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ABSTRACT

The five commissioned papers in this anthology provided part of the research base for the national report, "National Excellence: A Case for Developing America's Talent." In the first paper, "The Performance of High Ability Students in the United States on National and International Tests," Carolyn Callahan describes discouraging national and international academic achievement data which indicate that America's top students continue to lag behind top students in other comparable nations. In the second paper, "Education of Gifted and Talented Students in China, Taiwan, and Japan," Harold W. Stevenson et al. report on studies of children's academic achievement in East Asia over the past 11 years and analyze those Asian nations' policies and practices for educating high-ability students. In the third paper, "State Policy Issues in the Education of Gifted and Talented Students," Patricia Bruce Mitchell examines current state policies, regulations, and legislation concerning education programs for gifted and talented students. She also discusses state policies which influence the nature and scope of gifted programming and considers implications of recent school restructuring efforts. James Gallagher, in "Current and Historical Thinking on Education for Gifted and Talented Students," describes how early cultures addressed or failed to address the needs of gifted children and contends that our society has traditionally had ambivalent feelings toward gifted children. He offers several definitions of giftedness and evaluates various educational methods with this population. In the final paper, "American Culture and the Gifted," Daniel P. Resnick and Madeline Goodman examine the role that the American culture and political beliefs have played in shaping the educational system. They suggest that forces outside the classroom (such as anti-intellectual attitudes) may account for more of the success or failure of programs for the gifted than previously thought. Each paper contains references. (DB)

National Excellence

A Case for Developing America's Talent

An Anthology of Readings

Office of Educational Research and Improvement
U.S. Department of Education

National Excellence

A Case for Developing America's Talent

An Anthology of Readings

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Introduction

The U.S. Department of Education's program for gifted and talented students was reinstated in 1988 with the enactment of the Jacob K. Javits Gifted and Talented Students Education Act.

Under the auspices of this program, the Department of Education's Office of Educational Research and Improvement has prepared a new report, *National Excellence: A Case for Developing America's Talent*. The report discusses the progress of American efforts to seek out and educate high-ability students. The last national report on this subject, known as *The Marland Report*, was completed in 1972.

The commissioned papers included in this anthology provided part of the research base for the new national report. They were prepared by experts and scholars throughout the country, who were asked to examine various aspects of the nation's efforts to educate top students.

In the first paper, Carolyn Callahan analyzes the performance of high-ability students in the United States. In both national and international tests she describes discouraging data on achievement and aptitude tests and on career goals, all of which indicate that America's top students lag behind top students in other comparable nations. According to Callahan's analysis, the most recent studies of the International Association for the Evaluation of Educational Achievement, data from the Educational Testing Service, the National Assessment of Educational Progress and the National Science Foundation, and other international achievement comparisons show that

- The *average* Japanese student in advanced (college preparatory) courses exhibits higher levels of achievement in calculus than the top 5 percent of American students enrolled in college preparatory courses;
- The most able U.S. students (the top 1 percent) scored lowest in algebra among the analogous cohorts of 13 other countries in an international study;
- The most able (the top 1 percent) of U.S. high school seniors scored among the lowest in geometry and calculus (12th out of 13 nations assessed);
- The algebra achievement of the top 5 percent of U.S. students is lower than that of the corresponding cohorts from all but 1 of 13 countries studied in an international comparison;
- The top 1 percent of science students in the United States were outscored by students in 8 of 12 other nations participating in international science assessments in 1976. By 1988, students in advanced placement programs in the United States were outscored by 12 other nations participating in assessments in biology, by all but 2 in chemistry, and by all but 4 in physics; and

In the second paper of this anthology, Harold Stevenson and his associates analyze the policies and practices for educating high-ability students in Japan, Taiwan, and China. Stevenson and his research team at the University of Michigan have been conducting studies of children's academic achievement in East Asia for the past 11 years. Stevenson's research team found that

- Most of the programs for top students in East Asia were established during the last decade. The most vigorous efforts are being made in China and Taiwan. Japan supports no pro-

grams specifically for gifted students prior to high school.

- In both China and Japan, the amount of effort students expend is thought to be the ultimate factor determining the level of achievement individuals attain. Innate abilities are not stressed nearly as much as in many Western countries. "Yareba dekiru," say the Japanese: "If you work at it you can do it." This optimistic belief underlies the expectation that all normal children are capable of performing effectively in school.
- Schools in East Asia produce some remarkable students. There is no indication that their general level of intelligence is higher than that of students in the West, but their level of sophistication in mathematics is well beyond that found in the United States and other Western countries.
- Students and their mothers most often knew in both this country and the East Asian countries whether they or their offspring scored well or average on tests. The one exception was in Minneapolis, where mothers of average-scorers generally considered their children to be more outstanding than their test scores suggested.
- A culture's philosophy of education is a key to determining whether the country establishes programs for top students. For example, in an effort to promote egalitarianism, all elementary students in Japan remain with their classmates, regardless of their level of intelligence or academic achievement. But in Taiwan and China, which are trying to improve the contribution top students make to their societies, elaborate programs have been developed to serve them.

Papers 3 through 5 discuss concerns about educating high-ability students in the United States. In the third paper, Patricia Bruce Mitchell examines current state policies, regulations, and legislation concerning education programs for gifted and talented students. In addition, Mitchell discusses state policies that are not specifically part of legislation or regulation on gifted and talented education but which have a direct influence on the nature and scope of local programs for gifted and talented students. Mitchell also discusses recent policies to restructure education that influence programs for gifted and talented students. The chapter concludes with a summary of the important issues and questions that need to be considered in developing a model for state policies and the formation of schools for all students.

In the fourth report, James Gallagher discusses major issues concerning the education of gifted students in the United States. He presents historical information that describes how early cultures addressed or failed to address gifted children. A major problem, Gallagher contends, is that our society traditionally has had ambivalent feelings toward gifted children. Some of the more widely accepted definitions of giftedness are discussed, as are traits that characterize gifted behaviors. While no one universally accepted definition exists, Gallagher presents several definitions which serve as a basis for understanding the child with above-average ability.

The paper also summarizes various methods that have been used to meet the educational needs of the gifted. Gallagher describes how schools have traditionally used these methods, and he provides both positive and negative aspects of these methods. In describing problems facing the education of gifted children, Gallagher explains how school systems have accommodated gifted children in the past and how they might better accommodate these children in the years to come. He also discusses the underrepresentation of minority and poor children in gifted and talented education programs.

Finally, Gallagher discusses future policymaking at the federal level, possibilities for future research, and future directions for educating gifted students. While research will provide a better understanding of the issues that must be addressed, policy makers will dictate the course of action.

Gallagher concludes by analyzing what has been achieved thus far and what is yet to be accomplished.

In the final paper, Daniel Resnick and Madeline Goodman examine the role that the American culture and political beliefs have played in shaping our educational system. The authors point out that forces outside the classroom may account for more of the success or failure of programs for the gifted than previously thought.

Their thoughtful analysis of the American ambivalence about intellectualism is guided by the following questions:

- What are the historical roots of American attitudes towards intellectuals and intellectualism?
- Where does the utilitarian spirit of this country come from and how is it manifested today?
- How has the culture been shaped by this spirit?
- What effect do anti-intellectual attitudes have on educating high-ability students in our country?

The Performance of High Ability Students in the United States on National and International Tests

Carolyn M. Callahan, Ph.D.
University of Virginia

Highly able students in the United States have received little attention in the wide-ranging discussions of poor performance in the American educational system. Unfortunately, ignoring the results of international and national assessments of this group of students has led to the misconception that they are sufficiently challenged by the educational system. Reviews of national assessments of aptitude and achievement reveal that few strides have been made in significantly improving the performance of the most able students in the United States, and the findings from international studies provide devastating evidence that the achievements of the most able students in the United States are far behind those of other industrialized nations. In addition, among students who score highest on assessments used for college admission, fewer and fewer are electing careers in mathematics or science—leaving fields essential for progress to languish in this country. Current trends must be reversed if we are to hope to meet the National Education Goals set by the President and Governors for the Year 2000.

Introduction

Callahan documents that the current status of the highest achievers in the United States is far below the international standard and that it will require an effort of major proportions to achieve the National Education Goals by the year 2000. Discouraging evidence abounds in data on achievement, aptitude and even career goals, that America's top students lag behind the top students of comparable nations. The most recent studies of the International Association for the Evaluation of Educational Achievement, data from the Educational Testing Service, the National Assessment of Educational Progress, and the National Science Foundation, and other international achievement comparisons yield telling data.

- The average Japanese student exhibits higher levels of achievement in calculus than the top 5 percent of American students enrolled in college preparatory courses.
- The most able U.S. students (the top 1 percent) scored lowest in algebra among the analogous cohorts of 13 other countries in an international study.
- The most able (the top 1 percent) of U.S. high school seniors scored among the lowest in geometry and calculus (12th out of 13 nations assessed).
- The algebra achievement of the top 5 percent of U.S. students is lower than that of the corresponding cohorts from all but one country of 13 countries studied in an international comparison.
- The top 1 percent of science students in the United States were outscored by 8 of 12 other nations participating in international science assessments in 1976. By 1988 students in advanced placement programs in the United States were outscored by 12 other nations participating in assessments in biology, by all but 2 in chemistry, and all but 4 in physics.

- Although the number of high scorers on the quantitative (mathematical) section of the Scholastic Aptitude Test (SAT-M) has been increasing, the number of high scorers on the verbal portion (SAT-V) of that test has been steadily declining.
- Even though there are more high scorers on the SAT-M, among the students receiving these high scores the proportion of the top scorers electing careers in math, science and engineering has been steadily declining since 1982.
- In mathematics graduate programs, the number of U.S. graduate students has declined by 1,400 while the number of foreign nationals in those programs has increased by 3,100.
- Since the National Assessment of Educational Progress (NAEP) began in 1971 with reading assessments, there has not been a single increase in the proportion of students scoring at the top levels in reading (between 1971 and 1984), mathematics (between 1973 and 1986), or science (between 1969 and 1986). In mathematics, the number of 13-year-olds scoring at the top level has significantly decreased.
- When items from the NAEP assessments in mathematics and science were used in a comparison by the International Assessment of Educational Progress with five other countries and four Canadian provinces, the children in the United States earned mathematics scores lower than all but one other group (French-speaking students in Ontario).
- In one international comparison of mathematics achievement among young children in three countries, only 15 Americans were among the 100 top scorers in first grade and only 1 American was among the top 100 in fifth grade. In a second study, only three American children were among the top 5 percent in a mathematics comparison across cities in Japan, China and the United States. If achievement had been equally distributed in the sample, 40 American children would have been in the top 5 percent.

Concerns about the achievement level of students in the United States have generated considerable interest in the media and among education professionals. Expressions of concern about the poor achievement of students in the United States have covered nearly every discipline—from math, science, and foreign languages to geography, reading, and writing. But most of the focus of concern has been on the poor achievement of the average student or the at-risk student. The data presented on these populations raised grave concerns and calls for substantial reform in the schools. Unfortunately, the discussions of the results of most of these assessments fail to bring forth information on the achievement levels of the most able students. Thus, a dangerous misconception has prevailed that the United States need not worry about the bright and capable students because they are achieving well in school. Further, this erroneous assumption has influenced discussions of educational priorities.

The synthesis provided by this paper began as an attempt to ascertain just how well the students in the gifted population in the United States have fared on both international achievement tests and on national tests of academic achievement and aptitude. The students who participated in these studies were not classified according to their intellectual ability, and the students singled out for closer scrutiny in this report were, therefore, not formally identified as "gifted" students among the populations studied. However, in each case the students selected for study represent the highest scoring students among the groups sampled and thus can be considered the "academically elite" or the "highest achieving" students in the U.S. population.

The basic question to be answered in this study was whether the achievement pattern of the most able population followed the pattern of decreased achievement characterizing the general popula-

tion, or whether the gifted group had received an education that had resulted in distinguished performance. Declines in achievement levels across many disciplines and in the general student population on national standardized tests have been documented in numerous sources. Thus, it is important to determine first whether the data on the achievement levels of the most able students indicate a similar trend of lower level of performance than that of prior, comparable groups, or whether these students are now achieving as well as or better than past classes. A corollary question is whether the current school setting and curriculum serve the most able students well.

In times of increased international competition and a shrinking globe, it is insufficient to maintain a parochial view of achievement and to be satisfied with internal, longitudinal comparisons. It is increasingly necessary that the United States examine the achievement of its students in relation to the achievements of students in other nations. "No longer can society view education and competitiveness in the international marketplace as disconnected happenings" (Cooney, 1988, p. 352). Thus the nation must ask if its schools provide the most able students with the background, the knowledge, and the problem-solving strategies that will allow them to be competitive internationally.

To provide answers to these questions, this document includes a review of the available data on select populations from a wide variety of sources. First, the longitudinal data available from performance on standardized tests administered in this country are examined. These tests are generally regarded as indicators of the quality of the performance of U.S. students and schools over time. Second, studies comparing the achievement of the highest scoring U.S. students and the achievement of the highest scoring students in other nations are scrutinized for evidence of the relative achievements of U.S. students. The studies included in this analysis include those of the International Association for the Evaluation of Educational Achievement (IEA) and the Center for the Study of Human Growth and Development at the University of Michigan. These data provide a reading of the global competitiveness of the most able U.S. students across both elementary and secondary levels of achievement. Because questions have been raised about the degree to which these international assessments may not match national goals, data which compare performance of U.S. students to students from other nations on measures developed as a part of the U.S. National Assessment of Educational Progress program (NAEP) are also examined.

There is a focus on mathematics and science in this paper which evolved from the characteristics of the available data which are, in turn, a reflection of the interests of contemporary society. The United States has become a technological society in which developments in many fields are dependent on the "basic science" work of scientists, mathematicians, and engineers with the capabilities of solving complex and sophisticated problems in those disciplines. The importance of science to every aspect of society, from basic health care to nutrition to improving the quality of life in general, is well understood. The importance of mathematics has been succinctly and clearly stated by Travers, Oldham, and Livingston (1982):

> At the most basic level, a knowledge of mathematical concepts and techniques is indispensable in commerce, engineering and the sciences. From the individual pupil's point of view, the mastery of school mathematics provides both a basic preparation for adult life and a broad entree into a vast area of career choices. From a societal perspective, mathematical competence is . . . needed to ensure the continued production of the highly-skilled personnel required by industry, technology and science (1).

The importance of mathematics and science to the general welfare of the nation warrants the general concern over achievement across all ability levels and the consequent investment in extensive

assessments in those areas. Further, it justifies the expectation that the most able of students in the United States achieve at a level which matches their capabilities and which is competitive with the youth of other nations. This focus on mathematics and science is reflected in the priorities given to assessments in these areas and the resulting data available for consideration in this paper.

Although much of the data presented in this paper are from achievement and aptitude indicators in the areas of science and mathematics, data from other disciplines have been introduced wherever they were available. Further, related findings from studies focusing on variables other than performance were also considered as they added to a complete discussion of the issue of high ability students. For example, a focus on the outcomes of measures of achievement and aptitude may reveal the capabilities of students, but if other data indicate that U.S. students are not electing to capitalize on their capabilities by pursuing majors, professional careers, or graduate programs in the areas in which they have greatest talent, the nation stands to lose great resources. Achievement and aptitude data on highly able students were accompanied by career interest data which indicated that those students scoring highest in certain areas of critical shortage express little interest in pursuing related careers in mathematics and science.

College Entrance Examinations

Without question, the issue of rising and falling Scholastic Aptitude Test (SAT) scores generates great interest and news each year when the latest results are published. At times, there has been great consternation over the decline in the number of high scoring students—the most recent occasion being the mid-1980s. This resulted in a publication by the College Entrance Examination Board (CEEB) (Turnbull, 1985) which included a special section entitled "Fewer High Scores," in which the drop in the number of high scores on both the verbal and mathematical portions of the test between 1970 and 1976 was attributed to a reduction in the number of students taking the SAT and the influence on high scorers of the same variables affecting the scores of the total test population. In 1985, The Educational Testing Service (ETS) reported, "The Panel, although a little troubled, did not pursue the matter further, but the decline in high scores has continued and remains a source of concern" (7). Although ETS acknowledged the problem, no further explanation has been offered or investigation undertaken.

As figures 1 through 12 indicate, the pattern of numbers and percentage of high performers since 1984 is quite different across the sub-tests of the SAT. Student performance on the verbal section of the test shows a fairly consistent pattern of decline between the years 1972 and 1989, with the 1989-1990 difference negligible. An examination of the most recent six years reveals a few years where the number of high scorers increased slightly, but overall, the declining pattern holds true, with 1989 yielding the fewest students scoring between 700 and 800 since 1984.

The pattern for mathematics, however, is quite different. The numbers of high scorers declined steadily in much the same way as for the verbal

Figure 1.—Number of students scoring ≥ 750 on scholastic aptitude test-verbal

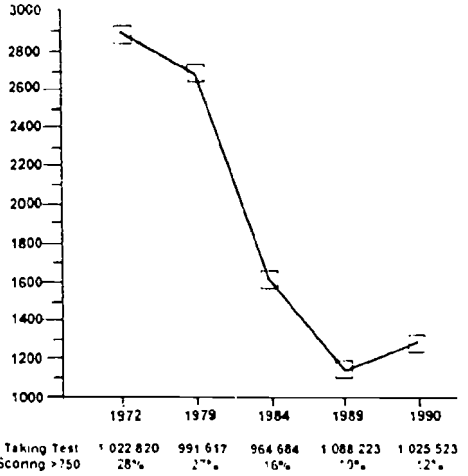


Figure 2.—Number of students scoring ≥ 750 on scholastic aptitude test-quantitative

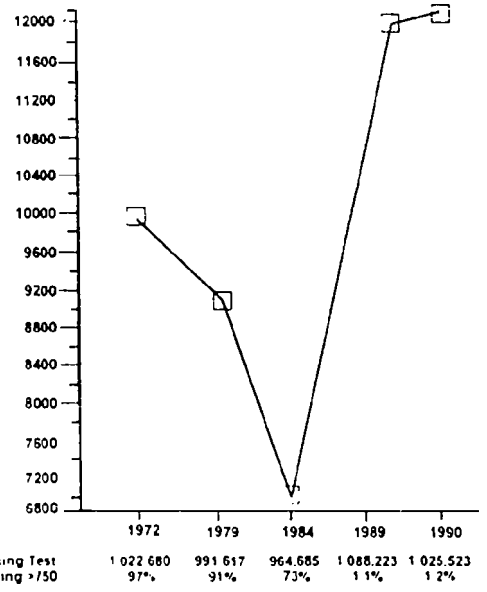


Figure 3.—Number of students scoring ≥ 750 on scholastic aptitude test-verbal

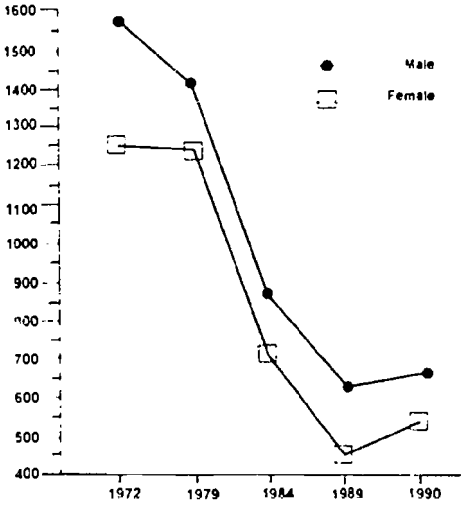


Figure 4.—Number of male and female students scoring ≥ 750 on scholastic aptitude test-quantitative

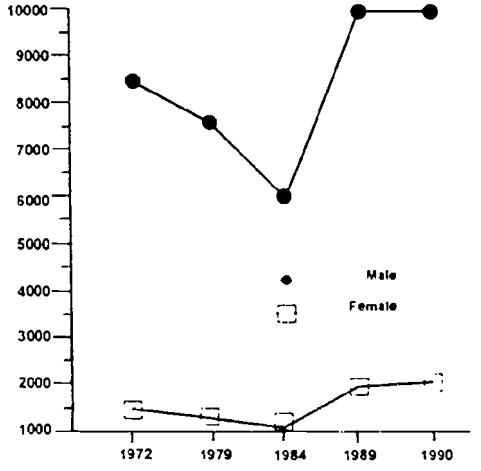
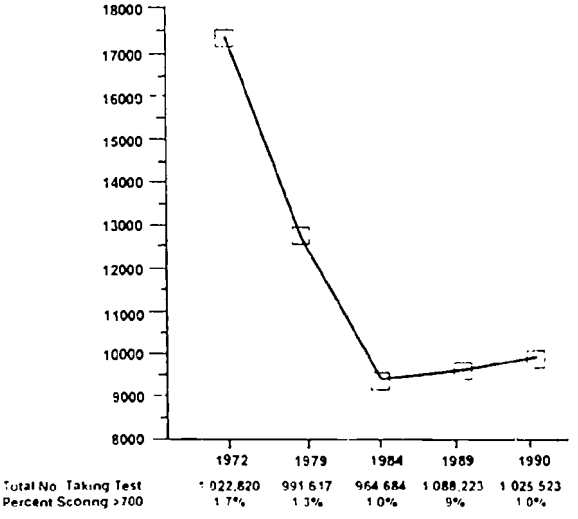


Figure 5.—Number of students scoring ≥ 700 on scholastic aptitude test-verbal



sub-test until 1982 when a consistent pattern of increasing numbers of high scorers began. This pattern has been consistent, with 1990 yielding the greatest number of high scorers (between 700

Figure 6.—Percent of students scoring ≥ 700 on scholastic aptitude test-verbal

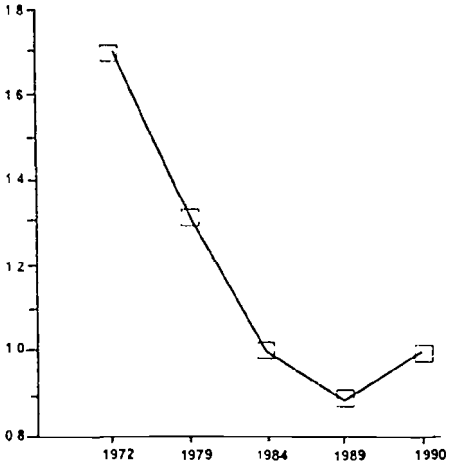


Figure 8.—Percent of students scoring ≥ 700 on scholastic aptitude test-quantitative

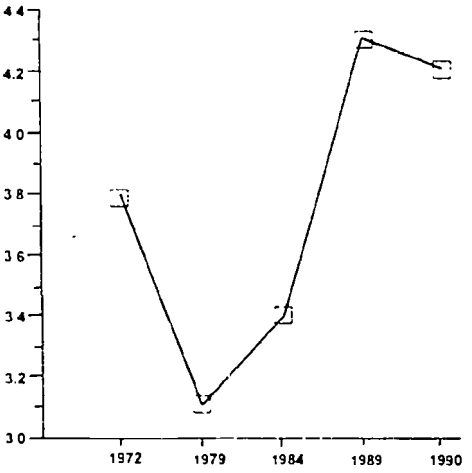


Figure 7.—Number of students scoring ≥ 700 on scholastic aptitude test-quantitative

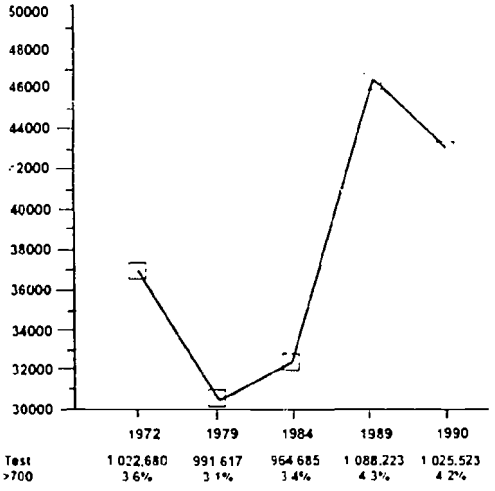
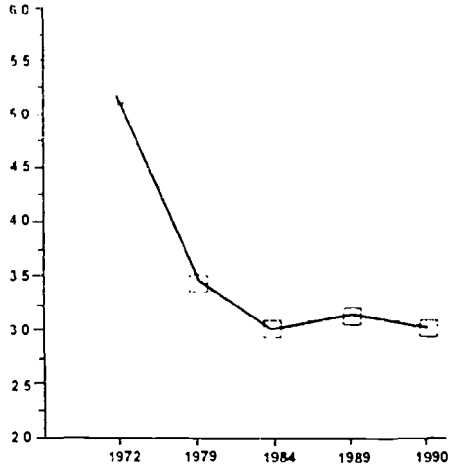


Figure 9.—Percent of students scoring ≥ 650 on scholastic aptitude test-verbal



and 800) in the history of the testing program. These data patterns are consistent, whether one defines high scorer as those scoring greater than 750, greater than 700, greater than 650 or greater than 600. All of these data are taken from the College Board reports entitled "College Bound Seniors." The pattern of continued decline in SAT-V scores and the increase in SAT-M scores has not been addressed or interpreted in any publications of the CEEB.

Figure 10.—Percent of students scoring ≥ 650 on scholastic aptitude test-quantitative

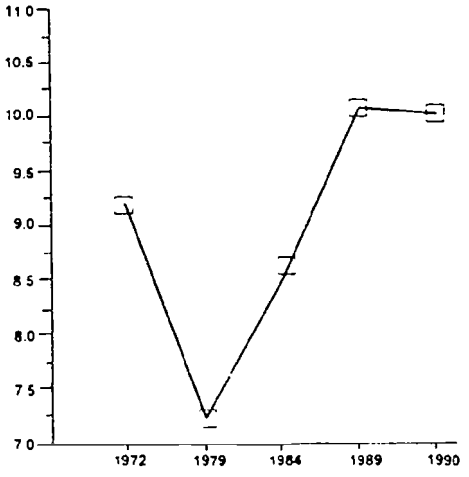


Figure 11.—Number of students scoring ≥ 700 on scholastic aptitude test-verbal 1985–90

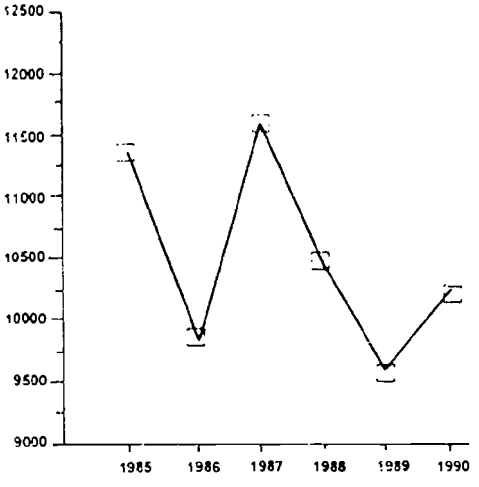
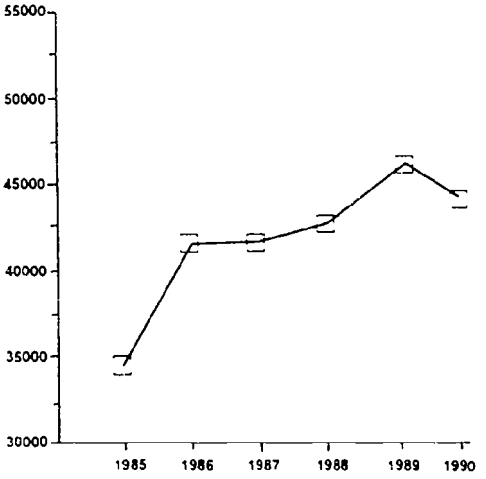


Figure 12.—Number of students scoring ≥ 700 on scholastic aptitude test-quantitative 1985–90



Speculations

The interpretation of the patterns of performance on SAT sub-tests is very difficult for several reasons. It is very difficult to define the construct measured by the Scholastic Aptitude Test. On the one hand, the title clearly suggests that it is an aptitude measure, and the researchers and administrators at the ETS have spoken "strongly and consistently against attempts to use SAT scores to measure American education" (Turnbull, 1985, 1). On the other hand, ETS publications include discussions of general test score decline and suggest a strong achievement component related to schools: "A decline as sweeping as the one we have seen in a generation presents educators with an obligation to explore the educational lessons that we may be able to learn from it" (Turnbull, 1985, 2). The current data in publications which report trends in course taking among college students suggest a very close relationship between the patterns noted above (increases in numbers of high scorers in mathematics and decreases in the number of high scorers in verbal areas) and achievement. For example, in a recent publication, *What Americans Study*, ETS reports that the percentage of students meeting the curricular recommendations of four years of high school English (recom-

mended by the National Commission on Excellence in Education in *A Nation at Risk*) has decreased since 1972, while the percentage of students taking three years of science and the percentage of students taking three years of mathematics has increased. This course-taking pattern may explain some of the decrease in high scorers on the SAT-V and the increase in high scorers on the SAT-M.

Eckland (1982) also notes that interpretation of changes in SAT sub-test scores is difficult because the items are changed each year, opening the possibility that the test actually becomes easier over time. Two technical studies comparing the 1963 and 1973 versions of the tests verified that the tests had become easier. Similar data are not available comparing the current versions of the test to earlier versions. However, if that trend has continued over time, the longitudinal data on verbal declines would be underestimated and increases in mathematics scores would be overestimated in terms of actual performance.

Another possible explanation can be offered for the increase in the number of high scoring students in mathematics on the SAT without a similar increase in verbal scores. The influx of Asian immigrants into the United States beginning in 1965 and rapidly growing over the past two and one-half decades may be associated with these patterns. For example, a study by the San Diego schools found that "Southeast Asian immigrants earn higher grades as high school juniors and seniors than virtually all other groups, significantly out-performing white students. The most academically successful among the refugees were students from Vietnam, who represented more than 23% of the valedictorians and salutatorians in the class of 1986" (Divorky, 1988, 220). The CEEB reports that between the years 1972 and 1990, the percentage of Asian Americans taking the SAT increased from 1 percent to 7 percent (from 25,158 to 71,792). Between 1987 and 1990, the average mathematics score for this group increased steadily from 521 to 528 and exceeded the average score of whites (the next highest scoring group) by 32 to 37 (in 1990) points each of those years. Average scores for the Asian-American population were not reported before that time. Unfortunately, it is not possible to separate American-born from immigrant children in the data base in order to verify the hypothesis that the increased scores may result from prior instruction in other countries, and it is not possible to separate the influence of instruction from the strong commitment to educational values within the Asian family.

A final hypothesis which may explain increases in SAT-M scores is the influence of the early identification of mathematics talent and subsequent educational programs (primarily acceleration opportunities) which have evolved through the administration of the SAT to more than 100,000 12-year-olds each year. Opportunities for these students to attend special programs, or the opportunity for them to begin study of algebra early, and the increased offering of algebra in eighth grade by many school districts as a means of addressing the needs of the mathematically talented may account for the increased number of high scores on the quantitative scale of the SAT. In other words, the increase in scores on the SAT-M sub-test may be evidence of the influence of direct intervention in a specific discipline with highly able students through programs specifically designed for gifted students.

Short-term Measures of Interest in Mathematics and Science and Long-term Trends in the Pursuit of Advanced Degrees and Productivity

Sadly, even the satisfaction felt with the increasing number of high scorers on the quantitative portion of the SAT is quickly squelched when the future plans of these students are examined. Clearly, the best minds in the quantitative fields are not interested in pursuing associated careers in the numbers needed to meet the growing demand for mathematicians and scientists. Students who take the SAT examinations asked to complete a

survey which includes questions relating to their anticipated college majors. An analysis of trends in the choices these students are making indicates that although the proportion of top-scoring examinees planning to major in math, science, and engineering (defined as in the top 10 percent according to ethnic group and sex) is greater than that of the general examinee population, that proportion has declined steadily since 1982. "The decline reflects an overall decline in interest in mathematics and the physical sciences" (Grandy, 1987, 1). In the last year reported, 1986, only about 15 percent of the white females who scored above the 90th percentile in mathematics planned to major in a "highly quantitative field, namely, mathematics, physical sciences, or engineering" (Grandy, 1987, 1). In 1982, half of the students scoring in the top 10 percent planned to major in math, science, or engineering. Only 44 percent expressed such intentions in 1986. Moreover, interest in engineering rose steadily between 1977 and 1982 but has now leveled off; the same pattern is true for computer science, with 1983 as the year of greatest interest. Interest in the study of mathematics and the physical sciences has steadily declined over the past decade among high scoring students.

Not only has there been a decline in the selection of mathematics and science careers at the bachelor's level among highly able students, but there has also been a decline in the percentage of students entering the graduate level of study, and ultimately, in the level of productivity. For example, even though the total number of graduate students enrolled in graduate programs in mathematics in the United States increased by about 1,700 students from 1975 to 1986, this number actually reflects a decline of 1,400 U.S. students and an increase of 3,100 non-U.S. students (Madison & Hart, 1989). The percentage of U.S. citizens earning doctorates in mathematical science in the United States declined from 72.3 percent of the total to 50.3 percent between 1974 and 1986, while the percentage of doctorates earned by students holding temporary visas increased from 18.5 percent to 37.3 percent. In addition, the total number of doctorates decreased from 1,211 to 730 (National Research Council, 1987). Further, the Committee on the Mathematical Sciences in the Year 2000 points to serious declines in the scholarly productivity of mathematical scientists and scientists in general. Although mathematicians in the United States produced 37 percent of the world's research articles in that field, this is a significant drop from the level of 1973 when they produced 48 percent of those articles. This decline does not represent a switch in productivity to math-related fields. Scholarly productivity in each of the areas of clinical medicine, earth and space sciences, engineering and technology development, biomedicine, biology, physics, and chemistry has also dropped or remained the same since 1973.

The National Assessment of Educational Progress

One indicator which can be used in assessing the relative achievements of high ability students is performance over time on the National Assessment of Educational Progress (NAEP). Although the tests used in the NAEP assessments are general proficiency tests (thus, failing to assess very complex and abstract reasoning) and are not designed to assess the specific achievement of the most able students, some of the trend data do suggest that there have been decreases in achievement among the most able students in several areas which are of concern.

Mathematics and Science Achievement

In the NAEP assessments, students' scores are standardized on a scale ranging from 0 to 500 with a median of 250. Further, students are categorized as scoring at or above a certain level of proficiency with 350 representing the highest category used. Appendix A provides descriptions of the highest categories based on the types of items which must

be answered correctly for a student to score in that category. Students of ages 9, 13, and 17 are assessed in each nationwide assessment.

The percentage of 17-year-old students scoring at or above 350 in mathematics declined 1 percent (a statistically significant decline) between 1973 and 1986 while the percentage of high-scoring 13-year-olds declined 1 percent in that same time frame (Dossey, et al., 1988). Mullis et al. (1988) also report that between the years 1977 and 1986 virtually no 9-year-olds demonstrated proficiency at the 350 level. Further, only .6 percent scored at the 300 level of proficiency in 1986, and the trend, though slight, was downward in that category from 1977 through 1986. The percentage of males in the 300 level category among 9-year-olds decreased from .7 percent to .6 percent, and the percentage of females in that category decreased from .8 percent to .5 percent. The decrease in students scoring in the highest category (greater than or equal to 350) was statistically significant for 13-year-olds for the years 1978-86 (from .9 percent to .4 percent), with the larger decrease in the percentage of females from .8 percent to .2 percent. While there was a slight upturn in the trend for 17-year-olds in the 1985-86 assessment, it primarily represented greater increases for males (from 6.7 percent in 1981-82 to 8.2 percent in 1985-86) than for females (4.1 percent to 4.5 percent). Further, earlier achievement levels (of either 1973 or 1976) were not attained in the latest testing.

In science, similar decreases are noted among 17- and 13-year-olds (1 percent) between 1969-70 and in 1986 (Applebee, et al., 1989). No change was noted for 9-year-olds, but "virtually no 9-year-olds" scored in the highest category in any of the science assessments (Mullis & Jenkins, 1988). From 1975-76 to 1985-86, the percentage of students scoring in the highest category fell from .07 percent to .02 percent among 13-year-olds and from 8.5 percent to 5.5 percent among 17-year-olds (Mullis and Jenkins, 1988).

Other NAEP Assessments

In the civics assessment, the average number of "acceptable responses" on the civics proficiency score for 17-year-olds decreased from 81.4 to 79.1 between 1976 and 1988 (Anderson et al. 1990). Although the average number of items answered correctly in the test of factual knowledge of history increased between 1986 and 1988, there were still no fourth or eighth graders scoring at the 350 level of proficiency, and only 4.6 percent of the twelfth graders scored 350 or above (Hammack, et al. 1990).

Other indicators

Maeroff (1983) has also reported on the serious underachievement of the most able U.S. students using the results of a recent assessment in New Jersey as an example. In 1981, of the 30,000 students entering public colleges in New Jersey, only 7,000 had completed college preparatory algebra. That means less than 1 percent of the students entering public colleges were proficient in basic mathematics.

Limitations of the National Assessment of Educational Progress for Evaluating High Ability Students

The NAEP data is more distressing when one considers that the items on all of the NAEP assessments are constructed at a relatively low level. As Shanker (1990) has pointed out, even the questions at the highest levels of these tests "do not require knowing Dickens or Shakespeare or calculus or difficult concepts in history or science. They require the kinds of skills people who have completed high school need in order to find their way in the world" (346). Two examples from the tests of mathematics considered to be at the highest level (350) illustrate this observation:

Which of the following are equivalent equations?

$x + 2 = 9$	and	$x - 2 = 9$
$y - 3 = 7$	and	$y + 5 = 15$
$z - 6 = 3$	and	$z = 3$
$1 + 2 = w$	and	$w + 1 = 2$

The number of tomato plants (t) is twice the number of pepper plants (p). Which equation best describes the sentence above?

$t = 2p$

$2t = p$

$t = 2 + p$

$2 + t = p$

Although these items are relatively simple, only a very few fourth and eighth grade students attain proficiency at the highest level, and the numbers of students scoring at that level have decreased since the beginning of the assessment program. Furthermore, the Educational Testing Service (Applebee et al., Langer 1989) reports that "few students performed at the extreme ends of the scale—that is, from 0 to 150 and from 350 to 500" (7) for any of the assessments. So few fourth and eighth grade students score in the upper ranges (beyond the 350 level) that data are not even reported on this group and the very small numbers of students in the 350 category make trend analysis very difficult and speculative. Dossey, et al. (1988) claim that the skills at the 300 level are too advanced for 9-year-olds and that it is "expected" (11) that no 9-year-olds or 13-year-olds will achieve at the 350 level.

Compare that claim with the findings of Miwa (1987) provided in table 1 on the achievement of Japanese fifth and sixth graders on similar assessments. These items are very close in conceptual difficulty of the 350 level of proficiency on the NAEP assessment, and yet more than 60 percent of Japanese students younger than 13 can answer those questions while only .4 percent of 13-year-olds in the United States do. The United States seems to be willing to accept and justify unnecessarily low standards of achievement for its students.

Shanker also points out that when the NAEP exam for 17-year-olds is compared with school-exit tests in other countries the NAEP instruments are far less demanding. It is little wonder that students in the United States perform so poorly on international assessments.

The International Comparisons

As the data from Miwa (1987) cited above suggest, relying only on longitudinal, national comparisons alone gives a very incomplete picture of the performance of U.S. students. Unfortunately, when international assessments are made, a consistent, damning pattern of low relative achievement of the most able U.S. students is evident.

In introducing the need for international assessments, McKnight et al. (1987) point out that scores

Table 1.—Representative items used by Miwa to assess mathematics achievement among Japanese fifth and sixth grade students

Fifth Grade

Find the value of X which satisfies each

$X \times 4 - 2 = 6$	(85.8% correct)
$5/6 + 3/8 = X$	(80.8% correct)

Sixth Grade

When we substitute a positive number into ___ of the following expressions the greatest is

(63.0% correct)

a. ___ × 1½

b. ___ × ½

c. ___ ÷ 1½

d. ___ − ½

We buy apples for A yen and oranges for B yen, and hand a 1000 yen note. How much change do we have? (61.2% correct)

on standardized achievement and aptitude tests (such as the SAT) have often been used to show that U.S. achievement in mathematics, among other subjects, is not what it used to be. (''Test scores are declining. . . .'') Recently these same measures have been used to announce that the crisis is past (''Test scores are rising again at last. . . .'') But whether used only to accuse or excuse, such information makes use of only one standard—what we are doing now as compared with our past performance. That is, we compare ourselves with ourselves (13).

A nation should not rely solely on its own educators to identify all of what is important to know, to be able to do, and to assess in the disciplines. The success of U.S. students in the future depends on their ability to function in a world with a global perspective and an international scientific and mathematical community.

Further, reliance on longitudinal data forces comparisons with arbitrary standard years. The choice of particular years for comparison over time of national achievement provides a standard for longitudinal comparison, but educators and policy analysts must be cautious about the value attributed to the years available for comparison. Of what importance is the year 1972 for SATs or 1973 for the NAEP mathematics data (except that 1972-73 was the first year in which NAEP mathematics assessments were administered)? There is no reason to believe that the benchmark years chosen for comparison represent ''good'' performance. Even if U.S. students were to make consistent and positive gains in test scores, what is to inform us of their progress relative to that of others? Olympic swimmers do not simply swim ''as fast as they can''; they sometimes swim against the clock with known times of accomplishments of others. And it is generally agreed that they need to swim against the competition to assess their real achievement. Similarly, one means of providing additional perspectives on the achievements of academically able students in the United States is to look at international comparisons.

