Synthesis of Research on Effects of Accelerated Instruction

A meta-analysis of 26 studies shows that accelerated gifted students perform almost a year ahead of talented, same-age control students and about as well as talented older students.

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When faced with technological challenges from abroad, American society has looked upon its academically gifted youth as a precious national resource. After the Russians launched Sputnik in 1957 for example, educational researchers began searching for better ways of identifying gifted learners; and school systems began developing programs to nurture the talents of their best and brightest pupils. After the Sputnik era, many school systems turned their attention away from the gifted and toward the socioeconomically disadvantaged, minorities, and the handicapped. *Equality* replaced *excellence* as the watchword in American education.

We are now entering a new technological era in which this country will face unprecedented competition to its technological leadership. We are almost certain to see renewed interest in education of the gifted in the years ahead. One early sign of a resurgent interest in talented students is the report of the Commission on Excellence in Education (1983). The report identified the gifted and talented as a "key group of students" for which the federal government has a special responsibility. Although the commission did not specify the kinds of programs that would be best for gifted students, it did recommend that placement and grouping of students be guided by their academic progress and instructional needs rather than by rigid adherence to age.

Special school systems for gifted students go back to the mid-19th century when accelerated instruction was first used to break the lockstep of age-graded classes (Otto, 1950). The St. Louis public school system introduced one of the first accelerated programs in 1862, when it began requiring frequent reclassification and promotion of pupils who varied markedly from the rest of their age group. Within a few decades other school systems introduced other forms of acceleration, and accelerated instruction took hold as a basic concept in the education of the gifted.

Acceleration has been in and out of favor in the years since. Today it is still among the most controversial of all approaches to education of children of unusual talent. Its supporters claim that accelerated instruction enables bright children to work with their mental peers on learning tasks that match their abilities. Opponents, however, argue that acceleration is undemocratic, promoting snobbery in an accelerated elite and a sense of inferiority in those who are left behind.

Researchers have carried out numerous controlled evaluations of accelerated instruction in an attempt to resolve differences in opinion about its effects. These studies can be divided into two types. The first type of study compares the performance of

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accelerated students with the performance of same-age nonaccelerates. In studies of this type, accelerates and nonaccelerates are of the same age and ability; but they differ in grade level when outcomes are measured. The second type of study compares accelerates with same-grade nonaccelerates of equal intelligence. Comparison groups in this type of study are equivalent in grade and IQ when outcomes are measured, but they differ in chronological age and also in mental age. The purpose of studies of this type is to determine whether talented younsters who are accelerated into higher grades perform as well as the talented, older pupils already in those grades.

Reviewers of studies of acceleration have reached favorable conclusions about its effects. Goldberg (1958) pointed out that it was hard to find a single research study showing accel-

eration to be harmful and that many studies showed it to be a very satisfactory method of challenging able students. Begle (1976) concluded that students who have been accelerated in mathematics almost always score higher than same-age controls and almost never score lower. He also pointed out that accelerated students usually do about as well as talented, nonaccelerated older students and that they almost always do better than average, nonaccelerated older students.

Paradoxically, however, acceleration has not been the favored way of dealing with talented students within the schools. Programs of enrichment and grouping have proved to be far more popular. "Perhaps what is needed," Gallagher suggested in 1969, "is some social psychologist to explore why this procedure is generally ignored in the face of such overwhelmingly favorable results" (p. 541). Our hypothesis is that narrative reviews of findings on acceleration have not made findings clear enough for educational policymakers.

To bring findings on acceleration into clearer focus, we recently carried out our own review of the research results. Unlike the earlier reviewers, we used objective and quantitative methods in our "meta-analysis." Glass (1976) first used this term to describe the statistical analysis of a large collection of individual studies for the purpose of integrating the findings. We hoped that this approach would overcome the shortcomings of narrative reviews.

Method

Reviewers who use meta-analytic techniques: (1) employ objective procedures to locate as many studies of an issue as possible; (2) describe features and outcomes of the studies in quantitative or quasi-quantitative terms; and (3) use statistical methods to determine the relationship between study features and study outcomes. We followed these three steps in our analysis.

To locate studies of accelerated instruction, we carried out computer searches of three major library data bases. The searches yielded 21 separate reports on the topic. The reports appeared in journal articles, books, dissertations, and clearinghouse documents. The 21 reports contained results from 26 different studies.

These studies covered three major approaches to acceleration: grade skipping; compressing a curriculum for talented students (for example, completing four years in three); and extending the calendar to speed up the progress of such students (completing the work of four years in three school years with five summer sessions, for example). The studies also differed in experimental design, course setting, and publication history. We created eight categorical variables to classify the 26 studies according to such features.

Each of the 26 studies described the cognitive outcomes of acceleration, and a few studies described some noncognitive educational outcomes as well. To express outcomes of each study on the same metric, we used the index of effect size—*ES* (Glass, 1976). This index gives the number of standard deviations that separate the group averages that are being compared. The index is defined as the difference between the means of two groups divided by the standard deviation of the control group.

