

## **CHAPTER 6**

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**OPENING AN AFRICAN AMERICAN STEM PROGRAM  
TO TALENTED STUDENTS OF ALL RACES:  
EVALUATION OF THE MEYERHOFF SCHOLARS PROGRAM, 1991-2005**



**Kenneth I. Maton**

**Freeman A. Hrabowski, III**

**Metin Özdemir**



## Introduction

The Meyerhoff Scholars Program at University of Maryland, Baltimore County (UMBC) was developed in 1988 in response to the low levels of performance of well-qualified African American science, technology, engineering and mathematics (STEM) majors, with a special interest in enhancing the performance of African American males. Baltimore philanthropists Robert and Jane Meyerhoff provided initial program funding, and have continued to contribute over the years. Other funding has come from national agencies, foundations, corporations, and individual donors. The program developers, led by UMBC's then Vice-Provost (and since 1992 UMBC's president), sought to develop a comprehensive, multi-component program that addressed the broad range of factors linked to minority student STEM success (cf. Maton & Hrabowski, 2004). Letters soliciting nominations were sent to principals and guidance counselors throughout Maryland requesting their "best and brightest" African American males; even among this group, relatively few had succeeded in STEM fields on the UMBC campus, or nationally. Forty nominations were received that year, and 19 African American males became the first Meyerhoff Program students in 1989. In 1990, the program admitted 15 African American males and females. During the next five years, 1991-1995, as funding availability increased, between 34 and 47 African American students were admitted each year. However, in 1996, in a political climate of lawsuits related to the use of race in scholarship programs and college admissions, and in particular the landmark lawsuit challenging the University of Maryland, College Park's Banneker Scholarship, the university opened the program to students of all races—those with an interest in the advancement of minorities in STEM fields.

The Maryland Attorney General's Office provided feedback on the proposal to open admissions to applicants of all races interested in working with underrepresented minority groups. The proposed change was a direct response to the *Podberesky v. Kirwan* (1994, 1995) rulings, in which the United States Supreme Court let stand the decision of a Federal Appeals Court which struck down the race-exclusive admissions policy of the Banneker Scholarship Program for talented African Americans. Following the court decision, UMBC made a strategic, conscious decision to open Meyerhoff Program admissions, even though some on campus, including various minority groups, wanted to continue to have a race-exclusive program on the grounds that national agencies continued to provide funding only for minorities and because of the pride associated with a program for African Americans known for its excellence. However, the University chose not to engage in a legal battle to avoid negative publicity and confusion about who could be in the program.

The decision process was not easy. Discussions were held with faculty, students, and staff about the pros and cons of bringing students from other racial groups into the program. The most compelling argument was that the underrepresentation of minorities in science was a national issue—not solely a minority issue—and that it was necessary to prepare many more Americans of all races both to understand the issue of underrepresentation and to develop skills in order to address this national challenge. Thus, while some argued opening admissions was akin to letting others "take over their program," the case was made that UMBC would continue to focus on the primary goal of producing minority scientists, especially African Americans (given the historically low number of members of other underrepresented groups in the Baltimore region), while also producing European American and Asian American scientists with a commitment to

supporting minority students aspiring to become researchers, physicians, and engineers.

Discussions next focused on strategies for determining non-minority students' interest in the underrepresentation of minorities in STEM fields. The program developed 1) language to include in recruitment materials focusing on the new criterion, and 2) questions to help the Meyerhoff selection committee assess students' interest in the underrepresentation issue. Indices used for determining the interest of non-minority students based on their application materials included: willingness to discuss issues of race, poverty and academic performance; involvement with activities and organizations that were (likely) ethnically diverse (e.g., multicultural clubs, athletic teams); tutoring minority children; and related activities.

The decision to integrate the program also meant an additional commitment by the University to find resources for scholarships for European American and Asian American students and to support these students financially in the Meyerhoff Program. A critical issue was to ensure that there was no difference of treatment between minority and non-minority students. Although the national agencies and a number of foundations were willing to provide funding for minorities, the campus reallocated money internally to support the students from other racial/ethnic groups. The leadership of the campus (e.g., budget committee and the president, working in conjunction with other leaders of the campus) came to this understanding. Scholarship funds, thus, for African American and Hispanic students primarily come from the federal government, corporations, and private foundations. Scholarship money for Asian American and European American students primarily comes from the University budget.

Currently, between 45 and 65 Meyerhoff students are selected each year. The number is directly dependent on the amount of available funding. The majority (55-65%) of entering students each year are African Americans. The program is situated on a predominantly white campus (34% minority), with more than half of the undergraduates and 60 percent of the doctoral students pursuing STEM degrees.

The primary purpose of the current paper is to examine the impact of the opening of the admissions process to talented students of all races, resulting in a change from a race-exclusive to a race-integrated (i.e., multi-racial) program. Specifically, the program impact in five areas is addressed: 1) the number of entering African American students, 2) the quality of entering African American students; 3) the program experience of students; 4) the perspective of African American Meyerhoff students about the integration of the program, and 5) program outcomes (i.e., entrance into STEM Ph.D. programs). The findings are relevant to the larger issue of what adaptations and changes can be made to race-specific programs in this anti-affirmative action era; the design of the research has relevance to future attempts to evaluate changes in this arena.

### *Historical and Policy Context*

The long history of racism in the United States has segregated racial and ethnic groups in many ways. Although constitutional rights were strongly defended by the majority group, minorities were systematically excluded from many opportunities throughout our history. This exclusion created social inequalities that have proved difficult to resolve. The public policy of affirmative action in the 1960s represented an attempt to address the history and thereby the destiny of

historically oppressed minorities through abolishing race- and gender-based discrimination in such processes as employment and admission to colleges and universities (Crosby, Iyer, Clayton, & Downing, 2003). It was proposed as a response to the need for equal representation of minorities and an attempt to eradicate racism from all social institutions. Nevertheless, in recent years this policy has received strong criticism and resulted in divisive debates.

One aspect of the remedy to increase diversity and equalize representation was setting aside quotas for underrepresented ethnic minorities applying to college. Opponents of affirmative action argued that these quotas were another version of discrimination. The first major lawsuit, the *Regents of the University of California v. Bakke* case, outlawed this practice. While the Supreme Court struck down the use of quotas, universities were allowed to use race as an admission criterion. Moreover, race-exclusive or race-conscious scholarship and fellowship programs were created to increase the ethnic diversity at colleges and universities. Nevertheless, these programs were subjected to controversial debates as well. Ultimately, many have been restructured to be inclusive of all races and ethnic groups following counterarguments and court cases outlawing affirmative action policies (Hebel, 2003; Schmidt, 2005a).<sup>1</sup>

Increasing diversity in higher education is thought to have multiple benefits for the whole society and for underrepresented ethnic groups in particular (Bowen & Bok, 1998; Cohen, 2003; Crosby, Iyer, Clayton, & Downing, 2003; Gurin, Nagda, & Lopez, 2004). Since the inception of affirmative action policies, the number of minorities granted admission to colleges and universities has increased significantly, increasing from 16 to 27 percent from 1976 to 1996 (National Center for Educational Statistics, 2001). However, the abandonment of affirmative action in some states reversed this effect (Bok, 2003; Cohen, 2003; Horn & Flores, 2003; Marin & Lee, 2003), although the proponents of the new policies claim the opposite. For example, in Florida, the Talented 20 program was adopted, which eliminated race-based admissions in favor of merit-based admissions to students in the top 20% of their high school classes. The number of minority admissions to top-tier universities decreased while there was a slight increase in admissions to historically Black and historically Hispanic universities (Marin & Lee, 2003). Card and Krueger (2004) analyzed the impact of the elimination of affirmative action policies in California and Texas, two of the nation's largest states. They found that after these policies were abolished in 1996 and 1997, the overall admissions rate for African Americans and Hispanics decreased about 30 to 50 percent in both states.

