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GIFTEDNESS AND SCHOOL: NEW ISSUES AND CHALLENGES

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GUEST EDITORIAL

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Simple fairness or justice demands that any society which prides itself on possessing an educational system aimed at enhancing the development of the individual child according to special individual needs and potentials should include fostering the realization of gifts and talents in its goals. Indeed, most countries, regardless of technological development or political orientation, stress the importance of an individually based educational system. Thus, interest in the realization of giftedness is part of the general conviction that all children should be helped to develop in accordance with their special needs and abilities. Special interest in gifted children is thus an integral part of any democratic, humanistic educational system. In addition, however, the promotion of gifts and talents has a more practical side: Many countries see gifted children as an important element in national development, as an aid in the integration of minorities, or as an instrument for the modernization of society. One important task of gifted youngsters in politically and economically less highly developed countries, for instance, is the application of their gifts to the development of society while maintaining national culture and identity. It is quite wrong to conceive gifted education as misappropriating funds which would be better applied in supporting the education of learning disabled children, the handicapped or the disadvantaged. Gifted education is not a competitor with these, but an aspect of the same complex of educational goals and methods.

The aim of this issue is to focus on a number of areas of particular interest in this domain, not to offer a complete overview of all research in the area; space limitations alone prevented this. One central issue is that of what is meant by the term "giftedness" in educational settings, and how educators have reacted to the felt need to make special provision for gifted pupils. Michael Shaughnessy of Eastern New Mexico University (U.S.A.) and his collaborators, Norbert Jausovec (University of Maribor, Yugoslavia) and Kimmo Lehtonen (University of Turku, Finland), as well as Klaus Urban (University of Hanover, Federal Republic of Germany) deal directly with these topics in their chapters. A strong emerging tendency in educational and psychological thinking about giftedness in recent years is the recognition that creativity is an integral part of "true" giftedness, and I have dealt with this in my own chapter.

A second major issue in recent theory and research on giftedness arises from recognition of the fact that not all groups of pupils are equally well served by special provision for the gifted: In particular, it has become apparent that in addition to lower socioeconomic status groups and members of some ethnic minorities, both girls (see the chapter by Rae Boyd of the University of New South Wales, Australia) and handicapped pupils (see the chapter by Carolyn Yewchuk, University of Alberta, Canada) may experience special additional problems when they are also gifted, which call for a special

response from schools. Finally, the question is increasingly being raised of whether gifted children experience personal, social, and psychological difficulties in school which are related to their giftedness, and whether this requires special counseling procedures (see the chapter by Ulrike Stedtnitz, Zurich, Switzerland).

One thing which becomes apparent upon reading the present chapters is that giftedness has been defined by all authors, at least implicitly, as intellectual giftedness. There are only passing references to artistic or sporting gifts, or social or manual gifts. This focus reflects, however, the current conceptualization of giftedness in most school systems, both in North America and elsewhere. Indeed, it is commonplace for procedures for selecting children for special programs for the gifted and talented to rely more or less exclusively on IQ scores, or perhaps some combination of academic achievement and IQ. This whole issue is one which needs to be aired, but the focus of the present chapters accurately reflects the onesidedness of most school practice at present. The present authors draw attention to a second problem, the absence of research in certain areas. As is the case with many educational issues, the area of giftedness suffers from patchiness of research or absence of appropriate investigations; frequently, empirical work consists mainly of descriptions of programs accompanied by ringing phrases. The present chapters offer an accurate reflection of this problem.

In choosing contributors for this issue I applied two criteria: I sought contributions from researchers with whose work I was personally acquainted and who I knew were active in the field of education of the gifted and talented (all contributors have distinguished themselves in this field). Secondly, I wanted to achieve something approaching a worldwide coverage. Consequently, I made vigorous efforts to recruit contributors from Europe, North America and the Antipodes. The aim of both these principles was to transcend purely local discussions. I hope that readers will find the results both of my efforts and of those of contributors rewarding. I am indebted to the authors of the various chapters in this issue, and offer them my sincere thanks.

CHAPTER 1

THE CONCEPT OF GIFTEDNESS

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Abstract

Giftedness has been around for centuries, but its conception has varied across the years. This chapter examines some of the current conceptions of giftedness across a number of dimensions, and attempts to do so both internationally and empirically. Both research and theory in this area are growing at an astounding rate, and the various domains of exceptionality in the realm of giftedness are also increasing. Salient political and social concerns and changes are addressed, and implications for research in the nineties and towards the year 2000 are noted.

Introduction

Supposedly, as a child, the famous existential philosopher Jean Paul Sartre would respond to his grandfather's probing questions with extremely insightful responses. The grandfather would exclaim in astonishment "Voila, un type extraordinaire!" (Richter, 1970). This anecdote typifies the existential encounter, if you will, between the detached observer and the gifted individual. The grandfather in this example had enough perspective and perspicaciousness to discern the young Sartre's prodigiousness. Other encounters may be more public (the wisdom of Solomon) or more private as in the case of Niels Bohr. The domains may be sedentary as in the realm of art, music, writing, poetry or more physical — ballet, track, mime, or leadership. In any event, it is perception of the fact that some people possess abundant skills, talents, gifts, and/or abilities which has led to the conception of giftedness. Initially, such individuals had to prove themselves repeatedly — either in debate in Athens or warfare in Sparta. Objective verifiable evidence was even procured in some instances as in the civil service system in China via early "tests." Contemporary endeavors began with Binet in Paris, although informal giftedness had previously been ascertained via either quantity or quality of artistic production, or verbal proclivity. From the Renaissance onward there

was certainly agreement between and among artisans as to talent/giftedness, yet the nature of this gift was rarely explored. Highly skilled specialists agreed on the "potential," and "ability" of their proteges, yet rarely stopped to examine and explore the nature of or the conception of giftedness. This chapter will attempt to do just that, as well as examining research relevant to the construct.

Conceiving of Giftedness

Earliest conceptions of giftedness inevitably stem from the fact that humans differ and that some are significantly stronger, swifter, smarter, more talented, charismatic or possess "more" of some skill. Recognition from a lesser mortal seems to be necessary, although the recognizer too must be intelligent enough to perceive the significant difference. While the Three Wise Men had divine inspiration, mere mortals must rely on their senses — eyes, ears, etc, — and cognitions to discern giftedness. Gutenberg's printing press led to greater dissemination of information regarding talents, skills and abilities, and began the standardization process. The later development of schools created a showcase where children could demonstrate their abilities, and made it possible for teachers to compare and contrast their charges more easily. These comparisons unfortunately resulted in grades (A, B, C, D) and sadly conceptualized "the gifted" inadequately. There are subtle differences and nuances — even between two "A" students. This variability could be in integration/memory/synthesis, quality or quantity. Variation may be within a subject or between subjects.

Conceptualizing Giftedness as Creativity

Throughout history, highly creative people have been labeled "gifted." The debate rages as to whether these two constructs are separate, disparate domains. The research in this area can basically be attributed to Torrance. His tests and his writings have contributed immeasurably to knowledge in this field: A recent text edited by Glover, Ronning, and Reynolds (1989) was dedicated to him. This volume covers the following issues relative to creativity: (a) psychometric issues, (b) individual differences, (c) cognitive processes, (d) perception, (e) memory, (f) metacognition, (g) personality, (h) psychopathology and a host of other applied domains. The research in the field embodies the central theme of creativity — it is divergent; however, it is also diverse, covering mathematical creativity, musical creativity, artistic creativity and creative leadership, among others. Further, the measurement of this elusive construct has proved problematic. No workable operational definition of creativity has been arrived at that can consistently be empirically tested. Presently there are a number of journals, none of which are providing any leadership in this field, and with the retirement of Torrance there are very few top flight researchers in the field. The difficulty with labeling creativity as an aspect or domain of giftedness is that it focuses excessively on the product, often neglects the process, generally ignores the person and negates the sociocultural environment (for an in depth review and analysis of this domain, see Cropley's chapter in this issue).

The Mathematically Gifted

Recent research on the mathematically gifted has endeavored to specify the salient personological variables relative to mathematical success. Odom and Shaughnessy (1989) have identified relevant personality domains which seem to be related to math success. Their work corroborates that of Weiss, Haier, and Keating (1973) who utilized a different personality instrument. Odom and Shaughnessy administered the 16PF to students in Advanced Placement Classes. These mathematically precocious young people were found to be assertive, dominant, and in general, solid, competent, fairly well adjusted people. The females showed more self-assurance, were more opinionated, and were more adventurous and spontaneous.

The Verbally Gifted

McGinn, Viernstein, and Hogan (1980) have conducted research on enhancing the verbal skills of very bright adolescents. Utilizing the verbal part of the SAT, McGinn and his associates used a productive thinking program and creative writing in social sciences to enhance verbal skills. Significant gains in verbal intelligence scores were noted. Measures of creativity also showed enhancement. Some reservations about the results were noted — lack of a control group; contact with other gifted individuals may also contribute to gain — and lastly economic concerns were noted. Obviously, enrichment programs cost a great deal, and the return on the investment will always be discussed and should be investigated empirically.

Giftedness as Intelligence

The teacher who is confronted with a straight "A" student who is at the 99th percentile on standardized tests differs greatly from the instructor at the Sorbonne who is teaching a Wagner composition to a gifted pianist. In one case, skills are equally distributed among many academic subjects. In the other, the musical prodigy is manifesting a different proclivity — exceptional talent in one area. Humphreys (1985) focused on the centrality of intelligence and linked it to giftedness in terms of occupation, education level, and learning. Gardner (1983) published the theory of "multiple intelligences" and provided both anecdotal and other material to support his view that there are not one but seven separate distinct "intelligences." These are musical, bodily-kinesthetic, logical, mathematical, linguistic, spatial, and intra- and interpersonal intelligence. This perspective has been reviewed by Shaughnessy (1988) and found relevant to creativity too. Yet a test must be developed for each area and greater statistical support is needed to substantiate this theory. Sternberg (1985) also reconceptualized intelligence and carried out research on "insight" as a particularly salient element of giftedness. His triarchic theory of intelligence posits three major aspects to intelligence: a componential, an experiential and a contextual.

While most clinicians utilize an IQ of 130 or above to classify students as gifted, other divergent approaches have been advocated. Shaughnessy and Jones (1983) reviewed

factor analytic studies applying the WISC-R with gifted children. There appear to be three, not two factors tapped or measured by the WISC-R. These are Verbal Comprehension, Perceptual Organization, and Freedom from Distractibility. However, using these scores instead of Wechsler's Verbal-Performance dichotomy has not "caught on". In lieu of IQ scores, studying the cognitive structures of the gifted (Shaughnessy, 1990) appears to be a promising alternative.

Metacognition and Problem Solving

Gifted students are generally conceded to be better problem solvers than average students. This could be due to superior metacognition. This term refers to "knowledge and cognition about cognitive phenomena" (Flavell, 1979, p. 906): Knowledge of general cognitive strategies along with ways of monitoring, evaluating, and regulating them, and beliefs about factors that affect cognitive strategies. While this definition is extremely broad, it refers more narrowly to monitoring one's own cognitive processes and the influences on them, while focusing on a specific task (Kitchener, 1983).

Metacognition seems to be an essential aspect of cognition which can affect problem solving (Doerner, 1974; 1979; 1983), but research has not yet provided the necessary answers. The main problem is the assessment of metacognition while subjects are solving problems. The "thinking aloud" method, where respondents are asked to verbalize their thoughts, is often used, but this approach has its limitations. In his study of the processes involved in solving logic problems, Doerner (1974) identified only 10 statements of respondents which could be classified as metacomponents. The frequency of metacognitive statements was also low in the research of Jausovec (1988), who investigated well- and ill-defined literature problems. While both studies showed that the quantity of overt metacognitive statements relates positively to problem solving, it is difficult to draw conclusions about this relationship because of the scarcity of statements labeled as metacomponents. Furthermore, the two studies focused only on a quantitative analysis of metacognition, neglecting the qualitative aspects. The research of Simon and Simon (1978) also indicates that experts give fewer metacognitive statements than novices, the explanation being a more automatic process among the experts (in line with Sternberg's idea of automaticity).

Schoenfeld (1985) described some of the strategic mistakes of college students engaged in mathematics problem solving as failures of goal setting, monitoring, and plan evaluation (the essence of metacognitive proficiency). The majority of students (nongifted) simply embark on a course of action that can be described as "read a problem, pick a direction and then work on it until you have run out of time" (Schoenfeld, 1985, p. 366). Experts, by contrast, have metacognitive knowledge that leads them to pose and answer three kinds of question: (a) What (precisely) are you doing? (b) What is the reason for doing it? (c) How will the result be used later in the solution?

Recently Metcalfe (1986a; 1986b), and Metcalfe and Wiebe (1987) introduced a different method for investigating metacognition during problem solving. The strategy asks the subjects to give judgements about how close they feel to the solution of problems, called "feeling-of-warmth" (FOW) judgements, repeatedly during the

course of problem solving. These judgements are called "warmth" judgements after the children's searching game, in which one child hides an object, then directs others to the object via statements that they are getting warmer — closer — to the object, or colder — farther away. Metcalfe (1986b) used this procedure to examine the subjective phenomenology of different problems. She showed that patterns of warmth ratings differed for insight vs. noninsight problems (the latter showed a more incremental pattern in the course of their solution than the former). In another study Metcalfe (1986a) hypothesized that able problem solvers — due to their greater ability to estimate their closeness to a solution and use this to determine the next step in the cognitive activity — would differ in their FOW patterns when solving different problem types. Conversely, poorer problem solvers, being less sensitive to the potential effectiveness of their problem solving approach, would not differ in FOW ratings when solving different problem types. Three experiments were conducted relative to this notion. In Experiment 1, warmth ratings of successful and unsuccessful solvers of different well defined and insight problems were compared. In Experiment 2, ill defined problems with goal characteristics which were not so rigorously defined were used. The third experiment further investigated the relationship between metacognition and problem solving, but utilized the FOW ratings in combination with the "thinking aloud methodology."

The results of these three experiments showed that more capable problem solvers differed in their FOW ratings when solving different problem types, whereas poorer problem solvers showed no such differences in FOW ratings. Similar results were obtained in the third experiment, where the thinking aloud approach was combined with FOW ratings. Able problem solvers seem to have a higher ability to estimate their closeness to the solution, and they use this in deciding the next steps in cognitive activity. Capable students, as shown in experiment three, seem to know much more about general cognitive strategies — how and when to apply them — than less capable individuals. Gifted instruction should thus explicitly be designed to assist students in acquiring metacognitive knowledge of how to plan their problem solving efforts, how to set goals and subgoals for their efforts, and how to monitor their progress towards their goals. Future research should explore the development of these metacognitive strategies and the differences (if any) between truly gifted students and above average students.

The "Aha" Experience

The gifted person, for some reason, sees, perceives, notes or ascertains some solution or essential element that the average person does not. Sternberg and Davidson (1983), and Davidson and Sternberg (1984) conducted research regarding the basic elements of this phenomenon of "insight." It seems to have three elements: selective encoding, selective combination, and selective comparison. As hypothesized, more intelligent subjects did better on "insight" problems than average students. As predicted, gifted children "spontaneously select and apply relevant information from insight problems" (Davidson, 1986, p. 219). In another study it was found that gifted students again "spontaneously combine and integrate" relevant data to solve problems. The application of relevant examples also differentiated gifted from average students. Other experiments were conducted which elaborated on the interaction of intellectual level, condition and

type of problem. The problems tapped "the ability to deal with novelty or to automatize information processing effectively" (Sternberg & Davidson, 1985, p. 42). The concept of insight can be understood in terms of Sternberg's triarchic theory of intelligence (1985).

Emotive Alignment

Many gifted people have an evocative love for their field of study. They are "seized" by an instrument, the pleasure of drawing, composing, or by a "thing" of interest (initially mollusks in the case of Piaget). This "emotive alignment" (Shaughnessy, 1989a) has been seen in many giants of the Renaissance and in varying fields. Basically, it is a blending/meshing of innate potential with a field of endeavor which is receptive to the particular skills and abilities of that individual. Walters and Gardner (1986) called this phenomenon "the crystallizing experience" during which talented persons "discover" their gift. Studying famous musicians, exemplary mathematicians (Gauss, Galois, Von Neumann), and artists (Cezanne, Renoir, Klee, Miro), they found that "crystallizing experiences" dominated in music and prodigious achievement in mathematics, but were less clear in the visual arts. Feldman (1986) investigated many cases of prodigiousness, reporting on family, social, school and other influences on the growth and development of the prodigy, and reported similar evocative discoveries.

Motivational Issues

While there are a great many gifted people, only a small number of these achieve recognition. Motivation, persistence, and interest apparently play a major role in achievement. Sternberg (1985) has given 20 reasons why able people do not always do well. Many of these reasons may be subsumed under the construct of "practical intelligence" (Sternberg & Wagner, 1986). Basically, the teacher in the classroom does not always know what to do with children who do not know what to do with what they have. Renzulli (1986) has offered a "three ring" conception which encompasses three domains, i.e., above average ability, task commitment and creativity. These three areas will obviously affect success in both global general areas and also in specific domains or subspecialities. While it is all well and good to theorize about motivational elements, the question of which specific motivators work in which subject areas with what type of gifted child is still open. Shaughnessy (1989b) has comprehensively reviewed in a meta-analysis the theoretical perspectives salient to motivating the gifted child. No research exists on the application of differing motivational strategies (e.g., reinforcement, disequilibration) to gifted children in different areas (e.g., math, science).

Giftedness in Anomolous Situations

There are many gifted people who are ignored. Perhaps it is difficult to conceptualize, for instance, a blind person as "intellectually gifted." Whitmore and Maker (1985) have endeavored to clarify issues in the field of the "gifted handicapped" student. Obviously,

many people have stereotypic expectations, while in other cases, developmental delays inhibit recognition of gifts in handicapped students. Case studies often do not include complete data, while in other cases many blind or deaf or otherwise handicapped students simply have no avenues to channel or direct their outstanding mental skills or abilities. Whitmore and Maker (1985) reviewed research on the field of intellectual giftedness in people with various handicapping conditions (e.g., hearing/visual impairment, physical impairments, learning disabilities) and included commentaries by specialists in these fields. They discussed both the affective needs and the intellectual needs of gifted children with disabilities. Basically, it is hard for the general public to conceptualize a quadriplegic or a dyslexic person as gifted. Case studies exemplify the problem of conceptualization, both personologically and clinically in terms of diagnosis. Obviously, interactions between the disability (either physical or learning) and giftedness yield complex results. Further, there are probably other disabilities (e.g., emotional problems) which Whitmore and Maker have not addressed. True commitment to the gifted requires extensive research on identification, conceptualization and education of the disabled person with giftedness.

Conceptualization in Different Countries

Marjoram and Nelson (1985) of Great Britain have written on the mathematically gifted. Drawing upon the work of the Russian psychologist Krutetskii, they described the Chelsea College studies and reviewed the ways in which mathematically gifted children differ from average children, going on to discuss identification strategies. Grubar (1985) of France conducted research on a most divergent element of giftedness — sleep. Apparently there is a relationship between sleep and mental efficiency. Obviously this is problematic from a conceptualization standpoint, but in the light of recent advances in biochemistry and physiology this research should be reviewed. While much research has been carried out on the sleep of the mentally retarded, Grubar compared 5 gifted children (IQs from 142–171) to 17 normal youngsters (mean IQ of 104). Twenty three sleep parameters were compared. Significant differences were found in sleep indices and in REM (rapid eye movement) sleep indices. The course of sleep, division into stages/cycles, was seen to be different. Gifted children spend more time in REM sleep, have more REM sleep phases and spend more time in undifferentiated sleep. Giftedness is clearly associated with special sleep patterns. Grubar cautioned, however, that the environment must be stimulating and educating in order to maximize brain plasticity.

Zi-Xiu (1985) showed that China's commitment to "supernormal" children has also contributed to the development of ordinary children. In a year long research study, five characteristics of the "supernormal" child emerged: strong cognitive interests and intellectual curiosity, concentrated attention and good memory, keen perception and power of observation, quick thinking, good comprehension and creativity, and confidence, competitiveness and persistence. A postscript indicated the importance of the child's personality characteristics and the home environment.

Butler-Por (1985) has discussed gifted children in three Israeli cultures: Kibbutz children; Arab children, culturally disadvantaged; gifted and normal middle class children. In different cultures, children are obviously socialized differently. Cultural

factors were seen to affect development, and described and practised values were often incongruous. Obviously, imperative values relative to giftedness place a high importance on learning, achievement, and the future ability to differentiate gratification. How to socialize these values into all cultures and socioeconomic groups remains problematic.

Giftedness and its conceptualization may vary as a result of the educational system and philosophy, political orientation or social structure. In the Scandinavian countries, giftedness has been a kind of taboo. The educational system there is strongly based on the idea of equal opportunities for everyone. This is perhaps the main reason why there is little empirical research/data/discussion about giftedness in Scandinavia. Further, it is very difficult to procure funds for experimental studies of giftedness in Finland, Sweden, Norway and Denmark. There is, sadly, fear of elitism. There has been a great deal of political debate about giftedness and the role of gifted pupils in the Scandinavian educational system. Politics have been blamed for the mishandling and misunderstanding of pupils with special gifts. The Scandinavian systems have often been accused of making different kinds of pupils equally "flat" by placing everyone in the same mold. Politicians on the right usually want to establish special schools for the exceptionally gifted, while the politicians on the left usually indicate that there is no need for such schools. This perspective tends to permeate the Scandinavian countries.

In the main Scandinavian journals of pedagogy and teaching there are very few articles or studies about "giftedness." Instead, the literature abounds with articles about cognitive therapy, special methods for low achievers and the provision of democratic opportunities. The main trend, however, in Scandinavian studies of giftedness has often been attempts to estimate the relationship between social status and intelligence or giftedness. Kuusinen (1985) investigated the effects of sex, social status and intelligence on entry to upper secondary level education. Essentially, the results of this study showed that IQ, sex and socioeconomic status were strongly related to access to higher education. For both sexes, the influence of social class on entry to upper secondary school was stronger than the effect of intelligence. Presently in Scandinavia there is much discussion regarding the reproductive effects of the schooling system on social stratification. Much of the literature indicates that "giftedness," "special gifts" or "high intelligence" are each very strongly related to the social status or educational level of the parents.

According to the "doctrine" of Scandinavian comprehensive education, gifted pupils do not exist in the schools. Nonetheless, there is a small group of studies and articles in Scandinavia about pupils with specific gifts and very narrow special fields of education. For example, Koivimaki (1988) investigated the process of selecting athletically gifted youngsters for ice hockey training. Koskinen and Hedegaard (1987) studied specific learning problems of bright children in language learning classes. There are articles which reflect special methodologies for gifted pupils such as project teaching, team teaching and independent reports and studies, but these are few and far between, and usually describe very narrow teaching experiments.

Research Needs, Research Agenda, Research Problems

Fortunately, there is a solid foundation upon which to build knowledge about the gifted into the year 2000. Horowitz and O'Brien (1985) edited a 14 chapter

text regarding the gifted from a developmental perspective. Sternberg and Davidson (1986) have provided salient insights into the conceptualization of giftedness via their eighteen chapter, comprehensive overview of implicit/explicit theoretical approaches both cognitive, developmental, and domain specific. Freeman (1985) has offered a multidisciplinary, international, research oriented approach. The gifted with physical handicaps and their needs and gifts have been well reviewed in the text by Whitmore and Maker (1985). The creatively gifted have been investigated in the *Handbook of Creativity* edited by Glover, Ronning and Reynolds (1989).

