



Now We Are Six: The Ever-Expanding SMPY¹

Julian C. Stanley and William C. George²

Study of Mathematically Precocious Youth (SMPY)
The Johns Hopkins University

The First Formal Follow-Up

The sixth year for the Study of Mathematically Precocious Youth (SMPY) was an even more active, productive, and successful twelve-month period than were the previous five. By June, 1977 virtually all of the 450 contestants from SMPY's March, 1972 mathematics and science talent searches had been graduated from high school or had become full-time college students without completing high school.

The composition of that remarkable initial group, classified by sex, school grade, contest entered and whether or not they scored high enough to be considered in need of

some special educational provisions, is shown in Table 1.

The ninth graders from the March, 1972 contest would have been graduated from high school by June, 1975 if they were "on schedule." The eighth graders would have been graduated by June, 1976, and the seventh graders by June, 1977.

A detailed questionnaire follow-up of those persons in the "Need Special Provisions" group (i.e., those who scored high enough in mathematical aptitude and/or science knowledge to be considered in need of supplemental educational facilitation) who were scheduled to be graduated in 1976 or 1975 was begun in December of 1976. After some prompting, 99 percent of the group who could still be

located filled out the long questionnaire, either at home or over the telephone. Counting the persons who had moved away and for whom no forwarding address could be found, the total nonresponse rate was only 5.6 percent. Therefore, we at SMPY are confident that the results analyzed represent the target population fairly well. A detailed analysis of those questionnaire responses is contained

¹Revised version of the "Sixth Annual Report to the Spencer Foundation concerning its support of the Study of Mathematically Precocious Youth during the period 1 September 1976 - 31 August 1977".

²We thank Sanford J. Cohn, Lois S. Sandhofer, and Camilla P. Benbow for their assistance with the report on which this article is based.

Table 1: Number of Participants in SMPY's March 1972 Talent Search

Sex	School Grade	Science Contest Only		Math Contest Only		Both Contests		Totals
		Did Not Score High Enough to Warrant Further Special Attention	Need Special Educational Provisions*	Did Not Score High Enough to Warrant Further Special Attention	Need Special Educational Provisions*	Did Not Score High Enough to Warrant Further Special Attention	Need Special Educational Provisions*	
Male	9	0	0	0	2	0	3	5
	8	11	18	7	55	12	54	157
	7	10	3	3	20	27	40	103
Female	9	0	0	0	2	0	0	2
	8	3	2	11	20	15	48	99
	7	6	1	5	13	30	29	84
Totals		30	24	26	112	84	174	450

*Special provisions were provided if a person earned a total combined score equal to or greater than 75 on STEP Science 1A + 1B and/or earned a score equal to or greater than 420 on the Scholastic Aptitude Test-Mathematics (SAT-M).

in an initial report prepared by Cohn, Gore, and Becker (1977).

More impressive, however, are the academic records of the 28 highest scorers on SAT-M (i.e., 620-790). Four of them, all from public high schools, have already been graduated from Johns Hopkins (May, 1977). Two of these were only 17 years old, one was 18, and the other was 19. Two were accelerated in grade placement four years each, and two were accelerated three years each. One of the 17-year-olds, who as a seventh grader had scored highest of the 192 entrants in the science contest and third highest of the 396 who entered the mathematics competition, was elected to membership in Phi Beta Kappa. So was the 18-year-old. The other 17-year-old missed being elected by only 0.03 of a grade-point! All three of these "radical accelerants" won three-year National Science Foundation graduate fellowships, half of all such awards for the entire graduating class of about 530 students at Johns Hopkins. All three were graduated with both general honors and departmental honors. Both 17-year-olds and the 19-year-old completed college in three years. The 18-year-old took four years, but had become a full-time college student after completing only the ninth grade. The 19-year-old did not win special honors, but he majored in mathematics and made good grades.

The two 17-year-olds majored in electrical engineering, with emphasis on computer science. The 18-year-old majored in theoretical physics. In the

fall of 1977 one of the 17-year-olds began work on his Ph.D. degree in computer science at Cornell University. The other 17-year-old is studying for a doctorate in electrical engineering at the Massachusetts Institute of Technology. The 18-year-old is working toward a Ph.D. degree in theoretical physics at Princeton University. The 19-year-old is working full-time.