Although percent plans, granting admission to high-achieving graduates of high schools (e.g., the top 10 or 20 percent), devised after the elimination of race-based admission programs increased the rates of admission and enrollment to undergraduate programs for some minorities, they have not proven to be a positive change overall, and especially for the African American population. Highly selective institutions in these states have generally seen declining enrollments. In Texas, a decline in the enrollment of underrepresented minorities has been observed in spite of the percent plan after the elimination of competitive minority scholarships in 1999 (Card & Krueger, 2004). Most important, one has to question the level of academic preparation of the top subset of students in poorly funded and low-achieving schools.

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<sup>1</sup> See chapters by Ancheta and Banks in this volume for further discussion of these issues.

A recent dramatic change has been observed in many universities following the Supreme Court decisions on two cases involving the University of Michigan, Ann Arbor. Specifically, a 2004 survey showed that 11 of the 29 surveyed universities had declines in their admission of African American or Hispanic students (Selingo, 2005). For example, at the University of Michigan, where these 2003 Court cases emerged, African American enrollment declined from 2002 to 2004 by 7.9% and Hispanic enrollment by 15.6%. Since early 2003, almost 70 universities have changed their policies regarding race-conscious programs and opened such programs to non-minority students as a result of complaints and threats of legal action from advocacy groups (Schmidt, 2005b). This occurred in spite of the positive ruling of the Court, reflected in Justice Sandra Day O'Connor's powerful statement on the value of diversity: "In order to cultivate a set of leaders with legitimacy in the eyes of the citizenry, it is necessary that the path to leadership be visibly open to talented and qualified individuals of every race and ethnicity" (*Grutter v. Bollinger et al.*, 2003). Justice O'Connor's expectation that "25 years from now, the use of racial preferences will no longer be necessary" (*Grutter v. Bollinger et al.*, 2003) underscores the time urgency of work to enhance the recruitment and achievement of minorities in higher education, including the effort examined in this paper.

Contentious arguments between the proponents of the new policy and advocates of affirmative action continue to lead to controversy, with conclusions often based on values rather than evidence. Research is sorely needed to examine the changes in the aftermath of abandoned affirmative action policies and changes in scholarship and fellowship programs designed to increase minority admissions to higher education institutions. In this chapter, the focus is not on changes in statewide and general university admissions policies for freshman, the area of most of the research to date. Rather, it is on the opening of the admissions process at one university to talented students of all races in a comprehensive scholarship and support program for students with career interests in the STEM area.

#### *Underrepresented African American Students in the Sciences, Technology, Engineering and Mathematics: The Meyerhoff Scholars Program*

The primary goal of the Meyerhoff Scholars program is to help African American students achieve at the highest levels in STEM areas and go on to STEM Ph.D. programs, in which they are dramatically underrepresented. Research has indicated that the low rates of success of underrepresented minority (URM) students in the sciences at the undergraduate level appear due to four sets of factors. These include academic and social integration, knowledge and skill development, support and motivation, and monitoring and advising (cf. Maton & Hrabowski, 2004). The Meyerhoff Program was developed with the specific intention of comprehensively addressing these needs, with an initial, exclusive focus on African American students. The focus of the current study is the viability of the strategy of responding to the anti-affirmative action climate by maintaining a primary focus on African American (and other URM) students, while opening the admissions process to include other students as well. Specifically, the strategy allowed a continued focus on increasing the number of minority scientists, including admitting both students who are ethnic minorities and admitting non-URM students with an interest in supporting this mission.

The academic criteria necessary for acceptance into the Meyerhoff Scholars Program have been increasing steadily over the years. The first entering cohort had mean SAT-Verbal scores of 587, mean SAT-Math scores of 611, a mean combined SAT of 1198 (recentered SAT scores, cf. Dorans, 2002), and a high school GPA of 3.60. The most recent 2005 entering cohort of Meyerhoffs had mean SAT-Verbal scores of 644, mean SAT-Math scores of 664, a mean combined SAT of 1308, and a mean high school GPA of 4.04. Prospective Meyerhoff students have cumulative high school averages in science and math well above a B, and many have completed a year or more of calculus in high school. Preference is given to those who have taken advanced placement courses in math and science, have research experience, and provide strong references from science or math instructors. Additional admissions factors considered include a commitment to stay in the sciences, a genuine interest in becoming a researcher, an openness to taking academic advice, a willingness to participate in study groups and to do community service, and a strong interest in the advancement of underrepresented minorities in STEM fields.

In 1996, the Meyerhoff Scholars Program was recognized nationally with the Presidential Award for Excellence in Science, Math and Engineering Mentoring. Previous research established the effectiveness of the program in enhancing the entrance of African American students into STEM Ph.D. programs and examined some of the key processes that lead to these positive outcomes (BEST, 2004; Gordon & Bridglass, 2004; Maton, Hrabowski & Schmitt, 2000; Maton & Hrabowski, 2004).

The program incorporates 15 different components, briefly described below (cf. Maton & Hrabowski, 2004; for a more detailed description, see Gordon & Bridglass, 2004).

*Financial Aid.* The Meyerhoff Program provides students with a comprehensive financial package including, in many cases, tuition, books, and room and board. This support is contingent upon maintaining a B average in a STEM major.

*Recruitment.* The top 100-150 applicants and their families attend one of the two recruitment weekends on the campus.

*Summer Bridge Program.* Meyerhoff students attend a mandatory pre-freshman Summer Bridge Program, and take courses in math, science, and Africana studies (i.e., Introduction to the Black Experience). They also participate in STEM related co-curricular activities, and attend social and cultural events. With the advent of students of different ethnicities, a community-building course was added as well (i.e., Gerstung team building).

*Study Groups.* Group study is strongly and consistently encouraged by the program staff, as study groups are viewed as an important aspect of success in STEM majors.

*Program Values.* Program values include support for academic achievement, seeking help from a variety of sources, peer supportiveness, high academic goals (with emphasis on Ph.D. attainment and research careers), and giving back to the community.

*Program Community.* The Meyerhoff program provides a family-like social and academic support system for students. Students live in the same residence hall during their first year and are required to live on campus during subsequent years.

*Personal Advising and Counseling.* The program employs full-time advisors who monitor and support students on a regular basis. Staff focus not only on academic planning and performance, but on any personal problems students may have as well.

*Tutoring.* The program staff strongly encourages Meyerhoff students to either tutor others or be tutored to maximize academic achievement (i.e., to get ‘As’ in difficult courses).

*Summer Research Internships.* Each student participates in multiple summer research internships at leading sites around the country, as well as some international locations.

*Research Experience during the Academic Year.* A number of students participate in the MARC U\*STAR program, which requires research involvement in a faculty member’s lab during the student’s junior and senior years.

*Faculty Involvement.* Key STEM department chairs and faculty are involved in the recruitment and selection phases of the program. Many faculty provide research opportunities for students in their labs.

*Administrative Involvement.* The Meyerhoff Program is supported at all levels of the University, including ardent support from the President (the program co-founder).

*Mentors.* Each student is paired with a mentor who is in a science profession.

*Community Service.* All students are encouraged to take part in a community service activity, which often involves volunteer work with at-risk Baltimore youth.

*Family Involvement.* Parents are included in social events and kept advised of their child’s progress.

## Method

### *Research Participants*

*Meyerhoff Sample.* The 692 Meyerhoff students from the third entering class (1991) through the most recent class (2005) comprise the primary Meyerhoff sample in this study. The first two entering classes (1989 and 1990) were not included since they were much smaller in size than those that followed. The primary sample includes 526 African American, 88 European American, and 79 Asian American students (12 entering Latino students were not included in the primary sample due to their limited number). The average entering class size between 1991 and 2005 was 46.9 students, with a range from 34 to 63. The average high school GPA for the primary sample was 3.8, average SAT Verbal 608.1, average SAT Math 661.9, and average SAT combined 1270; 49.1% were male.

The number of Meyerhoff students completing process evaluation surveys over the years differed, depending on the specific survey item (some items were added in later years). For the 1991-1995 entering classes, the number of students completing surveys ranged from 91 (45%) to 156 (77%), depending on the item. For the 1996-2000 entering classes, the number of students completing items ranges from 100 (63%) to 110 (69%) for African Americans, 24 (67%) to 28 (78%) for European Americans, and from 22 (67%) to 24 (73%) for Asian Americans. From 1999 to 2001, a subgroup of 40 African American students took part in process evaluation interviews, and a subgroup of 54 students took part in exit interviews from 2002 to 2005.

