

Accelerative Strategies: How Effective are they for the Gifted?*

Linda E. Brody
The Johns Hopkins University

Camilla Persson Benbow
Iowa State University

Abstract

Accelerative strategies offer gifted students the opportunity to participate in educational programs suited to their particular needs and interests. Yet, fear of possible negative effects of acceleration prevents many educators from advocating these options. The Study of Mathematically Precocious Youth (SMPY) has evaluated the long-term effects of a variety of accelerative options for a group of highly gifted students. Academic achievements, extracurricular activities, goals and aspirations, and social and emotional adjustment were considered, and no discernible negative effects of various accelerative strategies were found.

The nation's most highly gifted and talented students often have difficulty being challenged in a regular classroom. Since classroom instruction is usually designed for the benefit of students who function at the level of the majority of their age peers, this instruction, no matter how well done, may not be appropriate for the extremely gifted student whose abilities differ greatly from this group. Even special programs for gifted and talented students may be designed for a broad group of gifted students and may not meet the specific needs of the extremely talented child, especially one with a special intellectual talent.

In response to these students' special needs, the staff of the Study of Mathematically Precocious Youth (SMPY) has explored possibilities for educating students who have been identified as extremely talented in mathematical or verbal reasoning ability. They have encouraged such students to choose from a "smorgasbord" of educational alternatives to meet individual needs and interests (Stanley, 1978; Stanley & Benbow, 1982; Stanley & Benbow, 1983a). Many of the options such as grade skipping, early graduation from high school, early entrance to college, acceleration in one or more subject areas, Advanced Placement Program tests, and college courses while in high school involve some degree of acceleration. These options generally utilize existing educational programs, but they stress a flexible approach to choosing curricula that meet the educational needs of individual students.

Yet, acceleration for gifted students is controversial. Proponents argue that, in addition to providing a suitable and challenging education for gifted students, acceleration costs little to implement and may actually save school systems money if students spend fewer years in the system (e.g., Stanley & Benbow, 1982). Kulik and Kulik (1984) found that accelerated students performed as well as older students with whom they were placed and exceeded the achievement of non-accelerated students of the same age and ability by almost a year. Concern about the social and emotional effects of acceleration (Kulik & Kulik, 1984), however, is the primary reason for bias against its use, although many studies have documented the benefits of acceleration without harmful social and emotional effects (e.g., Daurio, 1979; Fund for the Advancement of Education, 1979; Hobson, 1963; Pollins, 1983; Pressey, 1949; Robinson, 1983; Stanley, 1985a,b; Stanley & Benbow, 1983b; Stanley & McGill, 1986).

Because the controversy over the effects of acceleration continues to exist, a long-term evaluation is needed. This study assesses the academic achievements, extracurricular activities, goals and aspirations, and social and emotional development of talented students who have accelerated to varying degrees during the high school years and compares them to non-accelerates.

Methods

The subjects were identified in talent searches conducted by SMPY in December 1976 or January 1978. Seventh grade and under-age eighth grade students who had scored in the upper three percent on the mathematical part of a standardized achievement test were eligible to participate in the talent search and take the Scholastic Aptitude Test (SAT), an examination designed chiefly for college-bound students finishing high school. Students who met certain criteria were invited for further testing, counseling, and longitudinal follow-up. For the 1976 group, the criterion was $2(\text{SAT-M}) + \text{SAT-V} \geq 1330$. For the 1978 group, any one of the following applied: (1) $\text{SAT-M} \geq 500$ and $\text{SAT-V} \geq 430$, (2) $\text{SAT-M} \geq 550$, (3) $\text{SAT-V} \geq 580$, and (4) Test of Standard Written English ≥ 58 . Two hundred seventy-eight students from 1976 and 395 from 1978 met the eligibility criteria and came for additional testing.

When these students had completed high school, they were sent a 20-page questionnaire. For the 1976 group, 90% of the locatable females and 86% of the locatable males returned a questionnaire. Nineteen students (7%) were unlocatable. For the 1978 group, 75% of the locatable females and 77%

*We are grateful to Julian C. Stanley, Founder and Director of the Study of Mathematically Precocious Youth at Johns Hopkins University, for helpful comments and suggestions, and Lois S. Sandhofer for preparation of the manuscript. This study was supported by grants from the U.S. Department of Education and the National Science Foundation.

of the locatable males responded, while 6% were unlocatable. For this study, the students identified in 1976 and 1978 were combined for statistical analysis.