Besides these four young men from the March, 1972 contests, in May or June of 1977 there were three other early graduates from college under SMPY's auspices. One of these, who completed his baccalaureate in quantitative studies at Johns Hopkins in January, 1977, about a month after his 17th birthday, was only a sixth grader in March of 1972 and therefore ineligible for SMPY's first talent search. He qualified for the second contest, held in January of 1973. During the spring and summer of 1977, this remarkable young man was the chief writer-photographer for a weekly newspaper in Ocean City, Maryland. He entered the University of Chicago in the fall of 1977 to work concurrently toward a Master of Business Administration degree and a Ph.D. degree in economics, specializing in finance. Having skipped the 7th, 9th, 10th and 12th grades and completed college in five semesters rather than the usual eight, he was accelerated 5½ years. Even taking off the second semester of the academic year 1976-77, he became a graduate student at Chicago three months before his 18th birthday. It is

astounding to recall that when we met him initially in October, 1971 (he was the first brilliant youth referred to SMPY after the grant from The Spencer Foundation created SMPY in September, 1971) this academic rocket was a sixth grader. Only a little more than five years later he had completed a B.A. degree with good grades and wide sampling of upper-level courses at a major university. Without our determined intervention on his behalf he might have been only half-way through the eleventh grade by then.

Another of our proteges, who does not live in Maryland and therefore was not eligible to enter SMPY's contests, did the same thing as the other early-graduate 18-year-old: he became a regular, full-time college student (at George Washington University) after completing only the 9th grade of a public school. His father had heard of SMPY'S programs and talked with the staff about them. This Virginian majored in mathematical statistics, won prizes for distinction in both physics and statistics, was elected to membership in Phi Beta Kappa, and won a three-year National Science Foundation fellowship. He became a graduate student at Stanford University during the fall of the 1977-78 academic year, working toward a Ph.D. degree in statistics.

The seventh youth is the most precocious whom SMPY has ever helped. SMPY heard of him from Professor Anne Anastasi of Fordham University after his parents had contacted her. They had seen

newspaper publicity about her participation in SMPY's first symposium, at the American Association for the Advancement of Science in Washington, D.C., in December of 1972. (That symposium led directly to SMPY's first book, *Mathematical Talent*, which appeared in 1974.) This brilliant boy, in April, 1973 still a sixth grader in a Brooklyn, N.Y., public school and barely 11 years old, came then for extensive testing with the best of the contestants in SMPY's 1973 math contest. He was so remarkable that SMPY urged his parents and the Brooklyn College mathematics professor who accompanied them to get him into Brooklyn College as a regular student that fall at age 11½, majoring in mathematics. He did so, began with third-semester college calculus and other subjects, and succeeded so well in everything that he was graduated as a mathematics major four years later *summa cum laude* at age 15. Like four of the six other early graduates, he won a three-year National Science Foundation graduate fellowship. In September of 1977 he entered Princeton University to study for a Ph.D. degree in mathematics.

Six of these seven early graduates were featured in the 6 June 1977 "Education" section of *Time* magazine. In addition, all seven were featured in an article published in the *Smithsonian* magazine (Nevin, October, 1977).

Lest it seem that most college graduates win National Science Foundation fellowships, let us emphasize that the five won by SMPY's seven proteges represent nearly 1 percent of all such fellowships given in 1977 in all fields throughout the entire United States. When one considers that these five winners ranged in age from 15 to 18 and in educational acceleration from 3 to 7 years and that these five students had already saved a total of 21 years of school attendance, their winning such distinguished financial aid with which to work toward the doctorate is almost unbelievable. They were competing chiefly with college seniors already 21 or 22 years old!