There are two sides to this coin — theory and research. At present the coin is top heavy in emphasizing theory. There is too little testing of theory and too little testing of models. Gardner's conceptualization of multiple intelligences (1983) is an interesting idea, but an appropriate follow up would have been a test based on his theory. Sternberg has promised a test based on his triarchic theory (1988). In the meantime, theoreticians should press on with more comprehensive, standardized approaches to research, not only on the gifted but on gifted education and the social and personality factors that contribute to the expression of giftedness. In addition, more comprehensive longitudinal follow up work must be done from the moment a child enters school to graduation from high school or college. With comprehensive data bases and more sophisticated testing instruments it will be possible to monitor more accurately the growth and progress of all children. This information can and should be shared via computer networks and various world conferences and conventions.

Academic freedom obviously requires that varying forms of research be allowed (interviews, correlational and case studies, observations, biographies), yet with the advent of statistical packages and desk top computers more rigorous, advanced multivariate methods can and should be utilized. More vigorous, radical lobbying should take place to procure more funding for gifted education and its evaluation. The personality, teaching style, and interpersonal style of gifted teachers should be explored, as well as the learning style and cognitive structures of the gifted student.

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CHAPTER 2

CREATIVITY AS AN ELEMENT OF GIFTEDNESS

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Abstract

A high IQ alone does not provide a satisfactory explanation of gifted achievement. "True" giftedness requires originality, persistence, and the ability to communicate results to other people, among other factors. This means that not only those psychological factors which are known to be related to intelligence in the conventional sense are necessary for gifted achievement, but also those usually associated with creativity. The interaction between intelligence and creativity has been described in various ways: as conceptualized here it involves not only ability but also personal factors, motivation and social factors, all acting together. Fostering creativity, and thus promoting giftedness, requires a comprehensive approach in all these areas not just, for instance, training in divergent thinking. This involves incorporating parents into programs, as well as necessitating special training for teachers.

Introduction

The "Sputnik shock" of the late 1950s led to a period of national soulsearching in the U.S.A., and to the conclusion that the country's educational system had failed because of its lack of emphasis on creativity, especially in scientific fields. The wave of creativity research which followed set the stage for intense interest in the topic on a worldwide basis; as Urban (1990) emphasized, European research — which was conducted mainly in Great Britain, Federal Republic of Germany, Holland and Italy — was dominated by questions and methods originating in the United States. By the early 1970s this initial surge of interest had largely died away. One result, as Simonton (1988) pointed out, is that despite strong beginnings (e.g., Maslow, 1966), no adequate psychology of scientific creativity has been formulated as yet. The late 1970s saw the emergence of a second wave of research — which is still continuing — once again largely set in motion by renewed interest in fostering giftedness.

Research Approaches

A frequent research approach has defined creativity in terms of creative products, and studied it by means of retrospective case studies of famous creative achievers in

the arts and sciences (e.g., Cox, 1926; Hadamard, 1945; Lehman, 1953). More recently, unusually creative specialists still active in various areas — for instance architecture — have been identified by asking colleagues or experts to nominate particularly creative members of their specialization. Subsequently, the persons nominated have been studied, sometimes very intensively, usually by means of some combination of interviews, self-descriptions, tests, observation during the solving of problems, and analysis of published works or other achievements. Typical studies are those of Roe (1952) with scientists and mathematicians, MacKinnon (1983) with architects, Helson (1983) with female mathematicians and Drevdahl and Cattell (1958) with artists and writers. These studies all concentrated heavily on the role of personality in creativity. Gardner (1988) discussed the advantages of the case study method in identifying giftedness and called for "cognitive case studies". An example of what this might involve is to be found in Hendrickson's (1986) longitudinal studies (although they did not confine themselves to the cognitive area) of four gifted Australian violinists who were followed over a period of several years, beginning at about the time their unusual talent was discovered in childhood and continuing until they became accomplished or even world famous adult players.

Also relatively common are self-report studies in which famous creators have described the process through which their achievements occurred. Simonton (1988) pointed out that the investigators in such studies sometimes (in his opinion frequently) twist the contents of self-reports to make them conform to preconceived models, rather than allowing the models to emerge from the materials. Weisberg (1986) raised further doubts about the value of self-reports by drawing attention to discrepancies between objective facts and the claims of some subjects. He concluded, for instance, that neither the stage of "incubation" described by Wallas (1926) nor the almost mystical "aha experience" described by many famous creative people exists.

Studies based on psychological tests usually define creativity as a score on a so-called "creativity" test, and then examine correlations with other scores (e.g., IQs, scores on personality tests, etc) or with school grades, scores on rating scales, and the like. Studies of this kind predominate in education. Less common are longitudinal studies, although several such investigations of creativity test scores and school achievement/out of school achievement exist (Cropley, 1972; Howieson, 1981; Torrance, 1980; Wallach & Wing, 1969). Among the approaches which have been applied in experimental studies are storytelling (Hennessey & Amabile, 1988), construction of thinking aloud protocols (Clement, 1989), tachistoscopic exposure of stimuli (Smith & Carlsson, 1989), and manipulation of visual imagery (Rothenberg, 1988). In the last example, subjects were asked to construct a new poetic metaphor under differing conditions: for instance during exposure to slides depicting "poetic" themes either singly (simple stimulus), or superimposed on each other (complex stimulus).

An outstanding example of an eclectic approach is Rothenberg's (1983) study of what he called "janusian" thinking. His subjects were 12 Nobel prizewinning scientists, 18 schizophrenic patients and 113 college students, divided on the basis of test scores into high and low creative groups. Thinking style was measured by means of timed word association tests. He showed that the scientists and the highly creative students resembled each other cognitively but differed from the noncreatives. This was also true of the schizophrenics. However, the creative individuals did not show thinking processes similar to those of schizophrenics. As a result it could be concluded that creativity is

related to atypical ways of thinking, but these are not the same as the aberrational thinking of psychotics.

Creativity and Giftedness

In retrospect, it is apparent that, from the very beginning of the wave of interest in the late 1950s and early 1960s, creativity was seen as an element in high academic achievement. The purpose of the initial education act on creativity in the United States was production of scientists and engineers capable of matching the achievements of their counterparts in the Soviet Union. Studies such as Gibson and Light's (1967) investigation of scientists at Cambridge University which showed that many of them had IQs under 130, the traditional cutoff point for identifying giftedness, indicated that intelligence alone was not sufficient. Bayer and Folger (1966) reported similar findings for the United States. More recently, Facaoaru (1985) showed that Romanian engineers regarded as unusually capable in a demanding practical activity did not differ from the less capable in IQ scores. In a major review of research on IQ and creativity, Milgram (1990) showed that, despite occasional findings to the contrary, IQs and similar scores do not correlate with real life creativity. Apparently, gifted achievement demands more.

Nonetheless, a recent review of research findings by Humphreys (1985) confirmed that IQ scores are the best single predictor of academic achievement over the whole range of ability. Furthermore, a mass of studies, mostly in North America, beginning in the 1950s, showed low correlations between school achievement and creativity test scores (see Torrance, 1962, 1963, for examples). In the United Kingdom Haddon and Lytton (1968) reported similar findings, while in the Federal Republic of Germany and Switzerland, Krause (1972, 1977) showed, for instance, that correlations between creativity scores and grades were as low as .09 (Phys. Ed.) or .15 (Art). In a longitudinal study from the 7th to the 11th grade in West Germany, Sierwald (1989) reported similar findings: not only was the correlation between creativity test scores and school marks actually negative in the case of Physics (−.12), but it did not rise above .26 even for Art!

Nonetheless, although creativity test scores alone account for little of the variance of school marks, it became apparent even in early studies that some kind of combination of "creativity" and "intelligence" is favorable for outstanding achievement. Wallach and Kogan (1965) looked at children high on both abilities and those low on both, while in studies of both schoolchildren in Canada (Cropley, 1967a) and also university students in Australia (Cropley, 1967b) I showed that, although the highly intelligent–low creative subjects obtained good marks, they were consistently outstripped by students high on both characteristics. This superiority of achievement among people combining conventional intelligence and creativity became more pronounced as the level of education increased (i.e., from Grade 7 to first year university to final year university to honours level studies). In Sierwald's (1989) longitudinal study in the Federal Republic of Germany, pupils of very high intelligence but without corresponding creativity surpassed those merely high on creativity, but in all other cases those higher on creativity achieved better. As Facaoaru showed in the study already cited, gifted achievement depends on a combination of conventional abilities (good memory, logical thinking, knowledge of facts, accuracy, etc) and creative abilities (generating

ideas, recognizing alternative possibilities, seeing unexpected combinations, having the courage to try the unusual, and so on). This combination defines what I called "true giftedness" (Cropley, 1981). Despite discouraging findings in early longitudinal research (Cropley 1972; Wallach & Wing, 1969), Barron and Harrington (1981) cited no fewer than 70 studies which demonstrated a significant relationship between creativity scores and real life achievement. Nonetheless, studies in Canada (McLeod & Kluckmann, 1985), U.S.A. (Yarborough & Johnson 1983), and Australia (Braggett, 1985) showed that IQ scores alone still form the basis of identification of the gifted in most school administrations.

The Psychological Components of Creativity

Cognitive Elements

The initial impulse in modern times in this area came from the work of Guilford. Early theorizing adopted a relatively undifferentiated approach (intelligence = convergent thinking, creativity = divergent thinking), but this has since been expanded by a number of authors. Torrance and Hall (1980), for instance, concluded that creativity involves:

1. uniting disparate ideas by putting them into a common context;
2. being able to imagine, at least as a theoretical possibility, almost anything;
3. enriching one's own thinking through the application of fantasy;
4. adding spice to ones thinking through the use of humor.

Neçka's (1986) "triad" model of creativity went beyond a purely cognitive position. Nonetheless, the cognitive elements are of great importance; they involve original, inventive, effective thinking strategies, which are a prerequisite for actual creative behavior in real life settings, although not by themselves sufficient. These are essential tactics for processing information, and include:

1. forming associations;
2. recognizing similarities;
3. constructing metaphors;
4. carrying out transformations;
5. selectively directing the focus of attention;
6. seeing the abstract aspects of the concrete.

Simonton (1988) advanced what he called the "chance-configuration" model of genius; his approach can, however, be applied to creativity. Simonton concluded — somewhat adapted for present purposes — that creativity involves production of a large number of associations, more or less randomly or blindly, and the chance occurrence of "configurations" — happy combinations which represent just what is needed to solve the problem in question. The creative person is especially good not only at producing associations, but also at recognizing that a configuration has occurred, and grasping that it offers a solution. Weisberg (1986) examined self-reports and case studies of famous creators and combined this information with data obtained in experimental studies. He concluded that creativity arises not from random combinations, but from "chains" of ideas connected associatively in a long series of strictly logical small steps, for which knowledge of the field is vital.

The Soviet psychologist Altshuller (1984) criticized the random variation or chain

of ideas approaches to creativity, arguing that running through large numbers of configurations would involve too many "empty" trials. Some mechanism is needed for presorting the infinitely large number of associations which would arise if all possible permutations and combinations were treated as equally deserving; most must be rejected in advance. Sternberg's (e.g., 1985) "metacognitive" approach argues that such mechanisms do exist, and shows what they might be like — rules for distinguishing in advance blind alleys from promising approaches, for choosing between competing lines of attack, for evaluating emerging solutions and deciding the best way to continue, and the like. In China, Zha (1986) showed that gifted children possessed highly effective tactics for searching for information in the memory store. Research in the former German Democratic Republic (Klix, 1983) demonstrated the importance in gifted achievement of, among other factors, "preorganizing" of information.

The Role of Motivation

Cognitive processes alone do not offer an adequate explanation of creativity. Studies of famous gifted individuals of the past have confirmed that, among other things, motivation plays an important role. For instance, Cox's (1926) retrospective studies of geniuses of the past such as Newton, Copernicus, Gallileo, Keppler, and Darwin showed clearly that in addition to high intelligence these people were marked by tenacity and perseverance. In a similar vein, Biermann (1985) concluded, on the basis of a study of creative mathematicians of the 17th to 19th centuries, that fascination with the subject matter and consequent extreme motivation was one of the major features of his subjects. Hassenstein (1988) also commented on the obsessive nature of the work of gifted individuals, while Goertzel, Goertzel, and Goertzel (1978) showed the importance of motivation in their case studies of historical figures. Feldman (1979), in a study of prodigious achievement in children, concluded that "passion" was perhaps their outstanding characteristic. Stanley (1984) linked motivation to gifted behavior in the classroom by referring to the "academic hunger" of outstandingly able mathematics students. Zha's (1986) exceptionally able pupils in China showed not only creativity, but also curiosity and persistence, on the one hand, self-confidence, on the other. According to Amabile (1983), the crucial element in motivation for creative behavior is that the drive or urge must come from within (intrinsic motivation) and cannot be imposed from without (extrinsic motivation). In fact, she reported studies showing that extrinsic motivation tended to inhibit school children's creativity.

Personality

One of the early findings in studies of creative mathematicians, scientists, architects, painters and writers already mentioned was that these people seemed to possess special personality characteristics which set them off from less creative colleagues: flexibility, sensitivity, tolerance, sense of responsibility, empathy, independence, positive self-image. Heinelt (1974) studied schoolchildren identified on the basis of test scores as highly creative, and came to the conclusion that they were, significantly more frequently

than uncreative youngsters, introverted, self-willed, intellectually active, flexible and possessed of wit and a sense of humor. Reviewing a substantial number of studies in this area, Farisha (1978) concluded that a relationship between personality and creativity is one of the most consistently emphasized findings in the literature.

Social Factors

Related to studies of personality and creativity are investigations emphasizing interactions with other people, i.e., social factors. Heinelt's (1974) study showed, for instance, that schoolchildren identified as creative tended to remain aloof from their classmates and preferred to work independently. They were often socially isolated and unpopular, and this phenomenon was associated with a tendency to feel superior to their classmates or even to be arrogant. Other studies (e.g., Neff, 1975) showed that creative youngsters are often uninterested in making a good impression on others or in conforming. As Cropley (1973) pointed out, being creative involves thinking or behaving differently from others (otherwise the element of originality would be missing). Consequently, creative individuals must display "the courage to create" (Motamedi, 1982): they must risk the censure and rejection often associated with failure to conform. Anderson and Cropley (1966) studied the reactions of schoolchildren in situations where a number of alternative courses of action were possible, and concluded that the children were guided by social "stop rules" which forbid most reactions in favor of the socially approved one. Societies have "filters" (Fromm, 1980) through which not only behaviors but also ideas must pass, and carry out constant "surveillance" (Amabile, Goldfarb, & Brackfield, 1990) in order to detect and deter deviance.

The Interaction of Creativity and Intelligence

Probably the best known attempt to depict the interaction of creativity and high conventional intelligence in giftedness is Renzulli's (1977) "three ring" model: he depicted intelligence, creativity and "task commitment" as three overlapping circles, each of the constituent elements defining a necessary but not sufficient condition for giftedness. The area in which all three circles overlap defines giftedness. The three ring model has been extended by Mönks, van Boxtal, Roelofs, and Sanders (1986), a group of Dutch researchers, who included a fourth dimension, the social environment. They showed, for instance, that underachieving gifted youngsters had a negative self-concept. A further extension of this model is to be seen in the results of an investigation carried out in Finland (Ruth & Birren, 1985). By taking the unusual step of including elderly people in a cross sectional study of creativity at various age levels, these authors were able to demonstrate the importance of biological factors in creativity, especially those affecting speed of information processing and memory. Adapting their findings for the present purposes, it can be said that they showed that giftedness requires a rich store of information to which there is free and rapid access (usually regarded as an essential characteristic of conventional intelligence), allied with the capacity to find novel ideas, and willingness to express them (usually thought of as creativity).

High Intelligence as a Prerequisite for Creativity

The question which now arises is that of how creativity and intelligence interact to produce giftedness. An early approach was that of MacKinnon (1962), who proposed the threshold theory. In essence, this argues that a certain minimum level (threshold) of intelligence is necessary before creativity is possible. Bringing out a different aspect of the same idea, McNemar (1964) pointed out that high IQ is no guarantee of creativity, but a low IQ means that it is impossible. Torrance (1966), among others, reported that the correlation of creativity scores with IQ was 0.50 for children with IQ scores below 120, but only 0.20 for children with IQs above 120. Guilford and Christensen (1973) took a somewhat different position, suggesting that there is a "one way relationship" between creative potential and intelligence, i.e., an IQ test provides an indicator of the upper limit for performance, but does not indicate the likelihood of creativity. Their interpretation is based on the argument that IQ indicates the extent to which an individual possesses relevant information and can call it out of storage upon demand. If a person does not have access to information, there is nothing to be retrieved and divergently processed. A more dynamic interpretation along similar lines is to regard the individual as a communication channel. Channel capacity, in the sense of an upper limit on the number of "bits" of information that can be assimilated, is intuitively compatible with the concept of intelligence, while the versatility and extent to which an individual can manipulate, reorganize and recombine those "bits" is compatible with the notion of originality, creativity, or divergent productive thinking.

In an early study (Cropley, 1967a), I showed that children scoring highly on creativity tests employed much wider categories in coding data, and concluded (Cropley, 1982) that creativity involves breaking the barriers of what is known and accepted, and bursting through into new territory. Torrance and Hall (1980) also wrote of the need to "transcend the boundaries" in order to think creatively. However, in order to do this it is first necessary to know where the barriers or boundaries are. It is also extremely helpful to know what attempts have already been made to break through, and where and why they were successful or unsuccessful. Thus, it is necessary to be well supplied with facts, and to acquire facts requires convergent thinking activities. To take a concrete example, it is a fine thing to be able to turn a creative or witty phrase in a foreign language — to find the "bon mot" — but it is first necessary to learn thousands of words in that language.

Creativity as a "Style" for Applying Intelligence

Of particular interest in this context is the conceptualization of creativity as a *qualitative* aspect of mental functioning: over 20 years ago, on the basis of data showing substantial correlations between creativity test scores and IQ scores, as well as between "creativity" and "intelligence" factors, I described creativity as a "style" for applying intelligence, rather than as a separate ability (Cropley, 1969); more recently, Gardner (1983) referred to creativity as the highest *form of application* of intelligence, and Runco and Albert (1986) defined it as *intelligence in action*. Horn (1988) distinguished between two basic styles of reacting to novelty, the one involving avoidance, the other attraction.

In essence, the "style" approach argues that people may deal with situations requiring intelligence either by trying to reapply the already learned, concentrating on proven tactics, and relating the new situation to the familiar, or by searching for the novel, backing intuitions, taking a chance, and so on. For brevity's sake, I will call the first kind of tactic "convergent", and the second "divergent". In real life these are obviously stereotypes, as few people function permanently at the one or other extreme, most tending towards a greater or lesser degree of divergence/convergence according to the particular situation in question.

A Model of "True" Giftedness

Common to the arguments reviewed up to this point is rejection of the idea that creativity and intelligence are separate dimensions of intellectual functioning which may even compete with each other. By contrast, what is emphasized is the view that "true" giftedness involves an interaction between divergent processes and convergent — between knowledge and novelty. In addition, however, it is apparent that divergent ways of applying intelligence require more than cognitive skills. The motivational, personal and social differences between highly and less creative people have already been discussed. Actual creative behavior requires a combination of properties in the various psychological domains.

This interaction seems to me to have the following form: As a result of convergent thinking (knowledge acquisition, development of skills), human beings possess a range of what Simonton (1988) called "mental elements". When confronted with a situation which demands mental action (problem solving in the broadest sense of the term), the individual works through the available mental elements, selecting or discarding, bringing them into juxtaposition, etc, until a "configuration" (see earlier discussions) occurs: this configuration could involve an idea, a model, an action, a way of arranging words, musical notes, shapes or forms, and so on. Convergent thinking offers a wide range of elements, and divergent thinking makes it possible to combine them in ways which are remote and unexpected and increase the chance that others will regard the product as creative. However, construction of divergent configurations requires not merely divergent and convergent thinking, but also motivation (for instance a drive to produce better solutions), appropriate personal characteristics (e.g., openness for the new), social elements (willingness to be nonconforming), and communication skills. This model of gifted achievement is shown in Figure 1.

Fostering "True" Giftedness

One aspect of the rise in interest in creativity as an integral element of giftedness has been research on getting people to be more creative. One early training procedure was that of Maltzman, Simon, Raskin, and Licht (1960), in which subjects were simply required to think up unusual associations to stimulus words. Maltzman reported that the procedure led to increases in originality after only a few minutes' training, which persisted over long periods of time. Glover and Gary (1976) reported increasing creativity by means of conditioning, a finding which was supported in Italy, where

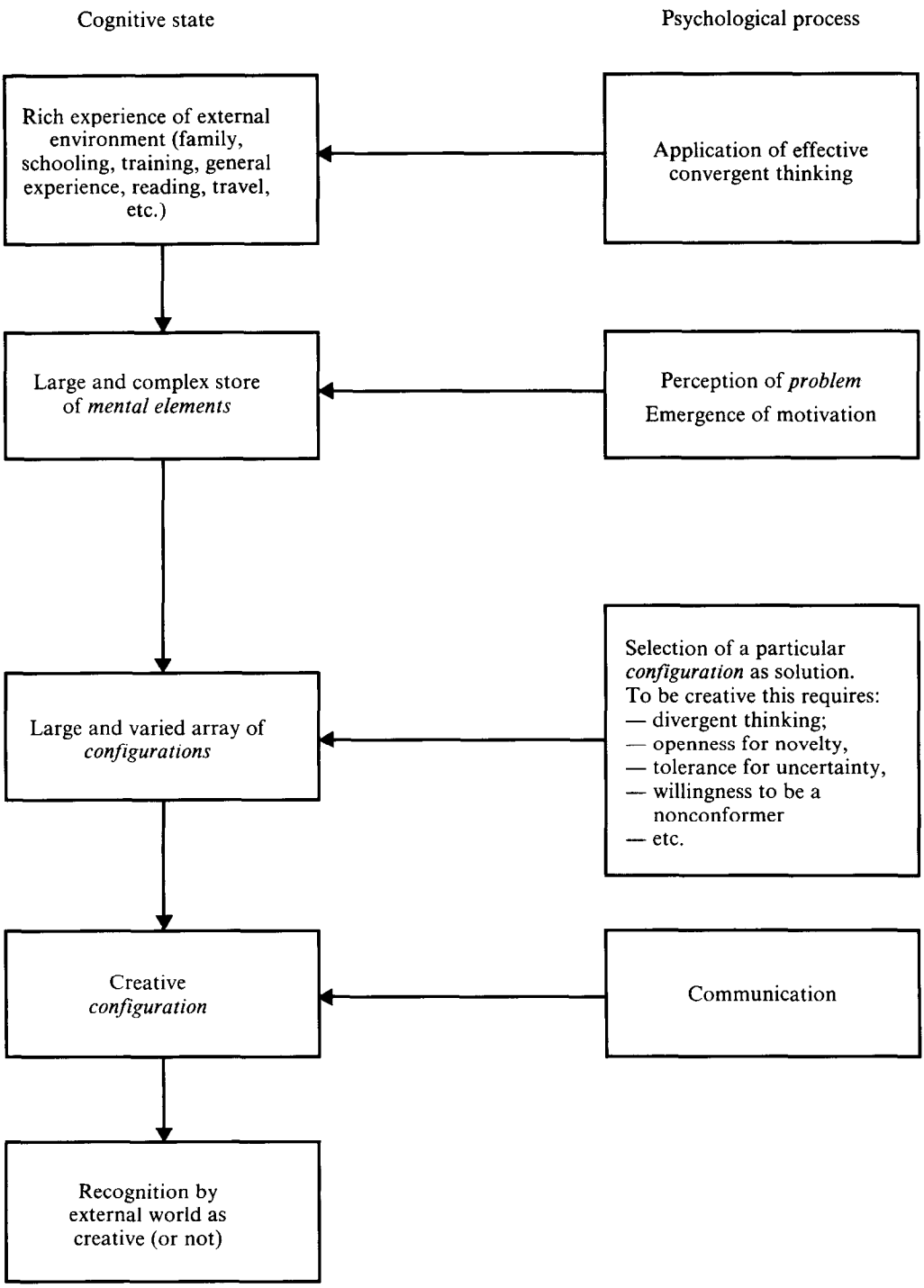

Figure 1. The process of achieving creative solutions.