Studies of the International Association for the Evaluation of Education Achievement

The International Association for the Evaluation of Educational Achievement (IEA) has conducted numerous studies comparing the achievement of students in cooperating countries in the disciplines of mathematics, science, civic education, reading comprehension and literature, and English and French as foreign languages. Over the history of this effort, the studies of this group have included students from various grade levels to allow comparisons at both elementary and secondary levels. Some nations have participated in all the studies assessing all of the disciplines, while others have opted to participate only in certain studies of particular interest. The concepts included in the assessments and the instruments used for assessments of the disciplines are determined by a distinguished panel of over 40 educators representing each of the countries involved in the project.

Although there is a plethora of data available from these studies, this paper will focus on the mathematics and science studies since the data are the most recent on these topics and some comparative data across years are also available for consideration.

The IEA Mathematics Studies

In the most recent studies of mathematics achievement, two different groups of students were studied. Population A was made up of all students in the grade (year level) where the majority of students had attained the age of 13.00 to 13.11 by the middle of the school year. The other population sampled, Population B, was composed of all students who were in the normally accepted terminal grade of the secondary education system and who were studying mathematics as a substantial part (approximately 5 hours per week) of their academic program. Population B, students studied at the end of their secondary level educational careers, was considered the ''elite'' or ''cream

of the crop' with respect to school mathematics in the school system of each country'' (McKnight et al. 1987, 17). In other words, the American students sampled in this study represented a very small percentage of the student body (15 percent)—the best or academically elite of U.S. high schools. Only Israel and Japan had a smaller percentage of the student body enrolled in such courses (10 percent and 13 percent respectively) than did the United States, and the low enrollments in Japan may be related to the early completion of mathematics requirements by the most able students in Japanese schools. When the total age cohort is considered (i.e., all age cohorts whether in school or not), only Israel, Sweden, and Belgium were testing a more select group of students than the United States (McKnight et al. 1987).

The most able college preparatory students in each country were assessed across the topics of number systems, sets and relations, algebra, geometry, elementary functions and calculus, and probability and statistics. In each of those categories, the students in the United States failed to achieve at the international average. In the area of sets and relations, the students in the United States scored halfway between the international average and the bottom quarter. In all other areas, their scores were generally among the bottom one-fourth of the countries assessed. When an even more elite group from the United States was selected, those taking calculus, the results were more distressing.

In the United States, the achievement of the calculus classes, representing the nation's best mathematics students, was at or near the average achievement of the advanced secondary school mathematics students in other countries. (In most countries, all advanced mathematics students take calculus; in the United States, only about one-fifth do). The achievement of U.S. pre-calculus students (the majority of 12th grade college-preparatory mathematics students) was substantially below the international average. In some cases the United States ranked with the lower one-fourth of all countries in the study, and was the lowest of the advanced industrialized countries (McKnight et al., 1987, vii).

At the risk of belaboring a point, this means that the top 3 percent of American students (20 percent of the 15 percent sampled) only earned scores at the average of all students taking the same level of mathematics in other countries.

Even more telling are the data which document that ''average Japanese students achieved higher than the top 5 percent of the U.S. students in college preparatory mathematics'' (McKnight, et al, p. 26). When the researchers controlled for selectivity effects by studying the top 1 percent and 5 percent of the age group in each country,

> The U.S. came out as the *lowest* [emphasis added] of any country for which data were available. That is to say, the algebra achievement of the most able students in the United States (the top 1 percent) was lower than that of the top 1 percent of any other country. The algebra achievement of the top 5 percent

Table 2.—Rankings of the mean mathematics scores of participating nations of the top 1 percent of population B students of the IEA Study of Mathematics (Garden 1989)

Algebra and Functions	*Geometry*	*Calculus Elementary*
Japan	Japan	Japan
Hungary	Hungary	Finland
Canada (Ontario)	Canada (B.C.)	Canada (Ontario)
Canada (B.C.)	Canada (Ontario)	Sweden
Sweden	Sweden	Hungary
Finland	Belgium (Flemish)	New Zealand
Belgium (Flemish)	Finland	England and Wales
Belgium (French)	New Zealand	Belgium (Flemish)
England and Wales	England and Wales	Belgium (French)
New Zealand	Scotland	Israel
Scotland	Belgium (French)	Scotland
Israel	United States	United States
United States	Israel	Canada (B.C.)

was lower than any other country, except for Israel. In functions and calculus, the achievement of the top 1 percent of U.S. students exceeded that of Canada's (British Columbia) by only a few points even though calculus is not even included in the curriculum of Canada (McKnight, et al. 1987, 27).

Not only did the students from the United States in the groups considered "elite" in the study of mathematics score lower than the elite groups from other nations, but they also were outscored by two countries (Hungary and Scotland) that used much broader definitions of the range of students to be included in the study (Travers, et al., 1989). The inclusion in the sample of students in Hungary who were not taking courses which would truly be regarded as pre-university courses and the inclusion of two of the highest grade levels in Scotland (instead of one) were regarded by the researchers as factors which resulted in scores which "may be considerably lower" (14) for those countries than if the more strict criteria had been applied in sampling. Therefore, the United States should have had an advantage in comparisons to Hungary and Scotland. Its lower scores reflect more serious underachievement than even the comparisons to other countries reflect.

In the collection of international data presented above, the assessment committee made some assumptions which cloud interpretations when comparing the achievement of the brightest students in each culture. As noted, the sample of students in Population B consisted of students in the terminal year of secondary school who were studying mathematics as a substantial part of their academic program. This sampling procedure assumed that the most able students would be in that sample. However, in the advanced or accelerated programs in countries such as Japan, many students complete their study of formal mathematics at the secondary level before that time. If this is the case, only those who are somewhat less able would be in the classes sampled, and the differences in achievement among nations may be underestimated since students of lesser ability in those countries are being compared with the most able in the United States.

Another important statistic emanating from these international studies is the number of high-achieving students (those scoring greater than 76 percent on the test) per 1,000 students of the age cohort from each country. Based on the latest assessment scores and the numbers of students currently served in advanced mathematics classes in the countries assessed, the expected yield for Japan is 58 high-achieving students per 1,000, while for the United States it is only 3 students per 1,000. Only British Columbia has a lower yield score (Garden, 1989).

The IEA Science Studies

IEA's first science assessment in 1970 administered comprehensive or general science tests to

Table 3.—Yield of high performance students as reported by the IEA study of mathematics: Population B (Garden, 1989)

Nation	Percent of sample scores exceeding 76%	Estimated number of students per 1,000 of the age cohort exceeding 76%
Belgium (Flemish)	11	11
Belgium (French)	7	7
Canada (British Columbia)	1	2
Canada (Ontario)	9	16
England and Wales	22	13
Finland	17	21
Hong Kong	56	33
Hungary	3	17
Israel	6	4
Japan	48	58
New Zealand	12	13
Scotland	3	5
Sweden	16	19
Thailand	2	—
United States	2	3

four populations, including one group which represented students "in the terminal year of those full-time secondary education programs which were either pre-university programs or programs of the same length" (Comber and Keeves, 1973, 10). At the time of this first science assessment, the top 9 percent of students in the United States ranked 7th, the top 5 percent ranked 8th, and the top 1 percent ranked 9th out of 14 countries. French-speaking students in Belgium and Flemish-speaking students in Belgium were treated separately.

During the mid-1980s, the IEA studied three populations in its science assessments. The youngest students were 10-year-olds, the second group were 13-year-olds, and the third group consisted of students studying science in the final year of secondary school. Students at all three levels were administered a general test, and the students at the highest level were administered specific discipline tests as well. It should be noted that the 13-year-old U.S. students ranked thirteenth out of sixteen countries, but more importantly, not a single student in the United States earned a perfect score (attained in twelve of the other countries). (International Association for the Evaluation of Educational Assessment, 1988).

The other results of this study to be discussed in this report are based on those students considered the "elite group" of each country (Population 3) who were in an advanced course (second year of study) in the particular science area assessed. In the United States, these students were all enrolled in an Advanced Placement course in the discipline assessed. The United States did not administer the general test nor assess students not in advanced classes and not in science classes. That is, U.S. students were assessed only in their Advanced Placement discipline while students in other countries were assessed on the general test and on one of the discipline tests. Further, the administrators in the United States did not administer five of the items on the biology test, five of the items on the chemistry test, and four of the items on the physics test. Postlewaite (personal communication to the Second International Science Study National Representative Committee on first draft of SISS Volume 2, dated July 22, 1989) points out that he assumes that these items were eliminated because they were not relevant to the curriculum of the United States. Although comparisons discussed in this paper are those using common items on the test, he notes that if his assumption is correct, then the United States "has an advantage over other countries" (26) because other countries did not eliminate items not part of their curricula. Scores of students in the United States were based only on items matching the curriculum of the United States; scores of the students in other countries, while containing common items also included items not necessarily part of the curriculum they studied.

The importance of the achievement of Population 3 and the status of the students in this population as the most able is stressed by the IEA assessment committee in their note that "the scientific literacy of the general population is one thing. The science achievement of the elite in a technological era is another" (International Association for the Evaluation of Educational Achievement, 1988, 43).

The performance of these "academically elite" students in the United States was shockingly low. U.S. students in biology classes ranked last of the 14 nations in the report of the IEA (1988); those in chemistry classes ranked twelfth out of 14; and those in physics classes ranked tenth. The authors of the report concluded that "the United States would appear to have grounds for concern unless the situation is remedied at the university level" (73). Although a small number of the nations studied reported mean age scores one year greater than the mean age reported for the United States, data are not available at this time which explain the effect of this age difference on the scores; nor does the age difference necessarily suggest a greater number of years of science instruction for the students in the other nations.

It is also important to note that the more select the population studied, the lower the performance of U.S. students (see table 4).

Table 4.--Rankings of the mean science scores of the top 1%, top 5%, and top 9% of Population 4 of the IEA Science Study (Walker, 1976)

Top 9%	*Top 5%*	*Top 1%*
Australia	Australia	New Zealand
Sweden	New Zealand	England
New Zealand	England	Australia
England	Sweden	Scotland
Hungary	Scotland	Sweden
Scotland	Hungary	Hungary
United States	Netherlands	Netherlands
Finland	United States	Finland
Belgium (Flemish)	Finland	United States
Netherlands	Federal Republic of Germany	Federal Republic of Germany
France	France	France
Federal Republic of Germany	Belgium (Flemish)	Belgium (Flemish)
Belgium (French)	Belgium (French)	Italy
Italy	Italy	Belgium (French)

[1]Population 4 was defined as all students who were in the final year of full-time secondary courses leading to University entrance qualifications, or of full-time courses of the same length.

Table 5.--Ranking of participating nations on the basis of mean scores of science students in Population 3[1] (International Association for the Evaluation of Science Achievement, 1988)

Biology	*%*[2]	*Chemistry*	*%*	*Physics*	*%*
Singapore	3	Hong Kong (Form 7)	8	Hong Kong (Form 7)	8
England	4	England	5	Hong Kong (Form 6)	14
Hungary	3	Singapore	5	England	6
Poland	9	Hong Kong (Form 6)	14	Hungary	6
Hong Kong (Form 7)	4	Japan	16	Japan	11
Norway	10	Hungary	1	Singapore	7
Finland	45	Australia	12	Norway	24
Hong Kong (Form 6)	7	Poland	9	Poland	9
Sweden	15	Norway	15	Australia	11
Australia	18	Sweden	15	United States	1
Japan	12	Italy	2	Sweden	15
Canada	28	United States	1	Canada	19
Italy	14	Canada	25	Finalnd	14
United States	6	Finland	14	Italy	19

[1] Population 3 is defined as all students studying science in the final year of secondary school. In the United States the population sampled was students in advanced courses such as Advanced Placement (second year of study of that particular science).

[2] The numbers in the % column indicate the percent of the total school population enrolled in the schools of that country who are enrolled in these courses.

Educators in the United States should also be concerned that scores of U.S. students showed greater sex differences in science achievement than the international average differences in all disciplines. The science scores of male and female students reflect greater discrepancies (favoring males) in the United States than in most other countries. Only three of the fourteen other countries had greater discrepancies between male and female scores in biology and chemistry, and only five other countries had greater discrepancies in physics scores.

Other Studies Supporting the International Association for the Evaluation of Educational Achievement Studies in Mathematics

The secondary level findings presented in the IEA studies (lower achievement of the most able students in the United States) are not unique to those studies or to secondary school results. Other international studies document similar performance differences in the elementary and middle school age population and suggest that the pattern of underachievement begins early. For example, Stevenson et al. (1986) compared mathematics achievement of Japanese, Chinese, and American first and fifth graders. Only 15 Americans were among the 100 top scorers in the first grade, and at grade 5 there was only 1 American among the top 100 scorers. The poor achievement of Americans was not due to a particular area of weakness. "They were as ineffective in calculating as in solving word problems" (605). Incidently, this study examined the hypothesis that the performance differences might be attributed to the outside tutoring of special after-hours schools in Japan and China and concluded, "Attendance at afterschool classes had no relation to academic achievement in any of the three cities" (Stevenson

and Lee, 1990, 45). In a second study reported by Stevenson (1987), only 3 American children scored in the top 5 percent in a mathematics assessment across 4 cities in Japan, China, and the United States. If the math achievement had been equally distributed, 40 American children would have been in that group.

Stevenson and his colleagues (1986) also studied the classrooms of the children and the attitudes of the children's mothers. They found that in grades 1 and 5 the amount of instructional time devoted to mathematics by the American children was about 3 hours per week (less than 20 percent of the school day as compared to 40 percent time on language arts and reading) and was less than half the time that either the Japanese or Chinese devoted to math instruction. In some American classrooms observed, no time was devoted to mathematics in over 40 hours of observation per classroom.

Further, in American classrooms, children known to be in school were often not in the classroom during observation times (18.3 percent of the time for American fifth grades; less than .2 percent in classes in classes in Taipei and Sendai). The absent students were found to be on errands to the school office, in another classroom, or, ironically, in the library. Stevenson, et al. also found that American mothers rated their children's achievement in mathematics very favorably and were pleased with the job the schools were doing. The Chinese and Japanese mothers did not rate their children's achievement as high nor did they believe the schools were doing as good a job in mathematics instruction. Finally, Stevenson and his colleagues found that the American mothers attributed the child's success or lack of success in mathematics to the ability of the child, while the Japanese mothers were more likely to attribute success to the effort of the child. These findings, combined with those of Miwa, suggest that the very low relative performance of the best U.S. students in mathematics begins in first grade and is consistent across grade levels and studies.

In an attempt to compare the performance of students from the United States and other nations on the concepts tested in the National Assessment of Educational Progress, the Educational Testing Service has used a sample of items from the 1986 NAEP mathematics and science tests to make international comparisons of the achievement of 13-year-olds. Six countries were included in this study, with four Canadian provinces studied as separate comparison groups. Comparisons of the percentage of students scoring in the two highest groups in mathematics (those scoring at or above 600 and those scoring at or above 700) are presented in table 6 (Lapointe et al. 1989). The scale ranges from 0 to 1000 with a mean of 500 and a standard deviation of 100. Of all the groups participating, the United States had the lowest percentage of students scoring in the upper ranges of assessment (at or above 600) of all but one other group (French-speaking students in Ontario). When the group scoring 700 or greater was considered, the United States had a lower percentage of students in that group than all other countries except French-speaking students in Ontario, Irish students, and French-speaking students in New Brunswick.

On the science assessment of this comparison using NAEP items, a greater percentage of students in British Columbia, Korea, the United Kingdom, and English-speaking Ontario scored at or above 700 than did students in the United States. Only Ireland, French-speaking Ontario, and French-speaking New Brunswick had a smaller proportion of students scoring 600 or greater.

School-Related Factors Which May Influence the Achievement of Highly Able American Students

Cross-cultural studies have not been limited to the examination of test scores alone. Curricular analyses and studies of other school factors suggest several variables which yield hypotheses for explaining the poor performance of all U.S. students, including gifted students. For example, the Second International Mathematics Study found that

Table 6.—Percent of students performing at or above 600 or 700 on the mathematics portion of the International Assessment of Educational Progress (LaPointe, 1989).

Level[a]	600	700
Korea[b]	40	5
Quebec (French)	22	2
British Columbia	24	2
Quebec (English)	20	1
New Brunswick (English)	18	1
Ontario (English)	16	1
New Brunswick (French)	12	less than 1
Spain	14	1
United Kingdom	55	2
Ireland	14	less than 1
Ontario (French)	7	0
United States	9	1

[a] Level 600 is defined as understanding concepts and level 700 is defined as interpreting data.

[b] Students in Korea, Quebec, New Brunswick, Ontario, and Spain begin school at age 6; students in British Columbia, the United Kingdom, and the United States begin school at age 5; students in Ireland begin school at age 4.

Table 7.—Percent of students performing at or above 600 or 700 on the science portion of the International Assessment of Educational Progress (LaPointe, 1989).

Level[a]	600	700
British Columbia[b]	31	4
Korea	33	2
United Kingdom	21	2
Quebec (English)	15	1
Ontario (English)	17	2
Quebec (French)	15	1
New Brunswick (English)	15	1
Spain	12	1
United States	12	1
Ireland	9	1
Ontario (French)	6	less than 1
New Brunswick (French)	7	less than 1

[a] Level 600 is defined as understanding concepts and level 700 is defined as interpreting data.

[b] Students in Korea, Quebec, New Brunswick, Ontario, and Spain begin school at age 6; students in British Columbia, the United Kingdom, and the United States begin school at age 5; students in Ireland begin school at age 4.

one likely contributor to differences in student achievement in mathematics was the curriculum presented to students. The curriculum has been identified as less challenging in the United States with more difficult addition and subtraction problems introduced later in the United States than in Japan, Taiwan, mainland China, and the former Soviet Union (Fuson et al. 1988) and with a much broader range of word problems introduced in Soviet texts than in American texts (Stigler et al. 1986). Clearly, if the most able students are not introduced to the same range of concepts, they cannot be expected to learn those concepts. The curriculum must be examined to ensure that all children in the United States are presented with the most challenging curriculum within their grasp.

Issues

A very disturbing finding of this review is the lack of information on the performance of "high ability" students—according to *anybody's* definition of high ability. Nearly all data which are reported are based on the high achievers on a given assessment instrument; however, little information is available on the cognitive abilities of these students. Further, the small number or percentage of students scoring in the upper ranges of the instruments, particularly the National Assessment of Educational Progress assessments, make analyses of trends and pattern particularly tenuous. Other comparative studies consulted for this paper simply did not include a large enough sample of high ability students to warrant their inclusion in the discussion.

The national assessment studies included in this review are often limited by their focus on the general population of students and the inclusion of high ability student analyses only as a by-product of the main purpose. This results not only in small numbers of high ability students studied but also in limited information on the effects of programs particularly suited to these students and on the

achievement of the goals set for the most gifted students. For purposes of this paper, the international studies provided the most comprehensive information on the most able students.

Other Related and Anecdotal Data

An anecdotal report of non-standardized, non-test data may illustrate the real-world impact of the performance differences. The managers of a semiconductor plant recently opened in the Southeastern United States had to hire *graduate students* to perform the statistical quality control functions carried out by *high school graduates* in a comparable plant in Japan (Gilden, 1987).

The superior quality of U.S. colleges and graduate schools is often cited as evidence of the success of the U.S. educational system. However, examination of the graduate enrolments in those institutions is further evidence of serious problems in the future if the United States cannot find a way to make its students competitive in the international arena and interested in careers in mathematics and science.

Conclusions

The available data on the performance of highly able students in the United States are limited by the shortage of studies particular to the gifted student, the limited assessment range and other problems and factors discussed above. Further, there is evidence that the mathematics aptitude test score decline among the highest scoring students as measured by SAT (Scholastic Aptitude Test) scores has leveled off. However, the data on the verbal performance of the most able U.S. students, the data from the NAEP studies and from the international studies of achievement in mathematics and science are compelling evidence that the achievement levels of the most able students in the United States are declining. The scores of the highest achieving students in this country do not compare favorably with those of most other industrialized nations—especially in advanced mathematics and science. America's most capable students are not competitive academically with the best students in other nations. In fact, they barely perform as well as the average student in many of those nations. These findings are dramatic testimony to the failure of the educational system to meet the challenge of developing the nation's greatest resource—the potential of the gifted student.

In presenting the educational goals for the Year 2000, former President Bush said, "These goals are about excellence. Meeting them will require that the performance of our highest achievers be boosted to levels that equal or exceed the performance of the best students anywhere. . . . We must work to ensure that a significant number of students from all races, ethnic groups, and income levels are among our top performers." The nation has far to go.

Some Final Concerns and Comments

Although this paper has been commissioned by the U.S. Department of Education and the natural tendency is to look to schools as the source of both the problems and the solutions, it is important to remember that schools exist within a societal and cultural context as the International Association for the Evaluation of Educational Achievement and other international studies clearly document. As Torsten Husen has pointed out, "IEA findings consistently show that non-scholastic factors account for a considerable portion of the between-student, between-school, and between-country variation. Thus educational improvement is also a matter of improving the social and economic conditions under which the educational system operates. To use a modern expression—educational reforms call for systems solutions which relate to society at large" (Walker, 1976, 12). The attitudes of mothers in the study by Stevenson et al. (1986) further document that finding. Any consideration of the changes necessary in order for gifted students

to fulfill their potential cannot ignore the larger context of education and society at large.

The challenge to the United States is to examine its educational system, the context of that system and the interactions between the two to determine the relevant forces which must be brought to bear if the serious trend of underachievement among the most able students in this country is to be reversed.

Appendix A: Definitions of Level 350 on the National Assessment of Educational Progress Scales

Reading Level 350: Advanced Skills and Strategies

Readers who use advanced reading skills and strategies can extend and restructure the ideas presented in specialized and complex texts. Examples include scientific materials, literary essays, historical documents, and materials similar to those found in professional and technical working environments. They are also able to understand the links between ideas even when those links are not explicitly stated, and to make appropriate generalizations even when the texts lack clear introductions or explanations. Performance at this level suggest the ability to synthesize and learn from specialized reading materials.

Mathematics Level 350: Multistep Problem-Solving and Algebra

Learners at this level can apply a range of reasoning skills to solve multistep problems. They can solve routine problems involving fractions and percentages, recognize properties of basic geometric figures, and work with exponents and square roots. They can solve a variety of two-step problems using variables, identify equivalent algebraic expressions, and solve linear equations and inequalities. They are developing an understanding of functions and coordinate systems.

Science Level 350: Integrates Specialized Scientific Information

Students at this level can infer relationships and draw conclusions using detailed scientific knowledge from the physical sciences, particularly chemistry. They also can apply basic principles of genetics and interpret societal implications of research in this field.

From: Applebee, A. N., Langer, J. A., & Mullis, I. V. S. (1989). *Crossroads in American Education: A Summary of Findings*. Princeton, N.J.: Educational Testing Service.

History Level 350: Interprets Historical Information and Ideas

Students at this level are developing a detailed understanding of historical vocabulary, facts, regions, and ideas. They are familiar with the content of a wider variety of texts such as the Articles of Confederation, the Federalist Papers, Washington's Farewell Address, and certain amendments to the Constitution. They are aware of the religious diversity of the United States and recognize the continuing tension between democratic principles and such social realities as poverty and discrimination. These students demonstrate a rudimentary understanding of the history of U.S. foreign policy. They are beginning to relate social science concepts -such as price theory, separation of powers, and essential functions of government—to historical themes and can evaluate causal relationships.

From: Hammack, et al (1990). *The U.S. History Report Card*. Princeton, N.J.: Educational Testing Service.

References

American College Testing Program. (1969-1989). *ACT High School Profile*. Iowa City: American College Testing Program.

Anderson, L., Jenkins, L. B., Leming, J., MacDonald, W. B., Mullis, I. V. S., Turner, M. J., & Wooster, J. S. (1990). *The Civics Report Card.* Princeton, NJ: Educational Testing Service.

Applebee, A. N., Langer, J. A., & Mullis, I. V. S. (1989). *Crossroads in American Education: A Summary of Findings.* Princeton, NJ: Educational Testing Service.

College Entrance Examination Board. (1972-1989). *College Bound Seniors.* Princeton, NJ: Educational Testing Service.

Comber, L. C., & Keeves, J. P. (1973). *Science Education in Nineteen Countries: An Empirical Study.* New York: Wiley.

Divoky, D. (1988). The Model Minority Goes to School. *Phi Delta Kappan, 70,* 219-222.

Dossey, J. A., Mullis, I. N. S., Linquist, M. M., & Chambers, D.L. (1988). *The Mathematics Report Card: Are We Measuring Up?* Princeton, NJ: Educational Testing Service.

Eckland, B. K. (1982). College Entrance Examination Trends. In G. R. Austin & H. Garber (Eds.), *The Rise and Fall of National Test Scores* (pp. 9-34). New York: Academic Press.

Educational Testing Service. (1989). *What Americans Study.* Princeton, NJ: Educational Testing Service.

Fuson, K., Stigler, J., & Bartsh, K. (1988). Grade Placement of Addition and Subtraction Topics in Japan, Mainland China, the Soviet Union, Taiwan, and the United States. *Journal for Research in Mathematics Education, 19,* 449-56.

Garden, R. A. (1989). Students' achievements: Population B. In D. F. Robitalille & R. A. Garden, (eds.), *The IEA Study of Mathematics II: Contexts and Outcomes of School Mathematics* (pp. 126-152) Oxford:Pergamon Press.

Gilden, G. (April 2, 1987). *Chip Sense and Nonsense.* Wall Street Journal.

Grandy, J. (1987). *Trends in the Selection of Science, Mathematics, or Engineering as Major Fields of Study among Top-scoring SAT Takers.* Princeton, NJ: Educational Testing Service.

Hammack, D. C., Hartoonian, M., Howe, J., Jenkins, L. B., Levstik, L.S., MacDonald, W.B., Mullis, I.V.S., & Owen, E. (1990). *The U.S. History Report Card.* Princeton, NJ: Educational Testing Service.

Harnish, D., Walberg, J., Tsai, S-L., Sato, T.,& Fryans, L. (1985). Mathematics Productivity in Japan and Illinois. *Evaluation in Education, 9,* 277-284.

Husen, T. (Ed.). (1967). *International Study of Achievement in Mathematics: A Comparison of Twelve Countries.* New York: Wiley.

International Association for the Evaluation of Educational Achievement. (1988). *Science Achievement in Seventeen Countries: A Preliminary Report.* Oxford: Pergamon Press.

Lapointe, A. E., Mead, N. A., & Phillips, G. W. (1989). *A World of Differences: An International Assessment of Mathematics and Science.* Princeton, NJ: Educational Testing Service.

Madison, B. L., & Hart, T. A. (1989). *A Challenge of Numbers: People in the Mathematical Sciences.* Washington, D.C.: National Academy Press.

Maeroff, G. I. (1983). *School and College.* Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.

McKnight, C. C., Crosswhite, F. J., Dossey, J. A., Kifer, E., Swafford, J. O., Travers, K.J.,

Cooney, T. J. (1987). *The Underachieving Curriculum: Assessing U.S. School Mathematics from an International Perspective*. Champaign, IL: Stipes Publishing Company.

Miwa, T. (1987, March). Algebra Teaching in Japanese School Mathematics. Paper presented at the Teaching and Learning of Algebra Conference, University of Georgia, Athens, GA.

National Research Council. (1987). *Summary Report 1986: Doctoral Recipients from United States Universities*. Washington, DC: National Academy Press.

Robitalille, D. F., & Garden, R. A. (Eds.). (1989). The IEA Study of Mathematics II: Contexts and Outcomes of School Mathematics. Oxford: Pergamon Press.

Shanker, A. (1990). The End of the Traditional Model of Schooling—and a Proposal for Using Incentives to Restructure Our Public Schools. *Phi Delta Kappan*, 71, 345-357.

Stevenson, H. W. (1987). America's Math Problems. *Educational Leadership*, 45(2), 4-10.

Stevenson, H. W., & Lee, S.Y. (1990). *Contexts of Achievement*. Monographs of the Society for Research in Child Development, 55 (1-2, Serial No. 221).

Stevenson, H. W., Lee, S. Y., & Stigler, J. W. (1986). Mathematics Achievement of Chinese, Japanese, and American Children. *Science*, 231, 693-699.

Stigler, J., Fuson, K., Ham, M., & Kim, M. (1986). An Analysis of Addition and Subtraction Word Problems in U.S. and Soviet Elementary Mathematics Textbooks. *Cognition and Instruction*, 3, 153-171.

Travers, K. J., Garden, R. A., & Rosier, M. (1989). Introduction to the study. In D. F.Robitalille & R. A. Garden, (Eds.), *The IEA Study of Mathematics II: Contexts and Outcomes of School Mathematics*. (1-16). Oxford: Pergamon Press.

Travers, K. J., & Westbury, I. (Eds.). (1982). *The IEA Study of Mathematics I: Analysis of Mathematics Curricula*. Oxford: Pergamon Press.

Travers, K. J., Oldham, E. E., & Livingston, I. D. (1982). "Origins of the Second International Mathematics Study." In K. J. Travers & I. Westbury, (Eds.), *The IEA study of Mathematics I: Analysis of Mathematics Curricula*. (1-14). Oxford: Pergamon Press.

Turnbull, W. W. (1985). *Student Change, Program Change: Why SAT Scores Kept Falling*. Princeton, NJ: Educational Testing Service.

Walker, D. A. (1976). The IEA Six Subject Survey: An Empirical Study of Education in Twenty-one Countries. New York: Wiley.

Education of Gifted and Talented Students in China, Taiwan, and Japan

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Introduction

The stunning success of East Asian students in many forms of academic achievement has aroused a great deal of international interest. What are the educational and child-rearing practices that might help to explain why East Asian students, from kindergarten through high school, have been among the top performers in international studies of academic achievement and in international academic competitions? If the general level of academic achievement is so high, what are the students like who are at the top of their classes in East Asia? How do these students differ in ways other than academic achievement from average-performing peers in their own countries and from high achieving students in the West? The purpose of this paper is to explore these questions in two ways. First, we describe educational practices, especially those for gifted and talented students, in three locations in East Asia: China, Taiwan, and Japan. Second, we review data from a series of studies in which we have compared students in these three locations with students in the United States in terms of such characteristics as intelligence, beliefs, attitudes, and self-evaluations.

We know from the beginning that the outcome of our explorations will not be simple. Attitudes and beliefs about giftedness differ greatly among cultures. The degree to which different educational systems attempt to accommodate gifted and talented students also varies widely. We know, too, that variables such as economic investment in education, size of classes, and academic preparation of teachers are unlikely to give us a great deal of insight into the high levels of performance of gifted and talented students. Such variables have failed to clarify cross-national differences in academic achievement between students in East Asia and in the West, and are unlikely to help us understand why certain students in these cultures perform at such remarkably high levels.

Background of the Report

In the first section of this report we discuss governmental policies and practices concerning the education of three types of students: those who display high levels of intelligence, who are talented in the arts, and who are high achievers in their academic work. Information for this part of the report was obtained from interviews with leading educators, educational officials, and psychologists in each country. In the second part, we describe the characteristics of students who have participated in a series of studies we have conducted in Japan, Taiwan, and mainland China, and compare their performance and personal characteristics with those of their American peers. The discussion of these students focuses on students who demonstrate high levels of cognitive ability and on students who display exceptional ability in mathematics.

Interviews

During the summer of 1991, we interviewed Asian participants in a workshop on Asian Perspectives on Human Development that was held in

Ann Arbor, Michigan. These participants included leading experts in psychology and education from China, Taiwan, and Japan. In addition, during the fall of 1991, Shinying Lee visited Taiwan; Kazuo Kato visited Japan; and Harold Stevenson visited Japan and China. During these visits we were able to conduct interviews with individuals highly placed in educational and scientific circles in Taipei (Taiwan), Tokyo and Sendai (Japan), and Beijing (China). In addition to the interviews, we collected written materials related to the education of gifted children in each country. Thus, our descriptions of the programs in each country are current and based on authoritative information.

Research Results

During the past eleven years our research group at the University of Michigan, in collaboration with colleagues in China, Taiwan, and Japan, has conducted a comprehensive series of studies in East Asia, involving large samples of students and their parents. Our primary interest has been the study of mathematics achievement among elementary school students. We have concentrated our attention on first-and fifth-graders; however, in 1990 we extended the age range to include eleventh graders. We have tested and interviewed children and youth, interviewed their mothers, given questionnaires to their fathers, observed in their classrooms, and interviewed their teachers. In each study, we have included comparison groups of American children obtained in the same fashion as the children in East Asia. Our discussion relies primarily on the results we obtained from the tests and the interviews.

Policies and Practices for Gifted Children in China, Taiwan, and Japan

China

Schools in China, like schools throughout East Asia, follow a system of six years of elementary education, three years of junior high school (lower middle school), and three years of high school education (upper middle school). The Chinese government has set the goal of achieving nine years of universal education by the end of the century, but it seems unlikely that this goal can be achieved.

In 1990, 97.9 percent of school-aged children were enrolled in elementary schools (State Statistical Bureau, 1991). Nearly all of these children complete the six years of elementary school, but only two-thirds go on to lower middle school. Admission to lower middle school, and to all subsequent levels of education, depends upon the student's score on entrance examinations. Of those who finish lower middle school, fewer than 40 percent are able to continue their education in high school. Admission to universities is possible for only a very small fraction of high school graduates. Among every 100,000 citizens, there are only 177 college students (State Statistical Bureau, 1989)—a striking contrast with Japan, where the comparable number of college students is 2,006.

The limited opportunities for advanced education produces intense competition among Chinese students, and current government policy is likely to increase this competitiveness. The policy is not to expand higher education, but to extend the reforms of primary and secondary education, improve the quality of education and the condition of schools at these levels, and raise efficiency. The goal for higher education in the future is to produce 25,000 masters degrees and 2,500 doctoral degrees annually from all fields. In view of the fact that approximately 620,000 students enter Chinese universities each year, this degree of restriction in higher education will further exacerbate the competitiveness that already exists among Chinese secondary and college students.

Middle school students follow either an academic or vocational track depending upon their abilities and aptitudes. The government has recently been working to increase enrollment in vocational schools to 50 percent of all upper middle

schools throughout the country, and is striving to improve the number and quality of vocational teachers. At present, only 45.7 percent of the upper middle school students enrolled in vocational schools (State Statistical Bureau, 1991).

Rural children have less opportunity to receive education beyond lower middle school than do urban children. This is evident in the percentages of rural and urban youth who graduate from various levels of schooling: 22 percent versus 48 percent, respectively, in lower middle school; 4 percent versus 16 percent in upper middle school, and .06 percent versus 3.8 percent in college (State Statistical Bureau, 1989). As a result, almost all gifted and talented education programs occur in urban areas.

Education of the Gifted and Talented in China

Special schools focusing on training in dance, music, fine arts, foreign languages, and athletics have existed intermittently in China since the 1950s. Generally, however, little attention was paid to the education of gifted and talented students until the late 1970s. Before then, as part of socialist philosophy, individual differences in intellectual abilities were de-emphasized by educators and government officials. Furthermore, the disorder caused by the Cultural Revolution of the 1960s and 1970s seriously disrupted educational efforts of all kinds.

Education of gifted and talented students in China began to take a more discernible form in 1978 with the creation in Hefei of the first so-called "Youth Class" at the University of Science and Technology of China. By 1985, Youth Classes had been established at twelve other Chinese universities. The availability of classes at all levels for gifted students began to grow from that time on, and in 1988 the first national conference on gifted education was held in Hefei.

As of now, the national government has no policies or institutions that are concerned with the education of gifted and talented students. Nevertheless, numerous programs have been organized both in and out of school by various cities and provinces in China. In-school programs take place alongside the regular curriculum. Out-of-school programs occur either in special schools or during evenings and weekends at the children's regular schools.

Out-of-School Education

The three major purposes of programs for gifted students are summarized in the Chinese appeal: "*Zaochu rencai; kuaichu rencai; chu hao rencai*" (Produce talent early, fast, and of high quality). Students are admitted to out-of-school programs in several ways: upon recommendation by their local schools, through outstanding performance in national competitions, or by passing a battery of entrance tests given by the school to which they seek admission. There is frequent assessment of a student's progress and the possibility of reassignment exists, depending upon a student's performance. Admission to these programs is highly competitive, and students usually must pay tuition.

There are no after-school schools such as the *caiyiban or bushiban* (cram schools) that flourish in Taiwan. Some parents may employ a tutor to assist a child who is having difficulties in school or to provide extra lessons for a child who they think has special talents or abilities. But this occurs very rarely.

Efforts to educate children outside of school hours are predominantly of four major types: Olympic Schools that concentrate on mathematics, special schools for students talented in athletics and the arts, Children's Palaces that offer a wide array of courses, and summer and winter camps that typically concentrate on topics such as science, foreign languages, and computers.

Olympic Schools. The first "Olympic School" opened in 1982. Today there are 18 Olympic Schools serving third- through eleventh-graders throughout China. The largest is in Beijing with 2000 students. The initial inspiration for Olympic

schools came from the International Mathematics Olympiad, where Chinese students have often been first- and second-place winners. There is a common belief in China that mathematics is an area in which Chinese students can become preeminent in the world. For example, of the six Chinese participants in the 1990 Mathematics Olympiad, five won a gold medal and one a silver medal. Nearly all Olympic Schools focus on mathematics, and students are expected to become adept in both mathematical theory and problem-solving. In addition to mathematics, some Olympic Schools emphasize computer science.

Experienced elementary and secondary school teachers, as well as college professors, serve as instructors in Olympic Schools. Teachers in Olympic Schools and national mathematics organizations create the teaching materials.

Special schools. In contrast to mathematics, athletics has been consistently emphasized in modern China. "After-school athletics schools" (*yeyu tiyu xuexiao*) have been in existence since the 1950s. Students admitted to these schools attend after their regular school day for approximately six hours each week. The schools emphasize basic physical skills and athletic techniques, and children are screened once a year to evaluate their progress. In 1956 there were 77 of these schools; by 1990 the number had grown to 3,685.

In addition to after-school athletics schools, special public "athletics elementary and middle schools" have been set up by the government to cultivate promising athletes. These schools offer a regular academic curriculum for six hours a day but also provide training in athletic techniques and theory for three hours a day. Generally speaking, parents prefer these schools to the after-school athletics schools, regarding them as superior in faculty, facilities, and quality of students. The curricula of these schools have been devised by leading experts and scholars with the goal of creating athletes who are competitive internationally and who are well-developed intellectually and morally, as well as physically. Admission is determined by assessment of the student's physical status and abilities and by tests of academic achievement. The success of these schools is evident in the past several Asian Games, where more than 80 percent of the Chinese medalists were graduates of the two types of athletics programs.

After-school schools for students talented in the arts follow a pattern similar to that of the athletics schools. Different types of schools for the arts exist, including those that train students in painting, sculpture, calligraphy, music, and theater.

Children's Palaces. Other programs that take place outside the regular school curriculum are held in China's Youth Palaces. These schools were begun in 1949 with the aim of cultivating student interest in science and art, often in the former residences of affluent families or in other buildings taken over by the government. More than one thousand are now in existence. In 1988, they were placed under the auspices of a newly formed government agency called the "National Association of Youth Palaces." Youth Palaces offer long-term, short-term, night, weekend, and holiday programs in a wide variety of subjects including music, dance, theater, calligraphy, photography, writing, computers, foreign languages, and model building. Each class lasts from six months to a year. Any student can apply for admission to one of the programs, but decisions about admission are based on the results of tests designed to select those students who have acquired the foundation that will allow them to benefit from the training that is offered.

Camps. Programs in summer and winter camps are similar to those offered in the Children's Palaces. Children are selected on the basis of tests and interviews and may attend camp for several weeks during the summer vacation or for one or two weeks during the winter vacation.

Publications. Newspapers and magazines published especially for students help to stimulate interest in math and science. These publications

contain interesting problems and supplementary information for students interested in mathematics, physics, or chemistry. Weekly newspapers such as *Zhongxuesheng Bao* for middle-school students not only publish new material, but also feature innovative or novel solutions submitted by students for earlier problems. Similar publications also exist in Taiwan and Japan.

In-School Education

The purpose of in-school gifted programs, like those of out-of-school programs, is to produce talent "early, fast, and of high quality." To meet these purposes, students are admitted to various programs at an early age. For example, children as young as three can be admitted to elementary schools, eight-year-olds can enter middle school, and ten-year-olds are able to enroll in colleges and universities. To enable students to complete their education more rapidly, the normal twelve years of primary and secondary education can be shortened to as little as eight years. The State Education Commission sponsors a separate type of program for children who are gifted in mathematics and science.

Youth Classes at Universities. Admission to Youth Classes is the most difficult among all of the programs open to gifted students. The rigorous criteria for selection include high recommendations by their school or outstanding performance in a nationwide academic competition, high scores on a battery of standardized tests, and special written and oral examinations. Students must show extraordinary academic promise to be selected for Youth Classes.

