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ABSTRACT

Academic Talent Search (ATS) provided advanced instruction in a 6-week summer school for talented middle school students on the campus of California State University, Sacramento. A survey was conducted to examine the long-term impact of the ATS program on students over a period of 7 years. Data were collected pertaining to high school and college achievement, career aspirations, personal values, self awareness, and personality self-descriptions, from students who participated in accelerated classes in mathematics, writing, and foreign languages in 1983, 1984, or 1985. Results indicated that these students continued to excel academically during the 7-year period after ATS participation. Students reported high academic achievement, high aspirations for advanced degrees, and impressive career objectives. Their responses reflected healthy self concepts, strong personal values, and inner-directed locus of control. They described themselves as independent, practical, and stable. There was no indication of any systematic negative impact from academic acceleration or from participation in the ATS summer school. Students reported fond memories of and satisfaction with their experiences in the program. (Contains 15 references.) (JDD)

The Achievement and Social Adjustment of Accelerated Students: The Impact of Academic Talent Search after Seven Years

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Abstract. A survey was utilized to examine the long-term impact of academic acceleration on Academic Talent Search (ATS) students over a period of seven years. ATS provided advanced instruction in a six-week long summer school for talented middle school students on the campus of California State University Sacramento. Three cohorts of former ATS students responded to questionnaires related to their academic achievement and social-emotional development. The purpose of this study was to assess the impact of the ATS program on students over time. The study attempted to determine if these students continued to demonstrate patterns of high academic excellence, and whether they developed socially and emotionally within "normal" bounds since ATS participation. Specifically the study asked if there were any systematic negative impacts on students attributable to academic acceleration or participation in ATS. Data were collected pertaining to high school and college achievement, career aspirations, personal values, self awareness, and personality self-descriptions. Results indicated that these students continued to excel academically during the seven-year period after ATS participation. Students reported high academic achievements and high aspirations for advanced degrees and impressive career objectives. Their responses reflected healthy self concepts, strong personal values, and inner-directed locus of control. They described themselves as independent, practical, and stable. There was no indication of any systematic negative impact of academic acceleration or from participation in the ATS summer school. To the contrary, students reported fond memories of and satisfaction with their experiences in the CSUS ATS program. The academic acceleration provided by ATS had a strong, positive impact even after a period of seven years.

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Background. Talent Search programs based on the principles Julian Stanley's Study of Mathematically Precocious Youth (SMPY) are found in all 50 states and several foreign countries (Stanley, 1991). These programs have as their key elements the identification of academic talent in middle school youth through the Scholastic Aptitude Test (SAT) or similar tests; and the development of talent through specially designed classes usually presented in a summer school setting. In such accelerated or fast-paced classes, students demonstrate their mastery of content via recognized standardized achievement tests and teacher evaluation. Students in such classes have demonstrated mastery of a year or more of high school material with only a few weeks of instruction. (Benbow & Stanley, 1983).

Educational acceleration provides many short-term and long-term benefits (Brody & Benbow, 1987; Daurio, 1979; Kulik & Kulik, 1984) and is generally endorsed as a useful strategy for gifted students (Cox, Daniel, & Boston, 1985; Feldhusen, 1989; Southern & Jones 1991). However, some educators view the practice with distrust. Resistance is often based on concerns about inadequate mastery of basics (Thurston, 1990) and preconceived notions about negative effects on social development and emotional well being (Daurio, 1979).

In 1982, California State University, Sacramento (CSUS) began sponsoring the Academic Talent Search (ATS), a program designed according to the model presented by Stanley (1977). Selected middle school students (grades seven through nine) in Northern California were invited to participate in fast-paced instruction during a six-week summer school. Selection criteria included high scores on the SAT verbal or mathematics subtests. Initial summer classes consisted of mathematics, expository writing, and study skills. Offerings were expanded each year to include foreign languages (French, Latin, Spanish), computer programming, debate, public speaking, and others. By 1993, the program had expanded to include 80 different classes providing challenge and enrichment to 1500 students.