The subjects were divided into four groups on the basis of the accelerative strategies they reported using in high school. Group 1 (N = 143) included students who had skipped one or more grades, graduated from high school early, or entered college early without graduating from high school. These students were considered the most accelerated, since they had gained a year or more in the process. Group 2 (N = 277) consisted of students who reported taking AP tests or college courses on a part-time basis while in high school but did not meet the criteria for Group 1. These are options that may have resulted in course credit for the student and clearly involved work beyond the high school level. We considered this group the second most accelerated. Group 3 (N = 50) were students who reported participating in subject matter acceleration, special classes or tutoring. While we did not always have information on the nature of these experiences, students in this category generally did not receive credit for the experience. Thus, this group was considered less accelerated than the first two groups. Group 4 (N = 40) included students who reported having no accelerative experiences. Approximately two-thirds of each group were males and one-third were females.

The follow-up questionnaire included items about high school experiences, post-secondary education, employment, family background, and attitudes and interests. Items relating to the specific areas of interest in this study were selected for analysis to compare the four groups. In addition, the students identified in 1976 were also administered several tests as part of the follow-up, including the Adjective Check List (ACL). The ACL consists of a list of adjectives from which

particular ones may be selected to describe an individual. Scales have been developed to describe particular psychological traits (Gough & Heilbrun, 1980). Some of these scales were used in this study to assess personality characteristics and emotional adjustment.

One-way analysis of variance (ANOVA) was used to compare the groups where test scores or interval data were involved, followed (when the ANOVA was significant) by a Scheffé multiple comparison test to determine group differences. For variables involving nominal data, chi square comparisons were used. Analyses were performed using the SPSSX computer program.

Results

Academic Accomplishments

Students reported their SAT scores in high school (see Table 1). On the SAT-M, Groups 1 and 2 scored significantly higher than Groups 3 and 4 ($p \leq .01$). This might be expected, since these groups had also scored higher on the SAT-M in the talent search. It is important to note, however, that acceleration, particularly for those who skipped a year in high school, did not adversely affect SAT scores and thereby limit possibilities for college acceptance. Moreover, there were no differences between the groups on SAT-V in high school (Table 1). Again, this was important because spending fewer years in high school apparently did not restrict growth on the SAT significantly. Group 1 did score higher than Group 3 in the verbal area in the talent search ($p \leq .05$), but no differences were found with the other groups. We also studied average scores on the College Board Achievement Tests. The mean scores for all four groups were quite high, and there were no significant differences (see Table 1).

Table 1
Means and Standard deviations of selected variables by group

Variable	Group 1			Group 2			Group 3			Group 4		
	Mean	s.d.	N	Mean	s.d.	N	Mean	s.d.	N	Mean	s.d.	N
SAT-M	743	46	132	741	48	268	705	65	44	698	59	38
SAT-V	658	71	133	666	69	268	642	68	44	632	86	38
TS SAT-M*	579	81	142	548	64	276	510	52	49	519	49	40
TS SAT-V**	467	75	142	453	71	276	433	57	49	439	85	40
College Board Achievement Tests	708	51	88	699	51	196	700	50	19	690	48	18
Grade Point Average	3.7	.4	141	3.8	.3	276	3.6	.6	49	3.6	.4	40
Proportion of Semesters of As	.4	.3	136	.4	.3	273	.3	.3	50	.3	.3	39
Special Accomplishments	1.2	1.5	143	1.4	1.4	277	1.3	1.4	50	1.2	1.4	40
Total Awards	2.8	2.3	143	2.5	2.0	277	2.1	2.2	50	2.2	1.9	40
National and State Awards	1.1	1.1	143	.8	1.0	277	.7	1.0	50	.6	.8	40
No. of Types of Activities	4.2	2.2	143	5.3	2.0	277	4.6	2.4	50	4.7	2.1	40
No. of Leadership Activities	1.3	1.3	143	2.0	1.5	277	1.7	1.7	50	2.0	1.6	40
No. of Offices Held	1.5	1.6	143	2.0	1.8	277	1.9	2.0	50	1.5	1.5	40
Self Esteem	17.2	2.5	138	17.2	2.6	271	17.4	2.6	50	16.4	3.6	39
Locus-of-Control	16.0	2.2	137	16.1	2.1	270	15.9	2.2	50	15.9	2.7	39