Reflecting the high criteria for selection, only 516 students participated in the program at the University of Science and Technology of China between 1978 and 1990. The average age of students entering this program was 14.7 years; the youngest students were 11, and the oldest, 15. Among these students, 85 percent were boys, and the parents of approximately 80 percent of the students were classified as intellectuals.

Once in the four-year program, students follow a curriculum constructed especially for them. A good deal of effort has been spent in preparing these curricula to assure that high school and college materials are properly integrated. For the first three years, these young students enroll in classes that are separate from other university classes. All introductory course work is covered, including the basic courses in the student's major. In their fourth year at the university, Youth Class students are allowed to enter regular courses in the department of their major. As a result of the students' high levels of ability and the care given to their education, their academic achievement tends to be consistently higher than that of their university counterparts. For example, 72 percent of Youth Class students have gone on to graduate school either in China or overseas, compared with 5 percent of all university students.

Staff members at the Special Department for the Gifted Young at Hefei have studied the psychological characteristics of students in the Youth Classes (Zhu, 1991). These students had higher than average scores on measures of perseverance and independence, and possessed "normal physical development and strong physiques." They had high scores on tests of intelligence (an average score of 124 on the Wechsler Adult Intelligence Scale) and of creative thinking, high motivation for achievement, and low levels of test anxiety—characteristics that have been found in many other studies to accompany high academic achievement. Despite the students' high scores on measures of intelligence, they concluded:

> "The early entrants are talented by learning, but not born 'gifted children.' The reason why they are different from other juveniles and enter college earlier at very young ages is that they begin to study on their own diligently when their age mates are unaware of the importance of and not good at studying independently. Therefore, an important aspect of developing the intelligence of the early

entrants after primary or secondary schools is to foster, train, and improve their abilities of studying on their own (Zhu, 1991, 17-18)."

Gifted Programs in the Public Schools. The first experimental class for gifted elementary school students was organized in 1984. Only five- and six-year-olds were generally selected for these classes, and the standard six-year curriculum was taught in four years. In 1985, this experiment was extended to middle schools. A four-year program which recruited gifted elementary students was implemented in lower middle schools. Students entering these classes were on the average under 10 years of age. At the same time, a two-year program was organized in upper middle schools for gifted lower-middle-school students. Students entering this program averaged about 12 years of age. It was possible through enrolment in these gifted programs to reduce the length of the normal twelve-year curriculum by two to four years. The curriculum in these programs seeks to be comprehensive and to develop well-rounded individuals who are capable of individual creativity and of teaching themselves.

In order to be considered for a gifted and talented program, a student is either recommended by his or her own school, or is brought to the attention of the school's authorities by demonstrating excellence in some regional or national competition, such as a math contest or a science fair. Once nominated, the student then must excel on a battery of standardized tests covering both aptitude and achievement, and pass a physical exam. After passing this initial stage, the student must undergo further testing by the school with the gifted program. This set of exams—which includes both written work and interviews—is unique to each school because each school develops its own program for gifted students.

There is little parents can do to help their child gain admission to this or any of the other special programs for gifted and talented students. Admission is limited to students who pass the entrance examinations and who meet whatever other criteria that are necessary for acceptance. Some especially influential parents have been known to override the system and gain entrance for their children, but this is believed to occur very rarely.

Programs for the Gifted in Math and Science. Classes in mathematics, physics, and chemistry were established in 1988 for gifted students at several high schools affiliated with universities. Actual classroom instruction was carried out by university professors, while high school teachers were involved primarily in looking after administrative and disciplinary details.

These special classes have been conducted differently, depending upon the subject being taught. The mathematics class has been a one and one-half year program that students enter after they have been in upper middle school for one year. Physics and chemistry programs have been available during the last two years of upper middle school. In each case, the students have continued with the regular high school curriculum in addition to doing 10 hours a week of additional work associated with the special course.

Problems and Perspectives

Educators and government officials in China point out many obstacles and difficulties that exist in the education of gifted and talented students. Psychological and educational measurement was unpopular for several decades in China. As a result, there are few systematic, standardized ways of identifying and developing appropriate curricula for gifted students. A lack of budgetary support and administrative co-operation among different schools has meant that there is little continuity between gifted programs in different parts of the country or even among different schools in the same region. Little has been done nationally even to identify goals for the education of gifted and talented students.

The programs that do exist have been predominantly at the secondary school level, rather than

representing a thoroughgoing effort to implement gifted programs at all levels of education. Some critics have argued that the programs for gifted students have often been misused, becoming nothing more than programs to help students prepare for college entrance exams. Others have pointed out that, despite efforts to the contrary, programs for gifted students often inundate students with large amounts of information, but fail to teach them how to reason or to think creatively. Current curricula are also criticized as lacking the depth and breadth of coverage that would be of benefit to gifted students.

The concern is often expressed in China, and in other countries as well, that programs for gifted students impede the development of the whole individual. Mathematics and science are usually heavily emphasized and little attention is paid to the humanities. Chinese critics suggest that education for all students, including gifted students, needs to be more attentive to moral education, the fine arts, and physical education. It has been noted, for example, that a high percentage of gifted students are nearsighted, apparently suggesting too much reading and too little physical activity.

In addition, there is a concern that the unusual situation of being selected and labeled as a gifted student may result in uneven personality development, manifesting itself in such things as lack of responsibility, lack of respect for teachers, and lack of self-control. Parents are seen to share part of the blame for this. Some educators believe that parents often push their children too hard and place too much emphasis on success in academics at the cost of giving too little attention to other facets of their child's development. At the same time, it is acknowledged that until the purposes of gifted education are more clearly defined for parents, it may be difficult for them to be involved in constructive ways.

Budgetary constraints have continually hampered efforts at education for the gifted in China. By the end of 1990, every college that had been running a Youth Class program, except the University of Science and Technology of China, had been forced to eliminate the program for financial reasons. Schools do not have the funds available to develop the curricula and facilities needed for gifted programs. Compounding these difficulties is the fact that China faces a shortage of qualified teachers for all its schools and lacks the facilities to train additional teachers in significant numbers. It seems unlikely, therefore, that there will be a significant increase in the near future in the number of teachers qualified to teach gifted students or in the number of classes for gifted students.

As the economy of China improves and funds for education increase, opportunities for gifted and talented students are likely to grow. Whether or not there is an expansion of special programs, gifted students will benefit from future improvements in Chinese schools. The general quality of education in large metropolitan areas already is high and teachers employ pedagogical techniques that appear to be very effective. In our research with urban children in China, Taiwan, Japan, and the United States, for example, Chinese children's scores on a battery of mathematics tests were as high or higher than those of children in the other locations (Stevenson, Lee, Chen, Lummis, Stigler, Liu, & Fang, 1990; Stigler, Lee, & Stevenson, 1990). Further improvements in educational facilities and in the quality of instruction should result in further advances in the remarkable performance of Chinese students.

Taiwan

The history of education in Taiwan is closely linked with that of China and Japan. Taiwan was a Japanese colony for 50 years earlier in this century, during which time its educational system was very similar to that found in Japan. Following the defeat of the Kuomintang government in 1949, Taiwan became the new home for over 1,500,000 mainland Chinese who brought with them the Chinese conception of an educational system and specific guidelines for its operation. Because educators were among this group of immigrants, Tai-

wan's educational system was strongly influenced by the early philosophy and practices that guided the development of public education in China. Although the forms of government differ greatly between Taiwan and China, the two educational systems possess many similarities.

For the past several decades, Taiwan has been undergoing a transition from an agricultural to an industrial economy, and has given high priority to the development and expansion of its educational system. As occurs in other East Asian societies, economic success in Taiwan is closely tied to the acquisition of proper educational credentials. Because of this, getting a good education is considered to be the primary goal for all citizens during childhood and early adolescence.

Education is free and compulsory for all children during the first nine years of the twelve-year program of primary and secondary education. At the end of the nine years, students have several alternatives. Most enter high school; others enroll in vocational or technical schools; some go to work. Currently, 99.9 percent of the children in Taiwan attend elementary school; 99.8 percent of these children attend junior high school; and 84.7 percent of the graduates of junior high schools attend senior high schools or vocational high schools; and 48.7 percent of the senior high and 12.9 percent of the vocational high school graduates continue further to colleges or universities (Bureau of Statistics, Ministry of Education of Taiwan, 1991). In 1990, 576,623 students were studying in universities, colleges, and junior colleges, including nearly 18,000 masters degree students and nearly 4,500 doctoral students. In view of the size of the population of Taiwan (around 21 million), these are impressively large numbers.

Junior high school students have the opportunity to compete by examination for entrance into various senior high schools. Each school is ranked according to its academic reputation, which is based on its success in placing students in top universities. Admission to institutions of higher education is highly competitive and is primarily determined, as it is throughout East Asia, by a student's scores on entrance examinations. When students fail to pass the entrance examination or do not get accepted in the university they would like to attend, most try to take the examination again the following year. Students are allowed to take the examination as many times as they wish.

Generally, students must achieve high scores in all areas, including mathematics, the Chinese language, science, social studies, and English, in order to gain admission to a university. As a result, a significant portion of students at the junior and senior high levels attend private "cram" schools called *bushiban*, as well as their regular schools. *Bushiban* have the single goal of improving student scores on the entrance examinations by supplementing knowledge and enhancing skills in taking tests.

Changes are being considered in the procedure for admission to high school. It is expected that in 1992, junior high school graduates in Taipei will enter the senior high school through a new type of application procedure that is being developed, rather than through entrance examinations. The goal of the government is to abandon the entrance examinations for junior high school by 1995.

Gifted and Talented Education in Taiwan

Active interest in providing special opportunities for gifted and talented students occurred relatively recently in Taiwan. Government and educational officials first became interested in the education of academically gifted students and of students talented in fine arts, drama, and music in the early 1960s. Shortly afterward, following the 1962 meeting of the Fourth National Educational Conference, steps were taken to institute the first programs for gifted children. During the following year, the "Experimental Education for Gifted Children" program was begun in fourth-grade classrooms of two elementary schools in Taipei. The intention in establishing this program was to begin the process

of developing supplementary learning materials for academically gifted students.

The government's interest in education for gifted and talented students grew out of recognition of the fact that a province with few natural resources must develop its human resources. Steps have been taken during the past several decades not only to improve education generally, but also to give greater attention to the education of all individuals with special needs (Wu, 1988, 1989). In 1968, compulsory education was extended from six to nine years, and accompanying legislation specified that special education was to be provided for gifted children. In 1971, an experimental curriculum for gifted children was created in one elementary school at the fifth-grade level, with special enhanced curricula in mathematics, natural science, and the Chinese language. The project lasted for three years. Shortly afterward, the Ministry of Education began a six-year program throughout Taiwan for gifted elementary school students. The program was extended to the junior high level in 1979 and to the senior high level in 1982 (Special Education Association of the Republic of China, 1988). All of these programs are operated through the public school system; the government plays an almost exclusive role in setting up and funding special education programs.

Programs for gifted and talented students are of three types: general programs such as those just described, programs in mathematics and science, and programs for students talented in the arts, music, and dance.

Students gifted in mathematics and science. As has typically been the case throughout the world, special attention was given first to highschool students who showed special promise in mathematics and science. Special programs for these students were begun in 1983, in response to the growing concern by the government with developing scientific and technological skills in the populace. Students gifted in these fields have the opportunity to be tutored by college professors and in some cases are allowed to skip their final year of high school and proceed directly to college. If they are unusually talented, they are allowed to enter college without taking the entrance examinations. A new science high school is being established and will accept students with superior performance in mathematics and science, beginning in the fall of 1992.

Students talented in music and the arts. Special efforts to teach musically gifted students began in the early 1960s in a private elementary school in Taipei. It was not until ten years later that the first public elementary school in Taipei created a similar class. A recent survey revealed that music programs for talented students have been established in 28 schools which enroll over 3,300 students; 29 schools have fine arts programs involving nearly 2,500 students; and 18 schools have dance programs involving over 1,400 students.

Provisions have also been made for talented students to bypass high school and college entrance examinations and enroll directly in college departments of music and fine arts. In the fine arts they are able to study many different subjects, including sketching, watercolor painting, graphic arts, carving, and sculpture. All areas of music can be studied, including choral and solo vocal music and solo and ensemble instrumental as well as music; and folk, ballet, and classical Chinese dance.

Identifying the Gifted and Talented

Clearly defined criteria must be met before students can be enrolled in gifted and talented programs. As might be expected, most students are first identified and recommended by their teachers. Next, according to national education law, students must (a) receive a score higher than two standard deviations above the mean on the IQ test given at the beginning of every school year, and (b) have a grade point average that is in the top 2% of their class or receive a score higher than one standard deviation above the mean on an achievement test covering all subjects in the curriculum.

In order to be considered gifted in the specific areas of mathematics or science, students must receive a score higher than one standard deviation above the mean on an achievement test in mathematics and science or on a test of intelligence or creativity. In addition, they must have a grade point average in the top 1 % of their class in mathematics and science or have performed well in a national or international competition.

The criteria are equally stringent for students talented in other areas. They must receive an above-average score on an IQ test and a score at least two standard deviations above the mean on an aptitude test measuring their special talent. They also must have distinguished themselves in some national or international contest.

Once students have tentatively been identified as gifted or talented, a committee made up of teachers and administrators from the students' schools submits a report to the education department of the local city government. After further screening by the department, qualified students are placed in appropriate special programs or schools.

Current Approaches

Currently, there are two main approaches to the education of gifted and talented students in Taiwan. In the "self-contained" approach, gifted and talented students are grouped together in one class and the standardized national curriculum is broadened in ways that will meet the needs of these students. The other approach is to keep students in regular classes but give them access to a special "resource classroom." Students in these classrooms receive tutoring to supplement the standard curriculum and have access to special materials (Lee, 1987).

The government has expanded the number of programs for gifted students greatly during the past decade. In 1991, 126 elementary schools, 102 junior high schools, and 35 senior high schools were conducting programs for gifted students (Bureau of Statistics, 1991). More than 23,000 students participated in these programs—a four-fold expansion since 1982, when only 5,800 students were enrolled.

For all programs, students must remain in the grade level appropriate for their age. According to the National Education Law, students who are deemed to be generally gifted and distinguish themselves in all areas of study are allowed to skip only one year in elementary school, junior or senior high school.

Students who are identified as gifted in either mathematics and science, but not necessarily in other areas, have the opportunity to take part in special weekend programs and summer camps conducted by university professors. They also are allowed to take the entrance examination for the next level of schooling at the end of their second year of junior or senior high school. Alternatively, they may qualify to bypass university entrance exams altogether and move directly into science or mathematics departments in universities. Entrance is restricted, however, to pure science departments, such as chemistry or physics, and mathematics; gifted students are not given privileged entrance into applied programs such as engineering.

Training Teachers

As the concern with special education has grown in Taiwan, colleges and universities have developed special training programs for teachers. Twenty hours of course work in gifted education are required in order to become a qualified teacher of gifted and talented students. Alternatively, teachers already in the work force can take short-term training programs designed to prepare them for teaching these students.

Problems and Perspectives

As Taiwan has continued to develop economically, the government has placed more and more emphasis on improving the quality of education offered to its citizens. In fact, improvement of education is part of a new six-year national develop-

ment project that is currently being launched. Education for the gifted is likely to benefit greatly from this project, for the government considers the performance of gifted students to be an important indicator of the general quality of education being provided throughout the province. Moreover, education authorities also hope to use teaching methods developed for the gifted with ordinary students, especially methods for promoting problem-solving and creative thinking.

The current system of education for the gifted and talented is not without its critics. Some object to what they consider to be a continuing overemphasis on the very rigid examination system, which they believe undermines gifted and talented education. Talented students, for example, are often torn between developing their special talent and preparing for the entrance examinations that are so important for their future success. Consequently, many parents and educators have become advocates for comprehensive programs of gifted education that continue from kindergarten through college.

Other critics believe the programs for gifted students place too much emphasis on preparing students for the college entrance examinations, rather than on attempting to broaden their knowledge and abilities. Another objection is that students gifted in mathematics and science should not be restricted to careers that emphasize only pure science. Some parents have actually kept their children out of such gifted programs so that they would have the option later of pursuing careers in other fields, such as engineering.

There are concerns, too, about the manner in which education for gifted students is organized. Debate continues about the relative merits of the "self-contained" and "resource classroom" approaches. Students in self-contained classrooms performed better on tests of academic achievement and creativity than their counterparts assigned to resource classrooms. However, some critics have expressed concern about whether appropriate social and emotional development of students takes place in the self-contained classes, where social interactions are restricted to those involving other gifted students. There are also those who have complained that the curriculum from the resource classroom and the regular classroom are not adequately integrated, and that trying to keep up with both overburdens students.

Other continuing challenges facing gifted and talented education programs in Taiwan include a lack of qualified teachers, the need for better selection devices, the paucity of competitions and scholarships for gifted and talented students, and the need to develop library and museum resources and other extracurricular activities to supplement classroom instruction.

Efforts are being made to expand special education training programs for teachers, including those who teach in kindergartens and in elementary schools, and to increase teacher access to conferences and workshops on gifted and talented education. Education departments of colleges are being encouraged to develop full-fledged graduate programs to which practicing teachers can return for additional training, and explorations are being made for increasing the opportunities for teachers to go abroad to study practices in other countries that have developed programs for gifted and talented students. In order to attract more teachers to the field, officials are considering supplementing the salaries of teachers of gifted and talented students.

Japan

Unlike China and Taiwan, Japan has no formal government programs aimed at cultivating the abilities of gifted and talented children. To understand why this is the case, it is necessary to consider certain aspects of Japanese culture and how these have influenced the development of the Japanese educational system. We begin with a discussion of changes that have occurred in Japanese educational philosophy since the opening of Japan to the West in the middle of the last century.

Pre- vs. Post-war Education

After the Meiji Restoration in 1868, when Japan reopened itself to the rest of the world, the government began to revise and modernize its education system. Its model was the elitist European system in which enrolment was restricted to individuals privileged by their economic or social status in society. By 1919, when Japan was firmly established as an international power, the government realized it was necessary to make education open to all citizens. The Government Responsibility for the Basic Support of Compulsory Education Act was passed, making the national government accountable for the major educational expenses for the six years of elementary school. Only the social and economic elite were expected to pursue education beyond these six years.

Because the so-called "higher school" education involved relatively small numbers of students, curriculum guidelines were few and loose, and teachers had a great deal of freedom to structure the pace and the content of study. Indeed, one official we spoke to suggested that gifted students probably received more attention then than they do now, because teachers were in a position to cater to the interests and abilities of individual students.

World War II and its aftermath brought profound changes in the Japanese education system. With the advent of American influence during the occupation and the adoption of the postwar Constitution, the Japanese populace pursued the equality they understood to be a product of democracy and swept away old types of social privilege. Not surprisingly, education underwent profound changes. The elitist European system was abandoned in favor of what education leaders refer to as a "formal egalitarian" system of education.

The guiding principle of today's system is that students throughout Japan should have equal access to comparable school facilities. To ensure equal access, the national government covers half the cost of teacher salaries, teaching materials, and construction of new buildings, and one-third the cost of maintaining existing buildings. The remaining expenses are the responsibility of local school districts. Education officials believe that this has served to create comparable teaching and learning conditions throughout Japan.

The administration of education in Japan, as it is in China and Taiwan, is highly centralized, and the Ministry of Education defines the content of textbooks and curriculum guidelines. The rationale for this degree of centralization is that only in this way will all students be properly equipped with the basic skills necessary for competition in contemporary society. Although teachers are given wide latitude in teaching the curriculum, there is a great deal of uniformity in the subject matter and skills that are taught throughout the nation. As one former education official told us,

> ". . . in the second term of the second year of primary school, teachers begin to teach multiplication skills everywhere in Japan. They do it thoroughly. When I was a child, we memorized our multiplication tables from 9 x 9 down to 2 x 2. It's impossible for a student to finish second grade in Japan and not know the multiplication table."

At the elementary school level, the concern is not with identifying individual differences and singling out gifted students for special attention, but with providing all students with certain necessary skills. The same official told us he was proud of Japan's "very uniform and rigid primary school system," and went on to say:

> "Since a democratic society is a competitive society, we need to assure that they [the students] will have the basic skills they need to compete. As long as they have these basic skills, it is up to them where to go or how much effort they want to give in order to succeed in competition."

Special treatment, such as allowing a student to skip a grade, is extremely rare in Japan. Special classes for gifted students do not exist. Such classes

would be regarded by both educators and parents as displaying unfair favoritism, thus violating the egalitarian philosophy on which the education system is built. Teachers often indicate that they do not especially appreciate having gifted children in their classrooms. The children they find more impressive are those who work hard. Besides, they say, gifted children only have the potential (*senzai*), and should learn the importance of hard work: "If you don't polish the stone it will have no luster."

At the high school level, some efforts have been made to recognize and accommodate divergent student interests and abilities, but these have also met with opposition because they smack of "elite education." We frequently heard comments suggesting that if a certain group of students is treated differently, other groups will complain about not having equal opportunity.

In the last two decades, the Ministry of Education has tried to introduce more flexibility into the high school curriculum. The number of required courses has been reduced to allow students to pursue their own interests, and teachers have been granted more flexibility to meet the individual educational needs of students. The Ministry of Education encouraged teachers to arrange classes according to student achievement so that all students would still be assured of learning the basic skills expected of high school students. To accomplish this, local schools were permitted to develop tracking systems, known as *seijukudo gakkyu hensei* , in which a student would be placed in a slow, average, or fast class depending upon that student's previous performance in a subject. The system does not require long-term assignment to a particular track; if a slower student's work improves, he or she moves up to a higher level. The basic content of the curriculum is the same in all tracks; only the speed with which it is taught varies. To help slower students master the basic skills, the Ministry of Education proposed that these students should be taught by master teachers.

This system was fairly widely implemented after the "second baby boom" in the mid-seventies, when schools were faced with a large number of students with wide variability in ability and preparation. By the early 1980s, about 40 percent of high schools practiced some degree of tracking; however, it seems never to have gained popular acceptance outside the urban areas of Tokyo and Osaka. The major objection was that it appeared to be a return to an elite form of education.

After-School Activities

Special opportunities do exist in the public schools for students to enrich their education through after-school clubs and classes. These extracurricular activities are open to all students and a high percentage choose to participate. During elementary school, students remain for an hour or more after their regular classes have ended; during high school they may remain for several hours. The range of activities depends upon the size of the school, but includes such diverse topics as orchestra, calligraphy, computer programming, sports, literature, geology, biology, art, chemistry, and journal writing and editing. While these activities are not offered especially for gifted and talented students, they do offer students a much broader scope of activities than those contained in the regular curriculum. Thus, although the length of the regular school day in Japan is comparable to that found in the West, these after-school activities keep students at school for much longer periods of time.

Kosei Kyoiku

Several of the experts and officials we talked to indicated that the educators and the Ministry of Education are still concerned that Japanese high school curricula are too rigid. Recently, the Ministry has proposed what they call *kosei kyoiku* , which may be roughly translated as "individualized education." It is an attempt to encourage high schools to make their curricula more flexible so that the schools can do a better job of meeting the individual interests, abilities, and needs of the students.

What is meant by *kosei kyoiku* remains vague, and educators are not clear about what individual-

ized instruction would encompass. The term *kosei* in Japanese carries more of a sense of individual differences in personality, rather than of individual differences in academic ability. Still, *kosei kyoiku* is quite different from conventional programs for gifted and talented students that seek out students with high academic ability. *Eisai kyoiku* is a direct translation of gifted education, but in our discussions a question was often raised about its goals. Would *eisai kyoiku* be defined by *noryoku*, a term describing capability, and usually implying mental capability? Would it include children characterized by *saino* , translated directly as talent? The question of whether *eisai kyoiku* should be directed primarily at promoting individuality, intellectual ability, or talent is not likely to receive a quick answer.

Elite Education vs. Gifted and Talented Education

In our conversations with Japanese education officials we sometimes found that they substituted the term "elite education" in their replies to our questions about gifted education. Discussion of special programs for gifted children seems to bring up images of the pre-World War II system of education based on the European models and restricted to students of socially or economically privileged families. Schools or programs that are organized to prepare the next generation of the elite to lead Japan are rejected in the egalitarian Japan of today.

Although entrance into the elite schools was not based upon ability, Japanese citizens apparently assume that the goal of special education of the gifted and talented is the same as that of the old elite system of education: to single out a group of students for special privileges later in their lives. The current social atmosphere in Japan is intolerant of any attempts that even appear to subvert the post-World War II egalitarian system that now prevails in Japanese public schools. Each child, says the Japanese parent, should be given the same chance to gain high positions in society. Although parents and teachers recognize variation in ability among students, they generally believe that any student who works hard has the potential to be a high achiever. They justify the stratification of high schools and colleges by pointing out that all children were given equal opportunities during the first years of schooling. Some children responded appropriately to these opportunities by studying hard; others did not. It is not unfair, they argue, that those who have already demonstrated their diligence should have greater opportunities to benefit from higher levels of education than those who failed to show such devotion to their studies.

High School

Compulsory education in Japan extends through the ninth grade. High school attendance is not mandatory, although over 95 percent of youths of high school age graduate from high school. In stark contrast to the egalitarian system that is strictly adhered to in elementary and junior high schools, a hierarchical order exists among high schools. High schools, especially in urban areas, are ranked into four levels according to their quality. The highest ranked schools are ones that have the greatest success in placing students in good universities; the lowest are those whose students specialize in vocational or technical education. "Can we say," an educator asked earnestly in one of our discussions, "that the number one school provides *eisai kyoiku* ?"

Students in Japan are admitted to a high school of a given level on the basis of results of entrance examinations. Competition for entrance into top high schools is keen because one's high school education has great importance for passing the examination to a good university. All students take the same high school entrance examination and in principle have an equal opportunity to enter a top high school. It is primarily through entrance examinations, first for high school and later for university, that individual differences in ability among students become acknowledged.

An alternative route to admission does exist in the case of college entrance. A certain percentage

of students, sometimes up to one-fifth, are able to bypass the entrance examination system via the *suisen* (recommendation) system. It has been the practice, primarily in private universities, to make a small number of places in each of their departments open to students from select high schools. Some universities might require an interview or a test of some type, but generally the students are allowed to avoid taking the stressful college entrance examinations.

Public universities have recently adopted and greatly expanded the *suisen* system. Rather than establishing relationships with specific high schools as they had in the past, departments in public universities set aside a few places to be filled by students with unusual qualifications. These include outstanding academic achievement or some other type of exceptional life experience, such as living overseas. The university interviews students who have been recommended by their schools and decides which ones to accept. Admission into these programs is competitive, but reliance on recommendations rather than scores on a college entrance examination has the potential of significantly modifying the way in which Japanese students gain entrance into universities.

Mention should also be made of private high schools. In addition to public high schools, private high schools are also popular, especially those that have good records in placing students in top universities. Private schools are able to pay greater attention to individual differences and to develop programs that will promote special talents and skills. Because they are more successful than public schools in instituting such programs, some of the educators with whom we talked suggested that private schools really insight be considered to provide *eisai kyoiku* .

Juku or Supplementary Schooling. In order to compete more effectively on high school and college entrance examinations, students turn to *juku* (cram schools analogous to Taiwan's *bushiban*). *Juku* are entirely outside the official education system and are not supervised by the Ministry of Education.

In addition to self-improvement *juku* that teach such things as music, calligraphy, abacus, and martial arts, there are two kinds of academic *juku*. *Hoshu juku* provide remedial instruction for students struggling with their schoolwork. *Shingaku juku* are the ones that specifically aim at preparing students for entrance examinations. The education officials we talked to generally expressed displeasure with the existence of *juku* , saying they felt that they too often emphasized material beyond what students at a given level should be expected to learn. Further, one person noted that this sort of juku created problems for egalitarian education:

> "*Juku* have begun to play the role of distinguishing among students by administering mock exams, the results of which could be compared to a large population of other students, thereby giving students an indication of their standing relative to others. Therefore, students began to discover divergences in ability among themselves by attending these *juku* because the regular schools refused to make such distinctions.

The main criticism of *juku* was from education officials who stressed that the official curriculum alone did a good job of equipping students with the appropriate skills. These officials expressed dismay that parents and students believed it was necessary to supplement an educationally sound curriculum with work in *juku* . Despite this view, attendance at *juku* is widespread, especially in large metropolitan areas. It is estimated that there are more than 35,000 *juku* in Japan, comprising an industry involving about six billion dollars a year (Adachi, 1988).

Possible Reforms. In addition to current discussion about how high schools might implement more individualized education, an interest in introducing reforms at the college level has also arisen. The Central Council for Education, an advisory body

to the Minister of Education, has discussed modifications of entrance requirements to universities that might foster the development of students with special talents and interests.

Currently, students must make high scores on all aspects of the college entrance tests. This system selects students who have talent overall, but ignores those with special talents. The Council may propose that students who are gifted and talented in particular areas be admitted to universities even if they do not have high scores on the total entrance examination. A related recommendation would be to allow highly talented high school students to enroll in university courses in mathematics, physics, and a limited number of other fields. A third recommendation being discussed is to lower the age for university entrance—but only in the field of mathematics—below the currently legal age of 18. No one has gone so far as to propose comprehensive programs for gifted and talented students such as those found at the secondary levels in China and Taiwan, and the idea of providing special opportunities to gifted students below the high school level is still considered to be inappropriate.

Problems and Perspectives

Predicting whether Japanese officials will ever introduce a broad system of special programs for gifted students is risky, but on the basis of contemporary Japanese philosophy and past educational practices it seems doubtful that this will occur in the near future. Special programs for gifted young children are unlikely to flourish in a culture where elementary school teachers would never tell parents directly that their child is gifted or advanced over other students and where there is assiduous avoidance of direct forms of teaching in nursery schools and kindergarten for fear that it would produce inequities in first grade. Teachers may provide subtle forms of encouragement to bright students by encouraging them to apply to good high schools, and indirect forms of teaching may be provided by parents and teachers before children enter school, but there is general avoidance of discussion of innate differences in ability. Even in high school, teachers do not praise especially sophisticated or straightforward ways of solving problems if the solutions are not dependent upon what has already been taught. Regardless of whether students have learned advanced mathematics on their own or whether they have already read the material that is assigned, they are given no opportunity to skip the classes which cover these topics. The only accommodation occurs in those high schools where such students are placed in the fast track. These students complete the regular assignments during the first half of the year; the second half is devoted to study of enrichment materials.

Some tension exists within Japanese society between egalitarian education and *eisai kyoiku* . One persistent theme is that all children should be given equal opportunities for a good education, but there is also the counter theme that, like China, Japan should be producing students "earlier, faster, and better." The home-study Kumon lessons and the Suzuki approach to early musical training have become very popular as means of enhancing public education for young children. Even the Chairman of the Sony Corporation has entered the argument by suggesting in a widely read book that kindergarten is too late for initiating formal education (Ibuka, 1977). Whatever form education of the gifted and talented may ultimately take in Japan, one thing appears to be sure: gifted education will not be part of the government-sponsored educational system, but will be something that highly motivated parents will provide for their children through private lessons.

Japan is a society in which children are exhorted to study hard and are told that if they apply themselves they will be able to achieve. The great emphasis on effort and the purposeful de-emphasis of innate abilities has paid off in terms of the remarkably high average levels of academic achievement and indirectly in the country's vast economic success. But the Japanese are beginning

to worry about why they are not producing larger numbers of basic scientific discoveries and more Nobel prize winners. Educators are especially concerned about how they can stimulate greater creativity and better problem solving in their students. Any discussion of education in Japan inevitably turns to these topics. How these worries and concerns may influence educational practices for gifted and talented students in Japan will be interesting to observe in the coming decades.

Results of Comparative Research

We turn next to the research projects we have conducted with students from China, Taiwan, and Japan and their counterparts in the United States. The analyses we report are for two types of highly able students. We focus our attention in the first set of analyses on the characteristics of students who demonstrated outstanding cognitive ability on a battery of tests of the types commonly included in intelligence tests. In the second set of analyses we discuss correlates of outstanding achievement in mathematics, a topic about which we have collected a great deal of information. We use data from the following studies:

1. Our first study, conducted in 1980, included 960 children, half from Sendai, Japan and half from Taipei, Taiwan, selected as representative samples of first-and fifth-graders from those cities. We also included 480 children from Minneapolis. The children were interviewed, tested for reading and mathematics achievement, and given a battery of ten cognitive tasks. The cognitive tasks included tests of coding, spatial relations, perceptual speed, auditory memory, memory for words, memory for numbers, verbal memory, vocabulary, general information, and verbal-spatial representation (Stevenson et al., 1985). Mothers also were interviewed. After completing this study we conducted a parallel study of kindergarten children of which we make brief mention.

2. In 1986-87, we conducted a much more thorough exploration of achievement in mathematics. In this study we visited 10 schools in Taipei and Sendai and 11 schools in Beijing. From each school we selected representative samples of 12 first graders and 12 fifth-graders. We also included 12 first- and 12 fifth-graders from each of 20 schools in the metropolitan area of Chicago. The children were given a battery of mathematics tests, and they and their teachers and mothers were interviewed. We replicated this study in Beijing in 1990.

3. In 1986-87, we also conducted a study of children's adaptation to school in Beijing and in Chicago. We gave tests in reading and mathematics achievement to over 2,400 first-, third-, and fifth-grade students in Beijing and nearly 3,000 in Chicago.

4. We replicated part of Study 1 in 1990 with 240 fifth graders from each of the three cities, Taipei, Sendai, and Minneapolis. We visited the same schools that we had visited in 1980 and tested children with the same tests and interviewed mothers about the same topics included in the earlier study. We also interviewed students about many of the topics included in Study 2.

5. A large study of eleventh-graders was conducted in Sendai, Taipei, and Minneapolis in 1990 and 1991. One part of the study included representative samples of approximately 1,200 Japanese, 1,500 Chinese, and 1,000 American students. We gave them tests of mathematics and general information, and asked them to answer items in a long questionnaire dealing with their attitudes, beliefs, and current life situations. In a follow-up study conducted at the same time, we located as many of the first- graders from our 1980 study (now eleventh-graders) as we could find. We place greater reliance in this report on the cross-sectional data because not all of the Japanese data from the follow-up study have been analyzed.

Students of High and Average Cognitive Ability

Giftedness is often defined in terms of intelligence. Data from the battery of cognitive tasks

given at first and fifth grades in Study 1 make it possible to form groups on the basis of their scores on tests of cognitive ability. We selected two groups; one we will term "highly able" and the other, "average." At each grade we selected approximately 24 students whose scores were in the top decile of scores on the battery of tasks for a "highly able" group and a corresponding group of approximately 24 students whose scores clustered most closely to the average for an "average" group. There was no consistent tendency for boys or girls to be more frequently represented among the highly able students. At first grade, a lower percentage of boys than of girls received the high scores in Minneapolis (39 percent) and Taipei (37 percent), but slightly more boys than girls were in the highly able group in Sendai (56 percent). The corresponding percentages at fifth grade were 67 percent, 46 percent, and 52 percent.

Academic achievement. One of the first questions we asked about the two groups of children is how well they were achieving in school. Level of cognitive ability has frequently been found to be related to academic achievement. The question here is whether the level of achievement differed between the highly able and the average students to the same degree in the diverse cultures in which our research was conducted.

Students who received high scores on the cognitive tests out-performed the average students on both the mathematics and reading tests. First-graders in the highly able groups could read many more words and phrases and were better able to understand what they read than were the average children. The highly able students also surpassed the average students in their ability to solve computation and word problems (see figures 1 and 2). Differences in scores on the achievement tests between the highly able and average groups of children were equivalent among the three cultures. However, the differences between the highly able and average groups 'were' less marked at fifth than at first grade, probably reflecting an increasingly strong influence of variables other than children's cognitive ability on academic achievement.

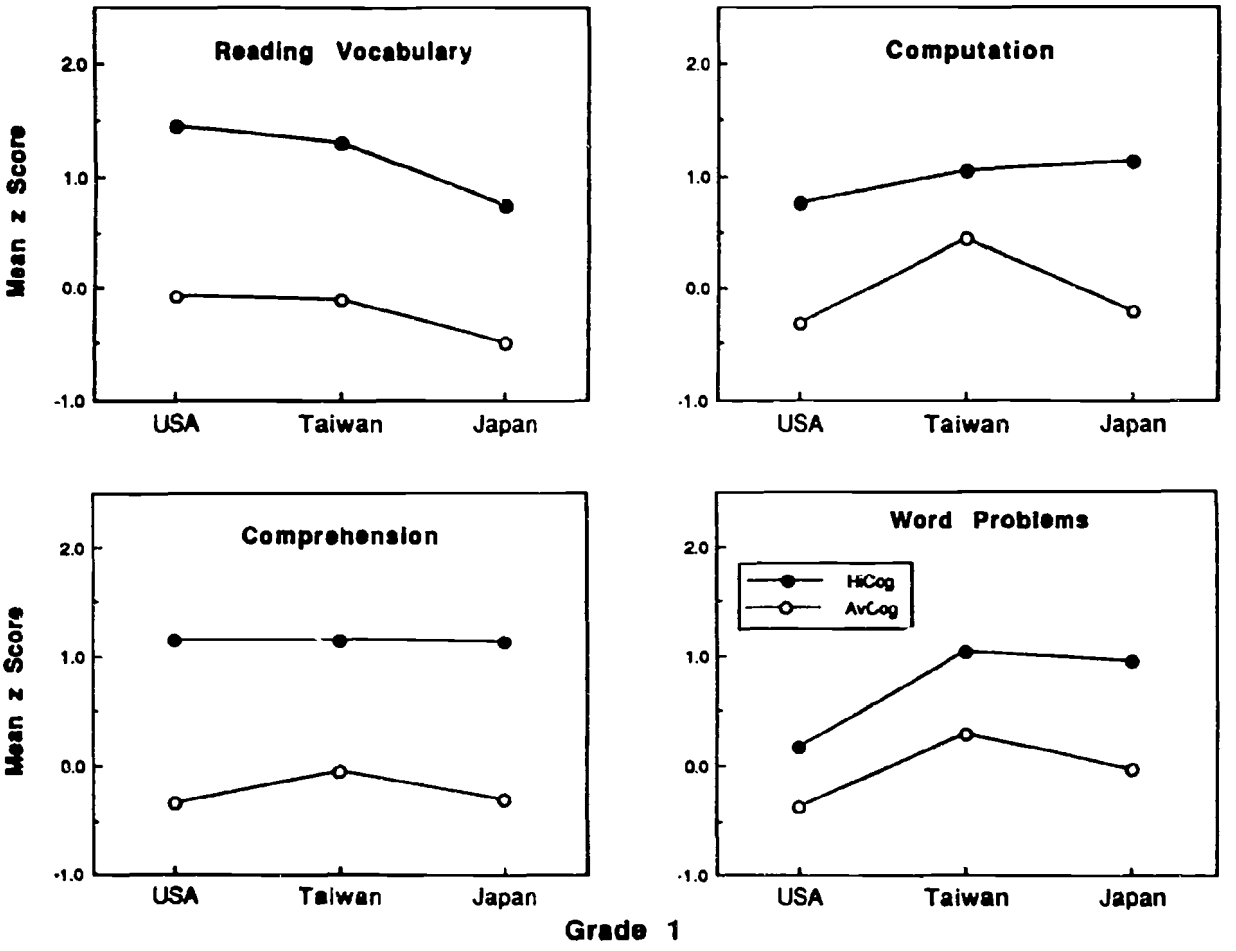
Scores at eleventh grade. We can also determine the predictive value of the early cognitive tasks by asking whether the scores obtained in first grade were effective in distinguishing between achievement scores at eleventh grade. Scores were available for mathematics, reading comprehension, and general information. The latter test tapped information that was not necessarily taught in school, such as why blankets keep us warm and why it has been possible to make smaller computers in recent years.

Bright first-graders were not only high achievers at first grade, but also ten years later when they were in high school (see table 1). They knew more than the average students about reading and mathematics, and also had a broader fund of general information about the everyday world.

Mothers' perceptions. Mothers in all three cultures tended to rate their children as being average or above in their intelligence and in their achievement in mathematics and reading. This is evident in the data summarized in figure 3. The average students received ratings that were above average—but significantly lower than those obtained by the highly able students. The differences between the ratings for the highly able and average groups were largest in Minneapolis and the smallest in Sendai.

Mothers in all three locations gave other indications of their awareness of their children's level of cognitive ability. Mothers of highly able students consistently gave their children higher ratings than did the mothers of average children on intelligence, memory, ability to learn new things, and at fifth-grade, to express themselves verbally and pay attention. In addition, mothers of highly able fifth-graders believed that their children would complete more years of school than did mothers of children in the average group and that their children had higher potential to do well in school. Ratings made by mothers of the highly able and average students differed from each other to the same degree in all

Figure 1.— Mean standard (z) scores on reading and mathematics achievement tests of the groups of first-grade students of high and average cognitive ability.



three locations. Only on two characteristics related to cognitive ability, creativity and curiosity, did the highly able and average groups receive similar ratings. We have no explanation for this departure from the general pattern other than to suggest that the mothers may not have had clear conceptions of these attributes.