Student performance has been exceptional in mathematics, writing, and foreign languages, as well as other subject areas. In mathematics, students were administered a Cooperative Mathematics Test, published by Addison Wesley, in one or more of the traditional high school topics of Algebra I, Algebra II, Algebra III, Trigonometry, and/or Mathematics Analysis. All students took one or more of

these tests as final examinations, and the majority of students scored above the 90%ile based on national norms, demonstrating mastery of content equivalent to a year of high school mathematics. Some students mastered the equivalent of two or even three years of traditional high school mathematics content. Evaluation of writing gains also produced impressive results. Based on writing assessments similar to proficiency evaluations used with university students, ATS students learned to write as well as most entering university freshmen. Foreign language achievement based on the textbook publisher's tests and teacher appraisals were similarly outstanding.

Purpose. The purpose of this study was to assess the impact of the ATS program on students over time. The study attempted to determine if these students continued to demonstrate patterns of academic excellence, and whether they developed socially and emotionally within "normal" bounds since ATS participation. Specifically the study asked if there were any systematic negative impacts on students attributable to academic acceleration or participation in ATS. Data were collected pertaining to high school and college achievement, career aspirations, personal values, self awareness, and personality self-descriptions.

Procedures. To examine the long-term impact of Academic Talent Search participation, three cohorts of former ATS students were contacted to participate in follow-up research. These students participated in accelerated classes in mathematics, writing, and foreign languages, during a summer school conducted in 1983, 1984 or 1985. Data were collected through a four-page questionnaire. An introductory cover letter explained the purpose of the survey was to determine the social involvement and academic achievement of former ATS students. A business reply envelope was provided for respondents to use in returning their completed questionnaires. The survey items were sent to students at their last known address at the following intervals: 1983 summer school students were sent a questionnaire in 1990; students in the 1984 summer school were sent a questionnaire in 1991; and the students in the 1985 summer classes were sent surveys in 1992. The survey focused on students' academic achievements in high school and college, and on their social and personal adjustments during the seven years since ATS participation. A free response opportunity was also provided on the questionnaire for students to write about their aspirations, goals, and concerns. Follow-up phone calls were made to those individuals who were late in responding, encouraging them to send in the completed materials. Many students were "off to college" and some were difficult to contact. Response rates were not as high as desired, however approximately 50 percent of each cohort responded, yielding acceptable results for analysis.

Data were analyzed through frequency tables, distributions, and percentages.
With a quasi-experimental design such as this study, implications of research findings must be

tempered with logic and restraint (Delisle, 1984). It may not be possible to demonstrate unequivocal causal relationships between the variables of treatment and outcome, however, one can infer generally strong patterns when multiple cohorts display identical effects over time. Essentially this longitudinal study involving three cohorts constitutes a double replication of research. The cohorts of 1983, 1984, and 1985 were analyzed independently, then compared for common effects.

Findings

SAT Scores. Subjects reported their highest SAT scores, which averaged for each cohort 615, 640, and 611 in the verbal test and 675, 690, and 641 in the mathematics test. The upper range of scores was quite impressive. Four students reported a perfect score of 800 for the mathematics section, and a score of 780 was the highest for the verbal SAT. The highest combined score for an individual student was an impressive 1580 out of a possible 1600.

The figure below shows a comparison of SAT scores for the three cohorts of this study and the national average SAT scores. Compared with a national SAT averages of approximately 426 Verbal and 476 Math, it is readily apparent that the former ATS students demonstrated their superiority in SAT scores.

(Insert Figure 1)

High School Graduation. The vast majority of students graduated from high school on time with their age mates. None graduated a year behind their agemates. Two students in the 1983 cohort reported they did not graduate, electing instead to take the California High School Proficiency Exam (CHSPE), and to go to community colleges. Each cohort contained some students who graduated ahead of their age-mates by at least one year, but the predominant pattern was graduation with their classmates. ATS participation was not closely associated with graduating early from high school or with grade skipping. Most students used the acceleration experience of ATS to allow them to take more advanced classes rather than to "get out of" school early.

High School Grades. Students in each of these three cohorts completed high school with outstanding academic records, typically earning A's in all of their classes. Approximately one-third of the students in each cohort (31%, 38%, 29%) earned GPAs at or above a 4.0 (straight "A") average. Weighted grading, a practice of allowing a five point scale for designated honors classes when calculating GPAs, has contributed to high school grade inflation.