Another interesting fact about the seven radical accelerants is that their fathers are not high-level professionals or wealthy business men. The occupations of the seven fathers as of the time their sons graduated from college were as follows: district sales

manager of a large company, engineer, owner-operator of an ice cream shop, owner-operator of a pest-control service, paper salesman, retired FBI agent, and teacher of mathematics. No father was a physician, lawyer, college professor (one mother is an associate professor), or major executive. All seven sets of parents are alive, and so far as we know there have been no divorces among them. Apparently, it took a great deal of parental stability and encouragement to produce these successful accelerants. But excellent parental education and high income did not seem to be major requisites.

One other person, now a college graduate, had begun with us after SMPY was created. In the fall of 1972 he entered college after completing the tenth grade of a public school and was graduated four years later from Princeton University at barely age 20, accelerated two years, Phi Beta Kappa, Sigma Xi, *summa cum laude* in mathematics, and with a three-year National Science Foundation fellowship. He became a doctoral student in mathematics at the University of California (Berkeley) in September of 1976 and earned his master's degree there in two semesters. It is clear from his academic work and professional achievements thus far that this mathematically and verbally brilliant young man is almost certain to become a fine researcher, probably in computerized aspects of medicine.

To return briefly to the top 28 scorers on SAT-M in the March, 1972 mathematics competition, all of whom are male, about half have attended Johns Hopkins or as of this fall will still be there. The other half went elsewhere, to universities such as Amherst, Boston, Brown, Colorado, Cornell, Harvard, Maryland (Baltimore County campus), Princeton and Towson State. The staff of SMPY makes no recruiting pitch to its proteges, but instead helps them choose the schools that seem best for them. If these students are eager to attend Johns Hopkins and seem well qualified academically to do so, SMPY gives considerable support in the admissions office.

To summarize, we note that although the March, 1972 talent search was our first, involved the fewest participants (450 vs. 953, 1519 and 873 in subsequent years), and led to the least direct educational facilitation, it had truly powerful effects on a

number of the ablest youths found. By December of 1976, when the fourth contest for mathematically apt students was held, SMPY's sophistication had increased so much that it was able to help all 873 entrants (mostly seventh graders) far more than it could aid and stimulate the smaller number several years earlier. The staff of SMPY expects a greater percentage of the youths from the 1976 talent search to forge ahead fast and well educationally, but it will be difficult to "produce" better achievers than SMPY's eight early college graduates in 1976 and 1977.

Counseling Looms Larger

Though following up the participants in the various talent searches for a number of years is a crucially important aspect of SMPY's work, coordinate with it are educational and vocational counseling and guidance. With the support of The Spencer Foundation, SMPY is increasing its emphasis on both aspects. Until SMPY began, little was known about how to facilitate the progress of youths who reason extremely well mathematically and are eager to move ahead fast and well educationally. Usually within their regular schools they were prevented from accelerating their mathematics, related subjects, or grade level at all. They might be given token acceleration at one level, only to lose its benefits at the next. Few could, for example, get clearance to take a high school calculus course in the eleventh grade, much less (as a number of SMPY's proteges now do) complete a year of college calculus well by the end of the ninth or tenth grade. (The Brooklyn prodigy did it by the end of the sixth grade, and he had already skipped a grade.)

Thus much specific help with scheduling is given by SMPY, but the more important feature is long-range planning within the context of overall guidance. Of course, because SMPY works to some extent with more than 3000 mathematically talented youths but has quite a small staff, it must develop appropriate principles, techniques, and programs that can be committed to paper. These aid not only the SMPY participants, their teachers, and their parents, but also other brilliant students, their teachers and their parents who reside outside SMPY's own geographical area. This massive flow of counseling informa-

(Continued on page 43)

(Continued from page 11)

tion from SMPY to the field is supplemented by correspondence, telephone conversations, and some personal conferences. SMPY's staff members answer the mail promptly and to the best of their ability attempt to be helpful. They talk with all callers. There are about 30 different mailing pieces, ranging from single sheet memoranda to long articles, that in the proper combinations are sent out to inquirers.

As a result, SMPY's models for educational acceleration seem to be influencing practice increasingly, even though those models run counter to conventional curriculum theory. SMPY's unique blend of exhortation with empirical confirmation and research at each stage is tending to make acceleration more permissible in many junior and senior high schools, colleges, and universities throughout the country. Via every feasible means the staff of SMPY pushes its prototypes into the limelight, especially through papers at professional meetings, workshops, symposia, articles in magazines and newsletters and professional journals, and edited volumes.