The picture was different for personality and social characteristics. Ratings of the children's level of anxiety, approval-seeking, obedience, restlessness, and shyness were generally not related to their level of cognitive ability. Nor, surprisingly, did the mothers, ratings of children's curiosity and creativity differ according to cognitive level. Significant differences appeared for only two characteristics, and then at only fifth grade. Highly able students in all three cities were rated as being more persistent, and in Taipei and Sendai they were given higher ratings for self-confidence.

Use of out-of-school time. One might expect that highly able and average students would spend their out-of-school time in different ways. According to their mothers, this was not the case for

Figure 2.— Mean standard (z) scores on reading and mathematics achievement tests of the groups of fifth-grade students of high and average cognitive ability.

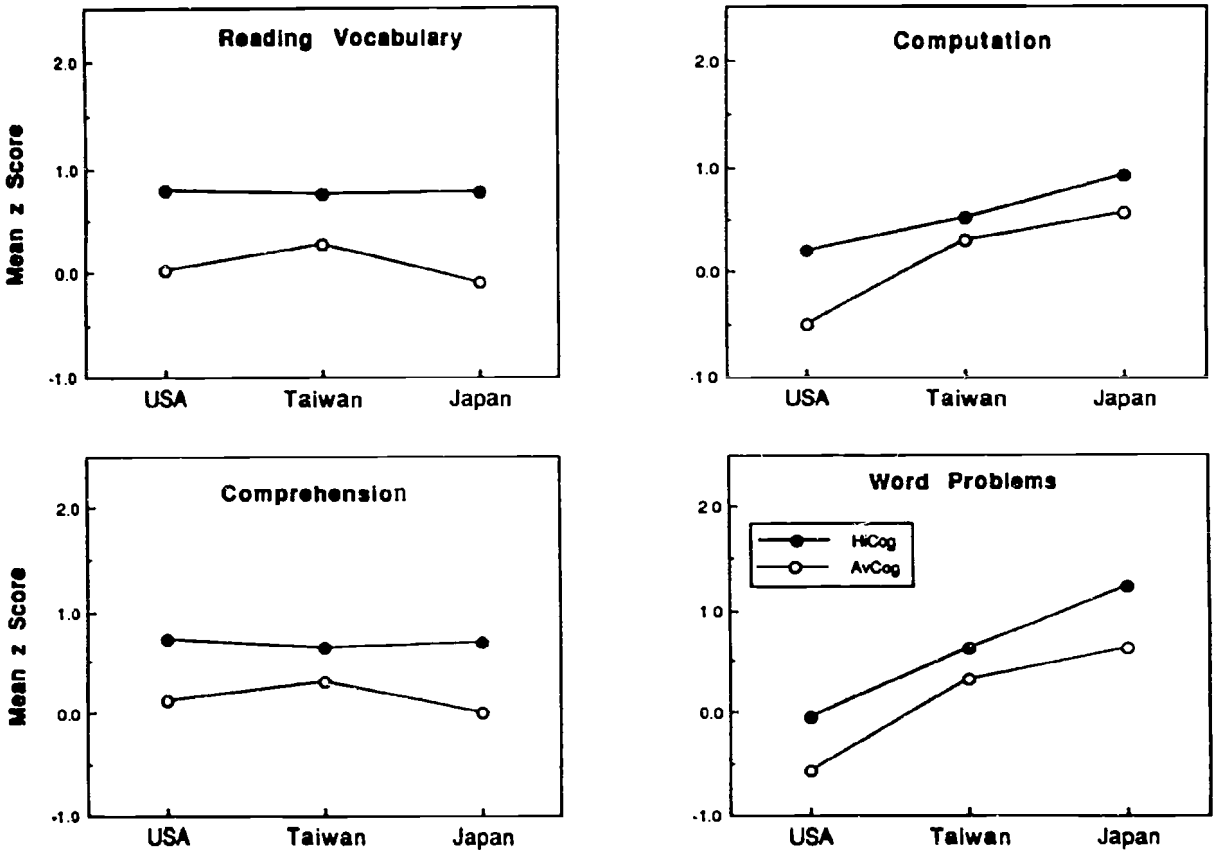


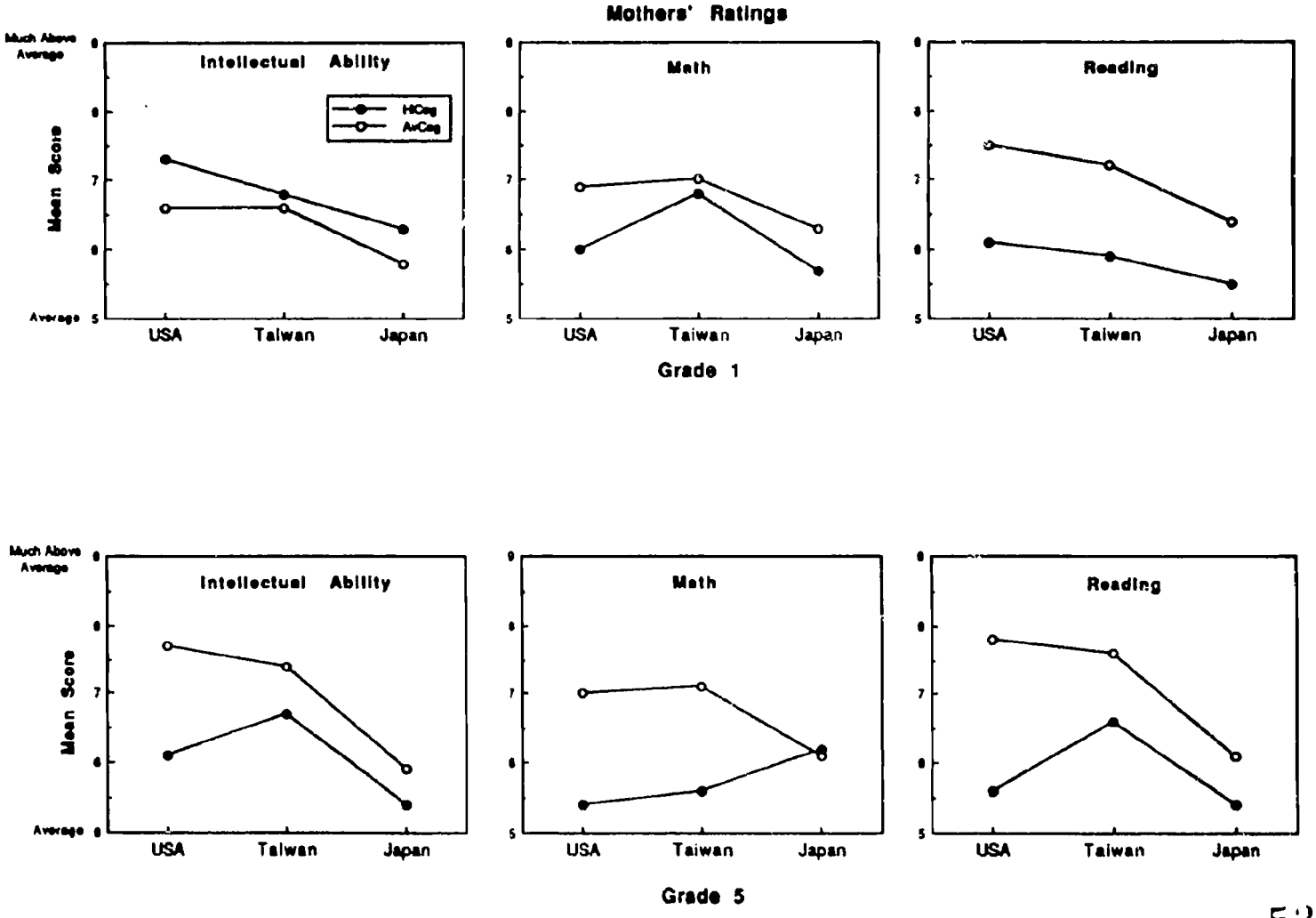
Table 1.—Weighted mean z scores of eleventh grade students who at first grade were in the average and highly able groups in terms of cognitive ability.

	United States		Taiwan		Japan	
	Average	High	Average	High	Average	High
Mathematics	-.54	.55	.34	1.29	.20	.71
Reading comprehension	.15	.59	.15	.70	-.30	.72
General information	.11	.91	-.01	.75	-.10	.53

watching television, doing homework, and at first grade, playing. At fifth grade, however, highly able students spent less time playing than their average peers. The highly able students in Minneapolis spent 14 hours a week playing; the average students, 21 hours. Even so, the highly able students in Minneapolis spent more time playing than did their peers in Sendai and Taipei, who were estimated to play only 13.0 and 6.3 hours a week, respectively.

One way in which highly able and average students differed consistently was in the amount of time they spent each week in reading for pleasure. Highly able students in Minneapolis, Taipei, and Sendai spent more time reading for pleasure than

Figure 3.— Mothers' ratings of the intellectual ability and reading and mathematics ability of the groups of students who received high and average scores on the cognitive tasks.



the average students. At first grade the estimates differed, respectively, by a quarter hour, half hour, and over three hours a week. By fifth grade, the corresponding differences were one hour, two and a half hours, and nearly three hours. These data offer interesting support for the view that highly able students are distinguished by their ability to learn a great deal by themselves.

Students with High and Average Achievement in Mathematics

We turn next to comparisons of students who displayed high levels of achievement in mathematics with those who performed at an average level. Performance in mathematics was selected as a second example of giftedness because of the widespread interest in the topic and because we have a great deal of information about students who do well in mathematics.

We developed our own tests of mathematics achievement in order to be sure that the tests were appropriate for the students in each culture. The tests were based on our detailed analyses of the content of the textbooks or workbooks used in the schools of each city. Information from these analyses made it possible to construct items of the types and levels of difficulty that children encounter every day at school. As a further check on the cross-cultural applicability of our tests and interviews, we routinely submitted all items to psychologists and educators in each culture for review.

Items for the kindergarten test ranged from identifying numerals, counting, and ordering, through adding and subtracting in simple computation and word problems. The test for elementary school students included more difficult computation and word problems. The test for the eleventh-graders was comprehensive and contained items ranging from simple inequalities to complex geometry and algebra.

We formed high-achieving groups in each city by selecting the students whose scores were in the top decile on the mathematics test. We also formed contrast groups of average students whose scores clustered around the average for the total group in each city.

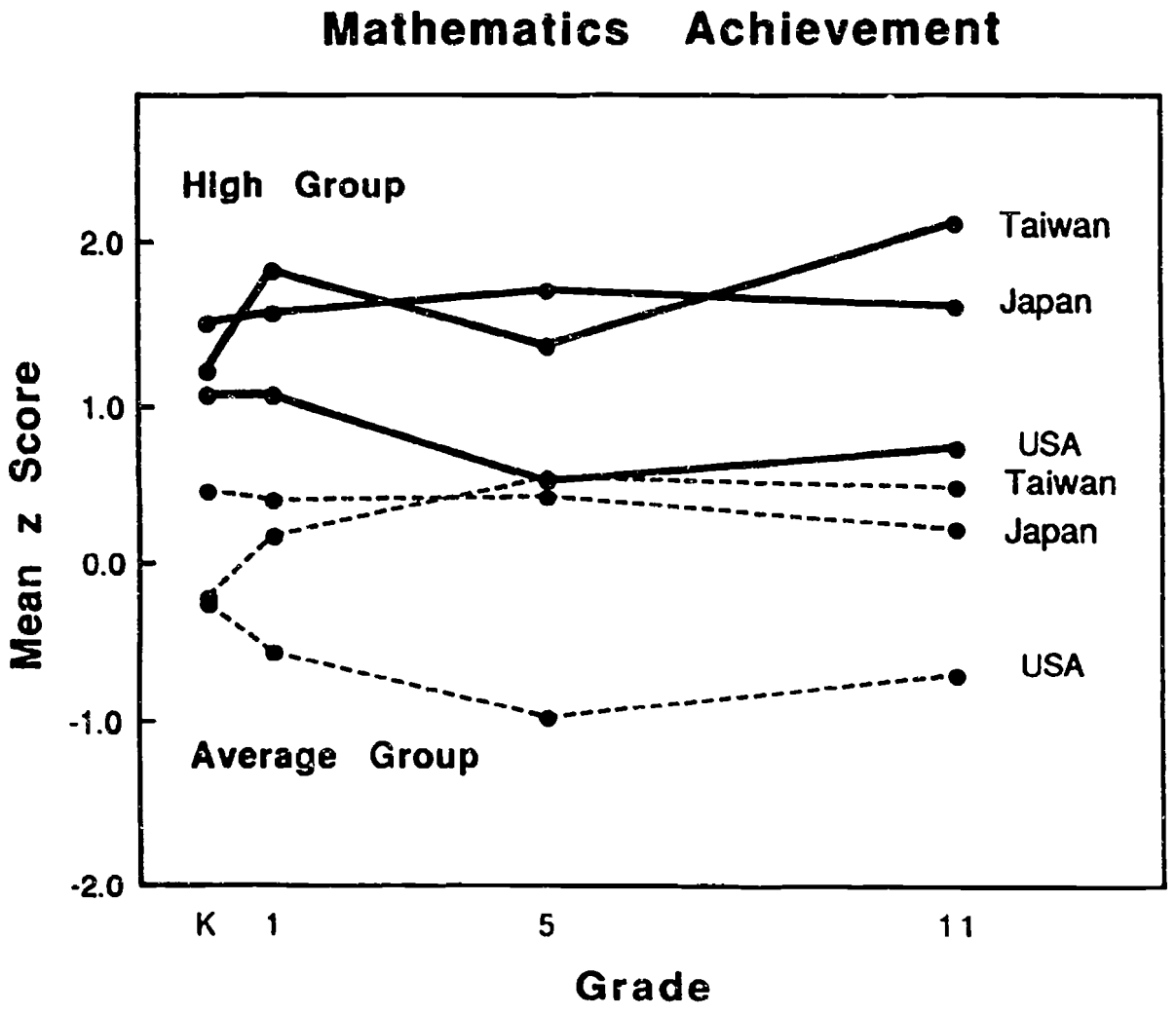
Mathematics Achievement. Scores on the mathematics tests of both the high achievers and the average students from Taipei and Sendai exceeded those of their Minneapolis peers at all grades after kindergarten. The degree of difference between the cities was so great that students considered to be high achievers in mathematics in Minneapolis were within the range of average students in Taipei and Sendai. This is illustrated graphically in figure 4, where the data are plotted in terms of weighted z scores computed at each grade level for all samples. The average scores of the high achieving American fifth- and eleventh-graders departed little, if at all, from those of the average Chinese and Japanese students.

The same effect appeared when comparisons were made between high achievers and average groups in Beijing and Chicago (see figure 5). In these comparisons, the high achievers in Chicago at first, third, and fifth grade received scores at or below those of the average groups in Beijing. Clearly, we are not talking about the same degree of proficiency in mathematics when we compare children in the top decile of mathematics scores in China, Taiwan, and Japan with the top decile of children in the United States.

Sex Differences. There was a predominance of boys among the high achievers in mathematics. In both Taipei and Sendai, there were more boys than girls at all grade levels. This was dramatically evident in Sendai, where nearly all of the high achieving students at the eleventh grade were boys. In Minneapolis, the groups included more girls than boys through fifth grade, but boys outnumbered girls at eleventh grade (see figure 6). In Beijing, there was a greater percentage of boys in the high-achieving groups at all grades: 64 percent (first grade), 58 percent (third grade), and 63 percent (fifth grade).

Educational level of parents. Parents of high-achieving and average students differed much

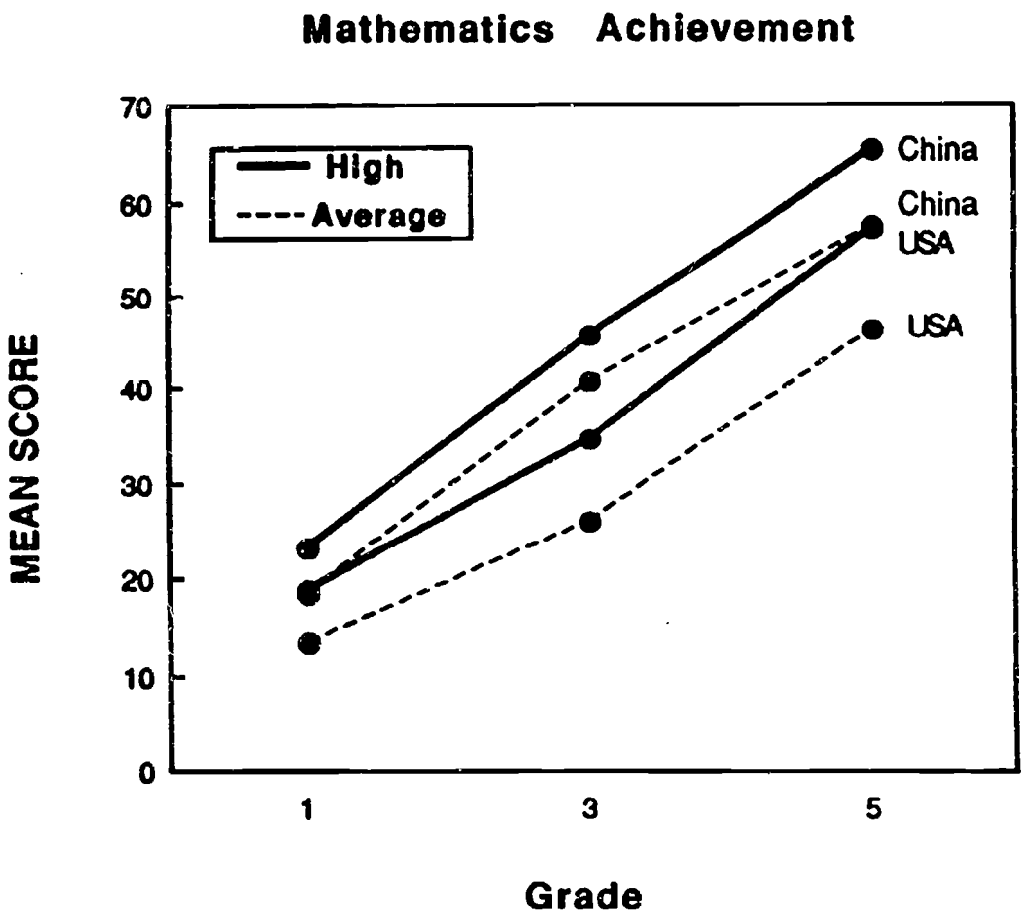
Figure 4.— Mean standard (z) scores on the mathematics test of groups of kindergarten, 1st-, 5th-, and 11th-grade students in Taipei, Sendai, and Minneapolis who received high and average scores on the mathematics test.



more in Taipei and Sendai than in Minneapolis in their educational levels. At the eleventh grade, for example, the difference in years of education for Minneapolis fathers was only half a year, but was 2.3 years in Taipei and 1.3 years in Sendai; for mothers the corresponding differences were 4, 2.5, and .8 years. Thus, while the socioeconomic status of the home as indicated by parents' education was greater in all cases for the high achievers than for the average students, it played a potentially much stronger role in the East Asian families.

Classrooms and schools. If all of the high-scoring elementary school students came from only a few

Figure 5.— Mean standard (z) scores on the mathematics test of groups of first-, third-, and fifth-graders in Beijing and Chicago who received high and average scores on the mathematics test.



of the 20 classrooms at each grade in each location, our findings might be attributable to the effects of a few teachers or to ability grouping. This was not the case. High achievers came from 13 or more of the 20 first-grade classrooms and from 12 or more of the 20 fifth-grade classrooms in each location. In none of the cities, therefore, was high achievement in elementary school attributable to a small number of especially skilled teachers or to other characteristics of a few classrooms.

The picture is much different at eleventh grade. In Japan, 83.1 percent of the students came from two of the eight schools involved in the study; in Taiwan, 82.1 percent of the high achievers came from five of the eighteen schools. Thus, the dispersion of high achievers among different schools during the elementary school grades was replaced by a much higher concentration of high-achieving

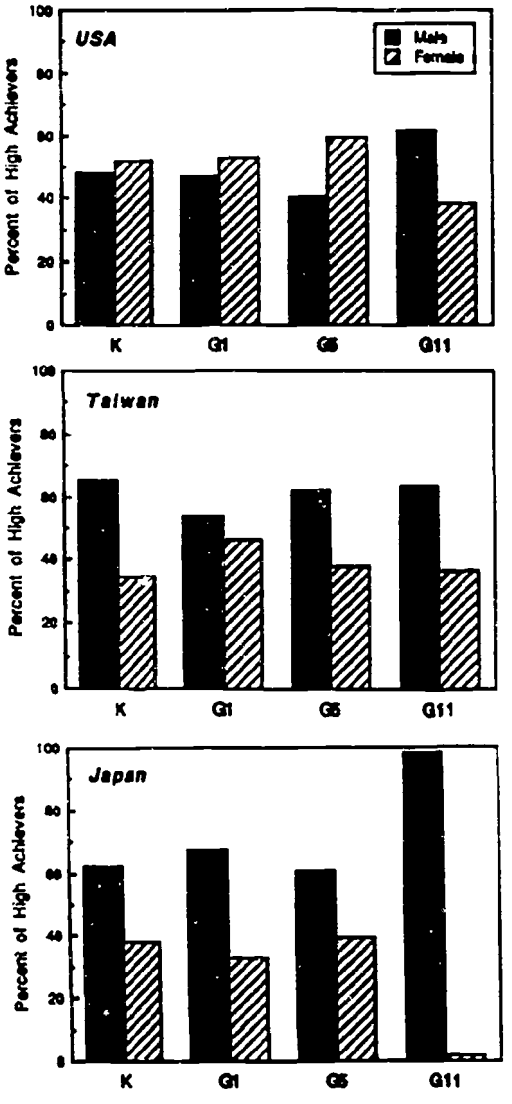
eleventh-graders in a small number of high schools. As we noted earlier, a hierarchy of high schools exists in Taiwan and Japan that is defined by the severity of the entrance requirements imposed upon the students. It is not surprising, therefore, that the greatest number of high achievers came from the most highly rated high schools.

The concentration of students in a few schools was somewhat less in Minneapolis, where 66 percent of the high achievers in mathematics came from three of the nine schools involved in the study. Although there are differences among American high schools in any large city in the quality of instruction and the students' abilities, a clear hierarchy produced by different entrance requirements does not exist.

Longitudinal Data. Because we followed the first-graders until they were in eleventh grade, we can ask how the high achievers in mathematics at first grade scored when they were in eleventh grade. The eleventh-grade percentile scores in mathematics for the high-achieving Minneapolis first graders was 77.7; for the high achieving Taipei students, 68.3, and for Sendai students, 86.2. These data indicate that the top-scoring first graders were likely to continue to do well in mathematics throughout their schooling.

But was the reverse true? Were the top achievers in mathematics at eleventh grade also high achievers at first grade? To answer this question, we looked back at the first-grade mathematics scores of the students who were in the top ten percent of the students on the eleventh-grade mathematics test. In all three cities the high achieving eleventh graders were found to be above average at first grade. The mean percentiles of first grade mathematics scores for Minneapolis, Taipei, and Sendai students were 79.8, 72.1, and 85.2. In general, therefore, the top students in eleventh grade were much above average according to tests given approximately six months after they entered first grade.

Figure 6.—The percentage of boys and girls in kindergarten, 1st-, 5th-, and 11th- grades that received high scores in mathematics in Minneapolis, Taipei, and Sendai.



Correlates of High Mathematics Achievement

We looked further at factors that differentiated high achievers from their average-performing

peers. Both in-school and out-of-school factors were considered, but our major interest was in how high levels of achievement are related to cultural values about education, parents' attitudes and beliefs about children's development, and scholastic performance.

First and Fifth-Graders

Cognitive ability. Replicating the finding that academic achievement differs according to students' cognitive ability is not especially useful, but it is of potential value to know whether the patterns of abilities of high achievers were similar among the three cultures.

Scores in all cultures differed on nearly all of the tasks between the high and average achievers. The only exceptions were for the rote memory and perceptual tasks (Uttal, et al., 1988). Not surprisingly, it was the more complex cognitive tasks that emerged as the best discriminators of performance in mathematics. Multiple discriminant function analyses of the data for the high achievers at each grade and in each city revealed that tasks such as verbal-spatial representation (identifying and drawing spatial patterns on the basis of verbal instructions), verbal memory (recalling the details of a short story), vocabulary, and general information were the strongest predictors of mathematics achievement. Although the patterns of these tasks were not identical in each location, we did not find a set of abilities related to high levels of achievement that was unique to any location.

Self-evaluations. Fifth-grade students in the 1990 study were asked to make their own evaluations of their levels of academic achievement, intelligence, and performance in mathematics. The high achievers did not rate themselves as being truly outstanding. In Taipei and Sendai they did give themselves ratings that were higher than those of the average students, but not in Minneapolis. The self-ratings of average students were as high as those made by the high achievers (see figure 7).

The lack of self-insight of the average American fifth-grade students may be a result of the lack of information available to students in American schools. The relative standing of all students is common knowledge among students in the classrooms of East Asia; scores on all important tests are reported publicly. This rarely occurs in American schools. Grades are available only to the individual student, and even then they may be disclosed in such general terms that the students are not aware of their actual standing in the class. Report cards in American elementary schools typically offer global evaluations, such as "satisfactory," while East Asian schools provide numerical grades. Because of this, it may be more difficult for average students to gain an accurate estimate of their relative status in American than in Asian elementary schools.

Attributions. The Confucian emphasis on the malleability of human beings and the perfectibility of human behavior through proper experiences continues to have a pervasive influence in Chinese and Japanese cultures. This was evident in the discussions we described earlier, and in the results of our research. We have found, for example, that Chinese and Japanese mothers, teachers, and students are more likely than their American counterparts to attribute success in school to hard work (Stevenson, et al., 1990), and less likely to attribute it to innate ability. Would these tendencies be exaggerated by high-achieving students? Would high-achieving Chinese and Japanese students give even more emphasis to hard work, and high achieving American students give even more emphasis to the importance of innate ability?

Evidence related to this question was obtained from fifth-graders. We asked the students to rate their agreement with statements such as "You can be good at any type of math problem if you work on it hard enough," "Natural ability is more important than effort for doing well in math," and "Everybody in your class has about the same amount of ability in math." The major finding was that high achievers in Taiwan and Japan were more likely than average achievers to attribute success to the attributes most favored by their

Figure 7.— Self-evaluations of their academic achievement, intellectual ability, and mathematics ability of fifth-graders in the high- and average-achieving groups.

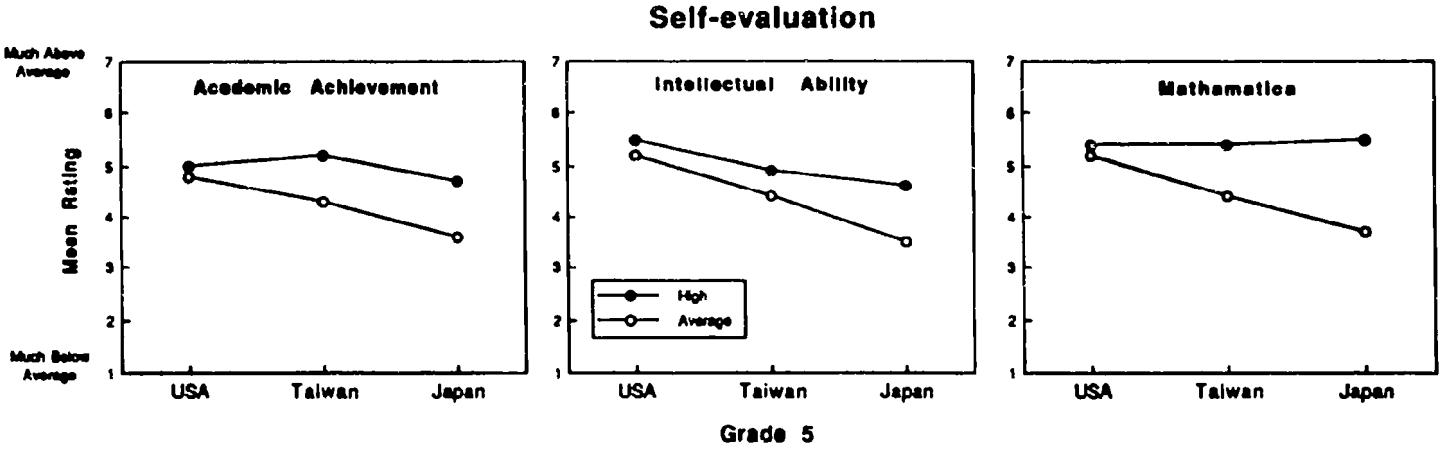
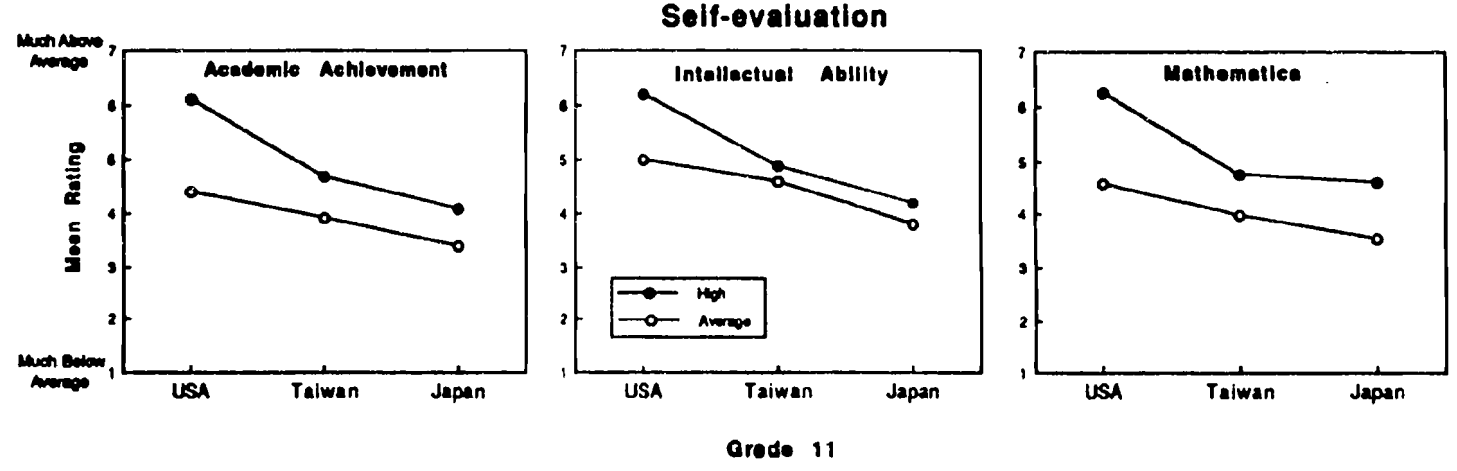


Figure 8.— Self evaluations of their academic achievement, intellectual ability, and mathematics ability of 11th-graders in the high- and average-achieving groups.



culture: they emphasized the importance of hard work and de-emphasized the contribution of- innate ability. Findings for the American students were less consistent. The average students were more likely than the high achievers to believe that hard work would lead to success, but they also gave stronger emphasis to the importance of innate ability (see table 2).

High School Students

Some of the questions asked of high school students were the same as those asked of the younger students. The responses to several of these questions yielded some interesting new insights into the personality and motivation of high achievers in high school.

Self-evaluations of Achievement and Intelligence. Eleventh grade high achievers, like their fifth-grade counterparts, were aware of the fact that they were doing well in school (see figure 8). American students were the most positive about themselves and Japanese students, the least. However, in contrast to the younger students, where the Minneapolis high achievers and average students gave themselves similar ratings, the Minneapolis high school students who were average achievers in mathematics did give themselves lower ratings than did the high achievers.

Table 2.—Attributions made by average and high achievers in fifth grade

	United States		Taiwan		Japan	
	Average	High	Average	High	Average	High
Everyone has the same amount of ability in math.	3.6	2.7	4.7	3.6	4.0	3.7
Anyone can be good at math if they work hard enough.	6.2	5.7	5.9	6.2	5.6	6.6
Natural ability is more important that effort for doing well in math.	4.0	2.7	2.9	2.6	3.6	3.2

Note: 1 = Strongly disagree; 7 = Strongly agree.

Other psychological characteristics. There were many other characteristics for which the high and average achievers gave themselves similar ratings. These included physical appearance, ability to get along with others, having good family relations, caring about others, wanting to study rather than having fun, not wanting to skip school, and not feeling satisfied with just a passing grade.

Attributions. One of the areas of greatest difference between the responses of the elementary school and high school students was in their attributions concerning the bases for academic success. Whereas the responses of the high achievers and average elementary school students differed from each other, the responses of the high and average achievers in high school were small or insignificant. The average high school students were more likely to believe that anyone could be good at math if they worked hard enough, but differences between ratings made for other statements were not statistically significant.

Indices of Stress. One domain we were able to explore with high school students that we could not investigate with young children was their level of stress. Parents and teachers often worry that high achievement may come at the cost of an increased incidence of psychological disturbance. We have not found this to be the case in analyses of eleventh graders in Taipei, Sendai, and Minneapolis, even though their levels of achievement differed greatly. Nor did we find it to be true of the high and average achievers in each city. In fact, if anything, it was the average achievers, not the high achievers, who were likely to describe indications of tension.

We asked the students to indicate the frequency with which they experienced a large variety of disorders, such as feeling tired, having problems with sleep, eating, and elimination, and having headaches and stomach aches. The average students in all cultures reported significantly more frequent headaches, stomach aches, and diarrhea than did the high achievers. They also indicated

that they were more anxious about keeping up with their schoolwork, and the Sendai and Minneapolis average achievers reported feeling more frequent anxiety while they were taking tests and when their tests were returned. Average students were also more frequently angry at their teacher, and in Minneapolis they reported feeling like hitting someone or destroying something more often than did the high achievers. High achievers in Sendai reported these aggressive feelings more often, but the frequencies for the high and average achievers did not differ in Taipei.

There was not a significant difference between high achievers and average students in the frequency with which they reported feelings of stress, but high achievers in Minneapolis did report more frequent feelings of depression. In Sendai and Taipei, however, high achievers reported feeling depressed less frequently than did the average achievers.

Reasons for studying hard. Another new area that we were able to explore with high schools students was the basis of their motivation for studying hard. High achievers were more likely than average achievers to believe that they studied hard because they wanted to gain more knowledge, to go to college, and because they set high standards for themselves. In contrast, the average achievers were more likely than high achievers to say they studied hard to please their parents and teachers, and because they had no other choice (see table 3).

Table 3.—Importance of various reasons for studying hard for eleventh-grade students

	United States		Taiwan		Japan	
	Average	High	Average	High	Average	High
Gain more knowledge	5.1	5.7	5.0	5.5	4.6	5.2
Go to college	6.2	6.1	5.5	6.2	5.4	5.6
I set high standards for myself	5.2	6.1	4.9	5.8	4.2	4.5
Please my parents	5.1	4.3	4.9	4.9	4.1	3.2
Please my teachers	4.2	3.3	3.3	3.0	2.9	2.5
I have no other choice	3.2	2.3	3.2	2.7	3.6	3.4

Note: 1 = Not all important; 7 = Very important.

In other words, the motivation of high achievers for studying hard lay within themselves, but for low achievers it was more likely to depend on external factors.

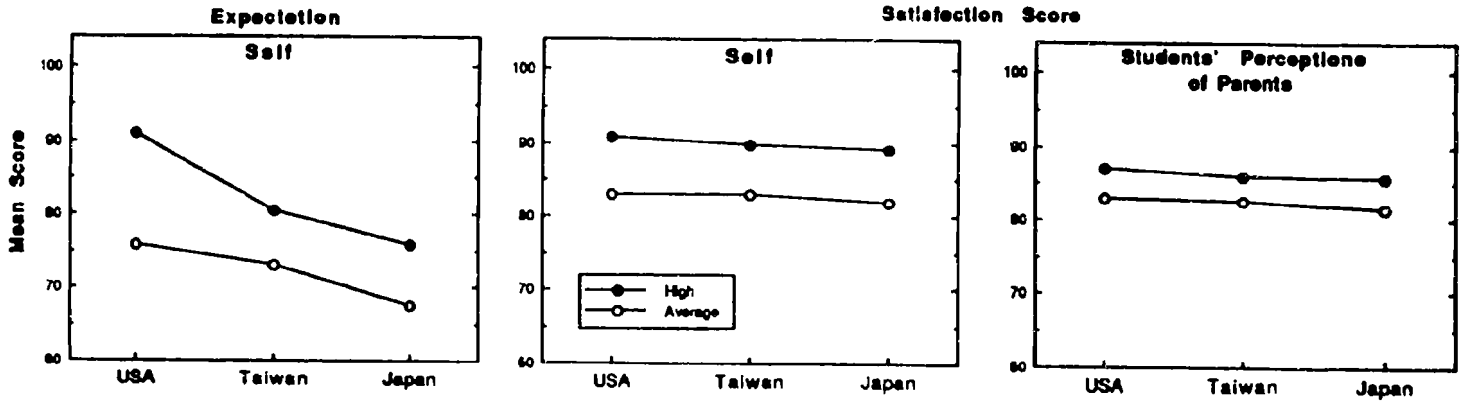
Additional evidence of the self-motivation of high achievers appeared in the students' ratings of the importance of getting good grades. We asked the students first to rate the importance for their parents and then for themselves. High achievers considered it more important to themselves to get good grades than they believed it to be to their parents. The average achievers thought it was equally important to their parents as it was to themselves to get good grades.

Expectations and Satisfaction. Another approach to exploring students' motivation for studying hard is to compare how well they expect to do on an examination with what they would consider satisfactory. We told the students: "Let's say there is a math test in which there are 100 points. The average score in your class is 70. What score do you think you would get? What score would you be satisfied with? What score would your parents be satisfied with? The results are summarized in figure 9.

In all comparisons there were significant differences between the estimates made by the high and average achievers. The average students expected to get a score around average; the high achievers, especially the Americans, expected to do much better.

Three interesting phenomena appeared in the satisfaction scores. First, the scores with which students in each culture would be satisfied were remarkably similar, as were the estimates of the scores with which they believed their parents would be satisfied. Second, there was a much greater discrepancy between what both the high and average achievers in Taipei and Sendai expected and what they would be satisfied with than was the case for American students. These results help to explain why the Chinese and Japanese students perform so much more effectively in academic achievement than do American students. American

Figure 9.— Mean score on a hypothetical mathematics test by groups of high- and average-achievers in mathematics, the score they would find satisfactory, and the score they believed their parents would find satisfactory.



students set standards for themselves that did not depart greatly from their expectations. Chinese and Japanese students set standards for themselves that were higher than the ones they expected to attain. Third, the high self-motivation of high-achieving students is evident in the fact that they set higher standards for themselves than they believed their parents would impose.

Summary and Conclusions

Programs for gifted and talented children in East Asia are new; the majority were established during the last decade. The most vigorous efforts are being made in China and Taiwan. China, with its need to modernize, and Taiwan, aware of its delicate economic position as a result of scarce natural resources, have promoted education as a means of advancing their societies. In this effort, the governments have introduced a wide array of programs for gifted and talented students during the regular school day and after school. Japan supports no programs specifically for gifted students prior to the high school years.

Political philosophy is obviously not a critical factor in determining whether programs for gifted students will be established. The socialist government of China promotes egalitarianism, but it also believes that well-trained scientists, mathematicians, and other professionals are important for the advancement of the country. The government assumes that the best way to develop such individuals is to nurture students who give evidence of outstanding abilities. Japan, on the other hand, had bitter experience with social elitism before World War II, and since then has taken vigorous steps to avoid the emergence of groups that would dominate the political and social life of the country. As a result, Japan makes strong efforts to ensure that all children begin school with equal knowledge and receive equal educational opportunities during their elementary school years. The Japanese explain that some children emerge as more effective students than others, but this occurs not because of their exceptionally high innate abilities or high social status, but because they have taken advantage of their opportunities and worked hard in school. Thus, high schools serving only highly able students are justified because these students have already shown that they are more likely to benefit from a more demanding curriculum than their average peers.

As far as we can tell from many hours of observations in the schools of China, Taiwan, and Japan, the formal policies are carefully adhered to by educational administrators and teachers. There is no denial of innate differences in ability, but in both Chinese and Japanese cultures, emphasis is placed on the importance of effort as the ultimate factor that differentiates the level of achievement individuals attain. "The slow bird must start out early," say the Chinese. "Yareba dekiru," say the Japanese: "If you work at it you can do it." These are optimistic beliefs, and underlie the expectation that all normal children are capable of performing effectively in school. The secret of academic success lies in having devoted teachers and supportive parents-but most importantly in the hard work of the students themselves. Chinese and Japanese educators and psychologists tell us they cannot understand why Westerners place such importance on innate abilities. They consider this a self-defeating emphasis, one that potentially limits the" achievement of average and gifted students alike. Average students may begin to doubt that they can succeed even if they do work hard, and gifted students may come to believe that their high abilities alone are sufficient for ultimate success.

A common question about effort-oriented philosophies is how gifted students continue to be motivated to study. Gifted students in China and Taiwan have many opportunities to work at levels beyond those demanded by the standard curriculum. It is a potential problem in Japan, where no special academic opportunities other than *juku* are typically available to gifted children.