*“Declined” Comparison Sample.* The “Declined” sample consists of 246 students who were offered Meyerhoff scholarships between 1991 and 2000, but declined the offer. Almost all of these students attended universities other than UMBC. This sample includes only students who took at least three science, engineering, and/or mathematics courses during their freshman year. The sample does not include entering students after 2000 since the Declined students are

included in analyses of post-college outcomes only (i.e., limited to students who have had, to date, at least five years to graduate college). The Declined sample includes 196 African American, 26 European American, and 24 Asian American students. The Meyerhoff and Declined samples differed significantly on several of the pre-college academic background variables, and gender (see Appendix 6-A).

### *Measures*

*Demographic and Academic Background Variables.* Ethnicity, gender, university entrance date, SAT scores (both math and verbal), and high school GPA were obtained from university application records.

*Graduate Education.* The STEM graduate education outcome variable contained eight post-college categories: 1) entered Ph.D. STEM program; 2) entered M.D./Ph.D. program; 3) entered STEM Masters program; 4) entered medical school; 5) entered other STEM professional school (e.g., dental); 6) no post-college education in STEM (includes students who did not complete college, those who graduated in a non-STEM major, STEM graduates who did not pursue graduate or professional education, and those who attended non-STEM graduate programs); 7) those still enrolled at the undergraduate level in a STEM major; and 8) those whose graduate status is unknown (to date). If a student entered a STEM Masters program upon graduation but later entered a STEM Ph.D. program, the latter (i.e., the higher degree program) was coded. However, if a student entered a STEM Ph.D. program but left the program with a terminal masters, or entered a Ph.D./M.D. program but only completed the M.D. aspect, then the degree actually received was counted. For primary analyses, with a focus on the Meyerhoff program goal of enhancing the number of STEM Ph.D.s, students in the first two categories (entered STEM Ph.D. or M.D./Ph.D.) were compared to those in the other six.

*Process Evaluation Survey Items.* Survey items assessed student perceptions of the value of various aspects of their experience in the program. Nine items that appeared especially relevant in the current context were selected (from the larger set of items) for analysis: 1) summer bridge program; 2) feeling a part of the Meyerhoff community; 3) study groups; 4) Meyerhoff staff advising; 5) summer research experience; 6) financial support; 7) social experiences with peers; 8) academic interactions with peers; and 9) program cultural activities. Over the years, who was surveyed, the wording of the survey items, the wording of the anchors on the 5-point Likert scale used, and how the survey was administered have varied (see Appendix 6-B). Any or all of these factors may affect survey responses, and thus comparisons on item responses over time must be viewed cautiously. Given this fact, only descriptive information (means, standard deviations) is provided related to change over time, with no statistical tests performed. A number of students completed surveys on two or more occasions over the years (about 45% of the 1991-1995 entering classes and 12% of the 1996-2000 entering classes); for these students, responses on the most recent survey was used (the only exception was if the most recent survey was the 1996 survey, which used a very different rating format than the others; see Appendix 6-B).

### *Procedure*

All students completed an informed consent form at the time they applied to the program, or else at the start of the program, along with a form providing permission to obtain college and graduate school transcripts from registrar offices. Information on post-college destination was obtained from multiple sources, including program records (in the case of Meyerhoff students), the students, family members, or through Internet or paid searches. Information was confirmed (or clarified) by phone calls to graduate and professional school registrar offices. Process evaluation surveys and interviews were conducted by graduate research assistants.

### Results

#### *Entering Students: Number and Percentage African American*

From 1991 to 1995, the five years preceding the opening of the program to students of all races, there were a total of 202 entering African American students, an average of 40.4 students per entering class (Table 6-1). During the subsequent five years, 1996-2000, following the opening of the admissions process to students of all races, a total of 158 African American students entered the program, an average entering class of 31.6 students. This represents a 21.8% decline in the number of entering African American students. In terms of change in class composition, the decline from 100% (202/202) to 69.0% (158/229) African American is statistically significant,  $X^2(1) = 75.0, p < .001$ . During the five most recent years, 2001-2005, there were 166 entering African American students, an average of 33.2 per entering class. This represents a 5.1% percent increase in the number of entering African American students from the preceding five years. However, there was a substantially larger increase of 49.2% in other entering students (from 71 to 106) during these years. In terms of change in class composition, the overall result was a decline from 69.0% (158/229) African American in 1996-2000 to 61.0% (166/272) in 2001-2006, a difference that approached but did not achieve statistical significance,  $X^2(1) = 3.6, p < .06$ .

Comparing the five years prior to the opening of admissions to all ten years since admissions have been opened (1996-2005 combined), there was a decline in the average number of entering African American students per year from 40.4 to 32.4, representing a 20% decline. In terms of change in class composition, the decline from 100% (202/202) African American to 64.5% (324/501) was statistically significant,  $X^2(1) = 95.6, p < .001$ .

#### *Entering Students: High School GPA, SAT Scores, and Gender*

The five cohorts of entering African American students prior to the opening of the admissions process, 1991-1995, achieved an average high school GPA of 3.6. The next five entering cohorts of African American students, 1996-2000, achieved a 3.8, and the most recent five cohorts, 2001-2005, a 3.9 (Table 6-2). An analysis of variance comparing the three groups was statistically

Table 6-1: Number and Percent of Entering Students by Year of Entry and Ethnicity

<b>Year of Entry</b>	<b>African American</b>	<b>European American</b>	<b>Asian American</b>	<b>Latino</b>	<b>TOTAL</b>
<b><i>Pre: Cohorts 3-7</i></b>					
1991-1992	34 (100%)	0	0	0	34
1992-1993	44 (100%)	0	0	0	44
1993-1994	38 (100%)	0	0	0	38
1994-1995	39 (100%)	0	0	0	39
1995-1996	47 (100%)	0	0	0	47
SUBTOTAL	202 (100%)	0	0	0	202
MEAN	40.4 (5.1)	0	0	0	40.4 (5.1)
<b><i>Post: Cohorts 8-12</i></b>					
1996-1997	28 (77.8%)	5 (13.9%)	3 (8.3%)	0	36
1997-1998	32 (71.1%)	6 (13.3%)	6 (13.3%)	1 (2.2%)	45
1998-1999	32 (60.4%)	8 (15.1%)	11 (20.8%)	2 (3.8%)	53
1999-2000	29 (58.0%)	14 (28.0%)	6 (12.0%)	1 (2.0%)	50
2000-2001	37 (82.2%)	3 (6.7%)	5 (11.1%)	0	45
SUBTOTAL	158 (69.0%)	36 (15.7%)	31 (13.5%)	4 (1.7%)	229
MEAN	31.6 (3.5)	7.2 (4.2)	6.2 (2.9)	0.8 (0.8)	45.8 (6.5)
<b><i>Post: Cohorts 13-17</i></b>					
2001-2002	36 (64.3%)	7 (12.5%)	12 (21.4%)	1 (1.8%)	56
2002-2003	25 (55.6%)	9 (20.0%)	8 (17.8%)	3 (6.7%)	45
2003-2004	36 (58.1%)	17 (27.4%)	8 (12.9%)	1 (1.6%)	62
2004-2005	41 (65.1%)	8 (12.7%)	12 (19.0%)	2 (3.2%)	63
2005-2006	28 (60.9%)	11 (23.9%)	6 (13.0%)	1 (2.2%)	46
SUBTOTAL	166 (61.0%)	52(19.1%)	46(16.9%)	8(2.9%)	272
MEAN	33.2 (6.5)	10.4 (4.0)	9.2 (2.7)	1.6 (0.9)	54.4 (8.6)
<b><i>Combined Post: Cohorts 8-17</i></b>					
SUBTOTAL	324 (64.5%)	88 (17.6%)	77(15.4%)	12(2.4%)	501
MEAN	32.4 (5.0)	8.8 (4.2)	7.7 (3.1)	1.2 (0.9)	50.1 (8.6)

significant,  $F(2, 520) = 28.6, p < .001$ , with post hoc tests indicating that each succeeding cohort achieved a statistically higher GPA than the preceding one.