In order to make its principles even more applicable elsewhere, the staff of SMPY is preparing a how-to-do-it "package" on the counseling of mathematically apt, well-motivated youths. This will be disseminated across the country to interested educators, parents, and intellectually talented students. The detailed manual will parallel, complement, and supplement the three instructional packages that SMPY prepared under a terminal grant from the Robert Sterling Clark Foundation. Those deal with the identification of youths who reason extremely well mathematically, the further study of such youths, and the setting up of special fast-math classes for facilitating their educational progress. It will be longer than each of those other packages, however, because guidance is a complex, inclusive topic.

This counseling package will be tried out in a variety of school and home situations in Maryland, adjacent states, and such far-away states as Minnesota, Illinois, and California. On the basis of feedback from those places it will be revised and made more useful. The final product may be publishable as a small book of guidance techniques for aiding mathematically talented students.

In emphasizing guidance, one of the writers (Stanley) is returning to the area in which he was first trained as a graduate student at Harvard University, 1945-46. The Master of Education degree program that he completed then was in educational and vocational counseling and guidance. The team of Stanley, George, Cohn, Sandhofer, and Benbow, supplemented by a number of part-time assistants, feels that it is becoming increasingly competent to help guide the educations of youths who reason extremely well mathematically. Its continual trying out and refining of guidance principles and practices in active interaction with thousands of students should make it far easier for other counselors of such youths to perform well.

Research is the Central Concern of SMPY

All of SMPY's developmental and service activities are based squarely on its own research and on relevant research done by others. Accumulating applicable new knowledge within the context of suitable theories is extremely important for work with mathematically talented students. Not all such research can have the rigor of the tightly controlled laboratory, of course, nor would research that rigorous likely yield immediate implications for educational practice. The staff of SMPY is trying to develop a suitable mix of "What?" questions with "Why?" questions. It combines behavioral engineering with carefully conducted applied research, the former emphasizing the here-and-now and the latter looking toward improving the behavioral engineering for subsequent cohorts of students. Put in other words, SMPY does the very best it can with students immediately but strives to discover principles that will enable it to do better in the future.

Even its behavioral engineering is meant to help SMPY develop principles, practices, techniques, and programs of wide utility. Although SMPY does render a great deal of service to youths in Maryland and adjoining states, its goal is to help improve the education of mathematically apt students all over the United States and in other parts of the world. This is accomplished partly by showing what astounding things

can be done with relatively small resources in an average state. For example, if in a single year at a small university where typically little acceleration occurs, five local students (1 percent of the graduates) can be accelerated in grade placement 3 to 5½ years by SMPY quite successfully, then many students across the country could be similarly accelerated.

The seven-year gap between the Brooklyn prodigy, who became 15 years old on March 24, 1977, and received his B.A. degree in mathematics with a truly distinguished record less than three months later, and the usual "on-schedule" college graduate should indeed be cause for deep concern. Suppose for example, that, analogous to this young man and to Norbert Weiner and Merrill Kenneth Wolf, who were both graduated from college at age 14, a few persons could run the mile in less than four minutes, whereas no one else could run it in less than six. We would wonder how the usual individual-difference model had failed. It is puzzling that a few students can readily and with pleasure complete the 16 years of schooling in about half that time, whereas it is atypical for other students to save even a year. Clearly, the answer lies not in some gap-theory of educational achievement, but instead in the powerful obstacles that educators, parents, and psychologists create in order to force virtually total compliance with the age-in-grade lockstep of the educational system. Already, SMPY has helped expose serious flaws in the "social-and-emotional-development" and the "gaps-in-knowledge" claims of psychologists and educators.

The SMPY model is developmental and longitudinal, but not "genetic". It does not inquire into the early origins of the high abilities found at ages 11-13, but instead tries to utilize actually developed precocity until each youth becomes a full-time college student and therefore at the level where appropriate educational opportunities should be readily available. Though important, questions such as "Why do boys tend to score higher on SAT-M than girls do?" and "How much of the variability in mathematical reasoning ability at age 12 is due to heredity, and how much of it is due to environment?" lie outside the area in which SMPY staff members believe they can make the greatest contributions.