Gifted Japanese students remain highly motivated in their regular classrooms for several rea-

sons. First, Japanese teachers use an interactive teaching technique, where they attempt to elicit information from students, rather than providing it themselves through frequent lectures. In seeking information from the class, teachers allow gifted students to share innovative ideas and explanations with their classmates. Further, classes in elementary schools are divided into *han*, small, heterogeneous groups that work together on problems. The more advanced students in the *han* assist other students who may be having difficulty. By high school, gifted students are separated into different schools in accordance with their level of academic achievement. During the high school years all Japanese students are intent upon doing well on college entrance examinations and know that the best way to do well is to master the high school curriculum.

The most notable finding in our comparative research is how similar the bright and high achieving students are in the different cultures in which we conducted our research. Only rarely was the degree of difference between students in the high scoring groups and those receiving average scores dependent on a particular culture. There were no especially outstanding characteristics that distinguished gifted and talented East Asian students from their American peers, except for their marked superiority in mathematics achievement.

Schools in East Asia are producing some remarkable students. Although there is no indication that their general level of intelligence is higher than that of students in the West, their level of sophistication in mathematics is well beyond that found in the United States and other Western countries.

We found, not surprisingly, that the bright students in first grade did well in high school. Conversely, students who did well in high school tended to be ones who received high scores on cognitive tasks in elementary school. The same type of results were found for mathematics achievement. The relationship was not perfect in either case, which leads us to wonder what happened to the children who did very well in mathematics in first grade but did not do well in high school, or to those who did very well in mathematics in high school but did not do well in first grade. What might account for the fact that of the very top achievers among the thousand eleventh-grade Minneapolis students, one received the top score at first grade, while another was over a standard deviation below the mean of all Minneapolis first graders?

The dominance of boys among the high achievers in mathematics in Japan, Taiwan, and China is in line with the preferred position of males in East Asian society. Similarly, the dominance of boys in American high school mathematics classes is undoubtedly related to their more frequent appearance among the high achievers. The unusually large proportion of boys among the high achievers at eleventh grade in Japan was not expected, but may reflect the fact that boys are more likely than girls to strive for admission to science and engineering departments of the leading universities and may work harder in mathematics.

As might be expected, the students and their mothers were generally aware of the relative status of high-scoring and average students. This was true in the East Asian societies that attempt to de-emphasize individual differences among children and in the United States, where individual differences are a matter of great interest. One exception occurred in Minneapolis. The average American elementary school students and their mothers generally considered the students to be more outstanding than was justified by their test scores. It seems likely that this is due, in part, to the lack of comparative information and more global evaluations received by American students.

We found that high achievers in Taiwan and Japan subscribed to the explanations for success favored by East Asian cultures more frequently than did the average students, but that the difference disappeared at eleventh grade. We know of no other developmental study of attributions made by high achieving and average students in East Asia; thus it is difficult to interpret the significance of these developmental changes.

We also found no evidence that high achievers experience greater stress than average achievers. From the self-ratings of nearly 400 high achievers in this study, we found infrequent indications of anxiety, tension, psychosomatic disorders, or other indications of poor adjustment. In fact, when differences between gifted and average students were found in this domain, the average students reported the greater stress.

High achievers appeared, however, to be much more self-motivated than were the average achievers. They were less dependent than average achievers on outside influences in getting them to study and to get good grades, and they set standards for themselves that were higher than those they believed would be set by their parents. Although the highly able American students suggested the highest scores when asked about the score they would expect to receive on a hypothetical test, high achievers in all three cultures made similar estimates of the score with which they would be satisfied. These data give us some insight into the reasons why East Asian students study harder than their American peers. If standards do not exceed the individuals' expected level of achievement, there is little reason for increasing effort. On the other hand, if a satisfying score is above what the individual expects to achieve, there is reason to persist. This prediction is supported by the students' reports of how much they study mathematics each week. Whereas the American eleventh-grade high achievers reported studying mathematics after school only a little more than three hours a week, both Chinese and Japanese high achievers reported that they studied mathematics after school more than six hours a week.

From this survey it appears that neither level of economic development nor the quality of schools and universities determines whether or not programs for the education of gifted and talented students will be established in any particular country. The critical difference is the culture's philosophy of education. In an effort to promote egalitarianism, all elementary school students in Japan are required to remain with their classmates regardless of their level of intelligence or of academic achievement. In contrast, Taiwan and China, seeking to enhance the contribution of gifted and talented students to their societies, have developed elaborate programs of special education. The natural experiments that are taking place in these cultures will provide information about gifted and talented students that will be of interest throughout the world.

References

Adachi, J. (1988). *The present status of juku*. Unput lished paper. Saitama University (Japan).

Bureau of Statistics. (1991). *Education in the Republic of China*. Taipei: Bureau of Statistics, Ministry of Education.

Ibuka, M. (1977). *Kindergarten is Too Late!* New York: Simon & Schuster.

Lee, D. K. (1987). Woguo zhifu youyi jiaoyu fazhang yu jiaoxue (The development and teaching models of gifted education in the Republic of China). *Zhiiou Jiaoyu Jikan*. 25, 17-21.

Special Education Association of the Republic of China. (1988). *Woguo teshu jiaoyu de huigu yu zhanwang* (Retrospects and prospects in special education of the Republic of China.)

Special Education Center, National Taiwan University (1991). *Zhonghua mingguo teshu jiaoyu fagui huibian* (Laws and regulations about special education and social welfare of R. O. C.).

State Statistical Bureau (1989). *Fenjin de sishinian* (Forty years of rapid development). Beijing: China Statistical Press.

State Statistical Bureau (1991). *People's Daily*, 1991, February 23, 3.

Stevenson, H. W., Lee, S. Y., Chen, C., Stigler, J. W., Hsu,C. C., & Kitamura, S. (1990). Contexts of Achievement: A Study of American, Chinese, and Japanese Children. *Monographs of the Society for Research in Child Development* 221:55, 1-2.

Stevenson, H. W., Lee, S. Y., Chen, C., Lummis, M., Stigler, J., Liu, F., & Fang, G. (1990). Mathematics Achievement of Children in China and the United States. *Child Development* 61, 1053-1066.

Stevenson, H. W., Stigler, J. W., Lee, S. Y., Lucker, G. W., Kitamura, S., & Hsu, C. C. (1985). Cognitive Performance and Academic Achievement of Japanese, Chinese, and American Children. *Child Development* 56, 718-734.

Stigler, J. W., Lee, S. Y., & Stevenson, H. W. (1990). *Mathematical Knowledge: Mathematical Knowledge of Japanese Chinese and American elementary School Children*. Reston, VA: National Council of Teachers of Mathematics.

Uttal, D., Lummis, M., & Stevenson, H. W. (1988). Low and High Mathematics Achievement in Japanese, Chinese, and American Elementary-School Children. *Developmental Psychology* 24, 335-342;

Wu, W. T. (1988 November). Current Trends in Gifted and Talented Education in Taiwan, R. O. C., Paper presented at the meetings of the National Association for Gifted Children, Orlando.

Wu, W. T. (1989). Gifted Education in Taiwan. *Educational Perspectives* 26,10-14.

Zhu, Y. (1991 April). The Special Department for the Gifted Young at the University of Science and Technology of China. Paper read at meetings of the Society for Research in Child Development, Seattle.

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[3] For ease of reading we will not indicate the results of statistical tests in this report; however, all of the differences we describe were statistically significant.

State Policy Issues in the Education of Gifted and Talented Students

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Federal, state, and local leadership and fiscal support are needed to improve the education of gifted and talented students in the United States. Federal and state leadership needs to provide rewards and sanctions that encourage districts and schools to create caring learning environments where successful interactions can occur between teachers and gifted students. Leadership will require that standards be developed to define desired outcomes for gifted students and programs and to ensure that diversity in student populations and abilities is addressed. Successful education reform initiatives will require the development of new systems for identifying and serving gifted students and for funding programs. Reform will require a reassessment of traditional state policies regarding gifted education and a partnership between gifted education and regular education. It is critical that policy makers, educators, and the public understand that services for gifted and talented children are a need of these students and should not be used as a reward for accomplishment.

Introduction

A little more than two decades ago, Senator Jacob K. Javits sponsored a bill requiring U.S. Commissioner of Education Sidney Marland to evaluate the status of the nation's gifted and talented children. The Commissioner was further directed to provide Congress with recommendations specifying how other federal educational assistance programs could be more effectively used to meet the needs of this population. The resulting report, *Education of the Gifted and Talented*, was widely acclaimed as a landmark document in the education of the gifted and talented. The document triggered the Special Projects Act of Public Law 93-380 and eventually led to the creation of the Office of Gifted and Talented within the U.S. Office of Education.

For the next ten years, limited funds were provided to state and local education agencies for program development. States used the modest incentive grants ($25,000 to $100,000) to create statewide awareness of the needs of the gifted and talented. Those seed monies, in turn, led to the allocation of state funds to support further programming. In numerous states, the initiation of the state leadership role began with funds from either the *Special Projects Act* or subsequent legislation, *The Gifted and Talented Children's Education Act of 1978*.

Substantial support for gifted and talented students education began with the states and was clearly triggered by federal leadership through the special incentive grant programs. Then in response to *The Education Consolidation and Improvement Act of 1981*, federal funds for the education of the gifted and talented were merged with the funds of 29 other programs, effectively ending federal leadership in the area. The states, however, continued to expand their programs and budgets for the gifted throughout the 1980s. The legacy of that early program leadership and fiscal support has continued into the present and been energized by the Jacob K. Javits Gifted and Tal-

ented Students Education Program established in 1988 under Public Law 100-297, the Elementary and Secondary Education Act. Through the national Javits Program, the Office of Educational Research and Improvement of the U.S. Department of Education is currently exploring issues for the next decade and the role of federal leadership in the education of gifted and talented children.

The purpose of this paper is to develop a clear perspective on state policies and policy making practices which may be of use in the creation of a new federal and state partnership in the provision of services for our nation's gifted and talented students.

Conceptual Approach to Mapping the Federal and State Role in Educating Gifted and Talented Students

In order to discuss the ideal parameters of a federal-state partnership for gifted and talented students, we must first determine the desired outcomes for such a partnership. Clearly, the overall goal for the partnership would be to improve the education of gifted and talented students, a goal which the federal and state players cannot, on their own, achieve. For all the power of policy and funding, The U.S. Congress, the U.S. Department of Education, state legislatures, state boards of education, and state education agencies cannot directly improve the education of a single student. Federal and state policy leaders can, however, strengthen the capacity of districts and schools to create a caring, learning environment where successful interactions can occur between teachers and gifted students. Federal and state leaders can create rewards and sanctions that strongly urge districts and schools to provide such an environment. Those incentives can raise the awareness of the general public and of local decision-makers to extend support beyond the limited coercion of federal and state policies. But the most important actors in meeting the needs of gifted and talented children are individual teachers and students.

To achieve the outcomes we desire for gifted and talented students, we must focus on what we would like to see happen at the student level, then determine what has to happen at each successive level above the student level so that students achieve the desired outcomes. This approach, called backward mapping by Richard Elmore, differs from the usual policy analysis which focuses on outlining ideal policies to be issued from the top of the pyramid, with the assumption that regulation and compliance- monitoring will ensure implementation throughout the system. Under a backward-mapping approach, education leaders should concern themselves with the following questions:

- What would we like for gifted and talented students to know and be able to do?
- What has to happen in the classroom and in communities to help students achieve our desired outcomes?
- What can the local school system do to increase the likelihood that classrooms and the community do what is needed to help students achieve our desired outcomes?
- What can the state legislature, the state board of education, and the state education agency do to increase the likelihood that local schools systems do the things that will, in turn, help classrooms and communities?
- What can the U.S. Congress and the U.S. Department of Education do to help states and local school systems successfully increase the capacity of classrooms and communities to help students achieve our desired outcomes?

The Goal for the Partnership: Supporting Schools Which Address Diversity in Ability

The principles of backward mapping can be useful in determining the ideal parameters of a new federal-state partnership for gifted and talented students. We should begin with the first step of the process defining the desired outcomes for gifted

and talented students. These outcomes must be flexible for the vast span of ability represented in the population of the gifted and talented. Yet, in spite of the variance, we need some common idea of what gifted and talented students should know and be able to do. At this time, the parameters of a federal-state partnership will have to be based on an backward mapping which starts with what we think needs to happen one step up in the system in classrooms and communities. Given what we know about gifted and talented students, we can sketch some outline of a vision of a school and community environment in which the needs of the gifted and talented students can be met.

In the schools we seek, all children, from the less able to the most highly able, experience challenging work which engages and instructs so that children learn to use their minds well. All children, from the less able to the most highly able, move along at their own pace. Each feels that the adults around them expect success and will watch them closely to ensure success. A rich curriculum provides a center for, not the boundaries of, instruction. Teachers assume that adaptations and extensions will be needed for all children, based on their learning style, rate, and level. Teachers have the capability and resources to provide these adaptations and extensions.

In the schools we seek, children whose learning abilities are markedly different receive the special attention of all educators, and are not the sole responsibility of special educators. Teachers and administrators with special expertise assist their colleagues in meeting the needs of diverse students. The classroom organization and instructional strategies are designed for diversity. When the diversity is extreme, the school faculty, with advice from specialists, are inventive with arrangements and programs which match community and school resources with unique strengths and needs. All of the faculty who work with any exceptional student can articulate that student's unique strengths and needs, and they can also describe how they are adapting and extending the curriculum based on those strengths and needs.

In the schools we seek, highly able students and less able students do not compete for resources. Achieving success for all students is not equated with achieving the same results. Faculty and administrators understand that the differences in abilities among students varies widely. They work to bring the community into the education of all children, but a special effort is made to draw the community toward children whose differences in ability require additional resources and support. Thus, the community sees education of the most and least able as a challenge to be met, not as a problem which syphons off resources.

All children need instruction which stretches their abilities, but those in the upper quartile in any ability area must be challenged to go well beyond age level norms. Gifted students (upper 5 percent) will differ in abilities from the typical upper quartile student. The top .05 percent, or the highly gifted, are different from the typical gifted student. In the schools we seek, there is a continuum of instructional adaptations and extensions because the faculty acknowledge that intensity of need increases as student's abilities hit at higher points on the continuum. In short, the school stretches to meet the highly able at their level. It does not pull them back to a preset level based on age or normative standards.

In the schools we seek, unusual intellectual abilities are not seen by students or teachers as being an embarrassment or a liability. By developing the potential of the most able, the school encourages all students to recognize the value of achievement. By celebrating the intellectual accomplishments of all, including the highly able, the school models its rhetoric of academic excellence.

There are elements of the schools we seek in schools that exist today. Schools reaching for the goals of the restructuring movement are providing a glimpse of what schools can become. For the first time in decades, we can hope to create schools which will truly address the full range of students' abilities without a dizzying array of segregated,

special services. The opportunity exists but the reality eludes us yet. Thus the goal of the federal-state partnership for the gifted and talented must be to shape fundamental reforms at all levels of the system.

Shaping the Reform Agenda in Education

In September 1990, the Office of Educational Research and Improvement sponsored a conference for state directors of programs for the gifted. At the two-day meeting, state directors examined the major education reforms being discussed at the local, state and national level. These reforms tend to cluster into three areas: curriculum and instruction, assessment, and governance. The actions being taken under the three major areas were organized according to reform principles generally cited by policy makers and educators as a rationale for their reform actions. The action areas then formed the basis for discussion among the state directors who were encouraged to articulate the implications of the form actions for high ability students; ways the reform actions at the local level can be shaped to ensure that the needs of high-ability students are met; state leadership initiatives needed to help local districts; and OERI leadership needed to help states. The following sections outline the potential impact of reform actions on high ability students and the challenges for educators.

Area 1: Reforms Focusing on Curriculum and Instruction

Reform Principle A: The goal of schools is to help students to use their minds well—to master in-depth subject matter versus acquiring discrete bits of knowledge.

Examples of Actions Being Taken:

- Reducing the emphasis on sports.
- Requiring students to meet academic standards to participate in extracurricular activities.
- Creating curricular frameworks that go beyond basic skills for all students.
- Increasing the emphasis on the importance of developing higher order thinking skills in all students.
- Expanding interdisciplinary instruction.
- Shifting the nature and content of student assessment measures.

Potential Impact on Gifted and Talented Students

Positive Impact. Teaching higher order thinking skills as part of all subjects will make general education more appropriate for gifted and talented students. When all parts of the curriculum and instruction provide mind-stretching work for all students, the discrepancy between what gifted students need and the general program will be reduced. Since most gifted and talented programs provide special instruction only a fraction of the school week, it is essential that general curriculum and instruction be more engaging to the high-ability learner.

Another benefit of the emphasis on higher order thinking skills and inter-disciplinary instruction will be the additional research and teaching materials produced. This will improve the resources educators have for adapting the curriculum and instruction for gifted and talented students.

Negative Impact. For many years, advocates for the gifted and talented were able to push for special programs that would offer higher order thinking skills because such skills were not systematically developed in the regular classroom. As general education shifts its goals from basic skills to developing the thinking abilities of all students, the rationale for gifted and talented education programs will have to change. This will create an "identity crisis" for some gifted programs.

Gifted and talented students may also be hurt if educators falsely assume that providing some at-

tention to higher order thinking skills in all subjects will "take care" of the special needs of gifted students. Given our history for seeking simple solutions to complex problems, one can easily envision some possible negative consequences for the gifted in the current attempts to develop thinking skills through the regular curriculum. Textbook publishers, anxious to meet state curricular standards for thinking skills, have added new questions to the unit quizzes and labeled the questions, "Thinking Skills." Educators who believe that students can develop their thinking abilities by answering some additional textbook questions may also believe that gifted students will no longer need special programs if thinking skills are addressed by the textbooks.

Challenges. Educators, both in general education and in gifted and talented education, need to ensure that curricular frameworks being developed facilitate greater depth and breadth of study for the gifted learner. Many educators of the gifted and talented have extensive experience in instructional techniques that help students learn to use their minds well. General education should tap the talent that exists among specialists in gifted education to help all teachers develop or improve their capabilities to develop students' higher order thinking skills. General education will also benefit from the lessons learned in gifted education regarding effective and ineffective ways to help students develop critical and creative thinking abilities.

In restructuring the traditional curriculum, general educators and gifted and talented educators must take care not to devise another rigid system. Policies which detail competencies to be acquired by certain age levels are almost always implemented too literally and in a highly fragmented fashion. Higher order thinking skills should not be considered a subject. Learning to use one's mind well is not accomplished through the completion of a sequential checklist of competencies. Our current "inch deep and mile wide curriculum of factlets" does not serve any student well. Gifted and talented students, particularly with their exceptional learning abilities, must have the opportunity for continuous progress through rich curriculum which stresses connections and applications.

Reform Principle B: Students should be the workers in a school; teachers should be coaches who provoke students to learn how to learn.

Examples of Actions Being Taken

- Emphasizing student centered instructional techniques.
- Encouraging cooperative learning groups.
- Emphasizing more sophisticated questioning techniques for teachers.

Potential Impact on Gifted and Talented Students

Positive Impact. Changing the role of students in schools from being seen as "products" to becoming the workers should lead to education which helps all children stretch their abilities. A challenging learning environment will provide opportunities for potential ability to emerge and demonstrated achievement to shine. Gifted and talented students will not have to hold back or hide their intellectual interests, because the norm of the schools will encourage achievement. As with higher order thinking skills, specialists in gifted and talented education have experience in student-centered instructional techniques, including posing questions. Their expertise should be tapped by general educators to help spread the use of these techniques for all students.

Many gifted and talented students prefer learning through inquiry and other approaches which capitalize on their proclivity for independence. Use of student-centered instruction and sophisticated questioning will make the general education program more appropriate for the gifted and talented.

Negative Impact. Gifted education was created and expanded because of the inability of general education to adapt its curriculum and instruction for students in the upper ends of the learning curve.

Once general education perceives it is doing a reasonable job in teaching higher order thinking skills and in fostering independent study among all students, they are likely to question the need for gifted programs and will want the special funds for the programs to be "returned" to general education.

Educators of the gifted may not be ready to defend the need for special programs as shifts occur in general education. Too many gifted programs have been sold as providing "special subjects" not covered in the general curriculum. The rationale for gifted education programs must be that exceptional ability requires extensions and adaptations of the usual curriculum and instruction based on the needs of individual students.

Not all teachers have sufficient knowledge, skills or abilities to effectively structure cooperative learning situations. Cooperative learning strategies in the hands of an unskilled teacher can be highly detrimental to gifted and talented students. At best, their pace and level of work can be inappropriately restricted. The potential for exploitation of the most able student exists when they are placed in poorly structured cooperative task groups. They may either insist on or be pressured into doing all the work of the group. They may be drafted into serving as "assistant teachers" for their classmates. Highly able students should be workers, but not the only workers among a group of students.

Challenges. As all teachers are trained in more effective instructional strategies, they will need to develop a greater understanding of the needs of gifted and talented students and a commitment to addressing those needs. They cannot assume that new instructional strategies will automatically "take care of" gifted students.

Reform Principle C: Schools should be structured to create a caring learning environment that focuses on attaining the curricular goal of helping all students to use their minds well. Instruction should be personalized to meet the needs of every group of students and paced according to individual student needs.

Examples of Actions Being Taken:

- Increasing support for the "Middle Schools Movement."
- Organizing ungraded primary schools.
- Reorganizing school structures to create "houses", "families", "wings" or similar clusters of students and teachers.
- Expanding "individualized education plans" to more students.

Potential Impact on Gifted and Talented Students

Positive Impact. Individualizing instruction will be highly beneficial to students with exceptional abilities, such as the gifted and talented. Once general education completely shifts from the current assembly-line model to an individualized, student-centered approach, the diverse needs of children will be addressed in all classrooms. Then gifted and talented education programs will be able to shift to a support role for general educators, with direct student services reserved for special cases.

Gifted and talented students have experienced alienation in schools. They will benefit from schools committed to being caring, learning environments for all students, including the exceptional.

Negative Impact. Individualized instruction is an ideal which is often discussed and infrequently practiced. The education system may not have the financial commitment to translate their rhetoric for individualized instruction into the time and training required. Most teachers will need training in student assessment and in utilizing an eclectic mix of instructional strategies. Individualized versus large group instruction will also require a reduced ratio of students to teachers and more planning time.

As with other reforms outlined above, there is a danger that schools will make some adjustments in the general education program and prematurely determine that they no longer need gifted and

talented programs. Or, general education may decide that the funds used for gifted and talented programs would be better spent trying to individualize instruction for all students, so that they will no longer need special gifted programs.

Creating caring, learning environments for all students means that the school must care about the bright students, as well as the slower students. Ingrained, dysfunctional school norms which promote anti-intellectualism and pressure students toward uniformity must be reversed. Restructuring schools to create close-knit communities, without making deliberate changes in school norms will only strengthen the effects of those norms on students. If this concern is not addressed, creating "nurturing" groups within schools will not meet the needs of the gifted. If those new groups are seen as replacements for programs which bring gifted students together for part of their school week, then gifted students will lose one of the few opportunities they have to spend time with people who accept their differences.

Challenges. Policymakers and educators have demonstrated narrow-minded thinking for decades. The "idea of the month" mentality, coupled with a strong tendency toward over-reaction, has created an endless series of discrete programs touted as systemic change. An educational system that works for all students will have to cease its tradition of trading-off resources where the needs of one group of students, high or low ability, are met at the expense of other students.

Parents and educators of gifted and talented children will have to change advocacy strategies. Their focus should remain on the gifted child, but their vision for what must change should be on all aspects of the gifted child's education. They must promote systemic changes in schools that will ensure that the needs of all students are met, including the extraordinarily gifted, the gifted, and the highly able.

Reform Principle D: All students, including those from racial, ethnic or socio-economic groups which have traditionally been less successful in schools, can and will learn to use their minds well.

Examples of Actions Being Taken:

- Grouping students with heterogeneous abilities.
- Questioning "general education" track in high school and the quality of academic instruction in vocational education programs.
- Recruiting minority teachers.
- Using newer technologies, video discs and microcomputers, to provide the stimulation, patience and persistence needed to help learning-impaired and at-risk students, as well as to provide opportunities for "self-paced learning" needed by other students.

Potential Impact on Gifted and Talented Students

Positive Impact. Gifted and talented students are also trapped in tracking systems. Teacher nominations and grades, two frequently utilized sources of information for identification techniques, yield both false "positives" and false "negatives". "Good students" who are not exceptionally able may be placed inappropriately in gifted programs. They find the pacing and level of work frustrating but may feel like failures if they are moved out of the program. Potentially gifted students missed in the identification process at one grade level may be permanently deemed to be "not gifted."

High ability and low ability students will benefit from the elimination of tracking whereby the learning capacity of children is appraised early in their school career and where then the results of that one-time appraisal guides instructional decisions for years. Greater flexibility for moving students in and out of gifted education programs will enable educators to focus their resources on services to students. Some districts expend the same, or more, resources to ensure that the right

students are selected as they do in providing special programs for the selected students.

Once the gifted label is not permanently affixed to students, educators will need to spend less time and energy on identification processes. Students' needs for some special assistance can be continuously appraised and services provided when they are needed, for as long as they are needed.

Negative Impact. Some schools have confused tracking and ability grouping and have eliminated any instructional grouping that places "like ability" students together. The misguided belief that heterogeneous grouping is best for all students has led some schools to eliminate a variety of advanced learning opportunities for more able students, including gifted programs. Other schools have decided that any adaptation for exceptional learners must take place in the regular classroom, but many have failed to provide teachers with the training, student load, or time they need to meet special learning needs.

Research has documented the benefits of grouping gifted students for instruction. The research findings on the negative effects of grouping low ability students should not be allowed to cancel out the positive effects of grouping gifted students.

Challenges. The same challenge in shaping the reforms outlined above exist for reforms that attempt to provide a challenging education for all students. The complexity and diversity of student needs must be understood by all educators. We cannot ignore one group, such as the gifted and talented, just because we have decided to turn our attention to another group. When policymakers and educators set a goal that all students will be successful, they must stick to their commitment to all students.

Reform Principle E: The key to a successful education system is talented personnel who have the knowledge, skills, and time to create and sustain effective schools.

Examples of Actions Being Taken:

- Focusing on improving the quality of persons entering the profession by higher admission standards and/or tests to enter professional preparation programs; additional courses required in professional programs; tests to receive initial certification; beginning teacher support programs; beginning teacher evaluation; and higher starting salaries.
- Creating "Alternative Routes" to certification to get competent individuals into education without having to complete the usual professional preparation programs or fulfill all of the state standards for professional certification.
- Increasing incentives for teachers to achieve "mastery" status as professionals by setting standards for mastery (National Board for Professional Teacher Standards); creating different roles for master teachers (mentor teachers, career ladders); providing additional pay for achieving mastery; and increasing the quality of professional development opportunities.
- Increasing the number of contract days for teachers without increasing required contact days with students so teachers have more days for planning and professional development activities.
- Increasing the opportunities for teachers to learn from and support each other as professional colleagues through team-teaching, collegial coaching, and collegial decision-making groups within schools.
- Expanding the focus on qualifications of teachers "up the hierarchy" to others such as principals, superintendents, and staff in state education agencies.

Potential Impact on Gifted and Talented Students

Positive Impact. Increasing the salaries, along with more rigorous standards for entry into the

profession, will raise the caliber of persons choosing teaching for a career. Alternative routes for earning a teacher certificate will enable talented persons to shift from other careers into teaching. Professional training opportunities which develop the skills of practicing teachers from the novice level through the proficient level will improve the quality of teaching. Gifted and talented students, like all other students, will greatly benefit from all of these efforts to improve teaching.

The movement away from the "egg crate" school where teachers were isolated in their classrooms will also benefit gifted students. As collegial sharing becomes the norm, gifted education specialists will find it easier to help general educators adapt and extend their instructional techniques to better serve the gifted. Similarly, general educators will be able to work with gifted education specialists in designing special services which are integrated with instruction in the regular classroom. Collegial sharing will also facilitate instructional planning across grades and subjects, so that the long-sought, "comprehensive, articulated services" could become a reality.

Negative Impact. Although certification and evaluation standards for teachers have been raised, there is no indication that the standards are designed to assess the knowledge, skills, and abilities needed by teachers to implement curriculum and instruction reforms aimed at developing the capacity of children to learn to use their minds well. Educators may talk about the need to focus on outcomes, but they still confuse means with ends. More preservice courses, entry tests, and observational evaluations of teachers will not ensure that teachers have the capabilities to assess student needs, learning styles, and levels, and to adapt the curriculum and their instructional techniques to ensure that all students are successful. Quality of teaching is the goal. Stricter certification requirements are just one of several strategies for achieving that goal.

The misplaced emphasis on raising certification requirements has also affected gifted education. The increased courses required for certification as a gifted education specialist may improve the knowledge of those earning the certificate, but it perpetuates the fragmentation that exists in education. Teachers see students as "your kids" and "my kids" and feel that "I'm not trained to do anything for those kids." The resulting problem is that no one is fully responsible for gifted students. Specialists are supposed to have the training to meet the needs of gifted students, but they only see the students for a few hours a week. Regular classroom teachers teach some or all of the basic subjects to their gifted students but are not expected to adapt fully or to extend the curriculum and instruction because they have not received special training.

Challenges. For at least fifteen years, leaders in gifted education have talked about the importance of training regular classroom teachers to help meet the special needs of gifted students. But the increased resources available for gifted education programs seems to have been expended primarily to train and hire more gifted education specialists. There is a growing movement to restructure education and pull the fragmented pieces back together into new paradigm of schooling. Leaders in gifted education need to advocate the shifting of some of the gifted education resources to the linking of general educators with specialists. These leaders also should strive to shape the new standards being set for general educators, especially the emerging indicators of proficient or expert teaching, to ensure that the definitions of mastery include ability to adapt instruction for the most able students.

Area 2: Reforms Focusing on Accountability

Reform Principle A: Policymakers, educators, parents and the public need to know how well schools are providing quality education to all their students and producing desired student outcomes.

Examples of Actions Being Taken:

- Shifting to alternative forms of assessments, away from using paper and pencil and multiple-choice tests as the predominant way of evaluating student achievement.
- Shifting to performance assessments from norm- referenced assessments.
- Shifting to a broader group of indicators, away from using student achievement test results as the predominant measure of the performance of the education system.
- Increasing the reporting of performance of students, schools, and districts to policymakers, parents, and the public through such mechanisms as School and District "Profiles" or "Report Cards," and annual state reports on education given to legislatures.

Potential Impact on Gifted and Talented Students

Positive Impact. Changes in student assessment provide a powerful lever to get schools to value and teach complex skills. The dethroning of norm-referenced, standardized tests as the measure of student achievement is likely to have a highly positive impact on gifted and talented students. Richer measures of complex cognitive abilities will be better for finding and gauging progress in gifted students. The shift in assessment will also trigger systemic change in curriculum and instruction throughout the general education program.

The emphasis on public reporting of student assessment information should help improve public awareness of and involvement in schools. In some districts, current "school profiles" or "report cards" are seen as public relations tools, and any information related to school problems or shortcomings is omitted. Hopefully, schools will begin to utilize their public reports as a tool to educate the public on the inadequacy of the current educational system, and the need for major changes to adapt to changes in our nation's work force and population. Public reports on schools should also move away from the numerical indicators which focus on describing the "average performer." The public needs to understand the diversity of student needs and learning styles and levels, while being convinced that success for all is in their best interest. If school profiles or report cards are used as tools to educate and not placate the public, then advocates for the gifted and talented will benefit. Public understanding of the diverse needs of students should engender a mood of support for the gifted and talented.

Negative Impact. Alternative assessment must remain fundamentally distinct from traditional assessment methods. The potential exists for any type of assessment to degenerate into norm-referenced, numerically-reported measures which do not serve students or educators well. For example, student portfolios permit a highly individualized evaluation with an "unlimited ceiling" in assessing student performance, which would make them ideal for gifted and talented students. Pioneer schools in alternative student assessment report that the greatest value of some of the new approaches is not the outcome, but the process itself. For example the process of a teacher and student selecting which pieces will be placed in a portfolio provide an rare opportunity for student self-evaluation and individualized teacher feedback. This type of activity would be very good for gifted students.

However, if portfolios are judged according to narrowly-focused criteria and the judgement reduced to whether or not a pre-set standard has been met, then the unique strengths of portfolios as an alternative assessment method will be lost. Then portfolios will offer only an illusion of true performance assessment. The exceptional work of a gifted student could go unnoticed because of a limited rating scale. Underachievement of some gifted students could be obscured by their portfolios. Their work could appear to a judge to be good compared to age peers although it would still be significantly below the capability of the students.

Challenges. Gifted and talented education leaders would be wise to invest heavily in influencing the development of alternative assessment methods. This reform area is still in the very early phases of development, but the potential for major changes is great for two reasons. First, policymakers are beginning to be very interested in alternative assessment. Second, using more complex and authentic measures of student performance will undoubtedly trigger a series of events that will ultimately transform schooling. Being present as the measures are developed and policies deliberated will enable gifted and talented educators to ensure that alternative assessment will also serve the needs of the most able students. This golden opportunity to bring gifted and talented students into the conscience of the entire education system should not be ignored.

Reform Principle B: The purpose of assessment should be to help improve education.

Examples of Actions Being Taken:

- Changing student assessment measures to reflect growing community support for student mastery of complex skills and knowledge.
- Increasing acceptance of teacher assessment and school- site assessment as valid approaches to measuring student progress.
- Collecting and analyzing data by school site so that the data can inform school improvement efforts.
- Utilizing assessment data to reward high-performing schools or districts in order to create incentives for others to improve.
- Utilizing assessment data to target additional assistance and resources to low-performing schools or districts.
- Utilizing assessment data to apply sanctions to low performing schools or districts in order to create disincentives for low performance.

Potential Impact on Gifted and Talented Students

Positive Impact. Developing the capacity of teachers and schools to assess the abilities (particularly the complex cognitive skills) of their students will be very beneficial to gifted students. As teachers gain experience in assessing complex skills, they will have a valuable tool to use in evaluating the effects of their teaching on students and in helping students evaluate their own performance.

If the criteria used to judge high-performing and low-performing schools includes appropriate indicators on the performance of gifted and talented students, then gifted education specialists may finally have their long-sought, magic wand that can impel all schools to address the needs of their most able students. The technical assistance and support given to low-performing schools should also benefit gifted and talented students trapped in ineffective schools.

Negative Impact. The accelerating interest in assessment and evaluation presents a major problem for gifted and talented education. Decisionmakers are posing tough questions and they want to see tangible results for their investment. Under the current system, the accepted measures of effectiveness have to do with effort expended and process completed.

Gifted education can satisfactorily answer traditional evaluation questions by citing increases in the number of students served, the number of districts or schools providing gifted programs, and other input indicators. As the evaluation system shifts to outcomes, gifted educators will have to be able to talk about progress in reaching desired learner outcomes. However, policymakers and educator have not yet defined desired outcomes for gifted and talented students.

If states are serious about moving into a phase of developing district capacity to meet desired outcomes, major resources will have to be invested

in helping low-performing districts or schools. Given the economic projections for revenues, increased expenditures in one area will have to be compensated for by decreased expenditures in others. Categorical programs are likely to be prime targets for expenditure reductions by legislatures and school boards.

Challenges. At present, the unstated goals of many gifted programs are to compensate for the inadequacies of general education. Others would infer that the goal of gifted programs is to produce world-class scholars. Leaders in the education of gifted and talented students must begin the process of determining a common vision of desired student outcomes.

Many will argue that common goals for gifted students are not possible given the diversity of needs and abilities within the population considered to be gifted and talented. Early efforts in the goal-setting and tracking process will probably seem inappropriate or even misguided. But goals are needed to build a constructive rationale and framework for programs.

Once some consensus is reached about expected results from gifted and talented education programs, whether provided in the regular classroom or in special settings, then educators will need to develop measures and to start tracking progress in reaching goals.

Area 3: Reforms Focusing on Governance

Reform Principle A: Parents should be partners in the education of their children.

Examples of Actions Being Taken:

- Creating and supporting parent education programs.
- Empowering parents to be decisionmakers for schools (e.g. the Chicago School Committees)
- Empowering parents to choose the schools their child will attend (Milwaukee Vouchers and other "Choice" programs).

Potential Impact on Gifted and Talented Students

Positive Impact. Gifted and talented education programs may become more popular as districts and states adopt choice plans. It is easy to envision schools creating or expanding special options for high ability students, as well as for the gifted and talented, to entice parents to choose their school. Gifted children can be taxing on their parents, as well on their teachers. Programs designed to educate and support parents will be very useful to parents of the gifted.

Parents of gifted and talented students are generally among the more active and vocal parents in a school. As parents are given a greater advisory or decision making roles in schools, the parents of the gifted may be in a better position to become strong advocates for the most able students.

Negative Impact. The elitist image of gifted education may create problems if parents brought into the advisory and decision making circles do not understand the rationale for gifted programs. All parents want their children to have a rich and challenging education that develops each child's unique abilities. They may find it difficult to support giving an ideal education to a select few, particularly if their child is not selected.

Challenges. Educators and parents of the gifted can make a unique contribution to parent education programs. Most teachers of the gifted have an extensive collection of enrichment ideas, or a "bag of tricks" as some call them. Many of these ideas can be adapted to create home projects for parents and children to work on together.

As schools strive to bring parents into the advisory and decision-making circles, they should ensure that those parents understand the diverse needs of students. Parents, like policymakers, tend to draw from their own experiences when

making judgments about best educational practices. Educators have a responsibility to make sure that parents can truly be partners by giving them the knowledge they need to make informed decisions.

Reform Principle B: Decisions regarding the desired outcomes of the education system should be made at the state level, but decisions as to how to achieve those goals should be made by those closest to the students.

Examples of Actions Being Taken:

- Shifting to site-based management for certain types of decisions.
- Increasing involvement of teachers in decision-making at the school level.
- Questioning the effectiveness of state and local governance structures.
- Restructuring state education agencies.

Potential Impact on Gifted and Talented Students

Positive Impact. If site-based management and the involvement of teachers in making decisions is successful, then the staffs of schools will feel responsible for the success of all their students. If school personnel within those schools have the commitment and abilities to address the needs of gifted and talented students, then one can envision that their decisions would keep the best interest of those students in mind.

Negative Impact. Many gifted and talented programs have been district-operated with minimal involvement of school administrators or faculty. District staff make final decisions regarding which children are to be placed in special gifted programs. Frequently itinerant teachers come to the school to provide the program. Occasionally the students are moved to another site to receive services. Any district gifted program which bypasses schools should realize that this approach can be perceived by the schools as absolving them of any responsibility for meeting the needs of their gifted students. Such programs will be vulnerable if decision-making is abruptly shifted to the sites.

Challenges. The boundaries which separate gifted education from general education in many schools must become less rigid. The sense of responsibility for the success of gifted students must be shared. Based on the experiences in some schools which have shifted to site-based management, gifted pull-out programs which operate in isolation from the general program will not survive. Gifted educators must work with the rest of the school's staff to determine the best options for meeting the needs of gifted students. Linking regular and gifted education was seen as a desired action in the past; such a linkage will be critical in the future.

Reform Principle C: States must insure that students in all regions of the state and in all schools receive the education guaranteed by the state constitution regardless of local fiscal resources.

Examples of Actions Being Taken:

- Increasing state control of fiscal resources for education.
- Changing school finance formulas to shift revenue bases and expenditures to achieve "standard" education for all students.

Potential Impact on Gifted and Talented Students

Positive Impact. Resource-poor districts will receive more funds once states shift funding systems to reduce the discrepancy in funding among districts. This should benefit gifted and talented students in the poorer districts, as the increase in funds may be used to purchase special programs.

Negative Impact. Many states are moving toward a set of standards that they guarantee will be

provided to all students. State finance formulas are being revised to provide a guaranteed level of funding to the districts so that they can meet the standards. The most recent court cases and state formulas are moving in the direction of the "Robin Hood" principle whereby rich districts must give their money to poor districts so that their per pupil expenditures are roughly equal.

States must define their standards to include special adaptations and extensions for the gifted and talented, or else those services will not be supported through the formulas. Furthermore, districts which formerly had the local resources to provide gifted programs, even though such programs were not required by the state, may be forced to turn their local revenues back to the state as part of funding-equalization.

Challenges. Educators of the gifted and talented in the more affluent districts must recognize the changes pushing their way through state finance formulas. It is essential that they improve advocacy efforts on behalf of gifted and talented students with state legislatures and state boards of education so that state standards require schools to address the needs of the gifted.

Traditional State Policy Issues

State policy issues in educating the gifted and talented have centered on administrative arrangements for the program, state definitions of the population, program requirements, and state finance of local programs. A brief analysis of the approaches taken by the state to these traditional issues are outlined in this section.

Issue 1: Should Gifted and Talented Education Policies Be Linked With Special Education Policies?

Education of gifted and talented children does not fit neatly into existing program categories. Many states feel that it belongs in special education. Approximately 13 states follow the same policies and procedures for the gifted as are required for the handicapped students in the state. At least 20 state education agencies place their specialists or directors of gifted programs in the special education unit. Other states believe that gifted education belongs in general curriculum or elsewhere in school improvement programs.

