Research Article

Meeting the Educational Needs of Special Populations

Advanced Placement's Role in Developing Exceptional Human Capital

April Bleske-Rechek, David Lubinski, and Camilla P. Benbow

Vanderbilt University

ABSTRACT—*We evaluated the Advanced Placement (AP) program from the point of view of intellectually precocious youth and their subsequent educational-vocational outcomes, analyzing normative and idiographic longitudinal data collected across 30 years from 3,937 participants. Most took AP courses in high school, and those who did frequently nominated an AP course as their favorite. Students who took AP courses, compared with their intellectual peers who did not, appeared more satisfied with the intellectual caliber of their high school experience and, ultimately, achieved more. Overall, this special population placed a premium on intellectual challenge in high school and found the lack of such challenge distressing. These findings can inform contemporary educational policy debates regarding the AP program; they also have general implications for designing and evaluating educational interventions for students with special needs.*

Intellectually talented students are an extraordinary national resource, and much research supports the importance of providing them with specialized learning environments to meet their unique intellectual and socioemotional needs (Benbow & Stanley, 1996; Reis, 1989). The Advanced Placement (AP) program affords one such learning environment (Stanley & Benbow, 1982). AP is viewed as the best large-scale option currently available for challenging academically prepared youth while they are still in high school (Benbow & Stanley, 1983; National Research Council, NRC, 2002). Not only does it provide bright, highly motivated students with an opportunity to take advanced coursework and receive college credit, but it is also typically advantageous socially because it allows them to experience high school life with their same-age peers. Historically, AP has provided gifted students with the appropriate developmental placement (Lubinski & Benbow, 2000) that all students require for optimal learning: a curriculum that progresses at a pace commensurate with one's rate of learning.

Since its inception (1955), and over the past three decades in particular, the AP program has grown tremendously. By the year 2000, for example, the program included 32 courses and exams, with 60% of high schools offering at least one AP course and over a third of college-bound seniors participating (College Entrance Examination Board, CEEB, 2001). This growth is expected to continue until AP courses are available in 100% of the nation's high schools (CEEB, 2001).

The rapid growth of the AP program, however, has led to various concerns. A recent report on advanced study in America's high schools (NRC, 2002) expressed concern that the shortage of qualified AP teachers is growing and that current AP classes tend to emphasize breadth of coverage over depth of understanding. Educators also have questioned a current tendency for selective institutions to employ AP coursework as a criterion for undergraduate admission (NRC, 2002); simultaneously, some universities are increasingly reluctant to grant college credit for anything other than the top score on AP exams (Matthews, 2002).

In addition, the rapid expansion of the AP program has led some educators to wonder if AP has compromised its rigor (Lichten, 2000), and what effects continued growth may have on the program and the students it serves (CEEB, 2001; NRC, 2002). In this report, we ask: What does the AP program do for students? And what are the potential implications of recent changes surrounding the AP program? Probably the most appropriate population for answering these questions is that for which AP was originally designed—highly motivated and intellectually talented students. In this report, we examine intellectually talented students' feelings about high school and their educational outcomes 15 years later as a function of their AP involvement.

Address correspondence to April Bleske-Rechek, Department of Psychology, University of Wisconsin-Eau Claire, Eau Claire, WI 54702, e-mail: bleskeal@uwec.edu, or to David Lubinski or Camilla P. Benbow, Department of Psychology and Human Development, 512 Peabody Campus, Vanderbilt University, Nashville, TN 37203, e-mail: david.lubinski@vanderbilt.edu or camilla.benbow@vanderbilt.edu.

METHOD

Participants

Participants were drawn from the five cohorts of the Study of Mathematically Precocious Youth's (SMPY) planned 50-year longitudinal

TABLE 1
Domains of High School Likes and Dislikes

Likes	Dislikes
Academic and intellectual activities	Lack of intellectual stimulation or engagement
Intellectual engagement	Lack of intellectual engagement
Teachers and instruction	Teachers and instruction
Classes and departments	Classes and departments
Success and recognition	Lack of success and recognition
Social life and extracurricular activities	Social isolation and peer pressure
Extracurricular involvement	Limited extracurricular involvement
Socializing and meeting people	Socializing and meeting people
	Social isolation and insecurity
	Peer pressure
Other	Other
School community and structure	School community and structure
Youth, being an adolescent	Youth, being an adolescent
Lack of intellectual demand	Intellectual demand
Global, miscellaneous	Global, miscellaneous

