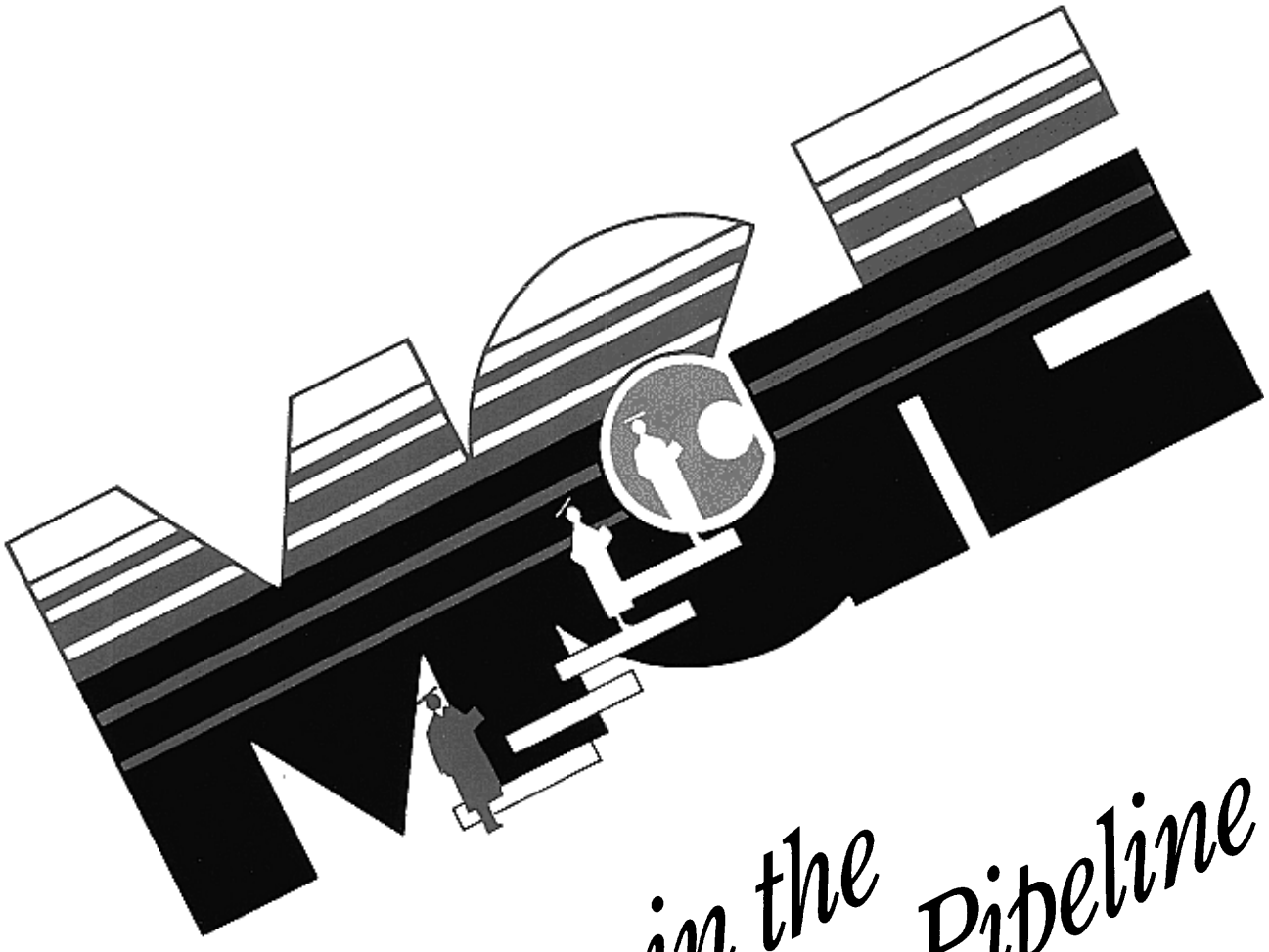

Minorities in the Graduate Education Pipeline

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Introduction

In his analysis of the status of minorities in U.S. higher education, Alexander Astin (1982) conceptualized the educational system as a metaphoric "pipeline" with "leakage" points out of which disproportionately large numbers of minority students leave the educational system, particularly after high school. The progressive losses of non-Asian-American minority students suggest that by the time they reach graduate school, their retention rate is 50 to 75 percent lower than that of White students. Consequently, few American Indian and Hispanic students (2 percent each) or Black students (4 percent) complete graduate programs, and future projections raise questions about whether even the current volume of minority students can be maintained during the coming decade.

For example, between 1980 and 1996, the total population of 18- through 24-year-olds is expected to decline by 25 percent. Table 1 shows that the percentage of 22- and 30-year-olds who are minorities is expected to rise during this period. Relatively few non-Asian-American minorities graduate from high school, and even fewer attend college. If these educational patterns continue, the future supply of minority graduate students may be even more limited (Blackwell, 1981).

Table 1. Estimates and Projections of Minorities as a Percent of U.S. Population in the 22-Year-Old and 30-Year-Old Age Categories: 1975, 1985, 1995, and 2005 (Percent).

Years	22-Year-Olds	30-Year-Olds
1975	14	13
1985	17	15
1995	19	18
2005	20	19

Source: From "Projections of the Population of the United States by Age, Sex, and Race: 1983 to 2080" by U.S. Department of Commerce, Bureau of the Census, Current Population Report Series P-25, No. 952.

This report presents findings on the nature and extent of minority underrepresentation in higher education and describes in some detail the status of minority students at various transition points from high school through graduate school. The scope of the review is limited to the transition to higher education, emphasizing racial/ethnic differences in the extent to which minorities are underrepresented by examining (1) high school completion and dropout rates and the association between high school programs and graduate/professional study; (2) trends in enrollment; (3) trends in degree attainment; (4) the composition and size of the minority talent pool; and (5) the transition points where the magnitude of loss is greatest.

Black and Hispanic students are the groups of primary interest; however, data on American Indian and Asian-American students are reported where available. The inclusion of Asian-American students is important because racial/ethnic status does not necessarily lead to the underrepresentation in higher education of all minorities relative to their proportional representation in the general population (Hansen, 1984). Rather, life circumstances alter the educational progress and course of some minorities, as in the case of Asian-American students. For comparative purposes, findings for White students are also presented.

The report is organized into eight sections. Following the introductory section, section two describes the data and method. The third section presents data on high school completion and dropout rates and the association between high school programs and post-baccalaureate study. The fourth section examines data on the progress of minorities in undergraduate education, emphasizing enrollment and degree-attainment trends and the size and composition of the undergraduate talent pool. The fifth section describes minority losses in the transition from undergraduate to graduate school. The sixth section describes trends in graduate enrollment and degree attainment. Section seven examines the role of traditionally Black institutions in the production of Black students for the graduate pool. The final section sets forth a research agenda that describes the issues to be addressed and the limitations involved in research on minorities in graduate education.

Data and Method

The primary source for the data used in this analysis is the Higher Education General Information Survey (HEGIS) conducted by the Center for Statistics (previously the National Center for Education Statistics). Developed in 1962, HEGIS collects data biennially from over 3,000 higher education institutions on such student characteristics as race, sex, and major field of study. The information presented in this chapter on enrollment and degree trends draws on data from these surveys.

Other data are from the National Longitudinal Survey of the High School Class of 1972 (NLS-72), which surveyed high school seniors during the 1972 base year and followed them for seven years, through 1979. NLS-72 was designed in part to study the educational progress of students, and it is used in this chapter to describe minority losses in the undergraduate-school pipeline. To describe a major subgroup of the graduate talent pool—Graduate Record Examinations (GRE) test-takers—data from the Graduate Record Examinations are used. Descriptive statistics are used throughout to present the findings.

Minority Precollege Education

The process of selecting a career requiring graduate study starts early in the educational pipeline—perhaps in kindergarten or preschool. However, secondary educational prepa-

ration and the completion of high school may have the most direct influence on later career choices. The transition from high school to college is a major turning point in the lives of many young people. Some fail to reach this point, however, and others graduate from high school and choose alternative paths that lead them away from higher education. This section examines high school completion and dropout rates as well as the effect of high school programs on the post-baccalaureate experiences of minority students.

Graduation and Dropout Rates. In 1976-77, the number of high school graduates reached an all-time high of 3,154,000; however, this number has gradually declined over the last 10 years. Figure 1 shows that, except for a temporary upward trend in the late 1980s, the projected number of graduates will continue to decline into the 1990s. Hispanic and Black students, who will represent a larger share of the future college-age population, have lower completion rates compared to White students. For example, from 1974 to 1982, the percentage of White high school graduates fluctuated around 85 percent; although Black and Hispanic graduation rates increased slightly during this period (from 72 to 77 percent and 56 to 60 percent, respectively), their rates were well below that of White students (NCES, 1985).

The lower graduation rates of minorities are directly related to their higher dropout rates. Table 2 reveals that proportion-

Figure 1. High School Graduates: United States 1976-77 to 1991-92

Note: Data include graduates of public and private high schools, but exclude high school equivalency certificates.

Source: U.S. Department of Education, NCES, Digest of Education Statistics, Projection of Education Statistics, 1982-1983.

Table 2. Public High School Dropout Rates of 1980 Sophomores by Race/Ethnic Group and Selected Background Characteristics: United States, Fall 1982.

		Race/Ethnic Group		
	Total	White Non-Hispanic	Black Non-Hispanic	Hispanic
Characteristic		Dropouts as a Percent of Sophomores		
Total	14.4	13.0	17.2	19.2
Socioeconomic Status				
Low	22.3	23.7	18.0	23.1
Low-Middle	13.2	12.6	10.2	19.5
High-Middle	10.7	10.3	15.6	11.0
High	7.0	6.3	13.8	10.6
High School Program				
Academic	5.8	4.8	7.1	14.8
General	16.6	15.9	18.1	18.4
Vocational	19.7	18.0	23.5	21.1
1980 Test-Score Quartile				
Low	24.8	28.0	21.6	23.2
Low-Middle	15.3	16.4	8.5	15.7
High-Middle	8.6	8.5	7.0	9.0
High	3.7	3.6	5.0	5.3
Father's Education				
<4 years High School	22.9	22.8	23.2	22.8
High School Graduate	13.7	12.9	14.1	17.6
Some College	10.5	9.7	13.5	14.7
College Graduate	6.8	6.2	11.1	11.0
Student Worked While in High School				
Yes	15.7	14.0	22.9	20.6
No	13.3	12.2	14.5	17.9

Source: National Center for Education Statistics, *The Condition of Education*, 1985, Table 5.2, p. 210.