The advantages and disadvantages of placing gifted and talented children, along with handicapped children, under an umbrella of exceptional child education are as follows:

Advantage #1: There is consistency in program philosophy.

Gifted and talented children, like the handicapped, are a unique population who differ significantly from average children. Their needs have not been as widely recognized as those of the handicapped, but they are just as "exceptional." Thus, the principles of special education for the handicapped also apply to the gifted: highly individualized instruction and a curriculum that is adapted and extended to meet unique needs.

Advantage #2: Existing systems for delivering programs can serve both groups.

Because the precepts for services to the handicapped and gifted are the same, a single administrative structure can be used for both. This can lead to more effective use of administrative and support personnel, including school psychologists.

Advantage #3: The funding mechanisms will work well for both types of programs.

A single system for funding serves two purposes: It simplifies the state's education budget and appropriation process for gifted students, since the same type of mechanism, even if the rate or weight varies, is used for all exceptional students. In addition, it provides a reliable stream of funding

to local districts. This enables districts to invest in developing a comprehensive program for the gifted because the state commitment appears to be more stable.

Disadvantage #1: Gifted programs may have to take a back seat to handicapped programs.

Due to the federal and state requirements for services to the handicapped, state and local education agencies are frequently too busy administering programs for the handicapped to pay adequate attention to gifted education. When gifted and handicapped students have to compete for limited resources, both human and fiscal, the handicapped are more likely to get a greater share of resources.

Disadvantage #2: Many educators of the handicapped resist the notion of including the gifted in special education.

Educators, parents, and other concerned citizens fought long and hard to get free and appropriate education for all handicapped children. Many feel that there are less than adequate resources to provide quality services for the handicapped. Thus, they are very nervous about having those limited resources stretched to reach children they feel do not need special help. Also, educators and parents of the gifted and talented are not always enthusiastic about including their children in special education. They often feel that gifted and talented programs will always play "second fiddle" to services for the handicapped.

Issue 2: How Should the State Define and Demarcate the Gifted and Talented Population?

Unfortunately, there is no clear sorting point between students whom everyone would consider gifted and talented and those whom everyone would consider just "above average." Children's abilities are difficult to assess accurately, subject to spurts and lags in terms of development, and range along a continuum. A state's definition draws the line between children who will be called gifted and talented and those who will not. Those included in the defined group will receive the extra funding and programs required by state standards. The others are likely to be denied the special assistance, even if individuals in the excluded group would clearly benefit from inclusion. The defining line is arbitrary and should be recognized as such.

States have wrestled with three issues in defining the gifted and talented population:

1. Narrow or Broad Definition

The majority of states have adopted some version of the broad definition of giftedness offered by U.S. Commissioner of Education Sidney Marland in his Report to Congress in 1972. This definition recognized potential as well as demonstrated ability in six areas: general intellectual ability, specific academic aptitude, creative or productive thinking, visual and performing arts, leadership ability, and psychomotor abilities. Other states limited their definition to include only students with either exceptional intellectual abilities, academic abilities, or both.

The advantages of the narrow definition are as follows:

- A narrow definition will focus the available resources of the state on abilities traditionally accepted as being "school" concerns—intellectual and academic development.
- The percentage of the school population that is selected under a narrow definition is smaller, making it possible to operate quality gifted programs with less funds.
- Intellectual and academic abilities can be measured on regularly administered standardized tests, and educators feel more secure when they can use test scores to make and justify difficult placement decisions.

The broader definition also has several advantages:

- A broader definition conveys the state's intent to recognize and develop such important abilities as leadership, creativity, and artistic expression.
- Gifted children who come from culturally diverse groups may not channel their talents into the traditional academic areas. A broader definition encourages educators to see the variety of ways children can express their outstanding potential.
- A broader definition provides more flexibility to a local district in establishing gifted programs that meet its interests and needs.

2. Percentage of the Population To Be Served

States usually feel that they have to limit the population that will be eligible for services through gifted and talented programs. Policymakers know that there are limited funds, and that only a small percentage of students have abilities so exceptional that they need services beyond those provided in the regular education system.

A few states use scores from either intelligence or achievement tests to set the cut-off. Most states set a limit by stipulating a percentage of a school district's enrollment that can be included in state-funded programs. Using percentage limitations is generally preferable to letting a specific test score draw the line between gifted children and "others," because the percentage approach gives more flexibility to schools in finding gifted and talented students who might otherwise be missed by standardized tests. The percentage limitations also work best for state budget and appropriation decisions, as it provides a more predictable figure of the numbers of students eligible for special state funding.

3. Local Or National Standards For Comparison

State definitions may or may not set the standard for comparison of gifted students to local or national norms. Many directly or indirectly encourage districts to define the gifted in terms of national standards. Thus, to be identified as gifted in a district, students must have scores that place them in the top national percentages.

In many districts, the distribution of scores on ability and achievement tests will reflect national averages. In some districts, particularly those with a higher percentage of poor students, scores may be below national averages. In other districts, students will achieve above national averages.

Policies which follow a national standard define giftedness as being in the uppermost range of scores on a standardized test, as reported by the publishers of the test. The chief advantage to using a national standard for defining giftedness is common acceptability. Most people are accustomed to defining the gifted either as those who have an IQ of 130 or above on a standardized intelligence test or those who score at or above the 98th percentile on a standardized achievement test.

The key advantage to setting policies which use local standards is flexibility. If the intelligence of the average student in a district is quite high, then the cut-off score on an intelligence test could be set even higher. If the district has a significant percentage of students who do poorly on standardized tests, then officials could set scores which help identify students who are exceptionally able given their peer group.

Using the local standard for comparison is defensible. Instruction in a regular classroom in any school across this country is generally geared for the average student in that group. The children who are significantly brighter or significantly slower are the exceptional learners, and they need special adaptations in the curriculum and instruction.

Issue 3: Should the State Mandate Services for the Gifted and Talented?

The majority of states have recognized that all districts should provide special services for the

gifted and talented and have mandated those services through state statutes or administrative code. If a state is truly committed to the success of all students, then the state should require schools and districts to address the needs of the gifted and talented. Those requirements can either be explicitly stated in law or regulations, or articulated through state standards for accreditation and approval of districts and schools.

Issue 4: How Can the State Provide Fiscal Incentives to Districts for Gifted and Talented Education Programs?

States which link gifted and talented education with special education tend to have a similar funding system for both groups. Those systems may generate funding based on special weights for exceptional students; level of services offered to "units" of children; reimbursement for a percentage of documented excess costs; or reimbursement for special education personnel.

States which separate gifted and talented education from education of handicapped students generally support special gifted programs through categorical funds. A number of states, however, have created special "funding weights" for gifted and talented students which flow to districts as part of the state general aid formula.

In states with categorical funding for gifted and talented education, the limited dollars are distributed to the districts through a number of approaches such as the following:

Competitive Grants

This approach has been commonly used by states as they initiated funding for the gifted and talented. Districts apply for grants and their applications are judged by a committee of qualified persons. Only the "best" grant applications (i.e., the best written, the most promising ideas, the agencies which propose the best approaches to addressing state priorities, etc.) are funded. Some states using this approach set a limit on the number of dollars any district can request so that more districts can be funded.

Predetermined Allocations

Some states set a dollar figure on the amount a district can receive for each identified gifted child—sometimes up to a specific limit-or for each program unit. Districts that wish to receive the allocation must apply to the state, which in turn grants them funding if state standards are met. If the state appropriation is not adequate to fund all district applications, awards are either decreased proportionally or else awarded on a competitive basis.

Important Considerations

In encouraging local districts to develop and expand programs for gifted and talented students, the stability of funding is at least as important as the amount of funding. Reliability of funding seems to be a particularly important variable if state funding is to be successful in stimulating local program development. If the state wants to communicate clearly its commitment to meeting the needs of gifted and talented children, then the state should provide stable financial support. District administrators have seen state and federal initiatives come and go. They watch any categorical program for signs of waning state interest. Districts will not invest their time and energy in creating quality programs if funds are going to disappear later. Funding should be balanced with state policies and appropriate services for gifted and talented education.

There are basically three ways that state policymakers can encourage local programs for gifted and talented students. They can adopt policies that encourage or require such programs. They can provide funding. They can provide services such as training and technical assistance.

The balancing of policies, funding, and services is crucial to systematic, statewide program growth. States have failed to create or sustain quality local programs for the gifted and talented

by having too much of one or two of the elements and not enough of the other. Examples of failed state leadership include states which have mandated, but not funded gifted programs; states which mandated and funded gifted programs but set requirements for the program that exceeded human resource capability (e.g., not enough psychologists to administer required test; not enough certified teachers); and states which failed to provide sufficient guidance on how to develop defensible programs. Funding should match the state's stage of development in terms of gifted and talented education.

Competitive grants are good to stimulate interest in the early phases of developing programs for gifted and talented children. Predetermined allocations work fine as long as the dollars available can grow with increases in numbers of students served and with improvement in quality of services. Ideally, all states should move beyond categorical funding to some type of formula funding or guaranteed reimbursement system. Imbedding additional dollars for gifted and talented education in general state aid or in special aid formulas signals the state's long-term commitment to supporting local services for the gifted and talented.

Policies either for program approval or school accreditation can ensure that districts which receive the additional dollars utilize them for gifted and talented programs.

State Policy Leadership for the 90s: Provoking the Transformation of Gifted and Talented Education

Gifted and talented education must change. State policies and actions can either encourage a transformation or continue traditional approaches which will become increasingly dysfunctional as reforms progress in regular education. A transformation in gifted and talented programs must occur in three critical areas: rationale, linkage with regular education, and addressing diversity among students.

Reconceptualizing the Rationale

Current programs for the gifted and talented are often defended with rhetoric about need but created with a philosophy of reward. Gifted and talented students do not deserve special services. Gifted and talented students have a marked difference in abilities which necessitates adaptations and extensions in the general education program. Many times these adaptations and extensions require alternative settings and specialized personnel. In short, when the differences in their learning rate and level exceed the resources of a regular classroom, gifted and talented children need special services.

Most program administrators are not aware of the pervasiveness of the overt and covert use of the reward rationale in gifted and talented education. But indicators of the reward rationale abound in programs. Outlined below are the differences in programs which have the need rationale as their philosophical base as opposed to the reward rationale.

Reward Rationale

Placement decisions are primarily based by the students attaining a set score on a norm-referenced, standardized test. There is one program. Students with the right score get to be in that program. The program has vague goals and objectives. The philosophy is that gifted students get to do whatever the teacher or students feel are suitable "gifted" activities. Students are not allowed to participate in the gifted program if their regular work is unacceptable, if they make bad grades, or if they misbehave. They must make-up any work they missed in their regular class.

Need Rationale

Placement decisions truly utilize and weigh a variety of data which compare the students to their peers in a particular school. Schools and districts examine the needs of students and strive to create a variety of arrangements, provisions, and formal

programs to address them. While individual differences and needs are addressed, the district has overall goals for educating its gifted students. These goals systematically guide teachers in planning learning experiences for their gifted students. When gifted and talented students are to receive instruction in special settings, the regular teacher understands how that instruction relates to the regular class work. Schools view slumping grades or misbehavior as possible indicators that the student needs more intensive help.

If programs are to address needs and not just reward accomplishment, then program leaders must invest more time in evaluating the effectiveness of their efforts. Evaluation requires knowing what you intended to accomplish in the first place. Thus an essential first step in ensuring a transformation of gifted and talented education is determining the desired outcomes for students. Programs are then centered around helping students achieve these outcomes through a curriculum and instructional strategies adapted and extended according to their strengths and needs. A continuous cycle of reflection, renewal, and revision ensures that every effort is made to match the program with the unique capabilities of gifted and talented students.

Linking With Regular Education

In reflecting on the development of the current education system, one could conclude that the first signs that restructuring needed to take place occurred decades ago when schools began to create a second system of special programs for the disadvantaged, handicapped, limited-English proficient, and the gifted and talented. In some districts, the profound structural inadequacies of the system are evidenced by the high percentage of students who must receive special services because their needs are not addressed by the primary system. When close to a majority of a district's students receive services through the second system, it is clear that the solution lies with changing the primary system, not with proliferating additional programs.

Most observers and leaders of the education system agree that fundamental changes, or restructuring, must take place. Schools must be designed to be caring, learning environments that help each and every child successfully accomplish the high goals we must set. As changes in the primary system occurs, proponents of second system programs must also change.

The inadequacies of most gifted and talented programs have been a source of concern to advocates for many years. We know that the 2 to 3 hours a week of "enrichment" which most special gifted education programs provide cannot begin to address fully the needs of gifted students. Such meager dosages of appropriate instruction are like insulin to the diabetic. The insulin does not cure the disease, it just keeps the person from going into a coma. Thus, advocates for gifted and talented education should welcome and support changes in the primary system of education. Existing models were just one type of means for meeting the educational needs of gifted and talented students. Now, educators of the gifted and talented should shift their commitment for discrete programs to commitment to ensuring that the goals of those programs are achieved.

State leadership is needed to encourage general educators to utilize the talents of specialists in creating classrooms that are capable of addressing diversity. Specialists in gifted education have often discussed the need to work with general educators. Creating a linkage with general education is no longer an ideal; it is an essential activity.

Creating a shared system of responsibility between specialists and general educators should become the goal of all state policies, funding mechanisms, training and technical assistance services, as well as of all administrative decisions. State education agencies should examine their organizational structures to see how they could model shared responsibility. State decision-makers should examine all aspects of statutory and regulatory requirements; funding mechanisms; application forms for grants; the questions asked by the state

as a part of local program approval; guidelines provided in resource documents; and various oral and written communications from agency staff. All of these state leadership tools should be designed to help, not hinder, local efforts to create the schools we seek for all students, including the gifted and talented.

Districts which operate gifted and talented programs from the central office so that they by-pass general educators and administrators should redesign their delivery systems. Schools which do not view education of the gifted and talented as a shared responsibility should bring the faculty together to find ways to cooperate. The state can encourage and support the districts and schools to transform their thinking about total system responses to the needs of gifted and talented children.

Addressing Diversity

State leadership tools must be used to push districts beyond the "one size fits all" gifted program. Flexibility in identification and services are essential because of uneven profiles of ability and non-traditional expression of ability. State standards must not encourage, directly or indirectly, narrow concepts of giftedness. If the state is concerned about funding and feels that narrow definitions and rigid identification are needed to create caps on expenditures, then they should think again.

States should, instead, talk about a "state share" of a comprehensive gifted education program and determine the state's contribution in terms of the percentage of students served or the percentage of expenditures on gifted programming. The same leadership tools that can build linkages between regular and special education can address statutory and regulatory requirements, funding mechanisms, application forms for grants, the questions asked by the state as a part of local program approval, guidelines provided in resource documents, and various oral and written communications from agency staff. State policies and practices should strongly encourage schools to seek exceptional potential among all populations and to recognize that the potential of diverse students may be exhibited in non-academic work.

A key lever in changing the education system's views on the value of diversity may well rest with identification requirements of gifted and talented programs. If grades, teacher approval, and standardized test scores are used to find the most able, then the message is that success in school is an end unto itself. Outstanding potential needs to be developed in students not to ensure a sufficient supply of valedictorians but because the fulfillment of that potential in adulthood is essential for our national survival.

A Checklist for States

States vary in capacity to lead a transformation of programs at the district and school level. Some states have a sufficient reform infrastructure in place to support the fundamental changes needed in gifted and talented education. States that are in earlier stages of reform should strive to bring gifted and talented education into their deliberations now so that changes in the primary system will also address needed changes in education of the most able.

Outlined below are some questions states can use as a framework for their own aetions in guiding the transformation.

- Are we ready to provide state leadership in transforming gifted and talented education?
- Have we educated ourselves about the issues in school reform across the nation and in our own state?
- Have we helped educate others such as parents, students, educators, and school board members as well as leaders from government, business, and the general community so that they can be part of the dialogue about transforming gifted and talented education?
- Is our department organized so that the talents of a variety of agency leaders can be utilized

in providing state leadership to transform gifted and talented education?

- Have we provided a clear vision of state goals?
- Have we clearly stated what we expect gifted and talented students to know and be able to do?
- Do we have written documents that provide guidance on gifted and talented education and how it should interface with general education?
- Do our state goals for all of education and our state curricular frameworks include specific language which articulate how the goals and framework are to be extended or adapted for gifted and talented students?
- Have we clearly stated what we expect of schools in terms of providing caring learning environments that address diverse strengths and needs, including the strengths and needs of gifted and talented students?
- Have we clearly stated what we expect of schools in terms of collaborating with parents, the community, and other private and public institutions in order to address the strengths and needs of all children, including gifted and talented students?
- Are our policies regarding special populations consistent with our state goals? Do our policies encourage the perpetuation of distinct systems or encourage the creation of schools that address diverse strengths and needs?
- Do our policies and standards promote a sense of shared responsibility with each part of the system striving to achieve success for all students, including the gifted and talented?
- Do our policies and standards inadvertently encourage preset standards for achievement which restrain the most able and brand the less able as being defective?
- Do we provide conferences and workshops for parents and educators who have a special interest in the gifted and talented, and also provide workshops and presentations at general education conferences on educating the gifted and talented?
- Do our state funding mechanisms promote shared responsibility and comprehensive approaches for addressing the strengths and needs of gifted and talented education?
- Do we have an effective system for accountability?
- Do we provide guidance to districts on (1) assessing the progress of gifted and talented students; (2) assessing the capability of schools to address the needs of gifted and talented students; and (3) assessing the competence of professionals to address the needs of gifted and talented students.
- Do our state's general education policies and practices regarding the assessment of students, schools, and professional personnel include indicators of success related to gifted and talented students?
- Do our state, district, and school reports on progress in education show progress made or not made in reaching desired outcomes for gifted and talented students?
- Do we conduct regular, on-site reviews of state-funded programs designed to serve gifted and talented students?
- Do we conduct regular, on-site reviews of schools as part of the state's accreditation and approval process, and during those reviews do we evaluate the schools' adaptations and extensions for gifted and talented students?
- Does our state provide rewards and sanctions (e.g. special grants, special recognition, program approval, special accreditation ratings) for gifted and talented programs based on outcomes for gifted and talented students?
- Do we judge the success of districts and schools based on progress in achieving desired outcomes in students, including achiev-

ing desired outcomes in gifted and talented students?

- Does our state system of rewards and sanctions align with progress made in achieving desired outcomes in students, including achieving desired outcomes in gifted and talented students?
- Do we help schools and districts develop and improve their education assessment systems, including assessment of services to gifted and talented students?
- Do the results of our assessments at the district and school level inform state decisions, policy revisions, and resource allocations so that we ensure that all schools and districts can help all students, including the gifted and talented, achieve desired outcomes?

Recommendations for Federal Leadership

Federal leadership should focus on helping states and districts provoke a transformation in programs. The Office of Education Research and Improvement, other offices in the U.S. Department of Education, federal agencies which set and monitor compliance with federal administrative policies, and Congress can help or hinder school- and classroom-level efforts to address diverse needs and strengths of students.

The Office of Educational Research and Improvement, the report it plans to issue next year, and its ongoing programs can make a difference in guiding states to a vision of a total education system which will help gifted and talented students. Some of the actions OERI can take are outlined below.

Report

The National Report on Gifted and Talented Education should serve as an advocacy document that will help everyone, from top level officials to school-site reformers, to recognize the need for restructuring to address the strengths and needs of all students, including the gifted and talented.

There should be strongly worded statements regarding the desire and need for educators of the gifted and talented to be brought into the discussions on reform. They have much they can contribute in terms of experience with curriculum and instruction that challenge students to use their minds well.

The report should be taken to national meetings and talked about in speeches by OERI leaders. OERI can play a critical role in reminding everyone in the system that success for all students means *all* students. Our concern for the less able does not have to displace our concern for the most able.

Research Center

All researchers receiving funding from OERI should be encouraged to consider gifted and talented students, as is appropriate, in conducting research on various aspects of education reform and school improvement.

The National Research Center on the Gifted and Talented should be encouraged to focus its research on how education reform and school improvement efforts can be shaped to address the strengths and needs of gifted and talented students.

Training

OERI should sponsor more meetings, like the ones held for state directors of programs for the gifted, that encourages leaders in gifted and talented education to explore strategies for transforming programs. OERI should sponsor meetings of general educators and reform leaders to encourage them to explore strategies for addressing the strengths and needs of gifted and talented students in the context of their reform and improvement efforts.

Current and Historical Thinking on Education for Gifted and Talented Students

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The purpose of this paper is to provide some historical background on issues in gifted education, together with some current ideas and practices from the special educational strategies now in use for gifted students. It is hoped that this information will inform policymakers and interested parties about the need for differentiated programs for gifted students.

This report will focus on the nature of superior intelligence, the general school adaptations for these children, current and unresolved issues in the education of the gifted, and specific policy issues in gifted education. Some future research directions are also presented.

Why Should We Be Concerned?

How gifted students are defined, how they are educated, and how society receives them, varies considerably across time and across differing cultures. How these students are educated today is dependent, in part, upon values and conceptualizations that may be generations old, but are still alive in the minds of educators and decision-makers. In order to understand the programs of today, we must reflect on the values of yesteryear.

Special educational programs for children with special needs have been well-accepted by the American public as an essential part of the educational mandate of a free and appropriate education for all children since the 1960s. For the child with special learning problems, with mental retardation, or with other disabilities, there is a complex system of special education that directs financial help to local school districts from both the state and federal government.

Do gifted children fit under the definition of children with special needs? Why, in fact, should we be paying attention to a group of children who are already performing above the average in school? There is a touch of enlightened self-interest in such support, since we have substantial evidence that many of these students will become the leaders of the future in medicine, law, the sciences, business, the arts, etc. It is in our own family and societal interest to ensure a strong education for them (Terman & Oden, 1959; Bloom, 1985).

History

Throughout recorded history, there have been instances of cultures paying special attention to children who revealed special talents. The early Greeks, Romans, Chinese, and Japanese all attempted to nurture outstanding talents for the good of the state. Plato, for example, wished to place the leadership of his ideal state in the hands of philosopher-kings who would qualify for their high status by possessing the greatest measure of rational intelligence (Tannenbaum, 1983).

One of the earlier approaches to shaping talent was the apprentice model, extensively used in art, music, and the dance. This approach was used widely in the Renaissance and post-Renaissance period as the appropriate method for nurturing revealed talent. The sponsorship of talented persons, such as Mozart, by the crown or by noblemen was a standard source of support and encouragement.

The specific study of giftedness and its nurture has occurred in relatively modern times, and organized attempts to stimulate these abilities through education were developed even later. Francis Galton has generally been credited with the first study on the transmission of high ability in families in England in the nineteenth century with the publication of *Hereditary Genius*, a study of famous English families. Terman (1925) and Hollingworth (1942) conducted the first serious studies of high-ability youngsters in the United States. The Terman Longitudinal Study (Terman & Oden, 1947; Terman & Oden, 1959) has been particularly influential in dispelling a series of myths about gifted students. Terman's sample of about 1400 students, studied throughout their life span, demonstrated that gifted children were not, as a group, physically weak, emotionally disturbed, or socially isolated, as had been previously suggested.

Although evidence of educational concern can be found in the establishment of special educational programs in St. Louis in the 1880s and Cleveland in the 1930s, the first widespread attention to the special needs of gifted students in public schools probably can be identified as beginning in the Sputnik era of the late 1950s (Tannenbaum, 1983). The challenge provided by the Soviets to the United States' superiority in scientific fields stimulated extensive curriculum reform through substantial investments by the National Science Foundation and, later, by the U.S. Office of Education (Goodlad, 1964). Although such efforts were not exclusively directed toward gifted students, the emphasis of major themes in these curricula, and in providing actual practice in doing research, fits well into the educational needs of gifted students (Gallagher, 1985).

The emphasis on the education of gifted students went into a slump from the mid 1960s to 1970s when public attention and the attention of educators shifted to issues of student equity. However, there was continued interest in the education of gifted students, largely due to the recognition of the need for a large and continuing supply of highly talented individuals to maintain U.S. leadership in business, industry, higher education, the sciences, etc., into the 21st century (America 2000).

Despite this attention, the attitude toward gifted students at a personal and societal level has often been one of ambivalence, in both the educational setting and in society at large. We may love the creative products of their mental processes but still feel the sting of envy when we observe some persons doing, with apparent ease, what is so difficult for others to accomplish. Such conflict between the public interest and personal feelings has been felt in many societies and has been a barrier to the education of gifted and talented students (Gallagher, 1984).

Definition

There are numerous competing definitions of the gifted and talented abroad in education today (see Sternberg & Davidson, 1986). Many of these definitions are theoretical in nature and difficult to transform into educational practice. Two definitions, representing differing points of view, currently seem to have the most influence over educational practice. One focuses upon individuals with outstanding ability and potential; the other definition emphasizes demonstrated productivity and creativity.

Representative of the "ability" concept is the Marland definition, given below, which emerged from a national review of the issue (Marland, 1972). Although there are reasons to believe that this definition will change as new knowledge about intellectual development is established and accepted, the Marland Report reflected state by state interest in the issue as defined at the time:

> Gifted and talented children are identified by professionally qualified persons as those who, by virtue of outstanding abilities, are capable of high performance. These are children who require differentiated educational programs and services beyond those normally provided by the regular program in order to realize their contribution to self and society. Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas: 1) General intellectual ability; 2) Specific academic aptitude; 3) Creative or productive thinking; 4) Leadership ability; 5) Visual and performing arts; and 6) Psychomotor ability.

The sixth ability, psychomotor, was later dropped from the list, since many felt it referred to athletic ability, which was already well-supported in our society.

The "productivity" concept is represented by Renzulli (1986). In contrast to Marland, Renzulle presented a three-ring conception of giftedness, in which a combination of task commitment, above-average ability, and creativity are necessary to produce gifted or productive performance. Renzulli prefers to discuss "gifted behaviors" rather than "gifted students" and, as a consequence, has devised the following definition:

> Gifted behavior reflects an interaction among three basic clusters of human traits—above-average general or specific abilities, high levels of task commitment, and high levels of creativity. Persons who manifest, or are capable of developing, an interaction among the three clusters require a wide variety of educational opportunities and services that are not ordinarily provided through regular instructional programs (Renzulli & Reis, 1986, p. 218).

Renzulli also insists that these behaviors be applied to potentially valuable areas of human performance.

Both definitions recognize the need to extend the regular educational program in order to provide adequate stimulation, whether for gifted students or for students manifesting gifted behaviors, and each leaves considerable leeway in terms of how one actually identifies a student or performance, in a concrete fashion, so as to certify a gifted student or gifted performance. It is in the actual attempts to identify such students or behaviors that much of the current argument and discussion about giftedness takes place.

What Is Superior Intelligence?

From World War II until the mid-1960s, there appeared to be no serious challenge to the concept that "intelligence is what an intelligence test measures." This circular, and generally non-productive, approach to understanding intelligence has been replaced, during the last couple of decades, by a series of attempts to explore how the developing child comprehends information, stores it, scans the stored information for relevant data, and makes decisions or solves problems. Many of these models were based upon research on artificial intelligence and information-processing by Sternberg (1985); Gardner (1983); Simon (1978, 1979); and Borkowski & Kurtz (1987). Such models promise a greater understanding of how information is received, stored, and retrieved—though it still might not be clear from such models why one child is gifted and another child is mentally retarded. Nevertheless, a better understanding of general intellectual functioning can be of special interest to educators who work with gifted students.

An explanation for the long predominance of the IQ test as a device for indicating high intelligence is that it largely did what the schools asked of it. These IQ tests, many of which are heavily weighted with vocabulary, simple reasoning, and analogy questions, predicted very well which students would learn rapidly and which would learn more slowly than their classmates. This was particularly true since memory, association, and rea-

soning—the characteristics measured by the IQ test—were also the abilities predominantly demanded of students in the classroom.

Is the Gifted Child Qualitatively Different in Intelligence?

Robinson (1977) has pointed out that it is often not *what* the gifted child does that is so remarkable, but rather *when* in the developmental process he or she does it. For example, the child who plays competitive chess at the age of five or six will naturally be seen as gifted but is doing only what other children might do at the age of twelve or thirteen. The basic question of interest to educators is, "Can gifted children accomplish some mental tasks that other students cannot perform at all?" If the answer is "Yes," then the stimulation of such special abilities becomes a major responsibility of the educator.

Rogers (1986), in a review of the existing literature, suggested not only that gifted students are quantitatively different from the average student in their intellectual performance but also that these *quantitative* differences may result in *qualitatively* different performance! For example, a student who masters calculus can achieve levels of problem-solving that are not available to students who have not mastered, or had the opportunity to master, calculus. There is a point, therefore, where quantitative differences seem to result in qualitatively different performance.

The Role of the Family in Promoting Giftedness

It has long been recognized that the social envelope in which gifted students reside has a great deal to do with shaping the interests, educational motivation, and even the full realization of their intellectual potential. One recent investigation, done by Bloom and his colleagues (1985), involved a retrospective analysis of families of world-class performers in the arts and sciences. In this group, Bloom found a consistent history of strong and early family identification and promotion of the talents of the child. The parents, in many cases, sought special instruction for these students. There were many instances of children displaying their talents in public performances which reinforced the children's interest in continuing the often difficult practice of their talents. Other reviews of the literature (Olszewski, Kulieke, & Buescher, 1987) confirm that parents of gifted students tend to stress the importance of academic achievement, hard work, and the full development of one's talents.

What is not always commonly recognized is that the converse of great attention and encouragement of talent can result in sizeable negative consequences for talent development. In families where there is a lack of interest in intellectual development, or where the parents are not able to provide either the resources or the intensity of interest and encouragement, it is likely that even outstanding talent will remain substantially underdeveloped. Therefore, in groups where economic disadvantage is a pattern—where there is a surplus of poverty, divorce, one-parent families, etc.—we would expect a lesser percentage of such students to reach the full realization of their talents—a sad event for the child, and a potential tragedy for the society (Maker & Schiever, 1989).

Gifted Averages or Gifted Individuals?

There are two general strategies for attempting to characterize a subgroup of the population such as "gifted students." One is to report how this group differs from other groups in the society on the basis of the mean or average performance of the two groups; the other is to report the range of characteristics in this special population. Such group comparisons leads to statements such as, "Gifted students tend to be more physically able, socially popular, and emotionally stable, than average students." Such statements, reflecting averages, ignore or omit information about the wide

range or variation of performance *within* the subgroup of gifted students. We can have, at one and the same time, a statement that gifted students are more emotionally stable than the average student together with significant reports of teen suicides or emotional maladjustment in gifted students (Delisle, 1990; Cornell, Callahan, & Loyd, 1991).

If we have a concern for the individual development of each child, then it is the range, or *variation*, that also needs special attention. We can say, with perfect validity, that gifted males, as a group, perform better in mathematics than gifted females. Such a statement, however, tends to ignore the also observable fact that many gifted girls can outperform the "average gifted boy" in mathematics. Also ignored is the fact that many gifted boys will fall below the average of gifted girls in mathematics. Another example of averages vs. variations is that the literature on student acceleration is highly positive when group results are considered. One can still find, however, individual instances of a student who was accelerated and did not achieve or who was not emotionally well-adjusted (Gallagher, 1985; Davis & Rimm, 1989). If we are making educational decisions or constructing educational policy based upon the information available, then we need to have a clear portrait of the range or *variation* within the group, as well as a comparison of averages of this group with others.

School Adaptations for the Gifted Child

The accumulated evidence on the characteristics of gifted students provides the basis for the differentiated program elements noted below. Gifted students have advanced, academically, far beyond their age peers and are often bored and unproductive in the normal school setting (Galbraith, 1985). Some change, or school adaptation, that allows these students to interact with each other—to be challenged by material at their developmental level—and to acquire skills useful in independent learning is being sought by educators (Passow, 1982). Over the past few decades, a wide variety of changes, or adaptations to the general program of the schools, have been made to try to meet the special needs of gifted students. Gallagher (1985) divided these adaptations into three major areas, in order to discuss them more thoroughly: *the learning environment*, *curriculum content*, and *skills mastery*. These adaptations, however, often interact and are combined with each other in active programs.

Learning Environment

The variety of special environments created for the gifted (e.g., resource rooms, teacher consultants, special classes, magnet schools, summer programs, Saturday programs, etc.) tend to distract attention from the two common purposes for such changes. First, there is a desire to bring together pupils of similar ability so that instruction can be pitched at the appropriate conceptual level for the student, and also so that the students with special abilities can stimulate each other. The second major reason is to place them with competent staff or outside personnel who can continue to challenge them intellectually and academically.

One of the interesting developments during the last decade has been the development of residential schools for talented students in mathematics and science. Beginning with the North Carolina School of Science and Math, in 1978, ten states have established such programs, and more states are planning such schools.

Changes such as resource rooms or special classes have the potential for creating political difficulties to educational administrators since these adaptations essentially impact all of the students and teachers in the school. Current evidence suggests that learning environment changes alone, unless the curriculum or skills to be mastered are also changed, does not yield impressive gains (Kulik & Kulik, 1991).

Student Acceleration

One of the earliest devices in educational adaptation for gifted students was to move the student

more rapidly through the school program. The potential virtues and dangers of such acceleration have been debated for the past six decades. The desire to reduce the duration of an educational program which, for some gifted students, can extend to a quarter of a century or more is understandable. If an educational program can be reduced one, two, or more years from the extended time for career preparation, would it not be to the benefit of the student, family, and society to do so?

Yet, student acceleration has neither been a popular nor heavily used device in the educational plans for gifted students (Clark, 1989; Van Tassel-Baska, 1986). There have been many fears raised about possible negative consequences. Southern, Jones, & Fiscus (1989) have recently polled over 1,200 educational practitioners on this question and found a substantial body of opinion concerned about possible social problems for such accelerated students; the possibility of extra stress caused by advancement; the possible loss of desirable childhood experiences; and the availability of other, more desirable, strategies (e.g., enrichment). In contrast to these concerns, the available literature on this topic reports strongly favorable outcomes of student acceleration (Gallagher, 1991), and it appears that many of the fears noted above are unfounded in the majority of cases (see Averages v. Individuals).

Content Differentiation

As noted above, changing the learning environment without changing the content of lessons seems nonproductive and leads to the clarion call of many gifted students that "school is boring." Can just any additional information serve the purpose of educating gifted students? Does teaching the physics of "chaos" equate with the history of pingpong? Obviously, some curricula content seems to serve our educational purposes for gifted students better than others.

Gallagher (1985) has identified four major ways in which curricula content has been modified to meet the special needs of gifted students. These categories are *acceleration*, *enrichment*, *sophistication*, and *novelty*.

Content Acceleration refers to the presentation, to gifted students, of curricula that was intended for older students. In this way, algebra and geometry can be presented to gifted students still in the elementary grades. There has been substantial demonstration of the ability of advanced students to master such a program. It has been shown that the early study of calculus allows the student to address a much more complex set of problems in biology and chemistry than can be mastered without calculus (Stanley & Benbow, 1986).

One of the organized efforts to provide systematically more challenging material to gifted students at an earlier age has been the Study of Mathematically Precocious Youth (SMPY). The original purpose of the project was to find students who reasoned very well in mathematics before the age of 13 and provide them with special accelerative opportunities so that they could move ahead in mathematics (Stanley, 1991). Some of these advanced students entered college early, others were given special experiences through curricular flexibility at high school as well as out-of-school experiences. This emphasis on identification and stimulation of outstanding talent has been adopted by a number of universities (e.g., Northwestern, Duke, Denver, etc.), and SMPY youth are reported to be successful in international competitions, Westinghouse Talent Searches, etc. (Stanley, 1991).

Content Enrichment refers to the variety of extra lessons or assignments used to elaborate the richness of understanding the student has of the existing curriculum goals. In this approach, the gifted child is kept mainly in the regular classroom, and content enrichment is used to extend the regular program (Parke, 1989). While the rest of the class is studying the Western Movement across the early United States, the gifted student could be doing a project on the diaries of wagon-train members or the

special perspective of Native Americans on the influx of settlers. Content enrichment gives gifted students material designed to broaden their understanding within the general educational goals.

Content Sophistication refers to attempts to challenge gifted students to learn the more complex and sophisticated information from the curriculum that the average student might not be able to master. Such an approach is most easily utilized in special class or resource room settings where the teacher can instruct a group of gifted students at a higher level without fear of leaving other, less rapidly developing students behind.

Examples of content differentiation of sophistication would be to take major social trends as proposed by Naisbitt (1982), such as the migration of business from North to South, and think about the consequences that stem from that move, or to focus on a new system of ideas such as the physics of chaos and what the implication of these ideas might be. Both examples require a wealth of prior knowledge—which gifted students may have but other students may not have.

Content Novelty refers to curriculum efforts that present content that is not covered in traditional school curriculum. Topics focusing on cross-disciplinary areas, such as the impact of technology on American society or the demographics of poverty, would be examples of such content-topics not traditionally dealt with in the regular curriculum but which may have special meaning for the gifted student who generally likes to tie apparently unrelated facts together. It is considered important for gifted students to reflect on the linkage between bodies of knowledge so that they are aware of the potential impacts of one field on another (e.g., the effects of the VCR on social patterns of youth) and reflect on what might be done to forestall possible negative consequences.

Skills Mastery

One of the tools that educators of gifted students have tried to provide this special population over the last two decades has been cognitive skills that increase the ability of gifted students to think productively (Bloom et al., 1956). Much of that work has focused upon the stimulation of divergent thinking and increasing the fluency, flexibility, and originality of ideas (e.g., Meeker, 1976; Guilford, 1967).

Direct attempts have been made to instruct students in the use of the creative problem-solving model (Parnes, 1981) or problem-solving strategies through the Schoolwide Enrichment Model (Renzulli & Reis, 1986). Additional stimulation in thinking has been fostered by student team competitions in such programs as the Odyssey of the Mind, Future Problem Solving (Torrance & Torrance, 1978; Crabbe, 1982), and models of creative thinking (Treffinger, 1991).

Whether the application of these strategies lead to an increase in educational attainment or skills and to a more creative adult are unanswered questions. There is a substantial body of knowledge reporting that creative individuals, as adults, differ in a number of personality traits from average adults. The most outstanding of these traits are the willingness to take risks, a strong ego that can go against the social tide, and a persistence and commitment to a special area of interest (Feldhusen & Treffinger, 1980).

The variety of attempts to instruct gifted students in skills that can enhance their creativity, their problem-solving abilities, and their problem-finding abilities will, almost surely, continue and increase. But we might expect to hear increased calls for accountability for such programs to prove that they not only increase these thinking skills in isolation, but that such increases also lead to demonstrably superior performance in real-life tasks.

Current Issues in Gifted Education

There are an impressive number of issues that can be identified as affecting the education of gifted students, either directly or as an unintended

Issue: Accountability

The question of the effectiveness of gifted programs has been posed quite often (Callahan, 1983). One approach has been to measure the effectiveness of ability-grouping—part of many programs for gifted students. Articles running into the hundreds have addressed ability-grouping (see Slavin, 1990a). Common evaluation design flaws, however, have prevented us from making more definitive statements about most program effectiveness. Callahan and Caldwell (1986) identified four specific flaws that tend to invalidate a large proportion of the evaluation papers on gifted students:

1. The use of standard achievement tests in such evaluations underestimates the knowledge and understandings of gifted students.

2. The use of standard measures will not reveal the mastery of the specialized content that is at the heart of special programs for gifted students.

3. A major curriculum emphasis in many gifted programs is developing problem-solving, problem-finding, and creativity skills; yet, few evaluation efforts have included any attempt to measure these key processes.

4. Few of the evaluation programs take into account the personal views of the students themselves. (When students are surveyed, themes of excruciating boredom in regular programs come through quite clearly.)

A recent meta-analysis on ability-grouping and gifted students was completed by Kulik & Kulik (1991). They summarized their findings as follows:

- The evidence is clear that high aptitude and gifted students benefit academically from programs that provide separate instruction for them.
- Academic benefits are positive, but small, when the grouping is done as a part of a broader program for students of all abilities.
- Benefits are positive and moderate in programs that are especially designed for gifted students.
- Academic benefits are striking and large in programs of acceleration for gifted students (p. 191).

It would appear that merely grouping gifted students together, without at the same time changing the content and the instructional strategies used with them, will not yield much in the way of benefits. On the other hand, a well-constructed program that brings gifted students together and provides them with an intellectually stimulating environment, in addition to giving them the opportunity to use their problem-finding and problem-solving abilities, seems to yield very tangible results.

Policy Issues and Gifted Education

Public policy consists of rules and standards by which society allocates its scarce resources. The education of gifted elementary and secondary students remains a policy issue debated at local, state, and federal levels. In post-secondary education, however, major resources are set aside for graduate and professional programs with little protest (Reis, 1989).

Equity versus Excellence

For the past three decades, the nation has struggled to reconcile two significant values of American society within the American educational system. The first of these is *equity*: the promise that all children shall receive an equal opportunity for education. The second value is *excellence*: that full attention and stimulation will be given to the very best of the students—those who demonstrate their ability and superiority in the educational domain.

consequence of striving for other educational goals. The issues listed here represent the author's attempt to identify the most critical topics of current concern in the field of gifted and talented education.