investigation of intellectual talent (see Benbow, Lubinski, Shea, & Eftekhari-Sanjani, 2000; Lubinski, Benbow, Shea, Eftekhari-Sanjani, & Halvorson, 2001; Lubinski, Webb, Morelock, & Benbow, 2001). Cohorts 1 through 4 consist of talent-search participants, who, beginning in 1972, were identified at age 12 or 13 by Scholastic Assessment Test (SAT) scores indicating that they represented the top 1% in ability. Because the data were secured at multiple time points across cohorts, sample sizes varied: in Cohort 1, from 694 to 1,195 for males and 449 to 764 for females; in Cohort 2, from 399 to 401 for males and 167 to 188 for females; and in Cohort 3, from 328 to 355 for males and 108 to 139 for females. Cohort 4 data were drawn from 97 males and 83 females who had completed a follow-up at age 18. Participants in Cohort 5 were 369 males and 346 females who, in 1992, were pursuing graduate training in top-ranked mathematics, science, or engineering programs (Lubinski, Benbow, et al., 2001).

Procedure

Information on talent-search participants' AP involvement was secured at the age-18 follow-up. Cohort 1 participants reported the number of AP exams they had taken, and participants from Cohorts 2 through 4 reported both their AP coursework and their AP exams. As one component of their age-33 follow-up, Cohorts 1 and 2 were asked to supply open-ended responses to the following questions: "What did you like most about your high school experience?" and "What did you like least about your high school experience?" Participants were allowed multiple nominations. High school likes and dislikes, plus the participants' three favorite high school courses, were secured at the age-23 follow-up for Cohort 3 and at the age-18 follow-up for Cohort 4. Cohort 5 participants reported this information when surveyed in 1992.

To code participants' high school likes and dislikes, we used a three-tiered hierarchical scheme (microcategories, categories, and domains) as follows. We initially compiled a master list of 223 distinct and highly specific microcategories derived from participants' open-ended responses. After coding participants' responses according to these 223 microcategories, we grouped related microcategories together to form 22 larger categories (10 likes and 12 dislikes). Finally, we aggregated these 22 categories to form six domains: three domains of likes, namely, academic and intellectual activities, social life and extracurricular activities, and other; and, conversely, three domains of dislikes, namely, lack of intellectual stimulation or engagement, social isolation and peer pressure, and other. These six domains, along with their 22 constituent categories, are displayed in Table 1 (the 223 microcategories are available upon request).

RESULTS

AP Involvement

Table 2 displays rates of AP involvement. Except for Cohort 1, for whom the AP program was not yet widely available, over 75% of participants reported taking at least one AP course or exam. The values for Cohorts 4 and 5 exclude those students for whom the program was not available (AP courses or exams were not available for 20% of Cohort 4 and 23% of Cohort 5), but the values for Cohorts 1 through 3 do not. Hence, the values shown for Cohorts 1 through 3 are lower-bound estimates because they include an unknown number of participants without AP opportunities.

Table 2 also displays the percentage of participants in each category who reported an AP course as their favorite course in high school. Between 22 and 49% of participants who took at least one AP course also nominated it as a favorite high school class. These values, too, are conservative estimates because favorite-class nominations were not coded as AP unless participants explicitly labeled them as AP. Thus, common nominations such as organic chemistry, Calculus I and II, and multivariate calculus were not coded as AP, although they likely were AP courses (or courses taken at a local university while students were still in high school).

High School Likes and Dislikes

Figure 1 displays participants' perceptions of their high school experiences as a function of AP involvement. Cohorts 1 through 4 are combined because the same pattern was found in each talent search cohort. Overall, participants valued academic and intellectual stimulation in high school and found the lack of it distressing.

Table 3, which displays representative likes and dislikes from academic-related categories, shows that participants regularly voiced positive reactions to working hard and being intellectually challenged.

TABLE 2

Involvement in the Advanced Placement (AP) Program During High School, by Cohort and Sex

Variable	Cohort 1: Talent search, 1972–1974		Cohort 2: Talent search, 1976–1979		Cohort 3: Talent search, 1980–1983		Cohort 4: Talent search, 1992–1997		Cohort 5: Graduate students, 1992	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
n	1,195	764	401	167	328	108	95	78	368	341
Percentage who took one or more AP courses or exams	41.8***	29.3***	80.8	77.8	86.0*	76.9*	79.0	80.8	75.8	77.4
Mean number of courses or exams taken	2.1***	1.8***	3.3**	2.7**	4.2**	3.5**	3.8*	2.9*	3.3	3.2
Percentage who nominated an AP course as their favorite course in high school	—	—	—	—	35.4	26.4	47.6	49.1	27.6	22.5

