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ABSTRACT

This statistical review, the third in a biennial series mandated by Public Law 96-516, provides a comprehensive overview of the participation of women and minorities and the physically handicapped in science and engineering (S/E). To provide perspective, both long term (1976-1984) and short term (1982-1984) trends are presented. The report consists of three chapters. The first chapter examines the representation and utilization of women in S/E, considering employment levels and trends, field, experience, career patterns, and labor market conditions. The second chapter presents similar information for Blacks, Asians, Native Americans, Hispanics, and the physically handicapped in S/E. The third chapter examines the acquisition of scientific and engineering skills of women and minorities and highlights differences with men and the majority in achievement, test performance, academic coursework, and degree production. An appendix includes 55 statistical tables. One finding noted is that the employment of women scientists and engineers increased by 157 percent between 1976 and 1984, compared with about 63 percent for men. No recommendations on programs or policies are offered, since, in conformance with the legislation, the report serves as an information source for policymakers and others interested in this area. (JN)

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Foreword

Women and members of minority groups have historically had low rates of participation in science and engineering. This fact is a cause for concern. The importance of scientific and engineering activities to the United States makes it essential that the best talent be attracted from every available pool.

An accurate assessment of the current situation and recent trends with respect to the participation of women and minorities in science and engineering is necessary for rational and effective policy formulation. This volume is the third biennial report in this series. It is designed to provide a factual basis for informed discussion and constructive policy and program development.

I hope that the data presented will help provide information needed by the Congress and by others who are concerned with the vitality of the U.S. science and technology enterprise and the furtherance of equal opportunities for women and minorities in science and engineering.

Erich Bloch
Director
National Science Foundation

Acknowledgments

This report was developed within the Division of Science Resources Studies, Scientific and Technical Personnel Studies Section, by Michael F. Crowley, Study Director, Demographic Studies Group; and Melissa J. Lane, Economist, Demographic Studies Group. The report benefitted from comments provided by external reviewers and the National Science Foundation's Committee on Equal Opportunities in Science and Technology. Guidance and review were provided by Charles H. Dickens, Head, Scientific and Technical Personnel Studies Section; William L. Stewart, Acting Director, Division of Science Resources Studies; and Richard J. Green, Assistant Director of the NSF for Scientific, Technological, and International Affairs.

Contents

Executive Summary

This report is the third in a biennial series required by the Science and Technology Equal Opportunities Act (Public Law 96-516). It presents information on the participation of women, racial/ethnic minorities, and physically handicapped persons in science and engineering. Since, in conformance with the legislation, the purpose of this report is to serve as an information resource, it offers no recommendations on programs or policies. Rather, it presents information that may be used to address issues of interest to policymakers and others concerned with the full use of the Nation's human resources in science and engineering. The focus of this report is the status of women and minorities in science and engineering. To provide perspective, both long term (1976-84) and short term (1982-84) trends are presented.

Women and most minority groups remain underrepresented in science and engineering (S/E) employment and training, but they have made substantial gains since the early to mid-seventies. This general underrepresentation of women and minorities reflects the fact that, historically, their participation in precollege science and mathematics courses and in undergraduate and graduate S/E education is below that of men and the majority. Those women and minorities who earn degrees in science and engineering fields generally have higher rates of unemployment and earn lower salaries than do their male and majority counterparts. Differences in labor market experiences between women and men, however, are generally greater than those between minorities and the majority. These and other differences noted in the text may reflect differences in sociodemographic characteristics, differences in career preferences, or a combination of such factors. Differences between women and men and between minorities and the majority may also reflect inequitable treatment.

Two major themes emerge from the data and analyses in this report. For women, concern is shifting from access to science and engineering education to equal treatment in the labor market. Evidence for this shift includes the increasing participation of women in mathematics and science coursework at the precollege level, and the increasing share of degrees they earn in S/E fields. For minorities, the fundamental concern continues to be the overall quality of their precollege experiences. They participate less frequently in academic programs and advanced mathematics and science courses—necessary precursors to careers in science and engineering.

Once women have earned degrees in science and engineering, they are more likely than are their male colleagues to be unemployed and, if employed, less likely to work in S/E jobs. In addition, salaries for women scientists and engineers average about 71 percent of those for their male colleagues.

Most minorities are less likely than whites to be in an academic curriculum while in high school, and less likely to take advanced mathematics courses such as Calculus. These and other differences are reflected in scores on the Scholastic Aptitude Test (SAT). Whites and Asian-Americans scored consistently higher than blacks, Hispanics, and native Americans on the SAT over the 1976-84 period, with the largest differentials on the mathematics component of the test.

The major findings of this report on women, racial minorities, Hispanics, and physically handicapped persons are summarized below.

WOMEN

Employment

- Employment of women scientists and engineers increased by 157 percent between 1976 and 1984, compared with about 63 percent for men. As a result, in 1984, women accounted for 13 percent of the S/E work force, up from 9 percent in 1976 and 12 percent in 1982. However, this level was still considerably lower than women's representation among aggregate groups: they represented about 45 percent of all employed persons, and almost one-half of those in professional and related occupations.

- Representation of women varies substantially by field. In 1984, for example, 1 in every 4 scientists, but fewer than 1 in every 20 engineers, was a woman. Within the sciences, the representation of women ranged from 11 percent of environmental and physical scientists to more than 40 percent of psychologists. While there have been notable recent increases in the proportion of degrees granted to women in engineering and some science fields, the actual numbers awarded have been small. As such, these increases are unlikely to change the proportions of women in the S/E labor force in the near future.

- Reflecting their more rapid increase in employment, three-fifths of the women, compared to roughly one-quarter of the men, had less than 10 years of professional work experience in 1984. Years of experience can impact on a number of career-related activities such as holding management positions or, if in academia, tenure status and rank.

- Women are less likely than men to cite management or administration as their primary activity (18 percent vs. 30 percent). Within educational institutions, women are less likely than men to hold tenure or be in tenure-track positions.

- Annual salaries for women averaged about 71 percent of those for men in 1984, down from 75 percent in 1982. The widening gap between female and male salaries reflects, in part, both the relatively large influx of women into the S/E work force in recent years and the relatively large number of women in the life sciences and psychology, fields where salaries are relatively low regardless of gender. Salaries for women, however, were below those for men across all fields and all levels of experience.

- About 77 percent of the employed women scientists and engineers were working in S/E jobs in 1984; the comparable figure for men was about 88 percent. Rates of both women and men were lower than those for 1982 (80 percent and 89 percent, respectively). The rates vary substantially by field, and much of the difference between women and men results from the concentration of women in science fields and men in engineering.

- The unemployment rate for women scientists and engineers was more than twice that for men in 1984 (3.4 percent vs. 1.3 percent). After controlling for field, the rate for women remains more than twice that for men.

- Available data show greater underemployment of women than of men among scientists and engineers. If those who are working involuntarily in either part-time jobs or in non-science and engineering jobs are considered as a proportion of total employment, about 8 percent of the women compared with 2 percent of the men are underemployed.

MINORITY WOMEN

- Of the approximately 512,000 employed women scientists and engineers in 1984, 5 percent were Asian, almost 5 percent were black, and less than 1 percent were native American. Minorities are more highly represented among women scientists and engineers than among men. For example, in 1984, only 2 percent of male scientists and engineers were black.

- Asian women are more highly represented among scientists and engineers than in the general work force. While they account for 5 percent of the women scientists and engineers, they represent only about 2 percent of all women in the U.S. work force. Black women, in contrast, account for 11 percent of all employed women, but only about 5 percent of the scientists and engineers.

- Labor force participation rates for women scientists and engineers show little variation by race. Salaries for Asian women are also above those for either white or black women. The higher salaries for Asian women reflect, in part, their greater number of years of professional experience.

- About 3 percent of all women scientists and engineers in 1984 were Hispanic, as were 5 percent of all employed women in the United States. Hispanics are more highly represented among women than among men scientists and engineers. Roughly 2 percent of male scientists and engineers in 1984 were Hispanic.

Education and Training

- During precollege preparation, females and males are equally likely to be enrolled in academic programs in high school, but males take substantially more courses in mathematics and science. This difference is reflected in part in scores on standardized tests of mathematics and science achievement. While females have slightly higher scores than males at younger ages (9 year olds), males score significantly higher among 17 year olds.

- Scores for females on the mathematics component of the Scholastic Aptitude Test (SAT) are below those for males (449 vs. 495 in 1984). Over the last decade, changes in scores on this component have exhibited similar trends between males and females. After falling steadily during the seventies, scores leveled off and began to rise during the eighties.

- Regardless of gender, the academic preparation of students who choose to major in science or engineering fields is stronger than that of students who choose non-science or engineering fields. Among those who intend to major in science or engineering, females are more likely than males to report a higher grade point average for high school work. For example, among probable engineering majors, roughly 60 percent of the females and 40 percent of the males reported a high school grade point average in the "A" range.

- Graduate Record Examination (GRE) scores of women and men are about the same on the verbal component, but men score substantially higher on the quantitative component and slightly higher on the analytical component.

- Women continued to earn an increasing proportion of S/E bachelor's degrees. They received about 38 percent of the degrees awarded in 1983, up from 26 percent in 1970. By S/E field, the share of degrees awarded to women in 1983 ranged from 53 percent in the social sciences to 13 percent in engineering.

- Between 1970 and 1984, the number of women (4,600) earning S/E doctorates increased by 181 percent. For men, the number (13,500) declined 19 percent. As a result of these changes, women received 25 percent of the S/E doctorates granted in 1984, up from 9 percent in 1970. There were substantial differences. In 1984, women earned 41 percent (2,400) of the doctorates in social science but only 5 percent (150) of those granted in engineering.

RACIAL MINORITIES

Employment

- Since the mid-seventies, employment of both black and Asian scientists and engineers has risen more rapidly than that of whites. More recently (1982-84), employment of blacks, Asians, and native Americans increased more rapidly than did employment of white scientists and engineers.

- In 1984, blacks accounted for about 2 percent of all employed scientists and engineers, but 10 percent of total U.S. employment and more than 6 percent of all professional and related worker employment. Asians, on the other hand, represented almost 5 percent of the employed scientists and engineers but less than 2 percent of the overall U.S. labor force.

- The representation of native Americans among scientists and engineers is roughly equivalent to their proportion in the overall U.S. work force. Data on native Americans, however, should be viewed with caution since they are based on an individual's perception of his or her native American heritage; such perceptions may change over time.

- Racial minorities are concentrated in different S/E fields than are their white colleagues. Two-fifths of the blacks were engineers, as were more than three-fifths of the Asians and more than one-half of the whites. Among scientists, blacks are more likely to be social scientists and psychologists; Asians are least likely to be in these fields.

- Unemployment rates for blacks (2.7 percent), Asians (2 4 percent), and native Americans (3.4 percent) were higher than those for whites (1.5 percent).

- The proportion of employed scientists and engineers who were underemployed ranged from 1.8 percent of the Asians, to 2.5 percent of the whites, and to 6.6 percent of the blacks

- Blacks are as likely as, and native Americans are more likely than, white scientists and engineers to report management or administration as their primary work activity (roughly 30-40 percent). Among Asians, about 20 percent were involved in management or administration.

- Salaries of black scientists and engineers averaged $32,500 per year, roughly $5,000 (about 13 percent) less than whites, Asians, and native Americans. The gap between salaries for blacks and whites remains after controlling for field differences.

Education and Training

- Whites and Asian-Americans scored consistently higher than did blacks and native Americans on the Scholastic Aptitude Test during the 1976-84 period. The largest differentials were on the test's mathematics component. In 1984, blacks scored 114 points lower than whites (373 vs. 487), while scores for native Americans were 60 points lower (427) than whites. These gaps have both narrowed since 1976. Asian-Americans scored consistently higher than did whites on the mathematics component; in 1984, their average score was 519—32 points higher than the score for whites.

- Blacks earned 6 percent of the S/E bachelor's degrees and about 2 percent of the S/E doctorates The share of S/E bachelor's degrees awarded to blacks ranged from 3 percent in engineering to about 8 percent in the social sciences and psychology. Blacks, however, accounted for 10 percent of overall undergraduate enrollments and 5 percent of graduate enrollments. Native Americans earned about 0.4 percent of the S/E bachelor's degrees and accounted for 0.7 percent of the total undergraduate enrollments. Since 1979, there has been little change in the proportions of blacks and native Americans earning science and engineering degrees at all levels.

HISPANICS

Employment

- In 1984, Hispanics represented 5 percent of all employed persons, almost 3 percent of all professional and related workers, and about 2 percent of all scientists and engineers.

- Among Hispanic scientists and engineers, about 55 percent were engineers rather than scientists, similar to the overall engineer-scientist split. Among scientists, Hispanics were somewhat more likely than all scientists to be social scientists.

- Hispanics report average salaries about 12 percent below those reported for all scientists and engineers ($33,100 vs. $37,400). By field, the largest differential was reported for psychologists and social scientists.

- Hispanics are as likely as all scientists and engineers to be in the labor force, but more likely to be unemployed and underemployed. Hispanics are also less likely to hold jobs in science or engineering.

Education and Training

- A smaller proportion of Hispanics than of all high school seniors are in academic programs, and those who are take fewer mathematics and science courses. This difference is reflected in the fact that Hispanic college-bound seniors scored below all college-bound seniors on the mathematics component of the SAT. In 1984, Mexican American scores (376) were 50 points lower and Puerto Rican scores (366) were 60 points lower than scores for all college-bound seniors.

- Hispanics earned about 3.2 percent of S/E bachelor's degrees awarded in 1983, and 1.9 percent of S/E degrees granted at the doctorate level. Since 1979, Hispanics have made proportional gains at all degree levels.

PHYSICALLY HANDICAPPED

- About 92,000 scientists and engineers (2.2 percent) reported a physical handicap in 1984. Of these, 23 percent reported an ambulatory handicap, 22 percent a visual handicap, and about 17 percent an auditory handicap. The remaining 38 percent did not specify the nature of their handicap.

- Scientists and engineers reporting a handicap are much less likely to be in the labor force. About 17 percent of the handicapped, but only 4 percent of all scientists and engineers, were not in the labor force.

- The field distribution of the 75,000 employed scientists and engineers reporting a handicap showed some differences from that of all scientists and engineers. Those with a handicap were more likely to be scientists than engineers.

- Physically handicapped scientists and engineers report an unemployment rate roughly similar to that reported for the total (2.0 percent vs. 1.6 percent), and are about as likely to hold jobs in science or engineering fields.

Introduction

This report provides a comprehensive overview of the participation of women, minorities (including Hispanics), and the physically handicapped in science and engineering employment and training. This Congressionally mandated report (Public Law 96-516) is the third in a biennial series on women and minorities in science and engineering. The legislation underlying this report reflects Congressional concern that inadequate levels of participation by these groups in science and engineering may result in underutilization of scarce human resources.

The report has been designed as a reference document and allows the reader to easily locate information on particular subgroups or on specific aspects of participation or utilization. Readers preferring a more concise overview of the findings are encouraged to read the Executive Summary.

Issues relating to employment focus on (1) the representation of women and minorities in S/E employment, (2) differences in employment characteristics between sexes and across minority groups, independent of overall employment levels, and (3) measures that indicate underutilization of those with S/E skills.

Representation in the labor market may be assessed by comparing the proportion of employed scientists and engineers who are women and members of minority groups with the proportion of these groups in some relevant population, such as overall U.S. employment or all professional and related workers. The level of representation, however, reveals nothing about the experiences of women and minorities once they are in the labor market.

Labor market experiences are examined in terms of field of employment and career patterns. Information on field of employment is valuable for at least two reasons. (1) it indicates whether women and minorities are underrepresented in some fields vis-a-vis men and the majority, (2) it reveals field differences by sex and racial/ethnic group. Since employment opportunities vary by field, field differences may be significant in determining differences in work characteristics, including employment in S/E jobs, unemployment, and salaries—characteristics that are frequently used as indicators of labor market experiences. Measures such as proportions in management positions and, for those employed in academia, tenure status and rank may be indicators of career development.

Insights into potential underutilization may be gleaned from a variety of labor market indicators. Labor force participation and unemployment rates are standard indicators and are useful in assessing whether market conditions for women and minorities differ from those for men and the majority.

Labor force participation rates measure the fraction of the S/E population in the labor force—that is, working or seeking employment. Low rates suggest that a significant fraction of those with S/E training and skills are not using their skills in science or engineering or any other jobs.

Unemployment rates measure the proportion of those in the labor force who are not employed but who are seeking employment. Higher rates for women and minorities may signify that these groups face labor market problems diffferent from those of men and the majority in the S/E work force. Unemployment rates, however, are incomplete indicators of market conditions for scientists and engineers. They do not indicate the degree to which those with the necessary education and training are successful in finding jobs in science and engineering.

In addition to the standard labor market indicators, the National Science Foundation has developed three measures unique to scientists and engineers: the S/E employment rate, the S/E underemployment rate, and the S/E underutilization rate.

The S/E employment rate has been developed to better assess the market conditions for scientists and engineers performing S/E work. This rate measures the degree to which employed scientists and engineers have jobs in science and engineering fields.

The S/E underemployment rate indicates the extent to which scientists and engineers use their training and skills. It provides an overall statistical measure of both involuntary part-time and involuntary non-S/E employment. When full-time jobs are not available, individuals may accept part-time jobs. When jobs in science and engineering are not available, some scientists and engineers accept jobs in other areas. Thus, some part-time employment (e.g., working part-time but seeking full-time employment) may indicate underemployment, as would working in a non-S/E job when S/E work is preferred.

The S/E underutilization rate combines numbers of both the unemployed and the underemployed, and presents them as a percent of the labor force. This rate is only a partial measure of potential underutilization since it does not account for those who may have greater S/E skills than jobs require.

Observed differences in labor market experiences between women and men and between minorities and the majority may highlight potential areas of concern. Although disparities may indicate inequitable treatment, by themselves they would not be sufficient to justify an inference of inequity. Differences may reflect (1) differences in field and work experience; (2) differences in workers' decisions about the nature of their work involvement, (3) differences in employer personnel practices in areas such as hiring, training, and promotion, and (4) a combination of such factors which include, or are byproducts of, inequitable treatment.