(Insert Table 1)

College Credits Earned in High School. Overall, 60% of the students earned college credits during high school either through the Advanced Placement Program or through other college credit opportunities such as the CSUS Accelerated College Entrance Center. The three cohorts in this study earned an average of 14, 18, and 13 credits per student. The highest number of college credits earned by one student was 60. The student with the second highest number of credits earned 43 units.

College Performance. All but one of the students surveyed reported they were attending college, and that they were doing quite well. The reported average GPA for these students was in the "B+" category, and the grades ranged from a high of 4.00 (straight "A") to a low of 2.00 ("C" average). University GPAs were not influenced by the "weighted grading" practices of high schools. The one student not in college was deeply involved in training for a world class athletic competition, and delayed college attendance to focus on that goal.

(Insert Table 2)

Universities Attended. One indication of academic performance is the quality of universities students attend. The ATS students surveyed were admitted to an impressive array of distinguished universities after high school. University of California at Berkeley and at Davis topped the list of most frequently named schools. The third most popular was CSUS. Table 3 shows the types of institutions and percentages for each cohort. The University of California campuses were most frequently chosen. The percentage of students who attended the California State University system was 10%, 20%, 28%. A relatively high percentage of students went to out-of-state schools.

(Insert Table 3)

Students reported attending a variety of highly selective private schools including the following: Boston, Cornell, George Washington, Harvard, Harvey Mudd, Johns Hopkins, MIT, Pacific Union, Princeton, Radcliff, Santa Clara, Spelman, Stanford, University of the Pacific, Wellsley, and Yale.

Degree Aspirations. Students' motivations for academic achievement were reflected in their aspirations for advanced degrees. A high proportion of students (45%) from all three groups reported intentions of earning degrees at the doctoral level, either Ph.D. or MD. Masters degrees were cited by 40% of the respondents as their goal. Only 15% of the students intended to end their college work with a bachelor's degree.

Career Aspirations. Students' academic goals gave support for very high career expectations. Students listed their career aspirations to be attained within the next ten years. Responses were sorted into categories as shown on Table 4. The most popular professional fields were in the sciences and engineering. The second most frequently cited field was education, including university teaching. Medicine and business ranked third and fourth in order of popularity with these students.

(Insert Table 4)

Some students were undecided or vague about their career goals. One such student stated his intention was to become, "The director of a socially beneficial program." A female history major candidly reported, "I haven't got a clue," regarding her occupational goals. Generally, however career goals and academic degree aspirations showed a direct relationship.

Personal Values. One possible negative consequence of academic acceleration is the development of distorted personal values. Such distortion could take the form of antisocial values and excessive competitiveness. Former ATS students were asked to indicate how much importance they placed on selected personal values. They rated a set of value statements on a scale of 1 to 5 with 5 being the highest or most valued. Analysis of the responses showed that overall students placed maximum value on having close friends, getting a good education and being successful at work. Having enough free time to enjoy hobbies, helping the less fortunate, and earning respect from peers were secondary values. Being married and raising a family scored fairly low. Competing with others (doing things better than most) and earning lots of money were rated lowest among the values listed. The agreement among the three cohorts on the ranking of these values was quite high. Table 5 shows the mean scores of the value statements which have been ranked from most to least valued.

(Insert Table 5)

The respondents reported values which did not confirm the stereotype of students who were negatively impacted by educational acceleration. These students valued close personal friendships over getting money and competing with peers. There was no evidence of the development of distorted personal values among these students.

Self Awareness (Locus of control). Is academic acceleration associated with distortion of emotional development in students? The degree to which one feels a sense of control over one's life rather than

being totally at the mercy of the whims of fate is an indicator of emotional well being. The three groups of former ATS students were asked to indicated the extent to which they agreed with a series of statements similar to statement used by The National Educational Longitudinal Study (Ingels, et al., 1989) to reveal something about their perceptions of self and the extent to which they felt "in control" of elements in their lives. As shown in the table below, the respondents strongly agreed with statements about themselves which reflected a strong internal locus of control. They disagreed with two statements which would tend to indicate a diffused locus of control. ("Planning is a waste of time, because plans never work out" and "It is better to accept things the way they are than to try to change them.") The results indicated that these former ATS students had well developed self concepts and strong internal locus of control, and that they felt in command of their lives rather than being at the mercy of forces beyond their control. These response patterns for the three cohorts were quite similar and give support to the notion that these three groups share common attitudes about control and self determination.