Cecere and Meazzini (1984) reported that simple reinforcement of divergent thinking led to an increase in this kind of activity. Firestien and McCowan (1988) trained small groups in problem solving and reported that they were better on participation, acceptance of other people's ideas, supportiveness for new ideas, humor and quality of ideas. Other simple procedures which have been reported to increase creativity include showing children a film in which an actor worked on a creativity test (Belcher, 1975), playing a tape of a famous comedian in order to promote humor (Ziv, 1976), or promotion of imagining (Schwab & D'Zamko, 1988) or visualizing (Zdenek, 1988). Landmann (1981) and Stranger (1987) reported that creativity training procedures were of remedial value with learning disabled and legasthenic children respectively.

Although Torrance evaluated 142 studies on the enhancement of creativity and concluded that many of these had a positive affect, several authors have challenged this. Mansfield, Busse, and Krepelka (1978), Rump (1979) and Weisberg (1986) suggested that even the more famous creativity training procedures are of doubtful value. Cropley and Feuring (1971) showed that a procedure which was effective with girls did not have the same effect with boys, and also that the effects of training depended strongly on the conditions under which the criterion data were obtained. Rump showed that the effects of creativity training are at their strongest when the criterion most closely resembles training procedures, and at their weakest when these elements are most dissimilar.

Figure 1 shows that conventional programs and procedures for fostering creativity are too narrow, concentrating as they do in most cases on loosening up attitudes and work habits and facilitating the development of divergent thinking skills, largely through practice in working with unconventional materials (unconventional in comparison with traditional school materials). Furthermore, they are limited to a particular short time period, for instance an hour a week for a year or so during the school years, and commence when the children have already had a number of years' exposure to convergent ways of operating. Ideally, what is needed is an effort embracing not only school, but also the family. (See Albert & Runco, 1986, for a longitudinal study of the role of the family in developing creativity.) What is needed, however, is a holistic approach, involving not only promotion of skills and abilities (as in most existing programs), but also promotion of personal properties (courage, determination, independence, conviction of one's own rightness) and motivational states (dissatisfaction with the imperfect, willingness to take risks). Fostering these requires that children have early contacts with ambiguity, puzzlingness, uncertainty and imperfection, and that they have experience both in seeking solutions and also in making errors without negative sanctions, or even in being praised for a bold attempt rather than a tamely correct solution. Bröcher (1989) showed how some of these experiences can be offered in a summer camp, and evaluated their effects on creative thinking. As can be seen from his study, the effective promotion of creativity goes well beyond isolated short sessions in the Gifted Education program.

Teachers and Teacher Training

In a seminal study Torrance (1963) showed that teachers had a strong preference for pupil behaviors such as learning by heart, reproducing the already known, reapplying existing techniques, and the like. They placed little value on "innovating activities":

branching out, inventing, speculating, questioning the conventional, etc. Raina and Raina (1971) compared five countries, and found that characteristics such as "obedient", "courteous", "industrious" and "punctual" received high ratings. In a much more recent study, Howieson (1984) readministered the same "Ideal Pupil Checklist" as Torrance had used to a sample of teachers in Western Australia and, despite the time difference of over 20 years, reported very similar findings. Even more recently, Obuche (1986) carried out a study of the pupil characteristics preferred by Nigerian teachers. From a list of 62 qualities, "industrious", "sincere", "obedient", "considerate", "courteous" and "does work on time" occupied 6 of the first 10 places. By contrast, "independent in thinking", "curious", "willing to take risks", "critical" and "nonconforming" occupied much lower positions. A possible direct link between such teacher preferences and creativity in pupils was also supported by Howieson's finding that Western Australian children obtained on average very low creativity scores. That teachers frown upon daring, innovative or unconventional behavior in their pupils is also supported by a number of case studies reported by Cropley (1982): some children are labelled "incapable" or even "disturbed" by their teachers, although they are highly intelligent and even high achievers.

Despite these rather depressing findings about teacher preferences, Cropley (1982) concluded that research has demonstrated that interest in and knowledge about creative children on the part of teachers are sufficient for significant positive effects on children's creativity. Among the necessary skills for teachers of creative children are skill in "diagnosis", skill in counseling and guidance, skill in devising learning experiences involving all levels of cognitive functioning, and skill in arousing the necessary affective conditions. The question now arises of whether such characteristics can be inculcated during teacher training. In general, a consensus seems to be emerging that special forms of training are needed, and that they do lead to better work with gifted children. McLeod and Cropley's (1989) survey suggests that, apart from a basic introduction in initial teacher training and special programs in postgraduate teacher training, inservice education would be a major element in preparing teachers to foster creativity in the classroom.

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Biography

Arthur Cropley was born in South Australia and graduated from Adelaide University in Arts and Education. After seven years as a school teacher in Australia, England and Canada he attended the University of Alberta, Canada, and obtained his PhD in Educational Psychology in 1965. He is presently Professor of Psychology in the University of Hamburg, after a number of years as lecturer in psychology in the University of New England (NSW) and Assistant to Full Professor in the University of Regina (Canada). He is the author of numerous publications on creativity, lifelong learning and adaptation of immigrants.

CHAPTER 3

FOSTERING GIFTEDNESS

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Abstract

Included in the very broad spectrum of forms of special provision for the gifted and talented are acceleration and enrichment, although it is increasingly being recognized that they are best seen as complementary and not as competing with each other. Other special measures such as grouping, special schools and classes, provision of resource rooms, extra courses and similar measures all involve adaptation of school curriculum. Also possible, however, and receiving increasing attention, are measures outside the traditional school such as competitions, summer camps and mentoring programs. Many of these measures are organized by individual institutions, special interest groups or institutions outside the educational system. Until now there has been a shortage of appropriate research, especially research evaluating programs.

Different Forms of Educational Provision — Organizational Aspects

In order to give an initial overview, Figure 1 lists various organizational forms for fostering and educating the gifted and talented. They are grouped in a kind of hierarchy according to the degree of social (peer) integration or segregation.

This list shows the very broad spectrum of possible forms of provision which all try (or claim) to react to and provide adequately for the special needs and potentials of the gifted. It is evident, however that not all possible forms of differential treatment of the gifted are to be found in this list: grade skipping, for example, or various combinations of those provisions, services, and programs are missing. It is evident, too, that this chapter cannot describe the whole range of different programs and forms of provision; it has to focus on some main or typical forms and be selective in mentioning examples and studies. An international perspective is preferred for two reasons: firstly, in order to show that gifted education is a worldwide challenge, even at the risk of neglecting major programs, studies and developments in countries which are leading in the field; and secondly, in order to stimulate interest in other countries' and cultures' approaches. For those who are eager to learn more from what is done elsewhere, I recommend looking at the international journals *Gifted International* and *Gifted Education International,* the proceedings of the biennial World Conferences (Gibson & Chenells, 1976; Gallagher,

Private individual instruction

Special residential school

Special full day school
Special full day school in cooperation with regular school

Special classes with special curriculum, resources, methods
Special classes with normal and enriched curriculum
Special classes, heterogeneous as to age
Special express classes, normal but accelerated curriculum

Individualized pullout programs

Part time (one or two days a week) special classes
Part time (one or two hours a day) special classes
Part time (one or two hours a week) special classes

Regular classes plus resource room
Regular classes with additional courses, working groups
Regular classes with supplementary teacher or treatment
Regular classes with extracurricular mentoring
Regular classes where cases/problems are dealt with (or not)

Regular classes and additional out of school activities, such as afternoon and weekend courses, summer schools/camps, excursions, correspondence circles, competitions

Figure 1. Organizational forms of fostering and educating the gifted and talented, grouped according to their degree of social segregation/integration: with ideas from Reynolds (1962) and Hilgendorf (1985).

1979; Kramer, 1981; Shore, Gagné, Larivée, Tali, & Tremblay 1983; Roldan, 1985; Cropley, Urban, Wagner, & Wieczerkowski, 1986; Taylor, 1990), or into a recent publication of Mehlhorn and Urban (1989) in which the "gifted situation" in 17 countries with policies, educational systems, programs, and provisions is described and discussed. As helpful general and structured overviews of education for the gifted and talented there are Passow (1987) and Cropley (1989).

I do not distinguish here between programs and provisions in the sense of Tannenbaum (1983). He sees the latter as "ad hoc provisions . . . as fragmentary learning experiences, lacking in complex form, long range purpose, or clear directionality" (p. 423). Programs are "designed by a curriculum committee and codified in the school records as a comprehensive, sequential plan that commands attention by the lay board and professional staff and is supported solidly by a school budget" (p. 423). I share Passow's (1988) concern about the large number of too narrow, limited, constricting, and, I add, badly or unevaluated approaches: "We provide a pullout program, an accelerated course, an honors class, a special class or some other program with a clever acronym and consider that we have provided adequately for the gifted" (p. 80).

In their survey of education of the gifted in the United States, Gallagher, Weiss, Oglesby, and Thomas (1982) found that at the elementary level the "pullout model", where the gifted leave their normal classes for special experiences and courses in a "resource room" with a specially trained teacher, was by far the most frequent approach, followed by self-contained classes. At the secondary or high school level,

grade skipping, special classes for very able students in all subjects, and independent studies were applied most often. According to Passow (1987) programs for the gifted are often classified into three categories: acceleration, enrichment, and grouping. These categories may be applied to the forms of provision mentioned above and they may be considered quantitatively as organizational features, on the one hand, or on the other hand, they may refer to qualitative, more curriculum oriented differentiations. "While these rubrics are useful for some purposes, they are often overlapping and interactive rather than discrete and different" (Passow, 1987, p. 2051); this point will be discussed later.

Acceleration

Acceleration as a special kind of educational provision means that the speed of learning, teaching, and instruction is much above that for the normal learner, but adequate to the accelerated cognitive level of the gifted learner. It is more quantitative in nature; the gifted student either learns much more, works on a more advanced curriculum within the same time period needed by a normal learner for a normal curriculum, or needs a much shorter time for the same content and can use the time saved for other activities. There is a broad spectrum of various accelerative provisions such as early admission to school, grade skipping, advanced placement, accelerated classes, partial acceleration in one or more subjects or early college admission.

The discrepancy between cognitive and general psychological and personal development and the possible negative effects of this on social behavior, emotional-affective stability and self-concept have always been arguments against segregation and acceleration. Without special support and a great deal of caution it might be difficult for a gifted child to work together with other children who are comparable as far as their cognitive working level is concerned, but are far in advance in psychological, biological, social, and emotional maturity. According to Terman, the dangers of maladjustment and behavioral disorders is not high. In his sample, 85% of the children had skipped at least one grade during primary school and more than 50% finished high school more than one year earlier than average students. Problems of acceleration have been investigated in a series of studies in the United States. Under the direction of the "Fund for the Advancement of Education" various projects have been started in which the curricula of American high schools were shaped and organized so flexibly that gifted students were able to enter college two years earlier than normal. These students were superior to the students of average age in general academic achievements. They had some initial problems in adapting to college and campus life, but in many cases the early college admission set them free from laziness and frustration in an uninteresting and boring school life, and brought to them fresh intellectual stimulation, and accelerated their social and emotional maturation (Wall, 1960).

Klausmeier and Ripple (1962) reported a study on the effect of acceleration with 52 above average children. Twenty six of them skipped grade three after a five week summer course and entered grade four classes immediately after second grade. The control group completed grade three. Seven months after the beginning of the school year, data were collected on academic achievement, attitudes towards school and learning, problem solving, ethical values, writing skills, psychomotor abilities,

intellectual and affective traits, social popularity and creative thinking. Generally, the accelerated students were equal to or better than the average fourth grader. The only negative finding was a relatively low level of social popularity of the boys. In their summary Klausmeier and Ripple concluded that acceleration is a sensible and educationally effective provision for gifted children. In a follow up study Klausmeier (1963) showed that the negative popularity effect had disappeared at the end of grade five, and that the accelerated students were level with or a little higher in all aspects than average or younger above average students. Adequate preparation and support may help to avoid negative developments after grade skipping. Another way of preventing deviant school characteristics is seen in the improvement of early identification, and in provision of early school entrance (Waddington, 1977).

The application of accelerative provisions differs greatly from country to country. Freeman (1989), speaking about Great Britain, stated that acceleration is nothing unusual for gifted children; academically oriented schools with selective admission (such as grammar schools) provide accelerated courses for about 50% of their students which last, for example, only four instead of the normal five years. In the seventies there were some experimental projects in West Germany using a comparable model at some grammar schools (Gymnasium); the experiences with these so-called *D-Zug-Klassen*, "express-(train)-classes", were mixed; but even some positive assessments could not prevent these model projects from being forgotten for a long time, probably because they were not desirable in a political sense. In 1985 new express classes started in the state of Rheinland-Pfalz, with positive feedback from the official side.

In Switzerland grade skipping or advanced placement in single subjects is not possible at any stage in public schools. However, a small scale experiment has been started in Bern in order to investigate the possibility of grade skipping for very special extraordinary cases (Stednitz, 1989). In West Germany grade skipping is still used very seldomly; each state has its own regulations concerning if, at what grade, and how often it is possible. It is mostly dependent on the personal engagement of parents and/or teachers whether grade skipping is applied at all, and if it is successful. There has been only one empirical study in which Kötter (1985) carried out the following calculation: Based on the assumption of one "skipper" per school year in eleven school years, there should theoretically be 1650 examples of grade skipping versus only 58 actual, empirically noted, cases in the Saarland. Even an estimated number of unnotified cases of 200% results in a ratio of 0.1%, i.e., only 1 out of 1000 students was actually offered the chance of grade skipping. This offer was rejected by every fifth student (or the parents). In order to evaluate these numbers adequately, it is necessary to realize that no alternative or other special educational provision for gifted students exists (in the Saarland). As might have been expected, interviews showed that nearly all skippers and nonskippers, looking back, confirm the wisdom of their original decision. The strong reservations of teachers, school officials, parents, and students may be to a good degree due to the idea that a mere organizational provision will not solve possible problems of, or with, a highly gifted student.

One of the most outstanding proponents of acceleration is Stanley. He emphasizes "that educational *non*acceleration is still an 'international tragedy' " (Stanley, 1986, p. 227). His "Study of Mathematically Precocious Youth" (SMPY) at Johns Hopkins University, Baltimore, which started in 1971 as a search for young students who reason exceptionally well mathematically, i.e., in the top 1% of their age group, is one of the best known and explicitly accelerative approaches. In the meantime an

analogous project for highly verbally talented youngsters has been added. The SMPY project and related research has been described and reported in a huge number of publications; for a short overview see Stanley (1986). The target group consists of students, mostly seventh graders, who before the age of 13 scored at least 500 on the Scholastic Aptitude Test-Mathematics (SAT-M). This is five points above the normal score for an average male, college bound twelfth grader in the U.S.A. The SMPY's *leitmotif* became its mentor model "DTPI procedure" — "diagnostic testing followed by prescriptive instruction" (Stanley, 1978). After what the high scorer on SAT-M already knows about a subject such as beginning algebra has been determined, he or she is helped to learn fast and well those concepts and algorithms not yet mastered. During summers at Johns Hopkins and several other universities fast paced mathematics classes are offered, giving time too, for other intellectual and arts oriented activities.

Cropley, McLeod, and Dehn (1988) summarized studies on the effects of acceleration in general and concluded that this form of provision has brought positive results; however, most evaluative studies are not satisfactory in thoroughness or adequacy of design and methods. According to Stanley and Benbow (1986), the main problem is to assess what students would have achieved if they had received no special treatment. The question remains of what variables are responsible for a positive career: "Were these gifted people successful, because they were given special treatment, in spite of this treatment, or would they also have been successful without any special treatment?" (Cropley, McLeod, and Dehn, 1988, p. 180).

Enrichment

Enrichment refers to all kinds of provision which enriches the normal academic curriculum in breadth and depth. Hoyle and Wilks (1975) see the danger that so-called enrichment programs are often nothing more than mere ineffective time killing occupations. Under organizational aspects Freehill (1961) lists the following enrichment provisions: special tasks, projects, freely selected activities, demonstrations, correspondence studies, preparation of special materials (e.g., for laboratory experiments), holiday schools and other activities outside the school.

One of the leading proponents of the enrichment approach in the education of the gifted and talented is Renzulli from the University of Connecticut. He is well known for his three ring conception of giftedness which, in addition to above average ability, includes creativity and task commitment as constituents of giftedness (Renzulli, 1978). A large number of so-called "pull out programs" at American schools apply his "enrichment triad teaching model" (1977). This model includes three different types of separate but interlocking activities: exploratory activities on the part of the gifted children (I), group training (II), and individual or small group investigations of real problems (III). In 1981 Renzulli, Reis, and Smith proposed a "Revolving Door Model" where gifted adolescents move into program activities for the gifted if they show an actual interest in and readiness for research questions and activities. They leave again when they have finished a project. The identification process leads to the assignment of students to a "talent pool", where they remain without conducting special program activities until a strong interest is recognizable which gains them access to the program. Up to now there have been very few well designed research studies to support the model (Feldhusen, 1989).

Acceleration versus enrichment — "a false dichotomy"

As indicated above, the differentiation between acceleration and enrichment is not compelling. Enrichment or extension may include acceleration and deeper processing; Stanley (1986) even states that, "enrichment must, in the long run, be accelerating, if it is not to be stultifying. To be really effective, acceleration must be enriching. Judicious combinations of the two would appear likely to work better than either alone" (p. 228). He complains that little systematic search for the best combinations seems to have been done. Both concepts should be considered supplementary and used under qualitative aspects. A thorough profound discussion of both interactive concepts with differentiated arguments is given by Passow (1987).

Recently an enriched and stimulating curriculum has been discussed as a necessary prerequisite for the development of gifts and talents. Urban (1988a) calls this the "further (giftedness) diagnostic approach". Since, given an optimum learning environment, many previously unrecognized children become capable of manifesting gifted behavior, Wallace (1986, 1990) demands that for educators the emphasis should be on providing an enriched curriculum for all children. "With an educational aim of enrichment for all pupils then it becomes quite defensible to discuss the need for greater individualization and consequently differentiation for those children who need *extension* of the normal curriculum" (Wallace, 1990, p. 206). Closely related to this idea is the "Multiple Talent Teaching" approach represented by Taylor. Basic is the "conviction that there are many talents and gifts and that practically every person is highly gifted in something" (Taylor, 1978, p. VIII). Thus it is not surprising that this approach has been used in all kinds of classrooms, with gifted children as well as with emotionally disturbed or those with very mixed abilities.

The indicators of talent include, for example, the academic area, creativity, planning, communication, forecasting, decision making, artistic talent, and leadership. A study by Hainsworth (1978) demonstrated that 91% of all children (N=1254) of one school working with the multiple talent approach exceeded the 50th percentile on at least one talent score, 55% on at least four scores; nearly 50% belonged to the best 10% on at least one score. There are many critical questions concerning this approach, but the positive effects for students and teachers working with the concept in mind become understandable: "Most evident are the structural changes in classrooms with increased opportunities for children as the school program has become more individualized" (p. 88). Hainsworth noted that teachers actually began to talk about the talents of children more frequently, parents noticed a change in the tone of the school and were more pleased with the program, classrooms looked richer and more complex in terms of materials and activities available, "teachers began to be more confident in talking about things they might do to aid the disadvantaged or disabled learner . . . teachers seemed much more confident, generally, in their ability to adapt their programs to new situations" (p. 89).

Curriculum Development and Differentiation

A good (enrichment) program which provides for more than mere occupational activity has to be closely related to approaches which stress the necessity of carefully developed

and designed curricula for the education of gifted and talented youngsters. A "gifted extension model" for an expanded curriculum in the sense stressed by Wallace has been proposed by Morgan, Tennant, and Gold (1980); it considers (1) a content area with the sections knowledge, skills, and attitudes, (2) a process and output area with the sections decision making, creativity, and cognitive abilities, and (3) the evaluation area. Well known for their endeavors in the field of curriculum development are Gallagher whose book "Teaching the gifted child" (1975; 1985, 3rd ed.) is widely used in teacher training, and Maker with her book on "Curriculum development for the gifted" (1982). She focuses on the point that the development of curricula has to be matched with the special characteristics of gifted students, and presents detailed step by step procedures and excellent models and examples for curricula and projects. Widely used for curriculum adaptation is Bloom's "Taxonomy of educational objectives" (1956). Kaplan's (1979) workbook offers a sequential approach to planning, defining, constructing, and implementing differential curricula for the gifted. More recently, a summary of eleven models to be applied to the development of curriculum for the gifted and talented was presented by Davis and Rimm (1989).

Not restricted to curriculum but considering the four main factors of a curricular theory, namely (1) the nature of the gifted learner, (2) the role of the teacher, (3) the demands of knowledge (production), and (4) needs and expectations of society, Jellen and Verduin (1986, 1989) developed, described and discussed 32 key concepts for a "Differential Education of the Gifted (DEG)", an approach which carries on the work of Ward (1980) and Phenix (1964). According to Passow (1988) other popular models which are not limited to the narrow academic area are only Taba's (1964) cognitive functioning in elementary school children; Meeker's (1969) structure of intellect using the Guilford model; Gordon's (1971) synectics; Kohlberg's (1971) moral development; William's (1972) total creativity program; Parnes, Noller, and Biondi's (1967) creative problem solving; Tannenbaum's (1983) enrichment matrix.

Grouping and clustering

Beside (1) a differentiated curriculum, that promotes higher cognitive processes, and (2) instructional strategies that accommodate both curriculum content and learning styles of gifted and talented children, the Marland report (1971) established (3) special grouping arrangements appropriate to particular children as the three characteristics for a differential educational program. These arrangements include special classes, honor classes, seminars, resource rooms, and the like. Special grouping, not only to facilitate appropriate experiences for the gifted, has long been discussed very controversially on philosophical, psychological, sociological, and educational grounds. Passow (1987) stated that "studies of gifted students in normal (heterogeneous) and special (homogeneous) classes on all educational levels tends to be more uniform in denoting beneficial effects of the special class on academic, personal, and social growth, though such findings are not consistently unidirectional" (Goldberg, Passow, & Justman, 1966, p. 2052).

Special schools and special classes

More than other provisions for the gifted, the establishment of special schools seemed to be dependent on political priorities, either in the direction of developing national superiority under strict control of the state or in the direction of a liberal and plural development of individual and private responsibility for gifts and talents. Thus, in the (former) socialist countries special schools for different academic, artistic talents and sport were, or still are, quite common, mostly in the form of residential schools. On the other hand special schools have been founded in democratic countries, too. Some of the oldest and most famous which still exist are located in New York, which has a population large enough to permit organizing four schools for generally gifted students (Bronx High School of Science, since 1938; Brooklyn Technical High School, since 1922; Hunter College High School, and Stuyvesant High School since 1906) and two schools for artistically talented adolescents (Music and Arts High School since 1938 and Performing Arts School).