Issues relating to training focus on the acquisition of those skills that are a necessary precursor to a career in science or engineering. Not every individual acquiring the necessary skills, however, will choose a career in science or engineering. This report presents information on precollege mathematics and science education, coursework, and performance on tests such as the Scholastic Aptitude Test (SAT), where a "low" score may limit a student's entry into a science or engineering field at the undergraduate level. Information also is presented on the quality of potential S/E graduate students and patterns of degree production and graduate support.

Much of the information presented in this report is derived from sample surveys and is therefore subject to sampling limitations and to incomplete or inaccurate responses. Because of the relatively small number of women and minorities in the sample surveys, data for these groups are not as statistically reliable as those for men and whites. However, any comparisons between women and men and between minorities and the majority that are made in this report generally are statistically significant at the 0.05 level, that is, the reported difference is due to chance only 5 or fewer times in 100. Presenting data first for women rather than for minorities reflects only the availability of more statistically reliable data for women.

In developing the surveys underlying the employment and labor market data on scientists and engineers, the National Science Foundation emphasized increasing sample sizes for women and minorities. The first set of preliminary estimates based on the increased samples for women and minorities was developed for 1982 and presented in the previous report. Because the data previously presented for 1982 were preliminary, readers are cautioned against comparing information in this report with that in previous reports in the series. Where possible, historical comparisons (1976-84) are presented in this volume and the statistics underlying the comparisons are contained in the appendix tables to the report. Generally, 1976 is the earliest year in which reliable and consistent data on a variety of topics are available for women and minorities in science and engineering.

Information pertaining to the statistical reliability of much of the report's data may be found in the Technical Notes. Some differences do exist in concepts, data collection techniques, and reporting procedures among statistics presented. Primary data sources listed in the references, Technical Notes, and statistical tables provide full information on these technical aspects and on the limitations of the statistics.

This report is organized into three chapters. The first chapter examines the representation and utilization of women in science and engineering. The second chapter presents similar information for minorities, including physically handicapped persons. The third chapter examines the acquisition of scientific and engineering skills of women and minorities and highlights differences with men and the majority in achievement test performance, academic coursework, and degree production.

Women in Science and Engineering

OVERVIEW

Women, compared to their representation in the U.S work force, are underrepresented in science and engineering employment. The 512,000 women scientists and engineers employed in 1984 represented about 13 percent of all scientists and engineers, up from 9 percent in 1976. Women, however, constitute almost one-half of overall U.S employment.

The underrepresentation of women is not uniform between scientists and engineers. Women account for almost 25 percent of scientists, but only 3 percent of engineers The underrepresentation of women among employed scientists and engineers persists despite significant gains since the mid-seventies. Between 1976 and 1984, employment of women rose 157 percent, while the increase for men was 63 percent.

Although there has been dramatic growth in the employment of women scientists and engineers, they are still more likely than men to be both unemployed and underemployed. The unemployment rate for women scientists and engineers in 1984 (3.4 percent) was substantially higher than that for men (1.3 percent). Women were also about four times as likely as men to report that they were underemployed (8 percent vs. 2 percent), that is, working part-time when full-time work is preferred, or working in a non-S/E job involuntarily.

Because of the more rapid increase in the employment of women, they are generally younger than their male colleagues and have fewer years of professional experience. In 1984, 60 percent of the women and 27 percent of the men reported fewer than 10 years of experience. Years of experience may affect a number of labor market variables. For example, women are less likely than men to hold management positions and those in academia are less likely to hold tenure or be in tenure-track positions. Women also report salaries below those for men, with the smallest difference among those with less than 10 years of experience.

Minorities constitute a small share of women scientists and engineers. In 1984, about 5 percent were Asian, almost 5 percent were black, and less than 1 percent were native American. Only Asian women are more highly represented among scientists and engineers than they are in the general work force. Minorities, however, are more highly represented among women than among men scientists and engineers. In 1984, Hispanics represented about 3 percent of the women scientists and engineers. As with racial minorities, Hispanics are more highly represented among women than among men scientists and engineers.

Employment Levels and Trends

Despite significant employment gains since the mid-seventies, women remain underrepresented in science and engineering. In 1984, women represented 13 percent of all employed scientists and engineers, but about 44 percent of all employed persons and almost one half (49 percent) of those in professional occupations.[1] Between 1976—when women constituted almost 9 percent of the scientists and engineers—and 1984, employment of women scientists and engineers grew by 157 percent compared to a 63 percent increase for men. Employment increases for both women and men scientists and engineers greatly surpassed employment growth in the general work force. The number of women in all occupations increased by 29 percent between 1976 and 1984, compared with about 11 percent for men.[2]

Over the more recent past (1982-84), employment of women scientists and engineers continued to increase more than that of men. Between 1982 and 1984, the number of women scientists and engineers increased at an annual rate of roughly 15 percent compared to about 10 percent for men. During the 1976-82 period, employment of women rose at an annual rate of almost 12 percent versus 5 percent for men.

Employment of doctoral scientists and engineers has been increasing more rapidly among women than men. Between 1973 and 1983, the number of employed women doctoral scientists and engineers showed a gain of 188 percent; for men, the increase was 58 percent. In 1983, women represented about 13 percent of all doctoral scientists and engineers, up from 8 percent in 1973.

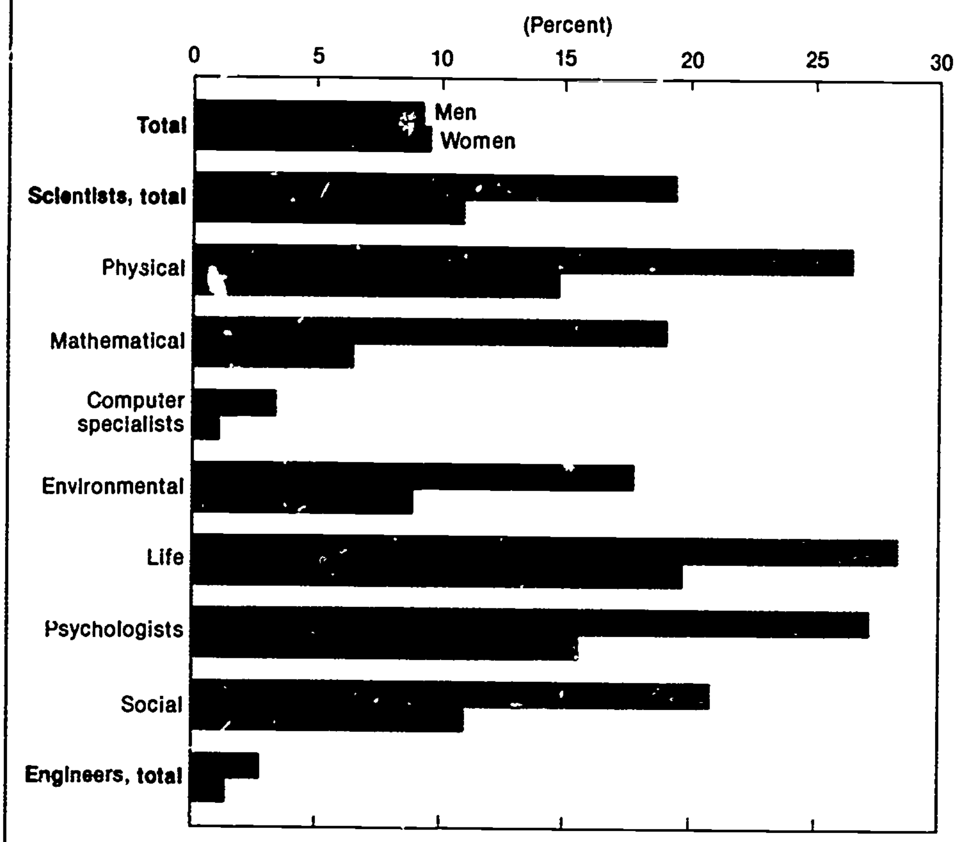
About 11 percent of employed women scientists hold doctorates, for men the comparable figure is 19 percent. Differences by gender in the propensity to attain doctorates vary by field, with the largest differences found among mathematical and environmental scientists. Compared to the sciences, relatively few men or women hold doctorates in engineering (figure 1-1).

Field

Women's representation in science and engineering varies considerably by field.[1] In 1984, women constituted 25 percent of all employed scientists, but only 3 percent of engineers Among scientists, the representation of women ranged from 42 percent of all psychologists to about 11 percent of environmental and physical scientists (figure 1-2).

Since the mid-seventies, the field distribution of employed women scientists and engineers has changed, reflecting differing growth patterns across fields of science and engineering. The most notable changes were observed for computer specialists, engineers, and social scientists. Between 1976 and 1984, employment of women computer specialists increased by about 450 percent, in 1984, 22 percent of women scientists and engineers were computer specialists, up from 10 percent in 1976. The number of women in engineering grew by almost

Figure 1-1. Proportion of employed scientists and engineers with doctorates by field and sex: 1984



SOURCES: Based on appendix tables 1 & 4.

250 percent, and the proportions of women who are engineers rose from 11 percent to almost 15 percent. Relatively slow growth was noted among women social scientists. During the 1976-84 period, employment of women social scientists increased by 63 percent, much less than the overall growth for women in all S/E fields. As a result of this relatively slow growth, the proportion who were social scientists declined from 28 percent to 18 percent.

Figure 1-3 shows the field distribution of employed female and male scientists and engineers. An "index of dissimilarity," which is a summary measure of overall differences between two distributions, may be used to quantify field differences between women and men.[4] In 1984, the index of dissimilarity between male and female scientists and engineers was 49. This statistic means that 49 percent of the women would have to change fields or occupations to have a distribution identical to that for men. If engineers are eliminated from the analysis, the difference narrows and the index falls from 49 to 25. Overall, the dissimilarity index has remained relatively constant since 1976.

While employment of doctoral women increased, substantial variability occurred among all S/E fields. The fields with the greatest relative growth of women doctorates were engineering, where employment of women increased from 100 in 1973 to 1,100 in 1983, and computer specialties, where employment increased from 100 to 1,300 during the same period. Despite rapid growth in these fields, only about 2 to 3 percent of the women holding doctorates were computer specialists or engineers in 1983. More than 80 percent of the increase in the employment of women doctoral scientists and engineers took place in three major fields. life sciences, social sciences, and psychology. The field distribution of women with doctorates, however, did not change greatly over the 1973-83 period. Women were somewhat more likely to be social scientists or computer specialists and less likely to be mathematical or physical scientists in 1983 than a decade earlier.

Field distribution differences between the sexes for doctoral scientists (excluding engineers) were larger than the differences for scientists at all educational levels. The index of dissimilarity for doctoral scientists was 29, compared with 25 for those at all degree levels.

Experience

The likelihood of holding management assignments or academic tenure status and rank may reflect many labor market related factors, including years of professional experience. Women scientists and engineers are generally younger than their male counterparts and thus have fewer years of professional experience. In 1984, about 60 percent of employed women scientists and engineers reported less than 10 years of professional experience and about 40 percent reported less than 5 years. For men, the comparable figures were 27 percent and 14 percent, respectively.

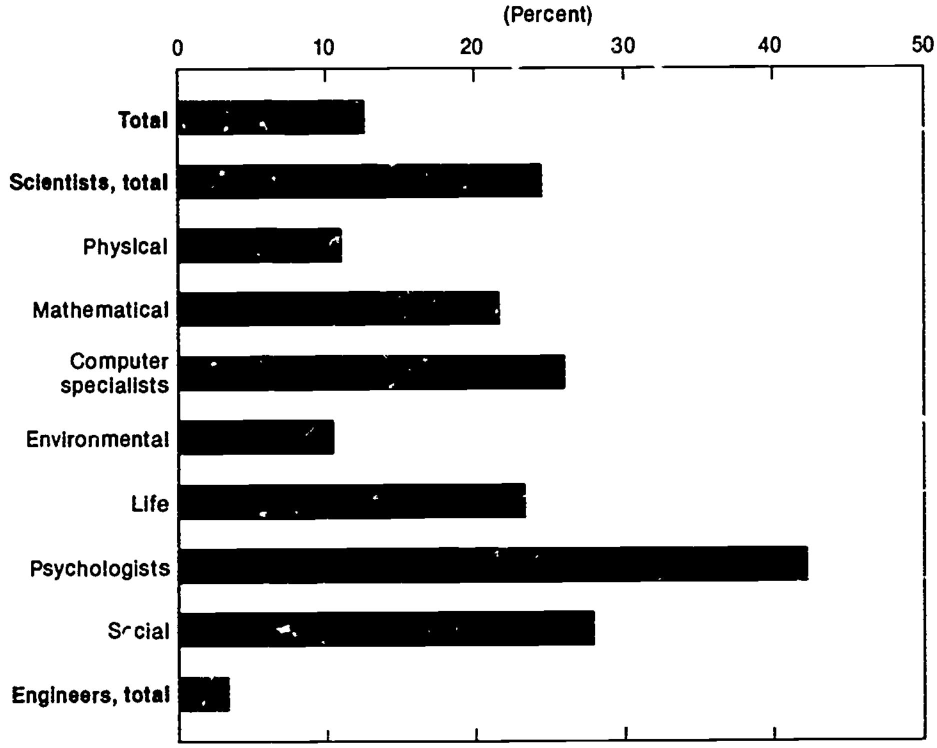
Years of professional experience for both men and women at all degree levels vary across science and engineering fields. These variations reflect not only differential growth rates by field, but also the movement of women into fields historically dominated by men. For example, 23 percent of the male engineers reported fewer than 10 years of experience, among women engineers, the comparable figure was about 72 percent (figure 1-4).

Women at the doctoral level also report fewer years of professional experience than men.[5] In 1983, about 43 percent of the women but only 24 percent of the men had less than 10 years of professional experience. In addition, more than twice as many women as men, proportionally, had less than five years of professional experience (18 percent vs. 9 percent).

Career Patterns

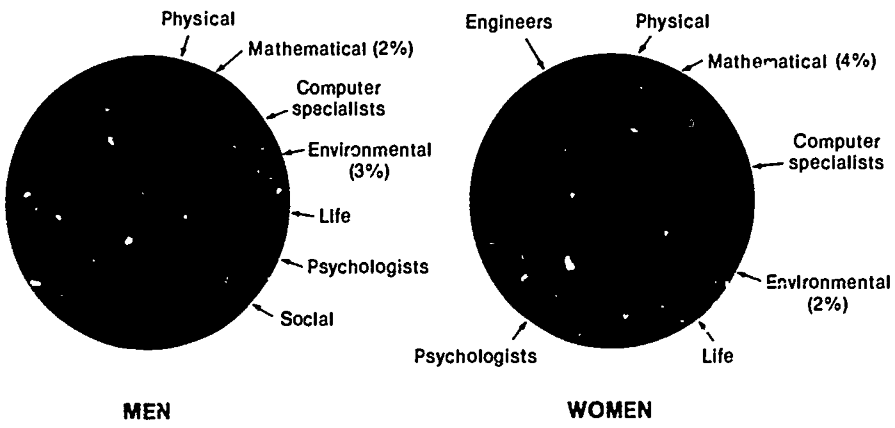
Direct indicators of career development for scientists and engineers are not

Figure 1-2. Women as a percent of total science and engineering employment: 1984



SOURCE. Based on appendix table 1.

Figure 1-3. Employed scientists and engineers by field and sex: 1984



SOURCE: Based on appendix table 1

available. However, information on specific career-related activities, such as the number and proportion of women primarily in management activities, is available. For those in academia, tenure status and faculty rank may be used as indicators of career progression.

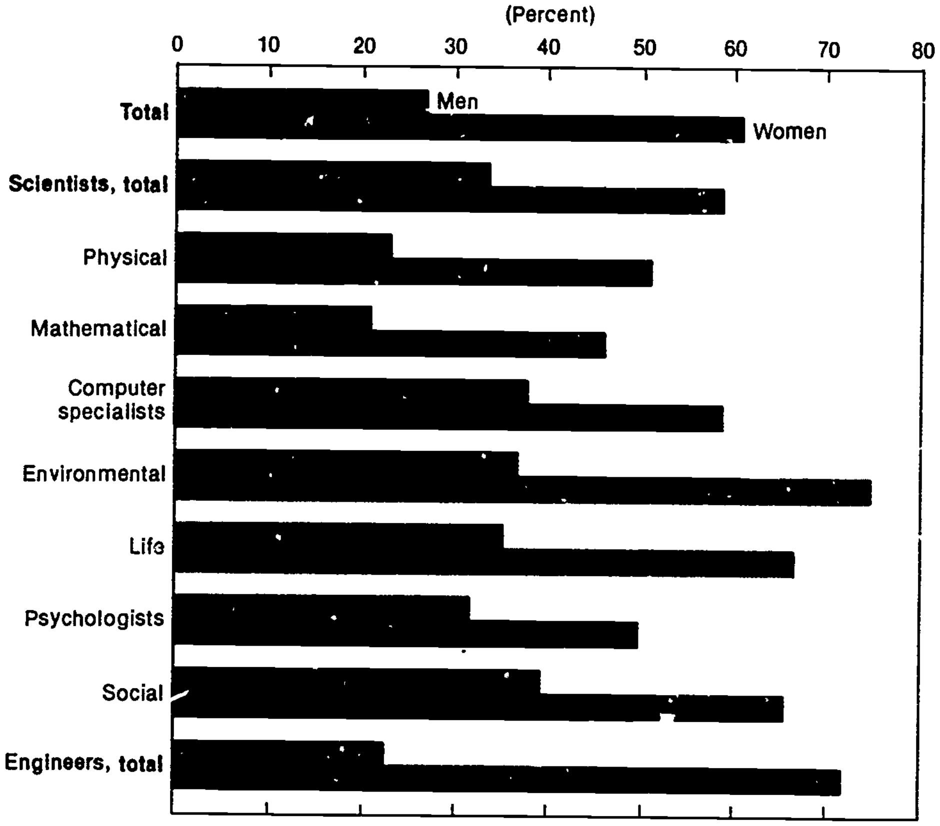
Men are more likely than women to report management as their primary activity. In 1984, 30 percent of the men and 18 percent of the women reported management as their major activity. Between 1976 and 1982, the proportion of both women and men scientists and engineers in management declined, but by 1984 had recovered to 1976 levels.

