified as gifted in the program increased their levels of intellectual performance, whereas only 30% of gifted students in an acceleration program model showed a decrease in their intellectual performance (Jeltova & Grigorenko, 2005). *Sozvezdie* is still an experimental program, however, so long-term outcomes have yet to be determined.

German Programs

There was a time when German researchers were weary of identifying students for special gifted programs (Bartenwerfer, 1978). Gradually, they saw a need for identification and today a variety of programs are being implemented in Germany to identify and nurture talent. In 1988, the Center for the Study of Giftedness was established. It adopted the Multifactor Model of giftedness (Mönks, 1992), based on the notion that giftedness is not identical to high IQ. The Center agreed to exclude any mention of a student's IQ in reports to parents and teachers.

A model that has been adopted widely in Germany for identifying giftedness is the ENTER model (Ziegler & Stoeger, 2003). The ENTER model not only assesses the current state of the child (e.g., IQ score), but also incorporates developmental issues into the identifying process. ENTER stands for five stages: explore, narrow, test, evaluate, and review. In the first three stages, a variety of data are collected on the child. In addition to tests of ability, information such as family life, early development, school experiences, leisure-time activities, and friends are collected. During the first three steps, objectives are narrowed.

The collected information and test results guide the evaluation stage, during which a decision is made as to the appropriate provisions. The review phase monitors the child continuously to determine the reasons for the initial identification and to make sure there is a good fit between the model of giftedness that was used for identification and the practical recommendation that was made in the evaluation phase.

Jena Plan Schools are a significant way to promote giftedness in Germany and across Europe. The schools were founded by the German educator and scientist Peter Peterson. His original intention was to establish a school not just for gifted students, but for children with all levels of ability (Mönks & Katzko, 2005). The schools were established with six basic principles in mind. First, the schools are integrated into the social environment, and do not solely focus on the development of intellectual abilities. Second, the age-graded class was replaced by a family structure with three different levels: lower, middle, and upper. Each level comprises three different age groups. Third, pull-out instruction groups are based on the ability and level of the child. Fourth, students are grouped around tables, with four to six children in a group. The purpose of these small groups is to facilitate social and cooperative learning and teamwork. The teacher can bring together both good and slow learners for a given group. Fifth, the school reflects natural learning situations in everyday life as much as possible. The weekly curriculum is organized around conversation, play, work, and celebration. Sixth, social learning is emphasized. Students work and play with one another. The Jena Plan Schools are an excellent example of modern conceptions of giftedness being translated into educational practice.

The Future of "Giftedness"

What does the future hold for the giftedness construct, and what will future conceptions of giftedness be like? Based on the current trends, the sociocultural approach to giftedness is probably not going away anytime soon. As more and more factors are taken into account in models of giftedness, one has to ask at some point: which models are not only theoretically sound, but can be practically implemented in the school system? As the lineup of conceptions of giftedness expands, the field needs to become both scientific and practical at the same time. Richard Mayer suggests that, in order to do this, the giftedness construct needs to be precisely defined and measured, theories should be clear and testable, conclusions on how to identify and nurture gifted students should be based on solid research findings, research methods that generate valid and reliable data should be used, and gifted programs based on a particular conception of giftedness should be evaluated in controlled experimental trials (Mayer, 2005).

This all is a tall order indeed. Nonetheless, the need for a more scientific approach to the study of giftedness reflects the fact that there are many conceptions available, and a number of programs are succeeding in identifying and nurturing youth. This is an exciting time for the field of gifted education, with more options available for children than at any other point in history. The particular conception of giftedness that is adopted is important and will become increasingly more important in the future, and will have strong implications for the development of talent. Yes, the future of gifted education looks bright and gifted indeed.

Conclusion

There is something profoundly unsatisfying about a chapter that reviews a number of diverse theories and ends with a statement that there is some merit to all, and it is up to the reader to find those merits and decide what he or she likes best. Rather than arguing for any particular point of view, we will conclude by mentioning three characteristics that we consider to be requisite for a model to be useful.

First, the model should use multiple and varied assessments. All instruments used to assess children have error of measurement. Different kinds of instruments have different kinds of error. IQ tests, for example, tend to be more reliable than many of their competitors, but they are also narrower, and are easier for children from certain cultural backgrounds than for those from others. By having multiple, diverse assessments, educators can guard against the errors of measurement inherent in any one technique.

Second, the model should take into account nonintellective personal variables. If one looks at people who succeed in their professions and in their life, it would be fair to say that *none* of them has succeeded on the basis of intellect alone, or at least, intellect narrowly defined. Motivation, creativity, wisdom, initiative, courage, stamina, and many other variables help differentiate those who have an impact on the world from those who do not. Merely looking at intellective variables will leave one with an incomplete model, no matter how many measures one employs.

Third, the model should take into account contextual variables, such as enculturation and socialization. Children brought up with English as a second language, or brought up in a home that emphasizes obedience above all else, will come to school with a pattern of skills different from children coming from homes that encourage, say, critical and creative thinking. Heath (1983) showed how intelligence can be socialized in different ways in different groups (see also Sternberg & Suben, 1986). In assessing children, their backgrounds should be taken into account.

In sum, there probably is no unique right way to identify children as gifted. There are multiple ways. But good identification procedures take into account the three principles above. Some procedures actually follow none of these principles, assigning children to gifted classes on the basis of a single test, such as an IQ test. We can do better, and given the current state of our knowledge, we must do better if we want to do justice to our children, our schools, and our societies.

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