Cooperation with the College Entrance Examination Board and Educational Testing Service

As SMPY produces "mountains" of evidence that the Scholastic Aptitude Test is a remarkably accurate locator of great mathematical and verbal aptitude among bright junior high school students, our relationships with the various branches of ETS and the College Entrance Examination Board (including its Advanced Placement Program) continue to be cordial. The staff of SMPY has frequent contacts, both personally and by letter and telephone, with a number of officials of those agencies. They participate in most of our symposia. The Study is able to get from those organizations whatever help it needs in carrying out its many activities on behalf of the mathematically talented. Also, SMPY established contact with the American College Testing Program and used two of its tests in the talent search conducted during the 1976-77 school year.

One of SMPY's most successful counseling efforts has been, and continues to be, the encouraging of able high school students to prepare for a number of Advanced Placement Program (APP) examinations and take them in May of the year that the preparation is completed. Many brilliant students are unaware of their ability to get college credit in this way. For example, a regular tenth grader took advanced placement courses in mathematics and physics while studying biology and chemistry entirely on his own. He earned the highest grade awarded (5 on a 1-to-5 scale) on the difficult mathematics examination (Level BC) and on each part of the higher-level (C) physics examination. He earned a 4 in biology and 5 in chemistry. While he was still 15 years old, these grades earned him 24 semester-hour credits at Johns Hopkins; that is 80% of a usual freshman-year course load and confers sophomore standing.

Another tenth-grade boy scored similarly on those four examinations and also earned 3's in American history and English. He took six three-hour APP examinations in one week, besides his regular final examinations in school that same week!

Without information and encouragement from SMPY, it is doubtful that either of these young men would

have taken a single APP examination earlier than the end of the twelfth grade, if then. We have seen many youths just as able as these go on to college at age 18 after the full kindergarten through twelfth grade sequence without any advanced standing and become so bored that they do mediocre academic work or drop out. In our opinion, much talent is wasted this way.

Diagnostic Testing Followed by Prescriptive Teaching

SMPY is developing a number of young college-student "mentors" to work with mathematically brilliant youths individually or in small groups (2-5 persons). This is proving to be enormously effective. For example, rather than seeing youths who reason extremely well mathematically when they are seventh graders (or even younger) forced to wait until the eighth grade to begin algebra and work on it there for 180 45- or 50-minute periods, the staff at SMPY is learning that such students can master first-year high school algebra in from one to five three-hour "tutoring" sessions.

First these youths take a standardized Algebra I test under standard conditions. The resulting score shows how they perform relative to students (e.g., eighth graders across the nation) who have studied the subject for a school year. Then the group is allowed unlimited time to work on the items they missed under the timed conditions. Those items still missed, and how they are missed, afford the mentor insight into what the students still don't know about elementary algebra. This is then worked on via practice materials and direct instructions until the student seems ready to take an alternate form of the algebra test. The score on it under standard conditions indicates how well he or she knows Algebra I. With a moderate amount of further practice and instruction, usually the student will become virtually perfect in the subject. (Algebra I is decidedly easy for youths who reason extremely well mathematically.)

The work of the mentor with a given student can continue through any number of courses. SMPY expects to carry the highest 100 or so scorers on the mathematical part of the Scholastic Aptitude Test in SMPY's 1977-78 talent search who are

well motivated through Algebra I-III, plane geometry, trigonometry, analytic geometry, and calculus as fast as each of them can move well. We anticipate that many of them will be ready to take the APP calculus examination by May of 1981 or earlier—i.e., by the end of the tenth grade. This would mean at least three years of acceleration in mathematics, plus an unusually high achievement level at an early age. Already, one 11-year-old student has made a grade of 4 on the APP Level BC calculus examination. Another barely 14 years old did, also, as did several tenth graders. Having highly able, exceptionally well motivated students complete a good year of college calculus while they are still tenth graders is not an impossible dream.