Issue: "Dumbing Down" School Programs

One of the current trends which seems to compound the problems that gifted students face in finding an adequate challenge for their abilities in school is a process that has been referred to as "dumbing down" the curriculum (Renzulli & Reis, 1991). In this "dumbing down" process, the textbooks for a grade level are written in overly-simplified terms and ideas are presented in a simplistic way, even for the average students of that age group. Kirst, for example (1982), found no textbook publisher ready to provide a textbook that would challenge the top one-third of students.

The curriculum, which is often based on the textbooks, is also "dumbed down" to make an already conceptually easy set of lessons even more simple! Unless the teacher provides alternative reading materials of adequate complexity, the gifted student is likely to be extremely bored and remain unchallenged by such simple texts.

The reason for such simplifications in the textbooks seems related to the process of textbook approval in which states or local communities may decide upon an approved list of textbooks at any given level. The publisher is engaged in an attempt to make the material so elementary in nature that even the slowest learning student would be able to grasp the content. The hope is that this will cause the textbook committees to react favorably. However, this process results in a serious "dumbing down" of content material, compounds the boredom and frustration of gifted students looking for challenge and intellectual adventure, and affects their performance.

In a recent study of the International Association of Educational Achievement (IEA), Renzulli and Reis (1991) reported, "The most able U.S. students scored the lowest of all these countries (Hungary, Scotland, Canada, Finland, Sweden, New Zealand, Japan, Belgium, England, and Israel). Average Japanese students achieved higher than the top 5 percent of the U.S. students in college preparatory mathematics" (p.27).

Issue: Educational Reform

The generally poor performance of students has largely been considered a school problem, rather than a societal one, and has generated a major and continuing phobic dissatisfaction with the performance of American schools. Thus, one of the major movements in education over the past decade has been a series of attempts to build reform elements into the American educational enterprise. These reforms would involve changing both structural and programmatic emphases. However, apart from the general merit of such reform elements as Cooperative Learning, or the Middle Schools Movement, or Accountability, there is the additional issue of how these reforms integrate with the program needs of gifted students (Gallagher, 1991; Renzulli & Reis, 1991).

The proponents of the process of *cooperative learning* differ somewhat among themselves about precisely how the concept is to be implemented in the school system (Slavin, 1990a; Johnson & Johnson, 1990; Kagan, 1988). Slavin, for example, emphasizes two essential features in his version of cooperative learning. The first is a *group goal*, or positive interdependence, in which the cooperative groups of students work together to earn recognition (grades, rewards, etc). The second is *individual accountability* in which the group's success depends on the individual learning and performance of each group member. Slavin (1990) strongly recommends the formation of heterogeneous groups by ability in the classroom, with the possible exception of mathematics. Robinson (1990), however, has pointed out three specific problems with cooperative learning as it relates to gifted students:

1) Cooperative learning will likely limit instruction to grade-level materials to account for either average or slow-learning students;

2) Cooperative learning will be presented at the pace of the slowest of the learners in the group; and

3) Cooperative learning will be evaluated on mastery of basic skills rather than on more sophisticated concepts.

Renzulli and Reis (1991) have pointed out the direct concern of many persons in gifted education about the overall impact of cooperative learning when these small groups are heterogeneous in ability and where, inevitably, the gifted students will become tutors to the slow learners in the group, since the entire group's performance will be judged by the individual scores on some outcome measure.

> You don't produce future Thomas Edisons or Marie Curies by forcing them to spend large amounts of their science and mathematics classes tutoring students who don't understand the material. A student who is tutoring others in a cooperative learning situation in mathematics may refine some of his or her basic skill processes, but this type of situation does not provide the level of challenge necessary for the most advanced types of involvement in the subject (p. 34).

It is currently unclear how, or even if, apparently desirable instructional strategies such as cooperative learning can be implemented in the best interest of gifted students. The same might be said for the Middle Schools Movement.

The focus of the *middle school concept* would seem to include the following elements:

1. A strong affective component, with teams of students and teachers organized to foster a sense of belonging.

2. An interdisciplinary focus on content.

3. A curriculum emphasizing inquiry, exploration, and discovery.

4. A schedule characterized by flexibility (George, 1988).

Many middle school programs also place emphasis on heterogeneous grouping and, once again, raise the question about whether the gifted students can be sufficiently challenged in these settings. However, Sicola (1990) sees no reason why special programming for gifted students cannot form a component of the middle schools program. She believes that honors courses, independent study, magnet schools, and other well-established programs can be effectively integrated with the middle schools concept to provide an effective education for gifted students.

Current reform movements rarely mention the special needs of gifted students in their goals or objectives. Unless rigorous efforts are made to integrate the best of gifted education with these movements, we will likely see a major erosion of gifted programs and an unintentional "dumbing down" of the school program for advanced students.

Issue: Creativity

There has been a major effort, in special programs for gifted students, to emphasize the stimulation of creative thinking. While this effort has extended across the nation in gifted programs for three decades, it is still unclear what constitutes "creativity" (Is it a product? Is it a process?) or how best to enhance it. However, the theoretical models of Guilford (1967) and Bloom, et al.(1956) have had a major influence on schools' attempts to stimulate creative thinking. The translation of the Guilford model into school-appropriate experiences has been the significant contribution of Paul Torrance (1977) and Mary Meeker (1969). Much of that work has focused on the nurturing of

divergent thinking, or improving the gifted student's intellectual fluency, flexibility, and originality.

While there is substantial evidence that direct training can improve student production of the number and originality of ideas (Mansfield, Busse, & Krepelka, 1978), there remains a question as to whether such training will result in improved creative behavior in adults. The study of creativity in adults focuses more upon personality traits: the willingness to take risks, a strong ego that enables the individual to go against the norm or social tide, and a willingness to persist in the face of difficulties in their area of particular interest (Barron & Harrington, 1981). Still, there is a continued emphasis on student mastery of strategies for attacking complex problems; and approaches such as the creative problem-solving model of Parnes (1981) and the problem-finding concepts made popular by Getzels & Csikzentmihalyi (1976) would seem to have some validity to them.

While creativity has often been thought of as an exclusively internal process, there is now opinion that creative products may well result from a complex interaction between a particular environment and internal thought (Greeno, 1989). Thinking, while obviously an internal process, must operate within a responsive social context which can be influenced positively by carefully devised educational environments (Gallagher, 1991).

Just as society is ambivalent about how it views giftedness, it is also unsure about creativity. Tannenbaum (1983) described the mixed feelings of modern society regarding human creativity as follows:

> On the one hand, the public has demonstrated an almost insatiable demand for newness in the arts, sciences, and humanities, and has, consequently, lavished encouragement and renown upon people with great ideas. On the other hand, it has manifested a tenacious will to remain culturally conservative and often views the creative spirit with suspicion and disdain (p. 4).

Issue: Underserved Populations

Cultural Differences

Until recently, one of the most embarrassing secrets in the education of the gifted was the differential prevalence of ethnic and racial groups in identification and placement in special programs. The embarrassment stemmed from the inappropriate assumption that intelligence tests measured only genetic potential, and that such a difference in proportions would then suggest superiority or inferiority in native ability for such groups—an intolerable political problem.

While the objective fact was that there were fewer minority students being identified through traditional methods (except for Asian-Americans), the reasons for such low numbers were not universally agreed upon. There are two major hypotheses proposed to explain underrepresentation of minority populations:

> 1. The instruments and procedures used for identifying gifted students are flawed and biased against those students who are not middle class, white Americans.

Such an argument rests on the proposition that there can be no true differences in levels of aptitude at the time of assessment; therefore, any group differences that are found are the fault of the measurement. Further, the choice of gifted students from the mainstream culture for special educational programs is an attempt—some may even see it as deliberate, to limit the opportunities of children from some minority groups (Richart, 1985). The intelligence tests that have been used by the schools may more aptly be referred to as academic aptitude tests and their predictions of lower performance for minorities as a group have, unfortunately, turned out to be quite correct for many minority students (Mercer, 1981).

Bias of test instruments, however, needs to be demonstrated by more than group differences on the test. Just as there may be differences between ethnic and racial groups on athletic aptitude or musical aptitude, based upon greater opportunity and experience, so the same may be true of academic aptitude. The excellent performance of Asian-Americans, on both tests and school performance, tends to indicate that there are factors operating here that go beyond simple differences from the mainstream culture (Zappia, 1989). Nevertheless, the current style of identification tries to cope with this issue by adopting multiple criteria for giftedness, of which IQ tests are only one.

2. These differential prevalences reflect differential opportunities and limited practice on key elements of intellectual development.

There is considerable evidence to support the importance of the role that practice and experience plays in later measures of aptitude. If we can extend the general principle that "we are good at what we practice" to include "we avoid tasks where we perceive ourselves as not competent and situations where we are not comfortable," then it is not hard to see how, progressively, some minority students who may have begun life with equal aptitudes with their majority group age-mates will fall further and further behind on measures of academic proficiency and aptitude. Such evidence of differential prevalence, the argument continues, does not speak to differences in native ability so much as it does differences in the availability of responsive environments to crystallize an individual's native ability.

The most reasonable position on cultural differences, given current knowledge, is to accept explanation #2—different experiences and opportunities are what makes the difference—and operate as though it is true. The obvious step to be taken, then, is early and intensive provision of experiences that can help talented minority students to more fully develop their potential more fully.

The current view in child development is that there is a complex interaction pattern between genetics and environment, as shown in figure 1, that tends progressively to facilitate or inhibit the full development of youngsters with special talents (Plomin, 1989; Weinberg, 1989). As noted in figure 1, the development of symbolic systems such as language lies at the heart of more sophisticated intellectual development. Children who have been raised in an atmosphere where language is not extensively used, or in which an adult is not present to interact with the child, will quite probably have limited language development. This, in turn, will lead to less than full potential academic performance and, possibly, to a consequent lack of interest in school and school-related activities. The combination of all of these progressive interactions, then, could result in a lower score on intelligence or aptitude measures than would have been likely under more optimum conditions.

Just as a series of unfavorable environmental forces can result in less favorable educational and psychometric outcomes, so can the opposite be true. If the family is encouraging and supportive, if the learning environment is superior, then there may be an opportunity for students from particular groups to show a greater than average prevalence of high ability or aptitude (Bloom, 1985; Olzsewski, Kulieke, & Buescher, 1987). Higher than expected prevalences of being identified as gifted would appear to be the case with another minority group, children from Asian families. The high prevalence of Asian-American children in programs for gifted students, as well as in other areas of performance such as music, arts, etc., has been a reminder of the attention paid, in many Asian-American families, to the importance of education and of setting high expectations for children's performance. Such departures of prevalence from normal expectations appear to demonstrate the power of the family and the culture to influence—both positively and negatively—the long-term performance of students. Such findings have stirred

major efforts to develop procedures or instruments that would help identify underserved gifted minority students (Baldwin, 1987; Sisk, 1989; Frasier, 1987).

Maker (1989) summarized program suggestions for minority students from a wide variety of specialists as follows:

1. Identify student strengths, and plan a curriculum to develop those abilities.

2. Provide for the development of basic skills and other abilities that students may lack.

3. Regard differences as positive, rather than negative, attributes.

4. Provide for involvement of parents, the community, and mentors or role models.

5. Create and maintain classrooms with a multicultural emphasis (p. 301).

These principles represent mainstream thinking on programs for minority students and reflect an interest in integrating minority gifted students with the larger society (Sparling, 1989). In some quarters, however, there is advocacy to maintain a separate cultural identity for Hispanic or Native American students, and this would, naturally, result in a very different program and curriculum (Kitano, 1991).

Gifted Girls

One of the major groups of the underserved gifted is gifted girls who are traditionally less represented in programs for gifted and talented, particularly in programs in mathematics and science (Stanley & Benbow, 1986). The traditional role of women to be childbearers and stay in the home has clearly been modified, but the new freedom has not yet resulted in remarkable change. Reis & Callahan (1989) point out how far society needs to progress:

> Why, for example, are less than 2 percent of American patents held by women? . . . Why are there only two females in the United States Senate, one female on the Supreme Court, and one female cabinet member? Why do women constitute less than 5 percent of the House of Representatives, own only 7 percent of all businesses in the country . . . occupy only 5 percent of executive positions in American corporations, and hold none of the leading positions in the top five orchestras in the United States? (p. 101-102)

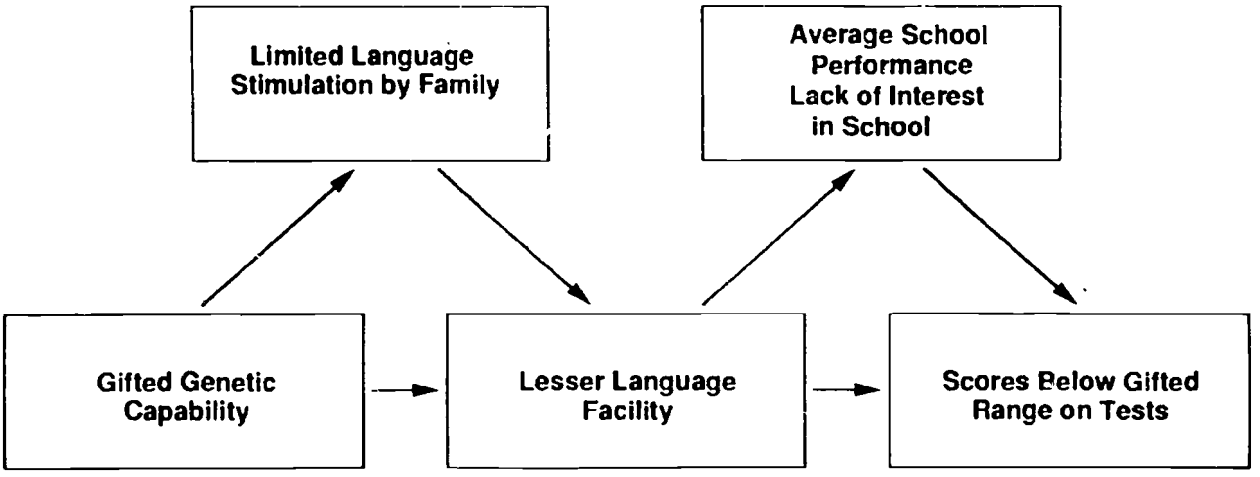
Another telling statistic is that though women represent 51 percent of the population, they comprise only 11 percent of the scientists and engineers in the United States, reflecting the vocational and societal tilt against women in these occupations (Schmiedler and Michael-Dyer, 1991). Some of the suggestions for changing this situation have included programs that exclude boys, at least until gifted girls have gained a much needed confidence in their own abilities (Rand & Gibb, 1989). Girls with outstanding potential would seem to be the largest untapped resource in our country.

Gifted Handicapped

The idea that gifted students could also have specific handicapping conditions has been a relatively recent one. The visibility of outstanding scientists such as Stephen Hawking—a quadriplegic—and a variety of gifted individuals with presumed learning disabilities, such as Einstein, Rockefeller, Churchill, etc., has opened new areas of investigation and special education (Whitmore & Maker, 1985).

The majority of recent attention has focused upon gifted learning-disabled students who have some type of information processing deficit which interferes with learning, despite superior general aptitude. Coleman (1992), in a study of such students, found that gifted/learning-disabled (LD) students showed differences from LD students of

Figure 1.— Underserved Gifted Sequence of Development



(After, Sameroff, 1986)

average ability in their use of coping strategies designed to deal with academic problems. The gifted-LD students used more "planful problem-solving" to overcome barriers, while the average aptitude group reported more "escape," "avoidance," "distancing," and "helplessness." Nevertheless, the direct instruction of coping techniques to meet common school challenges, such as taking exams, would seem to be a clear need for all students with learning disabilities, regardless of ability level.

However, we do not yet know the degree to which visual and auditory disabilities disguise the intellectual aptitude of children, and a new sensitivity to special talent is being sought from educators with expertise in these fields.

Underachievers

Most of our knowledge of underachieving students comes from the longitudinal studies of Terman and his associates (Terman & Oden, 1947) and from a variety of case studies and clinical study reports (e.g., Rimm, 1991). Such students, predominantly boys, seem to have a variety of self-concept and family-conflict problems which carry over into ineffective academic strategies.

Some recent attempts to intervene educationally with underachievers have proven successful (Whitmore, 1980; Butler-Por, 1987). The amount of time needed for such remediation to become effective, however, is extensive and confirms the notion that chronic underachievement is a complex syndrome of behaviors that is very difficult to change once well-established.

The gifted underserved clearly represent a major loss to our community and national potential, and the strategies for recovering that loss is different for each of the subgroups.

The Fairness of It All

One of the most elusive, but seemingly most powerful, inhibitors of programs for gifted students involves the value issues of *fairness* and *equity*. Many people ask, "Is it really fair for some children to have so much ability while others have so little? Is it fair for us to be giving special education opportunities for students who already have so much going for them? Isn't this type of special educational programming akin to giving tax breaks to the rich?"

Such concerns seem to be made worse by the additional realization that minority groups, with the significant exception of Asian-Americans, have a lesser presence in programs for gifted students than in proportion to the general population. This underrepresentation enhances the image that programs for gifted are really designed as "special privileges for special people."

The only answer to all of these value statements is that, "Of course, it *isn't* fair." Abilities are not equally distributed, nor are the opportunities to enhance aptitudes that are present in the child. But this isn't the only thing unfair in the world. It is unfair that so many people live in poverty and in disease-ridden environments while others live in opulent wealth. It is unfair that we continue to have wars and many people are needlessly killed. It is unfair that some countries have continuous droughts while others prosper with good growing seasons for their crops.

But who among us will do something constructive to combat this massive unfairness? The record is clear: those students that we call gifted will have the best chance, when properly educated, to do something about the array of social problems facing the next generation. Just as we support medical schools and law schools (since we all may need a good doctor or lawyer someday), our enlightened self-interest should argue for a solid preparation for the most talented of our students.

The National Educational Goals

This ambivalence, or attempt simultaneously to achieve two apparently competing goals of equity *and* excellence, is clearly seen in the national educational goals established by the Governor's Task Force on Education. These goals (see table 1) are targets established for achievement by the year 2000. Goals 3 and 4, (requiring high competences in content fields and promising top performance in math and science), represent a major emphasis on excellence and would be highly relevant to gifted students. Goals 1 and 2, in contrast ("that all children will start school ready to learn" and, "that 90 percent of the children will graduate from high school"), represent efforts at achieving equity (America 2000).

There are strong threads in our cultural heritage inclining us toward *equity*. Many of our ancestors broke away from an elitist society in Europe. Our most treasured documents, the Declaration of Independence and the Constitution, take great pains to ensure that power will not once again reside in the hands of a small elitist group. People are loathe to do anything that they believe would strengthen elitist tendencies.

The drive for excellence, in contrast to equity, seems based upon societal needs. In the modern, post-industrial, information society into which we are developing, the need for large numbers of well-educated and extensively prepared students is manifest, as is the need for a large pool of creative scientists, managers, communicators, etc. The education of gifted students is clearly a high priority for such a society. Unfortunately, we are now receiving pessimistic messages about American students compared to students of other advanced nations.

A series of comparisons of American students with students from other countries (Jones, 1989; Crosswhite, et al., 1985) has also revealed the lamentable state of our students' learning—and has concerned those current leaders who realize that *student* noncompetitiveness in the educational scene will likely translate into *adult* noncompetitiveness in the economic and political world in the near future.

There have always been educators who have eloquently urged attention be paid to gifted young-

Table 1.—National Education Goals

1. By the year 2000, all children in America will start school ready to learn.
2. By the year 2000, we will increase the percentage of students graduating from high school to at least 90 percent.
3. By the year 2000, American students will leave grades four, eight, and twelve having demonstrated competency over challenging subject matter, including English, mathematics, science, history, and geography. . .
4. By the year 2000, U.S. students will be first in the world in science and mathematics achievement.
5. By the year 2000, every adult American will be literate and possess the knowledges and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.
6. By the year 2000, every school in America will be free of drugs and violence and offer a disciplined environment conducive to learning

America 2000 (1990). Note The Goals 2000: Educate America Act, signed into law March 31, 1994, added a goal for parental involvement and a goal for professional development.

sters because their needs required it (see Hollingworth, 1942), but it has been the economic arguments that have generally impressed decision-makers to pay special attention to these students.

If policy represents the rules and standards by which we agree to allocate scarce resources to specific needs and persons, then the emergence of public policy related to gifted children becomes a particularly significant topic. Since special education provisions for gifted students cost more than the average costs of education (though significantly less than special education for other exceptional children), then the question becomes, "Where will such resources come from?"

Every state has some type of special program or designated resources related to the education of gifted students. In the case of almost half the states, the extra resources for such programs are allocated, by the state, to local districts through general legislation concerning exceptional children for that state. In other states, resources reimbursing local school districts or the assignment of state leadership personnel to gifted education are made available through a variety of state education authorities.

The major thrust for special programs underwritten by state education departments came largely on the heels of the Sputnik challenge of the late 1950s. Many states, seeing the United States falling behind in key technological areas, wished to strengthen the educational output of the United States and saw improving programs for gifted students as one vehicle to that goal. Extensive curriculum reform efforts, largely stimulated by major projects funded by the National Science Foundation, as well as by the U.S. Office of Education, proved an advantage for gifted students since such projects placed an emphasis upon high level conceptualization and the learning of science by doing science (Bruner, 1960; Goodlad, 1964).

The involvement of the federal government in specific policy for gifted students was delayed another decade, however, primarily due to the general reluctance of Congress to get involved in education, which up to then had been seen as primarily a state responsibility. The overwhelm-

ing needs of economically disadvantaged students helped propel federal action to aid education and to include children with handicaps as part of the total federal effort. These provisions led the way for subsequent legislation for other groups of school children.

As seen in table 2 (Reis, 1989), there have been a variety of federal efforts devoted to special concerns for gifted students, beginning in 1958 with the National Defense Education Act. Predominant among those initiatives have been the 1969 bill which called for a major study of the education of the gifted student in the United States and a report to Congress. These initiatives spawned the Marland definition of gifted students which has been copied by many of the states.

In 1973, an Office of Gifted and Talented Education was established in the U.S. Office of Education, and small sums of money were made available for research and demonstration projects. In 1983, *A Nation at Risk*, the noted report of the National Commission on Excellence in Education, indirectly aided programs for gifted students by sounding an alarm for programs of excellence.

But by far the most significant of the federal actions has been the passage of the Jacob K. Javits Gifted and Talented Students Education Bill in 1987, reestablishing a federal office, providing grants for training and demonstration projects, and establishing a National Research Center on the Gifted. A major theme of the Javits program is the discovery and stimulation of underserved and undiscovered gifted students. Meanwhile, the collective state investment in gifted program efforts now exceeds over 250 million dollars annually. It seems clear that concern for the economic viability of the country is fueling a gradually increased effort and support for state and federal responsibility for greater stimulation of excellence in our schools. (See section on National Goals.)

Future Research Directions

The earlier parts of this paper have identified some of the research investigations that could be carried out to help us understand the gifted child more thoroughly, to experiment with differing educational techniques and settings, and to understand the role that society plays in educating these students. Horowitz and O'Brien (1985) developed a research agenda for the gifted which included three major areas of investigation.

Understanding Intellectual Processes

This research would require investigations of knowledge acquisition, storage, and retrieval, as well as problem identification and solution. Efforts to describe these information-processing mechanisms should extend across the lifespan.

Differentiating Social and Personality Characteristics

Variables of socialization, motivation, energy, and personal perceptions appear to influence the degree to which intellectual gifts are fully realized. Research in these areas would include investigations that could determine why some highly intelligent individuals lead concomitantly creative and productive lives whereas others do not. Again, it would be important to look at such characteristics across substantial periods of time.

Assessing Educational Strategies for Gifted Students

We need to determine what kinds of programs most benefit what kinds of gifted and talented children so that we can better target our scarce educational resources. We should support programs to the extent that they provide evidence that they make a real difference.

The newly established National Center for Research on the Gifted and Talented will, undoubtedly, develop a research agenda of its own (Renzulli, 1991). The following represent areas of investigation of special interest to the author of this report.

Table 2.—Federal policy and legislation regarding the gifted

1958	Following the Soviet Union's launching of the first satellite (Sputnik) in 1957, Congress declared an educational emergency and enacted the National Defense Education Act (P.L. 85-864), which allocated funds to develop potential for talent in math, science, and foreign languages.
1965	The Elementary and Secondary Education Act (P.L. 89-10) passed in Congress; Titles III and V related to the development of model gifted programs and the hiring of state-level gifted education personnel.
1968	President Johnson established a White House Task Force on the Gifted and Talented; the formal report was never published, but a 50-state survey was completed.
1969	Federal bills were introduced in both houses of Congress that would have established a federal definition, provided support to states to expand programs, and directed the U.S. Commissioner of Education to conduct a study on the needs of the gifted.
1970	Federal bills introduced in 1969 were included as section 806 of the Elementary and Secondary Educational Amendments of 1969 (P.L. 91-230), which mandated a report to Congress on the status of and need for programs for the gifted.
1971	Sidney P. Marland, Jr., U.S. Commissioner of Education, submitted to Congress the report mandated by P.L. 91-230. *The Marland Report* (1972) included a national assessment of educational programs for the gifted and talented and a federal definition of gifted and talented students.
1973-1974	Several federal bills introduced in both houses of the 93rd Congress resulted in the establishment of an Office of Gifted and Talented in the the U.S. Office of Education, annual appropriations for the office, grants for training, research and demonstration projects, grants to state and local agencies, and the establishment of a national clearinghouse related to gifted.
1975	Only $2.5 million was appropriated for federal efforts, funding remained at this level for several years.
1977-1978	Federal bills supporting the education of the gifted and talented were again introduced in both houses of Congress. The proposed Gifted and Talented Children's Education Act (P.L. 95-561) passed as Title IX-A of the Education Amendments of 1978.
1978-1980	Appropriations increased from $3.8 million to $6.2 million in 1980. President Carter supported continuing $6.2 million funding.
1981	Congress provided $5.6 million in fiscal year 1981. The consolidation and improvement provisions of the Omnibus Budget Reconciliation Act of 1981 consolidated 20 programs into a Chapter 2 block grant for state and local educational agencies; funding decreased 42% for programs.
1982-1983	The National Commission on Excellence was established; hearings were held around the country on six aspects of public education including gifted education; the National Business Consortium was established to put business and education into a partnership for the promotion of education of the gifted.
1983	The report of the National Commission on Excellence in Education, titled *A Nation at Risk: The Imperative for Education Reform*, was published; education of the gifted was mentioned in several sections.
1983-1984	In the 98th Congress, the Senate established a caucus on children that explored (among other issues) the impact of federal budget cuts on highly talented children, especially special populations.
1987-1988	Both houses of Congress overwhelmingly passed virtually indentical bills regarding education of the gifted. The Senate passed House Omnibus Bill, S. 373. The House bill was also included in the House Omnibus Bill, H.R. 5. Funding of $7.9 million was appropriated for the reestablishment of a Federal Office of Gifted and Talented, for grants for training and demonstration projects, for grants to state and local agencies, and for the establishment of a National Research Center.

Note: Data obtained from DeLeon and Vandenbos (1985), Radcliffe (1987, 1988), and Tannenbaum (1983).

Information Processing

One of the most potentially fruitful lines of investigation seems to be the continuation and extension of various investigations on information processing in human beings, particularly children. There has been little written about the "executive function" or the control mechanisms by which we pay attention, or how we choose between various cognitive strategies or decide on our mode of intellectual expression (Borkowski & Kurtz, 1987).

Decision-making is a poorly understood information processing function and one that could be studied fruitfully in young children where it can be seen in a more observable process than in the complex network of forces affecting decision-making in adults. One particular element of the executive function operation-problem-finding, or of choosing the most significant problem to be attacked—is an important act not only for researchers, but also for politicians, and artists, and parents. The right choice can lead to significant findings or products; the wrong choice can lead to months, or even years, of wasted effort. Obviously, how this process of decision-making works and how it can be enhanced is a key area of investigation.

Family Support

We now have a significant body of investigation demonstrating the importance of family encouragement and support for the full development of the intellectual capabilities of talented youngsters. One line of research would be to investigate how to provide support for families who are not now encouraging their talented youth, in the hopes that they would begin to play this role more assertively. Another line of investigation would be to examine whether other persons in the environment of the child (friends, relatives, teachers, etc.) can provide the type of support and encouragement necessary to promote full development of these talents, if the parents are, for some reason or other, unable to provide it.

School Program

When we attempt to evaluate the impact of a particular school environment, such as the resource room (Vaughn, Feldhusen, & Asher, 1991), or ability-grouping, or a particular instructional method such as creative problem-solving, we can be confused by the range and diversity of our results. It is clear that resource rooms work well sometimes, and not well at all other times. The Enrichment Triad Model is a great success in some places, and a disappointment in others. Merely placing youngsters in a particular setting, or providing them with a particular set of activities, does not necessarily lead to success. Therefore, it would seem most important to document, in some detail, what works.

If a resource room is doing an outstanding job by all accounts, then the particular way in which it is operating needs to be carefully analyzed and studied to understand the ingredients of this recipe for success. If an honors course in philosophy is achieving visible and tangible success, then the nature of that total setting needs to be examined. Is success dependent upon a creative teacher, or are there other elements in the situation that need to be recognized? By studying the staffing patterns, the history, the processes, and the students, it may be possible to emerge with some better idea of what the recipe for success is within a given structure or program.

A second area of concern in the school program is the nature of the alternative curriculum for gifted students. Much of the curriculum that is presented to the gifted student goes beyond the regular program. Currently, this alternative curriculum is designed on an ad hoc, program by program, basis. Should there be a scope and sequence established for programs for gifted students? Should there be a set of specific curriculum goals for history, or language arts, or economics, for gifted students? Deliberate attempts to develop sophisticated curricula should be supported and encouraged as a means for moving toward some more organized set of program activities and cur

riculum options for students at various educational levels.

Societal Interests

Many of the adaptation problems of gifted students and gifted adults come from the love-hate relationship that such talent generates in society at large. Socrates, Galileo, and many others have demonstrated what happens to the talented person who runs afoul of society or power groups within a society.

It seems reasonable to suspect that envy and dislike have always been part of the price that talented people pay for the expression of their talent. With Bach or Verdi, this was probably not terribly important since they needed to please only a relatively few people in order to continue doing what they wanted to do.

In a democracy, where large numbers of people have a "say" in what happens, it becomes increasingly important to understand societal ebbs and flows in attitudes toward gifted students and adults. What are the dynamics of societal concerns and reservations about such individuals? Is there fear that gifted individuals will use their abilities to gain control over others? How can such feelings be counteracted?

These are some possible topics for investigation. Funds have not always been available to address these issues seriously, however, and doctoral dissertations alone cannot be relied upon to explore and offer answers to some of the most complex of our educational problems.

Summing Up

The last quarter of a century has seen a quantum leap in our understanding of the student we refer to as gifted or talented. Many myths have been dispelled. There has been an increased level of sophistication regarding the nature of high intelligence, as well as considering the educational methods that can enhance its development. As more has become known about giftedness, there has been a greater emphasis on some of the subgroups with special needs; that emphasis will certainly continue into the near future. One thing, however, that clearly has not changed much is the ambivalent societal view of how giftedness and gifted individuals should fit into a democratic society.

Society may continue to view gifted behavior as an uncomfortable presence, as well as a great resource. However, it is increasingly clear that we deny its presence in our youth at our own national peril. We are neither so rich nor so blessed with natural resources that we can, as a nation, afford to ignore educationally the human potential in the minds of our gifted students.

Our generation will place its signature upon the poetry, the science, the art, and the business prosperity of the next generation, in large measure, by how enthusiastically we respond to the educational challenge of our gifted and talented children.

References

America 2000 (1991). Washington, DC: U.S. Department of Education.

Baldwin, A. (1987). Undiscovered Diamonds. *Journal for the Education of the Gifted, 10* (4), 271-286.

Barron, F., & Harrington, D. (1981). Creativity, Intelligence, and Personality. *Annual Review of Psychology, 32*, 439-476.

Bloom, B. (Ed.) (1985). *Developing Talent in Young People*. New York: Ballantine Books.

Bloom, B., Engelhart, M., Furst, E., Hill, W., & Krathwohl, D. (1956). *Taxonomy of Educational Objectives, Handbook 1: Cognitive Domain.* New York: McKay.

Borkowski, J. & Kurtz, B. (1987). Metacognition and Executive Control. In J. Borkowski & J. Day (Eds.), *Cognition in Special Children: Comparative Approaches to Retardation in*

Learning Disabilities, and Giftedness. Norwood, NJ: Ablex Publishing Corporation.

Bruner, J. (1960). *The Process of Education*. Cambridge, MA: Harvard University Press.

Butler-Por, N. (1987). *Underachievers in School: Issues and Intervention*. New York: John Wiley & Sons.

Callahan, C. & Caldwell, M. (1986). Defensible Evaluations of Programs for the Gifted and Talented. In C. Maker (Ed.), *Critical Issues in Gifted Education: Defensible Programs for the Gifted* (Vol.1). Rockville, MD: Aspen.

Callahan, C. (1983). Issues in Evaluating Programs for the Gifted. *Gifted Child Quarterly, 27*, 3-9. Clark, B. (1989). *Guiding your Gifted (3rd ed.)*. Columbus, OH: Charles H. Merrill.

Clark, B. (1989). *Guiding Your Gifted* (3rd ed.). Columbus, OH: Charles H. Merrill.

Coleman, M. (1992). A Comparison of How Gifted/LD and Average/LD Boys Cope with School Frustration. *Journal for the Education of the Gifted, 15* (3), 239-265.

Cornell, D.G., Callahan, C.M., & Loyd, B.H. (1991). Socioemotional Adjustment of Adolescent Girls Enrolled in a Residential Acceleration Program. *Gifted Child Quarterly, 35* (2), 58-66.

Crabbe, A. (1982). Creating a Brighter Future: An Update on the Future Problem Solving Program. *Journal for the Education of the Gifted*, 4, 2-9.

Crosswhite, F., Dossey, J., Swafford, J., McKnight, C., Cooney, T., & Travers (1985). *Second International Mathematics Study: Summary Report for the United States*. Champaign, IL: Stipes.

Davis, G. & Rimm, S. (1989). *Education of the Gifted and Talented (2nd ed.)*. Englewood Cliffs, NJ: Prentice-Hall.

Delisle, J. (1990). The Gifted Adolescent At-risk: Strategies and Resources for Suicide Prevention Among Gifted Youth. *Journal for the Education of the Gifted, 13* (3), 212-228.

Feldhusen, J. & Treffinger, D. (1980). *Creative Thinking & Problem Solving in Gifted Education (3rd ed.)*. Dubuque, IA: Kendall/Hunt.

Foster, W. (1986). Giftedness: The Mistaken Metaphor. In C. Maker (Ed.), *Critical Issues in Gifted Education: Defensible Programs for the Gifted* (5-30). Rockville, MD: Aspen.

Frasier, M. (1987). The Identification of Gifted, Black Students: Developing New Perspectives. *Journal for the Education of the Gifted, 10* (3), 155-180.

Galbraith, J. (1985). The Eight Great Gripes of Gifted Kids: Responding to Special Needs. *Roeper Review, 8* (1), 16.

Gallagher, J. (1984). Excellence and Equity—A Worldwide Conflict. *Gifted International, 2* (2), 1-11.

Gallagher, J.J. (1985). *Teaching the Gifted Child (3rd ed.)*. Boston, MA: Allyn & Bacon.

Gallagher, J.J. (1991). Educational Reform, Values, and Gifted Students. *Gifted Child Quarterly, 35* (1), 12-19.

Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.

George, P. (1988). Tracking and Ability Grouping: Which Way for the Middle School? *Middle School Journal, 20* (1), 21-28.

Getzels, J.W. & Csikszentmihalyi, M. (1976). *The Creative Vision: A Longitudinal Study of Problem Finding in Art*. New York: Wiley.

Goodlad, J. (1964). *School Curriculum Reform in the United States*. New York: Fund for the Advancement of Education.

Greeno, J. (1989). A Perspective on Thinking. *American Psychologist, 44*, 105-111.

Guilford, J. (1967). *The Nature of Human Intelligence*. New York: McGraw-Hill.

Hollingworth, L. (1942). *Children above 180 IQ Stanford Binet: Origin and Development*. Yonkers on Hudson, NY: World Book.

Horowitz, F. & O'Brien, M. (1985). *The Gifted and Talented: Developmental Perspectives*. Washington, DC: American Psychological Association.

Johnson, D. & Johnson, R. (1990). Social Skills for Successful Group Work. *Educational Leadership, 47* (4), 29-32.

Jones, L. (1989). School Achievement Trends in Mathematics and Science and What Can Be Done To Improve Them. *Review of Research in Education, 15*, 307-341.

Kagan, S. (1988). *Cooperative Learning: Resources For Teachers*. Riverside, CA: University of California.

Karnes, M.B. (1983). The Underserved: Our Young Gifted Children. Reston, VA: Council for Exceptional Children.

Kirst, M. (1982). How to Improve Schools Without Spending More Money. *Phi Delta Kappa, 64* (1), 6-8.

Kitano, M. (1991). A Multicultural Education Perspective on Serving the Culturally Diverse Gifted. *Journal for the Education of the Gifted, 15*, (1), 4-19.

Kulik, J. & Kulik, C. (1984). Synthesis of Research on Effects of Accelerated Instruction. *Education Leadership, 42*, 84-89.

Kulik, J. & Kulik, C. (1991). Ability Grouping and Gifted Students. In N. Collangelo & G. Davis (Eds.), *Handbook of Gifted Education* (pp. 178-196). Boston: Allyn & Bacon.

Maker, C. & Schiever, S. (Eds.), (1989). *Critical Issues in Gifted Education: Defensible Programs for Cultural and Ethnic Minorities*. Austin, TX: PRO-ED, Inc.

Maker, C. (1986). *Critical Issues in Gifted Education: Defensible Programs for the Gifted*. Austin, TX: PRO-ED.

Maker, C.J. (1989). Programs for Gifted Minority Students: A Synthesis of Perspectives. In C.J. Maker & S. Schiever (Eds.), *Critical Issues in Gifted Education: Defensible Programs for Cultural and Ethnic Minorities*. (Vol. 2), (pp. 311-328). Austin, TX: Pro-Ed.

Mansfield, R., Busse, T., & Krepelka, E. (1978). The Effectiveness of Creativity Training. *Review of Educational Research, 48*, 517-536.

Marland, S. (1972). *Education of the Gifted and Talented. Volume 1. Report to the U.S. Congress by the U.S. Commissioner of Education*. Washington, DC: Government Printing Office.

Meeker, M. (1969). *The Structure of Intellect: Its Interpretation and Uses*. Columbus, OH: Charles C. Merrill.

Meeker, M. (1976). *Basic Teaching Comprehensive Skills Workbook*. El Segundo, CA: SOI Institute.

Mercer, J. (1981). Testing and Assessment Practices in Multiethnic Education. In J. Banks (Ed.), *Multiethnic Education: Theory and Practice*. Boston, MA: Allyn & Bacon.

Naisbitt, J. (1982). *Megatrends*. New York: Warner Books.

National Commission on Excellence in Education. (1983). *A Nation at Risk: The Imperative for Educational Reform.* Washington, DC: U.S. Government Printing Office.

Olszewski, P., Kulieke, M., & Buescher, T. (1987). The Influence of the Family Environment on the Development of Talent: A Literature Review. *Journal for the Education of the Gifted, 11* (1), 6-28.

Parke, B. (1989). *Gifted Students in Regular Classrooms.* Boston, MA: Allyn & Bacon.

Parnes, S. (1981). *The Magic of Your Mind.* Buffalo, NY: Creative Education Foundations.

Passow, A. (1982). Differentiated Curricula for the Gifted/Talented. In *Curricula for the Gifted* (pp. 4-20). Ventura, CA: National/State Leadership Training Institute on the Gifted/Talented.

Plomin, R. (1989). Environment and Genes: Determinants of Behavior. *American Psychologist, 44, (2),* 105-111.

Rand, D. & Gibb, L. (1989). A Model Program for Gifted Girls. *Journal for the Education of the Gifted, 12* (2), 142-155.

Reis, S. & Callahan, C. (1989). They've Come a Long Way—or Have They? *Journal for the Education of the Gifted, 12,* (2), 99-117.

Reis, S. (1989). Reflections of Policy Affecting the Education of Gifted and Talented Students: Past and Future Perspectives. *American Psychologist, 44,* (2), 399-408.

Renzulli, J. & Reis, S. (1986). The Enrichment Triad/Revolving Door Model: A Schoolwide Plan for the Development of Creative Productivity. In J. S.Renzulli (Ed.), *Systems and Models for Developing Programs for the Gifted and Talented* (pp. 216-266). Mansfield Center, CT: Creative Learning Press.

Renzulli, J.S. & Reis, S.M. (1991). The Reform Movement and the Quiet Crisis in Gifted Education. *Gifted Child Quarterly, 35,* (1) 26-35.

Renzulli, J.S. (1986). The Three-Ring Conception of Giftedness: A Developmental Model for Creative Productivity. In R. Sternberg & J. Davidson (Eds.), *Conceptions of giftedness* (53-92). New York: Cambridge University Press.