Note. Values shown for Cohorts 1, 2, and 3 include an unknown number of participants who did not have AP courses available at their high school. Cohort 1 reported only on AP exams they took in high school; all other participants reported both AP courses and AP exams. Values for favorite-course nominations were calculated using the number of participants involved in the AP program as the denominator; sample size is reduced for Cohort 3 analyses because calculations for this cohort required data from both the age-18 and age-23 follow-ups. Asterisks indicate significant male-female contrasts, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Across samples, more than a third of participants nominated either intellectual challenge, opportunities for acceleration, prointellectualism (the promotion of intellectual rigor by teachers, administrators, or fellow students), schoolwork, academic clubs, or excelling at academics as something they liked most about their high school experience. Fewer than 7% nominated tests, exams, homework, or quizzes as something they disliked. Overall, participants placed more emphasis on academics than on socializing. When asked what they liked most about high school, more than 60% cited something academic (i.e., academic and intellectual activities), whereas 49% cited something social (i.e., social life and extracurricular activities). When asked what they liked least, more than 45% cited something academic (i.e., lack of intellectual stimulation or engagement), and 30% cited something social (i.e., social isolation and peer pressure).

Participants' high level of intellectual engagement was underscored by their likes and dislikes as a function of AP involvement. As displayed in Figure 1, talent-search participants and graduate students who took one or more AP courses were more likely than those who did not to nominate academic and intellectual activities as a liked aspect of high school: talent search, $\chi^2(1, N = 2{,}196) = 27.51$, $p < .001$; graduate students, $\chi^2(1, N = 684) = 10.70$, $p < .01$. Among both groups, individuals involved in AP were less likely than those not involved in AP to nominate a lack of intellectual stimulation or engagement as a disliked aspect of high school: talent search, $\chi^2(1, N = 2{,}056) = 4.19$, $p < .05$; graduate students, $\chi^2(1, N = 649) = 6.41$, $p < .05$. Among talent-search participants only, individuals who were involved in AP were less likely than those who were not involved in AP to nominate social life and extracurricular activities as a liked aspect of high school, $\chi^2(1, N = 2{,}196) = 9.91$, $p < .01$, and more likely to nominate social isolation and peer pressure as a disliked aspect, $\chi^2(1, N = 2{,}056) = 12.10$, $p < .001$.

Advanced Degrees

Longitudinal data on secured educational credentials were available for participants in Cohorts 1 and 2. At age 33, 70% of individuals who had taken one or more AP courses or exams during high school had obtained an advanced degree (master's or beyond), compared with 43% of those who had not taken an AP course or exam. Table 4 displays multiple regression analyses of AP involvement and mathematical reasoning ability (scores for the Mathematics subtest of the SAT, SAT-M, at or before age 13) as predictors of advanced-degree status. (Scores for the Verbal subtest of the SAT, SAT-V, were available for only approximately half the participants.) Although SAT-M scores predicted attainment of an advanced degree 20 years later, AP involvement accounted for an additional 7% and 5% of variance in advanced-degree status for Cohorts 1 and 2, respectively. Thus, through self-selection or something intrinsic to the AP program itself, AP involvement is a positive predictor of educational success and satisfaction for intellectually talented youth.

DISCUSSION

Overall, the intellectually talented youth in this study embraced and placed a premium on intellectual challenge in high school. The majority participated in the AP program. Those who did participate more frequently expressed satisfaction (and less frequently expressed dissatisfaction) with the intellectual caliber of their high school experience, compared with those who did not. Moreover, students who participated in the AP program were more likely to earn an advanced educational degree, even after controlling for mathematical reasoning ability.

Normative data suggest that the mind-set of intellectually talented high school students differs markedly from that of their typical age mates. Recall that more than 60% of the participants cited something academic as a liked aspect of their high school experience, whereas 49% cited something social (30% cited friends and socializing, and 29% cited extracurricular activities; some nominated both). In contrast, 85% of a representative sample of 1,560 Indiana high school students cited friends and socializing as a liked aspect of high school, with less than half that percentage (40%) nominating educational benefits (Erickson & Lefstein, 1991). Further, less than 2% of intellectually talented participants, compared with 19% of Indiana high school students, nominated the opposite sex and dating as a liked aspect. Less than 7% of SMPY participants nominated exams, homework, or studying as something they disliked about high school, whereas 35% of Indiana youth nominated homework or term papers,