Table 3. Estimated Number Per 1,000 White, Per 1,000 Black, and Per 1,000 Hispanic High School Seniors Classified by High School Program and by Type of Postbaccalaureate Study

High School Program	Group	Type of School			Did Not Attend School	No Bachelor's Degree	Total
		Graduate	Professional	Missing Data			
Academic: Balanced	White	14	17	0	82	86	200
	Black	6	7	0	39	66	117
	Hispanic	8	10	0	25	101	144
Academic: Science	White	7	9	1	57	155	229
	Black	6	5	0	42	177	231
	Hispanic	4	5	0	14	146	169
Academic: Humanities and Social Studies	White	5	3	0	26	63	96
	Black	2	1	0	12	40	55
	Hispanic	2	2	0	9	126	139
All Other[1] Programs	White	6	4	0	39	427	475
	Black	6	3	2	46	539	597
	Hispanic	3	2	1	25	518	549
Total	White	31	33	1	204	731	1,000
	Black	20	16	3	139	822	1,000
	Hispanic	17	19	1	73	891	1.000

[1]Students with two years or less in a field of study (i.e., science, foreign language, humanities, and social sciences) were included in this category.

Source: Thomas L. Hilton and William B. Schrader, *Pathways to graduate school: An empirical study based on national longitudinal data.* Final Report. Educational Testing Service, Princeton, New Jersey. 1985.

ally fewer 1980 White than Hispanic and Black high school sophomores dropped out, and that the White dropout pattern was related to socioeconomic status (SES), type of high school program, test performance, and level of father's education.

Hispanic students had the highest dropout rate (19.2 percent), and although their dropout pattern resembled that of White students, the relationships between dropping out and high school program and father's education were somewhat weaker.

Black students had the second highest dropout rate (17.2 percent). Their pattern was also more complex; compared to their White and Hispanic peers and to Black students at other income levels, fewer low-middle income Blacks dropped out of school; however, Black dropouts resembled White dropouts in high school program and in test performance scores. They also resembled Hispanic dropouts in that the relationship between dropping out of school and father's education was relatively weak. Both Black and Hispanic students had higher dropout rates than White students among those who worked while in high school.

High School Program and Postsecondary Study. There is abundant evidence that the quality of high school education is important for the participation of minorities in higher education (Hilton & Schrader, 1985; Brown, forthcoming). Hilton and Schrader (1985) found that Black and Hispanic students who took high school academic programs that were classified as "Balanced, Science, or Humanities and Social Science"[1] had higher percentages who earned bachelor's degrees than did Black and Hispanic students in other high school programs. However, compared to Black and White students, Hispanic students were underrepresented in every academic category.

Table 3 presents the post-baccalaureate educational choices for each racial/ethnic group by the type of program taken in high school. Slightly over half of all White students and less than half of all Black and Hispanic students took academic high school programs. The rank-order in which all students took these programs was: (1) Science, (2) Balanced, (3) Humanities and Social Science. By examining the post-baccalaureate career paths of each group, it is clear that very few Black and Hispanic students entered graduate or professional programs compared to White students, and of those who did, most took academically Balanced or Science high school programs.

An interesting finding in Table 3 is that more students who took "other programs" went to graduate or professional schools than did students who took high school programs in the Humanities and Social Sciences. In general, however, there appears to be a link between high school program and post-baccalaureate study, with professional study showing a slight edge over graduate study in career choices among students who took "Academic Balanced" or "Academic Science" (except for Black students) high school programs.

[1]Hilton and Schrader's (1985, pp. 2-3, 2-4) classification scheme is as follows: "Students who had two or more years of all four fields during the last three years of high school were classified as 'Academic: Balanced.' Students who had more than two years in both science and mathematics but not in both foreign languages and social science were classified in 'Academic: Science'; those who had more than two years in both foreign languages and social studies but not in both science and mathematics were classified in 'Academic: Humanities and Social Science'; and the remaining students were classified in 'All Other Programs.'

Minority Undergraduate Education

Trends in Enrollments

Enrollment is declining for some groups in undergraduate education. Table 4 presents enrollment trends for American Indian, Black, Hispanic, and White students from 1976 to 1984. After steady growth from 1976 to 1980, the enrollment of Black students began to decline in 1980 and has decreased by over 3 percent since 1980. The enrollment rate for American Indian students dropped by almost 6 percent between 1982 and 1984.

Hispanic rates have continued to rise, although their increases have moderated downward from a high of more than 13 percent in 1980 to about 2 percent between 1982 and 1984. The trend for Asian-American students shows steady increases over the nine-year period: from 18.7 percent in 1978 to 22.7 percent in 1982 and then dropping to 9 percent in 1984. It is notable that the lowest rate of growth for Asian-American students is still higher than the highest rate of growth for Black and American Indian students during the nine-year period.

Table 5 presents college enrollment by type of institution. Similar to White enrollments, minority enrollments were concentrated in public rather than private institutions in 1984. Proportionally more Black students were enrolled in four-year colleges and universities than in two-year institutions, where proportionally more American Indian (50.9 percent), Hispanic (52.5 percent) and Asian-American (42.5 percent) students were enrolled.

Moreover, in private institutions, Blacks had higher enrollments than other minority groups, and their enrollment patterns closely resembled White enrollment patterns. This appears to be a reflection of the sizable enrollment of Black students in traditionally Black private institutions.

Two-Year/Four-Year Transfers

Hilton and Schrader's (1985) study found that relatively few NLS-72 two-year college entrants earned bachelor's degrees,

Table 4. Total Enrollment and Percent Two-Year Change in Enrollment in Institutions of Higher Education by Race/Ethnic Status: United States, 1976-1984.

	Enrollment since 1976 and 2-Year Changes				
	1976	1978	1980	1982	1984
American Indian	76,000	78,000	84,000	88,000	83,000
	—	+2.6%	+7.7%	+4.8%	−5.7%
Asian-American	198,000	235,000	286,000	351,000	382,000
	—	+18.7%	+21.7%	+22.7%	+8.8%
Black	1,033,000	1,054,000	1,107,000	1,101,000	1,070,000
	—	+2.0%	+5.0%	−0.5%	−2.8%
Hispanic	384,000	417,000	472,000	519,000	529,000
	—	+8.6%	+13.2%	+10.0%	+1.9%
White	9,076,000	9,194,000	9,833,000	9,997,000	9,767,000
	—	+1.3%	+7.0%	+1.7%	−2.3%
All students	10,986,000	11,231,000	12,087,000	12,388,000	12,162,000
	—	+2.2%	+7.6%	+2.5%	−1.8%

Source: U.S. Department of Education, NCES, Fall Enrollment in Colleges and Universities, 1976, 1978, 1980, 1982, and 1984.

Table 5. Total Enrollment by Control and Type of Institution and by Educational Level: United States, 1984.

	1984 Enrollment by Type of Institution					
	Total	American Indian	Asian-American	Black	Hispanic	White
Public						
Universities	17.5%	12.7%	17.1%	9.3%	9.2%	18.6%
Other 4-year	24.9%	23.0%	23.5%	30.4%	23.9%	24.5%
2-year	35.1%	50.9%	42.5%	39.0%	52.5%	34.0%
Private						
Universities	6.0%	2.4%	7.3%	4.0%	4.1%	6.0%
Other 4-year	14.5%	7.2%	8.9%	13.6%	8.5%	15.0%
2-year	2.0%	3.8%	0.7%	3.7%	1.8%	1.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: This table shows, for example, that while 17.5 percent of all students were enrolled at public universities in 1984, only 12.7 percent of American Indian students attended such institutions.

Source: U.S. Department of Education, NCES, Fall Enrollment in Colleges and Universities, 1976, 1978, 1980, 1982, and 1984.

and very few entered graduate or professional schools. The authors note the serious implications of this finding for minority students, particularly Hispanic students, who are more heavily concentrated in two-year institutions.

The problem lies in the fact that few students make the transition from two- to four-year institutions. Table 6 shows the percentage of 1980 high school graduates who entered two-year or junior colleges and later transferred to four-year institutions. The results make it quite clear that of the large percentage of Hispanic students who entered two-year institutions, less than 25 percent transferred to four-year colleges and universities. The only exceptions were Puerto Rican students (36.27) percent), who, after Asian-American students (40.75 percent), had the highest transfer rates.

Table 6. Percentage of 1980 High School Graduates Who Entered Two-Year Junior Colleges by October 1983 and Who Later Transferred to Four-Year Institutions, by Race/Ethnic Group

Race/Ethnic Status	Percent
Hispanic	23.45
(Mexican-American)	(24.47)
(Cuban-American)	(27.79)
(Puerto Rican)	(36.27)
(Other Hispanic)	(17.78)
American Indian	30.23
Asian-American	40.75
Black	18.35
White	30.39
Total	28.79

Source: National Center for Education Statistics, "Postsecondary Transitions, Entry, Persistence, Transfer, Dropout, and Completion for 1980 High School Graduates." October 18, 1985.

Black students had the lowest transfer rate of all groups. However, the overall low rate of transfers for all groups indicates that many two-year college enrollees are not seeking bachelor's or higher degrees (Hilton & Schrader, 1985).

Not all institutional transfers are from two-year to four-year institutions. Students also transfer from four- to two-year institutions. This pattern is of special interest in the decline of minorities in graduate education because the movement is away from rather than toward graduate study.

Table 7 presents a detailed picture of the racial/ethnic background of students who transferred from public or private four-year institutions to two-year institutions. Relatively few students (10.98 percent) transferred from public four-year to two-year institutions; however, of those who did, higher percentages of Hispanic (12.05 percent) and Black (11.67 percent) students transferred in this direction.

Students in private four-year institutions were even less likely to transfer to two-year schools. Nevertheless, more than twice as many Hispanic students (20.66 percent) transferred from private four-year institutions to two-year schools as did private students in general (8.48 percent). Of these, Mexican-American students (27.84 percent) and "other" Hispanic students (24.91 percent) had the highest transfer rates. American Indian (14.18 percent) and Black (10.65 percent) students were the groups next most likely to transfer from private four-year institutions to two-year institutions.

Table 7. Percentage of 1980 High School Graduates Who Entered a Public or Private Four-Year Institution and Who Later Transferred to a Two-Year Institution

Four-Year Institution and Race/Ethnic Group	Transferred to Two-Year Institution
Public	*Percent*
Hispanic	12.05
(Mexican-American)	(10.95)
(Cuban-American)	(11.00)
(Puerto Rican)	(9.52)
(Other Hispanic)	(15.88)
American Indian	4.06
Asian-American	9.07
Black	11.67
White	10.97
Total	10.98
Private	
Hispanic	20.66
(Mexican)	(27.84)
(Cuban)	(5.64)
(Puerto Rican)	(–0–)
(Other Hispanic)	(24.91)
American Indian	14.18
Asian-American	6.06
Black	10.65
White	7.92
Total	8.48

Source: National Center for Education Statistics, "Postsecondary Transitions, Entry, Persistence, Transfer, Dropout, and Completion for 1980 High School Graduates." October 18, 1985.