Glenn R. Babbitt

Thirteen of the 26 studies that we located used same-age control groups to measure the effects of acceleration, and 13 studies used older control students. Findings of the two types of studies were distinctly different; therefore, we analyzed the two sets of findings separately.

Achievement Results

Each of the 13 studies with same-age control groups showed greater student achievement in the accelerated class. The average *ES* in the 13 studies was 0.88. This means that achievement scores of accelerated students were, on the average, 0.88 standard deviations higher than were scores of same-age nonaccelerates. To interpret this effect more fully, it is useful to refer to areas of the standard normal curve. Approximately 81 percent of the area of this curve falls below a z score of 0.88. We can conclude, therefore, that in the typical study, approximately 81 percent of the students in the accelerated class outperformed the typical student in the control class.

Grade equivalents provide another rough guideline for interpreting *ES*'s. The standard deviation of most achievement tests in elementary school is approximately 1.0 grade-equivalent units. The grade-equivalent score of a typical accelerated student would, therefore, be about 0.88 grades (or nearly one grade) higher than the score of a bright, nonaccelerated student of the same age. The overall message is unequivocal: acceleration contributes to student achievement.

In striking contrast to studies with same-age controls, studies with older control groups reported only small differences in achievement between

accelerates and nonaccelerates. In some of the studies, the accelerated students had slightly higher achievement scores; in some studies, the accelerates had slightly lower scores. The average *ES* in the 13 studies with older control groups was 0.05. This difference in average achievement of accelerates and nonaccelerates is minimal.

Even though performance of accelerates and nonaccelerates was similar in these studies, the study results seemed remarkable to us because the accelerates were at such a clear disadvantage. They were approximately a year younger than the nonaccelerates in chronological age; and more important, they were approximately a year younger in mental age as a consequence of the matching of accelerates and nonaccelerates on IQ. Because performance on standardized tests in such subjects as mathematics and English is strongly influenced by mental age, the accelerates could hardly be expected to equal the older nonaccelerates in test performance. Yet in most comparisons accelerates did very well indeed.

Effects of acceleration varied somewhat in each of the two types of studies: those using same-age controls and those using older control groups. The variation seemed great enough to lead us to suspect that factors other than acceleration were playing a role in determining study outcomes. Further analysis, however, did not establish that study features were significantly related to achievement outcomes. The small number of studies available for this analysis might have accounted in part for the failure to find significant relationships.

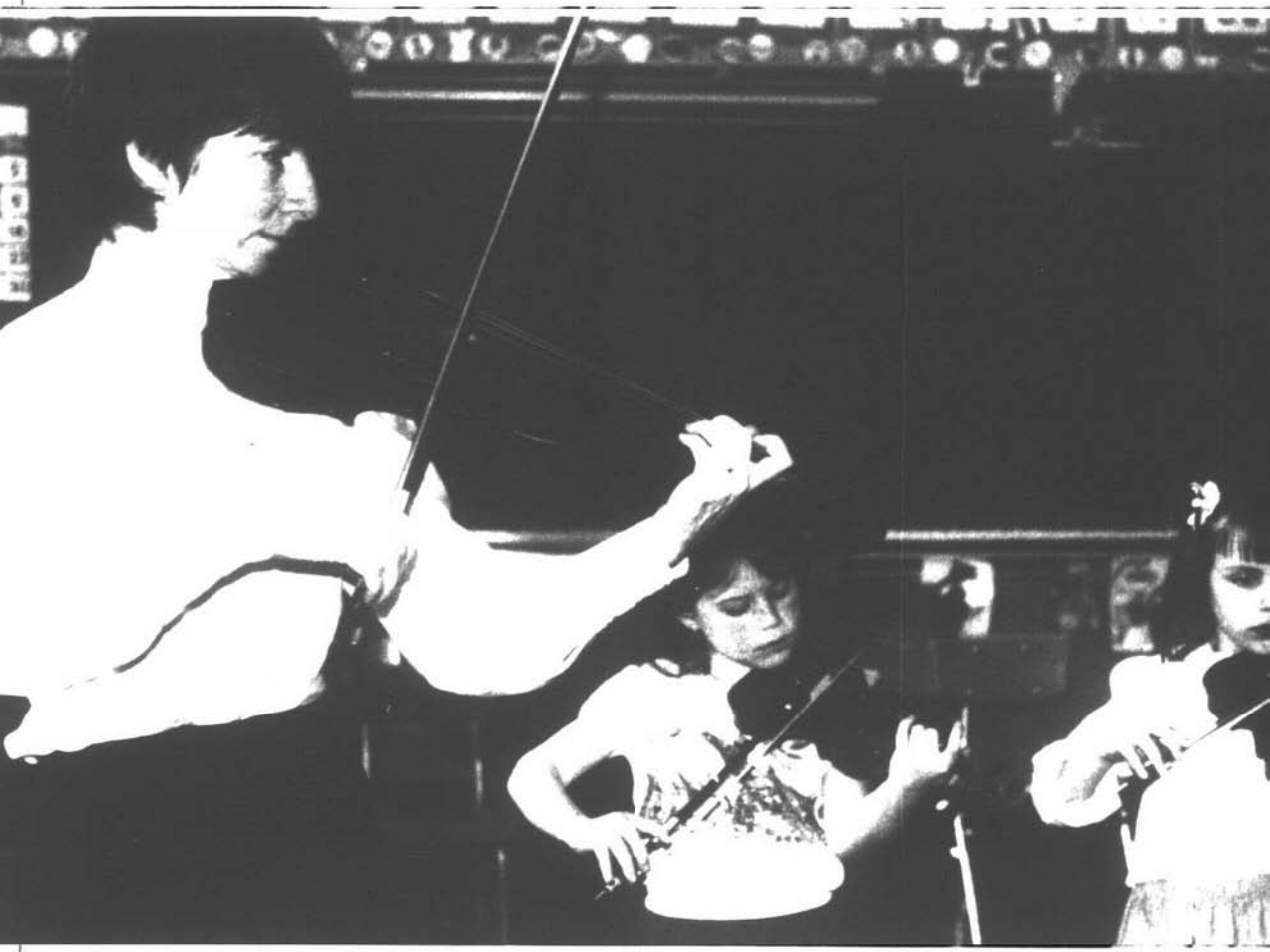
This failure to find strong relationships between study features and study outcomes was a major disappointment to us, but it was not a surprise. On the basis of a number of