(Insert Table 6)

Personality Descriptions. Respondents placed themselves on a scale between sets of adjectives which described opposite personality characteristics such as dependent and independent. From their responses, a view of students' perceptions of self emerged. They described themselves as independent, practical and emotionally stable, also somewhat dominant and outgoing. Again, there was no consistent pattern of distortion. These respondents perceived themselves as having characteristics which are normal, even desirable for university students. There was close agreement in the patterns of self concept among the three cohorts of this study. Figure 2 shows the distribution patterns of personality descriptors of the former ATS students.

(Insert Figure 2)

Recommendations. Some caution must be taken in generalizing these findings beyond the limits of this study. However, the pattern that emerges is consistent internally and with the findings of other studies (Brody & Benbow, 1987; Stanley, 1991). Academic acceleration as provided through the talent search models has positive and long-lasting consequences for academically talented youth. Programs similar to ATS should be expanded to become accessible to students in every community. Research should be conducted to identify key program elements that are most associated with high students success rates. The educational community should be better informed about the potential for these programs to supplement regular school curricula. Parents and educators should be reassured regarding the limited potential for negative consequences of such programs. Efforts should be continued to find

efficient techniques for identifying students with academic talent, and alternative strategies should be examined for developing that talent to its fullest.

Student Comments: The following comments were taken from the open-ended response opportunity contained in the questionnaire.

Here at MIT, I have applied for a summer fellowship for research outside of science and engineering. Since I am concentrating on philosophy, I hope to pursue some of my ideas which lie outside my major. If this fellowship comes through, I would be studying the foundations of visual communication and look for universal, unambiguous icons.

I have been attending Berkeley since the Fall 87, right after high school graduation. I have been participating in Navy ROTC and, when I graduate in the Spring of 92, I will be commissioned an ensign in the USN.

I have found college to be hard and sometimes discouraging. But now in my final year I have found it to be very rewarding. Chemistry is not as easy as I thought it would be. The ATS helped me a lot and then the ACE program helped me excel in high school and prepared me fully for college. If not for these programs, I would not be doing so well in college. Thanks for giving me the extra advantage and motivation.

ATS allowed me to graduate from high school 2 years early... I went to CALTECH and got a job doing research on robot vision for an autonomous Mars surface rover. Then I transferred to U. C. Davis where I got a job in the speech computer research lab. In the summer, I worked as an intern at Apple on computer speech recognition. When I graduate in June, I'll work full time for Apple Computers.

Perhaps the most important thing ATS did for me was to give me confidence. It taught me about initiative. It made me more independent and gave me the desire to be in a collegiate environment. I believe it is a wonderful program for highly motivated students, and I'm glad to see how it has expanded over the years.

I am ...(at)...Pepperdine University in Malabu, and I expect to graduate early, 3.5 years. I hope to attend law school beginning in September. ATS sharpened my writing skills to a point that has carried over into my college writing. I still have those two books and I still remember my two wonderful writing teachers.

There is no doubt whatsoever in my mind that ATS contributed to my feelings of competence and self-worth throughout my college and high school careers.