One of the oldest and probably best known programs is the Cleveland Major Work Plan (Hall, 1956). At every school with a sufficient number of gifted children special classes were established, sometimes including children from three different grades. Considering emotional, psychological, and social aspects the IQ limit was set at 125. Thus, about 5% of all children attended the special classes, but also participated in the general school life. Summarizing the results of comprehensive interviews with former students Barbe (1955) stated that the positive enrichment of the program gives (1) the opportunity to develop individuality in an atmosphere free from compulsion, (2) stimulation and challenge including curricular differentiation, a positive teacher–student relationship, and cooperation with intellectually comparable schoolmates. Negative assessments referred to attitudes and behavior of other teachers and students, as well as the lack of social contacts with other students. Another kind of clustering has been realized in the "Colfax Plan", Pittsburgh; after integrated work in the regular classroom every day the gifted students meet in special working groups or clubs in which critical and analytical thinking is stressed. The rest of the day they learn together with the other children (Pregler, 1954; Hoyle & Wilks, 1975).

In Poland a private school for the gifted was opened before World War II; in Brazil, the special (technical) school of the José Carvalho Foundation has become well known (Guenther, 1986). Even before World War I there was consideration in Germany of special schools for the gifted, while around 1900 schools in Mannheim provided differentiated grouping within grades according to achievement level, and in 1920 special classes were established in Leipzig (Cropley, McLeod, and Dehn, 1988). In the Federal Republic of Germany today there is no special school for the generally gifted, but some residential institutions for the highly talented in sports, such as the so-called "Ski-Gymnasium". On the other hand, a broad and very differentiated system of special schools for the handicapped and retarded has developed. Special classes can be classified, like other forms of provision, in a manifold way, (1) by administrational aspects such as time, space, and grouping, (2) by content or curricular aspects — what is learned and how, and (3) by level of knowledge acquisition, processing, and production, to name a few. The only school in West Germany with special classes for generally gifted, the so-called "Spitzenbegabte", is run by a large private institution in Braunschweig, the "Jugenddorf-Christoperusschule", a Gymnasium with residential facilities. Since 1980

students in grades 11 to 13 work with a highly compressed, extended, and engrossing curriculum, which nevertheless allows time for extracurricular activities with mentors in various professions and full participation in the enriching school activities of the whole school community in the afternoon or evening. A study with the first two classes showed a general stabilization in the personality of the students, who had mostly come from other schools with discouraging experiences and a defective self-concept (Urban, 1983).

Resource room provisions

Resource rooms are used for various forms of pullout programs. In special room(s) within the school building various resources of different kinds are available for students who, alone or in small groups, work independently or guided by a special resource teacher on freely chosen or assigned projects. The resources include books and other publications, electronic and audiovisual equipment, computer hard and software, instruments and apparatus for work in the sciences, materials and requisites for arts and music, etc. Beside the appropriate equipment of such resource rooms, the important factor for effective and successful work is the specially trained or experienced resource teacher. A list of important characteristics of the resource room model is given by Hammill and Wiederholt (1972).

Additional courses and working groups at school

Additional courses or working groups are most favored in the Federal Republic of Germany, since these provisions are least controversial and relatively easily defendable and applicable. In the state of Baden-Württemberg in the last few years about 15000 students from 460 schools of different forms have participated in about 1600 additional courses for specially able students. This project has been intensively evaluated in respect to teachers' judgment, attitudes, nomination effectivity and teaching quality, as well as to students' expectations, learning styles and so on (Bittner & Hany, 1987). In 1987 Bavaria started the so-called "Plusprogramm" which is limited to Gymnasia only; at present about 30% of them offer a total of about 200 additional voluntary courses of one or two hours a week for gifted students.

Admission to such programs, in or out of school, touches upon the question of identification. This is handled differently, from rigidly allocating to fully accepting the free decision of the student. An interesting approach here is "selection or identification by provision", which means an open door for all who are interested, even though they may not be identified or labelled as gifted. Shore and Tsiamis (1986) did a study on the question of whether children selected by provision differ on any identification criteria from those admitted to programs in more conventional ways. They concluded that no statistically significant differences of any importance existed. The group identified by offering a suitable program and opening the doors to those interested was not distinguishable from the group selected by the school on the basis of formal tests. It was concluded that formal selection by testing was not necessary for a substantial number of gifted pupils, but that resources for such services could be redirected to program development and services, and to the search for hard to find special populations of gifted children.

Individualized Education Programs

Another approach which is not so well known uses the so-called IEP (Individualized Education Program). It is derived from special education and defines special learning activities individually for each gifted and talented child. A leading proponent of this approach is Treffinger with his IPPM (Individualized Program Planning Model). He states that the gifted are by no means a homogeneous group; he therefore proposes using the special and individual information yielded by the identification procedure for the development of programs for the gifted. He presents procedures for applying the results of identification tests and assessment scales to the planning of adequately individualized programs and activities (Treffinger, 1981). Also suitable for this purpose is the "Guidebook for developing individualized educational programs for gifted and talented students" by Renzulli and Smith (1979).

In an example of an "Individual Work Schedule" in the elementary school, gifted students may leave the regular classroom for two hours per day for their individual work in the pullout program. The emphasis is on language: writing, reading, listening and comprehension, speaking and reporting, verbal thinking abilities and creative writing. In the mixed pullout classes with 10 children each, even the weaknesses of the gifted, for example, spelling, are considered. The preschool children have older students as resource persons. The students work independently on prepared programs and materials, the teacher functioning as individual facilitator and counsellor. The danger of such programs lies in the segregation and the lack of stimulating, challenging, and satisfying social learning and working experiences with other children of a similar level.

Provisions in the regular classroom

Interestingly enough, budget shortfalls in the United States were one major reason for the reopening of, and increasing discussion about, fostering the gifted in the regular classroom by means of individualized teaching. Feldhusen (1986) presented a strategy for working with the gifted by means of individual and small group activities in the regular classroom. Bandura (1974) observed 50 above average children in 26 elementary classes with a total of 850 children. He found that regular classes can give enough room to improve the achievement of gifted children by reshaping teaching methods, grouping with differing levels of difficulty, encouraging creative thinking, and well designed and organized extracurricular activities. Borzym (1989) reported on studies conducted a number of years ago in Poland, on instructional and teaching methods and their effects on gifted and nongifted students in normal elementary classes. An experiment designed by Nakoneczna (1974) included 10 elementary and secondary schools in rural, small and large urban areas of Poland. The following three principles were transferred into educational practice:

(1) Acceleration of the development of individual abilities by individualized instruction and appropriate curricula,
(2) promotion of independent studies, self-responsibility and self-assessment of the students, and
(3) inclusion of more and deeper knowledge into curricula by organizing eligible

individual instruction, clubs and summer camps for special interests, by contacting and working with local communes, scientific institutions, and other resources.

The study is still in progress, but preliminary results are very encouraging: the number of children with good school reports increased, more children participated in various olympics, acquisition of knowledge was much better and more extensive than for control classes, the children became more creative and more critical, the tendency towards neurotic or maladjusted behavior decreased, motivation and general aptitude went up, relationships with the teachers developed more positively, and contact to local and regional institutions was very helpful and effective. These forms of educational intervention, extension of curricula, and improvement of teaching yielded positive results for the children, gifted or not.

The difficulties and problems which may emerge if there is no special attention to the needs of the gifted, no consideration of their abilities, no individualized teaching and methods became obvious in other studies by Dabrowski (1963), Wasyluk-Kuś (1971), Panek (1977), and Borzym (1979). Drewelow (1988) from Rostock, in the former German Democratic Republic, investigated the development of able students in normal polytechnic high schools between grades 5 and 9. The particular emphasis in special provision was on the close connection of provision in school with extracurricular activities. One of the relevant findings was the strong dynamic of development in important personality traits, for example, thinking abilities, fantasy, memory, and learning attitudes. These remarkable deviations in all directions led to the conclusion that limitations of valid and reliable prognosis are not only caused by the methods and instruments applied for identification but also by the developmental dynamic of the object of prognosis itself.

Provision Outside Traditional Schools

Competitions

Within the last 10 to 15 years, as was the case with summer schools and camps but some years earlier, competitions have become very popular in many countries; the number of participants in international competitions or "olympics" has greatly increased. In the Federal Republic of Germany, the Federal Ministry for Education and Science became especially supportive of nationwide competitions. The reason is simple: After the federal decision to make special provision for the gifted and talented one of the government's politicoeducational priorities—apart from the funding of research studies and projects—promotion of competitions was almost the only avenue available for realizing the new goal, since schooling and education are not part of the federal, but of the states', responsibilities. The rationale is that competitions stimulate numerous students to become interested in and investigate new fields of knowledge and skills, and challenge gifted students to make extraordinary achievements. Critical voices refer to the fact that participation or nonparticipation too often happens only by accident, dependent on the chance interest and support of single teachers and schools, and more relevant, that aims and functions of competitions are confined to giving awards to a few superior achievers, but do not develop and foster gifts and talents in general; the large

pool of promising but unrewarded talents remains unaffected. This criticism has led to an increasing number of workshops and camps for participants in competitions. On the other hand, the scope of this criticism depends on the kind of competition and on the level. There are competitions with no, or only indirect, selective character, but with extremely high levels of participation, for example, in sports or public speaking. Other competitions aim at highly specific extreme achievements in the areas of science and mathematics, language, history and politics, arts and music or professional training.

Research studies with participants and winners of competitions have a strong tradition in the Federal Republic of Germany. Dahme (1981) studied the characteristics of adolescents with high aptitudes in sciences, and more recently the role of motivation and self-concept in persistence in long term high level projects (1988). Urban (1988b) compared personality profiles based on self-assessments of winners of science competitions with those of award winners in a creative writing contest. Unequal chances and support concerning participation and success of students in competitions was demonstrated in a study by Báthory (1986). He analyzed the results of the regular annual national interschool competitions for 3rd and 4th year students in secondary schools in Hungary between 1974 and 1983, and showed that by far the most winners came from a mere 25 out of the 539 secondary schools in the country; 22 were academic schools, 23 were in the capital or a big town, and all six training schools attached to universities were included in the group.

Other Extracurricular Activities and Programs

The range of possibilities for fostering gifts and talents outside schools is nearly unlimited and may be described from more than one perspective. Procedures range from relatively school bound or academically oriented courses and activities (e.g., math circles in the former East Germany) as are common in the (former) socialist countries, to individually and privately organized activities in special areas of interest (e.g., the Saturday Clubs of the British NAGC); they encompass fostering a single gifted person to provision for local, regional, state wide, even international and global groups; they range from one off intervention to once a week or once a year events or to periodical or permanent programs; they are funded by single private persons, by firms and institutions, by associations, and by public agencies at the local, regional or state level.

In countries with no explicit policy or no generally accepted rationale concerning the gifted, initiatives for the gifted and talented often come from the private sphere, from parent/teacher associations or from single institutions or universities. In Australia, for example, where the situation may be improving after the 8th World Conference on Gifted and Talented Children, 1988, in Sydney, the South Australian Association for Gifted and Talented Students runs multifaceted programs including preschool sessions for the gifted, Saturday Clubs for five to twelve year old gifted children, mentor programs for gifted teenage students, enrichment courses at Adelaide University for thirteen to sixteen year old students who are talented in specific areas, teacher development (inservice training), and support services for parents of the gifted and talented (Mitchell & Williams, 1986). In Israel, based on the private initiative of Erika Landau, the Young Persons Institute for the Promotion of Art and Science in Tel Aviv has been helping children to develop and realize their gifts and talents since 1968. With

about 2600 children aged from 5 to 15 in more than 150 courses per semester (in the afternoon or during holidays) this institute is the largest of 14 enrichment centres in Israel, which as a rule, work in close cooperation with a university or other larger school systems.

In recent years one type of program has found increasing interest in a steadily growing number of countries, namely, summer schools or camps. This is true, for example, for the Federal Republic of Germany. While there was almost nothing eight years ago, now, to name a few, there are computer camps of the German Association for the Gifted Child (DGfhK), holiday academies for highly talented students in mathematics or creative writing organized by the foundation "Bildung und Begabung e.V.", mathematical university courses in Ulm, "holiday seminars for broadly interested and gifted students" of the Bavarian Ministry of Culture, the summer academies of the Technical University Munich and the University of Erlangen/Nürnberg, sponsored by industry, and the university summer camps initiated by Kluge, which have been intensively described and documented (Bröcher, 1989; Bröcher *et al.*, 1987a, 1987b; Pinnow, 1989).

The summer holiday program of the Milton Campos Association in Minas Gerais, Brazil gives disadvantaged gifted students from poor rural and urban slum areas the opportunity to participate in an enrichment program on a farm. In three age groups the 6 to 16 year olds develop and work on projects in physics, ecology, psychology or in the arts, go on field trips and visit museums and historic places. Since 1973 more than 700 children have taken part in the program (Alencar, 1989). In the Republic of Korea the first summer science camp in 1981, organized by three science professors of the Seoul National University, was at the same time "the first attempt in Korea at gifted education" (Chung, 1982). Thirty participants had been selected as science gifted students out of 45,000 9th grade students, and learned and worked together very successfully in a ten day program. A unique approach is the McGill Summer School for the Gifted in Montreal, Canada; founded in 1981 it is embedded in a network of school university cooperation, research and university studies, and teacher training (Shore, 1985).

Mentoring

Mentoring is probably the oldest model for fostering gifted and talented people: Gray and Gray (1986) see its origins some 3500 years ago in ancient Greece. Through the centuries inventors, thinkers, artists of genius have developed their extraordinary talents through close relationships to and the wise support of their mentors. Reports about mentor–student relationships make clear that it is not only the special individual teaching of mastery of a discipline, but the very complex interactive communication of both personalities which make this approach a unique and very effective one. The educational influence goes far beyond mere passing and acquisition of knowledge and skills; the personal interaction allows the student to learn about ethical values, attitudes, and self-concept of the mentor. Because of this very special complex and individually differing relationship, because of the relative isolation of mentorships, because of its ancient roots and the recency of its cautious revival, there are only a few systematic and/or empirical studies and a handful of programmatic approaches in the educational literature.

In contrast to the form of "direct mentoring" described above, Gray and Gray (1986) from Vancouver, Canada, emphasize "indirect mentoring". Since "no adult can know and teach all that a less experienced protege wants to know", a mentor who "lacks personal expertise . . . can arrange for the protege to learn from other people's expertise in the community and workforce" (p. 471). After years of research with hundreds of mentors and proteges Gray and Gray (1986) found that successful mentoring (which includes parents as mentors) involves four basic phases: (1) Writing a proposal; (2) agreeing on a project plan, (3) carrying out the plan, and (4) creating and presenting an end product. Progressing through the four phase mentoring model should be supported through their Helping Relationship Model which helps in the child's progressive development of an independent identity. Shaughnessy (1989) posits that mentoring "creatives" differs greatly from academic and corporate mentoring. He discusses both advantages and disadvantages of the parent as mentor.

Cropley *et al.* (1988) report on a statewide mentor program in Victoria, Australia. An interesting approach has been described by Clifford, Runions, and Smyth (1988) as part of a high school program for gifted adolescents. As a complementary support system to the Learning Enrichment Service (LES) the Mentor Academy Program (MAP) works with changing mentors. It is "a broader skill based model focusing not only on mentorship training, but also on more effective independent learning and experiential learning" (p. 165). It involves "a cycle of integrated reflective experiences, academic, career, leadership and creative, requiring multilevel and multipurpose synergy" (p. 168). The Learning Activity Mentor Program (LAMP) is an advisory, mentor and material resource service for seven high schools in Christchurch, New Zealand, assisting schools in providing for the needs of their able students (Beard & Densem, 1986). Schools are encouraged "to evaluate their programmes both in general and in relation to the specific activities undertaken" (p. 114). Pre and postprogram (self-)assessments for students, teachers, and parents are used, but few results are available as yet. One finding is that parents, without exception, have been supportive of the program concept, while several students demonstrated a revival of interest in learning which has flowed over to other subjects and led to an improvement in school reports.

One study in this realm which has to be mentioned here is that of Bloom (1985) on the talent development process in young people. His research concentrated on persons who had already attained a very high level of talent development and performance. Retrospectively, the relevant life histories of these musicians and artists, swimmers and tennis players, mathematicians and scientists were studied, in order to find common features within the particular talent areas. Along the way to excellence, families and teachers played the crucial roles which changed greatly over time. After the young child had already learned something about the field from family members or friends, at a certain age differing for each talent area, the first teacher was found. This teacher changed with increasing expertise of the student to a more expert one, and in the later years, to an outstanding master teacher who became a real mentor (Bloom, 1990).

Research and Evaluation

In the same way as the variety of forms of provision for the gifted and talented seems to be almost unlimited in the areas of curriculum, instructional adaptation and modification,

administrative arrangements, and specific macro and microenvironmental conditions and adjustments, research also varies widely in terms of purpose, focus, sample, inclusion or exclusion of variables, methods and instruments, quality, generalizability, implementability and range. Last but not least, even similar or comparable findings may be assessed and interpreted differently from different viewpoints. Nevertheless, reflection and control of what is done in the important field of education is substantial and indispensable.

Often the evaluation of a program remains implicit; positive effects reported from all sides seem sufficient for all participating in the program. An example is Feldhusen and Koopmans-Dayton's (1987) thorough and conscientious study of the Super Saturday Program at Purdue University, which started in 1971 to meet the special needs of able students which could not readily be satisfied in school. Approximately 400 children from ages 2 through 18 are enrolled in 40 special classes each semester. The summary of results, based on teacher observation, students', teachers', and parents' evaluation emphasizes that it is successful in meeting the needs of gifted and talented students. This is obviously linked with the fact that the teachers are well trained and effective in the classroom. Children learn a great deal, and they and their parents are satisfied with the program.

There are other research studies which are not restricted to one specific model for fostering giftedness but try to compare the impact of different models. Two examples of such studies from the Republic of China demonstrate how different the range of variables and intended findings can be. Wu (1986) evaluated educational programs for intellectually gifted students in junior high schools in the Republic of China. His study included more than 1000 gifted students from 12 schools which either had adopted the self-contained class model or the resource room model. Instruments and methods involved questionnaires for students, and parents, field visits, observations, and interviews. The evaluation referred to the whole range of program factors, like teacher training, identification and screening, placement, curriculum, teaching, guidance and counseling, finance and facilities, administrative and parental match, school internal research, follow up activities, parents, and last but not least the students and their assessment of their own creativity development, academic achievement, and interpersonal relationships. Most findings were in favor of the self-contained class model. Again, this result may not be generalized too readily, but has to be interpreted in the light of the specific local conditions and in the context of other findings. Another Chinese study comparing 546 students in gifted special classes, gifted resource rooms, and honor classes from nine junior high schools in Taipei was conducted by Kuo (1990), but his focus was limited to the effect of the different models on life stress. The general "stress score" was highest for students from honor classes. However, the sources of greatest stress were different among the groups: "peer relations" for students in special classes, "teacher–student relations" in resource room models, and "schoolwork problems" for students in honor classes.

There is a substantial number of publications on general and specific questions of evaluation and research in gifted education. Bell (1986), from Canada, presented a proposal for "evaluation of the implementation of innovation in a gifted/enrichment program" (p. 120). She suggested an extensive profile which enables teachers to examine their philosophy, the quality of resources, teaching strategies and objectives. Valuable source books concerning questions, methods, and instruments of program evaluation

are the CONNCEPTs I and IV (Vassar & Krausvick 1979; White, 1978) of the Connecticut State Department of Education as well as Renzulli's "Guidebook for evaluating programs for the gifted and talented" (1975) and Whitmore's (1984) EEPIGS. Additional annotated bibliographical references are to be found in the World Council's bibliography (Gallagher & Courtright, 1986, pp. 65–72). Nonetheless, it is important to remain aware that, even with the best set of procedures, evaluation remains an implicit process which may be made more transparent by means of observers from outside the program; but as long as no control variables and no control groups are available the question may not be answered of what factors really are responsible for any changes in whatever direction. The question remains if, in case of positive learning effects for example, the same effects would not also have been reached without any program or with quite different interventions. These problems seem to be inherent in educational research generally, especially in the case of more complex program evaluations. It is relatively easy to design well controlled experiments for a small and restricted treatment with only two or three variables, but then the question of transferability and generalizability arises. For large complex intervention programs it often seems impossible to create appropriate control groups; and even more important questions of ethical value and responsibility are touched upon.

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Biography

Klaus K. Urban teaches psychology for special education at the University of Hannover. He has served as member of the Executive Committee of the World Council for Gifted and Talented Children and as vice-president; he is still chairman of the Research Committee. He has published several articles in national and international publications about various aspects of giftedness. His main fields of interest and research are (test-) diagnostics, giftedness, creativity, language (development), and listening comprehension, documented by a large number of publications.

CHAPTER 4

GENDER DIFFERENCES IN GIFTS AND/OR TALENTS

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Abstract

Studies of gender differences in academic subjects highlight the greater variance among boys, so that a higher proportion of boys is to be found in the extremely gifted category. Little research has been focused on the important area of language or even creativity. Mathematics studies show gifted males to be significantly better in mathematical reasoning as assessed on SAT-M. Environmental influences rather than sex appear to be responsible for much of this phenomenon, although there is a suggestion that talented females prefer rigorous experimentation and males abstract theorizing. Career planning research indicates the need for gifted adolescents of both sexes to be aware of the career/parenting conflict.

Introduction

Of the 220 reports and articles read for this review no research was located exploring talents which Clark (1979) classified under "sensation" in Jung's four function theory, i.e., music and the visual arts. The focus is on talents of significance in school settings, and the definitions of gifts and talents are those given by the authors of the articles: these vary from the top 2% to approximately the top quartile of a large group. The chapter focuses on gender differences (1) in identification, (2) in language, (3) in creativity (including humor), (4) in mathematics and the natural sciences and (5) in career planning.

Gender Differences in Identification

Brown (1983) noted that in Western Australia, where teacher selection was used to identify children for special gifted classes, boys tended to be selected ahead of girls in the ratio of 2 to 1. Hollingworth (1926) considered that teachers' judgements were biased towards selecting boys. Kissane (1986) noted that teachers successfully nominated two thirds of the boys correctly, but overlooked two thirds of the girls. Parental nomination can also favor boys. In a longitudinal study carried out in New South Wales (Boyd, 1986), it was noted that girls were more likely to participate if both their parents had

been born in Australia (58% of the girls compared with 25% of boys had two Australian born parents).

Hall (1980) obtained an even sex ratio in her study of young people who met the criterion of an IQ of 130 or better on at least two intelligence tests. She considered that this result was related to the fact that a person could qualify for the study at any time between six years of age and senior high school. This was important because of a difference in the number of girls compared to the number of boys who changed in IQ between eighth and twelfth grade. Hall noted that more girls were identified in the primary school years, but that the number of boys increased from 12 to 22 between the sixth and twelfth grades. What was interesting in Hall's study was that six girls and only one boy showed a marked decline in IQ in high school, but fourteen girls increased their IQ scores compared with nine boys. She concluded that girls' IQ scores were more vulnerable to change during adolescence. Heller (1989a), reporting on the results of a three year study in Munich, noted that while boys in grade 1 appeared to improve their results slightly more than the girls, the differences were not significant, and by the end of grade 4 these differences had practically disappeared. However, girls in the senior grades showed a deterioration on tests of intellectual abilities from grade 7 to grade 11.