Involvement in management in 1984 varied by field and between scientists and engineers, with men more likely than women to be in management across most major fields. Among scientists, 19 percent of the women and 28 percent of the men were managers or administrators. For engineers, the comparable figures were 15 percent for women and 32 percent for men.

Women scientists and engineers are less likely than their male colleagues to work in industry, and more likely to work in educational institutions. This sectoral distribution affects both work activities, such as the propensity to be in management, and salary levels. In 1984, about 45 percent of women worked in industry and 26 percent were employed by educational institutions; for men, the comparable figures were 65 percent and 12 percent. Since 1976, the number of women employed in industry increased more than four times as rapidly as that for men (259 percent vs. 63 percent, respectively). There is relatively little variation by field in the proportion of women and men employed by industry. Among engineers, for example, 78 percent of the women and 75 percent of the men were in industry. For scientists, the proportions were 45 percent for women and 48 percent for men.

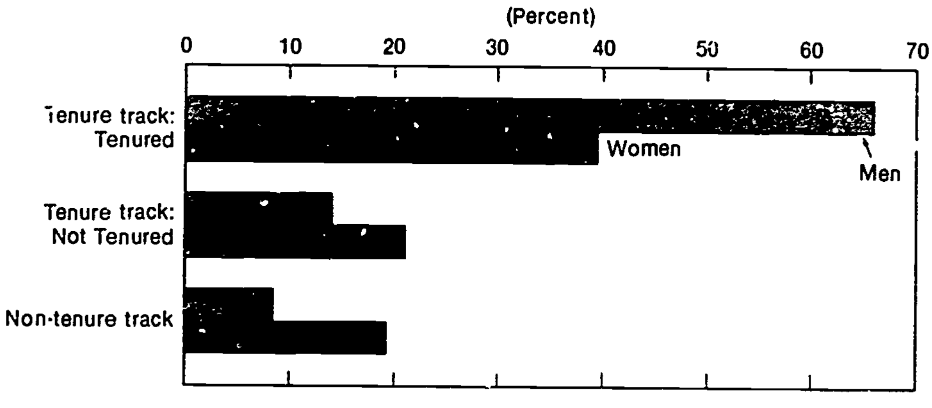
In academia, a smaller proportion of doctoral women scientists and engineers hold tenure or are in tenure-track positions (figure 1-5). However, the number of women holding tenure is increasing more rapidly than the number of men. Between 1981 and 1983, the number of women with tenure grew by 21 percent, while the increase for men was 5 percent. In addition, women are less likely than men to hold professorial rank (i.e., professor, associate, or assistant professor). In 1983, 89 percent of the women held professorial rank; for men, the comparable figure was 97 percent. Among those with rank, men were more than twice as likely as women to be full professors (50 percent vs. 21 percent).

Figure 1-4. Proportion of scientists and engineers with less than ten years of professional experience by field and sex: 1984



SOURCES. Based on appendix tables 9 & 10.

Figure 1-5. Doctoral scientists and engineers in four year colleges and universities by tenure status and sex: 1983



SOURCES: Based on appendix tables 21 & 22.

However, the number of women who are full professors increased more than twice as rapidly as that of men between 1981 and 1983 (20 percent vs. 9 perce '). Differences between women and me in tenure status and rank are not explained by field differences. Differences by gender in rank and tenure status persist across all major S/E fields (appendix tables 21, 22, 24, and 25).

Labor Market Indicators

Labor market indicators,[6] such as labor force participation and unemployment rates, are useful in assessing relative market conditions (i.e., employment relative to available supply) for scientists and engineers. Disparities in labor market variables between women and men scientists and engineers may reflect differences in labor market behavior, in demographic characteristics, in behavior of employers, or combinations of these factors.

Women and men scientists and engineers are equally likely to be in the labor force; that is, working or seeking employment. In 1984, about 94 percent of the women and 96 percent of the men scientists and engineers were in the labor force. Since the mid-seventies, the labor force participation rate of women has increased from 90 percent while that of men has been constant. Labor force participation rates for both men and women scientists and engineers vary in a fairly narrow range by field (appendix table 26). Rates for scientists and engineers are higher than those for the general population and the college-educated population. Overall, about 54 percent of all women and 72 percent of all college-educated women were in the labor force in 1984.[7] For men, the comparable figures were 76 percent and 89 percent, respectively.[8]

Among doctoral scientists and engineers, women are less likely than men to be employed or seeking employment. In 1983, the labor force participation rate for doctoral women was 92 percent, slightly below the 95 percent rate for men (appendix table 27). Although rates do vary by field, the rates for women in all science fields were lower than those for men; in engineering, the rates were essentially the same.

Labor force participation rates for recent female S/E graduates (excluding full-time graduate students) are generally lower than the rates for recent male graduates. Among recent graduates at both the bachelor's and master's degree levels, the labor force participation rates for women (94 percent) were below those for men (98 percent) when measured in 1984.

Although there is relatively little difference in labor force participation rates between women and men scientists and engineers, women and men cite different reasons for not being in the labor force. Men are much more likely than women to report they are retired (74 percent vs 15 percent); women are much more likely to cite family responsibilities (31 percent vs less than 1 percent) By way of comparison, about 64 percent of all women not in the labor force reported family responsibilities as the major reason for not seeking work.[9]

The effect of children on the labor force participation rate of women scientists and engineers is much less than among all women in the United States.[10] The labor force participation rate for women in the U S. with children 6 to 17 years of age was 63 percent. For those with children under 6 years of age, the rate was 48 percent.[11] In 1984, female scientists and engineers with children 6-17 years of age reported a rate of 89 percent, while the rate for those with children under 6 years of age was almost 92 percent.

Although women scientists and engineers are about as likely as men to be in the labor force, they are more likely than men to be unemployed. The unemployment rate for women scientists and engineers in 1984 was 3.4 percent, substantially above the 1 3 percent rate for men. Unemployment rates for both sexes have declined since the mid-seventies, but the gap between female-male unemployment rates has persisted. For example, the unemployment rate for women was 5.4 percent in 1976; for men, it was 3.2 percent. The unemployment rate for women scientists and engineers in 1984 was below that for all women in the U.S. (7.6 percent), but above that for women in professional occupations (2.8 percent)[12] and for all women college graduates (2.7 percent).[13]

Unemployment rates for scientists and engineers vary considerably by field, with the rates for women above those for men across all fields except computer specialties, where they are essentially equal (figure 1-6). Women scientists reported an unemployment rate of 3.5 percent, more than twice that reported for men. With the exception of computer specialists, the smallest rate differential between women and men was found among mathematical scientists while the greatest differences were recorded among environmental scientists. Women engineers had an unemployment rate of 2.9 percent, compared to 1.2 percent for men.

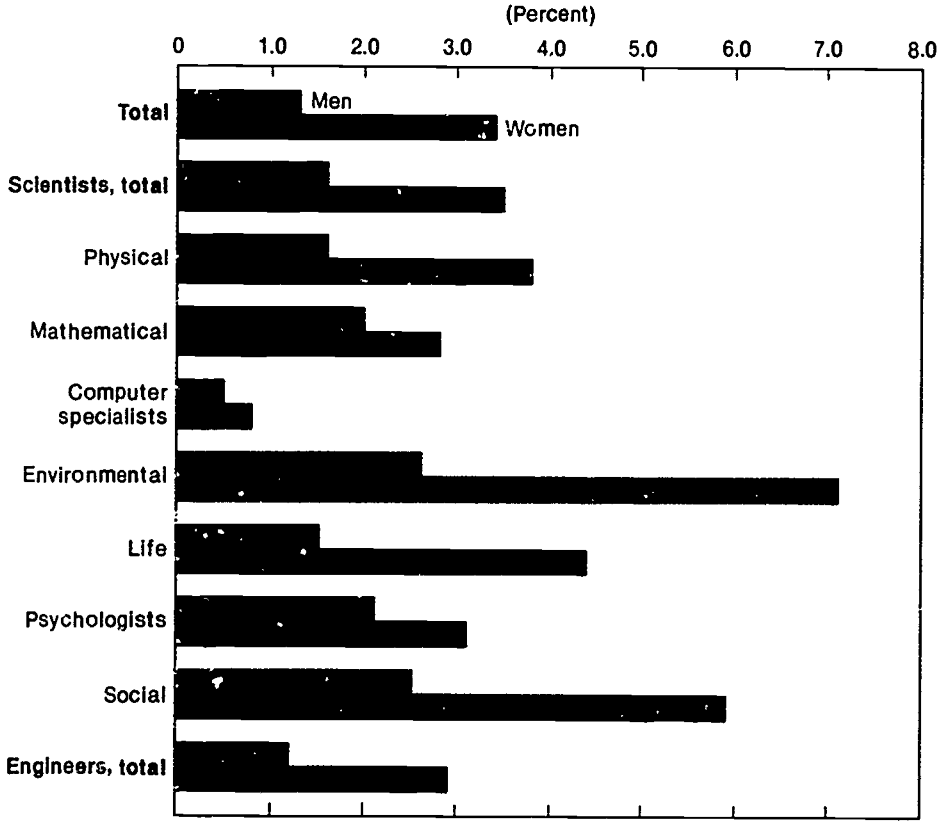
The fact that women and men are concentrated in different fields has little influence on the overall unemployment rate for women scientists and engineers. The rate for women remains more than twice that for men, after controlling for field.

Women also experience more difficulty than men in finding entry-level jobs. For recent (1982 and 1983) S/E graduates at the bachelor's level, 6.8 percent of the women and 4.8 percent of the men were unemployed, with the rates for women above those for men across most major science fields. Among recent S/E master's degree graduates, rates for women and men were roughly similar (3.7 percent vs. 3.4 percent).

Limited research suggests that unemployment rates for female scientists and engineers may be higher than those for their male counterparts because women are more likely to constrain their job search. Such constraining factors include geographic location, family responsibilities, and desire for part-time employment.[14]

Unemployment rates for both female and male scientists and engineers with doctorates are below the rates for those at all degree levels. In 1983, women doctorates reported an unemployment rate (2.5 percent) substantially above that for men (0.7 percent). Although these rates have declined since the early seventies, the rate differential between doctoral men and women persists. In 1973, the unemployment rate for men was 0.9 percent; for women, it was 3.8 percent. In

Figure 1-6. Unemployment rates for scientists and engineers by field and sex: 1984



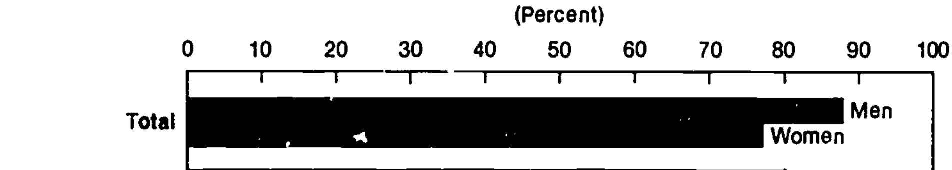
SOURCE: Appendix table 26.

1983, unemployment rates for women generally were higher than for men within fields of science, although in computer specialties, virtually no unemployment existed for either sex. Field, age, race, and family characteristics (i.e., marital status and presence of children) account for only a small proportion of the differences in unemployment rates. When these variables are standardized through multiple regression analysis, about 90 percent of the difference in unemployment rates between women and men remains unexplained.[15]

The S/E employment rate measures the extent to which employed scientists or engineers have a job in science or engineering. Depending on the specific reasons for non-S/E employment, a low S/E employment rate could be an indicator of underutilization. Factors relating to non-S/E employment include lack of available S/E jobs, higher pay for non-S/E employment, location, or preference for a job outside of science or engineering.

Women scientists and engineers are less likely than men to hold jobs in science or engineering (figure 1-7). In 1984, the S/E employment rate for women was 77 percent; for men, it was 88 percent. Rates for both women and men were lower than those in 1982 (80 percent and 89 percent, respectively). The rates vary substantially by field, and much of the difference between women and men results from the concentration of women in science and men in engineering. Engineers of either sex are more likely than scientists to hold S/E jobs, and the rates for men and women engineers were 93 percent and 94 percent, respectively, in 1984. Among scientists, the rate for women was lower than the rate for men (74 percent vs. 80 percent).

Figure 1-7. S/E employment rates by field and sex: 1984



SOURCE: Appendix table 26.

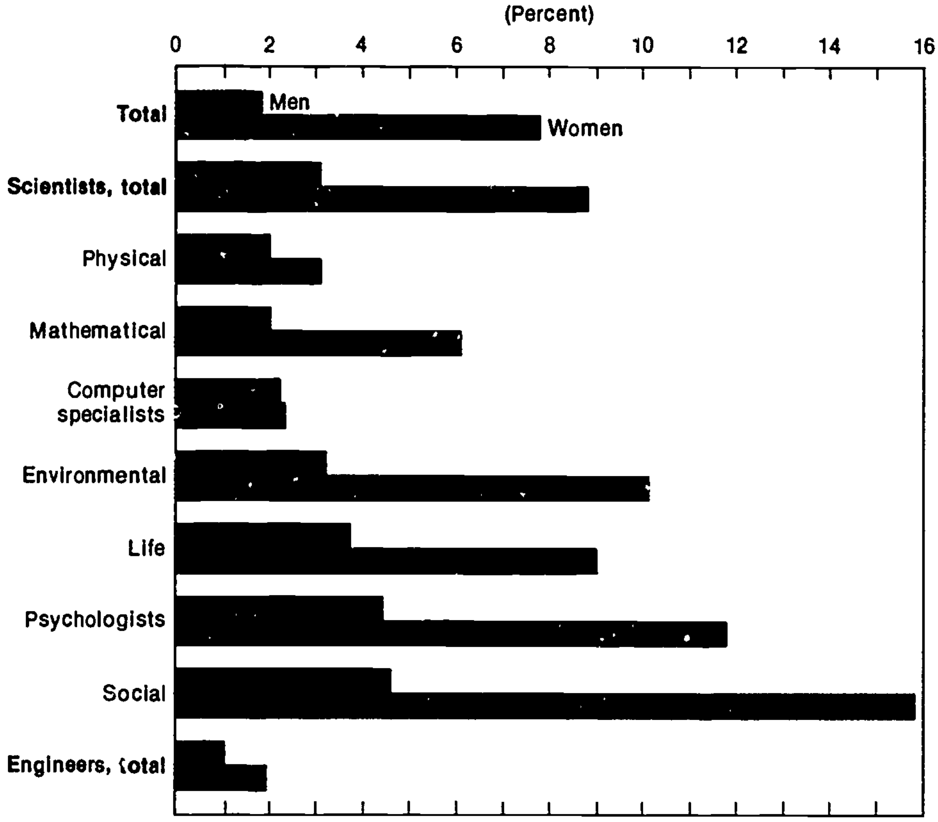
Women and men doctoral scientists and engineers have roughly similar S/E employment rates. In 1983, the rate for women was 87 percent; for men, it was 89 percent. Little variation existed between women and men on a field specific basis. The S/E employment rate for women engineers, however, was higher than the rate for their male colleagues. Since 1973, the S/E employment rate at the doctoral level has declined for both women and men (92 percent and 94 percent, respectively).

The S/E employment rate for women who were recent S/E graduates was below that for men at both the bachelor's and master's levels. Among 1982 and 1983 bachelor's degree recipients, the rate for women in 1984 was about 50 percent; for men, it was 70 percent. On a field-specific ba[illegible]ss variation occurred in the rate[illegible] tween women and men; generally, [illegible]owever, rates for women were lower than those for men. Among engineering and computer science graduates, rates for women and men were high (80 percent to 90 percent) and roughly similar (appendix table 26). The difference in overall S/E employment rates between men and women reflects the fact that relatively more men than women earn degrees in engineering. At the master's level, rates increase for both women and men, but the rate for women remains below that for men (71 percent vs. 85 percent).

Although unemployment rates of women scientists and engineers are relatively low as compared with rates for women in the general population, those who are employed may be underemployed. Working in a non-S/E job or working part-time may indicate underemployment, depending on the reasons for such employment. To help measure the extent of potential underemployment, the S/E underemployment rate has been developed. This rate shows those who are involuntarily working in non-S/E jobs or involuntarily working part-time as a percent of total employment.

Not only are female scientists and engineers more likely than male scientists and engineers to be unemployed, they are also more likely to be underemployed. The S/E underemployment rate for women in 1984 was about 8 percent, compared with almost 2 percent for men (figure 1-8). Part of this difference can be traced to the general concentration of women in science fields where underemployment is greater than

Figure 1-8. Underemployment for scientists and engineers by field and sex: 1984



SOURCE Appendix table 26

in engineering. Among engineers, underemployment for men and women ranged from 1 to 2 percent. Among scientists, however, women were three times as likely as men to be underemployed (9 percent vs. 3 percent). Underemployment rates for women were higher than those for men within all science fields with the exception of computer specialties where the rates were essentially equal (about 2 percent). Among doctoral scientists and engineers, underemployment rates are relatively low for both women (2.5 percent) and men (1.2 percent) (appendix table 27).

To derive a more comprehensive indicator of potential underutilization, figures for those who are unemployed and those who are underemployed may be combined and expressed as a percent of the labor force. It is only a partial measure, however, since it does not take into account the number of scientists and engineers who may have jobs requiring skills below those that the job holders actually possess. The underutilization rate for women scientists and engineers in 1984 was 11 percent; for men, it was 3 percent. The rates for women were above those for men across all major fields with the exception of computer specialties, where they were about equal (3 percent). Female doctoral scientists and engineers are also more likely than men to report that they are underutilized. In 1983, the underutilization rate for doctoral women was 6 percent, about three times the approximately 2 percent rate for their male colleagues. Underutilization rates for women were above those for men within all major fields.