SMPY is presently developing plans to go beyond mathematics into "tutoring" in subjects such as physics and chemistry so that brilliant students can enter college early and with sophomore standing in mathematics and physical science. This expansion is due to grants from the Camille and Henry Dreyfus Foundation and the Geraldine R. Dodge Foundation.

Using mentors to help the brightest students forge ahead seems to be virtually essential. Personnel of SMPY are experimenting with the concept for three youths (two boys and a girl) whose IQ's are around 200 and who, therefore, function educationally so far ahead of their agemates that worthwhile academic experiences at the usual age-in-grade level or anywhere near it are unlikely. The girl at age 10 learned Algebra I in a few hours and moved on to Algebra II with her mentor, a barely 18-year-old college junior. She was excused from taking mathematics with her seventh-grade gifted-child class and allowed to study French there, instead. One of the boys, seven years old, moved into the CEMREL mathematics program with the same mentor, working with him on a long-term basis. When eight years old, the other had already been working for several years on the CEMREL materials with two mentors (father and son). All three of these remarkable youngsters need mentors in various other subject-matter areas. The staff of SMPY tries to help them locate such persons, but cannot find the time or resources to do anything directly outside of mathematics, physics, and chemistry.

(Continued on page 50)

SMPY's Fourth Talent Search

Talent searches to discover youths who reason extremely well mathematically were conducted by SMPY at the following times, with the number of contestants indicated in parentheses: March 1972 (450), January 1973 (953), January 1974 (1519), mostly seventh and eighth graders; and December 1976 (873), seventh graders and youths in higher grades only if of seventh-grade age). The participants themselves were from the upper few percent of mathematical reasoners.³

Thus these contests have involved 3795 examinees, of whom approximately 3600 were different individuals.⁴ The searches have provided or confirmed most of the mathematical talent that SMPY has found in the Maryland area. They are at the heart of its identification program.

The 1976 contest, for which further testing of those youths who scored in the top third of the group extended into February of 1977, furnished the participants in SMPY's extensive algebra tutoring programs. An all-day "algebra tutorial clinic" followed in April and involved 75 of the group, a number of whom later received further tutorial aid in order to learn Algebra I thoroughly. Also, from the pool of 278 further-tested high scorers, SMPY referred to Dr. Lynn H. Fox, head of the Intellectually Gifted Child Study Group (IGCSG), most of the 29 students who attended her 1977 summer fast-math classes (Algebra II and plane geometry) and the 24 girls for her summer role-models class. Those two programs proved highly successful.

The Chemistry vs. Physics Experiment

From the ablest of the 1976-search students the staff of SMPY will choose about 50 for a controlled experiment in which the long-term effects of facilitating interest and progress in chemistry vs. physics will be compared. The staff plans to select 50 more in 1978 (from the 1977-78

contestants) and another 50 in 1979. This will yield 75 students for the chemistry-facilitation group and 75 for the physics-facilitation group. The basic motivation for this experiment is that youths who reason extremely well mathematically do not seem oriented toward chemistry. SMPY intends to help the chemistry-facilitation group explore the scientific and vocational possibilities of physical chemistry, chemical physics, and other quantitatively oriented aspects of chemistry.

It will be of some value to see whether SMPY's attempt to attract mathematically highly apt students into chemistry will be successful. Of even greater importance is understanding why excellent mathematical reasoners tend to shun chemistry after taking the basic inorganic course in college. Apparently, they find too little quantitative challenge in that course and therefore do not enroll subsequently for higher-level chemistry courses that require more mathematical reasoning ability.

The Awards Ceremony

During the 1976-77 school year, more than previously, great efforts were made to provide counseling by mail and in some cases orally for each of the 873 persons who took both parts of the Scholastic Aptitude Test in December of 1976. The Study's main goal was to make those youths, especially the 278 of them who scored unusually well on SAT and therefore were tested much later, highly "visible" to themselves, their parents, and their educators as persons who need and fully merit special educational provisions. To help do this SMPY conducted a large honors program in March 1977. All 873 contestants received certificates of participation, unless they had scored high on mathematical reasoning, high on verbal aptitude, or high on both, in which cases they received certificates noting that fact. One hundred and ninety were commended for exceptional mathematical aptitude, 177 for exceptional verbal aptitude, and 89 for both. Also, 79 one-course college scholarships were awarded and a total of 583 book prizes were given. Each of the 65 schools from which at least one high scorer came was honored.