Historically, IQ tests were developed free of sex bias (Hollingworth, 1926). However Karnes and Brown (1980), when comparing the performance of 479 boys with 467 girls (all aged between 6 and 16 years) with WISC-R quotients of 120 plus, found that the boys scored significantly higher on Information, Similarities, Vocabulary, Comprehension, and Block Design. Only on Coding did girls score significantly higher. Likewise, Sheverbush (1974), after analyzing the Stanford–Binet Scale (Form L-M) according to functional clusters, noted that the girls performed significantly better on Language Usage but that boys were significantly better on Verbal Comprehension, Nonverbal Reasoning, and Numerical Reasoning. His subjects were 104 boys and 88 girls. The girls had a mean chronological age of 9 years 6 months with a mean IQ of 144.4, while the boys' mean age was 9 years 11 months and their mean IQ 149.2. The major problem with the results of both the Karnes and Brown and Sheverbush studies is that the boys and girls were not matched according to age, nor was account taken that "the proportion of very exceptional individuals might be greater among boys" (Hollingworth, 1926, p. 63). Hollingworth's (1975) own case studies of children with exceptionally high intelligence quotients (IQ 180+) included eight boys and only four girls.

When Whorton, Karnes, and Currie (1985) compared the achievement of gifted children in grades 4 to 6 (classified as gifted according to state guidelines) they noted that the mean WISC-R scores of the 19 boys and 21 girls in grades 4 and 6 were the same. In grade 5 the mean score for the 11 boys was 3 points higher than that of the 13 girls, but the standard deviation was much larger for the boys, wiping out any significant difference. Unless Karnes and Brown give a much more detailed description of the groups of 6 to 16 year old boys and girls in their study, and Sheverbush matches subjects according to mental age, the view of Hollingworth that there are no significant differences between the sexes on intelligence tests should stand. Because of apparent teacher bias (and less well documented parent bias) which favors the identification of a higher proportion of academically able boys than girls as gifted, there is some value in using intelligence tests which are not biased towards one or other sex. However, it is important that intelligence tests are not given simply once in a child's school career, but that they are administered at regular periods to take into account the developmental

aspect of intelligence. In the early years an excellent verbal memory would result in a high IQ, but ability to reason is essential to score well in the adolescent years. It would be of value to investigate whether environmental pressures or the earlier maturation of some girls (Rathus, 1988) is responsible for the IQ changes recorded by Hall.

Areas of Gender Difference

The term "language" is complex, including listening skills, verbal expression and vocabulary tested in verbal intelligence tests. Studies by Brimer and Dunn (1968), Brimer (1969) and McGing (1989) suggest that, in the normal population of children, boys are better at listening comprehension than girls, although no studies have been located that look specifically at sex differences in listening among gifted boys and girls. Support for the better performance of gifted girls in written expression was presented by Hoffman (1981). She tested 54 fifth and sixth grade students (36 boys and 18 girls) attending a talented learning centre. The 18 girls wrote more sentences and total words ($p<.01$) and were more grammatically correct. However, Hoffman pointed out that, while the girls were more productive in their writing, they used significantly less complex language than the male students. Andresen (1969) addressed the problem of teaching literary appreciation skills to able high school students. She developed a structured procedure and then tested it out on average and gifted high school freshmen. While there were no significant differences between the experimental and control boys, there was a marked difference ($p<.01$) in favor of the girls in the experimental group. Was it the better listening skills of the boys that helped them to generate their own system, while the girls required instruction in applying the tools of literary criticism to particular situations?

Because many gifted children can read before they come to school, little attention has been paid to gifted readers. However, Anderson, Tollefson, and Gilbert (1985) asked 276 children from grades 1 to 12 (classified as among the top 5% of American children in ability) to respond to a questionnaire about their attitudes to reading. Results showed that significantly more girls regarded reading as fun and considered reading one of their favorite hobbies. More girls considered that reading the book was more fun than seeing the movie of the book, and they disagreed that teachers made them read too much. More of the boys, however, wanted to choose their own reading. For both boys and girls the primary grades were the best for reading. The number of books read declined steadily as they advanced into junior and later senior high school.

To summarize, the broad spectrum of language has not been examined extensively in relation to differences among talented girls and boys, probably because language is one of the "easy to assess" areas of a young child's ability. However, there is evidence to suggest that talented boys are similar to boys in general, who perform better in listening comprehension. While talented girls appear to be more creative in their expressive writing, they do respond and gain significantly from well organized instruction in understanding literature. But much more research needs to be done on language talents.

Creativity and Humor

In India Raychaudhuri (1971) studied the relationship between creativity and sex using Rorschach M responses. The creative group of 20 males and 20 females were recognized as creative in a variety of art fields. The comparison group of 20 women and 20 men were drawn from the general population with no known creative leanings. The results showed that the 40 creative artists scored significantly higher on the Rorschach M responses than the normal group (Mean: 4.30 vs. 1.8, $p<.001$). While there were no significant differences between the means for the creative men and women, the difference between the 20 comparison women and the comparison men was significant beyond the .01 level, the women producing more creative responses. Raychaudhuri argued that the higher M responses produced by the women was "not only indicative of a rich inner life and fantasy, but also of the subjective need to overcome culturally determined restrictive sex-roles and to derive vicarious gratifications." Unfortunately no studies of the creatively gifted in the West were located which used Rorschach M responses. Rather the Torrance tests, with the breakdown into fluency, flexibility, originality, and elaboration, have dominated. Jensen's (1978) results showed that able elementary girls tended to score slightly higher than boys except on originality and interpreting data.

Aldous (1973) hypothesized that grade 3 boys would show more originality than grade 3 girls, but the hypothesis was not supported. It was family factors, such as the number of siblings and the professional status of the parents that influenced originality. Khatena (1975) however, tested 248 young people (122 boys and 126 girls) on the Children's Version of Onomatopoeia and Images. His data showed that boys from age 11 produced more complex images more frequently than girls of comparable age. Khatena obtained a triple interaction of simple–complex images by age and sex with the eight to ten year old girls performing better on complex production, while in the older age groups the boys produced more complex but fewer simple images than they did in the earlier years. Heller (1989b) also observed a decline in verbal creativity on the unusual uses test between grade 9 and grade 11 for girls, yet the boys in those same grades showed an improvement.

Although Tan-Willman and Gutteridge (1981) obtained results using the Torrance Tests of Thinking Creatively with Words that showed adolescent girls scoring higher than their male classmates, it was in fluency and flexibility that the 17 year old girls actually scored significantly higher. Torrance (1972) found that in 1959 the adolescent girls scored significantly higher on elaboration and tended to be better on the other measures in his Test of Creative Thinking. But creative performance 12 years later was more poorly predicted for women than for men ($r=0.59$ for men but for women $r=0.46$). Prediction for women improved if the Creative Thinking scores and the Alpha Biographical Inventory were included (Torrance, Bruch, & Morse, 1973).

Severeige and Sugawara (1985) studied the effectiveness of creative experiences in enhancing creative development of gifted children in the kindergarten year and grades 1 and 2. They found that more significant progress was made with creative problem solving classes than with a combination of imaginative communication classes and puppet classes, with girls making most marked improvement under both forms of instruction. In Bulgaria Zdravchev and Paspalanov (1985) studied whether the de Bono method of teaching thinking would influence Raven's Matrices scores. Subjects were in grades 2 to 6, 176 males and 192 females, with 164 males and 182 females acting as controls.

Comparison of pre- and post-Raven tests showed significant differences in favor of those students who had been taught thinking skills. Although the boys seemed to have made most improvement, an analysis of the data indicated that the experimental group of girls performed significantly better on the pre-test than the males, although no control was made for their better pre-test performance. The investigators also commented that great developments were observed in the experimental group's originality scores on the Torrance Test after training in thinking.

Although humor has been considered an important indicator of creativity (Renzulli, Smith, White, Callahan, & Hartman, 1976) and the fourth edition of the Stanford–Binet test includes a section on absurdities (Thorndike, Hagen, & Sattler, 1986), little has been done to explore gender differences in the humor of creative young people. Westcott (1983) studied the self-generated humor of 26 males and 36 females (IQ 120+) in grades 9 to 12. No significant sex differences were found in the five measures investigated—objective humor, qualitative humor, the circles subtest and unusual uses subtest in the Torrance Test of Creative Thinking or the IPAT Humor Test. The small size of the sample might have been the reason for the lack of significance.

Ziv (1981) selected her sample of 162 boys and 182 girls in grades 9 to 11 from four Tel Aviv high schools. On the three measures of humor the boys scored significantly higher. Test used were: (1) Sociometry, in which each student had to list the names of those they knew who had a very good sense of humor, another list for those with a good sense of humor and a third list of those without a good sense of humor. (2) Humor creation—the students were given 10 cartoons without captions and were asked to look at the cartoons and write the funniest caption or dialogue they could think up. (3) Humor questionnaire in which the adolescent humorists and their nonhumorist peers completed a semantic differential scale containing 16 bipolar adjectives. While the self-concept of humorist boys was not significantly different from that of nonhumorist boys, the humorist girls' assessed self-concepts were significantly below those of the non-humorist girls. Ziv considered that the view of themselves of humorists girls was poorer because they saw themselves as more assertive than their nonhumorist peers. Ziv believed some aspects of sex stereotying would be removed if girls' expressions of humor were rewarded at school.

To summarize, creatively talented females tend to perform better on fluency, flexibility and elaboration, with older creative boys producing more complex original ideas. The research by Severeide and Sugawara gives support to the view that gifted young girls benefit from direct instruction in aspects of creativity more than young boys, but in the elementary grades Zdravchev and Paspalanov found that both girls and boys improved their thinking skills with training. Humor is one topic talented girls need to understand. They need to know how to handle the "teasing" of males (Reis 1987), and gain confidence within themselves to break away from sex stereotyped behavior.

Mathematics and Science

Of all aspects of academic performance, mathematics has received most attention by researchers studying gender differences in the gifted. Women concerned about equal opportunities in the work force realized that adolescent girls were closing doors of

opportunity by not studying mathematics to advanced levels. Maccoby (1972) pointed out that the results of adolescent girls in mathematics dropped below their male peers even though, in the elementary school, girls had performed on average as well as the boys (Leder, 1989; Schildkamp-Kundiger, 1982).

Fox (1974) presented a paper at the annual meeting of the American Education Research Association in which she stated that 10% of male contestants (N=22) in the Johns Hopkins mathematical talent search scored at or above 660 on the SAT-M. Even though 44% of contestants were girls, no girl scored above 600. In 1973 the highest score for girls was 650, but 7% of male contestants surpassed this highest scoring girl and two boys obtained a mark of 800. Since that paper there have been a number of books and articles from the Johns Hopkins University study (Stanley, Keating, & Fox, 1974; Fox, 1978; Fox, 1982; Benbow & Stanley, 1980; Benbow & Stanley, 1982; Stanley & Benbow, 1983; Benbow & Minor, 1986; Stanley, 1988) which highlight the significantly better performance of gifted young males on the SAT-M tests. The researchers concluded that it was mathematical reasoning where the boys had an edge on the girls. Alexander and Pallas (1982) were careful to point out that the Johns Hopkins University findings related to gifted mathematicians and not to the general population of adolescents.

When only the talented are considered, it is not surprising that the boys outperform the girls because of their greater variability. Kaufman (1984) balanced her numbers of fifth and sixth graders so that she had 63 boys and 63 girls from the 97th percentile to the 99th. Similar numbers composed the average groups, scoring between the 50th and 70th percentiles. Her findings showed no significant differences in the performance of average girls and boys in mathematical reasoning on the Iowa Test of Basic Skills, or Mathematics Problem Solving (Test M-2, level 13, form 7), but in the gifted group the boys scored significantly better.

Not only in North America have SAT-M results favored mathematically gifted boys over the gifted girls. Kissane (1986) obtained significant differences in Western Australian samples. Wagner and Zimmermann (1986) found SAT-M to discriminate in favor of boys, whereas results of the *Hamburg Test für Mathematische Begabung* (HTMB) tended to show the sixth grade girls performing, if anything, slightly better than the boys. The HTMB concentrated on (1) organizing material, (2) recognizing patterns or rules, (3) changing the representation of the problem and recognizing patterns and rules in this new area, (4) comprehending very complex structures and working within these structures, (5) reversing processes and (6) finding (constructing) related problems. However, Wagner and Zimmermann did point out that in their sample of 159 gifted mathematics students (123 boys and 36 girls) the ratio was 4 boys to 1 girl. Greater variability among boys alone could not account for the difference. Wieczerkowski and Jansen (1989) reexamined the results of the talent search in Hamburg over the period 1984–1988. They looked at the right solutions, wrong solutions and omissions in the SAT-M according to sex. Taking the mean scores for the five years, their results showed little difference between girls and boys in the wrong solutions (boys 21.3, Girls 21.9), but a very significant difference in the mean number of omissions (Boys 9.7, Girls 11.8).

Weiner and Robinson (1986) studied the mathematical performance of 77 boys and 62 girls attending a summer project. They were 7th graders who had achieved stanine 9 on SAT-M. Their results supported the Johns Hopkins University studies in that they found spatial visualization made the weakest contribution to the variance between the sexes. They concluded that mathematical reasoning ability as measured in SAT-M was

the major variable discriminating between boys and girls. Verbal ability, spatial ability and personality factors for these talented mathematicians did not differentiate the sexes. These researchers found that mathematical ability was the primary predictor of mathematical achievement for boys (r=.50). For girls verbal ability was primary (r=.38).

Astin (1974) noted that spatial relationships emerged as one of the most consistent and strongly differentiating aptitudes between the sexes. However, Pearson and Ferguson (1989) using first year college students as subjects, indicated that sex differences in spatial relationships were more complex than originally thought. For example, with reading a map there were no sex differences. Nor were sex differences shown in the results of the group Embedded Figures Test (EFT). Only the Shepard/Metzler Mental Rotations Test (MRT) and the Differential Aptitude Spatial Relations Test (DAT) showed the expected sex difference. The four spatial ability tests used by Pearson and Ferguson were significantly correlated with both mathematics and English achievement. However, for men mathematics achievement alone was predictive of the composite spatial ability score, but both mathematics and English achievement were predictive of spatial ability for women.

Although most research on mathematics has focused on gifted students' scores on SAT-M, Brekke, Johnson, Williams, and Morrison (1976) studied the mastery of conservation of weight with gifted (individual IQ results between 130 and 155) and average children (IQs between 80 and 115) between the ages of nine and a half and twelve and a half. While the intelligence quotients were significantly different, mastering conservation of weight was not. Rather, sex made the highest independent contribution, with the boys conserving weight more often than the girls. The investigators pointed out that Piaget's conservation of weight requires experience. The girls, then, were not receiving experience essential for mastering conservation of weight. When interviewing girls and boys in grades 3 and 6 in Melbourne, Leder (1989, p. 221) noted that "girls seemed to spend more time on sedentary indoor activities; boys on active outdoor pursuits." Confessore and Confessore (1981) also noted that girls were less active. In spite of similar performances by girls and boys on mathematics tests, teachers in grades 3 and 6 rated 25% of the boys and only 14% of the girls as above average, compared with 18% of boys and 28% of girls in the below average group. The statement by Wieczerkowski and Jansen (1989) that mathematics teachers must expect the same performance from the girls as they do from the boys must be emphasized to elementary schools teachers, where attitudes about gender and school subjects are being formed by their pupils.

In spite of the evidence, Rodenstein (1981) argued that there were no cognitive differences in her sample of adults identified as gifted in high school. But she had included in the equation a control for the number of mathematical studies taken. Rather than controlling for the fewer mathematics subjects chosen by girls, it would be more relevant to ask why Leder (1989) found 51% of grade 4 and 6 boys electing mathematics as a favorite study compared with 21% of girls, although the girls were performing as well as the boys.

Buescher and Higham (1987) examined the way 12 to 16 year olds handled their talents in mathematics and verbal ability as assessed on SAT-V and SAT-M. A main effect was sex. They found that between ages 13 and 16 boys employed more strategies and relied on support from adults. Girls employed fewer strategies and relied on support from friends,

who might be gifted or nongifted. The girls were more willing to sacrifice their talents in order to blend in with their increasingly diverse peer group. They tended to dismiss the reality of their talents and kept their accomplishments quiet. They wanted to integrate more areas of their lives and seek more acceptance in a wider context than the boys. The boys coped with being different by acquiring more recognized labels and staying in a group of equally talented friends. By so doing they would be challenged to achieve. By 16 years of age Buescher and Higham observed that girls who had retained active use of their talents were similar to 16 year old boys in the strategies they used. Unfortunately only a few girls reached that stage. Loeb and Jay (1987) studied the self-concept of gifted children aged 9 to 12 (60 males and 65 females) and compared the results with a control group of average children from the same school districts. Gifted girls were found to have a very positive self-image as a result of their classroom success. They were models of good behavior, conscientious and obedient. The boys on the other hand were learning to be self-reliant and individualistic, characteristics which did not make life easy in the elementary school but helped to foster the development of their reasoning powers.

Wieczerkowski and Jansen (1989) studied an education setting where the able girls and boys were taught together, with special consideration given to fostering positive attitudes to mathematics and science. They observed quite marked changes in stated attitudes, particularly when compared with girls and boys attending academic secondary schools (Gymnasium). This result is contrary to that of Ormerod (1975), who found more sex linked polarization of subject choices in coeducational schools. However, Watson (1988) obtained results on a mathematics test for able Year 10 girls in two selective high schools (one a single sex girls' school and the other a coeducation school) which showed no significant difference in mathematical performance between the two groups of girls. One possible reason for her results was that in the coeducational school modern mathematics texts were used which deliberately presented girls as mathematical achievers. The girls in the single sex school were still using older texts that did not sell mathematics as a girl's subject. Schildkamp-Kundiger (1982) pointed out that in England and Wales at age 11 the achievement of girls was higher than boys. But the degree to which a girl adopts the concept that mathematics is a male domain is dependent on the sex role conceptions of her environment. If mathematics textbooks focus on males and male interests it is little wonder that girls see mathematics as masculine.

Campbell and Connolly (1984) hypothesized that the large gender differences seen among our scientists, mathematicians and engineers should apply to all ethnic groups if, in fact, gender were the cause. They studied a group of 209 Caucasians and 78 Asians enrolled in advanced science and mathematics courses. The Asians were found to be more influenced by their families. Asian females saw themselves as more radical than any other group, rating research activities more important than the males. Caucasian females put in the least time on research. It was the Caucasian males who made negative comments about the girls such as: "Girls just care about their hair—how they look", "Girls can't grasp numbers", "Girls shy away from abstract thinking", "Girls do more with their friends." Such psychological and attitudinal differences between the sexes did not hold for the Asian students. Asian families put a high premium on education, and females were encouraged to explore any talents they had. The Caucasian females saw themselves as very different from the males in the honors classes; the Asian females were more concerned about doing their best.

Rees (1981) in England made an intensive study of 400 mathematically able pupils at

the end of the fourth year. They were drawn from one comprehensive school and one selective school, where the heads of the mathematics departments were both female. Pupils in both schools were encouraged equally in their mathematics studies. Sex related results showed no significant differences in "g" maths score, Thurstone's reasoning and verbal abilities, Eysenck's Extraversion, Furneaux's Persistence Levels, stressed and unstressed speed, and stressed accuracy. But boys showed a significant preference for mathematics. They found mathematics easier and finished their mathematics more quickly. Boys performed better on Thurstone's Numerical and Spatial Ability tests. Girls performed better on Furneaux's unstressed accuracy, were more neurotic, "tender-minded" and more keen to please. These last three traits appear to correlate with the findings of Loeb and Jay just mentioned. Fox (1978) would say that Rees's girls were internalizing a "feminine" orientation, making their motivation to solve difficult mathematics problems less effective.

The way mathematics and the sciences are presented to girls in the classroom is also an important factor. Subotnik (1988) asked a group of 300 students, selected on the basis of the quality of their 1000 word research reports in the 1983 Westinghouse Science Talent Search, to complete a questionnaire. A total of 93 males and 49 females responded to the section on the "Image of Self as Scientist". Four categories were used: intuitive synthesizer, rigorous experimentalist, humanistic scientist and abstract theorizer. While 25% of males saw themselves as abstract theorizers, only 8% of females checked that category. Further, 39% of males checked intuitive synthesizers compared with 18% of females. The percentage selecting humanistic scientist were almost the same (17% males, 18% females) but 55% of young women and only 29% of males selected rigorous experimentalist. No wonder many able young women are turning away from physics, which is becoming much more closely associated with philosophy than the rigorous scientific method. Although only 41 males and 20 females responded to the question on the qualities admired in a scientific hero or heroine, 60% of female respondents checked "Dedication to Work" compared with 17% of males. For the males the most preferred quality was intelligence (29%).

In summary, it is apparent that gifted adolescent males are performing much better in some aspects of mathematics than mathematically talented girls. Contrary to earlier speculation that the better performance of males is a result of their higher spatial abilities, careful analysis has shown that spatial abilities make only a minor contribution to mathematical performance, but mathematical reasoning, as measured in SAT-M, seems much stronger in the gifted boys. By around 16 years of age mathematically gifted boys and girls seem to have similar personality characteristics but the present ratio of 4 boys to 1 girl is out of proportion, even taking into account the greater variability among boys. More recent studies are examining the attitudes and motivation of high school girls, and the environmental pressures on them to conform to society norms. However the work by Brekke *et al.* indicates that in the early school grades girls are missing out on experiences that could influence their mathematical development in the upper grades. Leder's investigation suggests that attitudes to mathematics are being firmly established in the early school years. Much more research should focus on attitude development in the elementary school years and on appropriate procedures for helping girls to compensate for their less active interaction with the environment.

Career Planning

Ekehammar (1985) carried out a study of the status of women graduates in Sweden from 1972–73 to 1982–83. One task she set able 18 year old high school students and 27 year old former able students was to express their attitudes towards science and research on a semantic differential scale. There was no significant difference in the way the two groups of women saw research. While they considered it good, useful, and of high status, they also regarded research as tending to be closed, cold, difficult, masculine and authoritarian. Eight years after graduating from high school 23 men and 13 women who had received the highest grades were asked to describe their careers. All 23 men had trained for a profession or were still in training. There was one law school student and one minister, but the other 21 men were in careers requiring science and technology. Of the women there was one physician, one civil engineer and one law student. Three were grade school teachers, one an early school teacher, one a nurse, two housewives and three clerks. Two of the clerks had BA degrees, the other a social work degree. Ekehammar also looked at the careers of these gifted people in relation to whether their fathers had been or were in white collar or blue collar occupations. The boys of blue collar workers chose, with one exception, careers involving technology: dentistry, engineering, physiotherapy and research psychology. The exception became a social worker. The women chose clerical work, elementary and early childhood teaching, with one obtaining a social work degree. Jensen and Hovey (1982) also found that the socioeconomic status of the family influenced the career prospects of gifted females. They concluded that the effects of lower socioeconomic status were detrimental for women.

Kerr (1985) obtained similar results to Ekehammar when she studied the careers of males and females in her special accelerated learning class 25 years later. Few of the women in Kerr's class had postgraduate degrees or high status careers. Fox (1982) noted that no young male mathematician contemplated any period of their lives being given over to child rearing, whereas over 70% of the females saw child rearing as interrupting their careers. Little wonder Schroer and Dorn (1986) found women students less certain about their careers than men. While a number of highly gifted women find they can combine a career with child rearing and family responsibilities (Rodenstein & Glickhauf-Hughes, 1979) there is a need to educate men to take responsibility for family chores, in particular child care.

Hollinger (1984) explored the views of talented adolescent girls about their personal attributes, using the Personal Attributes Questionnaire (PAQ). The 284 participants were classified as Undifferentiated, Masculine, Feminine, Androgynous. Their profiles on Holland's Self Directed Search were then compared. Those grouped as feminine were more likely to score highly in the career areas of enterprising and social, while those classified as masculine were more interested in realistic and investigative careers; this confirms the view of Ekehammar's gifted Swedish young women that research was masculine.