Female scientists and engineers, on the average, earn lower salaries than their male colleagues. These differences may reflect variations in field, education, experience, labor market behavior, employer, or some combination of these factors.[16]

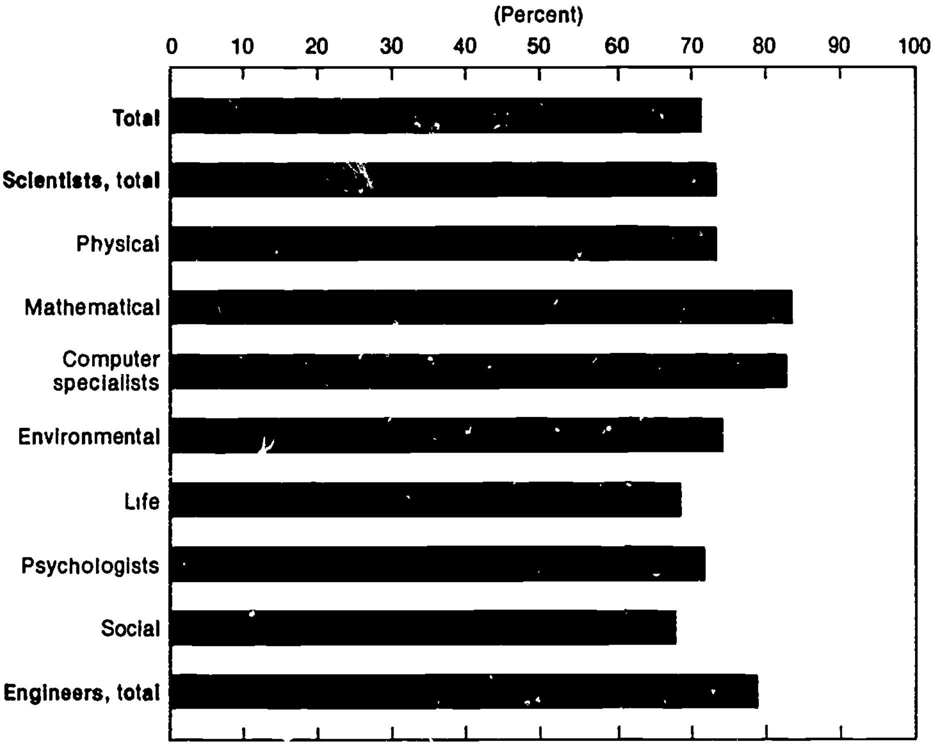
In 1984, the average salary for women scientists and engineers was $27,600; for men, it was $38,700. Across all fields, women's salaries averaged about 71 percent of men's. By major field, women's salaries ranged from 68 percent of men's salaries among life and social scientists to roughly 84 percent among computer specialists and mathematical scientists (figure 1-9). Differences in field distributions between women and men do not account for the differences in overall salaries. Controlling for field, salaries for women still average about 71 percent of men's salaries.

The female-male salary differential has not improved over time. In 1982, women earned 75 percent of men's salaries, down from about 80 percent 10 years earlier. By 1984, women earned 71 percent of men's salaries. The widening gap between female and male salaries may be accounted for by differences in experience levels, due, in part, to the relatively large influx of women into the S/E work force in recent years. In addition, rapid employment increases for women between 1982 and 1984 were noted among life scientists and psychologists, fields where salaries are relatively low for both sexes. Salary differences between female and male scientists and engineers, however, are smaller than among all college graduates. Earnings of female college graduates averaged roughly two-thirds of those of males in 1984.[17]

Women scientists and engineers, on average, earn less than men across all levels of experience. The smallest salary differences in 1984 were for those scientists and engineers with 5-9 years of experience. In this group, women earned 88 percent of male salaries. By field, salary differentials for this group ranged from 81 percent among psychologists to parity among mathematical and environmental scientists.

Women also earn less than men at the doctoral level. Average salaries paid to women doctoral scientists and engineers in 1983 were 78 percent of those paid to men. For all fields combined, women doctorates earned $32,000; the comparable figure for men was $40,800. Salaries for women doctoral scientists

Figure 1-9. Women's salaries as a percent of men's salaries: 1984



SOURCES. Based on appendix tables 29 & 30.

increased slightly more rapidly than those for men between 1981 and 1983 (17 percent vs. 15 percent).

The pattern of lower women's salaries for doctoral scientists and engineers appears across all fields of science and engineering, and across work activity, sector of employment, and years of professional experience. About one-half of the differential in female-male salaries remains unexplained after standardizing for field, race, sector of employment, and years of professional experience.[18]

Among recent graduates with degrees in science and engineering, women also earn less than men. When recent (1982 and 1983) degree recipients were surveyed in 1984, women at the bachelor's level earned, on average, 67 percent of the salaries paid to men with wide variation across S/E fields. At the master's level, salary differences between women and men are less pronounced than at the bachelor's level. Among recent master's degree recipients in 1984, women earned about 75 percent of the salaries paid to men.

MINORITY WOMEN

The following discussion focuses on black, Asian, and native American women. Information on Hispanic women is presented after the discussion on racial minority women.

Employment Levels and Trends

Minorities account for a relatively small share of employed women scientists and engineers. Of the approximately 512,000 employed women scientists and engineers in 1984, 5 percent (27,000) were Asian, and 4.5 percent (23,000) were black. The 1,500 native American women represented less than 1 percent of employed women scientists and engineers.[19] White women constituted about 88 percent of the total, while the remainder (about 2 percent) were of mixed racial backgrounds or did not report their race. Blacks are more highly represented among women than among men scientists and engineers. In 1984, 92 percent of male scientists and engineers were white, 2 percent were black, almost 5 percent were Asian, and less than 1 percent were native American.

Between 1982 and 1984, employment increases for women scientists and engineers differed by race. Employment of Asian women rose by 43 percent, while the number of black and native American women scientists and engineers remained essentially the same. By way of comparison, employment of white women rose by 33 percent.

Another way of viewing the status of minority women is shown in table 1-1. For some groups, the proportion of minority women was higher than the proportion of minority men. While women represent about 13 percent of total S/E employment across all racial groups, black women represent 25 percent of all employed black scientists and engineers.

Asian women are more highly represented in the S/E work force than in the general work force. In 1984, Asians represented 5 percent of employed women scientists and engineers, but only about 2 percent of all women in the U.S. work force were Asian.[20] Black women, in contrast, represented 4.5 percent of female scientists and engineers, but 11 percent of all employed women in the U.S.[21]

At the doctoral level, relatively few of the employed women scientists and engineers were members of racial minority groups. In 1983, about 3 percent (1,400) were black and 7 percent (3,400) were Asian; the number of native Americans was too low to estimate. Among male scientists and engineers with doctorates, about 1 percent were black, 8 percent were Asian, and 0.1 percent were native American. Thus, black females constitute a larger share of all black doctoral scientists and engineers than do other minority women of their respective racial groups.

Field

The field distributions for women scientists and engineers varies by race (table 1-2). Regardless of race, however, women are more likely than men to be scientists than engineers (appendix table 3). In 1984, about 14 percent of both white and black women were engineers, as were 23 percent of the Asian women.

Table 1-1. Employed scientists and engineers by race and sex: 1984

Race	Total	Men	Women
Total	100%	87%	13%
White	100%	88%	12%
Black	100%	75%	25%
Asian	100%	86%	14%
Native American	100%	93%	7%
Total[1]	—	100%	100%
White	—	92%	88%
Black	—	2%	5%
Asian	—	5%	5%
Native American	—	1%	(²)

¹Detail will not add to total because no report and other are included in the total
²Less than 0 5 percent
SOURCE. Based on appendix table 3

Experience

Generally, Asian women scientists and engineers report more years of professional experience than do white women. In 1984, 53 percent of the Asian women, and about 61 percent of white women, had fewer than 10 years of professional experience in 1984.

Career Patterns

In 1984, the proportions of women who reported management or administration as their primary work activity varied in a narrow range by racial group. Roughly 20 percent of all groups reported this activity as their primary work.

Tenure status and academic rank may also be used as surrogate measures of career development. Among doctoral women in educational institutions, blacks are in tenure-track positions slightly more often than are whites and Asians. In 1983, about 65 percent of the black doctoral women were in tenure-track positions, compared to approximately 62 percent of the white women and only 45 percent of the Asian women. Although black women were more often in tenure-track positions, about the same proportion of black and white women reported holding tenure (slightly less than two-fifths). Among doctoral women, variations in the proportion holding professorial rank range from 86 percent (Asian women) to 89 percent (black women).

Labor Market Indicators

An analysis was made of S/E employment, unemployment, underemployment, and underutilization data for women by racial/ethnic group (appendix table 26). The rates varied, but the observed differences were not statistically significant at the 0.05 level; these rates therefore are not presented.

Labor force participation rates for women scientists and engineers show little variation by race. In 1984, black women at all degree levels reported a labor force participation rate of 97 percent, while the rates for white and Asian women were roughly 94 percent.

White and black women scientists and engineers reported average salaries of about $27,000 per year in 1984. Asian women, however, reported average salaries of $31,000. Higher salaries for Asian women do not result from the fact that they are more likely than other women to be engineers; rather, higher salaries for Asian women reflect in part their greater number of years of professional experience. Among scientists, salaries for Asian women average $29,000 per year compared to $26,000-$27,000 for other women scientists (appendix table 30).

Regardless of race, salaries for women were below those for men. Salaries for black and Asian women, however, average about 78 percent of those for men in these same racial groups while those for white women average about 71 percent of white male salaries. At the doctoral level, salaries for white and black women were higher than those for Asian women ($32,000 for whites and blacks and about $31,000 for Asians).

Table 1-2. S/E field distribution of women by race: 1984

Field	Total	White	Black	Asian	Native American
All scientists and engineers	100%	100%	100%	100%	100%
Scientists	86%	86%	87%	77%	87%
Physical scientists	6%	5%	5%	10%	(¹)
Mathematical scientists	4%	4%	7%	2%	(¹)
Computer specialists	22%	22%	25%	27%	7%
Environmental scientists	2%	2%	(¹)	(¹)	(¹)
Life scientists	16%	16%	9%	16%	33%
Psychologists	17%	18%	19%	4%	20%
Social scientists	18%	18%	21%	18%	13%
Engineers	15%	14%	14%	23%	13%

¹Less than 0 5 percent
NOTE Detail may not add to totals because of rounding
SOURCE Based on appendix table 3

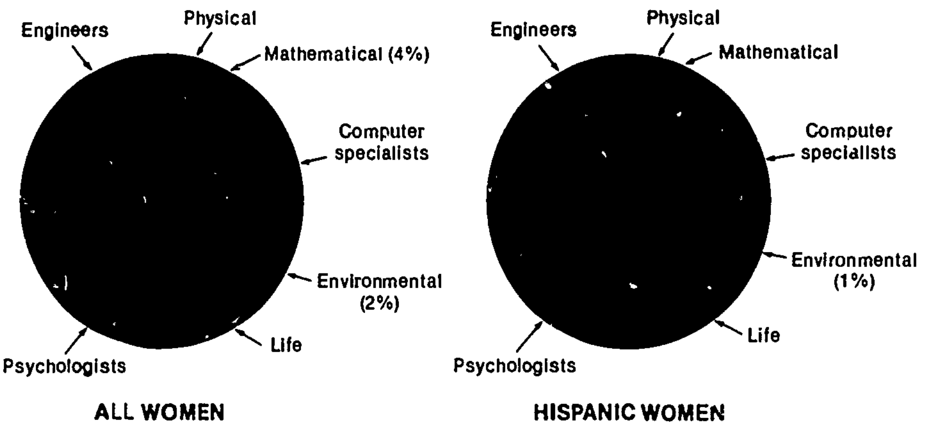
Hispanic Women

The approximately 15,000 Hispanic women scientists and engineers represented 3 percent of all women scientists and engineers employed in 1984. Among all employed women in the U.S. in 1984, about 5 percent were Hispanic.[22] Between 1982 and 1984, employment of Hispanic women scientists and engineers increased by roughly 3,700 or 32 percent, the same rate of growth registered by all women scientists and engineers.

Hispanics are more highly represented among women scientists and engineers than are their male counterparts. While 3 percent of the women scientists and engineers were Hispanic, about 2.1 percent of the men were Hispanic. The field distribution of Hispanic women is similar to that of all women scientists and engineers (figure 1-10).

Hispanic women scientists and engineers have fewer years of professional experience than all women. In 1984, 71 percent of the Hispanic women, but only 61 percent of all women scientists and engineers, reported fewer than 10

Figure 1-10. Field distribution of all women and Hispanic women: 1984



SOURCE. Based on appendix table 3

years of professional experience. Almost three-fifths (59 percent) of the Hispanic women reported less than five years of professional work; among all women scientists and engineers, 40 percent reported fewer than five years of professional experience.

Among doctoral women in educational institutions, Hispanics are less likely than other women to hold tenure or be in tenure-track positions. In 1983, 55 percent of the Hispanic women, compared to 60 percent of all women, held tenure or were in tenure-track positions. Hispanics are also less likely than all women to hold professorial rank. About 84 percent of the Hispanic women held professorial rank in 1983 compared to 89 percent for all women.

Hispanic and all women scientists and engineers reported similar labor force participation rates in 1984 (94 to 95 percent). Hispanic women, on average, reported annual salaries well below those for all women scientists and engineers. In 1984, Hispanic women had average salaries of $21,400 per year compared to $27,600 for all women scientists and engineers. Salaries for Hispanic women averaged only about 61 percent of those for Hispanic men, while for all women the average was 71 percent. Among those with doctorates, Hispanic women earned almost $1,000 less per year than the average for all women ($31,100 vs. $32,000).

ENDNOTES

1 U.S Department of Labor. Bureau of Labor Statistics, *Employment and Earnings*, vol 32. no 1, Washington, D.C., January 1985, p. 176.

2 Ibid.

3 See Technical Notes for NSF's definition of fields of science and engineering.

4 U.S Commission on Civil Rights. *Social Indicators of Equality for Minorities and Women*. Washington. D C, August 1978, p. 39 "The index represents the percentage of a group who would have to change occupations in order for the group to have identical occupational distributions of a comparison group If two groups had the same distributions of occupations, the index of dissimilarity would be 0.0...." p. 44.

5 Overall years of experience, not just those since the doctorate As would be expected, female doctorates are, on average, younger than their male colleagues

6 See Technical Notes for definitions of these statistical measures and how they are constructed

7. Data for all women are from U S. Department of Labor. Bureau of Labor Statistics. *Employment and Earnings*, vol 32, no 1, Washington. D C, January 1985, p 154 Data for college-educated women are from U.S. Department of Labor. Bureau of Labor Statistics. unpublished tabulations.

8 Ibid

9 *Employment and Earnings* January 1985, p 194.

10 For a discussion of the influence of children on labor force participation of women, see, for example, Jacob Mincer and Solomon Polachek, "Family Investments in Human Capital: Earnings of Women," *Journal of Political Economy*, vol. 82, no. 2, pt. 2, (1974), pp. 76-108; "Working Mothers in the 1970's," *Monthly Labor Review*, October 1979, pp. 39-49; "Labor Force Patterns of Single Women," *Monthly Labor Review*, August 1979, pp. 46-49; James E. Long and Ethel B. Jones, "Labor Force Entry and Exit by Married Women," *Review of Economics and Statistics*, February 1980, pp. 1-6; and "Back to School at 35 and Over," *Monthly Labor Review*, August 1979.

11. U.S. Department of Labor, *Employment and Training Report of the President, 1982*, p. 217. These rates are for married women with husbands present.

12. *Employment and Earnings*, January 1985, p. 165.

13. U.S. Department of Labor, Bureau of Labor Statistics, unpublished tabulations.

14. See Michael G. Finn, "Understanding the Higher Unemployment Rate of Women Scientists and Engineers," *American Economic Review*, December 1983.

15. National Science Foundation, *Women and Minorities in Science and Engineering*, (NSF 82-302), Washington, D.C., 1982, p. 18. Although in widespread use, it should be noted that the use of multivariate statistical techniques to isolate effects of selected variables on differences in earnings and other labor market indicators has been criticized. See, for example, Richard F. Kamalich and Solomon W Polachek. "Discrimination. Fact or Fiction? An Examination Using an Alternative Approach," *Southern Economic Journal*, October 1982, pp. 450-461, and H. Roberts, "Statistical Biases in the Measurement of Employment Discrimination," in Robert Livernash, ed., *Comparable Worth: Issues and Alternatives*, (Washington, D.C.: Equal Employment Advisory Council, 1980), pp. 175-195.

16. There is a large amount of literature on salary differences between women and men. See, for example, Nancy C. Ahern, *Career Outcomes in a Matched Sample of Men and Women Ph.D.'s. An Analytical Report*, (Washington, D.C.: National Academy Press, 1981); Jonathan R. Cole, *Fair Science. Women in the Scientific Community*, (New York The Free Press. 1979), Michael G. Finn, *Training, Work Experience, and Earnings of Men and Women Scientists and Engineers*, (Oak Ridge, Tenn.. Oak Ridge Associated Universities, December 1981), and Robert H. Frank, "Why Women Earn Less: The Theory of Estimation of Differential Overqualification," *American Economic Review*, vol. 68, no. 3, June 1978, pp. 360-373.

17 U.S. Department of Labor, Bureau of Labor Statistics, unpublished data.

18. National Science Foundation, unpublished analysis.

19 Data for native Americans should be viewed with caution since the estimates are based on an individual's own classification with respect to native American heritage, such perceptions may change over time.

20. Department of Commerce, Bureau of the Census, *Detailed Occupation and Years of School Completed by Age for the Civilian Labor Force by Sex, Race, and Spanish Origin. 1980*, Supplementary Report #PC 80-SI-8, 1980 Census of the Population. (Washington, D.C.. 1983). p. 7.