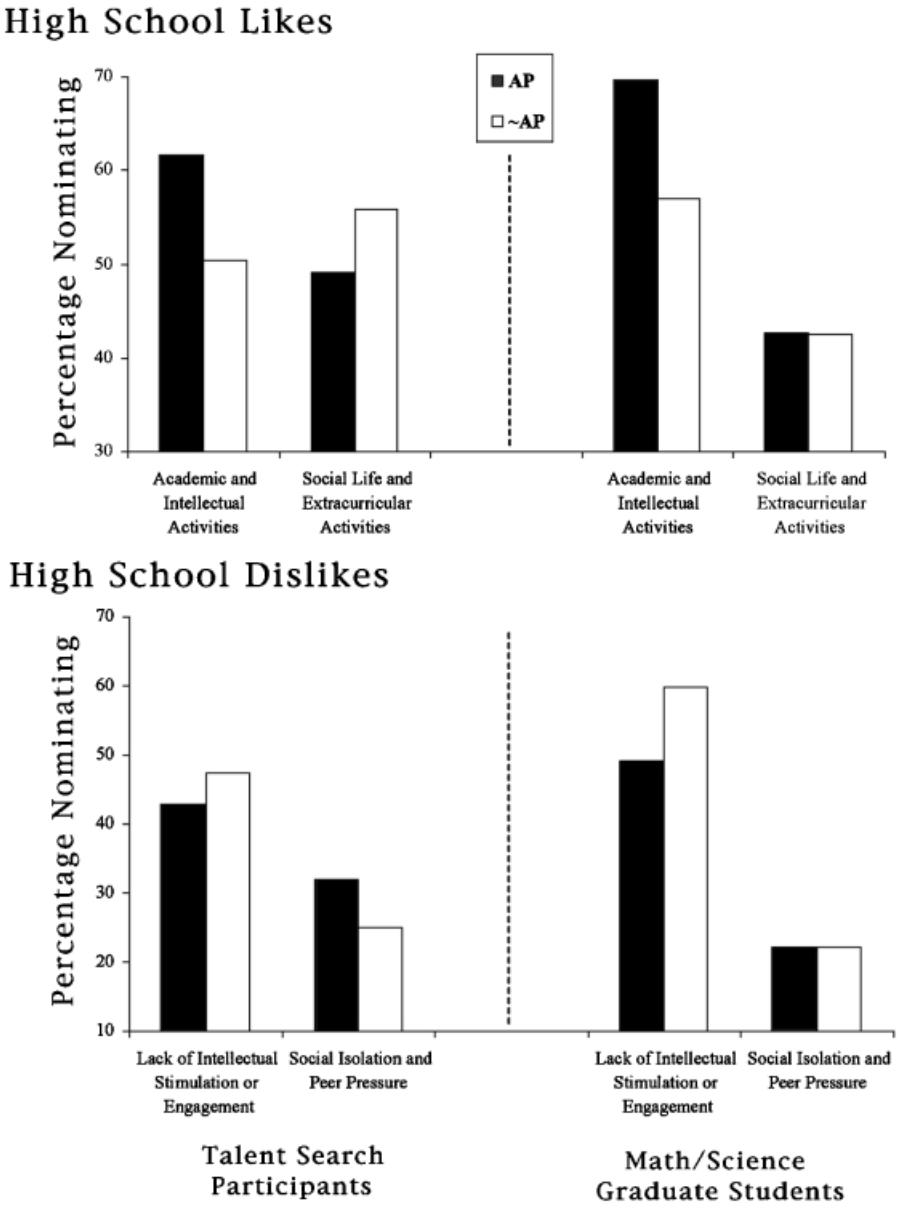

Fig. 1. Percentage of participants who nominated academic and social experiences as what they most liked (top panel) and most disliked (bottom panel) about high school as a function of involvement in the Advanced Placement (AP) program. Participants nominated up to 6 high school likes (talent search $\overline{X} = 1.75$, graduate student $\overline{X} = 1.76$) and 6 high school dislikes (talent search $\overline{X} = 1.39$, graduate student $\overline{X} = 1.47$). Sample sizes for likes are as follows: 1,271 and 925 for AP and non-AP talent-search participants, respectively, and 461 and 223 for AP and non-AP math and science graduate students, respectively. Sample sizes for dislikes are as follows: 1,165 and 891 for AP and non-AP talent-search participants, respectively, and 433 and 216 for AP and non-AP math and science graduate students, respectively.

and 6% nominated tests and exams (Erickson & Lefstein, 1991). Across groups, 2% of SMPY participants nominated early mornings, and 1% nominated long school days, as aversive; of Indiana high school students, 23% complained about getting up early and 20% about long school hours or days.