Although this migration pattern involves only a small fraction of college transfers, it represents another type of loss from the education pipeline that appears to affect minorities more severely than other groups and is a definite path away from graduate school. It is unknown whether minorities are likely to opt for the quicker (and often terminal) Associate of Arts (AA) degree instead of higher degrees. Data from the 1984 HEGIS survey show that the fraction of Black and Hispanic students (8.7 and 3.7 percent) earning AA degrees was higher than their peers earning bachelor's (5.8 and 2.8 percent), master's (4.9 and 2.4 percent), and doctoral (3.5 and 2.0 percent) degrees.

Table 8 presents an overview of the enrollment of racial/ethnic groups at different levels of the higher education pipeline. As the level of education increases, the fraction of White students enrolled increases. In contrast, the representation of Black, Hispanic, and American Indian students

Table 8. 1984 Total Enrollment* by Educational Level and Race/Ethnic Group: United States, 1984

	American Indian	Asian-American	Black	Hispanic	White
Undergraduate	0.7%	3.2%	9.5%	4.6%	79.9%
Graduate	0.3%	2.6%	4.8%	2.2%	80.2%
Professional	0.4%	3.3%	4.8%	2.9%	87.4%

Source: U.S. Department of Education, NCES, Fall Enrollment in Colleges and Universities, 1976, 1978, 1980, 1982, 1984.

*Excludes Foreign Students

dropped considerably by the time they enrolled in graduate and professional schools, indicating the cumulative loss of these minorities as they advance through the pipeline.

Baccalaureate Degree Attainment

Trends in minority degree attainment at the bachelor's level closely follow earlier trends in enrollment. Table 9 shows that, although there have been slight increases in the percentage of bachelor's degrees awarded to American Indian, Asian-American, and Hispanic students, these groups received only a small fraction (3 percent or less each) of the bachelor's degrees awarded in 1984-85. Only 5.9 percent of the bachelor's degrees went to Black students, and that represents a 9.26 percent decline in bachelor's degrees from the high of 60,673 in 1980-81. Although White students experienced a similar decline, they maintained the same share (88 percent) of all baccalaureate degrees conferred from 1976-77 to 1984-85.

The trends shown in Table 10 reveal clear shifts in interests in certain career fields at the undergraduate level. In general, non-Asian-American minorities pursuing the bachelor's degree were more likely than Asian-American students to take their degrees in the fields of education and the social and behavioral sciences; all groups were more likely to earn degrees in business. Although non-Asian-American minorities are still somewhat concentrated in education and the behavioral and social sciences, this does not obscure the substantial decrease in degrees from these fields, particularly among Black students, who took almost 50 percent fewer degrees in the field of education.

Many of the majors in the social and behavioral sciences (i.e., sociology, psychology, economics) are career fields that are relevant to graduate education. Because Black students have traditionally majored in these fields, these decreases and the lack of substantial gains in the humanities may be associated, in part, with their declining enrollment at the graduate

Table 9. Percent Bachelor's Degrees Conferred by Institutions of Higher Education by Race/Ethnic Group: United States, 1976, 1978, 1980, and 1984.

	1976		1978		1980		1984	
	N	%	N	%	N	%	N	%
Hispanic	27,027	3.0	29,700	3.3	21,832	2.3	24,739	2.9
American Indian	3,324	.40	3,407	.40	3,593	.38	3,707	.43
Black	58,679	6.5	60,248	6.6	60,673	6.5	51,466	5.9
Asian-American	13,903	1.5	15,535	1.7	18,794	2.0	23,495	2.7
White	807,368	88.7	802,078	88.0	807,319	86.4	764,154	88.1
Total	910,281	100.0	910,968	100.0	934,800	100.0	867,561	100.0

Source: NCES, Higher Education General Information Survey (HEGIS), 1976, 1978, 1980, and 1984.

Table 10. Bachelor's Degrees Conferred by Institutions of Higher Education by Year, Broad Field and Race/Ethnic Group: United States, 1976, 1978, and 1984.

	Black		American Indian		Asian-American Pacific Isl.		Hispanic		White	
	N	%	N	%	N	%	N	%	N	%
Business										
1976	13,583	23.1	635	19.1	2,991	21.5	5,543	20.5	164,018	20.3
1978	15,956	26.5	723	21.2	3,608	38.5	7,350	22.4	182,706	27.4
1984	15,764	30.6	925	24.9	5,067	21.6	6,250	25.3	194,786	25.5
Education										
1976	13,997	23.8	765	23.1	1,314	9.5	4,962	18.4	140,763	17.4
1978	12,733	21.1	724	21.3	1,216	7.8	5,089	17.1	125,205	15.6
1984	6,151	11.9	527	14.2	1,072	4.6	3,174	12.8	88,267	11.5
Humanities										
1976	6,183	10.5	416	12.5	1,719	12.4	4,255	15.7	122,109	15.1
1978	6,711	11.1	390	11.4	1,740	11.2	3,644	12.3	116,422	14.5
1984	6,961	13.5	513	13.8	2,336	9.9	3,474	14.0	116,431	15.2
Sci/Tech										
1976	9,350	15.9	708	21.3	4,880	35.0	5,643	20.8	209,007	25.9
1978	10,179	16.9	743	21.8	5,986	38.5	6,643	22.4	219,886	27.4
1984	11,996	23.3	987	26.6	11,533	48.1	6,659	26.9	231,229	30.2
Soc/Beh Sci										
1976	13,581	23.1	641	19.3	2,471	17.7	5,541	20.5	141,685	17.5
1978	12,268	20.4	675	19.8	2,408	15.5	5,649	19.0	129,165	16.1
1984	8,314	15.8	579	15.6	2,721	11.6	4,116	16.6	107,121	14.0

Source: NCES, Higher Education General Information Survey (HEGIS), 1976, 1978 and 1984.

level. The trends for American Indian and Hispanic students parallel that of Black students in these fields.

In contrast, the rate of increase for degrees conferred in science and technology and business fields steadily rose over the eight-year period. Most minorities earned degrees in computer science and engineering, fields that have high labor-force participation rates right out of undergraduate school.

The career choices of Asian-American and White students somewhat stabilized, although Asian-American interest in education declined even further, as shown by the low percentage of degrees awarded to Asian-American students in 1984. Their concentration in science and technology fields became stronger over this period, as almost half (48 percent) of all bachelor's degrees in these fields were awarded to Asian-American students in 1984.

These findings indicate a shift in curriculum emphasis that is leading away from graduate school. Students are beginning to select college majors that are linked to specific occupations, such as education, computer science, engineering, and business administration, and provide a quicker entry into the labor force. This phenomenon and its relationship to the depletion of the minority talent pool are explored in the following section.

The Minority Talent Pool

The pathway to graduate school begins with a series of decisions at various transition points, several of which are related to the motivation to pursue a postsecondary education. Davis (1965) believes that career aspirations are fairly crystallized by the time most students enroll in college, and Thomas (1981) and Johnson (1982) have confirmed the influence of early educational and career expectations on the baccalaureate and post-baccalaureate careers of Black students. Currently, there is concern that interest in higher education may be waning among Black students. However, Hilton and Schrader's (1985) study fails to support this speculation. Their findings show not only that larger proportions of high school seniors reported plans to attend graduate school in 1980 than in 1972 (20.7 and 12.6 percent, respectively), but that Black and Asian-American students reported slightly higher levels of educational expectations than did White seniors.

Quite apart from educational aspirations and plans, other factors govern the access of minority students to graduate education. Increasingly, minority enrollment in higher education is being determined by performance competency on standardized achievement tests such as the Scholastic Aptitude Test (SAT) and the Graduate Record Examinations (GRE). Since the mid-1980s, nearly 30 states have increased admission standards to public colleges and universities (ACE, 1985) and many use SAT and GRE scores as criteria in the selection and admission process. The slight improvement in the performance of Black and Hispanic students on these tests since 1978 does not overshadow the fact that their mean performance scores are substantially lower than the scores of Asian-American and White students. Thus, there is concern that because of rising educational standards, there will be further erosion of the minority enrollment in higher education. This is an uneasy position, given the lack of agreement on the predictive validity of standardized tests.

Minorities in the GRE Applicant Pool

In light of evidence that student performance has declined on 11 of the 15 GRE Subject Area Tests between 1964 and 1982, there is concern that fewer college graduates of high ability are choosing to attend graduate school (Boldt, 1976). This concern is complicated by a lack of agreement on the definition of and the criteria for measuring student "quality" (Hartle, 1986). Furthermore, the assessment of student quality is rhetorical, because there are no detailed and comparable national data on student performance at the postsecondary level. At best, only crude estimates can be made of the quality of subgroups in the graduate talent pool by examining trends and characteristics of the applicants taking such tests as the GRE. It is the GRE talent pool that will be used in the analysis that follows.

Individuals who take the GRE represent a large subgroup of the graduate applicant pool. The majority of GRE test-takers are college seniors, graduate school applicants, or first-time graduate school enrollees (Smith, 1985). However, not all GRE test-takers are seniors, apply to graduate school, or actually enroll in graduate school, and not all graduate departments require or recommend the GRE for admission. For these reasons and because GRE test-takers are, to some extent, a self-selected population, the findings may not be representative of all potential minority graduate school applicants or enrollees in graduate school.[2] Thus, care should be taken in interpreting these data as being descriptive of all minorities in the graduate applicant pool.

Trends in the Size and Composition of the Minority GRE Pool. Table 11, which presents trends in the size of the minority GRE applicant pool from 1975 to 1982, reveals that the proportional representation of each racial/ethnic group has remained relatively stable over this eight-year period. However, there are notable reductions in the absolute numbers of Black and Mexican-American students in the GRE pool, particularly since 1981. The numbers of White students have also declined, although they still comprise 86.37 percent of the GRE applicant pool. There has been a slight increase in the numbers of American Indian, Puerto Rican, other Hispanic, and Asian-American students since 1975, although their proportional representation is small relative to Whites and has remained fairly constant over the eight-year period.

Characteristics of the Minority GRE Pool. Detailed information on the characteristics of the minority talent pool at this stage is limited to the voluntary responses of SAT and GRE test-takers to questions on background characteristics. However limited, these data are useful for making comparisons across racial/ethnic groups and for assessing the extent and nature of change within and between groups over time.

[2]The findings presented are based on 65 to 70 percent of GRE test-takers who responded to questions on background characteristics. Students who took the GRE as standby registrants and those who took it at Special GRE Administrations are excluded.

Table 11. Numbers and Percents of Examinees by U.S. Ethnic Subgroup by Testing Year.