Minorities in Science and Engineering

OVERVIEW

Blacks and Hispanics are underrepresented in science and engineering employment, while Asians are not underrepresented (figure 2-1). The representation of native Americans among scientists and engineers is roughly equal to their representation in the tctal U.S. labor force. The approximately 90,500 employed black scientists and engineers in 1984 represented about 2 percent of all scientists and engineers. Blacks, however, account for 10 percent of total U.S. employment and 6 percent of all employed professional and related workers. Hispanics represented about 2 percent (86,600) of the employed scientists and engineers in 1984, while 5 percent of all employed persons and 2.5 percent of those in professional and related occupations were Hispanic. Asians represented almost 5 percent (186,500) of all scientists and engineers, but less than 2 percent of the U.S. labor force. The 20,400 native American scientists and engineers represented somewhat less than 1 percent of total scientific and engineering employment, roughly similar to their representation in the overall U.S. labor force. Approximately 2 percent (75,000) of all employed scientists and engineers reported a physical handicap in 1984.

Since the mid-seventies, employment of black scientists and engineers rose by almost 140 percent, while employment of whites increased by 70 percent, and employment of Asians grew by 75 percent. Over the more recent past (1982-84), employment among black, Asian, and native American scientists and engineers continued to grow more rapidly than did employment of white scientists and engineers. Growth in Hispanic employment was roughly equal to that for all scientists and engineers.

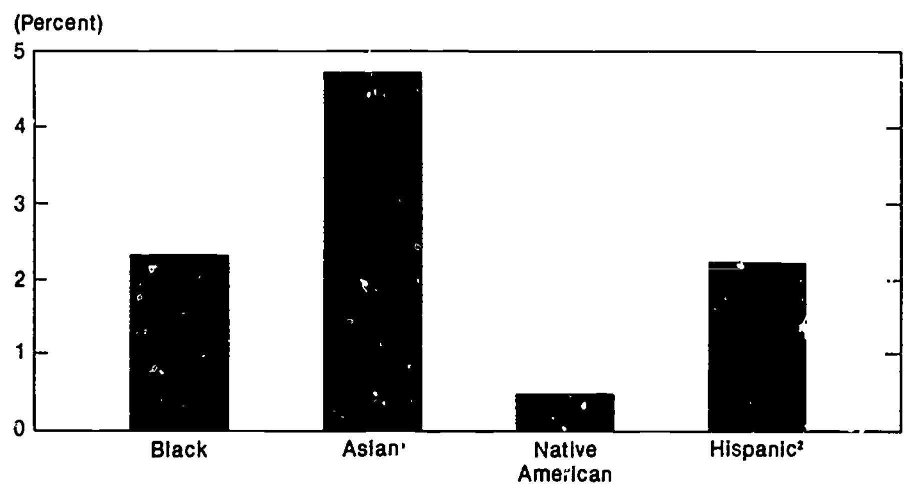
Field distributions in science and engineering differ among racial/ethnic groups. The proportions who were engineers ranged from 63 percent of the Asians to 41 percent of the blacks. In comparison, 55 percent of the whites were engineers. Among scientists, blacks generally were more likely than others to be social scientists and psychologists. Asians, on the other hand, were least likely to be in the social and behavioral sciences. Since 1976, blacks have moved away from engineering and toward the social sciences and computer specialties; among Asians, proportional increases have occurred in engineering and computer specialties.

Once employed as scientists and engineers, both Asians and Hispanics are less likely than other scientists and engineers to report management or administration as their primary work activity. For example, 29 percent of the whites but 20 percent of the Asians and 26 percent of the Hispanics reported such activities in 1984. Blacks and native Americans, however, were at least as likely as whites to hold management positions. For those employed in educational institutions, both blacks and Asians were less likely than whites to hold tenure or be in tenure-track positions. Native Americans were more likely to hold tenure or be in tenure-track positions than were whites, and Hispanics were almost as likely as all scientists and engineers to hold tenure or be in tenure-track positions.

Black and Hispanic scientists and engineers, on average, earn salaries below those earned by whites, Asians, and native Americans (table 2-1). Salaries for blacks averaged 87 percent of those for whites in 1984, while salaries for both Asians and native Americans were above those for their white colleagues. Hispanics earned about 89 percent of the salaries paid across all racial/ethnic groups.

Generally, minorities are more likely than white scientists and engineers to be unemployed and underemployed, and

Figure 2-1. Racial/ethnic minorities as a percent of employed scientists and engineers: 1984



[1]In 1984, almost 30 percent of all Asian scientists and engineers were not U.S. citizens
[2]Includes members of all racial groups.
SOURCE: Based on appendix table 2.

Table 2-1. Selected characteristics of scientists and engineers by racial/ethnic group: 1984

Characteristic	White	Black	Asian	Native American	Hispanic[1]
Unemployment rate	1.5%	2.7%	2.4%	3.4%	2.1%
S/E employment rate	86.8%	81.3%	90.8%	78.3%	80.3%
S/E underemployment rate	2.5%	6.6%	1.8%	2.9%	4.2%
Annual salary	$37,500	$32,500	$38,200	$40,500	$33,100

[1]Includes members of all racial groups
SOURCES Appendix tables 26 & 28

less likely to work in S/E jobs (table 2-1). For example, unemployment among black and Asian scientists and engineers in 1984 averaged around 2.5 percent; for whites, the unemployment rate was 1.5 percent. About 2.5 percent of the whites reported they were underemployed, as did 6.6 percent of the blacks, but only 1.8 percent of the Asians. The proportions of employed scientists and engineers working in S/E fields ranged from 91 percent of the Asians to 81 percent of the blacks and 78 percent of the native Americans.

BLACKS IN SCIENCE AND ENGINEERING

Employment Levels and Trends

Blacks are underrepresented in the science and engineering work force. In 1984, they accounted for only 2.3 percent (90,500) of the employed scientists and engineers. In the general work force, they represented 10 percent of total U.S. employment and almost 6 percent of those employed in the professional and related work force.[1] Although still underrepresented, blacks have made proportional gains; in 1976, black scientists and engineers constituted 1.6 percent of total employment.

Between 1976 and 1984, overall employment of black scientists and engineers rose about twice as fast as employment of their white counterparts: 138 percent versus 70 percent. The growth rates for blacks and whites were more similar over the recent past. In the two-year period from 1982 to 1984, employment of blacks increased by 27 percent as compared to 22 percent for whites.

Blacks also are underrepresented in the doctoral science and engineering work force. In 1983, about 4,900, or 1.3 percent, doctoral scientists and engineers were black. However, in 1973, less than 1 percent (2,000) of the doctoral work force was black. This rise in proportion represents an overall growth rate of 142 percent for black scientists and engineers with Ph.D.'s over the decade. In contrast, employment of white doctoral scientists and engineers rose 62 during the same period.

Field

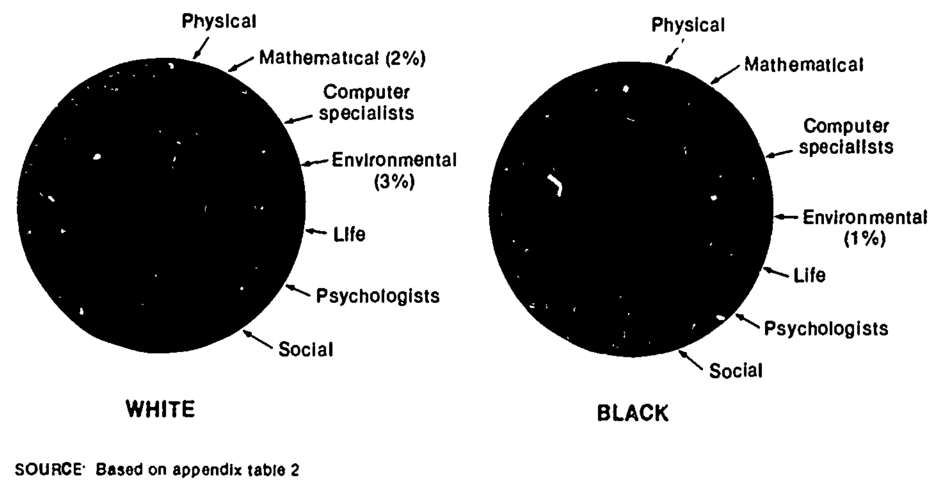
The representation of blacks varies considerably by science and engineering field. While almost 5 percent of the mathematical and social scientists were black in 1984, less than 1 percent of the environmental scientists were black. Among doctoral scientists and engineers in 1983, the field with the highest proportion of blacks (2.5 percent) was social science; the lowest share (0.2 percent) was in environmental science.

The index of dissimilarity[2] is used to summarize general field differences among racial groups. The index between whites and blacks was 20 in 1984; that is, about 20 percent of the blacks would have to change fields to have a distribution identical to that of whites.

Blacks were more likely than whites to be scientists than engineers. In 1984, 59 percent of the employed blacks were scientists compared to 45 percent of the whites. Among science fields, blacks were most likely to be social scientists or computer specialists while whites were most often computer specialists (figure 2-2). Between 1976 and 1984, the most rapid employment increases occurred among black computer specialists (up 656 percent) and social scientists (up 382 percent). In comparison, employment of whites in these fields rose 255 percent and 54 percent, respectively.

At the doctoral level, a higher percentage of the blacks (92 percent) than whites (85 percent) were also in the sciences in 1983. Over one-half (53 percent) of the blacks compared to about two-fifths (42 percent) of the whites were either life or social scientists. The

Figure 2-2. Field distributions of employed white and black scientists and engineers: 1984



SOURCE: Based on appendix table 2

index of dissimilarity between black and white doctoral scientists and engineers in 1983 was 11.

Experience

Black scientists and engineers have fewer years of professional experience than do whites. In 1984. almost 40 percent of the blacks had fewer than 10 years of work experience compared to 31 percent of the whites. However, a higher proportion of the blacks than whites reported having between 10 to 14 years of experience—20 percent vs. 15 percent.

Career Patterns

White scientists and engineers were more often employed in industry than were blacks. In 1984, about 63 percent of the whites and 55 percent of the blacks were working in this sector. This overall differential also prevails for major fields. Among engineers, for example, 76 percent of the whites compared to 70 percent of the blacks were employed by the industrial sector.

Although there were differences among sectors, the proportions of blacks and whites reporting management or administration as their primary work activity were about the same across all sectors. In 1984, roughly 30 percent of both racial groups were engaged in some aspect of management. By field, however, differences arose. For example, among engineers, 32 percent of the whites compared to 24 percent of the blacks reported this activity.

Black scientists and engineers enter the academic sector at a higher rate than whites. Among those in this sector, however, whites are more likely than blacks to be tenured or hold full professorships.

Among doctoral scientists and engineers who are employed by four-year colleges or universities, almost two-thirds of the whites compared to one half of the blacks held tenured positions in 1983. However, a larger fraction of the blacks than whites were in tenure-track positions—23 percent versus 15 percent. By academic rank, over 46 percent of the whites and only 30 percent of the blacks were full professors. About 36 precent of the blacks held associate professorships compared to 30 percent of the whites.

Labor Market Indicators

Black scientists and engineers experience different labor market conditions from white scientists and engineers. Blacks are slightly more likely than whites to be in the labor force. Within the labor force, they are more often unemployed or underemployed and less often employed in S/E jobs.

The labor force participation rate for black scientists and engineers was 98 percent in 1984; for whites, it was 96 percent. This participation rate for black scientists and engineers was much higher than the rate for blacks in the overall population (62 percent)[3] or blacks with four or more years of college (85 percent).[4] The labor force participation rate for black scientists and engineers has remained stable since 1976.

Unemployment rates for black scientists and engineers averaged about 2.7 percent in 1984, much higher than the 1.5 percent rate for white scientists and engineers. In comparison, blacks in the overall population experienced an unemployment rate of 16 percent,[5] and black college graduates registered a 6.8 percent rate in 1984.[6] The unemployment rate for black scientists and engineers has fallen steadily since 1976 when it was 5.9 percent and 1982, when the rate was 4.7 percent. The unemployment rate for black doctoral scientists and engineers was only 1.9 percent in 1983.

Unemployment rates differ by field among blacks. Those in the physical (5.6 percent) and social (3.8 percent) sciences experienced the highest unemployment rates while blacks in the life sciences experienced a rate of only 1 percent in 1984. Among whites, these rates ranged from 3.6 percent in social science to 0.5 percent in computer specialties (appendix table 26).

Blacks are employed in non-S/E jobs more often than are whites. In 1984, the S/E employment rate for blacks was 81 percent compared to 87 percent for whites. This rate is lower for blacks across the physical, life, and social sciences, and psychology with the largest difference exhibited in the social sciences (56 percent vs. 63 percent). In engineering, the rates for blacks and whites were equal at 93 percent. Largely resulting from above-average growth in fields where employment in S/E jobs is traditionally lower, the S/E employment rate has declined substantially for blacks and somewhat for whites since 1976 when their rates were 92 percent and 91 percent, respectively. The S/E employment rate among doctoral scientists and engineers was also lower for blacks than for whites—80 percent versus 89 percent in 1983.

Black scientists and engineers experienced higher rates of underemployment than did white scientists and engineers: 6.6 percent compared to 2.5 percent in 1984. This higher rate primarily resulted from the high underemployment rates of blacks in science fields (9.3 percent vs. 4.3 percent for whites). Among science fields, black psychologists and social scientists registered the highest rates at 18 percent and 14 percent, respectively.

The underutilization rate for black scientists and engineers also exceeded that for whites: 9.1 percent and 3.9 percent, respectively, in 1984. At the doctoral level, the rate for blacks was twice that for whites. 5.1 percent versus 2.5 percent.

Black scientists and engineers earned annual salaries that were, on average, 87 percent ($5,000 less) of those of whites. In 1984, salaries were $32,500 and $37,500, respectively. Annual salaries for blacks were lower than those for whites across all science and engineering fields. The largest differential occurred in the field of environmental science, where salaries for blacks ($31,600) were about 81 percent of those for whites. In contrast, salaries for black computer specialists averaged 91 percent of those for whites. At the doctoral level, the overall differential in annual salary was smaller. Black doctoral scientists and engineers earned salaries averaging about $37,000 per year in 1983—about 92 percent (or $3,100 less) of those for white scientists and engineers with doctoral degrees.

Salary differentials among recent science and engineering graduates are more pronounced than those reported for the overall S/E work force. In 1984, blacks who graduated with a science or engineering bachelor's degree in 1982 or 1983 reported salaries that were about 70 percent of those earned by their white counterparts. Among engineering graduates, salaries for blacks and whites were essentially equal.

ASIANS IN SCIENCE AND ENGINEERING

The employment characteristics of Asian scientists and engineers differ substantially from those of other racial minority groups. For example, Asians represent a higher fraction of the science and engineering work force than they do of the general U.S. population. Asian scientists and engineers are also more likely than members of other racial minorities to be non-U.S. citizens. In 1984, almost 29 percent of the Asian scientists and engineers did not hold U.S. citizenship. Among doctoral scientists and engineers, over one-third of the Asians were not U.S. citizens. In the overall U.S. population, about 40 percent of the Asians were not U.S. citizens.

Employment Levels and Trends

In 1984, almost 5 percent of all employed scientists and engineers (186,500) were Asian. In comparison, Asians represented less than 2 percent of the U.S. work force and 2.6 percent of those in professional occupations.[7] Since 1976, employment of Asian scientists and engineers has risen at a somewhat faster rate than that of whites—75 percent versus 70 percent. The rate has accelerated between 1982 and 1984, with Asian employment increasing almost twice as fast as that of whites—39 percent versus 22 percent.

The representation of Asians among doctoral scientists and engineers is higher than their representation among all scientists and engineers. In 1983, more than 8 percent (29,700) of employed doctoral scientists and engineers were Asian. Between 1973 and 1983, employment of Asians rose at a faster rate than that of either whites or blacks. While employment for Asians rose almost 190 percent over the decade, employment of whites and blacks grew 62 percent and 142 percent, respectively.

Field

Asians are far more apt to be in engineering than in the sciences. About 63 percent of the Asians, compared to 55 percent of the whites, were engineers in 1984. Almost one-half of the Asian engineers were in either electrical or civil engineering. Among science fields, Asians were most likely to be in computer specialties and least likely to be in psychology (figure 2-3). The index of dissimilarity between Asians and whites was 15 in 1984; i.e., 15 percent of the Asian scientists and engineers would have to change fields to have a distribution similar to that of whites.

Between 1976 and 1984, employment of Asian engineers considerably outpaced that of Asian scientists—102 percent versus 43 percent. This pattern, however, was reversed between 1982 and 1984. Employment of scientists, driven partially by increases among computer specialists, rose 45 percent and employment of engineers was up 36 percent.

The field distribution of Asian doctoral scientists and engineers also differed from that of whites. Almost 65 percent of the Asians compared to 85 percent of the whites were employed in a science field in 1983. Across science fields, almost two-thirds of the Asians were either life or physical scientists. The index of dissimilarity between Asians and whites measured 15 in 1983. Since 1973, employment of Asians in engineering has risen more rapidly than their employment in science. Over the decade, these respective growth rates were 252 percent and 162 percent.

Experience

The number of years of professional work experience does not differ greatly between Asian and white scientists and engineers. Slightly more than 30 percent of both have less than 10 years of experience, while a higher fraction of the Asians (23 percent) than whites (15 percent) reported between 10 and 14 years of work experience in 1984.

Among doctoral scientists and engineers, Asians are likely to have fewer years of professional experience than whites. In 1983, almost 36 percent of the Asian doctoral scientists and engineers had fewer than 10 years of professional experience; for whites, this percentage was 26 percent.