The 1991-1995 cohorts of entering African American students achieved an average verbal SAT of 626.7, the 1996-2000 cohorts 626.1, and the 2001-2005 cohorts 620.4 (SAT scores reported prior to 1996 have been recentered; cf. Durans, 2002). There was not a significant difference

Table 6-2: High School GPA, SAT Scores, and Gender by Year of Entry and Ethnicity

Year of Entry	African American	European American	Asian American	Total
<b>Pre: Cohorts 3-7</b>				
High School GPA	3.6 (0.3)			3.6 (0.3)
SAT Verbal	626.7 (52.5)			626.7 (52.5)
SAT Math	643.4 (47.4)			643.4 (47.4)
SAT Total	1270.1 (73.6)			1270.1 (73.6)
% Male	51.5%			51.5%
N	202			202
<b>Post: Cohorts 8-12</b>				
High School GPA	3.8 (0.3)	4.0 (0.2)	4.0 (0.3)	3.8 (0.3)
SAT Verbal	626.1 (59.2)	667.8 (71.3)	629.0 (41.4)	633.1 (60.9)
SAT Math	657.3 (39.7)	688.6 (52.6)	686.5 (54.4)	666.3 (46.1)
SAT Total	1283.4 (73.2)	1356.4 (85.6)	1315.2 (75.5)	1299.4 (80.0)
% Male	45.6%	41.7%	38.7%	44.0%
N	158	36	31	225
<b>Post: Cohorts 13-17</b>				
High School GPA	3.9 (0.4)	4.0 (0.4)	4.1 (0.4)	3.9 (0.4)
SAT Verbal	620.4 (62.7)	655.4 (53.1)	625.7 (67.7)	628.2 (63.1)
SAT Math	651.5 (41.6)	706.4 (53.3)	702.0 (48.9)	671.3 (52.0)
SAT Total	1271.9 (82.7)	1361.9 (72.0)	1327.8 (88.2)	1299.5 (89.5)
% Male	47.9%	55.8%	54.3%	50.4%
N	166	52	46	264
<b>Total: Cohorts 3-17</b>				
High School GPA	3.7 (0.4)	4.0 (0.3)	4.1 (0.4)	3.8 (0.4)
SAT Verbal	624.5 (57.8)	660.5 (61.1)	626.9 (58.3)	629.4 (59.4)
SAT Math	650.1 (43.7)	699.1 (53.4)	695.7 (51.4)	661.5 (50.1)
SAT Total	1274.7 (76.5)	1359.6 (77.3)	1322.6 (83.2)	1290.9 (83.0)
% Male	48.5%	50.0%	48.1%	48.6%
N	526	88	77	691

across the three cohorts,  $F(2, 521) = 0.6, ns$ . The 1991-1995 cohorts of entering African American students achieved an average math SAT of 643.4, the 1996-2000 cohorts 657.3, and the 2001-2005 cohorts 651.5. There was a significant difference between cohorts,  $F(2, 521) = 4.7, p < .01$ . Post-hoc comparisons indicated that the 1996-2000 cohort had significantly higher scores than the 1991-1995 cohort, but there was not a significant difference between the 2001-2005 cohort and either of the two earlier cohorts. In terms of combined SAT scores, the 1991-1995 cohorts of entering African American students achieved 1270.1, the 1996-2000 cohorts 1283.4, and the 2001-2005 cohorts 1271.9. There was not a significant difference across the three cohorts,  $F(2, 521) = 1.5, ns$ .

Slightly more than half, 51.5%, of the 1991-1995 entering African American students were male, and somewhat less than half, 45.6% and 47.9%, respectively, of the 1996-2000 and 2001-2005 cohorts were male. Chi-square analyses did not reveal statistically significant differences between the 1991-1995 and 1996-2000 cohorts,  $X^2(1) = 1.2$ , *ns*, the 1996-2000 and 2001-2005 cohorts,  $X^2(1) = 0.1$ , *ns*, or the 1991-1995 and the 1996-2005 cohorts (combined),  $X^2(1) = 1.2$ , *ns*.

In terms of ethnic group differences, analyses of variance for the 1996-2000 entering students revealed statistically significant differences on all academic variables: high school GPA,  $F(2, 221) = 14.2$ ,  $p < .001$ , SAT Verbal,  $F(2, 222) = 7.4$ ,  $p < .001$ , SAT Math,  $F(2, 222) = 11.1$ ,  $p < .001$ , and combined SAT,  $F(2, 222) = 14.5$ ,  $p < .001$ . Post hoc tests indicated that African American Meyerhoff students achieved statistically lower scores than the European American and Asian American students on high school GPA, SAT Math, and combined SAT, and statistically lower scores than European American students but not Asian American students on SAT Verbal. A chi-square analysis did not reveal ethnic group differences in gender,  $X^2(2) = 0.6$ , *ns*.

Similarly, analyses of variance for the 2001-2005 entering students indicated ethnic group differences for all academic variables: high school GPA,  $F(2, 259) = 13.4$ ,  $p < .001$ , SAT Verbal,  $F(2, 259) = 6.4$ ,  $p < .01$ , SAT Math,  $F(2, 259) = 41.5$ ,  $p < .001$ , and combined SAT,  $F(2, 259) = 27.2$ ,  $p < .001$ . Post hoc tests indicated that African American Meyerhoff students achieved statistically lower scores than European American and Asian American students on high school GPA, SAT Math, and combined SAT, and statistically lower scores than European American students but not Asian American students on SAT Verbal. On the combined SAT, Asian American students scored significantly lower than European American students. A chi-square analysis again did not reveal ethnic group differences in gender,  $X^2(2) = 1.4$ , *ns*.

### *Experience in Program*

The 1991-1995 entering African American Meyerhoff students did not achieve a mean score on any of the nine survey items equal to or higher than those of the 1996-2000 entering African American Meyerhoff students (Table 6-3). Averaging across the nine items, the 1991-1995 students had scores 0.4 lower (range 0.2 to 0.7). Although changes in the wording and scaling of items over the years preclude formal statistical testing, the findings suggest that a decline in the value of the program experience did not occur (if anything, it increased).

Of note, both sets of entering students perceived the value of their experiences in the program to be quite positive, with six of the nine items rated 4.0 or higher for the 1991-1995 students, and eight of the nine items for the 1996-2000 students rated 4.0 or higher (the scale range was 1 to 5, with 5 the most positive rating). Financial support was rated most highly by both groups of students (4.4 and 4.7, respectively). Academic interactions with peers (4.2, 4.5), being part of the larger Meyerhoff community (4.1, 4.6), the on-campus, 6-week summer bridge orientation program (4.0, 4.5), social interactions with peers (4.0, 4.4) and summer research opportunities (4.0, 4.2) also received ratings of 4.0 or higher from both sets of students. Study groups also were rated highly by both (3.9, 4.2). The largest discrepancy between groups was for the value

Table 6-3: Program Components by Year of Entry and Ethnicity

Year of Entry	African	European	Asian	TOTAL
<b>Pre: 1991-1995</b>				
Summer Bridge	4.0 (1.1)			4.0 (1.1)
Part of Community	4.1 (1.1)			4.1 (1.1)
Study Groups	3.9 (1.2)			3.9 (1.2)
Staff Advising	3.5 (1.3)			3.5 (1.3)
Summer Research	4.0 (1.5)			4.0 (1.5)
Financial Support	4.4 (1.1)			4.4 (1.1)
Peer Social	4.0 (1.3)			4.0 (1.3)
Peer Academic	4.2 (1.1)			4.2 (1.1)
Program Cultural	3.4 (1.2)			3.4 (1.2)
Mean across items	3.9 (0.7)			3.9 (0.7)
<b>Post: 1996-2000</b>				
Summer Bridge	4.5 (0.8)	4.3 (0.8)	4.6 (0.7)	4.5 (0.8)
Part of Community	4.6 (0.8)	4.1 (1.3)	4.7 (0.6)	4.5 (0.9)
Study Groups	4.2 (1.2)	4.2 (1.2)	4.3 (1.1)	4.2 (1.1)
Staff Advising	4.2 (0.9)	3.8 (1.3)	4.4 (0.8)	4.2 (1.0)
Summer Research	4.2 (1.0)	3.9 (1.1)	4.1 (1.1)	4.1 (1.0)
Financial Support	4.7 (0.7)	4.9 (0.5)	4.7 (0.9)	4.8 (0.7)
Peer Social	4.4 (0.9)	4.4 (0.8)	4.5 (0.7)	4.4 (0.9)
Peer Academic	4.5 (0.7)	4.4 (0.8)	4.4 (0.8)	4.5 (0.7)
Cultural Activities	3.6 (1.1)	3.1 (1.0)	3.5 (0.9)	3.5 (1.0)
Mean Across Items	4.3 (0.5)	4.1 (0.7)	4.4 (0.4)	4.3 (0.5)

of program staff academic advising (3.5, 4.2). Both sets of students viewed program cultural activities as providing moderate value (3.4, 3.6).