Year	Am. Ind.	Black	Mex.-Am.	Asian-Am.	P.R.	Hisp.	White	Other
1975-76	884	13,433	2,738	2,573	1,259	979	178,313	3,968
1976-77	916	13,420	2,487	2,671	1,149	1,136	166,645	3,578
1977-78	982	13,475	2,522	2,869	1,332	1,323	166,291	4,859
1978-79	1,057	13,025	2,417	2,923	1,452	1,436	161,592	4,395
1979-80	1,158	12,046	2,178	2,860	1,337	1,386	156,296	3,928
1980-81	1,096	11,133	2,150	2,940	1,282	1,437	148,513	3,339
1981-82	1,192	9,536	1,983	2,834	1,451	1,355	129,355	2,558
1982-83	922	8,370	1,714	2,715	1,359	1,288	117,686	2,205
Percents of Examinees by U.S. Ethnic Subgroup by Testing Year								
1975-76	.43	6.58	1.34	1.26	.62	.48	87.35	1.94
1976-77	.48	6.99	1.30	1.39	.60	.59	86.79	1.86
1977-78	.51	6.96	1.30	1.48	.69	.68	85.87	2.51
1978-79	.56	6.92	1.28	1.55	.77	.76	85.82	2.33
1979-80	.64	6.65	1.20	1.58	.74	.76	86.26	2.17
1980-81	.64	6.48	1.25	1.71	.75	.84	86.40	1.94
1981-82	.79	6.36	1.32	1.89	.97	.90	86.07	1.70
1982-83	.68	6.14	1.26	1.99	1.00	.95	86.37	1.62

Source: Graduate Record Examinations General Test, 1975-1982.

Table 12 presents information on several characteristics that may shed some light on minorities in the GRE talent pool. Looking at the degree objectives of the respondents in 1978 and 1984, in the latter year proportionally more Puerto Rican (43.99 percent) and Asian-American (41.14 percent) students reported an interest in attaining the doctorate than other groups. The proportions of American Indian and Black students who reported an interest in pursuing the doctorate remained constant over the seven-year period and were slightly higher than White students during both test years. The most notable decrease in interest was among Mexican-American students (36.47 to 29.90 percent), who had the lowest share of students reporting an interest in obtaining an advanced degree.

The shifts seen earlier in the section on undergraduate degree trends are repeated among GRE test-takers at the undergraduate level: Students were concentrated in the social sciences, although there was a definite shift away from this undergraduate major and from the humanities to the physical sciences. Among the non-Asian-American minorities and White students, this shift is due, in part, to fewer students choosing majors in the behavioral sciences and education; among Asian-American students, the shift was clearly away from majors in the social and behavioral sciences to majors in the biological and physical sciences.

Age differences reveal that Black, American Indian, and Mexican-American students (in 1984) were the oldest groups and Asian-American students were the youngest in the GRE pool for both test years. The average age of Black students was about one to 2.5 years older than White students.

The family income of racial/ethnic groups underwent a moderate change during the five-year period, although there was almost no change in the proportions of American Indians, Blacks, Mexican-Americans, and Puerto Ricans in the lowest family income group. However, there were modest increases in the two highest family income levels, even though few non-Asian-American minorities were in the highest family income category (> $25,000).

Finally, the mean GRE scores shown in Table 12 reveal that between 1978 and 1984, there were slight increases among non-Asian-American minorities, but as previously noted, non-Asian-American minority scores were still far below those of Asian-American and White students in both test years.

In sum, from 1978 to 1984, the non-Asian-American minority GRE pool:

- declined for Black and Mexican-American students and slightly increased for all other minorities, even though their representation was small compared to White students in the pool;
- consistently reported a desire to attain higher levels of education (except for Mexican-American students) than did their White counterparts;
- was concentrated in the social sciences and education, although there was a gradual shift from these fields to the physical sciences;
- was generally older than White and Asian-American students;
- is still overrepresented in the lowest family income category, although there has been a slight shift to higher family income categories.

The Transition from Undergraduate to Graduate School

In the previous sections we have generally presented time-series analyses of the participation of minority students in higher education. In this section, the strategy shifts to a longitudinal analysis that follows the same group of students from high school to the receipt of the bachelor's degree and into graduate school. The data are from Hilton and Schrader's (1985) analysis of the educational progress of the NLS-72 high

Table 12. Background Characteristics of GRE Pool by Race/Ethnic Group: U.S. Citizens, 1978 and 1984.

	Black		American Indian		Asian-American		Puerto Rican		Mexican-American		White	
N 1978 =	13,025		1,057		2,923		1,452		2,417		161,592	
N 1984 =	8,398		905		3,479		1,486		2,069		132,912	
	1978	1984	1978	1984	1978	1984	1978	1984	1978	1984	1978	1984
Undergraduate Major												
Humanities	12.87	10.70	12.49	13.25	12.64	10.82	15.01	11.90	15.38	13.82	17.15	15.89
Social Sciences	60.18	55.92	57.31	47.57	33.36	26.41	45.03	43.05	57.10	58.58	45.14	41.82
Biolog. Sciences	16.27	18.11	19.55	22.42	26.53	19.75	24.53	24.07	15.38	13.97	21.75	21.51
Physical Sciences	6.49	12.24	7.65	13.82	24.39	41.65	14.04	19.19	8.65	11.67	12.66	18.65
Other/Undecided	4.19	3.03	3.00	2.94	3.08	1.37	1.39	1.79	3.47	1.96	3.30	2.14
Graduate Major												
Humanities	7.76	6.87	8.38	9.81	9.53	8.51	10.38	8.17	9.43	8.57	12.38	12.07
Social Sciences	59.32	54.60	54.58	47.24	34.86	26.33	46.73	42.10	60.27	58.91	45.58	41.27
Biolog. Sciences	15.16	16.34	20.18	21.98	24.84	18.40	24.37	23.16	14.00	12.59	19.73	19.33
Physical Sciences	4.74	10.04	5.65	11.50	20.11	36.85	11.70	17.57	6.83	11.17	10.20	15.95
Other/Undecided	13.02	12.14	11.21	9.47	10.65	9.91	6.82	8.99	9.47	8.77	12.11	11.37
Mean Age												
1978		28.25		28.22		25.01		26.06		27.73		25.71
1984		28.05		28.75		25.24		25.72		28.51		27.11
Degree Objective (Ph.D. or beyond)												
1978		36.83		38.35		37.88		48.65		36.47		34.99
1984		36.99		38.99		41.14		43.99		29.90		35.83
Family Income												
Less than $15,000	38.25	30.94	26.09	23.18	13.98	10.97	36.62	30.69	38.79	30.22	8.55	6.91
$6,500-$15,000	43.88	42.93	41.66	33.40	36.63	30.80	41.22	42.55	43.95	44.86	38.09	30.68
$15,000-$25,000	13.65	18.80	20.32	25.83	32.79	33.08	16.12	18.83	13.51	18.03	33.21	35.04
More than $25,000	4.22	7.33	11.93	17.58	16.60	25.15	6.04	7.93	3.75	6.89	20.15	27.37
GRE-Verbal												
Mean	362.3	370.4	459.4	461.1	479.8	497.3	389.4	381.2	418.8	419.7	511.5	510.8
S.D.	99.4	101.8	114.0	114.4	120.5	115.9	104.7	102.0	109.5	107.3	110.5	108.1
GRE-Quantitative												
Mean	357.6	363.4	457.3	464.3	565.5	574.9	417.7	419.8	422.1	426.5	525.1	527.9
S.D.	107.4	109.6	122.8	132.9	129.5	125.3	119.9	121.3	122.3	126.1	122.0	123.1
GRE-Analytical												
Mean	352.5	364.0	457.2	468.0	510.0	521.8	384.7	390.2	412.3	422.5	528.7	536.9
S.D.	106.0	107.4	120.2	124.2	124.5	122.4	111.7	112.1	116.6	119.0	110.6	113.0

Source: Graduate Record Examinations General Test, 1978 and 1984.

school seniors who were followed from high school to the point of entry into graduate or professional school. Although these data describe the progress of minority students who made these transitions, certain decision-rules indicate the need to exercise caution in interpreting these findings, and the reader should keep several points in mind:

- The study sample includes only students who had earned baccalaureate degrees by 1979 and who were classified as full-time students in graduate and professional school for at least one semester between 1975 and 1979. The findings are not generalizable to part-time graduate students, many of whom are minority students.
- The sample includes only students who participated in all four follow-up surveys and who provided data for the School Record Information form. The exclusion of nonparticipants introduces possible bias into the findings, particularly for minorities, because they are less likely to respond to survey questionnaires (Kandel, Ravies, & Logan, 1983).
- The data were collected over a seven-year time span, a relatively short time between high school graduation and entry into graduate school. Thus, the results are based on full-time graduate and professional school students who progressed rapidly in their academic careers. Minorities, in particular, are likely to take longer to enter graduate school.
- The data were collected during a period of rapid growth in higher education (i.e., the 1970s). The downturn in minority enrollments since 1983 could produce a substantially different impact on future graduate school enrollments.

Thus, while the findings are informative, they may not

describe current or future trends in student enrollments in graduate or professional school. Nonetheless, the NLS-72 is the only survey that has complete data on the educational progress of the same students in the higher education pipeline who entered graduate school and, therefore, may shed some light on minority transition-point losses that may be linked to post-baccalaureate career options and the recent decline in Black student enrollment in graduate school.

Competing Post-Baccalaureate Career Choices

Labor-Force Participation. The majority of college graduates emerging from the undergraduate-school pipeline go directly into the civilian labor force. Table 13 shows that, for college graduates who received baccalaureate degrees between June 1979 and June 1980, 82 percent were in the labor force one year later as full-time (70 percent) or part-time (12 percent) workers; only 8 percent (not shown) were in school. This suggests that only a small fraction of college graduates continue on to graduate school immediately after receiving the baccalaureate degree.

Table 13. Percent 1979-80 Bachelor's Degree Recipients in Civilian Labor Force by Employment Status, May 1981.

Employment Status	Percent
In Labor Force	82
Full-time	70
Part-time	12
Not in Labor Force	18

Source: Douglas Braddock and Daniel E. Hecker, "The Class of '80 One Year After Graduation," *Occupational Outlook Quarterly*, Summer, 1984.

Racial/ethnic estimates for this cohort were unavailable for graduates who went directly into the labor force. However, Table 14 reveals that Black bachelor's degree graduates in 1980-81 were concentrated in fields such as business and education that had high labor-force participation rates. The following analysis of NLS-72 post-baccalaureate outflows will show that almost all Black and Hispanic students left the education pipeline at this transition point.

Table 14. Percent 1979-80 Bachelor's Degree Recipients in Civilian Labor Force by May 1981 and 1980-81 Black Bachelor's Degree Recipients by Selected Fields

Major Field	Civilian Labor Force	Blacks BA
Art	91	0.6
Business	90	22.1
Communication	92	3.9
Computer Science	97	1.3
Education	93	15.6
Engineering	88	4.0
Mathematics	75	0.9
Psychology	80	5.4

Sources: Douglas Braddock and Daniel E. Hecker, "The Class of '80 One Year After Graduation." *Occupational Outlook Quarterly*, Summer 1984, Table 1; NCES, Higher Education General Information Survey (HEGIS), 1980-81.