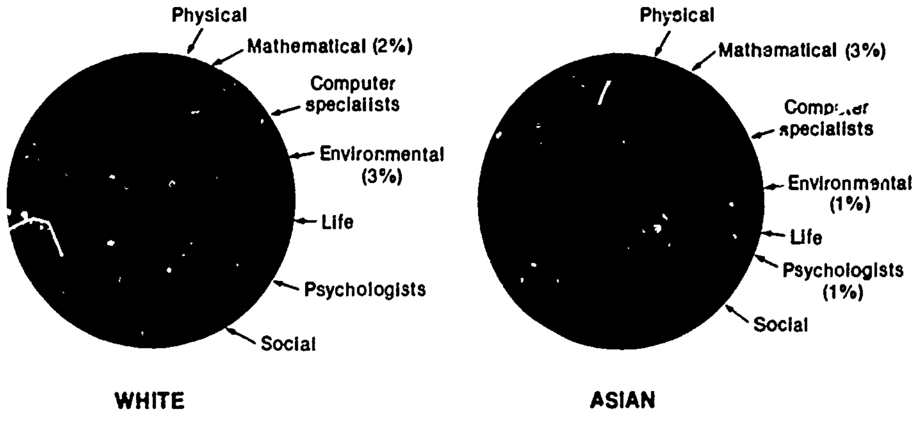
Career Patterns

The sectoral distributions of Asian and white scientists and engineers are similar. In 1984, roughly three-fifths of both groups were employed by industry. In addition, Asians (15 percent) and whites (13 percent) were about as likely to be employed by educational institutions.

Although they are employed in roughly equal proportions by sector, Asians and whites are not engaged in the same activities in these sectors. In 1984, about 20 percent of the Asians reported their primary work activity as management or administration. This proportion for whites was almost 29 percent.

The tenure status and academic rank of Asian scientists and engineers also differs from that of whites. Among doctoral scientists and engineers in four-

Figure 2-3. Field distributions of employed white and Asian scientists and engineers: 1984



SOURCE: Based on appendix table 2.

year colleges and universities, Asians are less likely to be tenured than whites. In 1983, about 55 percent of the Asians held tenure, while 17 percent were not in tenure-track positions. Comparatively, 63 percent of the whites were tenured and only 15 percent were in non-tenure track jobs. Differences between Asians and whites were not large by academic rank. About 43 percent of the Asians and 44 percent of the whites held full professorships. At the associate level, the percentages were 32 percent for Asian, and 30 percent for white, doctoral scientists and engineers

Labor Market Indicators

Labor market conditions for Asian scientists and engineers generally are favorable. Asians are as likely as whites to be in the labor force and to hold S/E jobs. Asians are more likely than whites to be unemployed but less likely to be underemployed.

Among scientists and engineers, Asians had a labor force participation rate of 97 percent in 1984, similar to that for whites (96 percent). The participation rate for Asians in the U.S. population was 67 percent [8] The participation rate for Asian scientists and engineers has fallen slightly from 99 percent in 1976.

The unemployment rate for Asian scientists and engineers is higher than that for whites The respective rates were 2.4 percent and 1 5 percent This higher unemployment rate results from above average rates among Asian mathematical and life scientists. Comparatively, the unemployment rate for Asians in the general population was about 5 percent.[9] The unemployment rate among Asian scientists and engineers has fluctuated substantially in the past eight years. In 1976, the Asian unemployment rate was only 1.5 percent but by 1982, it had doubled to 3.4 percent The unemployment rate among doctoral scientists and engineers who were Asian was 1 1 percent in 1983.

A higher proportion of Asian than of white scientists and engineers work in S/E jobs. In 1984, almost 91 percent of the Asians and 87 percent of the whites were in S/E jobs. By field, S/E employment rates ranged from 62 percent of the Asian social scientists to 97 percent of the Asian environmental scientists. The S/E employment rate for Asians virtually remained unchanged between 1976 and 1984. The S/E employment rate for Asian doctoral scientists and engineers was 91 percent in 1983.

Only 1.8 percent of the Asian scientists and engineers were underemployed in 1984. The rate for whites was 2.5 percent. The S/E underemployment rate varies by field. For example, Asian scientists exhibited a rate of 3.2 percent while the rate for Asian engineers was only 1 percent. At the doctoral level, the S/E underemployment rate for Asians was 1.1 percent compared to 1.5 percent for whites in 1983.

S/E underutilization rates were similar for Asian and white scientists and engineers. In 1984, 4.1 percent of the Asians and 3.9 percent of the whites were underutilized. Field variation for Asians ranged from about 1 percent (social sciences) to 11 percent (mathematical sciences).

Average annual salaries for Asian scientists and engineers were above those for whites across most fields. In 1984, salaries for Asians were $38,200 compared to $37,500 for whites. The salary differential favored Asians by 1 to 8 percentage points in all fields except the physical sciences and engineering. Only Asian physical scientists received average salaries appreciably lower ($1,100) than white physical scientists, salaries for Asian and white engineers essentially were equal. At the doctoral level, salaries for Asian and white scientists and engineers were virtually identical—$39,500 and $39,800, respectively, in 1983.

NATIVE AMERICANS IN SCIENCE AND ENGINEERING

The employment characteristics and experiences of native American scientists and engineers are more similar to those of white than to those of other racial groups. Data for native Americans, however, should be viewed with some caution for two reasons. First, estimates for both scientists and engineers and for the overall U.S. labor force are based on self-reported data. An individual's perception of his or her native American heritage may change over time. Second, sample sizes for native Americans are very small, thus, statistical reliability is lower for native American data than for data on some other groups.[10]

Employment Levels and Trends

The representation of native Americans in science and engineering employment is similar to their representation in the U.S. labor force. In 1984, the 20,400 employed native Americans constituted 0.5 percent of the science and engineering work force, similar to their representation in professional and related fields and in the overall U.S. work force.[11] Between 1982 (the earliest year in which data are available) and 1984, employment of native American scientists and engineers rose more rapidly than the employment of whites: 31 percent versus 22 percent.

There were very few native Americans in the doctoral science and engineering work force. In 1983, only 418, or 0.1 percent, of the employed doctoral scientists and engineers were native American, up from 141 (0.1 percent) in 1973.

Field

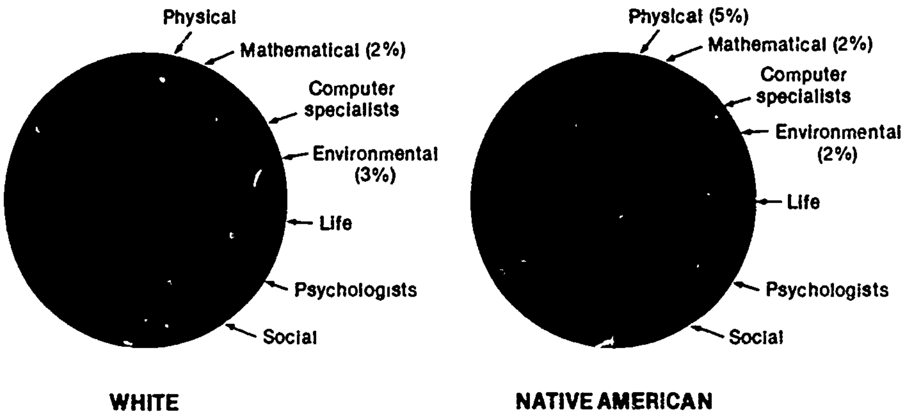
Native Americans are about as likely as whites to be scientists or engineers. In 1984, about 42 percent of the native Americans were scientists; among whites, scientists comprised 45 percent of the total. The field distribution of native Americans, however, differs somewhat from that of whites (figure 2-4). For example, across scientific fields, native Americans were most highly concentrated in the life sciences and psychology, while whites were most likely to be in the life sciences or computer specialties. Since 1982, the most rapid growth rates for native Americans have been in the mathematical and physical sciences.

At the doctoral level, native Americans are most often in psychology or the life and social sciences. In 1983, these fields accounted for almost 70 percent of the native Americans.

Experience

Native American scientists and engineers report more years of professional experience than do white scientists and engineers. About 25 percent of the native Americans compared to 31 percent of the whites reported having less than 10 years of experience in 1984. On the other hand, about 15 percent of the native Americans reported between 25 and 29 years of experience compared to 10 percent of the whites.

Figure 2-4. Field distributions of employed white and native American scientists and engineers: 1984



SOURCE: Based on appendix table 2

Career Patterns

The industrial sector employed a slightly smaller share of native American than white scientists and engineers. In 1984, about 60 percent of the native Americans and 63 percent of the whites were employed by this sector. Native Americans were also less likely than whites to be academically employed—8 percent versus 13 percent.

The primary work activities of native Americans and whites differ. Among native American scientists and engineers, 37 percent reported management or administration as their primary work activity in 1984, compared to 29 percent for whites.

Among doctoral scientists and engineers employed in four-year colleges and universities, native Americans are much more likely to be tenured than whites. 82 percent versus 63 percent in 1983. Also in 1983, about 41 percent of the native Americans held full professorships compared to 46 percent of the whites.

Labor Market Indicators

Among scientists and engineers, native Americans had slightly higher labor force participation rates but also higher unemployment rates than whites. In 1984, about 98 percent of the native Americans participated in the labor force, up from 96 percent in 1982. In comparison, white scientists and engineers registered a rate of 96 percent in 1984. Among those in the labor force, 3 4 percent of the native Americans but only 1.5 percent of the whites were unemployed.

Rates related solely to science and engineering also differ between native Americans and whites. The S/E employment rate for native Americans was 78 percent compared to a rate of 87 percent for whites in 1984. However, differences become more evident when disaggregated by field. Among scientists, for example, native Americans had a rate of 64 percent and whites had a rate of almost 79 percent. In 1982, the S/E employment rate was 82 percent for native Americans and 88 percent for whites. The S/E underemployment and S/E underutilization rates for native Americans were higher than those for whites. In 1984, underemployment among native Americans occurred at a rate of 2.9 percent, versus 2.5 percent for whites. Similarly, the S/E underutilization rate of 6.2 percent for native Americans was somewhat higher than the 3.9 percent rate for whites.

Although the above rates suggest that the labor market was not as favorable, relatively, for native American scientists and engineers, their average salaries were above those for whites. The average salary for native American scientists and engineers was $40,500 in 1984 compared to $37,500 for whites.

HISPANICS IN SCIENCE AND ENGINEERING

Hispanics are a diverse ethnic group. Distinguishing among Mexican Americans, Puerto Ricans, and other Hispanics is desirable because socioeconomic backgrounds and reasons for underrepresentation may differ among these groups. Because of data limitations, however, most of the discussion treats Hispanics as an aggregate. About 11 percent of the Hispanic scientists and engineers in 1984 were not U.S. citizens; for all scientists and engineers, the comparable figure was about 3 percent. Among all Hispanics in the United States, about 20 percent were not U.S. citizens.

Employment Levels and Trends

Hispanics are underrepresented in science and engineering. The almost 87,000 employed Hispanic scientists and engineers in 1984 represented about 2.2 percent of all employed scientists and engineers, the same proportion as in 1982. Almost 6 percent of all employed persons and 2.5 percent of those in professional and related occupations were Hispanic in 1984.[12]

Almost 28 percent (24,100) of the employed Hispanic scientists and engineers were Mexican American and 18 percent (15,500) were Puerto Rican. The remaining 54 percent (47,000) were "Other Hispanics" or did not report their specific Hispanic origins.[13] In the total U.S. work force, about 46 percent of the Hispanics were Mexican American and only 7 percent were Puerto Rican.[14]

Hispanics also are underrepresented among doctoral scientists and engineers. In 1983, the 5,400 Hispanic Ph.D.'s represented about 1.5 percent of all doctoral scientists and engineers, up from 1,600 (0.7 percent) in 1973. Among Hispanic doctoral scientists and engineers, approximately 20 percent were not U.S. citizens in 1983, and an additional 20 percent were foreign born but held U.S. citizenship.

Field

Only minor differences exist between the field distribution of Hispanic and all scientists and engineers· the index of dissimilarity was 8. In 1984, about 55 percent of both the Hispanics and the total were engineers (figure 2-5). Hispanic scientists are somewhat more likely to be social scientists. At the doctoral level, the field distribution of Hispanics is similar to that for all doctoral scientists and engineers (appendix table 5).

Experience

Hispanics report significantly fewer years of professional experience than do all scientists and engineers. About 43 percent of the Hispanics reported fewer than 10 years of professional experience in 1984; among all scientists and engineers, the comparable figure was 31 percent. At the doctoral level, a higher proportion of Hispanics than all doctoral scientists and engineers, had fewer than 10 years of professional experience: 32 percent versus 26 percent in 1983.

Career Patterns

Few differences existed in the sectoral distributions of Hispanic and all scientists and engineers. In 1984, 59 percent of the Hispanics and 63 percent of all scientists and engineers were in industry (appendix table 14). Hispanic scientists and engineers are slightly less likely than all scientists and engineers to report management or administration as their primary work activity (26 percent vs. 29 percent).

Within educational institutions, few differences occur between Hispanic and non-Hispanic doctoral scientists and engineers with respect to tenure status and professorial rank. In 1983, approximately 57 percent of the Hispanics and 62 percent of all scientists and engineers held tenure. About 95 percent of both Hispanic and all doctoral scientists and engineers in educational institutions held professorial rank in 1983. Hispanics, however, were less likely to hold full professorships than non-Hispanics (33 percent versus 46 percent).

Labor Market Indicators

Hispanics are as likely as all scientists and engineers to be in the labor force (that is, working or seeking employment), and more likely to be unemployed. Hispanics are less likely than all scientists and engineers to hold jobs in science and engineering, and report higher levels of underemployment and underutilization.

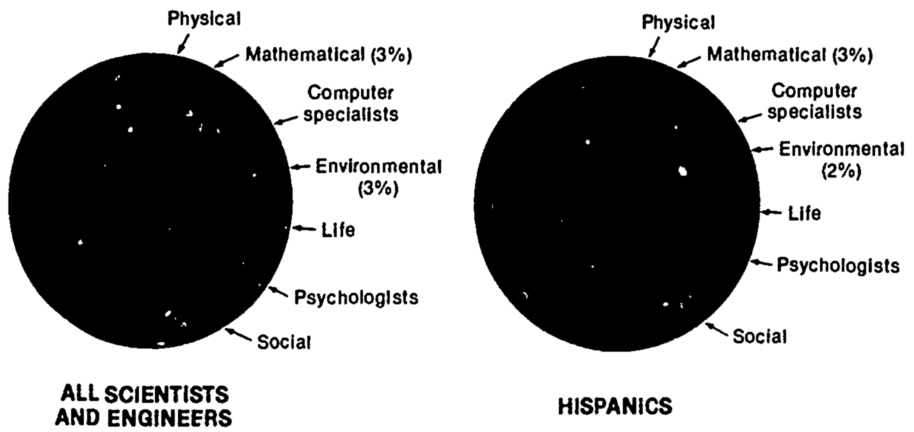
In 1984, the labor force participation rate for Hispanic scientists and engineers was 96 percent, the same as that for all scientists and engineers. The participation of Hispanic scientists and engineers in the labor force is well above the 64 percent rate for the overall Hispanic population,[15] as well as the 83 percent rate for Hispanic college graduates.[16] Since 1982 (the earliest year in which data are available), the labor force participation rate for Hispanics has not changed.

In 1984, the unemployment rate for Hispanic scientists and engineers was higher than that for all scientists and engineers (2.1 percent vs. 1.6 percent). The rate for Hispanics, however, has dropped since 1982 when it stood at 2.8 percent. At the doctoral level, unemployment rates for Hispanics also were similar to those for all doctoral scientists and engineers.

About 80 percent of the employed Hispanic scientists and engineers held jobs in science and engineering in 1984, down from 83 percent in 1982. In comparison, 87 percent of all scientists and engineers were engaged in S/E jobs in 1984. S/E employment rates for Hispanics varied between science and engineering and across fields of science. The rate for Hispanic scientists (68 percent) was well below the rate for all scientists (79 percent), primarily because relatively large numbers of Hispanic psychologists, social scientists, and computer specialists were working in non-S/E jobs. At the doctoral level, Hispanics reported an S/E employment rate of 87 percent, slightly below the rate reported for all doctoral scientists and engineers (89 percent).

Hispanic scientists and engineers, on average, experience a higher degree of underemployment than all scientists and engineers. In 1984, the underemployment rate for Hispanics was 4.2 percent, compared with 2.6 percent for all scientists and engineers. The relatively high rate for Hispanics reflects underemployment among scientists (8.1 percent) rather than engineers (1.1 percent). Among Hispanic scientists, rela-

Figure 2-5. Field distributions of employed scientists and engineers by Hispanic status: 1984



SOURCE: Based on appendix table 2.

tively large numbers of psychologists and life and social scientists reported they were underemployed. Among doctoral scientists and engineers, underemployment rates were slightly lower for Hispanic than for all scientists and engineers (1.1 percent vs. 1.5 percent).

Hispanics experience a greater degree of underutilization than do all scientists and engineers. In 1984, the underutilization rate for Hispanics was 6.3 percent compared with 4.1 percent for all scientists and engineers. For those holding doctorates, the underutilization rate reported by Hispanics was lower than that for all doctoral scientists and engineers (2.0 percent vs. 2.5 percent).

Since Hispanics have fewer years of professional experience, it is not surprising that they report salaries that generally are below those earned by all scientists and engineers. Hispanic scientists and engineers reported an annual salary of $33,100 in 1984, lower than the $37,400 salary reported by all scientists and engineers. Salaries for Hispanics averaged 89 percent of those for all scientists and engineers, with substantial variation by field. Hispanic engineers earned 92 percent of the salaries earned by all engineers; for scientists, the comparable figure was 82 percent. By science field, the differential ranged from 94 percent among environmental and life scientists to 73 percent among social scientists. Salaries of Hispanics were below those for all scientists and engineers across all experience levels. Hispanic doctoral scientists and engineers earned approximately 96 percent of the salaries for all Ph.D. scientists and engineers ($38,200 vs. $39,700) in 1983.