* Talent Search SAT-M score
** Talent Search SAT-V score

Achievement in school was also investigated. Differences were found in overall grade point average (GPA) between the 8th and 12th grades using ANOVA and the Scheffé test. Groups 1 and 2 had significantly higher GPAs than Group 3, and the mean for Group 4, while not significantly different statistically from the other groups, was almost the same as for Group 3 (see Table 1). The number of semesters of all As between and including 8th grade and 12th grade was also considered. The numbers were adjusted for the number of semesters the students spent in school during that time. In Table 1 are shown the proportion of semesters attended that the students in each group received all As. No significant differences were found, using ANOVA. Students also reported their academic rank in school as being in the top ten percent, second ten percent, third to eighth ten percent, ninth ten percent, or bottom ten percent. A chi square comparison of all responses was significant ($p \leq .001$). The majority in all groups were in the top ten percent, but this was more frequently true for Groups 1 and 2, where 84% and 83%, respectively, were in this category, than for Groups 3 and 4, where 72% and 68% were in the top ten percent. In terms of grades in school, therefore, the accelerated students in Groups 1 and 2 had higher GPAs and class rank, and as many semesters of all As, as the non-accelerates. Clearly, achievement in high school coursework did not suffer as a result of the accelerative options selected. Since it is likely that the students in Groups 1 and 2 also took more difficult courses (e.g., Advanced Placement courses are usually the most difficult a high school offers), the achievement of these students in terms of grades is even more impressive.

Academic awards and special accomplishments were also considered. There were no significant differences between the groups in National Honor Society membership. There were also no significant differences in the number of National Merit Finalists in each group, although there were higher percentages in Groups 1 and 2. Finally, few students in any group reported being Presidential Scholars, and the differences were not significant. Group 1 was at a disadvantage for this honor, however, since students who did not complete their senior year would be ineligible. Chi square comparisons were used for these analyses.

Students were also asked the number of school, local, state, and national awards they had won in high school, and no statistically significant differences in the total number of awards reported by each group were found by an ANOVA. Group 1 did win significantly more national and state awards than Group 4, however ($p \leq .05$) (see Table 1). Special accomplishments were also assessed, including inventing something, making a presentation at a conference, editing a paper or yearbook, writing a published article, working on a special project in art, mathematics, or science, or contributing to an important research project. The average number of accomplishments per student in each group is shown in Table 1. No significant group differences were found. Finally, participation in mathematics or science contests or special honor-

ary programs was considered. Chi square comparisons revealed no significant differences between the groups.

We conclude that few differences were found between any of the groups with regard to special awards and accomplishments. The accelerated students, however, including those who spent less time in high school, appear to have done at least as well as the others in these accomplishments, and Group 1 students won more state and national awards. Moreover, the accelerated students did as well as or better than the non-accelerated students on standardized tests and in high school coursework. Thus, no disadvantages of acceleration were found from these analyses.

Extracurricular Activities

We were also interested in investigating the effects of acceleration on participation in extracurricular activities. Students were asked if they participated in any of 14 types of school and community activities such as academic clubs, service clubs, student government, performing arts, and athletics, as well as anything else not listed. The mean number of types of activities each group participated in is shown in Table 1. Group 2 participated in significantly more types of activities than Group 1 ($p \leq .05$). Other comparisons were not significant.

The clubs and activities were also combined according to four categories to determine if the accelerated students were more likely to join a certain type of activity than the non-accelerated students. The clubs were classified as school clubs, athletics, performing arts, and community organizations. Students were classified as to whether they did or did not participate in each type of activity. Chi square comparisons were then made. Group 2 had the most participants in school clubs (97%, $p \leq .01$), followed by Group 1 (92%) while Groups 3 and 4 had 86% and 88% participation, respectively. In athletics, Groups 2 and 3 had the most participants (66% and 68%, respectively), and Group 1 the least (53%), but the differences were not significant. In the performing arts, Group 4 had the most participants (70%) followed by Group 2 (64%), while Group 1 had the least (52% $p = .056$). Groups 2 and 3 had the most students involved in community organizations (58% in each compared to approximately 45% for the other two groups) ($p \leq .05$).