Tomlinson-Keasey and Smith-Winberry (1983) used the California Personality Inventory (CPI) to compare the personalities of gifted and nongifted college students. They found an interaction between sex and giftedness, the 42 control females obtaining significantly lower scores than the 60 gifted, while the 31 control males obtained higher scores than the 59 gifted males. They then grouped the gifted females into the type of

school education they had experienced: (1) all day classes for the gifted; (2) special enrichment programs and honors course; (3) occasional field trips and honors course. Results showed that those females who had been in the all day classes had the advantage as far as their personal expectations were concerned, as well as the expectations of significant adults and peers.

In an extensive study of 60 gifted adolescents (30 males and 30 females) aged between 16 and 18 years, Leroux (1986, 1988) observed that gifted males experienced more anxiety about new situations, their personal appearance, social interactions and ability to adapt to external expectations. The females, however, were more anxious about impulse control and familial relationships. While the gifted females felt they had gained much from feminist consciousness raising, they were more concerned about teachers' reactions than the males. Further, the girls adapted more to adult expectations, while the males adapted more to peer expectations. As the gifted males tend to associate with other gifted students (Buescher & Higham, 1987) they would greatly advance their learning.

Fox, Tobin, and Brody (1981) studied the career development of gifted women and concluded that between 1972 and 1979 there appeared to be a growing interest in investigative careers among girls. The analysis for the 1979 group suggested that a number of gifted girls might be selecting careers in medicine in an attempt to integrate their social and scientific interests. Part if not all the credit for this change in attitudes among gifted American girls must be given to the changes in attitudes in the community relating to the appropriateness of women continuing their careers when they marry and have children (Boyd, 1988).

Dolny (1985) carried out a study of the University of Toronto School's gifted students (108 females and 120 males) aged 11 to 18 years. Unfortunately no breakdown according to the age of these young people was given, but Dolny indicated they came from homes where father was a professional with a postgraduate degree and mother, also with university training, had made a career within the home. He found that both gifted boys and girls were similar in their expectations of careers, although more of the girls stated their expectations of becoming professionals than boys. Most students expected to be single until after 26 years of age, when they would marry and have three or more children. But while most of the girls saw no work/family conflicts, because both husband and wife would share home and family responsibilities, half the boys were unsure of their perceptions of the work/family conflict for their spouses. This finding suggests the need to help gifted adolescents face up to the problems of parenting and having careers, particularly if their own experience has been with a mother who has made her life in the home.

Conclusions

Mathematical performance has been central to research into sex differences among our ablest young people. Present knowledge indicates that mathematically talented boys perform significantly better on certain aspects of mathematical reasoning. Campbell and Connoly (1984) questioned the gender aspect of this difference because Asian girls were not found to be significantly weaker in mathematics. Differences in language have not been explored in depth yet, but there is a suggestion that boys generally perform better

on listening comprehension tests. If this is confirmed for the gifted, a theory emphasizing the rigorous practical nature of gifted girls compared with abstract theorizing among the boys might explain some of the findings on gender differences among the talented, as well as accounting for the fact that girls respond well to structured lessons. Recent research on gifted adolescents' ideas about careers indicates the need for talented adolescents to understand the importance of the career/parenting conflict when planning their futures. At present a gifted young woman cannot assume that her husband will take an equal share of child rearing and household responsibilities.

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Biography

Rae Boyd (now retired) was senior lecturer in Education at the University of NSW, Australia. Following her PhD dissertation into the assessment of reading comprehension, her research focused on the significance of spoken language in the development of reading skills. Since 1978 she has undertaken a longitudinal study into the needs of talented young people in the high school years and has become an advocate of special provision for the most able teenagers.

CHAPTER 5

THE HANDICAPPED GIFTED

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Abstract

Gifted handicapped children require special education services for one or more types of handicap and one or more areas of potential giftedness. The same multifaceted identification procedures used with gifted children in general produce the best results, although special considerations relative to comparison group, test modification and compensatory strategies are required for specific areas of handicap. Incorporating elements of handicapped and gifted education, successful programming includes diagnosis of individual strengths and weaknesses, remediation of deficits, nurturing of gifts and talents and attention to affective development. There is a need for research relative to all aspects of education for the gifted handicapped.

Introduction

Concern with individuals who are both gifted and handicapped is not new. There are many historical examples of highly talented men and women who have overcome disabilities to make unique contributions to society. Some obvious examples include Helen Keller (deaf, blind, mute), Thomas Edison (deaf, dyslexic), Beethoven (deaf), Albert Einstein (dyslexic), Itzhak Perlman (physically impaired). How many more gifted individuals, however, with some type of disability, have been unable to transcend their handicap because their potential has not been identified and/or specialized training has not been available?

Before the 1970s, gifted children who had handicaps were generally undereducated. Where they received special programming, if at all, it was in the area of handicap, with no special provision for extending their gifts and talents. "Only a few who had environmental advantages or visionary, innovative educators were enabled to develop their gifted potential" (Johnsen & Corn, 1989, p. 15). Within the last fifteen or twenty years, however, there has been a growing professional awareness of the educational needs of gifted children who may also be handicapped. In the United States, the first national conference on handicapped gifted and talented students was held in 1976, and the category "gifted handicapped" was added to the indices of the Educational Resources Information Centre (ERIC) in 1977 (Whitmore & Maker, 1985). By the mid-seventies, at

least eight special programs for gifted handicapped children were in operation (Maker, 1977), and special groups to further the interests of the gifted handicapped were created (Johnsen & Corn, 1989).

Despite the flurry of professional interest, research and educational programming reported in the literature in the 1970s, there was a general tendency to neglect the special needs of gifted handicapped students through the 1980s, according to Karnes, Gallagher, and Hanninen, leading American advocates for gifted students with disabilities interviewed by Whitmore (1989). Karnes attributes neglect to lack of leadership, with teachers of the gifted usually unaware of services for handicapped children and teachers of the handicapped not trained to recognize potential gifts or talents. State consultants for the gifted may not even know the consultants for the handicapped!

Gallagher notes that, logistically, the small numbers of students who are both gifted and handicapped make it difficult for school districts to allocate limited resources for special program development, while psychologically, people who work with handicapped or gifted children may not be able to respond appropriately emotionally to the other group. "Children who are gifted almost seem to be disliked . . . for their potential, or disregarded at the very least" (Whitmore, 1989, p. 8) by professionals trained to work with the handicapped, while educators of the gifted "can be made uncomfortable even by the presence of handicapped children in the same program" (Whitmore, 1989, p. 9). Hanninen refers to the emphasis within special education programs on the handicapping condition, and not on serving the whole child. Where the handicapping condition is severe, teachers consider the development of necessary skills to be so important to the developing child that they relegate other considerations, including encouragement of potential giftedness, to a position of secondary importance.

In spite of the general decline in educational provision for the handicapped gifted during the last decade, professional concern for this population has remained strong, and articles on the topic have continued to appear in the literature, particularly within the last five years. Nevertheless, education of the handicapped gifted remains a "new frontier" (Whitmore, 1981; Whitmore & Maker, 1985), and considerable research initiatives with respect to all aspects of this specialization are indicated. This chapter will be limited to issues relative to definition, identification, and programming for gifted handicapped students.

Incidence

Who are the gifted handicapped? Because of the multiplicity of handicapping conditions and the multifaceted nature of the definitions of giftedness currently employed, a variety of individuals with different profiles of strengths and weaknesses may be considered to be gifted handicapped learners. These include the mentally retarded, hearing handicapped, speech impaired, visually handicapped, seriously emotionally disturbed, orthopedically or other health impaired children, or children with specific learning disabilities (U.S. Congress, 1975). In the United States, these children are eligible for special education services if the impairment prevents them from performing appropriately in regular programs. Except for mental retardation, all of these categories of handicap can coexist with potential giftedness.

A gifted handicapped child, then, is one who requires special education services for one or more types of handicap and one or more areas of potential giftedness. A

definition this broad is both helpful and problematic in fostering research. On the one hand, there are few restrictions on the topics that can be investigated, but on the other, it is difficult to know where to begin. With a population which is so diverse by definition, a fundamental question that needs to be answered is whether this is a specialization at all, or merely a conglomeration of subspecializations lumped together conveniently for administrative purposes. What is common to all the possible manifestations of gifted handicap? What is different? Are the commonalities sufficient to clearly delineate and provide cohesiveness for the field? In the course of doing this review, it was observed that literature dealing with the "handicapped gifted" tends to focus on "apple pie" issues such as the psychosocial needs of gifted handicapped children and the dire consequences of inappropriate programming. In contrast, articles on discrete subpopulations tend to report specifics regarding identification, programming and the like. In other words, the educational impact of the field is found within very specific types of gifted handicap. It remains to be shown that procedures developed with the gifted learning disabled or the hearing impaired, for example, are generalizable to all gifted handicapped.

It is generally acknowledged that the incidence of gifted handicapped children is low: Various estimates range from a conservative 2% of all handicapped children in the United States or between 120,000 and 180,000 (Schnur & Stefanich, 1979), to a more liberal 5% or between 300,000 and 540,000 (Whitmore & Maker, 1985). These estimates are based on the assumption that the incidence of giftedness among the handicapped is similar to that within the general population, given that, with the exception of mental retardation, handicapping conditions typically do not preclude giftedness. Reported percentages within subpopulations have varied a great deal: 2.3% of learning disabled children (Mauser, 1980), 4.2% (Gamble, 1985) and 6.1% (Yewchuk & Bibby, 1989a) of children in classes for the hearing impaired, and 9.2% of preschool handicapped children (Karnes & Johnson, 1986). These empirically derived rates cannot be considered definitive, because of inconsistency in the operational criteria for giftedness and, more obviously, the nature, severity and effect of handicap.

Identification

There is general agreement that modification of the screening and identification procedures commonly used with gifted children is required in order to increase the likelihood of recognizing potential gifts and talents among handicapped students. General guidelines for modification proposed by Maker (1976, 1977; Whitmore & Maker, 1985) include comparison with similarly handicapped peers, not with the general population of gifted learners or nonhandicapped students; modification of test situations to make it possible for handicapped students to respond without bias to their true ability; and greater emphasis on characteristics instrumental in successful compensation for the handicapping condition.

Pendarvis and Grossi (1980) suggest that the special concessions must be specific to the type of handicap. Corn (1986) argues that, where specific identification procedures have not been developed for a particular segment of the handicapped population, checklists and other criteria for giftedness need to be examined to determine whether they are appropriate. Johnson (1987) has found, for example, that checklist items such as "understanding of abstract concepts" and "perceptive of the environment" are very

difficult for visually impaired students. She believes that "if a blind youngster rates high average in relation to sighted children . . . this is a sign of high intellectual ability, considering the obstacles he must overcome" (p. 51). Functioning at, or somewhat above, grade level is also considered exceptional for hearing impaired children (Yewchuk, Bibby, & Fraser, 1989).

In some cases, it is recommended that the IQ criterion cutoff requirement for admission to programs for gifted learners be lower for the handicapped than the nonhandicapped. For example, educators working with the learning disabled gifted typically use WISC-R scores of 120 or 125 on any one of the Verbal, Performance or Full Scales instead of the more commonly employed 130 and over (Yewchuk, 1986). Since it is crucial that modifications be based on a thorough understanding of the limitations of a student's handicap, Stefanich and Schnur (1979) recommend that, where possible, the evaluation process should involve an examiner who is similarly handicapped.

In an attempt to delineate the differential effect of varying sources of information on the effectiveness of the identification procedure, Yewchuk and Bibby (1989a) utilized nonverbal intelligence test scores, teacher nominations and parent nominations in two educational settings, a school for the deaf and classes within a public school system. All students were severely or profoundly hearing impaired. Achievement indices were not included in the study because of the difficulties inherent in reliable standardized assessment of students typically lagging four to five years behind their hearing agemates. Parent nominations were included because parents may be able to report on behaviors and activities that are not evident in school. Of the 47 students who were nominated 22 were identified by teachers only, 11 by parents only, and 14 by both teachers and parents. Thus parents nominated students whom teachers did not nominate and vice versa. The most glaring disparity between parent and teacher nominations appeared with regard to the two students ranked highest in IQ. A student with an IQ at the 99th percentile was nominated only by a parent, while another similarly intellectually gifted student, scoring at the 98th percentile, was nominated only by a teacher. Statistical procedures indicated that parent nominations, teacher nominations and IQ scores functioned independently of each other. No significant correlations were found betwen parent nominations and teacher nominations; parent nominations and IQ; and for the most part, between teacher nominations and IQ. Yewchuk and Bibby (1989a) concluded that "All three measures appear to provide important sources of information in a comprehensive scheme to identify gifted hearing impaired children" (p. 46).

Several studies have shown that unless adults have specific training in the characteristics of giftedness among handicapped children they may fail to identify these children for special programming. In a dramatic example, Eisenberg and Epstein (1981) found that when teachers of handicapped children in New York were initially asked to nominate children for a program of gifted and talented learners, not one nomination was received. The situation was improved after the teachers were given inservice training on the needs and characteristics of these children. Waldron, Saphire, and Rosenbaum (1987) found that teachers who have training in special education are more likely to identify gifted students with learning problems than regular classroom teachers without such training. They concluded that gifted learning disabled students "may be masking failure through passive behaviors, and that they may be unidentified at home and school, unless adults are trained in special education" (p. 422). On the basis of an extensive survey of special education and gifted programs in Texas, Boodoo, Bradley, Frontera, Pitts, and Wright

(1989) noted that gifted learning disabled children often fall into the gap between the two types of program. They recommended that all classroom teachers be informed about the characteristics of gifted learning disabled learners to enable appropriate placement relative to strengths and weaknesses.

Within the schools, the primary defining characteristic of learning disability is a discrepancy between measures of aptitude and achievement. Because children with exceptional talent may develop strategies to compensate for areas of disability, the disability may become obvious only if very severe. The usual procedure for identifying students for both gifted and learning disability programming includes nomination, screening and selection, with the classroom teacher being the usual source of nominations (Fedoruk & Yewchuk, 1986; Gunderson, Maesch, & Rees, 1987). It is thus very important that the classroom teacher be aware of the discrepant nature of the characteristics exhibited by gifted learning disabled children. Provisions need to be put in place to de-emphasize achievement scores in the selection process for gifted programming. In general, what teachers need to be sensitized to are the ways in which handicapping conditions can impede the expression of characteristics revealing giftedness. Where normal channels of expression are blocked, teachers must seek out alternate modes of assessing superior qualities of thought. "Identification must depend less on oral and written language to reveal giftedness and rely more on assessing mental abilities through tasks requiring problem solving, memory, critical thinking and creativity" (Whitmore, 1981, p. 110).

Attempts to identify distinguishing characteristics of giftedness have been most extensive with learning disabled students. Empirical studies have focused primarily on WISC-R subtest scores (Barton & Starnes, 1989; Fox, 1983; Schiff, Kaufman, & Kaufman, 1981). In general, the results have been congruent with informal reports by teachers and parents of an inconsistency between strengths in abstract reasoning, problem solving and quick understanding, on the one hand, and difficulties with learning in specific areas such as reading on the other. The pattern of WISC-R subtest scores for gifted learning disabled students combines the highs usually noted for gifted students and the lows usually found for learning disabled students. The highest scores are found on measures of verbal conceptualization/comprehension (Similarities, Vocabulary, Comprehension), and the lowest on measures of sequencing/distractibility (Arithmetic, Digit Span and Coding). Some divergence from this general patterning has been noted. Silverman (1989) found Block Design to be among the high scales in a clinical sample. Fox (1983) found Coding among the highest and Vocabulary among the lowest scales for girls. Additional research into factors associated with divergent WISC-R patterning appears to be necessary.

A study involving teachers of the hearing impaired revealed that the characteristics associated with giftedness are essentially the same as those typically reported for hearing students (Yewchuk, Bibby, & Fraser, 1989). Teachers of the hearing impaired associate superior recall, speed of understanding, reasoning ability, expressive ability, eagerness to learn and keen observation with giftedness. Like their hearing counterparts, hearing impaired students are seen to excel in intellectual, academic and motivational endeavors relative to their peers. A checklist of general learning/motivational characteristics developed by Pledgie (1982) is useful for teachers and others as a gross initial indicator of potential or functional giftedness in handicapped children. Labelled "Teacher Observational Items" (TOI) it consists of the following items (p. 223): (1) Has advanced,

expressive and elaborate vocabulary. May read prior to school entry. (2) Memorizes and recalls information easily. (3) Is aware of cause/effect relationships. Questions and applies information; doesn't just recall facts. (4) Engages in divergent thinking. Generalizes and provides more than one possible correct answer. (5) Has a prolonged attention span. Is persistent. (6) Has many interests. Is curious. May be a high risk taker. (7) Displays a sense of humor. The TOI is intended to identify a pool of individuals among the handicapped who may be gifted. It is important that observations of student behavior are made over time, with opportunities for discussion between parents and teachers. Pledgie (1982) cautions that no one checklist is capable of identifying the multiplicity of characteristics of the gifted handicapped, and that, following the initial screening, appropriate standardized measures, specific to areas of disability, and modified as necessary, should be administered by qualified personnel. A listing of appropriate instruments crossmatched by type of disability and area of giftedness is provided by Pendarvis and Grossi (1980).

Programming

Appropriate educational programming for handicapped gifted children combines basic approaches and practices from handicapped education as well as gifted education. In general, such programming includes accurate diagnosis of strengths and weaknesses, special education services for deficits, accommodation of gifts and talents and development of self-concept (Yewchuk & Bibby, 1989b). Program particulars are specific to type of handicap and area of giftedness addressed. The programs which are described below have been selected to illustrate a variety of educational delivery systems and areas of gifted handicap.

A highly successful program for preschool handicapped gifted children, referred to as Retrieval and Acceleration of Promising Young Handicapped and Talented (RAPYHT), initiated at the University of Illinois in 1975 as a federally funded demonstration project (Karnes, 1979, 1984), has been replicated at 77 sites in 18 states (Karnes & Johnson, 1986). Teachers in ongoing programs for handicapped children are trained in recognizing characteristics of gifted and talented children and in facilitating the emergence of talent. Screening instruments in the six areas of giftedness have been developed by project staff for use by parents and teachers. The final identification of children for RAPYHT programming is determined by a multidisciplinary team on the basis of parent and teacher referrals, standardized test results, observation of the children, and exhibited characteristics of giftedness. Following an indepth assessment of a child's level of functioning within each talent area, a Talent Education Plan is written, analogous to an Individual Education Plan for remediation in areas of weakness, and individualized programming is implemented. Family members are viewed as partners in the RAPYHT program, and encouraged to participate according to their needs, interests, and level of comfort. Project evaluation of creativity, basic skills in the talent area, interests in the talent area, task persistence and self-concept is conducted annually on a pre/post test basis (Karnes, 1984). Significant short term gains have been reported on measures of self-esteem, school related task persistence, creativity, and talent area functioning (Karnes, Schwedel, & Lewis, 1983b). A follow-up study of children enrolled in the RAPYHT program one to five years later indicated that they performed at or above

grade level on nationally normed tests of academic achievement. Teachers rated these students above their classmates on listening skills, self-assurance, memory skills, writing skills, attention span and self-concept (Karnes, Schwedel, & Lewis, 1983a).

The educational problems inherent in including handicapped children in a "regular" gifted and talented program are presented by Paskewicz (1986). How does one teach material about a subject that someone has never visualized to a visually impaired student? In developing a four week unit on astronomy for a group of 15 students aged 8–10, Paskewicz (1986) found the major stumbling block to be a lack of adequate braille materials. It was also crucial to prepare the teacher and sighted students for working with a blind student through discussions about how to assist blind people, what blindness constitutes, and how to dispel stereotyped beliefs. The issue of elitism arose in conjunction with a six week summer school program for gifted visually handicapped adolescents at the Texas School for the Blind (Hackney, 1986). Critics expressed skepticism that these students require a program that is different from that of other visually handicapped students, citing their deficiencies in areas such as braille usage, orientation and mobility and social skills. Supporters on the other hand focused on the additional needs of these children because they are gifted, and argued that "one set of needs does not negate the other" (p. 94).

At the Texas School for the Deaf (Pollard & Howze, 1981), two gifted staff resource teachers assisted in differentiating curriculum for students identified as gifted according to multiple criteria varying with age. At the elementary level, the resource teacher worked with the regular classroom teacher to enrich the curriculum for the seven identified gifted students. In the middle school, the six gifted and talented students were grouped together to receive instruction from five different teachers for academic subjects, and integrated with other students for their elective classes. These teachers had received instruction on the gifted and talented through inservice training programs and also had access to the services of a gifted resource teacher. At the high school level, students attended regular classes for instruction in each subject. In addition, they attended a class designed especially for gifted students, and worked individually with the gifted resource teacher on a pullout basis.

Baum and her associates have described how the special talents of gifted learning disabled children can be accommodated within the Enrichment Triad Model (Baum, 1984, 1988; Baum, Emerick, Herman, & Nixon, 1989; Baum & Kirschenbaum, 1984; Baum & Owen, 1988). Based on the criteria of above average ability, creativity and task commitment, gifted learning disabled children can be evaluated on psychometric, developmental, performance and sociometric indices. Information about the students' talent areas can be gathered from standardized tests, interviews with parents and teachers, checklists, and products completed by the student. The model is considered to be especially suitable for gifted learning disabled students because of the provision of a wide variety of experiences, and the flexibility in options for creative production. Baum (1988) believes that programs for gifted learning disabled students should focus on the children's gifts or talents. They should not be embedded within a remedial model. Remedial approaches tend to focus on isolated basic skills such as mastery of math facts or phonetic analysis. Such noncontextual learning is at odds with the global, contextual learning styles of gifted students, as in the case of Neil who was failing in all his subjects (Baum & Kirschenbaum, 1984). He was depressed and turned off by school. His teachers considered him lazy, claiming that he was not working hard enough. Neil's weaknesses

were in short term visual memory, and written expression. He had great difficulty in writing a well organized paragraph. Remediative activities only made Neil angry; he felt that he was doing better only because of the special concessions made by the school on his behalf. When the school tried to use his interest in photography as a means of building up his weaknesses he rebelled to the extent of giving up photography. This example points to the need for accommodating student strengths in their own right.

An alternative approach to intervention with the gifted learning disabled which focuses almost exclusively on the home setting is described by Sah and Borland (1989). Eight boys and one girl in grades 4 to 6 of a private school for gifted children were referred to a learning disabilities specialist because of poor organizational skills, such as inability to follow instructions, persistent classroom underachievement, and discrepancy between scores on intelligence and achievement tests. In conjunction with the parents, a "home plan" consisting of a detailed timetable structuring the child's after school activities and a set of parental techniques for monitoring and reinforcing those activities was drawn up. Periodically during the intervention period the learning disabilities specialists met with the student and parents, and visited the home to discuss, modify and monitor the progress of the plan. Instruments for assessing behavioral changes were administered before the study began, at the end of the intervention, and then six weeks later. The results indicated a significant decrease in all problem behaviors at home and at school over the course of the intervention, with maintenance of the decrease throughout the six week nonintervention period on all variables except homework submission.

Conclusions

Education of the gifted handicapped covers a very broad spectrum of gifts and talents. The field is in its infancy, and the literature with regard to identification and programming is scattered, with little, if any, evaluation of the efficacy of the procedures employed. Much of the early literature features case study accounts of gifted individuals with disability. More recently, there have been concerns expressed that the handicapped are among the gifted underserved. Gallagher (1988) identified the handicapped gifted as a priority in describing an agenda for educating gifted students in the United States. Similarly Whitmore (1986) argued that the handicapped gifted are underserved. Estimates of the number of handicapped children who are receiving gifted services are difficult to obtain. Gamble (1985) estimated that 15% of the hearing impaired in the U.S.A. are so served, and there is no reason to assume that the figures are any higher in the case of other disabilities. Obviously a large pool of individuals exist whose gifts and talents are not being nurtured within educational settings.