Although the Indiana youth were surveyed while still in high school and SMPY participants were surveyed after high school, SMPY participants' pattern of responses was robust across a wide range of longitudinal follow-ups. The overall picture of intellectually talented youth is one of young men and women who have an intense need for intellectual growth and who are invested in their intellectual development. Their distinct learning preferences (cf. NRC, 2002, annex 6-1, pp. 11–14) necessitate a differentiated curriculum. AP opportunities appear to facilitate the positive development of highly motivated students who learn at rapid rates. Yet, like all educational interventions, AP is not a panacea. For profoundly gifted students, for example, AP coursework may need to be combined with skipping grades, taking college courses early, and even going to college early.

TABLE 3

Percentage of Participants Nominating Academic-Related High School Likes and Dislikes, by Sex

Academic-related category (and sample responses)	Talent-search participants		Math and science graduate students	
	Males	Females	Males	Females
Likes				
Intellectual engagement	33.0	34.9	33.6*	41.5*
"Opportunity to take advanced placement classes"				
"Working hard in my classes"				
"Association with highly intelligent classmates"				
"Solid education—good preparation for college"				
Teachers and instruction	15.0*	18.4*	19.8*	27.6*
"Several supportive and encouraging teachers"				
"Intelligent and knowledgeable teachers"				
"Several teachers encouraged advanced learning"				
"Getting to know teachers"				
Classes and departments	11.8**	15.9**	10.7**	18.5**
"Math and language courses"				
"Well-balanced curriculum"				
Success and recognition	5.5	6.1	3.7	4.8
"Excelling at academics"				
"Receiving recognition from others for my academic achievement"				
Dislikes				
Lack of intellectual engagement	23.5	23.6	31.0	32.9
"The slow pace of instruction in most classes"				
"Not being challenged intellectually"				
"Lack of intelligent, motivated peers"				
"Poor education—I wasn't taught enough"				
Teachers and instruction	8.5	9.4	14.6	16.9
"Unenthusiastic, controlling teachers"				
"Some teachers were not bright"				
"Teachers who tried to inhibit my advancement"				
"Half the teaching was mediocre"				
Classes and departments	9.3	10.5	13.4	14.1
"Boring, required classes"				
"English and reading Shakespeare"				
Intellectual demand	6.7	5.4	4.2	4.2
"Quizzes"				
"Doing homework"				

Note. Among talent-search participants, sample sizes were 1,327 and 1,252 for male likes and dislikes, respectively, and 797 and 755 for female likes and dislikes, respectively. Among graduate students, sample sizes were 354 and 336 for male likes and dislikes, respectively, and 330 and 313 for female likes and dislikes, respectively. Nonrespondents were omitted from analyses. Other academic-related categories were nominated by fewer than 2.5% of participants and thus are not shown here. Asterisks indicate significant male-female contrasts, $^{*}p < .05$, $^{**}p < .01$.

Adult surveys of gifted individuals reveal that they do not regret their acceleration. Rather, they regret not having accelerated more (Lubinski, Webb, et al., 2001).

To solidify an appreciation of the educational needs of intellectually talented youth, consider the following. In 1972, when SMPY initiated its first talent search using the SAT, fewer than 500 seventh graders participated. Today, some 200,000 seventh and eighth graders who score in the top 3% of their age mates on conventional achievement tests routinely administered in their schools take college entrance exams for admission to summer residential programs for intellectually talented youth. These students generate the same SAT score distributions as do high school seniors. Moreover, those who score at or above the SAT mean of college-bound seniors (SAT-M or SAT-V = 500) can, under the right circumstances, assimilate a full year of a rigorous high school course (e.g., chemistry, English literature, mathematics) in 3 weeks. Those scoring 700 or more can assimilate more than twice this amount (Benbow & Stanley, 1996; Stanley, 2000)! All students profit from a curriculum that moves at a pace commensurate with their rate of learning (Cronbach & Snow, 1977), and for intellectually precocious students, the optimal pace is much faster than the optimal pace for typical high school students. It is understandable that SMPY participants' evaluations of their high school experience vary as a function of their AP involvement, given the rapid rate at which intellectually talented youth consume abstract material. As the AP

TABLE 4
Predicting Attainment of an Advanced Degree at the Age-33 Follow-Up

	Cohort 1: Talent search, 1972–1974 (n = 1,263)		Cohort 2: Talent search, 1976–1979 (n = 469)	
Variable entered	Multiple R	Incremental R^2	Multiple R	Incremental R^2
SAT-M (before age 13)	.20***	—	.16**	—
AP involvement	.34**	.07***	.28***	.05***

Note. Age-33 follow-up data were available only for the first two talent-search cohorts. Advanced degrees include a master's degree or equivalent, doctoral degree or equivalent, medical degree, or law degree. SAT-M = Mathematics subtest of the Scholastic Assessment Test.
**$p < .01$. ***$p < .001$.

program expands and changes, however, will it continue to meet the needs of this special population? Can it serve both a broader population of high school students and the intellectually talented? We turn now to a closer look at recent developments that suggest these are important questions to ask.