Renzulli, J.S. (1991). The National Research Center on the Gifted and Talented: The Dream, the Design, and the Destination. *Gifted Child Quarterly, 35* (2), 73-80.

Richart, E. (1985). Identification of Gifted Children in the United States: The Need for Pluralistic assessment. *Roeper Review, 8* (2), 68-72.

Rimm, S. (1991). Underachievement and Superachievement: Flip Sides of the Same Psychological Coin. In N. Colangelo & G.A. Davis (Eds.), *Handbook of Gifted Education* (328-343). Boston: Allyn & Bacon.

Robinson, A. (1990). Cooperation or Exploitation? The Argument against Cooperative Learning for Talented Students. *Journal for the Education of the Gifted, 14* (1), 9-36.

Robinson, H. (1977). *Current Myths Concerning Gifted Children. Gifted and Talented Brief, 5,* 1-11. Ventura, CA: National/State Leadership Training Institute.

Rogers, K. (1986). Do the Gifted Think and Learn Differently? A Review of Recent Research and Its Implications. *Journal for the Education of the Gifted, 10* (1), 17-40.

Schmiedler, A. & Michael-Dyer, G. (1991). *State of the Scene of Science Education in the Nation.* Washington, DC: United States Public Health Service.

Sicola, P. (1990). Where Do Gifted Students Fit? An Examination of Middle School Philosophy as it Relates to Ability Grouping and the Gifted Learner. *Journal for the Education of the Gifted, 14* (1), 37-49.

Simon, H. (1978). Problem Solving and Education. In D. Tuma & R. Reef (Eds.), *Problem Solving and Education: Issues in Teaching and Research.* Hillsdale, NJ: Erlbaum.

Simon, H. (1979). Information Processing Models of Cognition. *Annual Review of Psychology, 30*, 363-396.

Sisk, D. (1989). Identifying and Nurturing Talent among the American Indians. In C.J. Maker & S. Schiever (Eds.), *Critical Issues in Gifted Education: Defensible Programs for Cultural and Ethnic Minorities (Vol.2)*, (pp. 128-132). Austin, TX: Pro-Ed.

Slavin R. (1990). Ability Grouping, Cooperative Learning and the Gifted. *Journal for the Education of the Gifted, 14* (1), 3-8.

Slavin, R. (1990a). Research on Cooperative Learning: Consensus and Controversy. *Educational Leadership,47* (4), 52-54.

Southern, W., Jones, E., & Fiscus, E. (1989). Practitioner Objections to the'Academic Acceleration of Gifted Children. *Gifted Child Quarterly, 33* (1), 29-35.

Sparling, S. (1989). Gifted Black Students: Curriculum and Teaching Strategies. In C.J. Maker & S. Schiever (Eds.), *Critical Issues in Gifted Education: Defensible Programs for Cultural and Ethnic Minorities* (Vol. 2), (pp. 259-269). Austin, TX: Pro-Ed.

Stanley, J. & Benbow, C. (1986). Extremely Young College Graduates: Evidence of Their Success. *College and University, 58*, 361-371.

Stanley, J.C. (1991). An Academic model for Educating the Mathematically Talented. *Gifted Child Quarterly, 35* (1), 36-42.

Sternberg, R. & Davidson, J. (1986). *Conceptions of Giftedness.* Cambridge, UK: Cambridge University Press.

Sternberg, R. (1985). *Beyond IQ: A Triarchic Theory of Human Intelligence.* Cambridge, UK: Cambridge University Press.

Storfer, M. (1990). *Intelligence and Giftedness: The Contributions of Heredity and Early Environment.* San Francisco, CA: Jossey-Bass.

Tannenbaum, A. (1983). *Gifted Children.* New York: MacMillan Publishing.

Terman, L. & Oden, M. (1947). *The Gifted Child Grows Up* (Vol. 4). Stanford, CA: Stanford University Press.

Terman, L. & Oden, M. (1959). *The Gifted Group at Mid-Life* (Vol. 5). Stanford, CA: Stanford University Press.

Terman, L. (1925). *Mental and Physical Traits of a Thousand Gifted Children* (Vol. 1). Stanford, CA: Stanford University Press.

Torrance, E. & Torrance, P. (1978). Future Problem Solving: National Interscholastic Competition and Curriculum Project. *Journal of Creative Behavior, 12*, 87-89.

Torrance, E. (1977). *Discovery and Nurturance of Giftedness in the Culturally Different.* Reston, VA: Council for Exceptional Children.

Treffinger, D. (1991). School Rreform and Gifted Education--Opportunities and Issues. *Gifted Child Quarterly, 35* (1), 6-11.

Van Tassel-Baska, J. (1986). Acceleration. In C. Maker (Ed.), *Critical Issues in Gifted Educa-*

tion: Defensible Programs for the Gifted (pp. 179-208). Rockville, MD: Aspen.

Vaughn, V.L., Feldhusen, J.F., & Asher, J.W. (1991). Meta-analyses and Review of Research on Pull-out Programs in Gifted Education. *Gifted Child Quarterly, 35* (2), 92-98.

Weinberg, R. (1989). Intelligence and IQ: Landmark Issues and Great Debates. *American Psychologist, 44* (2), 98-104.

Whitmore, J. & Maker, C. (1985). *Intellectual Giftedness in Disabled Persons.* Rockville, MD: Aspen Systems Corporation.

Whitmore, J. (1980). *Giftedness, Conflict, and Underachievement.* Boston, MA: Allyn & Bacon.

Zappia, I. (1989). Identification of Gifted Hispanic Students. In C.J. Maker & S. Schiever (Eds.), *Critical Issues in Gifted Education: Defensible Programs for Cultural and Ethnic Minorities* (Vol. 2), (pp. 19-26). Austin, TX: Pro-Ed.

American Culture and the Gifted

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Daniel P. Resnick and Madeline Goodman in American Culture and the Gifted examine the relationship between American culture and its efforts to educate gifted and talented students. The authors present an historical overview of the cultural forces that have affected public policy, review the conflict between equality and intellect, and examine public education's attempts to educate gifted students. The lack of respect for achievement, effort, and merit in American schools and culture is described, and Resnick and Goodman discuss the tension between the cultural values of attitude toward intellect and deviance. The ideas of de Toqueville, Locke, Binet and Terman are cited by the authors to help explain the cultural forces influencing the education of gifted children.

Resnick and Goodman conclude by identifying three challenges for American educational policy makers. The authors believe that educational leaders need to make American culture supportive of the efforts to develop the talents of its young people by recognizing their achievements. The second challenge is to reform schools so that the needs of students who have a "curiosity and taste for achievement" are challenged and a less restrictive view of talent is adopted. The third area of challenge is the need to make able students "visible pace-setters within their schools" and to make schools more challenging for a broader spectrum of students.

This essay is about the relationship between cultural patterns in American life and our nation's response to the challenge of educating the gifted and talented. In the chemistry of that interaction between culture and policy lies some explanation for our faltering commitment to develop the potential of our most talented young people and to grant dignity to their dreams and ambitions. This relationship is difficult to explore. For while it is clear that our culture is dynamic and evolving, examining it requires one to label its central elements.

The difficulty of describing gifted education in America is compounded by problems of generality and definition. Discussions of policy must be broad enough to include the actions of school districts, states, and the federal government, but too much generality in the argument may deprive the reader of adequate focus. As to "giftedness" itself, there is no tight definition, no single agreed-on meaning. It is a flexible construct which is part of the debate over culture and policy.

Culture embraces the pattern of customs, beliefs and practices in a society (Childes, 1964; Hansen, 1975; Kluckhorn & Kroeber, 1952; Sapir; White, 1975). Although cultures are often characterized by great richness and variety, there are also strong sources of anthropological and historical literature that characterize cultures in terms of single dominant traits. Alexis de Tocqueville's (1883,/1983) description of American society in the Jacksonian period as a culture of equality belongs in this category, as does Norbert Elias' (1983) portrait of Old Regime France as a society based on the etiquette of deference and distinction. De Tocqueville's portrait of the United States as an egalitarian society with low levels of interest in education and

intellect is a compelling one. But the American tendency to reduce social and intellectual distinctions does not exist in a vacuum.

What appears to characterize our culture as it educates the young is a tension between two quite different beliefs. The first is one that de Tocqueville identified in the 1830s when there were no more than five million Americans. In his eyes, the worth of individuals in American society was determined by what they made of themselves. There was no natural or inherited hierarchy, as there was in France, that could stand in the way of success for the industrious individual. Our support for common public schools at the elementary level was derived in some measure from that ideal.

The second value that has also influenced the public response to the education of young people, including the exceptionally able, is the acceptance of the inequality of natural endowments. Eighteenth century thinkers assumed that individuals were born with different capacities. During the Enlightenment, it was common for those who supported ideas of natural inequality to also support plans for public education. Thus, for John Locke, "Everyone's Natural Genius should be carried as far as it could. . ." (Locke, in Axtel, 1968). In the nineteenth century, however, theories of individual differences came to be linked with views of the domination of races, classes, and cultures. Individual differences were associated with rankings of power and privilege. Ideas about the natural superiority of races were used in the Atlantic world to justify the enslavement of Africans by those of European stock. Biological and geopolitical theories in the last few decades of the nineteenth century, part of the intellectual argument of Social Darwinism, supported the arguments about natural hierarchies, with serious implications for educational theory (Cravens, 1978; Kamin, 1974).

These two cultural currents were associated with competing views about whom our schools should teach, how they should teach them, and what resources to use in education. Out of the belief in equality stemmed support for elementary schooling, but under limited conditions. The programs of the common schools until the Civil War were largely confined to the basics of reading, writing, and arithmetic. Attendance in rural areas was sporadic; seasonal absences and voluntary termination of studies at the age of 12 or 13 was expected. A belief in natural inequality assumed that special opportunities would be needed by only a few who were privileged by family and circumstance—and that only this few could benefit from them.

In the tension between the two values, attitudes toward intellect and deviance were also forged. On the one hand, intellect was respected, particularly on its practical side where it could serve to generate wealth and position. On the other hand, intellect carried with it the stigma of deviance by assuming the superiority of a highly trained mind over even the most widely held opinions. Intellect was foreign to a society built on practicality and consensual understandings. It could be supported by a respect for natural differences in other cultures, but in the American setting the supporters of inequality were also driven by a preoccupation with the practical.

Giftedness in American schools, at least since the 1920s, has been seen as both a troublesome expression of deviance and a valuable human resource, playing out the ambivalent feelings about distinction that were clearly visible in the preceding century. The schools reflect the tensions within our culture surrounding both equality and intellect without offering a way to resolve them. Schools have devoted significant effort to identifying young people who are talented but have not found ways to respond to their needs. In general, school authorities have lacked the resolve to step up the pace of normal schooling to reduce boredom and have been equally remiss in not providing special and accelerated curriculum and instruction.

Public Policy Toward the Gifted

As a result of their capacities, gifted young people stand out in a culture that is wary of

differences. Their special needs can bring demands for differential treatment, and schools and policy boards have set about defining the conditions under which that can be justified. To this end, some educators have relied on the classic psychometric dimensions of verbal and mathematical aptitude classified for more than seventy years by intelligence tests. Others have looked for ways to recognize and encourage many different kinds of intelligence—among them the visual, musical and kinesthetic (Gardner, 1983).

Public support for special treatment of the gifted has changed over the years and has been far from even across state and district lines. The gifted, defined in some states and urban districts as those who excel in schoolwork, have had the opportunity for special treatment in their school programs in these states and urban districts for more than century. In the 1860s in St. Louis, Superintendent William Harris initiated a rapid promotion schedule for "bright pupils," a program widely emulated elsewhere. In the same era, the Regents of the state of New York introduced subject area examinations for entrance into academies. Only in the 1920s, when pencil and paper intelligence tests were first introduced in the schools for grade and program placement, did states and districts begin to define giftedness in the narrower terms of the verbal and mathematical aptitudes that those aptitude tests measured. Opportunities for rapid promotion, enriched programs, and special schools were all part of the response to this new conception of giftedness.

The first federal involvement in gifted education came in the 1930s, with the creation of an office on Exceptional Children and Youth in the U.S. Office of Education (Deleon & Vandenbos, 1985). The first major allocation of federal funding for the gifted in the post-war period came with the National Defense Education Act of 1958. Prompted by the launching of Sputnik, the act provided resources for the identification and guidance of gifted youths. A multitude of programs were created as a result of this initiative, but a sizable portion of them were eliminated when funding began to dwindle in the early 1960s.

In the mid-1970s, the federal government again began to show an interest in supporting programs for the gifted. The Education Amendments of 1974 included provisions for the establishment of an Office of Gifted and Talented in the U.S. Office of Education; authorization of an annual appropriation of up to $12.5 million; grants for training, research, and demonstration projects related to the gifted; grants to state and local education agencies for gifted education programs; and the establishment of a national clearinghouse of information related to the gifted and talented. Despite these efforts, however, as late as 1978 fourteen states still made no mention of gifted and talented children in their state codes or statutory language, and only an estimated four out of every one hundred gifted students had access to any enrichment activity in their school programs (Zettel, 1978).

By the early 1980s, the Office of Gifted and Talented had been closed and funding for gifted programs had mainly been me- -d into block grants to be used at the discretion of individual states. Later in the decade, sentiment again shifted as an Office of Gifted and Talented Students Education was reinstated and federal funding of gifted and talented programs was increased. Today, 47 states have legislation recognizing gifted and talented children, and 31 have specific standards to which state-funded gifted programs must adhere (Kleine, 1990).

Equality and Intellect: A Nineteenth Century Perspective

Examining the public environment in the early 1960s, John Gardner wrote: "the critical lines of tension in our society are between *emphasis on individual performance and restraints on individual performance*" (Gardner, 1961, p. 33). The notions that quality and equality represent tradeoffs in our culture, and that the ideal of equality places limits on recognizing distinction, have visible roots in our nineteenth century culture. Among

the weaknesses of American culture identified in de Tocqueville's *Democracy in America* (1833, 1983) was a tendency toward that 'middling standard':

> It is not only the fortunes of men which are equal in America; even their acquirements partake in some degree of the same uniformity. I do not believe that there is a country in the world where, in proportion to the population, there are so few ignorant, and at the same time so few learned, individuals. (p. 53)

Americans, according to de Tocqueville, admired and rewarded the inventive mind that concentrated on practical application of ideas. Rarely, however, did he see Americans engaged in more abstract levels of human knowledge or intellectual pursuits that tended to yield little tangible results in the physical world. De Tocqueville attributed these limits to the movement and pace of the democratic age, an age of "active life." Excessive value was assigned to "the rapid bursts and superficial conceptions of the intellect; and, on the other hand, [there was a tendency] to depreciate unduly its slower and deeper labors" (p. 165).

This "middling standard for human knowledge" was tied, in the French commentator's judgment, to the overwhelming power of popular opinion in American society. Other critics of our culture, historians among them, have extended de Tocqueville's argument. In *Anti-Intellectualism in American Life*, Richard Hofstadter (1970) writes: "Again and again . . . it has been noticed that intellect in America is resented as a kind of excellence, as a claim to distinction, as a challenge to egalitarianism, as a quality which almost certainly deprives a man or woman of the common touch" (p. 51). Such attitudes have had serious consequences for education in America where, Hofstadter continues, "vital segments have fallen into the hands of people who joyfully and militantly proclaim their hostility to intellect and their eagerness to identify with children who show the least intellectual promise" (p. 51)."

Equality, however, was more an ideal than a reality in Jacksonian America. The French observer was struck by the force of American political democracy, even though he did note the lines of race in our society (Drescher, 1968; Mayer, 1966). The reigning inequality in the distribution of wealth and power has been more fully explored by historians in the last quarter-century. Studies of social strife in the cities, slavery, and war against the Indian nations have highlighted the differences between the conditions of life of different parts of American society (McPherson, 1988). Although de Tocqueville's argument about our egalitarianism has not been sustained in contemporary American history, his judgment about patterns of conformity has been supported and extended. While social differences remained heated to the point of threatening violence, the underlying pull of many of the material changes in the society was toward increasing sameness in tastes and values.

The conformity of tastes, helped along in de Tocqueville's day by the absence of an established aristocracy whose preferences and eccentricities could resist public preferences, was supported in the second half of the century by the progress of mechanization and mass production. This was the age of the mass circulation of newspapers and magazines. The camera was invented, making it possible to mass produce identical images from a single negative. In the new department stores, retailers devised elaborate schemes to entice buyers to purchase mass-produced items, and buying and selling took on a cultural importance and form different from that in earlier times. There was a great improvement in material life for most of the population, but clothing and furnishings for most of the population looked more and more the same (Sennet, 1978).

Much of the pressure for standardization came from manufacturers and leaders in the top industries of the nation, particularly the railroads. Track widths had to be standardized to make rail travel across the nation possible. The needs of the railroad

industry and their customers, however, dictated a transformation much more profound than this—an alteration in time. Before 1883, every city in the U.S. had its own "local" time, based on its presumed relation to the sun. "Local" time played havoc with the needs of the transportation industry in setting train schedules. Railroads had to have their own time, registered on a separate clock in local train stations beside local time. The imposition of standard time, (which left the minutes hand on the clock unchanged between time zones and altered only the hour hand depending on whether one resided in the Eastern, Central, Mountain, or Pacific time zone) was, in effect, the process of imposing "railroad time" on the rest of the nation (Lasker, 1984).

Schools and the Gifted: The Formative Years

During the first decades of the twentieth century, the American educational system was experiencing unprecedented growth. Large influxes of immigrants in the quarter-century between 1890 and the First World War caused the country's population to grow from sixty-three million to over one hundred million, twenty times the population in de Tocqueville's day. At the same time, compulsory education and child labor laws were forcing more and more children into the schools. Additional school growth came as high school attendance became normative for those 14-18 years old. Elementary school enrollments increased by fifty percent, and attendance in the high schools increased five hundred percent. In a city like New York, in a single decade, 1900-1910, school enrollment increased 57 percent. More rapid promotion for the gifted was welcomed wholeheartedly as a policy by school administrators seeking to bring efficiency to their overpopulated schools.

Efficient management—associated with division of labor, assembly lines, and relatively undifferentiated products—meant reducing failure rates by placing students in adaptive classes appropriate to their abilities. The Russell Sage Foundation supported a study by former school superintendent Leonard Ayres (1909) to call attention to the problem of school failure. Ayres argued that too many students were overage for their school year, and repeated school failures were wasteful of school resources. Among his recommendations, Ayres proposed a curriculum "which will more nearly fit the abilities of the average pupil." Such attitudes created problems for the gifted who became more clearly identified as special and deviants in a school culture increasingly preoccupied with the mean, the middle, and the mass. Guy Whipple, writing at the end of the First World War on ways of responding to the needs of the gifted, noted that their needs had been placed in relief by "the mechanizing tendency of the graded school system" (1924, p.1).

The intelligence test helped school administrators to identify the gifted. An early version was designed by Alfred Binet in France to predict which children would be unable to succeed in school. It had to be individually administered and required two to three hours. Lewis Terman created an American version, the Stanford-Binet, which still required individual administration. In 1917, one of Terman's graduate students, Arthur Otis, resolved these problems by creating and norming a group pencil-and-paper version of the test. Used as the basis for the Army Alpha test on 1.7 million World War I draftees in 1917, it proved the feasibility of mass testing for school purposes.

The introduction of intelligence tests to establish giftedness did no great service to educators. For Lewis Terman and his generation, the gifted enjoyed their abilities as the result of natural endowment and not opportunities created by schooling. He remained highly skeptical of the value of research on ways in which child-rearing and early schooling influenced the emergence of talent, and his own studies of the life course of the gifted in the 1920s started with children who were already eleven years old (Chapman, 1988). For Terman, the function of educational psychology was largely

to place students of different abilities with their peers. Education became involved more with recognizing talents than with developing them.

A movement beyond the classification of students on scales of verbal and mathematical ability required a richer view of both the varieties of creativity and intellect in children and a more sanguine and constructive view of how schools could promote achievement. By 1930, some of the racial and ethnic bias associated with early school classification efforts had been recognized, and some of the leaders in the movement had recanted earlier racial positions (Cravens, 1978). There was also growing interest in the variety of aptitudes children might have. School structures, however, remained relatively rigid, and there was little effort devoted to using schools to promote achievement. Pennsylvania and New York Regent studies in the Great Depression showed the problems of low morale and achievement even among gifted students. Pennsylvania, for example, identified in a graduating class across the state a large number of very able students, more talented than many of their peers, who never continued on to college (Learned & Wood, 1938).

The paradigm for the identification of the gifted by intelligence tests was solidified between the two world wars, and a high test score remained the major or sole determinant of eligibility for participation in gifted programs in most states and districts into the early 1960s. Research studies presented to Congress indicated that until the end of the 1950s, schools were defining the gifted as those whose test scores were in the upper 2 to 3 percent and thus had a Binet I.Q. of 130 or more (Marland, 1972). Since the 1960s, criteria for eligibility have been broadened to recognize teacher recommendations and demonstrations of capacity and insight, particularly in the arts. These changes responded both to research on human differences and the political and legal battles over civil rights. Gifted programs were opened to more females and minorities, but the ambivalence about special opportunities for a small portion of the population persisted.

Post-War Culture, Schooling, and the Gifted

The period after World War II brought major strides in removing the worst forms of racial inequality and religious intolerance in our society. It also introduced Americans to a competitive world environment in which school success had some bearing on national strength. The Soviet Union's early success in launching the Sputnik satellite in the 1950s started a space race which had some positive short-term effects on academic programs particularly in science and mathematics. Those programs, in turn, opened up new curricular opportunities for the most able students in our schools.

A major innovation of direct interest to the most able students, operating without any necessary relationship to IQ scores, was the Advanced Placement (AP) program. The college level syllabus examination courses were introduced into the high schools in 1953 with the support of the Fund for the Advancement of Education. Their direction was later taken over by the College Board. Although only a little over 500 students in 18 schools took the syllabus examination program in its first year, the figure had increased to 29,000 by twelve years later. By the early 1980s, the number taking AP courses had risen to more than 120,000, and was increasing at the rate of 10 percent a year. In 1991, 42 percent of all secondary schools in the United States offered AP courses (AP Yearbook, 1990).

The AP program introduced a model of high-level work for the high schools that continues to influence discussions of standards, curriculum and assessment. The demands of the course program were clear to administrators, teachers and students, and within the means of most high schools. In the words of an evaluator of the programs, "There are few schools, public or independent, large or small, urban or rural, that could not institute Advanced Placement in one form or another and in at least one subject" (Copley, 1961, p. 33). Eligibility to

take the courses did not depend, in most schools, on IQ tests, but on motivation and teacher recommendation (Fenton, in Cohen, 1966). The AP program continues to grow, and what was introduced as a program for the gifted, has attracted students who want to "stretch" and learn to become achievers under conditions of high expectations. The College Board's Pacesetter Program for the 1990s is an effort to extend to a broader portion of the high school population a syllabus-backed course program with enriched forms of assessment.

Curricular efforts to enrich programs and accelerate student development have generally not received support from the tests that are now in use in the schools. The pencil and paper testing programs which have served to identify the gifted as well as the least able are not designed to help students learn. Nor do they encourage students to integrate knowledge, carry out projects, or keep records of their written work. Characterized by a view of knowledge that is decomposed and decontextualized, such tests have the effect of fragmenting learning. Unlike the examinations introduced by Advanced Placement, the most common forms of aptitude tests encourage no writing. It should be no surprise then, that as Applebee (1981) estimates, 97 percent of the writing that is done in secondary school English classes is a paragraph or less in length. The longest passage for reading comprehension in the standardized tests commonly administered to high school students is no more than 350 words, and most are shorter (Resnick, in Gifford & O'Connor, 1991). There are clearly negative consequences for the language development of all children in this kind of environment.

The assessment system within our schools lacks the external examination component common within the school systems of other nations (Cheney, 1991). Advanced Placement, International Baccalaureate and the New York Regents examinations being the exception. External examinations in the school programs of European and Asian nations encourage those students to work for success in mastering the knowledge of a field and to demonstrate that knowledge through extended written and sometimes oral performance. Our system does not give our own most able students that opportunity for social recognition and it deprives culturally excluded minorities of a way to earn school success through hard work. The absence of equitable and universal standards for all students allows prejudices about minority potential to go unchallenged.

The inequality of school expectations for poor and minority communities exacerbates the low expectations for the school population generally. With low school expectations, there can be little hope of overcoming the deficits of our out-of-school culture, particularly in the area of language. Inequality of access to language is a serious impediment to the *development* of giftedness in children. Heredity is significant in shaping only part of the capabilities of the gifted, as a number of studies have shown; the other factor is environment (APA Monitor, 1991; Bouchard, Lykken, McGue, Segal, & Tellegen, 1990). Inequality of access to a rich language of practice is clearly tied to the conditions of poverty.

The number of poor children has increased in the last quarter-century, and their social status has deprived many of needed opportunities to grow in their control of language. Language is an instrument to develop a sense of power over environment and to communicate with others. Losses in the occasion to discover and practice language can thus stunt the development of talent. The declining practice of exchanges through language—oral and written—can be traced in the family, the community, and the school. As the occasions for sustained contacts with family members has declined, the much vaunted individualism of our society has expressed itself in boredom and solitude for many young people (Brice-Heath, in Lunsford, Moglen, & Slevins, 1989).

The growth of single-parent households, dual-career families and non-kin nonconjugal temporary households has removed and altered the nature

of family occasions for talking and listening to share experiences. Only 7 percent of American families in the mid-1980s had two parents with a working father and an at-home mother. In Csikszentmihalyi and Larson's (1984) study of 75 middle-class adolescents in the Chicago area in the late 1970s, as Shirley Brice-Heath (1990) notes, the teenagers spent a total of only about half an hour a week interacting with their fathers alone (on half of the occasions, a television set was on) and less than fifteen minutes a day interacting with their mothers (Resnick, 1990). Meals and outings together are becoming rarer, and those in the adult world who can model for their children the art of story-telling are fewer in number. Although these occasions are often thought of as ways of sustaining traditional family values, they should also be understood as occasions for language exchange that develop the sense of self and self-confidence of the young.

That decline has been mirrored in the reductive patterns of linguistic communication in the television medium, the most accessible literacy medium for the American population. While young people were not reading very much, not doing much homework, and not finishing high school in greater numbers (the rate of school completion, 75 percent, was the same at the end of the 1980s as it had been in the mid-1960s), their viewing of television did not suffer. Television, in turn, reenforced the pleasures of the spectator and intensified the exposure to the marketing of articles of mass consumption. Volumes have been written to protest the school-taught literacy of American young people, but the public literacy of mass consumption has just emerged as a matter of public concern (Sizer, in Lunsford, Moglen & Slevin).

Even in early summer, television sets are on for seven hours or more a day in 95 percent of American homes. About one-third of American households, more than thirty-five million of them, can be expected to watch a Super-Bowl with its bits and pieces of comment, logos and celebrations of the wedding of business, leisure, and bone-crunching ballet (Sizer, in Lunsford, et.al.). It is a rare event, by contrast, when more than a tiny percentage of television audiences will watch theater, in which the power of language is stretched to its fullest.

The fundamental inequality represented by the withdrawal of language opportunities from a large segment of our population is underlined by Joseph Brodsky in his acceptance speech for the 1988 Nobel Prize in literature: ". . .if it is still possible to find some purely physical or material grounds for the existence of social inequality, for intellectual inequality these are inconceivable. Equality in this respect, unlike anything else, has been guaranteed to us by nature. I am speaking not of education, but of the education in speech, the slightest imprecision in which may trigger the intrusion of false choice into one's life. . ." (pp. 27-32).

Toward a Respect for Achievement

The traditions of respect for effort and reward for merit in our culture are now poorly represented within the schools and better represented in the external community where children devote the hours of learning and practice to out-of-school activities—in music, dance, theater, technology, and sports. Consequently, students are unmotivated to perform in school. In this context, some models can be found for revitalizing high achievement standards in school. Something as seemingly common as the Merit Badge program of the scouting movement deserves our attention in this regard. In 1986, the national Boy Scout organization reported that more than 1.6 million different badges were earned by a little under a million enrollees, ages 11-17 (J.W. Dean, personal communication). Merit badges are offered in more than a hundred fields that include birdwatching, bookbinding and botany, and each certificate requires considerable study and a demonstration of learned competence before a proficient judge. Only a small portion of Scouts will have earned enough certifi-

cates to be eligible, with other requirements, for Eagle Scout status, but the goal and possibilities are extended to a very large number.

It is an expectation that the gifted will become bored and non-adaptive in our school system. This is well-illustrated in an episode recounted in a recent ethnography of preschools in three different cultures. Examining a videotape of a Kyoto preschool, an American early childhood educator Dana Davidson commented to Japanese teachers that the explanation for a child's obstreperous behavior might well be the result of giftedness. When asked what the concept of giftedness meant, he said the following:

> Well, by giftedness in the United States, we mean someone who is exceptionally talented in some area, like intelligence. Like Hiroki [the child in question] who seems to be so smart, so quick. He has such a bright look in his eyes. We would say that a boy like this has a lot of energy and is so bright that he is quickly bored by school. To me, it seems that his incidents of misbehavior occur when he has finished his work before the other children. He provokes his teacher and the other children in an attempt to make things more exciting, better matched to the pace and level of stimulation he needs (Tobin, Wu, & Davidson, 1989, p. 24-25).

The Japanese teachers rejected this explanation and insisted that Hiroki was of average intelligence like all the other children. The cultural anthropologist David Wu and his coauthors found little resonance for American understandings of giftedness and the problems associated with it in their discussions with the Japanese. They wrote: "We suspect that many Japanese preschool teachers and administrators we talked with found our questions about giftedness hard to understand in part because of their distaste for the notion of inborn abilities and their suspicion that the identification of children as having unequal abilities would inevitably lead to an unequal allocation of educational effort, resources, and opportunity" (Tobin, et. al.; 1989, p. 24-25).

American rhetoric about giftedness has an archaic character to it, tied to late nineteenth and early twentieth century theories of inherited traits and social ranks, often masking a genuine concern for the full development of the child. In that mode, the rhetoric is as difficult for many lay Americans to accept as it was for these Asian teachers. The practical American response to evidence of unusual talent, however, has won a deserved amount of respect. It amounts to breaking the mold of everyday schooling practice for such children, changing their environment so that they can accelerate programs, attend complementary external classes, and enjoy more individualized learning opportunities. When Americans worry about what to do about the schooling of those they have identified as gifted, they turn away from conventional practice. That is also what they will have to do if they wish to *develop* the talent of our young. In that effort, our inherited culture, with its dynamic tensions, will not be the enemy of change.

Conclusion

American policymakers at work on education for the gifted and talented face three challenges that call for sensitivity to the limits and potential of our cultural environment. The first challenge is to find ways to make the culture of the society supportive of efforts to develop the talents of the young, within and outside of school, and to encourage the emergence of as varied a developed pool of talent in the society as possible. The second is to modify the program of the schools so that they can be adequate not only for the broad middle of students but also for those who have a curiosity and taste for achievement and individual effort which is not visible in the rest of the age group. The third is to make especially able young people the visible pacesetters within their schools so that others can take pride in their achievements and aspire to earn like rewards.

If the first goal is to make our culture supportive of the search for and development of talent, we

must understand the predisposing forces and habits, in the Burkean sense, that move Americans toward and away from respect for such goals. Although thoughtful critics of our culture, from de Tocqueville onward, have called attention to our aversion to distinction based on intellect, and to our drift toward a leveling kind of democracy, we believe that certain elements of our culture are also struggling against these tendencies. These elements support recognition of achievement and talent in ways that make our democracy more informed and more capable of survival.

If the second feature of the challenge is to make public education more adaptive to the varied talents of the young, we raise two caveats. Talent must be developed and not simply recognized. Talent speaks in a number of tongues; its arts are many. It is no longer credible to speak only of talent along the dimensions described by tests of mental intelligence. A restricted view of talent as an inborn and genetic property of races, cultures, or families, common from 1905 through 1925, is no longer an acceptable premise for American psychology. The nature-nurture argument has been resolved in a way that indicates a significant if not always determining role for environment—and therefore education—in the emergence of talent.

The task for education in a democracy is to maximize the capacity of talent to develop in as rich and full a way as possible. In order to reach out to the diversity of talent, it will be necessary to reshape broad patterns of schooling, and not just the programs dealing with those already identified as talented and gifted. Too narrow a focus risks denying the opportunity for development to those whose family, class, sex, race, or personality remove them from the ways of behaving that allow for early identification as talented.

Adaptation to individual differences in the interests of better education need not confine itself to the school environment. Across the nation, schools are working with libraries, museums, science centers, symphonies, universities and businesses to create adaptive learning experiences for young people. We have models in other nations for adolescent programs of part-time schooling and part-time work that have become appealing even to the strongest academic students. It would be unreasonable to assume that better solutions for the education of young people can be found by confining ourselves to the narrowest notion of institutional schooling.

Finally, we deal with the challenge of helping other students find common ground with the gifted. It is a common finding that bright young people, when confronted with ordinary schoolwork, tend to withdraw, become bored, and sometimes develop behavior problems. Ordinary youngsters, however, are also quite bored with school. As Mihaly Csikszentmihalyi (1984) described the experience of middle-class Chicago students in the late 1970s, school is a joyless and dispiriting part of their day. Easy access to education and an easy passage through school has been revealed as a demoralizing experience for the least as well as the most able. We are now at a juncture where we can place the experience of leveling in some historical perspective and seek out ways to restore the sense of challenge. This must be done, however, in ways that promise reward in more varied forms and for a broader portion of the school population than was done in the past. Our effort to broaden as widely as possible the opportunities for development of talent suggest that the search to create challenges in schooling should address a broad spectrum of public school students.

Gifted young people have emerged over the past century and a half, more as a challenge to the organization of the American system of education than as a special resource to be developed. That organizational system has, in turn, shown a great debt to nineteenth century culture and institutions. As we turn in the last decade of our own century to a reordering of the public system of education, many of those values and cultural patterns require reexamination. A way must be found to turn the constraints of the past into the opportunities of the present.

Attention to the needs of the gifted forces into sharp relief the way in which talent and effort have been recognized in public education. The gifted have been, for the most part, participants in mainstream patterns of curriculum and assessment. The deficiencies of these arrangements—their low expectations of effort and their inability to award achievement—are especially visible when examined from the perspective of the gifted, who demand challenging programs. Our attention to their needs, however, should not obscure the imperative of improving the overall school environment in which they work.

To a large extent, the fate of education for the gifted is tied to the general conception of public education. It is the character of our mainstream education that has excluded the gifted. The preoccupation with conformity to a broad middle, with middling down, is a long-standing one in our culture, and it has entered the ethos of public schools. When norms for performance are established in that way, the gifted are deviants. When, however, the expectations for learning and achievement of the broader school population are raised, we may expect a large improvement in the schooling and satisfaction of the most able. Until the broader norms of schooling reward effort and achievement, the most and least able will suffer together.

References

A.P. Yearbook 1990. (1990). New York: College Entrance Examination Board.

Applebee, A. (1981). *Writing in the Secondary School: English and the Content Areas*. Urbana: NCTE.

Bouchard, Jr., T.J., Lykken, D.T., McGue, M., Segal, N.L., & Tellegen, A. (1990, Oct. 12). Sources of Human Psychological Differences: The Minnesota Study of Twins Reared Apart. *Science*, *250* (4978), pp. 223-228.

Brice-Heath, S. (1990, Spring). The Fourth Vision. *Daedalus*, 291.

Brice-Heath, S. (1989). The Fourth Vision: Literate Language at Work. In A.A. Lunsford, H. Moglen & J. Slevin (Eds.), *The Right to Literacy*. New York: Modern Language Association.

Brodsky, J. (1988, Jan. 4 and 11). Uncommon Visage. *The New Republic*, pp. 27-32.

Chapman, P. (1988). *Schools as Sorters: Louis M. Terman, Applied Psychology, and the Intelligence Testing Movement, 1890-1930*. New York: New York University Press.

Cheney, L. (1991). *National Tests: What Other Countries Expect Their Students To Know*. Washington D.C.: National Endowment for the Humanities.

Childe, G.V. (1984). *What Happened in History*. Baltimore: Penguin Books.

Copley, F. (1961). *The American High School and the Talented Student*. Ann Arbor: University of Michigan.

Cravens, H. (1978). *The Triumph of Evolution: American Scientists and the Heredity-Environment Controversy, 1900-1941*. Philadelphia: University of Pennsylvania Press.

Csikszentmihalyi, M. & Larson, R. (1984). *Being Adolescent*. New York: Basic Books.

de Tocqueville, A. (1983). *Democracy in America* (R.D. Heffner, Ed.). New York: New American Library. (Original work published 1833).

Deleon, P.H. & Vandenbos, G.H. (1985). Public Policy and Advocacy on Behalf of the Gifted and Talented. In F.D. Horowitz & M. O'Brien (Ed.), *The Gifted and Talented—Developmental Perspectives* (p. 410). Hyattsville, Maryland: American Psychological Association.

Drescher, S. (Ed.). (1968). *Tocqueville and Beaumont on Social Reform.* New York: Harper and Row.

Elias, N. (1983)*The Court Society* (E. Jephcott, Jr.). New York: Pantheon Books.

Fenton, E. (1966). In the Secondary Schools. In J.W. Cohen (Ed.), *The Superior Student in American Higher Education* (221). New York: McGraw Hill.

Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.

Gardner, J. (1961). *Excellence: Can We Be Equal and Excellent Too?*. New York: Harper and Row.

Hansen, F.A. (1975). *Meaning in Culture.* Boston: Routledge and K. Paul.

Hofstadter, R. (1970). *Anti-Intellectualism in American Life.* New York: Alfred A. Knopf.

Kamins, L.J. (1974). *The Science and Politics of I.Q.* New York: Halsted Press

Kleine, P. A. (1990). *For Gifted and Talented Students, School is a Place to Be—Not a Place to Learn.* Draft of a paper commissioned by U.S. Department of Education office of Gifted and Talented (p. 4).

Kluckhorn, C. & Kroeber, A.L. (1952). *Culture: A Critical View of Concepts and Definitions.* New York: Random House.

Lasker, A. A.(Fall 1984). Standard Time Had a Rough Time in Bangor. *Maine Historical Society Quarterly, 24* (2), pp. 274-279.

Learned, W.S. & Wood, B.D. (1938). *The Student and His Knowledge; A Report to the Carnegie Foundation on Results of the High School and College Examinations of 1928, 1930, and 1932.* New York: Carnegie Foundation for the Advancement of Teaching.

Locke, J. (1968). Some Thoughts Considering Education. In J.L. Axton (Ed.), *The Educational Writings of John Locke: A Critical Edition with Introduction and Notes.* London: Cambridge University Press.

Marland, Jr., S.P. (1972) *Education of the Gifted and Talented, Report to the Congress of the United States by the U.S. Commissioner of Education.* Washington, D.C.: U.S. Government Printing Office.

McPherson, J. (1988). *Battle Cry of Freedom: The Civil War Era.* Oxford and New York: Oxford University Press.

Research on the Effects of Heredity on I.Q. Using Identical Twins. (1991, January). *APA Monitor*, p. 1.

Resnick, D.P. (1990, Spring). Historical Perspectives on Literacy and Schooling. *Daedalus*, pp. 15-32.

Resnick, D.P. & L.B. (1991). Assessing the Thinking Curriculum. In B.R. Gifford & M.C. O'Connor (Eds.), *Future Assessments: Changing Views of Aptitude, Achievement and Instruction*. Boston: Kluwer Academic Publishers.

Sapir, E. In D. Mandelbaum (Ed.), *Culture, Language and Personality.* Berkeley: University of California Press.

Sennet, R. (1978). *The Fall of Public Man: On the Social Psychology of Capitalism.* New York: Vintage Press.

Situation of the Black Race in the United States: Dangers Entailed for the Whites by its Presence (1966). In J.P. Mayer (Ed.), *Democracy in America*. New York: Harper and Row.

Sizer, T.R. (1989). Public Literacy: Puzzlements of a High School Watcher. In A.A. Lunsford, H. Moglen & J. Slevin (Eds.), *The Right to Literacy*. New York: Modern Language Association.

Tobin, J.J., Wu, D.Y.H., & Davidson, D.H. (1989). *Preschool in Three Cultures: Japan, China and the United States*. New Haven: Yale University Press.

Whipple, G. (1924). Historical and Introductory. *The Education of Gifted Children, Twenty-third Yearbook of the National Society for the Study of Education*. (Part 1), 1. Bloomington, Ill.: Public School Publishing Co.

White, L. (1975). *The Concept of Cultural Systems: A Key to Understanding Tribes and Nations*. New York: Columbia University Press.

Zettel, J. (1979). State Provisions for Educating the Gifted and Talented. In H. Passow (Ed.), *The Gifted and Talented: Their Education and Development—The Seventy-fifth Yearbook of the National Society for the Study of Education*, Part 1 (pp. 63-65). Chicago: University of Chicago Press.

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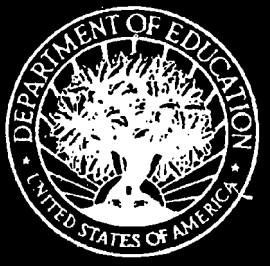

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