Among the 1996-2000 cohorts, an analysis of variance did not reveal a difference in overall perceptions (all items combined) among African American (4.3), European American (4.1), and Asian American (4.4) students,  $F(2, 134) = 2.3, ns$ . In terms of individual items, the three groups did not differ on seven of the nine items. There were significant differences on being part of the Meyerhoff community,  $F(2, 147) = 3.0, p < .05$ , and program staff academic advising,  $F(2, 147) = 3.3, p < .05$ . Post-hoc analyses revealed that European American students had marginally ( $p < .06$ ) lower scores than African American students on the program community item, and significantly lower ( $p < .05$ ) scores than the Asian American students on the academic advising item. The African American and Asian American students reported scores of 4.0 or higher on eight of nine items (only cultural activities was below 4.0), and the European American students reported scores of 4.0 or higher on six of nine items (staff advising, summer research, and cultural activities were each below 4.0).

*Student Perspectives on the Opening of Admissions*

*Interview Findings: 1999-2001.* Semi-structured interviews were conducted with a randomly selected subgroup of 40 African American Meyerhoff students in 1999, 2000, and 2001—three, four, and five years following the entrance of the first integrated class. The interview examined various aspects of the student’s experience in the program. One question asked students to provide their thoughts and feelings about the racial integration of the program, and whether such an integration would allow the program to remain true to the goal of increasing the number of African American Ph.D.s in the sciences. Students expressed positive, negative, and mixed feelings about the change. However, most students expressed a belief that despite this change the program would still be able to meet its overarching goal of increasing the number of African Americans receiving STEM Ph.D.s. Representative responses from students interviewed are provided below.

*Positive.* Positive feelings primarily involved an appreciation for diversity in the program and the positive impact racial diversity would have on minority and non-minority students. Students reported feeling that the racial integration of the program would prepare them for racially integrated environments of graduate school and workplace, reduce biases and racial stereotypes held by both minority and non-minority students about the other, and make the program stronger by enhancing its credibility and legitimacy in the larger campus environment. The first three interview excerpts below are representative of the large number of students who viewed diversity in the program as providing African American students with a necessary “real world” experience—preparing them for the racially integrated environments of graduate school and the workforce.

*“I think that it is a benefit. Only because, the work place and . . . graduate school—it’s not going to be only African American. By making the program more diverse people are surrounded by an atmosphere that’s going to be more similar to the atmosphere we’re going to experience when we actually get into the work force.”* (African American female student, 1998 entering class; interviewed in 1999)

*“I think it’s good that other racial groups have [been] included . . . . When you get out in the real world there are a number of other people that you’ll have to be able to work with, and you can’t be biased or anything.”* (African American female student, 1996 entering class; interviewed in 2000)

*“I think it’s great to have people from different backgrounds interacting while they’re going through the process of becoming scientists, so when they get to become scientists it won’t be hard for them to interact with people who aren’t like them.”* (African American male student, 1997 entering class; interviewed in 2001)

The next three respondents focus on learning from others who come from a different ethnic background, and the reduction of biases.

*“I guess [the integration] can help us networking. Maybe some of the Caucasians in the program will talk to other Caucasians outside of the program which will then introduce*

*them to other Meyerhoffs . . . . It's helped the program become more diverse. It's helped people get a feel for different cultures outside of African American.”* (African American male student, 1997 entering class; interviewed in 1999)

*“I think it is for the better to have the program for all races. For example, one guy...had not experienced intelligent people of color until he came here. So that definitely helps. Having things diverse is better.”* (African American male student, 1998 entering class; interviewed in 1999)

*“I guess it's always good to have different types of people. We can really learn from each other.”* (African American female student, 1998 entering class; interviewed in 2000)

A number of students reported feeling that racial diversity among applicants and students awarded the Meyerhoff scholarship added legitimacy and credibility to the program, in that it would less likely be viewed as an “affirmative action” program for blacks—but instead a program truly based on excellence in scholarship.

*“I think opening the program to everyone made it stronger . . . . It makes the comment that you only got the award because you're black irrelevant now. So now if you get in the program you can say, 'Well I'm just the best of the best that came to get this.'”* (African American male student, 1997 entering class; interviewed in 2000)

*“From what I've seen . . . it makes us a lot more open and it kind of destroys the biases that are there, especially in dealing with the campus at large. I'm sure people used to look at it and say, “Well, those black people really don't deserve it and why do they have all these privileges.” But now seeing that it's open to everybody and the [way the] races interact with each other, now it's like the only bond isn't race. So everyone's looking at it like, “Wow, there's something really special here.”* (African American male student, 1996 entering class, interviewed in 2001)

*“I think it makes the program better to see that you don't have to be a particular race or ethnic group to actually be successful.”* (African American male student, 1997 entering class; interviewed in 2001)

Several students expressed a positive or accepting viewpoint concerning the legal rationale for the change in program admissions. The first excerpt below reflects a positive view and the second an accepting perspective along with comments on the likely continued achievement of program goals.

*“I think it was a very smart decision to integrate the program before it was forced to integrate.”* (African American male student, 1996 entering class; interviewed in 1999)

*“I don't have any objections to including any other races besides African American. I do like the fact that the program is still focused on particularly African Americans but I understand where they're coming from, as far as on a legal level that they have to*

*include other races. I don't see that as something bad and I definitely don't see that as a detriment to the program at all . . . . I believe the goal [of the program] is still . . . attainable and likely, with the inclusion of other students besides African Americans."* (African American male student, 1996 entering class; interviewed in 2000)

*Negative.* Although a number of students discussed positive aspects of the integration, many others expressed negative feelings about the change in the program's racial demographics. Concerns focused around a fear that the goals of the program would change as a result of the demographic shift, a change in program cohesion as a result of the integration, and feelings of upset that resources initially designed for African Americans were being taken away. The first five responses focus on concerns about changing the program's goal of enhancing the number of African American Ph.D.s.

*"You know it's a shame because whenever black people get anything good someone always starts to take it away. My only worry is that the whole goal was to increase the numbers of blacks with Ph.D.s. By letting other students in that's taking away a spot for another black student who is deserving and otherwise may not have opportunities to get the Ph.D."* (African American female student, 1995 entering class; interviewed in 1999)

*"I don't think the inclusion [of students from different background] has helped, honestly. Just because you're not as focused on your main objective. Because my understanding of it is that they did this, integrated the program not because they thought it would be better for the program or they thought it would be better for the students they were targeting. They did it because it was mainly a political issue."* (African American male student, 1996 entering class; interviewed in 2000)

*"I think it's changed the dynamics of the program. I would say that due to the inclusion of non-minority students the goals of the program need to shift . . . . Because the goal was to get more minority students to get Ph.D.s. As more and more non-minority students are coming in those goals don't seem to be the same among those students."* (African American female student, 1997 entering class; interviewed in 2000)

*"Actually I think it weakened the program . . . . It's basically diluting the program."* (African American female student, 1997 entering class; interviewed in 2000)

*"Whenever Summer Bridge comes in [6-week summer orientation session] there is always more white people . . . . It seems like [the program] is losing its goal as the years progress."* (African American male student, 1998 entering class; interviewed in 2000)

The next three students note a reduction in cohesion within and between cohorts of students. The fourth student expresses concern about a potential loss of an African American core of support.