PHYSICALLY HANDICAPPED IN SCIENCE AND ENGINEERING

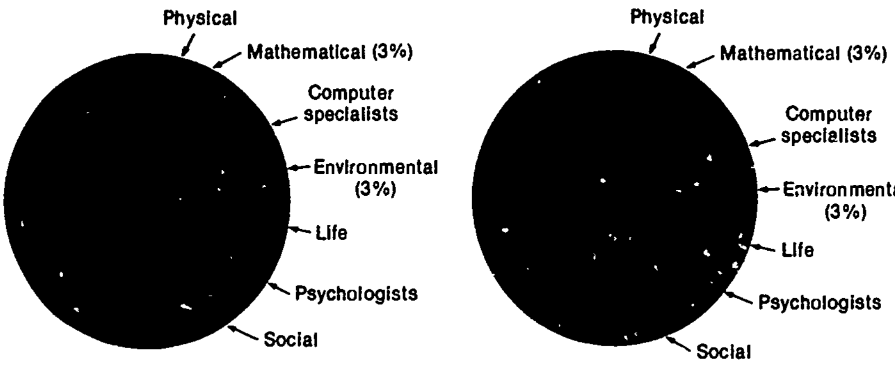
In 1984, about 92,000 scientists and engineers, 2 percent, reported a physical handicap.[17] Of these, about 23 percent reported an ambulatory handicap, 22 percent reported a visual handicap, and about 17 percent cited an auditory handicap. The remainder (about 38 percent) did not specify the nature of their handicap.

Approximately 75,000 scientists and engineers with physical handicaps were employed in 1984. Their field distribution showed some differences from that of all scientists and engineers (figure 2-6). Those with a handicap were about as likely to be scientists as engineers, and among scientists, more likely to be computer specialists or psychologists.

Those reporting a handicap are much more likely than all scientists and engineers to be out of the labor force; that is, not working and not seeking employment. Their labor force participation rate was 83 percent, compared to 96 percent for all scientists and engineers. About 30 percent of the physically handicapped cited illness as the reason for not being in the labor force. Among all scientists and engineers, only 3 percent cited illness as their major reason for being outside the labor force.

Handicapped scientists and engineers reported an unemployment rate higher than that reported for the total (2.0 percent vs. 1.6 percent). Those employed are about as likely as all scientists and engineers to hold jobs in S/E fields—about 87 percent.

Figure 2-6. Field distributions of all employed scientists and engineers and those with physical handicaps: 1984



SOURCES: Based on appendix tables 1 & 7.

ENDNOTES

1. U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, vol. 32, no 1., Washington, D.C., January 1985, p. 176.
2. U.S. Commission on Civil Rights, *Social Indicators of Equality for Minorities and Women*, Washington, D.C., August 1978, p. 39. "The index...represents the percentage of a group who would have to change occupations in order for the group to have identical occupational distributions of a comparison group. If two groups had the same distributions of occupations, the index of dissimilarity would be 0.0...." p. 44.
3. *Employment and Earnings*, January 1985, p. 158.
4. U.S. Department of Labor, Bureau of Labor Statistics, unpublished data.
5. *Employment and Earnings*, January 1985, p. 158.
6. U.S. Department of Labor, Bureau of Labor Statistics, unpublished data.
7. U.S. Department of Commerce, Bureau of the Census, *General Social and Economic Characteristics, United States Summary*, 1980 Census of Population, Washington, D.C., December 1983.
8. Ibid.
9. Ibid.
10. See Technical Notes for a discussion of the statistical reliability of the estimates of scientists and engineers.
11. *General Social and Economic Characteristics. United States Summary*, 1980 Census of Population, December 1983.
12. *Employment and Earnings*, January 1985, p. 176.
13. The "other Hispanics" category includes individuals whose origins are in Spain or the Spanish-speaking countries of Central or South America. Also included in this category are those who identified themselves as Spanish, Spanish American, Hispano, Latino, etc.
14. *Employment and Earnings*, January 1985, p. 201.
15. Ibid., p. 198.
16. U.S. Department of Labor, Bureau of Labor Statistics, unpublished data.
17. As part of the NSF surveys underlying the employment and related data for scientists and engineers, respondents were asked if they had a physical handicap and, if so, to specify the nature of their handicap (visual, auditory, ambulatory, or other). Thus, the data for the physically handicapped reflect respondent self-perceptions. Terminology makes it very difficult to measure, in a precise way, the number of scientists and engi-

neers who may have a physical handicap. Frequently, the term disability, impairment, or handicap are used synonymously, but their meanings have important differences Johnson and Lambrinos ("Wage Discrimination Against Handicapped Men and Women," *Journal of Human Resources*, vol xx, no 2, Spring 1985, pp 264-277) point out that according to the World Health Organization, impairment is a psychological, anatonomical, mental loss, or some other abnormality Disability is any restriction on or lack of (resulting from an impairment) ability to perform an activity such as work in the manner or within the range considered normal Handicap is a disadvantage resulting from an impairment or disability. Thus, an impairment subject to prejudice is a handicap, whether or not it is a disability.

The intent of the NSF in collecting data for the physically handicapped is to estimate the number who have a condition that in some way may limit their physical activity. These scientists and engineers may have difficulty gaining access to buildings, may need a technical device such as a Telephonic Device for the Deaf (TDD), or may require assistance to carry out a particular physical task. The NSF data provides no information about the age of onset of the physical handicap. Thus, it is not known if the handicap began before or after a scientist or engineer was established in his or her career. Policy implications relating to the access of the handicapped to our educational system are different from the implications of any form of discrimination against those scientists or engineer who may have a physical handicap

Education and Training

INTRODUCTION

One major cause of the underrepresentation of women and minorities in science and engineering is the different patterns of participation they exhibit compared to men and the majority at all educational levels. This chapter examines these differences at three levels: precollege, undergraduate, and graduate.

At the precollege level, there are many critical junctures where decisions regarding type of curriculum or type of coursework may enhance or impede potential careers in science or engineering. One of these critical junctures is at the junior high school level; i.e., grades 7 and 8. Students at this level begin to make decisions which ultimately affect the educational and vocational paths they will follow. For example, they choose which type of curriculum and thus, which type of coursework, to pursue in high school. High school students who are enrolled in an academic curriculum tend to take more courses in science and mathematics than do other students. Students with more exposure to science and mathematics coursework generally have higher scores on achievement tests designed to measure quantitative ability. One of these tests, the Scholastic Aptitude Test (SAT), is a significant factor for college admissions. A relatively lower score may inhibit a student from deciding to major in a science or engineering field at the undergraduate level. Evidence exists that women and minorities are not making the same decisions and therefore not participating in science and mathematics education at the same rate as are men and the majority at the precollege level.

At the undergraduate and graduate levels, women and minorities are not participating in science and engineering fields to the same extent as are men and the majority. Patterns of degree production and postdoctoral appointments may be used to illustrate these differences. In addition, women and minorities who do participate do not appear to have the same educational experiences and opportunities as do men and the majority. Trends in type of graduate support and scores on the Graduate Record Examination (GRE) illuminate these disparities.

Scores on standardized tests measuring mathematics and science achievement are used in this chapter as indicators of different participation patterns. They are not used as indicators of inherent ability as they may also reflect a variety of social, demographic, and economic factors.[1] For example, evidence exists that links student performance on standardized tests with family income; a disproportionate number of minority families are at lower economic levels.

The demographic mix of the population is changing resulting in a rate of influx for minorities at all educational levels much higher than that for whites.[2] As such, the lower participation of minorities in science and engineering training becomes a more important issue.

In this chapter, information is presented first for women and then for racial and ethnic minorities. Among racial and ethnic minorities, data are presented for men and women wherever possible. Information on Hispanics is presented separately for Mexican Americans, Puerto Ricans, and Latin Americans, if available. Since data on the educational experiences in science and mathematics for physically handicapped persons are only available for a very limited number of variables, they are excluded from analysis in this chapter. Overviews of the major findings are presented at the beginning of each major section.

WOMEN

Overview

The performance of both males and females on tests measuring science and mathematics achievement are similar at younger ages; by the mid-teens, however, males score higher than do females on these tests. This gap primarily results from differences in the types of coursework pursued at the secondary level. Even though males and females are equally inclined to be in academic programs, males enroll in more advanced science and mathematics courses than do females.

At the end of secondary school, females are not as likely as males to consider further training in quantitatively based fields. For example, among college-bound seniors (those students who take the Scholastic Aptitude Test), females were not as prone to take the achievement tests offered in science and mathematics or specify a science or engineering field as their intended undergraduate major. Nonetheless, among freshmen who enter science and engineering programs, females are as academically able as males. A substantial fraction of both sexes reports a high school grade point average in the "A" range.

Although women do not pursue science and engineering training to the same extent as do men, they have made significant strides. While the rate of growth in the number of women earning degrees in science and engineering has risen rapidly at all degree levels, the number of men earning these degrees has declined at the bachelor's and doctorate levels and risen slightly at the master's level. The increasing number of women earning science and engineering degrees partially reflects the substantial number who have earned these degrees in "non-traditional" fields; e.g., engineering and the physical sciences.

Although S/E degree production has risen, women do not have the same educational experiences as do men at the graduate level. For example, women who receive doctorates in science and engineering were less likely to receive university support and much more likely to be self-supported than their male counterparts.

Precollege Preparation

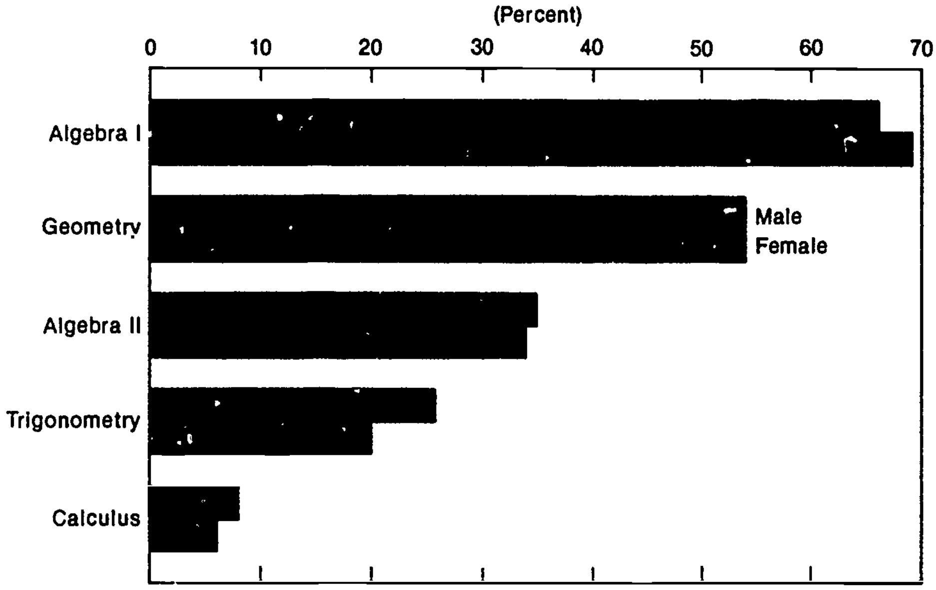
Curriculum and Coursework

Slightly less than two-fifths of both male and female high school seniors were in academic programs.[3] Students in academic programs tend to take more mathematics and science courses and achieve higher SAT scores than those in other programs. As such, they are better equipped to enter and succeed in S/E programs at the undergraduate level.

Male and female college-bound seniors (those who take the SAT) are more highly concentrated in academic programs than are all high school seniors.[4] About four-fifths of college-bound males and females were in academic programs in 1984.

Males tend to take more mathematics courses than do females.[5] Almost 47 percent of the males had enrolled in four or more mathematics courses, compared to only about 36 percent of the females. Nonetheless, the average grade point average in mathematics for males was somewhat lower than that for females (2.18 vs. 2.35, respectively, on a 4-point scale). This lower average may reflect the types of courses taken. For example, while about the same proportions of males and females took Algebra I, Algebra II, and Geometry, males were more likely to have taken Trigonometry and Calculus (figure 3-1).

Figure 3-1. Mathematics coursetaking by sex[1]



[1] Represents individuals in 1982 who were sophomores in 1980 (High School and Beyond Survey, First Follow-up).
SOURCE. Appendix table 35.

In the sciences, the number of courses taken by males and females is more similar than that reported in mathematics. About 25 percent of the males and 18 percent of the females had been in four or more science courses. Again the average grade point average for females (2.47) was higher than that for males (2.29). Types of courses selected differs substantially (figure 3-2). About the same proportions of males and females took Chemistry, but males were much more likely than females to have taken Physics and females were somewhat more likely than males to have taken both Biology and Advanced Biology.

Among college-bound seniors, differentials in coursetaking behavior narrow. The average number of years of mathematics taken by males was 3.8 in 1984 compared to 3.5 for females. Across sciences, males were more likely to have enrolled in physical science courses while females tended to be in biological science courses (appendix table 36).

Coursetaking differentials may be further explored by examining the number of high school mathematics and science courses completed by first-time college freshmen planning to major in a science and engineering field.[6] In 1983, males whose probable major was science or engineering were somewhat more likely than females to have taken four or more years of mathematics (84 percent vs. 70 percent, respectively). With two exceptions, this differential persisted when further stratified by field. Females planning to major in either mathematics or engineering were as likely as males to have finished four or more years of mathematics in high school. Among those students choosing non-science and engineering fields, about 63 percent of the males and 53 percent of the females had taken mathematics for at least four years.

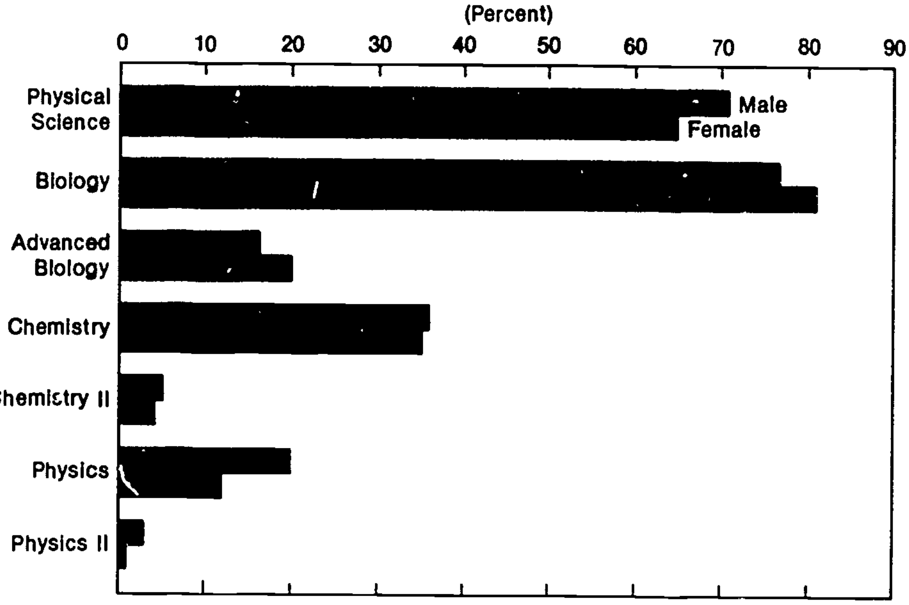
Freshmen males took substantially more years of physical science lasses in high school than did freshmen females. Among first-time freshmen, about 40 percent of the males who chose science and engineering fields had taken at least three years of physical science compared to about 26 percent for females. This differential persisted across all science and engineering fields. For example, among males and females who were majoring in a physical science field, about the same proportion had taken at least three years of high school physical science courses—37 percent versus 38 percent. However, 23 percent of the males compared to only 14 percent of the females had completed at least four years of high school coursework in this subject.

Mathematics and Science Achievement

The National Assessment of Educational Progress is designed to assess the achievement levels of precollege students in a number of cognitive areas, including mathematics and science. The objective is to establish how specific groups of American students respond to exercises in different academic areas rather than to measure the performance level of individual students. The assessments are administered periodically to 9, 13, and 17 year olds.

Mathematics.[7] The overall results of the most recent NAEP mathematics as-

Figure 3-2. Science coursetaking by sex[1]



[1]Represents individuals in 1982 who were sophomores in 1980 (High School and Beyond Survey, First Follow-up)
SOURCE Appendix table 35

sessment are mixed.[8] At the 9 year old level, females outperformed males by about one percentage point with the largest differential occurring on the knowledge component. At age 13, males and females received about the same overall scores, although males scored higher on the applications component and females outperformed males on the skills portion. Among 17 year olds, overall scores showed a more than two point advantage for males. Since 1978, scores have risen significantly[9] for females at ages 9 and 13 and for males at age 13 (appendix table 38).

Science.[10] Results of the 1982 science assessment show that for 9 year olds, scores for males are slightly higher than those for females regardless of component.[11] This differential tends to widen at 13 and 17 year old levels. For example, at age 9, the largest score difference was 2.6 points on the attitude component. At age 13, the greatest differential, 5.2 points, also occurred on the attitude portion. By age 17, a difference of 5.8 points was recorded on the content component. Scores have fluctuated at all age levels since 1977 (appendix table 39). Noteworthy changes include statistically significant declines among 17 year old males on the inquiry and content components, a significant score decrease among female 17 year olds on the inquiry component, and a significant increase on the attitude portion for 17 year old females.

Characteristics of College-Bound Seniors

The College Board offers a series of national tests to college-bound high school seniors. These tests are not only important in college admissions decisions but may also provide further insights into the different participation patterns in science and engineering of women and minorities compared to those of men and the majority. The exams discussed in this section include (1) the SAT, (2) the SAT Achievement Test series, and (3) the Advanced Placement (AP) examinations.

Scholastic Aptitude Test.[12] SAT scores for males remain higher than those for females on both the verbal and mathematics components (table 3-1). Over the last decade, changes in scores on the components of the SAT have exhibited similar patterns between males and females. After falling steadily during the seventies, scores on both components leveled off or rose slightly during the eighties.

Between 1974 and 1984, verbal scores fell more for females (down 22 points) than for males (down 14 points). In 1984, males (433) scored 13 points higher than did females (420) on this component. Since 1981, verbal scores have leveled off for females and risen 3 points for males.