Articles dealing with identification indicate that, overall, the same multifaceted procedures employed with gifted children in general are also appropriate for the handicapped gifted, with adaptations relative to abilities affected by the disability. The literature suggests strongly that the child's teacher is a vital part of the identification procedure, and that identification is enhanced with increased teacher familiarity with the characteristics of gifted handicap.

Nevertheless, stereotypes die hard, and teachers make judgements in accordance with their preconceptions of student abilities. Minner, Prater, Bloodworth, and Walker (1987) found that children labelled "learning disabled" were less likely to be referred

to gifted programs by teachers than those with identical characteristics who were not so labelled. This reluctance to refer was characteristic even for teachers trained in special or gifted education. It is clear that teachers require training at both the preservice and inservice levels to sensitize them to the needs of gifted handicapped students and the methods of identifying and educating them. Research into how training programs might be structured so as to influence teachers' perceptions of gifted handicapped youngsters is clearly needed.

Research is also required into the effects of different types of school placement on the achievement and affective development of gifted handicapped children. Nielsen and Mortorff-Albert (1989) showed that self-concept of gifted learning disabled children varies according to type of special education received. The lowest self-concepts were reported by those receiving primarily, or exclusively, learning disability service, with little or no gifted service, while the highest self-concepts were reported by those receiving either exclusively gifted education or a combination of learning disability and gifted education. The mean self-concept score of those in the self-contained gifted learning disabled classes fell between that of those being educated predominantly for their learning disability and those receiving gifted education. Interestingly, the self-concept scores of the gifted learning disabled students who had been identified by their school district as learning disabled only, were as high as those of gifted learning disabled students receiving gifted education only.

When Whitmore and Maker (1985) published their landmark volume on *Intellectual giftedness in disabled persons*, one of their stated goals was to increase the amount of research and development relative to identification and diagnosis, the effect of alternative programming, resources for teachers, and dissemination of information. In some small measure, their goal is being realized, particularly with the gifted learning disabled, but much work remains to be done.

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Biography

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CHAPTER 6

RESEARCH ON SELF-EFFICACY: NEW DIRECTIONS FOR COUNSELING THE GIFTED AND FOR DEVELOPING SUITABLE EDUCATIONAL PROGRAMS

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Abstract

Self-efficacy, a construct related to social learning theory, has been introduced into research as a mediating variable to explain children's achievement and social behavior. Based on an overview of recent literature on psychosocial aspects of high ability and on self-efficacy, a psychological construct related to high ability, some implications are stated concerning: Preventative counseling and program planning, counseling and educating gifted and talented subpopulations who are at risk, and counseling teachers and parents of the gifted. Particular emphasis is placed on whether such measures are defensible in the light of current research findings.

Introduction

To assess social–emotional aspects of high ability, self-concept has very frequently been used as a variable. This factor, a variable related to social learning theory, has been introduced into such research as a mediating variable affecting children's achievement and social behavior. Self-efficacy theory offers some promise in explaining important facets of children's achievement motivation and their social behavior in school, and for evaluating the merits of various programming approaches to teaching the gifted. An overview of the systems currently most popular and of models for teaching the gifted (Renzulli, 1986a) reveals that the importance of psychosocial aspects or motivational outcomes has been recognized by most developers of such models (see for example Betts, 1986), but few research results have been presented substantiating such outcomes. Also, the question of whether children with high abilities need special counseling, and if so in what form, needs to be reassessed.

Bandura (1977a, 1977b) defines an efficacy expectation as the conviction that one's behavior will produce a desired outcome. Since Bandura's introduction of self-efficacy theory, numerous empirical studies have supported the notion that self-efficacy expectations influence people's choice of activities, how much effort they will

expend, and how long they will persist at an activity (Bandura & Cervone, 1983; Lent, Brown, & Larkin, 1984; Locke, Lee, & Bobko, 1984). It has been pointed out that educational settings are particularly suitable for testing self-efficacy theory, but initially the construct has been applied to counseling issues (Moe & Zeiss, 1982; Kanfer & Zeiss, 1983; Lee, 1984).

To explore the possibilities for research on self-efficacy and high ability, preliminary results will be presented and the following major questions will be addressed: To what extent do children and adolescents need counseling based on their particular needs as individuals with high abilities? How does self-efficacy relate to variables frequently studied in connection with high ability, such as self-concept or motivation? And finally, what kinds of issues in counseling and programming for the gifted might research on self-efficacy help clarify? To avoid the cumbersome but more accurate designation "individuals with high abilities" the term "the gifted" will be used frequently in this chapter, even though it is really unsuitable for describing a highly heterogeneous population, which cannot be identified precisely.

Gifted Children and Adolescents' Counseling Needs

A large number of recent investigations and comprehensive reviews of the literature (see for example Janos & Robinson, 1985; Olszewski-Kubilius, Kulieke, & Krasney, 1988; Czeschlik & Rost, 1988) have firmly dispelled the notion that gifted children suffer from various psychosocial adjustment problems to a higher degree than the normal population. It must be noted, however, that the majority of these investigations have been conducted in the U.S.A. and subjects were often academically gifted students identified for participation in programs for the gifted. Unfortunately, little research exists on various important subpopulations, such as highly creative children or children talented in the visual or performing arts.

How do children and adolescents identified as gifted compare with those who have not been identified on various personality variables? As a group, the gifted appear to be generally healthy and well-adjusted, but their socioemotional development is still usually not as advanced as their intellectual development (Janos & Robinson, 1985). Olszewski-Kubilius *et al.* (1988) reported the following findings: When differences are found between gifted students and chronological peers, they tend to favor the gifted. Specifically, there are lower levels of anxiety, and fewer indications of psychological problems, combined with higher scores on multidimensional personality instruments such as the California Personality Inventory (CPI). Interestingly, personality profiles of gifted males and females appear to be more similar than different. Gifted individuals seem to differ most from the average on motivational and achievement variables—"sustained intent and concentrated effort" (Janos & Robinson, 1985). Special interests tend to manifest themselves earlier and in a more intense and mature form than in children not identified as gifted. Perhaps not surprisingly, for reasons explained later, the research on variables such as self-concept and locus of control, as related to high ability, is not so clear.

It appears that moderately gifted primary age children (IQ below 150, but above 120) also tend to be integrated better socially, are often well accepted and popular, and seldom socially isolated (Czeschlik & Rost, 1988). However, in primary schools

popularity and high achievement often correlate highly, and there is some controversy about what happens in adolescence. Is this high social status then lost, as Austin and Draper (1981) suspect? Can gifted adolescents cope with this dip because of their greater self-sufficiency, autonomy and nonconformity (Janos & Robinson, 1985)? Even though Janos and Robinson (1985) caution that psychosocial problems may arise through inadequate educational programming, this issue has not really been investigated sufficiently. What is clear from a number of studies, however, is that identification and placement in educational programs for the gifted have an impact on gifted students. Whether this impact is positive or negative has not been sufficiently investigated (Culross & Jenkins-Friedmann, 1988).

Unfortunately, a common theme that runs through research on the psychosocial development of the gifted is that of the large number of serious methodological problems which arise. Common are a lack of suitable control groups, or small sample sizes. Although IQ is a frequently used identification measure of giftedness, cutoff values and instruments used differ, while other measures have also been used. Clinical experience shows that children sometimes have marked differences on two sets of intellectual functioning: there might be a high score on a nonverbal intelligence test and only specific strengths on a test like the WISC-R, combined with an average performance in other areas. Cases like these have not been taken into account sufficiently. Too often research findings are still based on outdated forms of identification, such as a sole reliance on an IQ, measured with only one particular test. Often the use of univariate rather than multivariate statistics has led to seemingly significant findings. Specifically in the case of the literature on peer relations of the gifted Czeschlik and Rost (1988) point out the following problems, which characterize the whole area of research on socioemotional aspects of giftedness: There is a predominance of interviews and questionnaires as opposed to behavioral observations, which would increase the validity of the findings but have practically never been used. To shed more light on developmental questions (but also on the longterm impact of educational programming for the gifted), more longitudinal studies would be needed. There are, furthermore, some seriously misleading conclusions, such as confusing the quantity with the quality of social contacts.

Ritchie, Bernard, and Shertzer (1982) justly charge that too much attention has been paid to the psychosocial *adjustment* of the gifted, while empirical investigations of psychological or social giftedness as an ability cluster apart from academic giftedness have hardly been carried out. Also, more investigations are needed as to why the gifted are often at an advantage psychosocially. Is this a function of intelligence, or of favorable childrearing techniques which optimized the development of giftedness?

Subpopulations at Risk

Despite the generally very positive picture of the psychosocial adjustment of the gifted, there can be no doubt as to the existence of several subpopulations which are at risk. These positive findings may not hold for them, and not all of them have been sufficiently investigated. There has been much work on the causes of, and possible counseling or programming approaches to underachievement in gifted children (Whitmore, 1980; Butler-Por, 1987; Rimm, 1986). Janos and Robinson (1985) found,

however, that surprisingly few interventions have actually been tried with this group, despite the fact that underachieving behavioral patterns are often firmly established by early adolescence. Underachievement is not only a problem among the gifted, of course, but effective approaches to its treatment may differ for them. Butler-Por (1987) provided a crosscultural review and critique of various intervention approaches, and included gifted females as a group at risk for underachievement.

Are the most highly gifted at risk for maladjustment, as the experienced educator Hollingworth (1942) pointed out about 50 years ago? Are they really "out of sync" with their school, friends or family, as Janos and Robinson (1985) concluded after their review of the literature, similar to the concerns of Powell and Haden (1984) and Roedell (1984)? There is some recent evidence to the contrary. Grossberg and Cornell (1988) conducted a well planned investigation with 83 students, aged 7–11, including family adjustment as a variable and accounting for respondent bias. Using four different measures of psychosocial adjustment they found modest support for the assumption that IQ relates positively to healthy adjustment. Children with higher IQ's were less anxious and nervous, had fewer problems in physical or cognitive development, and exhibited fewer behavioral or disciplinary problems. Galluci (1988) found a normal incidence of psychopathology in a sample of 90 children aged 12–16, even in children with an IQ above 150. He therefore recommended that the presence of adjustment problems be regarded as evidence of actual psychopathology rather than the outcome of giftedness. On the other hand, in a very recent study Dauber and Persson-Benbow (1990) found that 111 modestly gifted 13-year olds (top 1 in 20) rated themselves as more extroverted, socially adept and uninhibited than 340 children extremely talented verbally or mathematically (top 1 in 10,000). Surprisingly, the verbally highly gifted students appeared to have the lowest feeling of importance and social standing.

Some thus far largely neglected subpopulations include the learning disabled gifted, handicapped gifted, and gifted children from ethnic or socioeconomic minorities. Baum and Owen (1988) found that data describing the learning characteristics of high ability learning disabled students were almost nonexistent. Baldwin (1987) stressed that it is crucial to consider affective curriculum goals as well as cognitive ones for such gifted populations.

Self-Efficacy and High Ability

How might self-efficacy theory relate to some of the above findings? To determine possible new applications it is first necessary to look more closely at self-efficacy as a psychological construct, and at the research that has recently been undertaken on self-efficacy and the gifted. Of additional interest will be the question of the relationship between self-efficacy and self-concept, as well as between self-concept and motivation. Both of these variables have frequently been mentioned in research on the gifted.

Self-Efficacy as a Psychological Construct

Bandura (1977a, b) defined an efficacy expectation as the conviction that one can successfully behave in such a way as to achieve a desired outcome, or as one's perception

that one will succeed at certain tasks. The emergence of self-efficacy as a psychological construct reflects two trends in contempory social learning theory as outlined by Bandura (1977a). One is that behavioral change has increasingly been explained by cognitive processes; the other, that mere modeling in promoting behavior change has largely been replaced by performance based treatments, where people are actively involved. In 1977 Bandura began to view people's efficacy expectations as basic to behavior change, even though he has more recently emphasized that such expectations are only one among many determinants of behavior (Bandura, 1984).

As a mediator, self-efficacy represents a variable intervening between cognitive processes and action, or behaviors (Bandura, 1977b). Self-efficacy is derived from four major sources: Performance accomplishments, vicarious experiences, verbal persuasion, or emotional arousal (Bandura, 1982a). Performance accomplishments, or direct involvement with a given challenging task, have repeatedly been found to produce the highest, strongest, fastest, longest lasting and most generalized increases in self-efficacy (Bandura, 1982b). Performance accomplishments provide people with potent feedback about their ability to cope, by producing concrete evidence of their abilities. Vicarious experiences or learning by imitation, although a weaker source of self-efficacy, have also been shown to be important and effective in promoting it (Brown & Inouye, 1978). Verbal persuasion (for example convincing people that they will succeed at a given task) and low physiological arousal (for example experiencing very little heart pounding before giving a speech) are both considered weak sources of efficacy.

What are the effects of self-efficacy on people? Bandura (1984) has held that individuals who perceive themselves as highly efficacious act, think and feel differently from those low in self-efficacy. Highly self-efficacious people are more likely to set themselves challenges (Locke, Lee, & Bobko, 1984), will persist longer at difficult tasks and expend more effort, and have fewer stress reactions when tackling difficult or threatening tasks (Bandura, Reese, & Adams, 1982). Although Bandura (1977b) does not view self-efficacy as a global personality trait and states that self-efficacy levels vary over time and across tasks, there has since been much evidence of the generalizability of self-efficacy theory. Perceived self-efficacy has been shown to influence social functioning (Goldfried & Robins, 1982; Kanfer & Zeiss, 1983) and to influence vocational behavior (Betz & Hackett, 1981). Self-efficacy theory has of course been criticized on a number of grounds. Overall, however, the quality and quantity of research supporting self-efficacy theory far outweighs the criticisms.

How has self-efficacy been measured in children? Because it is not considered a global trait, but is always restricted to clearly defined areas, a number of instruments have been developed to measure such specific areas, for example school related self-efficacy or self-efficacy related to peer interactions. Even though White (1959) held that effectance motivation is quite undifferentiated in young children, and develops only through experience and interaction with the environment, school related self-efficacy has since been measured in children as young as four (Stedtnitz, 1986). Reliability (alpha reliability coefficient .83) and stability (stability coefficient after nine weeks .51) of the 28-item Self-Efficacy Scale for Young Children were satisfactory. The 34-item SEAT (Owen & Baum, 1985) measures children's perceptions of academic self-efficacy, their confidence in organizing and carrying out typical actions in school. It also measures students' attributions of success and failure on school tasks. In the social domain, Wheeler and Ladd (1982) developed the Children's Self-Efficacy for

Author/Year	Sample	Variables	Results/Implications
Baum & Owen (1988)	HA: n=54 (IQ=120) HA/LD: n=24 (IQ=119) AV/LD: n=34 Grades 4–6	I: WISC-RL SE: Self-Efficacy for Academic Tasks (SEAT) Other: creative potential, interests, disruptive behavior, self-concept	HA students highest sense of academic self-efficacy HA/LD students heightened sense of school-related inefficacy, often ascribe academic failure to shyness. Need challenging tasks, help with shyness through challenging enrichment activities
Gresham *et al.* (1988)	HA: n=30 (IQ 130) MH: n=49 NH: n=257 Grades 3–5	I: Intelligence test, 2 SD above norms in reading and math SE: Academic and Social Self-Efficacy Scale (ASSESS)	MH students reported lower academic and social SE than NH and HA students. HA students reported lower social SE than NH students, but not a higher sense of academic SE (HA students received gifted education services)
Starko (1988)	HA: n=58 C: HA, n=58 Grades 7–8	I: Top 10% on achievement or intelligence tests, or teacher nomination SE: Self-Efficacy for Creative Productivity Inventory	Experiences in individual or small group independent investigations of real problems were associated with increased self-efficacy and more creative productivity outside school. Participation in HA program alone resulted in no increase of SE
Stedtnitz (1985)	E: n=33 C: n=33 Ages 4–6	I: WPPSI SE: Self-Efficacy Scale for Young Children (SESYC)	School-related self-efficacy can be measured fairly reliably in children as young as 4 years, measurement is stable over time. IQ not shown to be related to school-related SE at that young age.

Figure 1. Overview of recent studies on self-efficacy and high ability. HA = high ability; LD = learning disabled; MH = mildly handicapped; NH = nonhandicapped; AV = average; C = control group; I = identification measure; SE = self-efficacy; E = experimental group.

Peer Interactions Scale to estimate children's efficacy beliefs in specific peer situations. An instrument developed by Gresham, Evans, and Elliot (1988) assesses both academic and social self-efficacy in children. Other measures for children and adolescents also exist (LaLonde, 1979; Schunk, 1981; Starko, 1988).

Research on Self-Efficacy and High Ability

The importance of self-efficacy as a predictor of achievement behavior has been established repeatedly, in sports (Barling & Able, 1983) as well as in intellectual pursuits (Bandura & Schunk, 1981; Collins, 1982; Lent, Brown, & Larkin, 1984). Little research has been done on self-efficacy and high ability. A few recent studies are briefly summarized in Figure 1.

An investigation on 66 preschool/primary students (Stedtnitz, 1986) found no relationship between school related efficacy and IQ in these very young children. A similar lack of relationship was reported for somewhat older children (Gresham, Evans, & Elliot, 1988). In this study the high ability students reported lower social skills self-efficacy than other children. In students in grades 4–6 Baum and Owen (1988) found that high ability students had the highest sense of academic self-efficacy, while high ability students who were also learning disabled showed a heightened sense of school related inefficacy, often ascribing their academic failure to shyness. In a promising study on gifted program evaluation Starko (1988) found that individual or small group independent investigations of "real problems" led to an increase in self-efficacy related to creative productivity for older students, as well as to an increase of creative productivity outside school. Interestingly, participation in the gifted program alone had no effect on self-efficacy. Overall, the results of these studies seem promising enough to warrant further investigations in this area.

Self-concept and motivation

Because self-concept is such a frequently used variable in program planning and counseling for the gifted, the relationship of self-efficacy to self-concept will be briefly explored here. Motivation, and particularly intrinsic motivation, are personality variables that play an essential role in gifted education.

Broadly speaking, self-concept refers to individuals' perceptions of themselves (Shavelson, Huber, & Stanton, 1976). Much like efficacy perceptions, such perceptions are believed to be formed through experience with the environment, and thus are influenced by environmental reinforcement and significant others (Coleman & Fults, 1982). But there are probably more differences than commonalities between the two psychological constructs. Self-concept is mainly an affective construct, self-efficacy a cognitive one. Definitions of self-concept have been accused of being imprecise and of varying from one study to the next (Walker, 1973). Self-concept measures have been widely criticized for their limited norms, lack of reliability, and poor validity data (Byrne, 1983; Wylie, 1974). Although contemporary developmental psychology recognizes the importance of self-concept as a multifaceted phenomenon, most of the studies on high ability students thus far have been limited to global summary scores. These are difficult to

interpret and compare, and inconsistent (Janos & Robinson, 1985). Bandura (1978) has charged that weaknesses in self-concept theory decrease its explanatory and predictive power. Self-efficacy measures, by contrast, have been based on narrow and consistent definitions, and have tended to be situational rather than general (LaLonde, 1979). In short, self-efficacy theory might lead to more precise, valid and useful findings on the psychosocial development of the gifted.

Intrinsic motivation has been frequently mentioned as a typical occurrence in the gifted. As Bandura has pointed out, it is a somewhat elusive construct, because it is difficult to find situations that completely lack external rewards (Bandura, 1977a). Children particularly, though, can be expected to pursue activities more for immediate than future benefits. Bandura and Schunk (1981) investigated the effects of short term goal setting on developing competencies, self-efficacy and intrinsic interest in children. They found that short term goals were superior to long term ones in these respects, and that perceived self-efficacy related positively to accuracy of mathematical performance and intrinsic interest. The researchers suggested that although a moderately high level of self-efficacy may be required to create and sustain interest in an activity, "through favorable continued involvement almost any activity can become imbued with consuming significance" (p. 587). This conclusion might be a bit optimistic, because the nature of the involvement seems important, and it is possible that there is a reciprocal relationship between the task and the interests and abilities of the person. This is, after all, what social learning theory postulates.

Implications for Preventive Counseling and Program Planning

(1) The question whether the gifted as a group need specific counseling to enhance their psychosocial *adjustment* must be answered negatively, based on current research findings. They do not seem to need any more counseling than the other children in the classroom — some need it, and some do not. A few years ago Renzulli (1977) asked that educational programs and special activities for the gifted be examined for their defensibility. In the same vein, the rationale for a special counseling program should be based on facts, not mere assumptions (counseling programs cost money). Helping children to develop "an accurate sense of self and an awareness of abilities, limitations, and interests", and "to develop adequate social relationships" (Culross, 1982) are fine objectives, but cannot be defended as appropriate only for the gifted. Certainly all children can benefit from this type of preventive counseling.

(2) Better questions to ask, then, might be: Are there ways in which educators and counselors could enable children to use their abilities more efficiently or responsibly? Often there is the argument that many students with high abilities will assume leadership positions later in life, and could therefore benefit from the development of their ethical, moral and social capacities. This might be true, even though it must be said that a society also desperately needs "ethical followers". In any case, what definitely needs to be investigated is whether people with high abilities need to learn different social skills, or learn social skills differently from the average population. Metacognitive approaches have been recommended by practitioners as a particularly suitable way to train social problem solving with the socially highly intelligent or

the highly verbal (see for example Schneider, 1987). Self-efficacy measures appear quite useful for establishing a baseline and measuring the outcomes of such training. Clearly, in this area, many interesting questions await the researcher and educator. Czeschlik and Rost (1988), for example, reported that they could find only one study that specifically examined the social self-concept of gifted children (Kelly & Colangelo, 1984).

(3) To assess the psychosocial development of those with high abilities accurately, more investigations need to be conceptualized around a particular *construct*. Surveying the empirical literature on various personality dimensions of the gifted, Olszewski-Kubilius *et al.* (1988) found the majority of studies to be designed around measuring *instruments*. It is also important to examine the theory behind those instruments—do they have predictive power? Do the instruments reflect the theory adequately?

(4) Clearly the impact of identification and placement in educational programs for high ability children needs to be investigated much more thoroughly than has been done yet, using longitudinal approaches. Also important is to analyze the impact of no programming on a suitable control group (as in Starko, 1988). Are there negative effects, using a variety of measures, or are there simply no effects? So far, the psychosocial impact of gifted programs had been evaluated mainly in terms of self-concept or labeling issues. Twelve studies that evaluated the impact of special programming on the social development of the gifted, using self-concept as a variable (also partly including academic, physical and social self-concept), produced "no significant change" in all but two cases (Schneider, 1987). This seems to indicate that either the programs were not very effective (should not a good gifted program make students more self-confident?) or that the outcome measure was not suitable. Either conclusion should lead to further investigation. Janos and Robinson (1985) have noted that far too little research exists to determine what specific variables in school programming for the gifted are associated with successful outcomes. An interesting question is, which particular activities in gifted programs might heighten students' sense of academic or social self-efficacy? It might also be asked, which kinds of "gifted behaviors" (Renzulli, 1986a) should be promoted in a program for the gifted, and how the likelihood of these behaviors occuring in the future can be predicted? It might be possible to design a program around the two strongest sources of self-efficacy, active involvement and imitation. Burns (1990) recently found, for example, that variables such as grade, sex, self-efficacy, learning style preferences, achievement and academic aptitude all predicted students' likelihood of initiating independent creative investigations.

The relationship between program placement and student adjustment needs to be analyzed, particularly for certain age groups, such as children in kindergarten, or adolescents. Clinical experience seems to indicate that for the psychosocial adjustment of kindergarten children program placement makes a greater difference than at other ages. Placement in a suitable educational program can in fact be viewed as a type of preventative counseling, not only for the gifted.