*"I've heard that the later [integrated] classes weren't as cohesive [and] that white Meyerhoffs stayed with themselves and black Meyerhoffs stayed with themselves. My [all*

*black] class was pretty unique [because] when we got in we all pretty much became friends.” (African American male student, 1995 entering class; interviewed in 2001)*

*“I think diversity in general is good. But in terms of the program and how they’re trying to promote a family atmosphere, it gets kind of hard sometimes . . . . The white people in my class sort of hung out together and with no one else. So [some] of the black students were saying, “You know when we go into a majority white atmosphere we’re the ones that have to reach out and get to know people.” They [see] the responsibility of the white students to reach out and get to know us because we were the majority in our class. So I think a lot of people didn’t get to know each other because of that reason.” (African American female student, 1997 entering class; interviewed in 2001)*

*“I think it put a division between the classes that weren’t, and the classes that were, [integrated].” (African American female student, 1997 entering class; interviewed in 1999)*

*“I see the program as being majority black and becoming increasingly white. And I think the idea of the program is majority black . . . . Being surrounded by blacks that were intellectual, well-rounded, and successful was really instrumental to my success and growth.” (African American male student, 1997 entering class; interviewed in 2001)*

*Mixed Responses: Transition Process and Post-Transition Future.* Some responses concerning the change in program composition could not easily be categorized as positive or negative, but contained elements of each. The three student responses below each refer to initial distress or resistance to the change, but also comment positively on the transition process or the post-transition future.

*“I think [the integration] changed the Meyerhoff program. I still see the focus as the same . . . getting minorities in science. [But] at first I was taken aback . . . . African Americans can never have anything without someone coming in and changing it . . . . For the future I still hope the focus is mainly towards African Americans and most of the classes are still African American students because there’s definitely more of a need.” (African American male student, 1994 entering class; interviewed in 1999)*

*“When [the transition] initially happened I was the last class to have an all African American class and initially we were distraught about the situation. . . . It’s kind of hard to go from one way of life to another. . . . But I think that they made a smooth transition because they made it as painless as possible.” (African American male student, 1995 entering class; interviewed in 1999)*

*“I was the first class that was actually integrated. I know initially there was some resistance to opening up the program to everybody because people thought it defeated the purpose: trying to get more minorities into science and engineering. I think the transition has been smooth.” (African American female student, 1996 entering class; interviewed in 2000)*

*Exit Interview Findings: 2002-2005.* As part of a larger exit interview conducted yearly with graduating seniors from the MARC U\*Star program (primarily Meyerhoff scholars), students are asked whether or not they felt the presence of students from different racial and ethnic backgrounds has affected the program and the students in it. Almost all of the graduating seniors have indicated that the program's diversity did not negatively impact the students or the program but rather was an important, positive factor. Many commented that it allows non-minority students to interact with minority students and experience different cultures, and helps to change perceptions of students who may have never otherwise had an opportunity to interact with minorities. Also, many minority students felt that white students get a chance to see what it is like to not be in the majority group (while in the program). Others felt that the experience encouraged them to explore more about their own culture. Representative student comments, from African American Meyerhoff/MARC scholars, included the following:

*“To see so many students, from all kind of backgrounds . . . to see them all on the same level does a lot for breaking apart any stigma you might have ever had, and that’s just great.”*

*“I think it gives you good experience, it gives you good training . . . to have this interaction with people now . . . . I mean you have to learn how to interact with people from different backgrounds, because otherwise you’re going to be trying to make it alone in this world and you really can’t.”*

*“I think it’s really important that the program doesn’t just focus on African Americans because people of other races need this too, they need to see that there are people that don’t live like them that can succeed in this field as well.”*

*“I think, it's more realistic of what everyday is like . . . what being in the workforce is going to be like.”*

### *Post-College Outcomes*

The post-college outcomes for the 1991-1995 and 1996-2000 Meyerhoff cohorts, for students of different ethnicities, and those for Meyerhoff cohorts versus Declined comparison students, are presented below. It should be noted that these latter findings are “quasi-experimental” in nature (i.e., they are not the result of random assignment of students to conditions).

#### Meyerhoff Cohorts: 1991-1995 vs. 1996-2000

African American Meyerhoff students in the 1996-2000 cohorts achieved more positive post-college Ph.D. outcomes than those in the 1991-1995 cohorts, without controlling for differing academic background characteristics (Table 6-4). Specifically, 35.4% of the 1996-2000 students entered either a STEM Ph.D. (27.8%) or M.D./Ph.D. (7.6%) program, compared to 20.3% of the 1991-1995 students (14.3%, STEM Ph.D., and 6.0%, M.D./Ph.D.). Fewer of the 1996-2000 students entered STEM masters programs (13.3% versus 23.8%), medical school (10.1% versus 17.8%), or had no STEM post-college (17.1% versus 33.2%). Conversely, more of the 1996-2000 students were still undergraduates (12.7% vs. 0.0%) or had an unknown graduate status to

date (10.8% versus 4.0%). The chi-square analysis comparing the 1996-2000 and 1991-1995 groups on STEM Ph.D. (includes M.D./Ph.D.) versus all other categories (combined) was statistically significant,  $X^2(1) = 9.5, p < .01$ . However, when SAT Math, SAT Verbal, high school GPA, gender, and college major were statistically controlled in a logistic regression analysis, there was no longer a statistical difference between the groups,  $Wald(1) = 2.4, ns$ .

### Ethnicity Differences

Among the 1996-2000 entering cohorts, 35.4% of the African American students, 41.7% of the European American students, and 22.6% of the Asian American students to date have entered a STEM Ph.D. or M.D./Ph.D. program. The three groups entered STEM master's programs at comparable rates (13.3%, 16.7%, and 16.2%, respectively). Fewer African American (10.1%) and European American (2.8%) than Asian American (22.6%) students entered medical school, more European American (27.8%) than African American (17.1%) and Asian American (6.5%) students had not pursued graduate school after completing their undergraduate degree, and fewer European American (2.8%) than African American (12.7%) or Asian American (9.7%) students were still undergraduates. The graduate status of a substantial number of African American (10.8%), European American (8.3%) and Asian American (22.6%) students were unknown (many of these are recent graduates whose post-college information is currently being sought or confirmed). The chi-square analysis comparing the three ethnic groups on STEM Ph.D. (includes M.D./Ph.D.) versus all other categories (combined) was not significant,  $X^2(1) = 3.0, ns$ . Similarly, the logistic regression analysis with covariates controlled was not significant,  $Wald(1) = 0.0, ns$ .

### Meyerhoff vs. Declined Students

The 1991-1995 African American Meyerhoff, 1996-2000 African American Meyerhoff, and 1996-2000 European American Meyerhoff students each achieved greater post-college STEM Ph.D. outcomes than their respective Declined comparison samples. Specifically, 20.3% of the 1991-1995 African American Meyerhoff students entered either a STEM Ph.D. or M.D./Ph.D. program, compared to 4.7% of the 1991-1995 African American Declined students,  $X^2(2) = 11.2, p < .001$ . With covariates controlled, the difference remained significant,  $Wald(1) = 7.4, p < .01$ . In turn, 35.4% of the 1996-2000 African American students entered either a STEM Ph.D. or M.D./Ph.D. program, compared to 5.5% of the 1996-2000 African American Declined students,  $X^2(2) = 32.4, p < .001$ . With covariates controlled, the difference remained significant,  $Wald(1) = 16.0, p < .001$ . Among 1996-2000 Meyerhoff European American students, 41.7% entered either a STEM Ph.D. or M.D./Ph.D. program, compared to 3.8% of the 1996-2000 European American Declined students,  $X^2(2) = 9.0, p < .01$ . With covariates controlled, the difference remained significant,  $Wald(1) = 8.0, p < .01$ . Among the 1996-2000 Asian American Meyerhoff students, 22.6% entered a STEM Ph.D. or M.D./Ph.D. program, compared to 16.7% of the