The literature on AP from the College Board and the popular press communicates one message loud and clear: The current primary objective of the AP program is that it become equally accessible to all high school students (e.g., CEEB, 2001, 2002; Hebel, 1999; NRC, 2002). This is a laudable goal. Clearly, all students who are intellectually ready for AP coursework should have access to it. Unfortunately, however, the individual student's readiness is no longer used as the primary criterion for evaluating AP accessibility; representation of demographic groups is taking on more weight. However, different demographic groups manifest different distributions of requisite achievement (Gottfredson, 1997; Halpern, 2000; Humphreys, 1988). As a result, a tremendous effort is being made to create an AP environment that can accommodate a student body that is more heterogeneous in academic readiness (CEEB, 2001, 2002).

This effort has engendered a variety of initiatives: (a) including both AP and non-AP students in AP classes ("Advanced Placement Takes Center Stage," 1999); (b) eliminating prerequisites, such as a certain grade point average and teacher recommendations, for AP admission (Grier, 2002; Matthews, 2002); (c) pushing students in rural schools and urban schools with large numbers of minority or low-income students, regardless of their standing on requisite attributes, to take AP courses whether they want to or not (Lewin, 2002; Matthews, 2001); and (d) encouraging certain students, such as those with low grades but near-average standardized test scores or those who have passed state minimum-proficiency exams, to take AP courses whether they are prepared for them or not (Lewin, 2002; Rothstein, 2001; Swanson, 2000). For example, 1,000 schools nationwide have adopted the Advancement Via Individual Determination (AVID) curriculum, in which B and C students who score close to average on standardized tests are automatically enrolled in AP courses as a part of their college preparatory curriculum.

Collectively, these initiatives point to an increasingly intellectually diverse AP population. Not only has the College Board acknowledged this (Ganeshananthan, 2000), but it also has advertised it in a recent brochure: "AP isn't just for top students or those heading to college. AP offers something for everyone" (CEEB, 2002, p. 4). The same brochure quotes an AP student: "We had students from different backgrounds, and people learn at different rates. The (AP) teachers took everyone's views seriously. No answers were wrong if people had an opinion about something" (CEEB, 2002, p. 18). These quotations are prototypical examples from the literature on AP. According to the current rhetoric, AP is no longer just for advanced learners. Unfortunately, to the extent that practices surrounding AP aim to accommodate everyone, regardless of academic readiness, they may have iatrogenic effects (i.e., harmful effects caused by treatment) on students at both ends of the ability spectrum (Lubinski & Humphreys, 1997). Proponents of these practices seem naively optimistic in responding to concerns about recent declines in AP exam pass rates when they suggest that "even students who failed AP tests gained considerable confidence and knowledge from the experience" (Matthews, 2001). Arguably, these students might have gained more in educational environments more closely aligned with their rate of learning and demonstrated achievement. What is not arguable is the need to collect data on the links between current practices, the rates at which students take and pass AP exams, and growth in students' knowledge and confidence.

Increased diversity in the academic readiness of the AP population also is likely to have iatrogenic effects on those for whom the program was originally designed. When demographic groups differ markedly in academic readiness, an emphasis on demographic parity often results in lowered standards and diminished intellectual rigor for students with high potential (Davis, 1976, 1986; Humphreys, 1988, 1991).[1] As AP teachers have recognized, "If you've got kids on the low end, you have to do a lot of remedial work that slows everyone down, so there's

[1]The competing demands of demographic parity and sustained intellectual rigor in college-level courses may be especially potent in math and sciences, where the gaps in AP involvement between different demographic groups are most glaring. Excellence in math and science is linked to exceptional quantitative reasoning ability, a correspondingly high commitment to hard work, and the aggressive self-directed pursuit of nonrequired, supplemental intellectual experiences (Lubinski, Benbow, et al., 2001). Furthermore, success in math and science AP courses requires a higher level of general aptitude than does success in most non-math-science AP courses (Camara & Millsap, 1998; Lichten & Wainer, 2000). Initiatives that place students in math and science AP courses on the basis of their demographic status rather than their level of achievement are unlikely to maximize student learning. A recent analysis of demographic parity and productivity in the world of work is readily generalizable to educational settings: When demographic groups differed markedly in ability, equal demographic representation and maximum productivity could not co-occur (other things being equal), and this problem intensified when the comparison of ability-discrepant groups was restricted to uniformly high levels of conceptually demanding occupations (Sackett, Schmitt, Ellingson, & Kabin, 2001). Similarly, when the groups under consideration differ markedly in academic readiness, promoting demographic parity in conceptually demanding educational tracks detracts from the goal of maximizing learning among all students.