(5) More information is needed about children who score very highly on only a few subtests of instruments such as the WISC-R and average or low on others. Some of these children might be learning disabled, some not. In any case, these children definitely have special educational, and quite probably also, counseling needs that have not been adressed at all so far. Many of these children do not qualify for

participation in traditional programs for the gifted, because their overall abilities are not high enough. For example, children from ethnic or socioeconomic minorities often have verbal deficiencies on traditional intelligence tests, as is well known. What are the psychosocial consequences of ignoring children like these?

(6) Answering some questions about self-efficacy and high ability might lead to valuable clues for parents, teachers, and program developers. For example, how do children who obtain low scores on school related self-efficacy differ from those scoring highly? Research might examine which parent and teacher behavior influences the early development of academic self-efficacy, and how perceptions of efficacy develop. Also important is the question: Which student *behaviors* correspond with a high sense of self-efficacy?

(7) There has been some interesting research on the self-efficacy of teachers of the gifted. Recently Starko and Schack (1989) found that teachers were more likely to use teaching strategies about which they felt efficacious than strategies they identified as best meeting the needs of gifted students. On the basis of these findings, Starko and Schack recommend that teacher trainers spend more time raising teacher's self-efficacy related to specific teaching strategies (for example, through simulations which would provide opportunities for performance accomplishment) rather than solely trying to convince them that certain strategies are beneficial to gifted students. This study is a step in a fruitful direction; too little attention has been given as yet to the teachers of high ability students.

(8) Along the same lines, it is also likely that parents show a preference for parenting interventions about which they feel efficacious, not necessarily those that might be most beneficial for their gifted child. Janos and Robinson (1985) have remarked that familial influences on the development of intellectual giftedness have been poorly described in the literature despite their obvious importance. The importance of such influences has been shown over and over again in the literature on underachieving gifted children.

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Biography

Ulrike Stedtnitz is a psychologist working in private practice in Zürich, Switzerland. She specializes in counseling children and adolesents with high abilities, as well as their teachers and parents. She is a founding executive member of the European Council for High Ability, and is active in helping shape better educational opportunities for the gifted all over Europe. As an instructor, she has worked at the University of Connecticut, U.S.A. and at the University of Cologne, Germany. Among her research interests are gifted preschool children and socioemotional aspects of high ability.

CHAPTER 7

GIFTEDNESS: RECENT THINKING

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Introduction

The purpose of this chapter is to offer an overview of current thinking on a number of major issues in the area of giftedness. It does not contain a summary of the earlier chapters, although it was written after these had been read and emphasizes some aspects of their contents. Since the intention is to summarize and generalize key ideas common to many publications in the area, no use is made of specific references to the literature. The chapter concerns itself with five broad areas:

1. The definition of giftedness.
2. The development of gifts and talents.
3. Identifying and fostering gifts and talents.
4. Special problems of the gifted and talented.
5. Special questions and research needs.

Definition

Particular individuals consistently or regularly display performances in various fields which amaze observers by the degree of expertise involved. Such people are referred to as "gifted" or "talented", or are said to display "gifts" or "talents". There is, in fact, considerable discussion of questions such as the difference between a gift and a talent, or indeed, the usefulness of these words, but an analysis of the terminology will be avoided here by focusing on performance involving astonishing expertise. Traditionally, the notion of giftedness has focused on the cognitive domain (e.g., feats of memory, exceptional performance on learning tasks, outstandingly clever thinking, and the like). In particular, giftedness has been associated with school settings or school like situations. Thus it is traditional to speak of "gifted students" or "talented mathematicians" or "gifted linguists", etc. This approach to giftedness has often been expanded somewhat to include performances in music, the fine arts and, perhaps surprisingly, chess. More or less parallel to interest in outstanding performance of the kind just described has

been an interest in exceptional sporting performance, although these two areas — the cognitive, on the one hand, the sensorimotor, on the other — have not usually been discussed in a single context; books and conferences on, for instance, gifted education have rarely concerned themselves with the teaching and learning of, let us say, skill in putting the shot or swimming, while coaches of outstanding athletes have seldom concerned themselves with the fostering of gifts in chess or music.

A major tendency in recent discussions has been a broadening of the definition of giftedness to include not only "schoolhouse" giftedness, but also nonschool giftedness — for instance, giftedness in sport or, to take an area which has recently received considerable emphasis, leadership. This tendency has been greatly facilitated by recent emphasis on not only the cognitive aspects of gifts and talents, but also the personal, affective and motivational elements. An example is to be seen in the discussion of self-concept and attitudes in high academic achievement or record breaking athletic performance. Another example is to be seen in the area of leadership: Many recent discussions emphasize the need for gifted individuals to use their gifts and talents in an ethically desirable way, applying them not, for instance, to self-aggrandizement and personal enrichment, but to the solution of societal problems such as poverty, prejudice, or environmental destruction.

Cognitive Approaches

In the cognitive domain there has been a move away from a quantitive (How much of some particular skill does a particular gifted person possess?) to a qualitative approach (What kind of abilities constitute giftedness? How are they organized and how do they interact with each other?) Some writers have suggested that even traditional cognitive tests should be used to define not *level* of ability, but *pattern* of organization: e.g., "cognitive structure". Allied with this development has been an increasing emphasis on cognitive *processes*, especially on the activities which define them and the mechanisms which direct, accelerate or decelerate, and guide them. Among others, achieving insight or developing heuristics for solving problems have been investigated. The metacognitive approach to giftedness emphasizes elements such as the selection of "good" problems, the distinction between promising lines of attack and dead ends, the evaluation of partial solutions or the identification of more promising alternative lines of attack when evaluation shows that progress to date has not been satisfactory.

Noncognitive approaches

Noncognitive approaches to the defining of giftedness emphasize motivation, values and attitudes, and personal characteristics such as self-image: Great expertise requires not only skills and abilities, but also fascination for a particular area of expertise, a feeling that it is worthwhile to dedicate oneself to this area, and confidence in one's own ability to master the area in question. The achievement of exceptional expertise also frequently requires investment of large amounts of energy (see later discussions). Finally, it has become apparent that giftedness has a strong social element: The society or its subgroups play a major role in deciding which achievements will be regarded as

prodigious and valuable (and hence gifted), and which, by contrast, will be dismissed as crackpot, dangerous, subversive, destructive or even criminal (and hence not gifted).

Creativity

The fairly recent resurgence of interest in giftedness has also given a new lease of life to research and theory on creativity. Going beyond the now well known "three-ring-model", according to which giftedness involves a combination of intelligence, creativity and motivation, writers have spoken of "genuine" giftedness or "freely developing" giftedness. The common element is the idea that truly gifted achievements require not only extraordinary mastery of conventional knowledge and skills, but also breaking through into the unexpected, original and surprising (i.e., creativity). This line of argument has been developed more fully in my own paper in this issue, and will not be dealt with in great detail here.

Comprehensive Definition

Emerging from the considerations just outlined is a more comprehensive definition of giftedness than that which prevailed in the past. It is not confined to school related activities, but also involves areas such as sport and leadership. It derives not merely from possession of a high level of cognitive skill, but also involves the nature and organization of abilities, and is best regarded as a process. The nature, direction and speed of this process depends partly upon cognitive factors, but is also strongly influenced by personality and motivation, and has strong social elements including, among other things, an ethical dimension and an important communication aspect. Finally, it is important to mention that many recent discussions of giftedness distance themselves from the idea that highly developed expertise is necessarily uncommon. In other words, an apparently paradoxical position is adopted where a high proportion of the population is theoretically capable of high levels of performance, even if only a few actually display such performances. Once again, this approach can be regarded as involving a move away from a quantitative model to a qualitative one: giftedness is seen as involving not "exceptional" or "extraordinary" expertise, but "very good" or "highly effective" performance. A gift or talent could manifest itself not only in the form of a statistically uncommon *level* of performance, but also in a *kind* of performance leading to "good" solutions. In theory, far more people than suggested by the quantitative approach possess the potential to develop high levels of expertise and display especially effective performances, even if most people do not at present do so, with the consequence that giftedness has, in the past, been regarded as confined to a small proportion of the population.

Development

Whether or not this approach to defining giftedness is accepted, it raises one extremely interesting and important question: What are the factors which determine whether or not

a particular person develops high levels of expertise and displays extremely capable levels of performance? Many of the findings underlying the conventional wisdom were derived from the application of psychological tests with school children. Recently, biographical and autobiographical studies of living or historical gifted individuals have come to play a more important role in investigating the developmental conditions for the emergence of gifts and talents. Such studies are by no means new, and many examples existed before the first world war. However, after a period of neglect the last few years have been marked by a resurgence in case studies of exceptional achievers such as famous personalities of the past, Nobel Prize winners or Olympic gold medallists, persons rated as exceptional by their colleagues, etc. These have been extremely fruitful, as they have contradicted a number of common beliefs about gifted individuals. Many gifted people do not show exceptional performance at an early age, despite the existence of exceptions such as Mozart. Achieving success is often a very long process: famous pianists, successful scientists and even Olympic swimmers typically require 15 years or more of intense effort before they are accepted as gifted. During much of this time their performances may be merely good, average or only somewhat above average.

What is clear is that the development of gifts and talents does not involve the emergence in a more or less preprogramed way of God given potentials. On the contrary, emergence of giftedness is a process, which may or may not reach a successful conclusion — it is possible for instance, to speak of unrealized gifts and talents. (It is, nonetheless, also possible to identify gifts and talents which have emerged from apparently unpromising beginnings.) Quite apart from the possible possession of inborn advantages involving the sense organs, the central nervous system, or other physical features, the development of gifts and talents depends upon the circumstances of life, and on the individual's personality, values, interests, self-image, motives and so on. These latter are themselves shaped by the circumstances of life. Necessary for the development of gifts and talents is opportunity (contact with a particular field, its contents, activities, materials, etc). In most cases long and concentrated practice is also necessary — case studies have shown that very few gifted individuals succeeded without this element. Fascination for an area, motivation to dedicate oneself to the area, belief in oneself as capable of high levels of achievement, and the like, are not only important aspects of the willingness to practise (possibly for thousands of hours), but are themselves partly acquired through crucial experiences provided by the environment. As various studies have shown, contact with models or mentors is of great importance. Such "crystallizing" persons may be parents or siblings, or teachers, coaches and the like. These people display the skills of the area of giftedness, the values and attitudes associated with it, and the self-image required for success. They need not themselves be gifted — studies have shown that the "crystallizing" person is sometimes someone in a humble role, such as an elementary school teacher.

The fact that the emergence of gifts and talents involves a developmental process guided by "environmental enablers" raises special problems for children from disadvantaged backgrounds: Not only for social outgroups such as the poor or immigrants, but also for groups from whom giftedness is not usually expected, or who by virtue of some special characteristic are denied contacts with a field, opportunities for practice, interaction with crystallizing persons, or other crucial experiences (e.g., girls, the physically handicapped, the sensorily handicapped). Not only may a stigma or a handicap limit contact with environmental enablers, but it may also inhibit recognition of an emerging potential

(e.g., because of prejudice, or even a well meaning desire to "protect" the child in question), and thus further reduce opportunity, introducing a downward spiral of unrealized potential. The problem of recognizing gifted potential in groups such as those just mentioned has received intense interest in recent years, and is one of the most important issues in contemporary gifted education.

Identification and Provision

Identification by Performance

In keeping with the early, very simple definition of giftedness as high conventional intelligence, identification of the gifted and talented has been, and still is, dominated by intelligence tests, high IQ being taken as a sign of giftedness. Although a number of writers have argued for an extension of the mental test approach by incorporating creativity tests, research has shown that only moderate progress has been made: Intelligence tests still predominate. In any case, use of creativity tests represents only an improvement of the existing, cognitively oriented, socially biased approach. More recently, some authors have called for "identification by performance". The basic idea is simple: children who display high achievement are deemed to be gifted and are offered special forms of provision. If this approach were limited to high marks in traditional school subjects, however, it would be fraught with problems. For instance, young children would scarcely be identified at all, since they have had no chance to display high achievement. The well known correlation between home background (social class, ethnic origin, mother tongue, and the like) and school marks would mean that identification would be limited almost exclusively to children from the dominant social class (usually middle class speakers of the official language of the society in question). For these reasons, "performance" must be understood as something more than school grades.

The extended definition of giftedness already discussed provides many ideas for the redefinition of "performance", and hence offers new impulses for identifying the gifted. Unusual skill or high levels of excellence can be expanded to include content areas going beyond those of the traditional classroom (e.g., photography, music, debating, etc.), or even lying outside the school altogether (e.g., hobbies and clubs, sports organizations, part time work, and so on). Furthermore, "performance" need not be confined to finished products, but can be expanded to include noncognitive aspects: intense interest in a field of endeavor, sustained effort stretching over months and years, willingness to make sacrifices in pursuing an interest, confidence in oneself as capable of "making it", willingness to stand up for something in the face of peer group pressure, and similar properties. The areas of activity need not be those conventionally prized in the dominant social group; indeed, in the case of youngsters from outgroups (the social underclass, migrants, native speakers of "foreign" languages — in many cases these are the same people, since there is a strong interaction among the three conditions), it is important that they are not. What is important in identifying the gifted is exceptional performance in areas of activity prized by the social subgroup to which a particular child belongs: naturally, excellence in conventional schoolhouse areas should not be devalued, but interest should be expanded in the way just outlined.

Identification by Provision

Other authors have proposed "identification by provision": Children who wish to take part in special provision for the gifted and talented (or whose parents or teachers nominate them) are admitted to such provision. If they flourish, they have, in fact, identified themselves (i.e., this is a variant of identification by performance), if they do not do well in "the gifted program" they have demonstrated its inappropriateness for them, and can return to normal provision. Research has shown that children "identified" by provision succeed about as frequently as youngsters identified by other procedures such as IQ testing. This raises the question of the usefulness of parent, teacher, even self-nominations for identifying the gifted. Research indicates that self-selection, especially through performance, as outlined earlier, as well as nomination by parents is not significantly less accurate than identification via test procedures — although both approaches have substantial weaknesses. Traditionally, the ability of teachers to identify gifted children has been sharply criticized, on the grounds that they tend to identify boys, conformers and generally likable youngsters at the expense of girls, quiet, self-effacing children and troublemakers. However, large scale studies have shown that when teachers are given a clear definition of the properties they are looking for and a certain amount of training, they can select with a satisfactory degree of accuracy.

Gifted Education

Identification of gifted children has no point unless it leads to special treatment aimed at facilitating the development of gifts and talents. Once again, the expanded definition of giftedness already outlined provides guidelines for such special provision. In order to promote the acquisition of high levels of expertise, it should offer opportunities for intensive work in a particular area. In addition, however, it should promote interest in the area, conviction of its importance and worth, familiarity with the values and ethics of the area, confidence in one's own ability to do outstanding work, and willingness to make long and sustained effort to achieve such success.

Traditionally, discussions of special provision have distinguished between "acceleration" (completing the work specified in the curriculum in less time than foreseen) and "enrichment" (going into material more deeply than foreseen). Speeding up by covering contents quickly or entering school, high school or university early may simply mean that a child finishes a program at an early age, leading, for instance, to people graduating from university at 13, 14 or 15, or receiving the PhD at 18, 19 or 20. However, in school settings it typically involves children spending time in a "resource room" or with the "gifted" teacher: the activities then carried out typically involve a more intensive treatment of the standard material, often accompanied by attempts to promote creativity. It is thus apparent that acceleration and enrichment are, for all practical purposes if not in theory, two sides of the same coin.

More recent work on special provision for gifted children has emphasized other forms of organization in which the acceleration/enrichment dichotomy has become blurred. For example, elementary schools may cooperate with secondary schools to allow gifted pupils to spend some class time with age mates in subjects where they are working at the "normal" level, possibly with an enriched intensity, some with older students,

where the gifted pupil has shown a thirst for acceleration. Outstanding examples of such patterns of special provision involve youngsters who may be in grade 5 or 6 in, let us say, mother tongue and Social Studies, in grade 11 or 12 in Chemistry and Biology and in third year university in Mathematics and Physics. Such forms of provision meet a number of objections to acceleration such as removal of a child from social contact with agemates, and offer great promise; however, they require a high level of cooperation among segments of the education system, and are only possible when administrators and teachers are flexible. In many cases the readiness to act is missing: In 1985 the Minister of Education of the State of Hamburg drew a comparison between contemporary interest in gifted education and that of the Nazi regime (without mentioning that the Nazis actually banned gifted education on the grounds that it was inconsistent with their ideology), while a few years later the Minister of Education for the Australian State of Victoria announced that gifted education would only be introduced over her dead body. In comparison with some other parts of the world, the situation in Canada and the U.S.A. is unusually favorable for gifted education. Other organizational forms of special provision include cooperation between schools and industry (for instance, unusually motivated students work in a firm's laboratory at weekends or during their vacations), Saturday Schools and vacation camps. The latter may occur with or without the cooperation of schools; in many Western European countries gifted education is almost confined to such activities, as Education Ministries, teachers' unions and even teachers are opposed to special provision for the gifted on ideological grounds.

A second area in which there have been marked changes in gifted education in recent years involves the definition of who is a teacher: not only may schools invite successful, even famous practitioners to give talks to pupils, but contact between gifted youngsters and such people may go beyond occasional visits, to include regular opportunities to work with them (for instance at the practitioner's place of work), intense tutoring from such people (for instance at weekend seminars or vacation camps), or even establishment of an informal or sometimes formal mentorship (practitioner and pupil plan a project together and the child carries it out under the watchful eye of the expert, who provides advice, encouragement, criticism, concrete help, collegial feedback, etc.). Such contacts are particularly important in helping gifted youngsters develop not only skills but also attitudes, values and identity and, perhaps most important, a feel for the ethics and brotherhood/sisterhood among practitioners of a particular discipline. In view of recent research on the role of a crystallizing person in the childhood of people who later became highly successful, this latter aspect should not be undervalued.

Political events of 1989, 1990 and, no doubt, the next few years in the countries of Central and Eastern Europe raise a number of interesting issues. Communist regimes were generally strongly in favor of gifted education (even if the political status of the parents played a major role in deciding which children were identified as gifted). Several of these countries have well developed systems of special schools (including the Soviet Union), as well as organized and effective holiday camps and children's villages, university clubs for children gifted in special subjects, etc. Although participation in competitions at national (such as the national science, language and music competitions in Germany) or international level (e.g., Mathematics Olympics) was by no means restricted to the former Communist countries, they supported such forms of special provision for the gifted with great vigor. It remains to be seen if these traditions will

be maintained and strengthened under new governments, or if they will be swept aside in the course of the reforms currently taking place.

Special Problems and Counselling

Early studies of academic and personal difficulties of gifted children created the impression that giftedness is invariably associated with psychological problems ("genius is to madness close allied"), or that early prodigious achievement usually leads to rapid burn out ("early ripe, early rot"). Opponents of special provision for the gifted have been quick to set up a straw man by claiming that proponents assert that giftedness is inevitably associated with psychological problems; the falsity of this claim can quickly be demonstrated, since many gifted youngsters get along well with other children, are psychologically stable and happy, and also achieve well. It is now apparent that gifted children experience social and psychological difficulties about as often as those of "normal" ability. What is important is not the frequency of problems but the *kind* of problem experienced and the tactics adopted for dealing with them. A substantial number of gifted youngsters start school with high expectations and great enthusiasm (as is the case with many school beginners), but soon become frustrated and bored: many enter a "spiral of disappointment" in the course of which they reject the institution school and/or come to doubt their own abilities or even worthwhileness as a person. They may deal with this by withdrawal, hostility or aggressiveness, but may also learn at an early age that problems can be avoided by fitting in, and deliberately adopt the tactic of "faking bad". This is a particular problem in the case of girls and members of minorities, where there may be unusually strong pressure to conform to values antagonistic to high achievement in the school sense. The point is not that all gifted children are preprogrammed to experience such difficulties, but that some do, and that these children have a special problem and need special help (see later paragraphs on counselling).

Recent studies have indicated that some gifted children experience special difficulties in the family. These go beyond the obvious, although by no means unimportant, problems arising from overambition on the part of parents determined to push their children into the gifted program and on to ever higher achievements, possibly as a way of succeeding vicariously in fields where their own ambitions were thwarted. Some parents seek counselling because they are afraid that their children are getting above their station in life and are dooming themselves to isolation from family and friends, as well as to eventual disappointment when they discover that the way ahead is reserved for people from other social groups. Once again, this attitude is particularly dangerous for girls and minority group members. Indepth studies of gifted children, for instance in the form of longitudinal case studies, have shown that they may be forced into the role of parents to their own parents: the mother and father may be so overawed by their child's gifts that they orient the life of the family around the child and slowly begin to demand that he or she make key decisions about family life, provide the parents with emotional support in time of stress, and display strength and resolution in difficult times. Coupled with the necessity to practise or learn for several hours a day, this may lead to a feeling in an adolescent of never having been a child, of being robbed of a

childhood. An extreme reaction to this state of affairs is the phenomenon of suicide in apparently successful youngsters.

Such special problems of gifted children impose special demands on counsellors. Counselling needs to be "two pronged", taking into account not only the normal needs of all children, but also emphasizing the special needs arising from giftedness. This is particularly true in the case of youngsters from disadvantaged backgrounds. In addition to counselling aimed at more or less conventional educational and career guidance, gifted children have special needs in the area of "personality guidance." This involves helping them cope with the special problems arising from giftedness: perfectionism and fear of failure, ambivalence about themselves, arrogance or its opposite self-doubt, deviation from family or peer norms and associated social isolation, and similar problems which have already been outlined. Even educational and career guidance take on additional dimensions with gifted children: Linking children up with out of school programs or mentors, finding teachers who display special sympathy or skills with gifted children, and so on. Personal counselling is needed to help children set realistic goals, accept and live with the consequences of giftedness on social relations, come to grips with the social and emotional situation within the family, or develop a strong self-concept and identity.

Counselling is often also necessary with parents. This goes beyond conventional family therapy or marital counselling to encompass problems arising from parents' uneasiness about the child's giftedness or fascination for a particular content area, coping with a child's ceaseless questioning and search for further knowledge or increased opportunities to practise a special skill, or dealing with the problem that a child may be judged by outsiders to be "weird". As has already been mentioned, some parents react to this situation by "going overboard" and orienting family life around the needs of the gifted child, whereas others take an opposite tack, seeking to make the child "normal" at all costs. Both of these extreme reactions can cause substantial problems within the family and in the personal and intellectual development of the child in question, and call for special counselling approaches.

Special Questions and Research Needs

A number of issues still need further clarification. Among these is a set of "conceptual" issues: What is giftedness and how can its origins and development be accommodated within existing psychological models (or what changes to such models are made necessary by the phenomenon of giftedness)? What forces and factors alter, facilitate or impede, accelerate or slow down, or change the forms in which excellence emerges? Also important are questions about the phenomenology of giftedness: What does it "feel like" to be unusually able? What tactics are developed for coping with the situation and what meaning do they have for the identity and self-image of the gifted individual? At the practical level, questions remain about, for instance, the way in which giftedness signals its presence. This question is especially important in regard to disadvantaged and deprived groups, the physically handicapped or the chronically ill. What are the signs of excellence in social outgroups? A further major practical question involves the part played by parents in the emergence of giftedness. Many of them are unsure of how to act

and are afraid of making mistakes, or of being laughed at by family and friends. Family counselling needs concepts for helping parents cope with the situation in a constructive way and for helping gifted children deal with ambivalence about themselves, the feeling of being denied a childhood, and similar problems. Research based answers to these and similar questions would greatly increase the practical value of recent thinking about giftedness.