Highlights of Research on the Effects of Acceleration

Research on acceleration of students to higher grades shows that such students:

- **Outperform students of the same age and ability who are not accelerated.**
- **Achieve as well as equally gifted older students in the higher grades.**

As to effects of acceleration on attitudes and social adjustment, research provides little evidence one way or the other. However, results of older, correlational studies not included in the meta-analysis suggest that accelerates are equally successful later in life.



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meta-analyses carried out by himself, his colleagues, and students, Glass concluded that study features seldom explain much variation in study outcomes in the social sciences (Glass, McGaw, and Smith, 1981). Our meta-analytic results supported Glass's conclusion.

Noncognitive Outcomes

Although debates about the value of acceleration often focus on its supposed negative social and attitudinal effects, only a small number of studies investigated noncognitive outcomes of accelerated instruction. Findings in these studies could best be characterized as sketchy and inconclusive. A few studies provided evidence that accelerated instruction can have a positive effect on students' vocational plans, and a few showed that teachers give positive ratings to students who are in accelerated programs. The studies provided little evidence, however, of a consistent effect of acceleration on student attitudes toward school or school subjects; on participation in school activities; on student popularity with peers; or on self-reported student adjustment.

One factor that may have contribut-

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ed to the inconsistency of findings on nonintellective outcomes was the variety of ways in which such outcomes were measured. With poorly calibrated measuring instruments, investigators can hardly expect to achieve exact agreement in their results. It is also possible that slight differences in program emphasis that do not influence intellective outcomes may influence attitudinal and social outcomes of instruction. A program like the one studied by Fox (1974), for example, may have affected students' vocational plans because teachers in the program emphasized students' career and vocational identity. Programs in which teachers do not emphasize vocational identity may have relatively little influence on students' vocational plans.

Discussion

Our meta-analysis provided strong evidence that talented students are able to handle the academic challenge that accelerated programs provide. Two major findings supported this conclusion. First, talented youngsters who were accelerated into higher grades performed as well as the talented, older pupils already in those grades. Second, in the subjects in which they were accelerated, talented accelerates showed almost a year's advancement over talented same-age nonaccelerates.

A question that our meta-analysis did not answer is whether the benefits of accelerated instruction endure into the adult years. The studies that we included in our analysis did not address this point. None of them looked beyond the high school years. In addition, the measures employed in the studies were paper-and-pencil tests and questionnaires. These are reasonable methods for judging success in school; they are not the methods usually used for measuring success in life.

In influential studies not included in our review, however, Flesher (1945) and Terman and Oden (1947) examined effects of acceleration on important criteria of life achievement. Flesher, for example, paired 19- and 20-year-old graduates of the College of Education at the University of Ohio with older graduates of the same sex, general ability, and grade average. She found that the younger graduates outdid their elders in securing advanced degrees. A greater number of them secured teaching positions immediately after graduation. More of them were able to secure top salaries in the teaching professions. They impressed their school administrators more favorably as teachers. Throughout, according to Flesher, the record of the younger graduates was as good as or better than that of the older. Terman and Oden's findings were similar. None of these results were included in our analyses, however, because they came from correlational rather than experimental studies. Nonetheless, these correlational results are an important supplement to our findings. Together, experimental and correlational studies provide strong evidence that acceleration leads to greater student achievement in school and in life for talented students.□

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