Graduate vs. Professional School. Background information on the NLS-72 sample indicates that 25 percent had earned baccalaureate degrees by 1979 and about 22 percent had enrolled (full- and part-time) in graduate or professional schools. Entry rates were highest for graduates with Arts and Science degrees rather than graduates with degrees in applied fields (NCES, 1981). From this larger sample, a subsample was drawn to analyze the transitions students made from high school to the point of entering graduate or professional school.

Table 15 shows the status of Black, Hispanic, and White students at various transition points and reveals that while 21 percent of Hispanic students entered college and Black (35 percent) and White (38 percent) students entered college at about the same rate, much smaller fractions (15 and 24 percent) of Hispanic and Black students were still in college by the fall of 1974. Over half of the Hispanic students and nearly half of the Black students had not received the baccalaureate degree by 1979. Their small pools were further depleted at the post-baccalaureate level. Only 2 percent or less of Hispanic and Black students had entered graduate or professional schools by 1979. Comparable estimates show that over two-thirds of the White students who entered college received bachelor's degrees.

To update these transitions, data from the High School and Beyond (HSB) longitudinal survey parallel the NLS-72 survey by following high school seniors from the point of entering college in 1980 to the point of receiving the bachelor's degree in 1984. These data provide more current information on the high minority attrition rates during the undergraduate years.

Table 15. Percent Educational Attainment of NLS-72 Seniors by Race/Ethnic Groups, 1979

Educational Status	Race/Ethnic Group Black	Hispanic	White
Entered 4-Year College	35	21	38
Entered 2-Year College	19	32	22
Enrolled in 4-Year College by Fall 1974	24	15	30
Earned BA	18	11	27
Entered Graduate School	2.0	1.7	3.1
Entered Professional School	1.6	1.9	3.3

Source: Thomas L. Hilton and William B. Schrader, *Pathways to graduate school: An empirical study based on national longitudinal data.* Final Report. Educational Testing Service, Princeton, New Jersey. 1985.

Table 16 presents college entry and persistence rates for eight semesters for students in private and public four-year institutions. The findings show that, after eight semesters, Black and Hispanic seniors resemble their NLS-72 counterparts. Although Black students have slightly higher entry and persistence rates than Hispanic or American Indian students at both private and public institutions, all three groups are disadvantaged by the small numbers who enter the higher education pipeline after high school.

Table 16 also shows that in private institutions, the proportional declines in the enrollment of non-Asian-American minorities (except Cubans) appear to occur early in the pipeline—by the third and fourth semesters—and continue

Table 16. Entry and Persistence Rates for 1980 High School Graduates Who Entered Public and Private Four-Year Colleges and Universities by February 1984 (Adjusted for Delayed Entry) by Race/Ethnic Group and Semester.

Race/Ethnicity	Entry Rate	Semesters						
		Two	Three	Four	Five	Six	Seven	Eight
Private Four-Year Institutions								
Hispanic	16.12	74.53	53.33	49.55	27.30	27.26	22.74	23.78
Mexican	12.69	68.86	45.72	38.97	28.66	28.32	17.19	17.24
Cuban	38.85	83.72	66.71	64.64	44.89	42.57	41.98	43.56
Puerto Rican	19.67	88.83	66.89	66.89	47.88	47.96	28.79	28.79
Other Hispanic	17.94	76.18	53.89	51.61	21.33	21.36	17.66	18.79
American Indian	14.72	69.38	41.94	32.62	15.84	16.26	19.54	19.54
Asian-American	18.84	98.72	73.19	71.76	49.05	48.00	48.65	51.23
Black	28.52	82.58	60.92	56.62	48.87	36.67	36.20	37.37
White	25.81	86.73	71.69	67.46	47.68	45.24	42.19	42.83
Public Four-Year Institutions								
Hispanic	41.82	87.35	63.86	54.73	33.28	32.74	27.56	26.97
Mexican	39.36	86.28	63.35	52.93	36.23	35.27	28.03	27.91
Cuban	34.68	82.61	75.25	58.53	26.88	25.95	22.85	22.99
Puerto Rican	68.56	91.68	43.88	38.68	24.77	26.41	25.49	22.49
Other Hispanic	48.38	88.87	72.01	65.20	32.91	31.95	28.68	28.11
American Indian	41.57	83.26	62.94	54.51	29.66	29.70	28.63	29.73
Asian-American	63.89	93.19	76.86	75.29	50.24	49.86	45.95	46.70
Black	53.43	82.31	65.71	60.36	38.77	36.89	32.43	32.65
White	49.64	90.15	72.01	65.91	45.92	43.86	38.43	36.99

Source: National Center for Education Statistics, "Postsecondary Transitions: Entry, Persistence, Transfer, Dropout, and Completion for 1980 High School Graduates." October 18, 1985.

to drop until the fifth semester, when they begin to stabilize.

Persistence rates of Asian-American and White students decrease until the fifth semester, when they begin to stabilize at higher persistence levels than other groups.

Table 17 provides some information on factors that may be associated with the attrition of underrepresented minorities. The findings reveal that proportionally more Black, Hispanic, and American Indian students delayed entry, stopped out (i.e., dropped out and later returned to college), and dropped out of college than did Asian-American and White students by 1984. Black students, who have the highest stopout and dropout rates, appear to be at greater risk than Hispanic students for failing to earn bachelor's degrees, even though their persistence rate was higher. Although this discrepancy is somewhat puzzling, it may be due to the smaller sample size for Hispanic students and may simply reflect sampling error.

Hilton and Schrader found that high-ability Black students tended to surpass White students in their educational progress throughout the undergraduate-graduate school pipeline; however, the finding was based on a very small Black sample (N = 45) and must be considered tentative.

To summarize, a major barrier to minority graduate enrollments appears to be the inability of U.S. colleges and universities to attract and retain large numbers of non-Asian-American minorities at the undergraduate-school stage of the pipeline, even though interest and plans for advanced study have remained consistently higher for these groups than for White students.

Table 17. Percentage of 1980 High School Graduates Who Entered Postsecondary Institutions by February 1984, Who Delayed Entry, Stopped Out, or Dropped Out by Race/Ethnic Group

Race/Ethnic	Delayed Entry	Stopped[1] Out	Dropped[2] Out
Hispanic	31.9	14.2	28.3
American Indian	39.7	16.2	27.6
Black	32.3	16.5	30.8
Asian-American	15.6	9.8	17.6
White	23.5	12.7	25.7
Total	25.3	13.0	26.1

[1]Stopouts are students who dropped out of college but returned by February 1984.

[2]The dropout rate is based on enrollment in February 1984 adjusted for completions by February 1984. It is possible that dropouts are actually stopouts who may return to complete their education but had not done so by February 1984.

Source: National Center for Education Statistics, "Postsecondary Transitions: Entry, Persistence, Transfer, Dropout, and Completion for 1980 High School Graduates." October 18, 1985.

Graduate Education

Enrollment

Table 18 shows that full-time graduate and professional school enrollments declined among Black students between 1976 and 1984. Hispanic full-time enrollments have increased in both areas; however, it is important to keep in mind the relatively smaller numerical base upon which these increases were calculated. The trend for White students shows declines similar to those for Black students.

Table 19 presents the nature and magnitude of these changes in greater detail. For example, the findings reveal that, in actual numbers and proportions, the decline in full-time Black graduate school enrollees (18 percent) was more than four times that of their White counterparts (4.2 percent). Full-time enrollment of Hispanic students increased by more

Table 18. U.S. Graduate and Professional School Enrollments of Full-Time Students by Race/Ethnic Group: 1976-1984

Group	Graduate N	Graduate %	Professional N	Professional %
Black				
1976	22,058	5.1	10,029	4.6
1978	20,985	4.9	20,260	4.4
1980	22,162	5.0	11,490	4.6
1982	17,883	4.2	11,214	4.6
1984	18,079	4.0	9,721	5.0
Hispanic[a]				
1976	8,045	1.9	4,104	1.9
1978	8,325	2.0	4,845	1.9
1980	9,842	2.2	5,997	2.4
1982	9,228	2.2	6,528	2.7
1984	12,715	2.8	8,117	4.1
White				
1976	340,876	79.6	198,063	90.0
1978	331,006	78.1	207,912	89.9
1980	334,104	75.5	223,316	89.3
1982	314,496	74.0	214,091	88.3
1984	326,436	72.4	168,987	86.3
Other[b]				
1976	57,367	13.4	7,841	3.5
1978	63.760	15.0	8,220	3.6
1980	76,296	17.3	9,244	3.7
1982	83,258	19.6	10,616	4.4
1984	96,688	20.8	9,500	4.6
Total				
1976	428,346	100.0	220,037	100.0
1978	424,076	100.0	231,237	100.0
1980	442,404	100.0	250,047	100.0
1982	424,865	100.0	242,449	100.0
1984	453,918	100.0	196,325	100.0

[a]Hispanics are U.S. residents who are Mexican, Puerto Rican, Cuban, Central or South American, or of other Spanish origin.

[b]Others include American Indians or Alaskan Natives, Asian-Americans, and nonresident aliens.

Source: U.S. Office for Civil Rights, unpublished data from the Higher Education General Information Survey (HEGIS), 1976-1982.

Table 19. Percent Change in U.S. Graduate and Professional Enrollments of Full-Time Students by Race/Ethnic Group: 1976-1984

	Black	Hispanic	White
Graduate[a]	−18.0	+58.0	−4.2
Total Professional[b]	−3.1	+97.8	−14.7
Law	+3.7	+18.2	−2.9
Medicine[c]	−4.1	+1.2	−10.9
Dentistry[c]	−14.7	+7.0	−16.4
Business	+34.4	+102.0	+23.9

[a]Excludes business majors

[b]Includes veterinary medicine

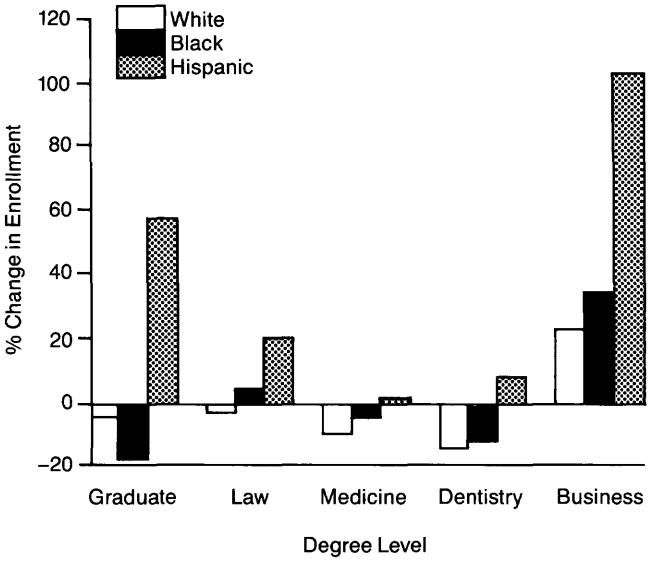
[c]Enrollment changes calculated for 1980-1984.