Since these analyses did not measure the extent of commitment to each activity, the students were asked the types of activities in which they had assumed a leadership role. The mean number of leadership activities reported by each group is shown in Table 1. Students may, of course, have been involved in more than one activity in a category, and that was not measured. Still, a significant difference was found. Groups 2 and 4 reported the most leadership areas, with Group 2 being significantly different from Group 1 ($p \leq .001$). In a separate but related question, Group 2 also reported being an officer in an organization more than any other group, although Group 3 was a very close second. A significant difference was found only between Groups 1 and 2 ($p \leq .05$).

Although there is some variation in the results, an apparently consistent trend suggests that Group 2 is the most involved in extracurricular activities. The students in Group 1 appear to be somewhat at a disadvantage in this area, although there are indications that they do participate in some activities. Perhaps students who enjoy activities do not choose to accelerate by skipping any of their high school years.

College Selectivity

We used Astin and Henson's (1977) College Selectivity Index to measure the level of selectivity of the colleges these students attended. The index is based primarily on the average SAT scores of the students attending. Since the mean SAT scores in all four groups were extremely high, many of these students could be expected to attend selective colleges. A fairly wide range of colleges was found in all four groups. When we looked at the percent of students in each group, however, who attended a college rated among the top 50 in the United States, Groups 1 and 2 had considerably more (62% for Group 1, 56% for Group 2, 28% for Group 3, and 33% for Group 4). A chi square was significant ($p \leq .001$). It is, of course, impossible to know whether the accelerative options helped students gain admission to more selective colleges, or whether students who choose to accelerate also choose to attend more selective colleges because they have been exposed to a more rigorous educational program and are better motivated toward academic excellence. Still, this finding is clearly supportive of the advantages of acceleration.

Goals and Aspirations

We were also interested in examining the goals and aspirations of the students in the four groups. The students were asked the academic degrees they planned to earn. Relatively few students did not plan to earn at least a Bachelor's degree. The differences were more apparent at higher levels. When law, medicine, and PhD degrees were combined, 49% of Group 1 and 46% of Group 2 planned to earn a degree at this level, compared to 20% of Group 3 and 23% of Group 4. The chi square was significant ($p \leq .001$).

The importance of particular goals was also assessed, with students indicating whether these goals were "very," "somewhat," or "not" important to them. Chi square comparisons revealed no differences among the groups on any of the following goals: being successful in work, having lots of money, having strong friendships, finding steady work, being a leader in the community, being able to give your children better opportunities, living close to relatives, correcting social inequities, having leisure time, or having children. "Getting away from this area of the country" was somewhat more important for Group 4 than the other groups ($p \leq .01$), and marriage and a happy family life were somewhat less important for Group 1 than the other groups. Students were also asked to anticipate their workstyle plans in terms of combining a ca-

reer and a family, i.e. whether they would work full-time always, part-time always, full-time until they had children, etc. There were seven possible combinations. No important differences were found as the majority in all groups selected the full-time options.

Thus, few differences were found with regard to lifestyle plans and goals, but Groups 1 and 2 did have higher educational goals than Groups 3 and 4. The greater desire of some of these students to earn higher degrees may have contributed to their greater willingness to accelerate. It is also possible that more challenging and appropriate educational experiences as a result of accelerative options have stimulated higher aspirations.

Social and Emotional Characteristics

Since the social and emotional adjustment of accelerated students has been of great concern, items were included on the questionnaire that were designed to measure the subjects' feelings about their own self-worth and their ability to control the direction of their lives. The items used were obtained from the sophomore questionnaire of the National Longitudinal Study sponsored by the National Center for Education Statistics (Conger, Peng & Dunteman, 1976; Peng, Fetters & Kolstad, 1981). To improve reliability, four items were combined to form a self esteem scale, and four items were combined to form a locus-of-control scale. The reliabilities of these scales were assessed using Cronbach's coefficient alpha and were found to be .82 for the self esteem scale and .46 for the locus-of-control scale. Analysis of variance comparing the four groups on these scales revealed no significant differences (see Table 1).