SMPY was assisted at the awards ceremony by a number of prominent

educators. These included Dr. Dorothy Sisk, Director of the Office for the Gifted and Talented in the U.S. Office of Education, and President Steven Muller of Johns Hopkins. They and others shook the hands of many students and teachers and congratulated many parents. The two-hour honors convocation celebrated educational potential. It was a rare event in today's world, where the main special emphasis is on slow learners. SMPY plans to make this major type of presentation an annual affair, following the first phase of each talent search.

Consulting

Much of SMPY's consulting was by telephone or letter. This ranged over the entire country and also involved a number of foreign countries such as Australia, Canada, and the Union of South Africa. It was not confined to mathematical talent or to youths of junior high school age, though of course the predominant emphasis was on them. There is such a dearth of plans for helping the gifted educationally that SMPY gets inquiries even from agencies which should themselves be more competent to help the generally gifted than SMPY is. For example, many public school system personnel find difficulty providing for intellectually brilliant youths. It is not uncommon for them to recommend to parents that they seek better facilities in private schools. We at SMPY deplore this abdication of responsibility. Public schools have an obligation to work with the parents of extremely bright children to provide for them. More willingness and ingenuity than money are required for this! Parents must work hard, too; they cannot simply expect the schools to carry the whole load of facilitation.

Communication by SMPY with former talent-search participants and their parents and with others across the country, especially including educators, is aided greatly by publication of the Intellectually Talented Youth Bulletin (ITYB). This appears each month, September through May, and in July.

Publicity

Publicity for SMPY, virtually all of it favorable so far as the Study knows, increased during the twelve months

³In 1972, minimum of upper 5% of national norms for an in-grade test, in top 2% in 1973 and 1974, and top 3% in 1976.

⁴Some students eligible as seventh graders in 1972 were also eligible as eighth graders in 1973, and similarly from 1973 to 1974.

covered by this report. As before, there were a number of newspaper articles and items in various periodicals. In addition, though, SMPY's early graduates from college were featured in the Education section of June 6, 1977 issue of *Time* magazine with a carefully prepared article that occupied nearly all of a page. That same topic was the theme of a seven-page article by David Nevin, with photographs by Okamoto, that appeared in the October, 1977 issue of the *Smithsonian Magazine*. In the August 21, 1977 issue of the *New York Times Magazine* Gene I. Maeroff, the national education correspondent for the *New York Times*, featured SMPY's activities several times in a major article about gifted children. Much publicity about SMPY that goes out on wire services to innumerable newspapers throughout the country is not even known to us, except as the staff happens to hear about it from parents, teachers, or others in various communities.

Publicity in the "popular press" is a mixed blessing for SMPY. Most such articles cannot make fully clear just what SMPY can and cannot do, so the Study gets a large number of inquiries only peripheral or even irrelevant to its main concerns and competencies. It is not uncommon for someone who lives thousands of miles away to merely glance at a news item concerning SMPY and immediately pick up the telephone to ask us about something little related to the contents of that very item. Most inquiries do, at least, concern bright children, however, so the staff makes every effort to be helpful. No reasonable request goes unanswered. SMPY sends almost all persons something—often a great deal of material—or writes and/or telephones them.

Though SMPY is not a recruiting arm of Johns Hopkins, nor does the Study urge students to attend Johns Hopkins in preference to some other highly selective university, great benefits to that institution accrue from the favorable publicity that SMPY gets. Johns Hopkins deservedly has a splendid reputation in premedical (and medical) studies. We at SMPY are working to make it widely known as the major university in the country where well-motivated students who are precociously talented in Mathematics and related subjects such as physics, computer science, and electrical engineering can find the

opportunities they need to develop their talents properly before going on to work for a Ph.D. degree here or elsewhere. Much progress is being made in that direction. In the fall of 1977 some 35 of SMPY's ablest contestants were "early entrants" at Johns Hopkins, ranging from the first semester of the freshman year to the last semester of the senior year. Each was at least a year ahead of his or her agemates in grade placement. Several were startlingly productive "radical accelerants" like the five who were graduated from Johns Hopkins at ages 17-19 this May and the two who were graduated elsewhere at ages 15 and 18.