Source: NCES, Higher Education General Information Survey (HEGIS), 1976-1981.

than 50 percent during this period. Figure 2 graphically depicts these changes.

Among students enrolled full-time in professional schools (Table 18), the share that is Black, as a fraction (5.0 percent) of all professional school enrollees, has increased slightly since 1982. In absolute numbers, however, Black professional enrollment went down by 3 percent between 1976 and 1984. Hispanic enrollment in professional schools nearly doubled during this period, while White enrollment dropped by almost 15 percent.

Figure 2. Percent Change in U.S. Graduate and Professional Enrollments of Full-Time Students by Race/Ethnic Group: 1976-1984



Source: NCES Higher Education General Information Survey (HEGIS), 1976-1984.

The bottom panel of Table 19 presents the proportional changes in full-time professional and business school enrollments. There were small Black enrollment gains and modest Hispanic gains in law; however, in medicine there was a slight drop in enrollment for Black students and a very slight gain for Hispanic students. White enrollment declined in both law and medicine.

Since 1980, the proportional changes in dentistry show that enrollment levels have declined for Blacks (14.7 percent) and Whites (16.4 percent) and slightly increased for Hispanics (7 percent). However, the most surprising changes took place in graduate business school enrollments and are in sharp contrast to enrollment trends for the professions. Black full-time enrollment in business schools rose 34.4 percent by 1984, and the gains were even higher for Hispanic enrollment (100 percent); White students (23.9 percent) also experienced an increase in business school enrollment, although a smaller one, during this period.

Table 20 provides more information about the growth and popularity of business majors during the 1970s and 1980s. It is clear that graduate enrollment in business schools is made up

Table 20. Percent Graduate Business School Enrollment of Full- and Part-time Students by Race/Ethnic Group: United States, 1976-84

Year	Black		Hispanic		White	
	N	%	N	%	N	%
Full-Time Students						
1976	2,058	33.8	774	34.6	40,361	32.0
1978	2,395	33.7	884	31.7	44,365	30.1
1980	2,921	38.9	1,156	31.0	49,060	29.8
1984	2,766	37.5	1,550	38.0	50,008	28.6
Part-Time Students						
1976	4,038	66.2	2,239	65.4	85,706	67.9
1978	4,722	66.4	1,904	68.3	103,225	69.9
1980	4,587	61.1	2,570	68.9	115,374	70.2
1984	4,604	62.4	2,529	62.0	124,729	71.4

Source: NCES, Higher Education General Information Survey (HEGIS), 1976-1984.

primarily of part-time rather than full-time students. The part-time/full-time ratio was highest among White students and grew from a 2-1 ratio in 1976 to about a 3-1 ratio by 1984. Among Black students, full-time enrollments increased slightly over the nine-year period, but part-time enrollment was still favored by a 2-1 ratio. Hispanic enrollment patterns show fluctuations over the period, although in 1984 a slightly higher proportion enrolled as full-time students.

In sum, enrollment patterns show a general decline for Black students in graduate education, except in business where their enrollment gains have been substantial. In professional schools, Black enrollment has increased slightly in law but has declined in both medicine and dentistry since 1980. Hispanic students have experienced increased enrollment in all three professions; however, the increases represent relatively small numerical gains.

Graduate/Professional Degrees

Master's Degrees. In the following analyses, Asian-American students are included to show the marked differences in the growth patterns of master's degree awards to minorities over the past nine years. For example, Table 21 and Figure 3 show that between 1978 and 1984, there was a decline in master's degrees for all groups except Asian-American students, whose share of master's degrees went up almost 40 percent. In contrast, Black students experienced nearly a 40 percent decline in master's degrees, while master's degrees for Hispanic students declined by 10 percent, and master's degrees for White students declined by 21 percent during the same time period. Table 21 also shows racial/ethnic differences in awards made at the doctorate and professional degree levels; these differences will be discussed in later sections of this chapter.

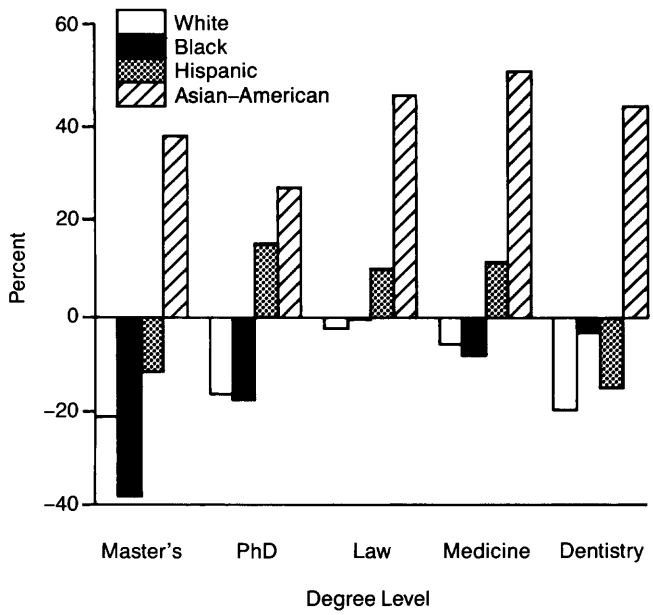
Table 21. Percent Change in Total* Degrees Earned by Race/Ethnic Status and Educational Level: United States: 1978-1984

Degree Level	Black	Asian-American	Hispanic	White
Master's	−39.0	+38.9	−10.1	−20.8
Ph.D	−16.0	+26.3	+15.3	−15.2
Professional:	− 1.5	+47.2	+ 7.8	− 4.6
Law	− 0.3	+46.7	+ 8.8	− 2.2
Medicine	− 6.7	+50.6	+10.4	− 4.4
Dentistry	− 3.3	+42.0	−12.2	−20.4

*Includes full-time and part-time students and business degrees.

Source: NCES, Higher Education General Information Survey (HEGIS), 1978-1984.

Figure 3. Percent Change in Total* Degrees Earned by Race/Ethnic Status and Educational Level: United States: 1978-1984



*Includes Full-Time & Part-Time Students & Business Degrees.
Source: NCES, Higher Education General Information Survey (HEGIS) 1978–1984.

There are clear shifts in curriculum emphasis shown in Table 22. In general, the declines in master's degrees for Black, Hispanic, and White students are reflected in the smaller numbers of students entering the fields of education, humanities, and the social and behavioral sciences. Although the proportions of Black, Hispanic, and White students have remained fairly constant in humanities and the social/behavioral sciences, they were calculated on smaller population bases in 1984.

With the population sizes placed in perspective, we can examine the changes in master's degrees awarded in the fields of business and the science/technology fields in Table 22. At first glance, the percentage of Black students receiving master's degrees in business in 1984 was higher than the percentage who received degrees in this field in 1976. However, in actual numbers, fewer Black students were awarded degrees in 1984.

The small but steady increases for Asian-American, Hispanic, and White students are based on increases in absolute numbers as well as increases in the proportions of these students taking their degrees in business fields.

There were small increases in master's degrees earned among minority students in science/technology fields; however, the proportions of Asian-American students receiving awards in these fields was from 2 to almost 3 1/2 times higher than those of other minorities during the nine-year period.

Table 22. Percent Total Master's by Broad Field and Race/Ethnic Group: United States, 1976, 1978, and 1984.

	Black		Asian-American		Hispanic		White	
	N	%	N	%	N	%	N	%
Business								
1976	3,501	16.7	1,213	28.7	1,427	20.3	55,745	21.0
1978	4,186	21.6	1,546	28.1	1,450	22.5	58,112	23.4
1984	3,672	28.6	2,090	29.4	1,604	25.3	62,525	29.8
Education								
1976	12,810	61.0	1,057	20.6	3,000	40.6	109,184	41.2
1978	10,950	56.5	1,014	18.5	2,837	44.0	96,163	38.7
1984	5,651	44.1	791	11.1	2,443	38.6	62,786	29.9
Humanities								
1976	1,422	6.8	648	12.6	840	11.9	32,489	12.3
1978	1,167	6.0	317	9.4	717	11.1	28,715	11.6
1984	875	6.8	579	8.1	655	10.1	23,504	11.2
Sci/Tech								
1976	1,613	7.7	1,766	34.5	995	14.1	43,952	16.6
1978	1,682	8.7	2,039	37.1	914	14.2	43,942	17.7
1984	1,700	13.3	3,199	44.4	1,057	16.7	44,306	21.1
Soc/Beh Sci								
1976	1,475	7.0	370	7.2	690	9.8	19,565	7.4
1978	1,224	6.3	323	5.9	467	7.2	17,196	6.9
1984	805	6.3	411	5.8	490	7.7	13,752	6.6

Source: NCES, Higher Education General Information Survey (HEGIS), 1976, 1978, and 1984.

Doctoral Degrees. Table 23 presents the percentages of doctorates awarded as a fraction of all doctorates awarded to each group in 1976, 1978, and 1984. In general, the proportions of students receiving doctorates remained fairly constant for each group, although there were small increases experienced by the Hispanic and Asian-American minorities. However, the actual numbers of degrees awarded dropped by 12.9 percent for Black students and increased by 55.3 percent for Asian-American students and 15.3 percent for Hispanic students. White students experienced a 15.2 percent reduction in the numbers receiving a doctorate between 1976 and 1984.

Table 24 shows the proportion of students earning doctorates by racial/ethnic groups and selected fields. Relatively few students earned doctorates in business, although there has been a small increase in Black doctorates in this field. Figure 4 presents a capsulized view of 1984.

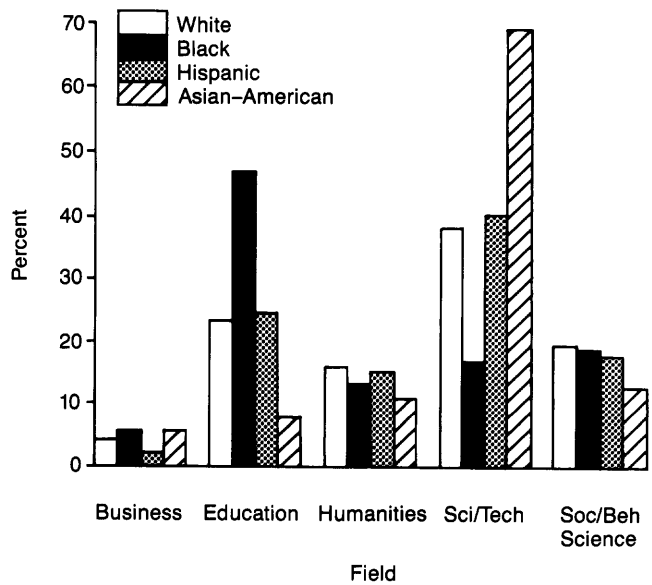
Table 23. Percent Total Doctorates By Race/Ethnic Group: United States, 1976, 1978, and 1984.