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Figure 1

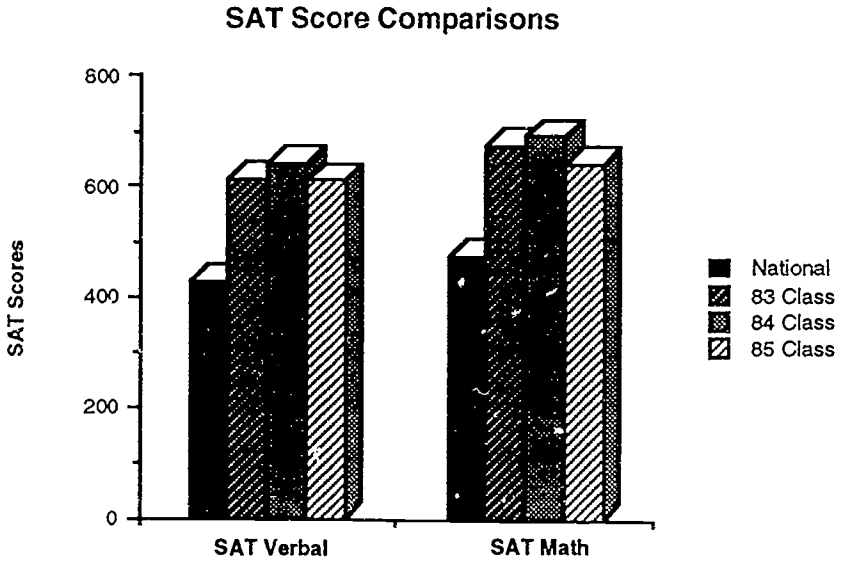

Figure 2
Personality Descriptions

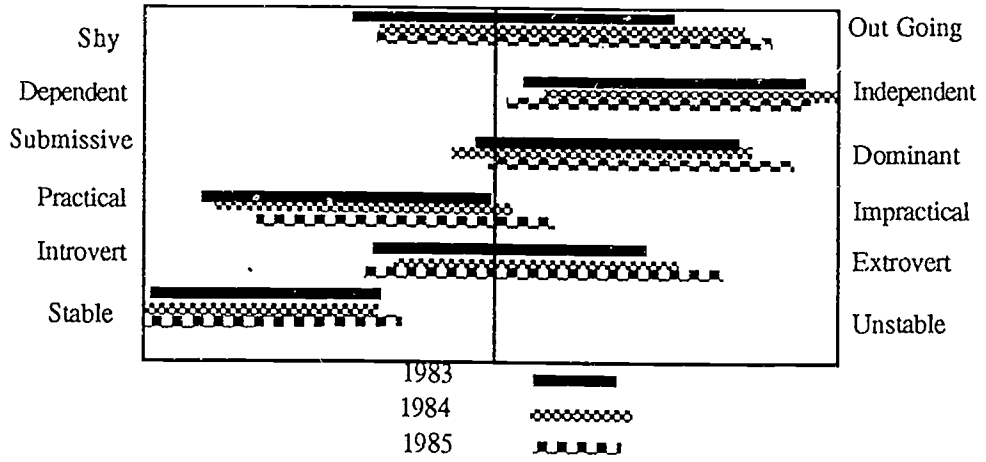

Table 1

Academic Performance in High School

Cohort	GPA (High School)
1983	3.75
1984	3 98
1985	3.66

Table 2

Academic Performance in College

Cohort	University GPA
1983	3.30
1984	3.39
1985	3.21

Table 3

Universities Attended

Institution	1983	1984	1985
	%	%	%
Community College	4	9	12
University of California	46	40	32
Cal State University	10	20	28
Private Universities	16	35	24
Out of State	25	36	20

Table 4

Career Aspirations

Occupation	'83	'84	'85
Science and Engineering	23%	27%	24%
Computer Science	8%	6%	2%
Education (professor/teacher)	19%	24%	14%
Medicine	17%	12%	9%
Business	13%	9%	19%
Visual and Performing Arts	4%	6%	14%
Military	2%	3%	5%
Law	4%	3%	4%
Other or Undecided	10%	6%	9%

Table 5

Personal Values

How important is each of the following? (1 to 5)

	1983	1984	1985
Having close friends	4.59	4.60	4.35
Getting a good education	4.33	4.70	4.34
Being a success at work	4.25	4.33	4.15
Having time for hobbies	4.29	4.24	4.07
Helping others less fortunate	4.20	4.18	3.81
Earning respect from peers	4.06	4.00	3.85
Being married with family	3.69	3.76	3.15
Do things better than other people	3.45	3.55	3.65
Earning lots of money	3.00	2.97	2.37

Table 6

Locus of Control

Statement	1983	1984	1985
Hard work more important than Luck	4.33	4.12	4.26
I am a worthy person	4.57	4.61	4.63
I am able to do things better than most	4.16	4.27	4.33
Planning is waste of time 'cause never work	1.98	1.70	1.96
Better to accept condition than try to change	2.43	2.50	1.89
I am satisfied with myself the way I am	3.80	3.88	3.93
People like me for myself	4.29	4.24	4.22

Scale: Strongly Agree=5, Agree=4, No Opinion=3, Disagree=2, Strongly Disagree=1