Table 6-4: Post-College Outcome by Year of Entry and Ethnicity for Meyerhoff and Comparison Students

	<b>African American</b>		<b>European American</b>		<b>Asian American</b>	
	<b><u>Meyerhoff</u></b>	<b><u>Declined</u></b>	<b><u>Meyerhoff</u></b>	<b><u>Declined</u></b>	<b><u>Meyerhoff</u></b>	<b><u>Declined</u></b>
<b><i>Pre: Cohorts 3-7</i></b>						
STEM Ph.D.	29 (14.3%)	4 (4.7%)				
M.D./Ph.D.	12 (6.0%)	0 (0.0%)				
STEM M.S.	48 (23.8%)	15 (17.5%)				
M.D.	36 (17.8%)	36 (41.9%)				
Other Profess.	2 (1.0%)	5 (5.8%)				
No STEM Grad	67 (33.2%)	19 (22.1%)				
Still Undergr.	0 (0.0%)	0 (0.0%)				
Unknown	8 (4.0%)	7 (8.1%)				
TOTAL	202	86				
<b><i>Post: Cohorts 8-12</i></b>						
STEM Ph.D.	44 (27.8%)	6 (5.5%)	14 (38.9%)	1 (3.8%)	6 (19.4%)	1 (4.2%)
M.D./Ph.D.	12 (7.6%)	0 (0.0%)	1 (2.8%)	0 (0.0%)	1 (3.2%)	3 (12.5%)
STEM M.S.	21(13.3%)	12 (11.0%)	6 (16.7%)	2 (7.6%)	5 (16.2%)	1 (4.2%)
M.D.	16 (10.1%)	20 (18.2%)	1 (2.8%)	2 (7.6%)	7 (22.6%)	5 (20.8%)
Other Profess.	1 (0.6)	3 (2.7%)	0 (0.0%)	1 (3.8%)	0 (0.0%)	0 (0.0%)
No STEM Grad	27 (17.1%)	47 (42.7%)	10 (27.8%)	10 (38.5%)	2 (6.5%)	9 (37.5%)
Still Undergr.	20 (12.7%)	8 (7.3%)	1 (2.8%)	1 (3.8%)	3 (9.7%)	0 (0.0%)
Unknown	17 (10.8%)	14 (12.7%)	3 (8.3 %)	9 (34.6%)	7 (22.6%)	5 (20.8%)
TOTAL	158	110	36	26	31	24

1996-2000 Asian American Declined students, a difference that was not statistically significant  $X^2(2) = 0.3, ns$ . With covariates controlled, there also was not a significant difference,  $Wald(1) = 0.1, ns$ .

## Discussion

The Meyerhoff Scholars Program changed in fall 1996 from a program that had exclusively served African American students to one that also admitted, in smaller numbers, students of other races who had an interest in the advancement of minorities in STEM fields. In the ten years since, there has been a 20% decline in the average number of entering African American students (40.4 to 32.4), with slightly more than one-third (35.5%) of the admissions slots going to other students (mostly European American and Asian American students). Over the 10-year period, if the rate of 40.4 per year had been maintained and the program maintained as race-exclusive, there would have been an additional 80 African American students (8 per year). Assuming this number of qualified African American students were in the application pool and would have matriculated, the opening of admissions has led to lowered achievement of the initial program goal of enhancing the number of African American students entering STEM Ph.D. programs. However, this assumption may be questionable, since the smaller number of African Americans, according to program staff, was largely the result of reduced external scholarship funding availability in many of the years. That is, the size of each cohort was determined primarily by the level of funding attracted from federal agencies, foundations and private individuals; when funding declined, the number of African American students admitted declined accordingly. (Of note, some of the decline was later offset by incorporating additional African American students (3-5 per year) from the existing student body as additional funding became available—these students are considered Meyerhoff “affiliates”).

Importantly, the opening of admissions has not resulted in a decline in the quality of entering students, their experience in the program, or their outcomes. Indeed, analyses indicated that the 324 African American students entering the program since the opening of admissions had higher high school GPA scores than those who preceded them, and were more likely to enter STEM Ph.D. programs. These trends may be due to various factors—for example, in part it may be due to a growing public recognition over the years, in Maryland and nationwide, of the quality of the program and its success in producing large numbers of students who enter graduate and professional schools. As a result, it may have attracted applications from students with stronger high school records than in the program’s earlier years, and those with greater interest in and commitment to matriculation in STEM graduate programs. In addition, the University and the program have continued to strengthen academic support initiatives (e.g., increased funding for tutoring and advising), and the peer support culture may be even stronger than in the early years.

African American students appear to have an experience in the program that is comparable (or perhaps better) to those in the program when only African Americans were participants, based on survey item responses. Their experience in the program is comparable to the European American and Asian American Meyerhoff scholars. Furthermore, although a number of African American students had very negative responses in the years following the change in admissions, a number of others did not, including those who were aware it would add credibility and legitimacy to the program in the primarily white campus environment. More recently, students

have only had the experience of the program as integrated, and they consistently voice positive views about the racial diversity within the program. Most important, the 1996-2000 African American students have been entering STEM Ph.D. programs at a much greater rate than those who preceded them (when differing background characteristics and major are not taken into account), at a rate comparable to those of their European American and Asian American peers in the program, and at a rate greater than comparison sample students.

Changing from a race-exclusive to an integrated program (with the majority African American), then, appears to have been on the whole a viable strategic response to an anti-affirmative action political climate. Admissions have been opened to students of all races, but the defined mission of the program helps to ensure an African American majority. Over the years, an increasing number of applications from European American and Asian American students has been received, but program staff report informally that it has been a challenge to find among these students those who meet the entire set of factors considered for admissions, including openness to taking advice, willingness to work with others in study groups and to take part in community service, and, directly related to the program mission, a strong interest in the advancement of underrepresented minorities in STEM fields. In fact, according to program staff, some of the European American students consider the staff's approach too strong-handed or "dictatorial," for example requiring students to attend regular program meetings.

It is possible that several additional factors have contributed to the maintenance of an African American majority in the program. These include the high number of high-achieving African American students in Maryland who apply, and the relatively lower numbers of comparable Latino/a students in the state, the unwavering commitment of University administration and faculty to the program mission, the location in the Washington/Baltimore metropolitan area, the science and engineering strengths of the University, the University's racially and ethnically diverse student body, and the commitment of the University administration and faculty to the program mission.

This study has a number of limitations. Possible self-selection differences between Meyerhoff and comparison students limit conclusions that can be drawn about these findings. That is, students who opt to attend the program may be more committed initially to obtaining a Ph.D. than the comparison sample of students who declined the admissions offer and attended other universities instead. Only random assignment designs would allow overcoming this design weakness. Also, the generalizability of findings may be limited. The Meyerhoff Program is relatively unique in its focus, its comprehensiveness, its high level of resources (e.g., a budget of several million dollars annually) and the high levels of commitment of the University administration (beginning with the University president, the program's co-founder) to its success. Also, the nature and quality of the program likely has changed over the years as faculty and staff have revised program strategies and components based on their experience with students.

The changes in the content and scaling of survey items over time greatly limit conclusions that can be drawn about change, or lack of change, in student experience over time. The interview findings are limited to small samples of students and do not reflect the perspectives of European American and Asian American students. The increasing quality of the high school records of

Meyerhoff students over the years limit the meaningfulness of direct comparisons on STEM outcomes. The attitudes and perceptions of faculty and Meyerhoff staff regarding the opening of the program to students of other races were not assessed and should be in future studies.

An additional limitation of the study was the absence of detailed information about the nature and quality of student relationships in the program. Anecdotal evidence indicates that, at least at times, the distinctive mission of the program combined with the mix of students has generated honest discussions about challenging issues such as the attitudes of faculty to different types of students, stereotypes students have about each other, reasons for the underrepresentativeness of minority groups in science, and what it means to be smart and black in America. In our experience, such discussions tend not to happen often in public settings in higher education, or even in private among students from different races. Changes over time in the nature and impact of such interactions, and more generally about the nature and quality of student relationships with those different than themselves in both academic and social contexts were not systematically examined and should be a focus of future research.