not much chance of accomplishing the curriculum" (high school principal quoted in Lewin, 2002). In accord with this statement, several SMPY participants reported, and disliked, being in advanced classes that were not really advanced at all or that slowed down to accommodate students who learned at a slower pace or who were less engaged intellectually. Such situations attenuate the academic growth of exceptional students (Ceci, 2000, p. 247). Ensuring that all students have access to the AP program if they are ready for it is an admirable goal—and clearly, all demographic groups have many members who qualify for AP. But ensuring equal representation in AP opportunities across all demographic groups by lowering standards is not consistent with the philosophy that initially undergirded the program. It is unrealistic to expect interventions to create equal educational outcomes among students at contrasting levels of academic readiness (Corno et al., 2002; Cronbach & Snow, 1977), even when those students are biologically related siblings raised in the same home (Murray, 1998). If educational policy and practice fail to respond to individual differences in personal attributes (Lubinski, 2000), programs like AP will be limited in their capacity to meet the educational needs of students with exceptional motivation and talent. It is conceivable, then, that the positive findings we have documented in this study will fail to be replicated in subsequent samples of comparably able youth whose AP experience will be impacted by a markedly different AP population and curriculum. Educational policymakers must be vigilant of modifications to the AP program, across both sides of the person-environment equation (viz., both selection of the student body and the depth and pace of the curriculum). As Cronbach (1983) emphasized, when implementing innovative interventions or modifications to preexisting programs (especially programs known to be highly efficacious), investigators need to collect data and assess the direct and indirect effects that those modifications foster on outcomes relevant to all participants involved. Perhaps Popper (1959) said it best nearly half a century ago: "*The main task of social science . . . is to trace the unintended repercussions of intentional human actions*" (p. 281, italics in original).

To the extent that a student body becomes more heterogeneous in academic readiness, delivering a uniform curriculum of any kind will compromise the academic development of a certain proportion of students. One size will never fit all. By definition, special populations have special needs. We urge policymakers and program evaluators to collect data on the outcomes of modifications to historically effective educational programs. In the current context, this may be critical for forestalling iatrogenic effects, meeting the needs of intellectually precocious youth, and building extraordinary human capital for society at large.

Acknowledgments—Support for this article was provided by National Science Foundation Grant MDR8855625, an anonymous donor, and a Templeton Award for Positive Psychology. Earlier versions of this report benefited from comments by Nathan Brody, Linda S. Gottfredson, Robert A. Gordon, Lloyd G. Humphreys, Earl Hunt, Arthur R. Jensen, Julian C. Stanley, and Rose Mary Webb.

REFERENCES

Advanced Placement takes center stage. (1999, October). *NEA Today*, pp. 22–23.

Benbow, C.P., Lubinski, D., Shea, D.L., & Eftekhari-Sanjani, H. (2000). Sex differences in mathematical reasoning ability at age 13: Their status 20 years later. *Psychological Science*, *11*, 474–480.

Benbow, C.P., & Stanley, J.C. (1983). Constructing educational bridges between high school and college. *Gifted Child Quarterly*, *27*, 111–113.

Benbow, C.P., & Stanley, J.C. (1996). Inequity in equity: How current educational equity policies place able students at risk. *Psychology, Public Policy, and Law*, *2*, 249–293.

Camara, W.J., & Millsap, R. (1998). *Using the PSAT/NMSQT and course grades in predicting success in the Advanced Placement program* (College Board Report No. 98-4). New York: College Entrance Examination Board.

Ceci, S.J. (2000). So near and yet so far: Lingering questions about the use of measures of general intelligence for college admission and employment screening. *Psychology, Public Policy, and Law*, *6*, 233–252.

College Entrance Examination Board. (2001). *Access to excellence: A report of the Commission on the Future of the Advanced Placement Program*. New York: Author.

College Entrance Examination Board. (2002). *Minority brochure*. New York: Author.

Corno, L., Cronbach, L.J., Kupermintz, H., Lohman, D.F., Mandinach, E.B., Porteus, A.W., & Talbert, J.E. (Eds.). (2002). *Remaking the concept of aptitude: Extending the legacy of Richard E. Snow*. Mahwah, NJ: Erlbaum.

Cronbach, L.J. (1983). *Designing evaluations of educational and social programs*. San Francisco: Jossey-Bass.