	Black		Asian-American		Hispanic		White	
	N	%	N	%	N	%	N	%
1976	1,215	4.3	658	2.2	534	1.8	26,822	91.4
1978	1,266	4.4	809	2.8	452	1.6	26,114	90.8
1984	1,058	4.1	1,022	4.0	616	2.4	22,754	89.1
	Percent Change							
	Black		Asian-American		Hispanic		White	
1976-84	−12.9		+55.3		+15.3		−15.2	

Source: NCES, Higher Education General Information Survey, 1976, 1978, and 1984.

There were substantial decreases between 1976 and 1984 in the percentage of doctorates that were awarded in education and the social and behavioral sciences. However, Black students are gradually increasing their numbers of PhDs in

Figure 4. Percent within Race/Ethnic Group Receiving Doctorates by Broad Field*; United States: 1984



*Excludes Fields in Interdisciplinary Studies.
Source: NCES Higher Education General Information Survey (HEGIS), 1984.

Table 24. Total Doctorates by Broad Field* and Race/Ethnic Group: United States, 1976-1984.

	Black		Asian-American		Hispanic		White	
	N	%	N	%	N	%	N	%
Year/Field:								
Business								
1976	35	2.8	17	1.7	16	3.0	946	3.5
1978	49	3.9	22	2.1	6	1.3	952	3.6
1984	45	4.3	42	4.5	12	1.9	834	3.7
Education								
1976	691	55.2	80	1.0	164	30.7	6,753	25.2
1978	634	50.1	101	1.4	136	30.1	6,531	25.0
1984	500	47.3	78	1.2	158	25.6	5,575	24.5
Humanities								
1976	126	10.1	50	1.1	94	17.6	4,432	16.5
1978	149	11.8	64	1.4	88	19.5	4,232	16.2
1984	131	12.4	96	2.6	89	14.4	3,389	14.9
Sci/Tech								
1976	164	13.1	409	4.3	139	26.0	8,878	33.1
1978	176	13.9	517	5.4	107	23.7	8,777	33.6
1984	179	16.9	691	7.2	240	39.0	8,478	37.3
Soc/Beh Sci								
1976	222	17.7	98	1.6	117	21.9	5,561	20.7
1978	243	19.2	88	1.6	103	22.8	5,058	19.4
1984	196	18.5	101	2.2	109	17.7	4,246	18.7

*Excludes fields in interdisciplinary studies.

Source: NCES, Higher Education General Information Survey, 1976-1984.

science/technology fields, and their share of doctorates in the humanities has remained almost stable. Hispanic students gained in the number and percentage of doctorates awarded in science and technology. Doctoral degrees for Asian-American students remained relatively stable across fields, except for small increases in the business and science/technology fields.

Table 25 summarizes the degrees earned at all educational levels in 1984 and presents a graphic picture of the 1984 degree outcome of minority and White students in the broad fields considered throughout the chapter. There are several similarities in these findings: (1) moderate proportions of all students took their bachelor's and master's degrees in business; at the doctoral level, however, the proportions dropped to less than 5 percent; (2) in each group, the percentage of degrees earned in the humanities remained stable over degree levels; and (3) in the social/behavioral sciences, slightly higher proportions in each group earned bachelor's and doctorate degrees than earned master's degrees.

The major differences were in education and the science and technology fields. Even though similar proportions of students in each racial/ethnic group (except Asian-American) earn bachelor's degrees in the field of education, it is noteworthy that (1) almost half (44 percent) of all master's degrees earned by Black students were in education, whereas only 11 percent of Asian-American master's degrees were awarded in this field, and that (2) proportionally more Asian-American students earned bachelor's, master's, and doctorate degrees in science/technology fields compared to other groups.

Black and Hispanic students appear to be more heavily concentrated than other groups in fields that are less relevant to graduate education (i.e., education, business) and that lead to immediate employment opportunities after the bachelor's degree rather than to further education.

Table 25. Summary of Degree Attainment by Race/Ethnic Group and Broad Field: United States, 1984

	Percent			
Field/Degree	Black	Asian-American	Hispanic	White
Business				
BA	31	22	25	26
MA	29	29	25	30
Ph.D	5	4	2	4
Education				
BA	12	5	13	11
MA	44	11	39	30
Ph.D	47	8	26	25
Humanities				
BA	14	10	14	15
MA	7	8	10	11
Ph.D	12	9	15	15
Science/Tech				
BA	23	49	27	30
MA	13	45	17	21
Ph.D	17	68	39	37
Soc/Beh Sci				
BA	16	12	17	14
MA	6	6	8	7
Ph.D	19	10	18	19

Source: NCES, Higher Education General Information Survey (HEGIS), 1984.

Professional Degrees. Table 26 presents the trends in the proportions of students receiving degrees in the three professions over the same time period. The overall results for minorities show that between 1978 and 1984, professional degrees were down for Black students by 2.3 percent, up for Asian-American students by 47.2 percent, and up for Hispanic students by 7.8 percent. White students' awards were down by 4.6 percent.

Table 26. Percent Change in Professional Degrees Earned in Law, Medicine, and Dentistry by Race/Ethnic Status: United States: 1978-1984

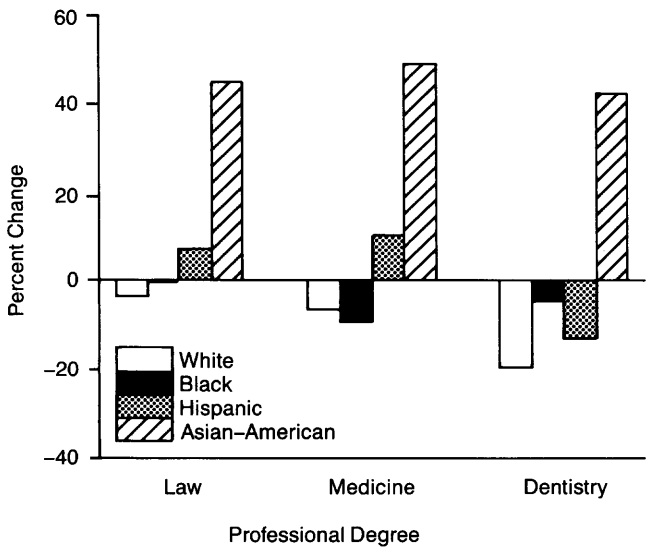
Professional Degree	Black	Asian-American	Hispanic	White
Professional	−2.3	+47.2	+ 7.8	− 4.6
Law	−0.3	+46.7	+ 8.8	− 2.2
Medicine	−6.7	+50.6	+10.4	− 4.4
Dentistry	−3.3	+42.0	−12.2	−20.4

Source: U.S. Office for Civil Rights, Higher Education General Information Survey (HEGIS), 1978-1984.

Figure 5 presents the trends for the three professions separately. The calculated percentage changes show that Black professional degrees declined from 1978 to 1984 in all three professions, while degrees awarded to Hispanic students during this period declined in dentistry, but rose in medicine and law. Asian-American students experienced substantial increases in degrees awarded in all three professions. The percentage of White students earning degrees fell in all three professions, but most notably in dentistry.

In summary, the findings suggest that there are clear differences in the enrollment and degree trends among minorities at different levels of the undergraduate-graduate pipeline and among career fields. Moreover, they indicate that among the possible factors closing off the participation of Black and Hispanic students in graduate education is their concentration in career fields that lead to higher labor-force participation after the bachelor's degree, their growing interest in professional education, and their lower participation in fields requiring advanced study.

Figure 5. Percent Change in Professional Degrees Earned by Race/Ethnic Status: U.S. 1978-84



Source: U.S. Office of Civil Rights, Higher Education General Information Survey (HEGIS) 1978–1984.

The Role of Traditionally Black Institutions in Graduate Education

Prior to the 1954 *Brown* vs. *Board of Education* decision, the traditionally Black institutions (TBIs) were critical to the higher education of Black students. Because the transitional period in the 1970s somewhat altered the development and status of the TBIs, this section reviews enrollment and degree trends to determine the importance of the role currently played by TBIs in the production of Black students for the graduate talent pool.

TBI Enrollment: Composition and Trends

Eighty-six percent of all students in TBIs are enrolled in undergraduate programs, and nearly all are full-time students (92 percent). Although TBIs were founded to serve Black students, they now serve growing numbers of U.S. students from other racial/ethnic groups and other nationality groups. For example, in 1976 other races and nationalities represented 12 percent of the TBI student population; in 1982, their representation increased to 18 percent and included: White students (11 percent), nonresident alien students (6 percent), and the combined populations of Asian-American, Hispanic, and American Indian students (1 percent).

Table 27 shows that, from 1976 to 1980, the enrollment growth in TBIs was due entirely to the nonresident aliens and non-Black (excluding Asian-American) students.

Apart from Black students, White and nonresident alien students were the two largest student populations being educated in TBIs. White students were primarily concentrated in graduate and professional degree programs; nonresident aliens—the majority of whom are from West Africa (40 percent), the Middle East (28 percent), and Latin America (15 percent)—were primarily enrolled in TBI undergraduate programs. Thus, there is a shift towards increasing racial/ethnic diversity in the student population of the TBIs.

Because of increased demand and support for higher education in the 1960s, TBIs experienced enrollment growth until 1980. Table 28 reveals that, between 1970 and 1975, the major enrollment increase (31 percent) took place in public four-year TBIs. Since 1975, however, public four-year general baccalaureate and specialized TBIs have lost rather than gained in enrollment.

There is also a decline in enrollment in both public and private two-year TBIs. However, from 1975 to 1980, the losses for public two-year TBIs were more substantial than those for private two-year TBIs (28 and 12 percent, respectively) and occurred after significant gains for public TBIs (76 percent) between 1970 to 1975.

Based on the data in Table 29, the change in enrollment

Table 27. Racial/Ethnic Composition of Students in TBIs: 1976, 1980, and 1982.

Race/Ethnic Group	Number			Percent Change	
	1976	1980	1982	1976-1980	1980-1982
Total	212,120	222,220	216,570	5	− 3
Black, not Hispanic	185,820	185,780	177,000	*	− 5
White, not Hispanic	18,390	21,480	23,040	17	7
Asian-American	610	1,340	1,050	121	−22
Hispanic	460	1,030	1,070	121	5
American Indian	180	400	570	120	41
Nonresident alien	6,660	12,200	13,840	83	14

*Less than 0.5 percent.

Note: Details may not add to total because of rounding. Percent change was calculated with exact numbers, not rounded numbers.

Source: Susan Hill, *The traditionally Black institutions of higher education, 1860 to 1982.* Washington, DC: National Center for Education Statistics.

Table 28. Enrollment in TBIs by Control and Classification: 1970, 1975, and 1980.