The limitations notwithstanding, the current study remains one of the few systematic, empirical evaluations of the impact of changes in admissions policies in the anti-affirmative action context. Consistent with methods used in the current research, future studies of similar programs in this area will benefit from examining changes over time on multiple outcome measures, including the following: the number and percentage of entering minority students; academic preparation; program and university-level academic and social experience, including the nature and quality of cross-racial interactions and relationships; student attitudes, including interest in and commitment to the success of minority students and professionals; and post-college student outcomes, including pursuit of graduate degrees and, over the longer-term, career pathways (e.g., academic; industrial research; policy work) and community involvement. The inclusion of comparison samples for outcome analysis, the assessment of student experience both prior to and in the years following the change, and the inclusion of both minority and non-minority student samples, represent additional important features to be considered in future research in this area. In addition, the use of both quantitative and qualitative data—mixed methods designs—allows the strengths of each to be drawn upon and the limitations of each to be offset. Whenever possible, both process and outcome evaluation data should be gathered and analyzed in order to strengthen program effectiveness.

Ideally, evaluations will be conducted by social scientists who have expertise in evaluation research and who are knowledgeable about theory and practice related to minority student access, retention, and achievement in higher education. To allow state-of-the-art evaluations, sufficient funding must be allocated. Furthermore, the evaluation research team ideally should be brought into the program planning process early on, prior to program implementation, to ensure that baseline information and appropriate comparison samples are included in the evaluation effort.

The future of access to higher education in this anti-affirmative action era represents one of the pressing issues of our times. Many approaches are being taken by universities and programs to address the issue. It is hoped that researchers will become involved increasingly in evaluating the outcomes, and the associated processes of these varied efforts, to ensure that decisions are

made on the basis of solid data and not anecdotes. As noted in the recent report from the National Academies, “Rising Above the Gathering Storm,” because of the increasing globalization of the world economy and of competitiveness in science and technology, “for the first time in generations, the nation’s children could face poorer prospects than their parents and grandparents did” (National Academies, 2005, p. 10). It is imperative that we find ways to reduce both the broad academic achievement gap among the races and the disparities in science and engineering performance education, for only in tapping fully the talents of all our citizens can we as a nation remain competitive and meet successfully the challenges ahead.

## Appendix 6A

### Meyerhoff vs. Declined Sample Differences on High School GPA, SAT scores, and Gender

The 1991-1995 Meyerhoff students had a lower high school GPA (3.6) than Declined students (3.7),  $F(1) = 7.8, p < .01$  and lower SAT Verbal (626.7 vs. 642.7),  $F(1) = 5.0, p < .05$ , and a greater percentage of males (51.5% vs. 25.6%),  $X^2(1) = 16.5, p < .001$  (see Table 6A). The 1996-2000 African American Meyerhoff students did not differ on any of the academic characteristics, or gender, from the 1996-2000 African American Declined students, nor did the 1996-2000 European American Meyerhoff and Declined students differ on any of the academic characteristics, or gender. The 1996-2000 Asian American Meyerhoffs had lower SAT Verbal (628.7 vs. 666.5),  $F(1) = 5.6, p < .05$ , and lower combined SAT scores (1315.2 vs. 1378.9),  $F(1) = 7.2, p < .01$ , than the 1996-2000 Asian American Declined students.

Table 6A-1: Meyerhoff and Declined Comparison Sample: High School GPA, SAT Scores, and Gender by Year of Entry and Ethnicity

	<b>Pre Cohorts: 1991-1995</b>		<b>Post Cohorts: 1996-2000</b>	
	<b><u>Meyerhoff</u></b>	<b><u>Declined</u></b>	<b><u>Meyerhoff</u></b>	<b><u>Declined</u></b>
<b><i>African American</i></b>				
High School GPA	3.6 (0.3)	3.7 (0.3)	3.8 (0.3)	3.8 (0.3)
SAT Verbal	626.7 (52.5)	642.7 (61.4)	626.1 (59.2)	638.9 (64.5)
SAT Math	643.4 (47.4)	635.7 (46.8)	657.3 (39.7)	657.9 (48.3)
SAT Total	1270.1 (73.6)	1278.4 (82.5)	1283.4 (73.2)	1296.8 (90.2)
% Male	51.5%	25.6%	45.6%	44.9%
N	202	86	158	109
<b><i>European American</i></b>				
High School GPA			4.0 (0.2)	3.9 (0.3)
SAT Verbal			667.8 (71.3)	639.2 (58.1)
SAT Math			688.6 (52.6)	689.2 (44.4)
SAT Total			1356.4 (85.6)	1328.5 (82.5)
% Male			41.7%	46.2%
N			36	26
<b><i>Asian American</i></b>				
High School GPA			4.0 (0.3)	4.0 (0.3)
SAT Verbal			628.7 (41.4)	666.5 (76.6)
SAT Math			686.5 (54.4)	712.3 (49.1)
SAT Total			1315.2 (75.5)	1378.9 (103.4)
% Male			38.7%	41.7%
N			31	24

Appendix 6B

Table 6B-1: Number of Students Completing Process Evaluation Item\* by Survey and Entering Class

Survey	1991	1992	1993	1994	1995	Total 1991-1995	1996	1997	1998	1999	2000	Total 1996-2000
1992/ Freshmen	4	0	0	0	0	4						
1993/ Program Sample	5	5	0	0	0	10						
1994/ All	14	16	22	0	0	52						
1996/ Graduating Seniors	4	5	0	0	0	9						
1999-2001/ Undergraduate Sample	0	0	0	0	0	3	12	16	48	45	0	121
1999-2001/ Graduate Sample	11	8	15	14	20	78	12	10	0	0	0	22
2005/ Graduating Seniors							0	0	0	0	6	6
<b>TOTAL</b>	<b>38</b>	<b>44</b>	<b>37</b>	<b>14</b>	<b>23</b>	<b>156</b>	<b>24</b>	<b>26</b>	<b>48</b>	<b>45</b>	<b>6</b>	<b>149</b>

\* The numbers are for the summer bridge process evaluation item. For students who completed a survey on two or more occasions, the most recent survey was used (except in the case of the 1996 survey, due to the different response format).

Table 6B-2: Process Evaluation Surveys: Item Wording and Rating Scale Over Time (summer bridge as sample item)

Sample Survey Item	Rating Scale				
<b>1992 and 1993 Surveys</b>					
Rate the extent to which each item listed below is a source of academic or emotional support for you: 16. Summer Bridge Program.	Not at all supportive			Moderately supportive	Extremely Supportive
	1	2	3	4	5
<b>1994 Survey</b>					
20. To what extent did your experience during the <u>summer bridge program</u> positively impact on your academic success	Not at All		Moderate Extent		Large Extent
	1	2	3	4	5
<b>1996 Survey**</b>					
Please indicate the type of impact the following aspects of the Meyerhoff program had on your experience as a Meyerhoff student. c. Summer bridge program	Great Negative Impact	Some Negative Impact	No Impact	Some Positive impact	Great Positive impact
	1	2	3	4	5
<b>1999, 2000, 2001, and 2005 Undergraduate Surveys</b>					
Please indicate the degree to which the following aspects of the Meyerhoff Program were helpful in your experience as a student. 11. Summer bridge program	Not at all helpful	A little helpful	Somewhat helpful	Helpful	Very helpful
	1	2	3	4	5
<b>1999, 2000, and 2001 Graduate Student Surveys</b>					
Please indicate the degree to which the following aspects of the Meyerhoff Program were helpful in preparing you for your current experiences in graduate school: 11. Summer Bridge Program	Not at all helpful	A little helpful	Somewhat helpful	Helpful	Very helpful
	1	2	3	4	5

\*\* To increase consistency with other survey scales, responses were recoded: 1, 2 or 3 as a 1, and 4 as a 3 (5 was retained as a 5).

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