Cronbach, L.J., & Snow, R.E. (1977). *Aptitudes and instructional methods: A handbook for research on interactions*. New York: John Wiley & Sons.

Davis, B.D. (1976). Academic standards in medical schools. *The New England Journal of Medicine*, *294*, 1118–1119.

Davis, B.D. (1986). Affirmative action and veritas at Harvard Medical School. In B.D. Davis (Ed.), *Storm over biology: Essays on science, sentiment, and public policy* (pp. 171–191). Buffalo, NY: Prometheus.

Erickson, J.B., & Lefstein, L.M. (1991). *Indiana youth poll: Youths' views of high school life*. Indianapolis: Indiana Youth Institute.

Ganeshananthan, V.V. (2000, July 14). Advanced Placement faces new criticism over its testing standards. *The Chronicle of Higher Education*, p. A45.

Gottfredson, L.S. (Ed.). (1997). Intelligence and social policy [Special issue]. *Intelligence*, *24*(1).

Grier, T.B. (2002). Advanced placement: Access to excellence. *Principal Leadership*, *2*, 16–19.

Halpern, D.F. (2000). *Sex differences in cognitive abilities* (3rd ed.). Mahwah, NJ: Erlbaum.

Hebel, S. (1999, November 26). A.P. courses are new target in struggle over access to college in California. *The Chronicle of Higher Education*, p. A32.

Humphreys, L.G. (1988). Trends in levels of academic achievement of blacks and other minorities. *Intelligence*, *12*, 231–260.

Humphreys, L.G. (1991). Limited vision in the social sciences. *American Journal of Psychology*, *104*, 333–353.

Lewin, T. (2002, April 17). Questions for Advanced Placement. *The New York Times*, p. A16.

Lichten, W. (2000). Whither Advanced Placement? *Educational Policy Analysis Archives*, *8*(29). Retrieved October 31, 2002, from http://epaa.asu.edu/epaa/v8n29.html

Lichten, W., & Wainer, H. (2000). The aptitude-achievement function: An aid for allocating educational resources, with an Advanced Placement example. *Educational Psychology Review*, *12*, 201–228.

Lubinski, D. (2000). Assessing individual differences in human behavior: "Sinking shafts at a few critical points." *Annual Review of Psychology*, *51*, 405–444.

Lubinski, D., & Benbow, C.P. (2000). States of excellence. *American Psychologist*, *55*, 137–150.

Lubinski, D., Benbow, C.P., Shea, D.L., Eftekhari-Sanjani, H., & Halvorson, M.B.J. (2001). Men and women at promise for scientific excellence: Similarity not dissimilarity. *Psychological Science*, *12*, 309–317.

Lubinski, D., & Humphreys, L.G. (1997). Incorporating general intelligence into epidemiology and the social sciences. *Intelligence*, *24*, 159–201.

Lubinski, D., Webb, R.M., Morelock, M.J., & Benbow, C.P. (2001). Top 1 in 10,000: A 10-year follow-up of the profoundly gifted. *Journal of Applied Psychology*, *86*, 718–729.

Matthews, J. (2001, May 10). City schools push students toward Advanced Placement. *The Washington Post*, p. T03.

Matthews, J. (2002, August 7). Advanced Placement. *Education Week*, *21*(43), p. 68, 51.

Murray, C. (1998). *Income, inequality, and IQ*. Washington, DC: American Enterprise Institute.

National Research Council. (2002). *Learning and understanding: Improving advanced study of mathematics and science in U.S. high schools*. Washington, DC: National Academy Press.

Popper, K.R. (1959). Critiques of classical theories of history. In P. Gardiner (Ed.), *Theories of history* (pp. 275–285). Glencoe, IL: Free Press.

Reis, S.M. (1989). Reflections on policy affecting the education of gifted and talented students: Past and future perspectives. *American Psychologist*, *44*, 399–408.

Rothstein, R. (2001, February 28). 'Scaffolding' is raised, and so are sights. *The New York Times*, p. B10.

Sackett, P.R., Schmitt, N., Ellingson, J.E., & Kabin, M.B. (2001). High-stakes testing in employment, credentialing, and higher education. *American Psychologist*, *56*, 302–318.

Stanley, J.C. (2000). Helping students learn only what they don't already know. *Psychology, Public Policy, and Law*, *6*, 216–222.

Stanley, J.C., & Benbow, C.P. (1982). Educating mathematically precocious youths: Twelve policy recommendations. *Educational Researcher*, *11*, 4–9.

Swanson, M.C. (2000). Rigor with support: Lessons from AVID. *Leadership*, *30*, 26–27, 37–38.

(Received 1/7/03; Revision accepted 5/6/03)