Items derived from the Cattell 16 Personality Factors Questionnaire (Cattell & Butcher, 1968) were included on the questionnaire to assess personality traits. Each item was presented as a scale from 0 to 10, with one extreme of the trait represented as 0 and the other extreme represented as 10. Using ANOVA, no significant differences were found among the groups on any of the items, with one exception. This item ranged from "conservative, stick to established methods" to "radical, willing to experiment." Group 1 had the highest mean score, which indicated that they were the most willing to experiment, and it was significantly different from Group 2. This finding is compatible with the fact that Group 1 was willing to accelerate the most radically of the four groups.

Although the Adjective Check List had been administered only to the group of students identified in 1976, we decided to use those scores in this study because it is standardized and would provide additional validation of our other findings with regard to social and emotional adjustment. On the ACL, the groups were compared on the favorable and unfavorable adjectives checked, the 15 Need Scales, and the Topical Scales of Self Control, Self Confidence, Personal Adjustment, and Ideal Self. There were no significant differences using ANOVA on any of these scales.

On the variables investigated, therefore, no personality differences were evident among the four groups, and no harmful social and emotional effects of acceleration were demonstrated. The only difference found was that Group 1 was less conservative than Group 2, which may partially explain that group's willingness to accelerate.

Discussion

This study investigated the relationships between acceleration and academic achievement, extracurricular activities, goals and aspirations, and social and emotional adjustment for highly able students who have selected accelerative options to varying degrees. The students were identified in SMPY's talent searches as being extremely talented mathematically and/or verbally and were followed up several years later. For this study, the subjects were assigned to one of four groups on the basis of the type of acceleration they had chosen during high school. Group 1 was the most accelerated and participated in some grade skipping; Group 2 took AP or part-time college courses which should have resulted in some college credit, but they did not skip any grades; Group 3 had some subject matter acceleration, special classes, or tutoring, but we had no reason to believe they had received any credit for the experiences; and Group 4 reported no acceleration.

This study did not reveal any harmful effects as a result of acceleration. In all areas of academic achievement, the accelerated students in Groups 1 and 2 did as well as or better than the students in Groups 3 and 4. Even in the area of special awards and accomplishments, the accelerated students did as well, and Group 1 earned more state and national awards in spite of skipping a grade sometime between 8th grade and the end of high school and having less time in which to earn such awards. Moreover, a larger proportion of students in Groups 1 and 2 attended highly selective colleges than in Groups 3 and 4.

In extracurricular activities, Group 1 was at a disadvantage; Group 2 generally seemed to be the most involved in activities. It is possible that students who skip a grade and are therefore younger than their classmates do not feel comfortable joining the older students in activities. A large proportion of the Group 1 students did participate in some type of school club, however, so this does not appear to be the problem. It is more likely that narrower interests or less free time contributed to these students' being involved in fewer activities.

Few differences were found in general lifestyle goals, but important differences were found in educational goals. More students in Groups 1 and 2 planned to earn PhDs or degrees in law or medicine. Possibly the goal of an advanced degree encourages students to accelerate, since they plan to spend more years in school.

Finally, no differences were found among the groups on the variables studied for evidence of social and emotional adjustment. There was no evidence that acceleration produced negative effects in this area. This finding is particularly im-

portant, since those who oppose acceleration primarily fear social and emotional maladjustment.

The four groups studied were not exactly comparable in ability, although all were clearly capable of a high level of achievement. The students who subsequently accelerated were somewhat abler mathematically and slightly superior verbally as evidenced by their SAT scores in the talent search. This may be considered a limitation of the study that limits the generalizability of the results.

The benefits of acceleration for students, schools, and society are many. For the student, accelerative strategies offer the opportunity to select an educational program that is challenging and that meets the needs of the individual student. This may not mean grade-skipping; some students may choose to accelerate in only one subject area, for example. The advantage is that acceleration offers many more options for meeting individual needs than any one program can, or it can be used as a supplement to a special program. For schools, acceleration offers a way to challenge highly able students without the expense and effort of designing a special curriculum. For society as a whole, it offers the promise of stimulating gifted youths to achieve more at a younger age and, thus, be more productive members of society for more years.