Control and Classification*	Enrollment (in thousands)			Percent Change	
	1970	1975	1980	1970-75	1975-1980
Total TBIs	170	213	222	25	4
Public	114	149	157	31	6
4-year	109	141	152	29	7
Comprehensive	69	90	102	30	14
General BA	41	52	50	27	− 4
2-year	4	8	6	76	−28
Private	56	65	65	14	2
4-year	53	61	62	14	3
Doctoral	9	9	11	6	20
Comprehensive	7	7	8	12	12
General BA	36	42	41	16	− 2
Specialized	2	2	2	17	−11
2-year	2	3	2	15	−12

Note: Details may not add to total because of rounding. Percent change was calculated using exact numbers, not rounded numbers.

Source: Susan Hill, *The traditionally Black institutions of higher education, 1860 to 1982.* Washington, DC: National Center for Education Statistics.

Table 29. Changes in Total Enrollment and First-time Freshmen in TBIs by Control and Classification: 1980 to 1982.

Control and Classification*	Total Enrollment		Percent Change	First-time Freshmen		Percent Change
	1980	1982	1980-1982	1980	1982	1980-1982
Total	222,220	216,570	− 3	54,940	48,610	−12
Public	157,370	154,650	− 2	38,090	33,440	−12
4-year	151,760	147,700	− 3	35,640	30,360	−15
Comprehensive	102,250	99,050	− 3	25,150	20,240	−20
General BA	49,510	48,650	− 2	10,500	10,120	− 4
2-year	5,600	6,950	+24	2,450	3,080	+26
Private	64,850	61,920	− 5	16,850	15,160	−10
4-year	62,420	60,140	− 4	15,520	14,120	− 9
Major Doctoral	11,320	11,450	+ 1	1,680	1,700	+ 1
Comprehensive	8,340	8,340	*	1,570	1,560	*
General BA	41,120	38,930	− 5	12,100	10,740	−11
Specialized	1,650	1,420	−14	180	120	−33
2-year	2,430	1,780	−27	1,330	1,050	−21

*Less than 0.5 percent.

Note: Details may not add to total because of rounding. Percent changes were calculated with exact numbers, not rounded numbers.

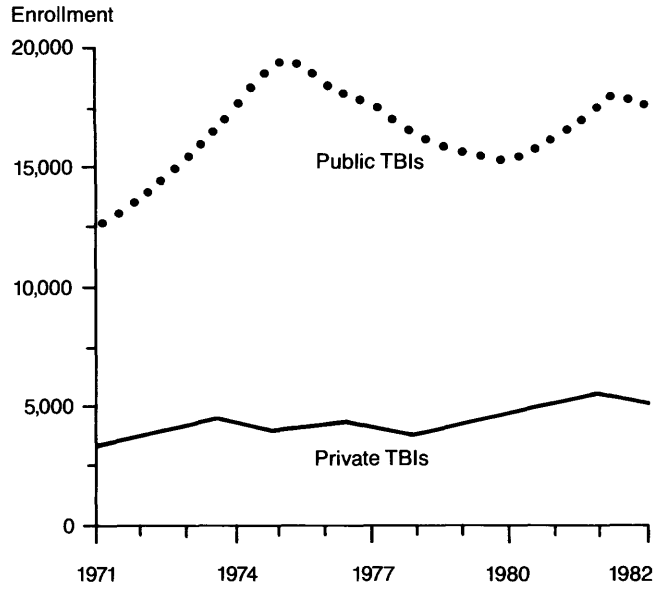
Source: Susan Hill, *The traditionally Black institutions of higher education, 1860 to 1982.* Washington, DC: National Center for Education Statistics.

from 1980 to 1982 reveals that public two-year TBIs gained in enrollment (26 percent) and that enrollment was generally down in public and private four-year and substantially decreased in private two-year institutions. Enrollment losses in private two-year institutions were due, in part, to the closing of three institutions (Hill, 1985). Among public TBIs, the decline was largest for comprehensive four-year institutions, primarily because of a decline in first-time freshmen (20 percent). Private school enrollment losses (14 percent) were heaviest among two-year TBIs, although specialized programs (14 percent) also lost students because of a decline in first-time freshmen.

Graduate Enrollment. Graduate enrollment in public and private TBIs was similar until 1961, when tremendous growth took place in public TBIs; public TBI enrollees outnumbered private enrollees almost three to one by 1971. Total graduate enrollment increased and peaked at 16,000 in 1975 and declined (28 percent) to 11,500 in 1979. The small percentage (7 percent) of students enrolled in TBI graduate programs reflects, in part, the recency of TBI graduate programs; these programs numbered only 17 in 1951 and grew to 40 by 1982.

Figure 6 shows that the growth in TBI graduate programs has been mainly in public institutions and that enrollment has dropped off slightly among private and public graduate programs since 1981. Only 3 percent of those enrolled are full-time students, and 28 percent of these are White.

Figure 6. Graduate Students Enrolled in TBIs by Control: 1971-1982



Source: Susan Hill, *The traditionally Black institutions of higher education, 1860 to 1982*. Washington, DC: National Center for Education Statistics.

Degree Trends

From 1954 to 1974, the number of degrees awarded by TBIs increased almost 150 percent, from 13,000 to 32,000, after which the number of degrees declined to 27,000 by 1982.

Table 30 presents the number of degrees awarded at all educational levels to Black students in TBI states[3] in 1976, 1979, and 1981. The findings show that while there were general increases in the number of degrees awarded to Black students from 1976 to 1981, the number awarded by TBIs fell by 13 percent and the proportional representation of TBI awards fell by 9 percent. Thus, even though Black students received slightly more baccalaureate degrees, fewer of these degrees were awarded by TBIs.

Table 30. Degree Awards to Black Students in the TBI States by Educational Level: 1976, 1979, and 1981.

Degree Awards to Black Students in the TBI States*	1976	1979	1981
Bachelors			
Number to Blacks	37,055	37,605	38,154
Number from TBIs	22,229	20,579	19,414
Percent from TBIs	60	55	51
Master's			
Number to Blacks	11,573	11,126	9,754
Number from TBIs	4,563	3,952	3,166
Percent from TBIs	39	36	32
Doctorates			
Number to Blacks	569	645	613
Number from TBIs	50	50	69
Percent from TBIs	13	8	11
First-professional			
Number to Blacks	1,343	1,472	1,646
Number from TBIs	544	601	622
Percent from TBIs	41	41	38

*Associate degree awards are not included in this analysis as the TBIs confer only a small percent of the sub-baccalaureate degrees awarded to Blacks.

Source: Susan Hill, *The traditionally Black institutions of higher education, 1860 to 1982*. Washington, DC: National Center for Education Statistics.

Of greater interest is the trend in graduate degrees. Overall, there was a 16 percent decrease in graduate degrees awarded to Black students from 1976 to 1981; however, the decrease among TBIs (31 percent) was nearly twice the rate for all graduate degrees awarded to Black students. Moreover, the proportional representation of degrees awarded by TBIs as a fraction of all graduate degrees awarded to Black students fell by 7 percent over the five-year period.

In actual numbers and proportions, awards were up for doctorate and first professional degrees. However, Table 30 shows that the fraction of doctoral and first professional degrees awarded by TBIs fell slightly from 1976 to 1981.

The graduate degrees from TBIs follow the current trend in certain disciplines: Fewer degrees are being awarded in the social sciences and education; more degrees are being awarded in business, engineering, and the health professions.

In sum, although there is a general decline in enrollment and degree awards at TBIs, their overall production of degrees among Black students indicates that their role is still crucial to the attraction, retention, and degree attainment of Black students in higher education: In 1981, 84 TBIs produced more Black baccalaureates than did all of the other 673 institutions in TBI states (Hill, 1985).

[3]TBI states include: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia.

Research Agenda

This section describes what is currently known about the status of minorities in the higher education pipeline. The findings suggest a number of questions that could be profitably explored using more current data on minority progress in higher education. For example, the fifth follow-up of the NLS-72 survey could provide important information about the post-baccalaureate educational and occupational careers of minority students. The High School and Beyond survey augments these data by providing information on current trends, a critical issue in future research on minorities, owing to the downward trends in enrollment and growing shifts in career-field choices. Of particular interest are the following questions:

1. Are minority baccalaureate-degree recipients and potential graduate students being closed out of graduate school, or are they opting for other stimulating and, perhaps, more lucrative fields?
2. Why are minority students more likely than White students to "stop out" for several years before entering graduate school?
3. What are the implications of part-time vs. full-time study for access, enrollment, and the progression of minorities at all education levels, but particularly undergraduate school?

The data suggest that graduate business schools may have practical advantages over other graduate (and professional) schools:

4. What are the specific ways in which schools of business and other graduate schools complement or compete with the effort to combine work and the attainment of advanced degrees?

An important research consideration in the study of non-Asian-American minorities is to examine family traditions in educational experiences. In particular, it is important to distinguish between students who are from families with first- and second-generation college graduates.

5. What are the implications of being a first-, second-, third-generation college graduate for persisting in the graduate education pipeline?
6. What are the implications of an educational tradition or nontradition for graduate/professional career choices?

Other issues are related to institutional factors:

7. What are the long-term implications of declining enrollments in TBIs for graduate school enrollments, retention, and degree attainment?
8. Is there an association between the percentage of minorities on the faculty and enrollment and retention in graduate school? Does this association vary by field?

Because TBIs have historically emphasized education, and still do even though this function has diminished over time:

9. Is there an association between enrollment in TBIs and curriculum choices relevant to graduate study such as the humanities and physical sciences?
10. Are minority graduate enrollments hit particularly hard in departments (also in non-TBIs) that offer a master's as the terminal degree?

Limitations of a Study of Minorities:

In a study of minority graduate issues, longitudinal analyses are required to determine barriers to minority access to graduate education, particularly in the undergraduate-to-graduate transition. There are several problems one encounters when studying non-Asian-American minorities:

- The problem of sample size is still paramount for Hispanic students. Their numbers are often too small for meaningful interpretation of the findings. Similar problems occur for Black students and other minorities when one tries to interpret curriculum areas where their numbers are too small to evaluate.
- A large minority sample size is critical for another reason. Non-Asian-American minorities have significantly higher non-response rates on items that request voluntary responses (i.e., attitudinal and personal issues), thus further reducing the sample.
- The actual size of the minority talent pool is difficult to assess because there are no complete data on the number of minority students who do not take the GRE, Miller's analogy, or other graduate aptitude tests.

The level of aggregating data, generally because of sample size, may also create problems and obscure important differences within groups:

- The tendency to aggregate minorities into racial/ethnic groups, ignoring sex differences, could have implications for a study of enrollment, persistence, and degree attainment, particularly among Black students, where there are changing gender-differences in these behaviors. The differences that are obscured may well vary by group as well as by the stage in the education pipeline.
- Because of the recent influx of first-generation Asian-American students into the U.S. postsecondary and higher education system, should we distinguish Asian-American (and Hispanic) students by this factor? Is language a serious barrier to the graduate education of some Hispanic and Asian-American students?

While the issues raised here are not meant to be exhaustive, they do represent important factors that may provide answers to questions concerning the lack of real progress in attracting and retaining minorities in graduate education.

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