The popular press is helping the staff of SMPY broadcast its story to colleges and universities that will follow the leadership of Johns Hopkins in the mathematical talent area, thus benefiting the mathematically apt everywhere. Already, getting to a college or university as a full-time student at an early age, even without bothering to be graduated from high school, is becoming increasingly possible. SMPY is glad of that, because in our opinion educational acceleration of various sorts is an essential route for many mathematically talented youths (Stanley, 1977).

Conclusion

This sixth year of SMPY's existence has definitely been its best yet. The staff is now noting major results of its sustained efforts. They are highly gratifying to SMPY's staff, who want more than anything else to see youths who reason well mathematically and are eager to move ahead educationally be given the freedom and information with which to do this effectively. The consequences that this facilitation can have for the youths themselves and for the society in which they will make their contributions are so important that they could hardly be exaggerated. Already the Study sees the heightened motivation, creativity, achievement, and professional productivity that is resulting. To evaluate the significance of this, one has to recall that, as of June 1977, in the "normal" course of events only seven of the 450 boys and girls who participated in SMPY's original talent search in its first year of operation would yet have completed even two years of college. SMPY is indeed a

young study with young students. The major confirming results will not be in for a number of years yet, but already it is clear that from the ranks of SMPY's former contestants in its talent searches will come a much larger number of top-level mathematicians, mathematical scientists, physical scientists, and other specialists than would otherwise have happened from this small geographical area.

More importantly, the lessons that SMPY is learning and the techniques that it is developing should help form an educational revolution for well-motivated youths who reason extremely well mathematically. It is long overdue.

References

- Cohn, S.J.; Gore, C.M.; and Becker, B.J. 1977. SMPY's first follow-up study: SMPYers of high school graduating age in June 1976. Baltimore, Md. 21218: Study of Mathematically Precocious Youth, The Johns Hopkins University Press. (Preliminary report)
- Fox, L.H. (ed.) *Women and the mathematical mystique*. (In preparation)
- George, W.C.; Cohn, S.J.; and Stanley, J.C. *Acceleration and enrichment: Strategies for educating the gifted*. (In preparation)
- Keating, D.P. (ed.) 1976. *Intellectual talent: Research and development*. Baltimore, Md. 21218: The Johns Hopkins University Press.
- Maeroff, G.I. 1977. The unfavored gifted few. *The New York Times Magazine*. August 21: 30-32, 72-76.
- Nevin, D. 1977. Young prodigies take off under special program *Smithsonian* 8 (7 October): 76-82, 160.
- Sears, R.R. 1977. Sources of life satisfactions of the Terman gifted men. *American Psychologist* 32 (2 Feb.): 119-128.
- Stanley, J.C. 1977. Educational non-acceleration: An international tragedy. Paper presented at the Second World Conference on Gifted and Talented Children, San Francisco, California, on August 2.
- _____; George, W.C.; and Solano, C.H. (eds). 1977. *Educational programs and intellectual prodigies*. Baltimore, Md. 21218: The Study of Mathematically Precocious Youth.
- _____; George, W.C.; and Solano, C.H. (eds.). 1977. *The gifted and the creative: A fifty-year perspective*. Baltimore, Md. 21218: The Johns Hopkins University Press.
- _____; Keating, D.P.; and Fox, L.H. (eds.). 1974. *Mathematical Talent: Discovery, description, and development*. Baltimore, Md. 21218: The Johns Hopkins University Press.
- Time*. 1977. Smorgasbord for an IQ of 150. 109 (23, June 6): 64.
- _____. In press. Predictive value of the SAT for brilliant seventh and eighth graders. *College Board Review*.