References

- Astin, A.W., & Henson, J.W. (1977). New measures of college selectivity. *Research in Higher Education*, 6, 1-9.
- Cattell, R.B., & Butcher, H.J. (1968). *The prediction of achievement and creativity*. Indianapolis: Bobbs-Merrill.
- Conger, A.J., Peng, S.S., & Duntzman, G.H. (1976). *National longitudinal study of the high school class of 1972: Group profiles on self-esteem, locus of control, and life goals*. Research Triangle Park, NC: Research Triangle Institute.
- Daurio, S.P. (1979). Educational enrichment versus acceleration: A review of the literature. In W.C. George, S.J. Cohn, & J.C. Stanley (eds.), *Educating the gifted: Acceleration and enrichment*. Baltimore, MD: The Johns Hopkins University Press, 13-63.
- Fund for the Advancement of Education. (1979). A summing up. In W.C. George, S.J. Cohn, & J.C. Stanley (eds.), *Educating the gifted: Acceleration and enrichment*. Baltimore, MD: The Johns Hopkins University Press, 138-161. (reprinted from *They went to college early*, Evaluation Report No. 2, Fund for the Advancement of Education, Ford Foundation, New York, April 1957).
- Gough, H.G., & Heilbrun, A.B. (1980). *The adjective checklist manual*. Palo Alto, CA: Consulting Psychologists Press, Inc.
- Hobson, J.R. (1963). High school performance of underage pupils initially admitted to kindergarten on the basis of physical and psychological examinations. *Educational and Psychological Measurement*, 23 (1), 159-170.
- Kulik, J.A., & Kulik, C.C. (1984). Effects of accelerated instruction on students. *Review of Educational Research*, 54, 409-425.
- Peng, S.S., Fetters, W.B., & Kolstad, A.J. (1981). *High school and beyond*. Washington, DC: National Center for Education Statistics.
- Pollins, L.M. (1983). The effects of acceleration on the social and emotional development of gifted students. In C.P. Benbow & J.C. Stanley (eds.), *Academic precocity: Aspects of its development*. Baltimore, MD: The Johns Hopkins University Press.
- Pressey, S.L. (1949). *Educational acceleration: Appraisal and basic problems*. Bureau of Educational Research Monographs, No. 31. Columbus, OH: The Ohio State University Press.

- Robinson, H.B. (1983). A case for radical acceleration: Programs of the Johns Hopkins University and the University of Washington. In C.P. Benbow & J.C. Stanley (eds.), *Academic precocity: Aspects of its development*. Baltimore, MD: The Johns Hopkins University Press.
- Stanley, J.C. (1978). Educational non-acceleration: An international tragedy. *G/C/T*, May-June, Issue No. 3, 2-5, 53-57, 60-64.
- Stanley, J.C. (1985a). Young entrants to college: How did they fare? *College and University*, 60 (3, Spring), 219-227.
- Stanley, J.C. (1985b). How did six highly accelerated gifted students fare in graduate school? *Gifted Child Quarterly*, 29 (4, Fall), 180.
- Stanley, J.C., & Benbow, C.P. (1982). Educating mathematically precocious youths: Twelve policy recommendations. *Educational Researcher*, 11 (5), 4-9.
- Stanley, J.C., & Benbow, C.P. (1983a). Intellectually talented students: The key is curricular flexibility. In S. Paris, G. Olson, & H. Stevenson (eds.), *Learning and motivation in the classroom*. Hillsdale, NJ: Erlbaum, 259-281.
- Stanley, J.C., & Benbow, C.P. (1983b). Extremely young college graduates: evidence of their success. *College and University*, 58 (4, Summer), 361-371.
- Stanley, J.C. & McGill, A.M. (1986). More about "young entrants to college: How did they fare?" *Gifted Child Quarterly*, 30 (2, Spring), 70-73.



If you are missing any back issues of the GIFTED CHILD QUARTERLY and would like to purchase replacement copies, address your request to:

National Association for Gifted Children
4175 Lovell Road
Box 30 — Suite 140
Circle Pines, MN 55014