On the mathematics component, scores for females fell slightly more than those for males, down 10 points versus 6 points, respectively, since 1974. However, the average score for males is substantially higher than that for females. In 1984, the score of 495 for males was 46 points higher than the score for females (449). Stemming a decline, scores for females have risen 6 points compared to a 3 point gain for males since 1981.

The percentile ranking in verbal scores indicate no differences in the proportions of males and females who score in the highest range (table 3-1). In 1984, 3 percent of both the males and females scored 650 or above. Unlike the verbal component, there are major differences in the percentile rankings between males and females on the mathematics component. In 1984, 12 percent of the males scored over 650 on the mathematics portion compared to 4 percent of the females. Since 1981, this proportion has risen slightly for males while it has remained unchanged for females.

Achievement Test Scores.[13] Males scored consistently higher than did females on each of the achievement tests in science and mathematics in 1984. The lowest score differential occurred on the Mathematics Level II test while the largest was on the Physics exam (figure 3-3). This general pattern has not changed since 1981.

Males who took one or more of the science and mathematics achievement tests also had higher SAT math aptitude test scores than comparable females. However, the SAT math scores for both males and females who took these achievement tests were higher than average. For example, the lowest SAT math score for both males and females occurred among those who took the Mathematics Level I test—583 and 539, respectively. These scores are 80 to 90

Table 3-1. Scholastic Aptitude Test (SAT) scores by sex

Year	Score			Percent Scoring Over 650	
	Male	Female	Difference	Male	Female
VERBAL					
1974	447	442	5	1[1]	1[1]
1981	430	418	12	3	3
1984	433	420	13	3	3
MATHEMATICS					
1974	501	459	42	6[1]	1[1]
1981	492	443	49	10	4
1984	495	449	46	12	4

[1]Data represents 700-800 point range. Not available for 650-800 range

NOTE: Score range is 200 to 800

SOURCES: Appendix table 40 and Admissions Testing Program of the College Board, NATIONAL COLLEGE-BOUND SENIORS, annual series

points higher than the average SAT math scores for all males and females in 1984.

In 1984, roughly one-half of both SAT test-takers and achievement test-takers were female.[14] The proportion falls slightly, to 45 percent, among achievement test-takers who took one or more of the science and mathematics exams.[15] The proportion fluctuates across type of science or mathematics exam—54 percent of the college-bound seniors taking the achievment test in Biology were female while only 19 percent of those taking the exam in Physics were female.

Advanced Placement Exam.[16] The mean grade for males was higher than that for females on each of the eight science and mathematics exams. The highest average score for males, 3.5 (3 = qualified), was on the Mechanical Physics exam while their lowest score, 3.0, was on the General Physics test. Among females, the score range was 3.2 on the Math/Calculus BC test[17] to 2.4 (2 = possibly qualified) on the Computer Science exam. The largest male-female differential (0.8) occurred on the Computer Science test (the mean score for males was 3.2) while the smallest differential (0.2) was on the Math/Calculus AB test (3.2 for males).

About the same number of males and females (approximately 90,000) took one or more placement exams in 1984.[18] However, a significantly higher proportion of males than females took one or more of the exams in science and mathematics—43 percent and 26 percent, respectively.[19]

Intended Undergraduate Major. Among college-bound seniors, females are much less likely than males to specify a science or engineering field as their probable undergraduate major.[20] In 1984, 30 percent of the females compared to 50 percent of the males chose a science or engineering field (table 3-2). Primarily because of the increase in the proportion of both females and males choosing computer science, the proportions choosing an S/E field have risen since 1981 from 27 percent and 47 percent, respectively.

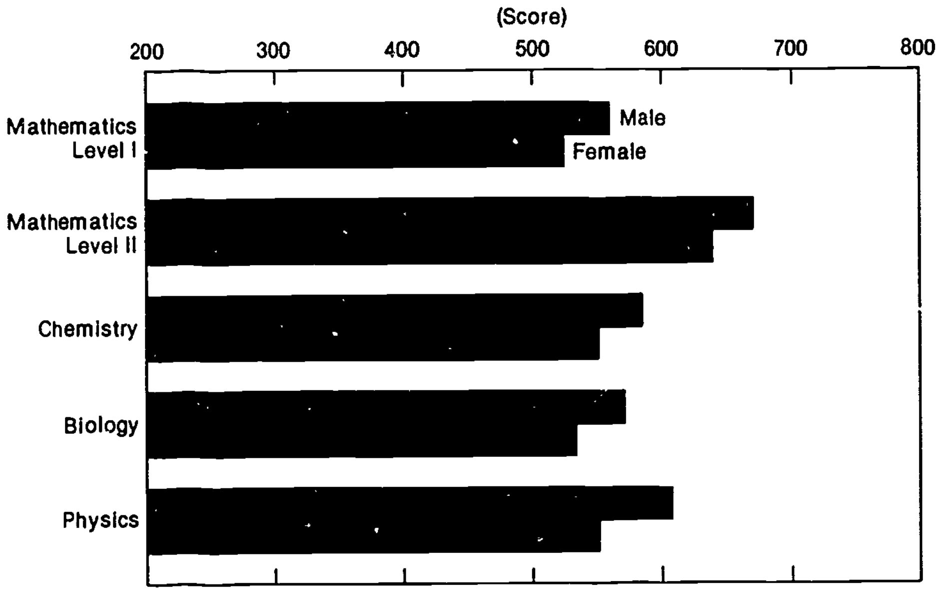
Among science and engineering fields, more than two-fifths of the males specified engineering as their probable major and another one-quarter chose computer science. This distribution differed for females. Over two-fifths chose to major in social science or psychology while an additional one-quarter specified computer science; only about one-eighth of the females chose engineering as their probable field of study at the undergraduate level.

SAT mathematics scores for males and females intending to major in a physical or biological science or engineering field were above the average for all college-bound seniors. Male scores, however, were consistently higher than female scores with the exception of prospective engineering majors where females scored higher than males, 558 vs. 549, in 1984.

College Freshmen

The precollege experiences of students may be further examined by exploring the characteristics of college freshmen.[21] These data indicate that students who intend to major in science or

Figure 3-3. Achievement test scores by sex: 1984



NOTE: Score range is 200 to 800.
SOURCE: Appendix table 42

Table 3-2. Intended Undergraduate Major of college-bound seniors by sex

Field	1981 Male	1981 Female	1984 Male	1984 Female
TOTAL	100%	100%	100%	100%
Science and Engineering	47%	27%	50%	30%
Science, total	25%	24%	29%	26%
Biological science	3%	3%	3%	3%
Agriculture	2%	1%	2%	1%
Computer science	7%	5%	12%	8%
Mathematics	1%	1%	1%	1%
Physical science	3%	1%	3%	1%
Psychology	1%	5%	1%	5%
Social science	7%	7%	7%	7%
Engineering	22%	3%	21%	4%
Non-science and engineering	54%	73%	50%	70%

NOTE: Detail may not add to totals because of rounding.
SOURCE: Appendix table 44e

engineering fields at the undergraduate level are more academically prepared than students in non-science and engineering programs. Nonetheless, differences by gender continue to be evident for those students who have entered college and are majoring or intend to major in science or engineering programs.

Regardless of sex, freshmen students who chose to major in science or engineering fields are more academically prepared than are students choosing non-S/E fields.[22] For example, 34 percent of the males and 41 percent of the females who chose science and engineering as their probable major reported a high school grade point average in the "A" range in 1983. Among non-S/E majors, these proportions were 17 percent for males and 28 percent for females. These proportions have virtually remained unchanged since 1974.

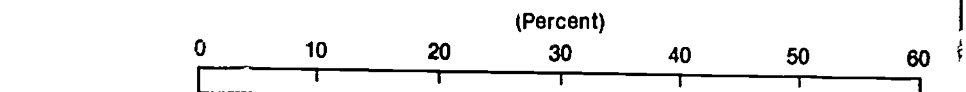
There is wide variation in self-reported high school grade point averages among prospective science and engineering majors. A higher proportion of females than males, however, report an "A" average regardless of field. Among major fields of science, the percentage reporting an "A" average for females ranged from 29 percent for social science majors to 58 percent for mathematics majors. For males, the range was 23 percent (computer science) to 44 percent (physical science and mathematics). For probable engineering majors, 59 percent of the females and 38 percent of the males reported a high school grade point average in the "A" range (figure 3-4).

Males and females whose probable major is science or engineering differ in terms of their degree aspirations. Among freshmen S/E majors in 1983, the largest fraction of both males and females indicated that their highest degree planned was at the master's level—38 percent (males) and 35 percent (females). A higher proportion of males (27 percent) than females (23 percent) expected the baccalaureate to be their highest degree. Females, however, were more likely than males to choose the doctorate (19 percent and 17 percent, respectively).

Undergraduate Preparation

The Educational Testing Service offers a series of exams to potential graduate students. The Graduate Record Examination is taken by students who plan further study in the arts and sciences. Ostensibly used by graduate and professional schools to supplement undergraduate records, it may also be used to examine the undergraduate preparation

Figure 3-4. Percentage of college freshmen who earned an "A" average in high school by probable major and sex: 1983



SOURCE: Appendix table 45.

of women and minorities compared to that of men and the majority.

Graduate Record Examination.[23] Males and females who majored in a science or engineering field at the undergraduate level earned higher scores than all male and female test-takers in 1984 (table 3-3).[24] A much larger proportion of the men than women had majored in a science or engineering field at the undergraduate level—68 percent versus 45 percent.[25]

Among test-takers who majored in science and engineering at the undergraduate level in 1984, females scored slightly higher than did males on the verbal component, males scored substantially better on the quantitative portion, and slightly better on the analytical section. These differences generally persisted regardless of field although wide variation occurred (appendix table 47). For example, among engineering majors, women scored higher than men on both the verbal (507 vs. 463) and analytical (605 vs. 554) components while men scored higher than women (669 vs. 659) on the quantitative section.

Since 1979, scores for both men and women who majored in science and engineering have declined on the verbal component and increased on both the quantitative and analytical components (table 3-3). The largest change has occurred on the quantitative portion. Scores for men rose 27 points while those for women were up 20 points. This change for men reflects increases in the quantitative scores for those majoring in the social, behavioral, and biological sciences. For women, the increase is attributable to very substantial gains among those who majored in engineering (up 56 points) and the biological sciences (up 28 points).

Table 3-3. Graduate Record Examination (GRE) scores by sex and undergraduate major

Score	1979 Men	1979 Women	1984 Men	1984 Women
All Test-Takers				
Verbal	487	489	488	487
Quantitative	555	478	580	494
Analytical	508	499	533	515
Science and Engineering majors				
Verbal	495	500	490	497
Quantitative	575	502	602	522
Analytical	515	515	545	535

NOTE: Score range is 200 to 800.
SOURCE: Appendix table 47.

Earned Degrees

Women continue to be underrepresented among graduates earning degrees in science and engineering. Although women represented about one-half of both total enrollment in higher education institutions[26] and all degrees awarded, they accounted for 43 percent of all science and 12 percent of all engineering degrees (including advanced degrees) awarded in 1983. Nonetheless, there has been progress at all educational levels since 1970.

Bachelor's Degrees. In 1983, almost 116,000 science and engineering bachelor's degrees were awarded to women, representing almost 38 percent of all S/E baccalaureates granted. In 1970, women earned 26 percent of the S/E bachelor's degrees. This proportional rise represents an overall growth rate of 68 percent for women over the 13-year period compared to a 2 percent decline for men.

Among science and engineering fields, women represented over one-half (53 percent) of the degrees awarded in social science but only 13 percent of those granted in engineering. Despite their low representation, the number of women earning engineering degrees has increased significantly from 338 in 1970 to 9,719 in 1983. In addition to engineering, the number of women earning degrees in the physical sciences (up 118 percent) and the life sciences (up 124 percent) have increased sharply.

Advanced Degrees. The pattern of change at the bachelor's degree level is mirrored at both the master's and doctorate degree levels. In 1983, women earned more than 17,000 (29 percent) master's degrees in science and engineering. Over the 1970-83 period, the number of master's degrees awarded to women increased 99 percent.

The largest relative increases occurred in engineering and the social sciences. The number of engineering degrees awarded to women increased almost 1,000 percent between 1970 and 1983, increasing their share of master's degrees in this field to almost 10 percent (1,900). During the same period, the number of men earning master's degrees in engineering rose from 15,400 to 17,800. In the social sciences, women accounted for 50 percent of the degrees awarded in 1983 and registered an overall growth rate of 126 percent since 1970.

The number of S/E doctorates awarded to women in 1984 was 4,568, or about 25 percent of the total. Between 1970 and 1984, the increase in the number of women earning S/E doctorates was 181 percent. In contrast, the number of men who earned S/E doctorates fell 19 percent. For women, above average growth rates were exhibited in engineering and the social sciences. In 1984, women earned 41 percent of the doctorates awarded in the social sciences, but 5 percent of those granted in engineering.

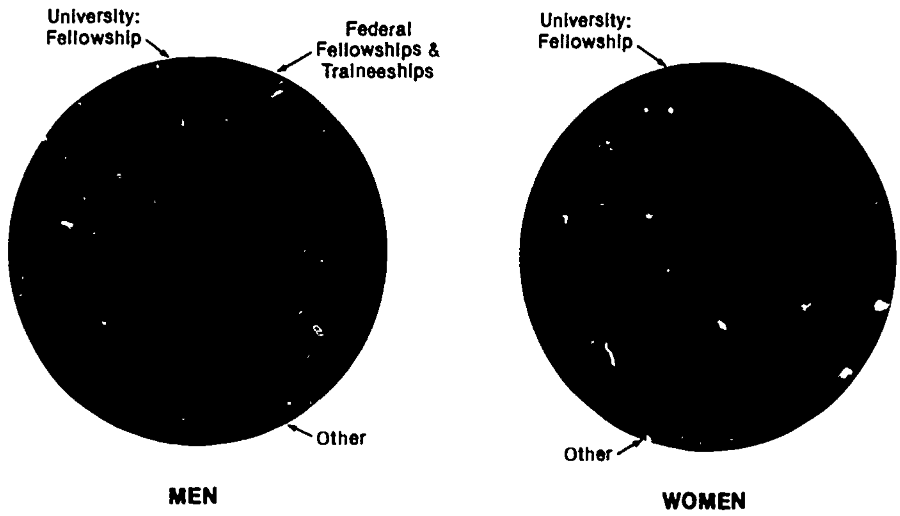
Graduate Degree Attainment Rates

Additional evidence of the significant gains made by women at all educational levels may be inferred by examining graduate degree attainment rates; i.e., the propensity of men and women to complete graduate degrees. Graduate degree attainment rates are defined as S/E master's degrees expressed as a percent of S/E bachelor's degrees awarded two years earlier and S/E doctorate degrees expressed as a percent of S/E bachelor's degrees awarded seven years earlier.

At the S/E master's level, the graduate degree attainment rate for women is lower than that for men, although the difference has narrowed slightly since 1972. In 1983, the rate for women was 15.8 percent, up from 13.9 percent in 1972. For men, it was 22.4 percent, virtually unchanged from 1972. Underlying this change in the attainment rate for women is above average growth, especially at the bachelor's level, in the number of women earning degrees in the physical and life sciences.

At the S/E doctorate level, the completion rates for both men and women have declined with that of men falling much more sharply. In 1984, about 4.7 percent of the women earned an S/E doctorate seven years after the baccalaureate compared to a rate of 7.1 percent for men. In 1972, the respective rates were 5.8 percent and 13.1 percent.

Figure 3-5. Major source of graduate support for 1984 doctorate recipients by sex



SOURCE: Based on appendix table 53

Graduate Support Status

For those who received a doctorate in a science or engineering field in 1984, both men and women reported universities as their primary source of support more often than other sources (figure 3-5). A substantially larger share of men than women, however, reported this source of support—54 percent versus 42 percent.[27] Sources of support for graduate education may illuminate potential areas of disparity between men and women; that is, the amount and type of support received may act to stimulate or inhibit further study in an S/E field.

Although a substantial number of both men and women receive university support, differences exist in the actual type of support. Among the women receiving university assistance, a slightly higher proportion held research (46 percent) rather than teaching (40 percent) assistantships. In comparison, men were much more likely to hold research (58 percent) rather than teaching (33 percent) assistantships.

On a field-specific basis, differences in the type of assistantship reported narrow (appendix table 53). For example, of those receiving degrees in the physical sciences, men (66 percent) were only slightly more likely than women (62 percent) to hold research assistantships. In comparison, one-half of both men and women receiving social science and psychology degrees held teaching assistantships. In 1984, women who had received university support were twice as likely as men to have earned their S/E doctorates in either psychology or the social sciences (40 percent vs. 19 percent). Thus, overall differences in type of support primarily reflects differences in field distributions.

Postdoctoral Appointments

An indication of the increasing number of women earning doctorates in science and engineering is the rising number of women holding postdoctoral appointments in science and engineering. In 1983, almost 3,100 women held these appointments, up from less than 900 in 1973. This increase raised the proportion of women holding such appointments from 15 percent to almost 28 percent of the total appointments in 1983.

In 1983, women accounted for about 29 percent of the postdoctoral appointments in science but the 27 women who held postdoctorates in engineering represented only 8 percent of all the engineering postdoctorates. Among science fields, women were most highly represented in psychology and the life sciences (table 3-4).

The field distribution among those holding postdoctoral appointments differs considerably between men and women (table 3-4). Almost 73 percent of the women compared to 59 percent of the men were in the life sciences. An additional 21 percent of the men held postdoctorates in the physical sciences while only 9 percent of the women held such appointments. Finally, women were more likely than men to hold appointments in the social sciences and psychology: 15 percent versus 11 percent.

A study by the National Academy of Sciences[28] reported that men and women take postdoctoral appointments primarily to gain research experience. Other reasons cited include (1) the opportunity to work with a particular scientist or research group; (2) the chance to transfer to different fields; and (3) the inability to secure employment. Very few men and women reported the final reason as their major incentive for taking these appointments.

RACIAL MINORITIES

Overview

Curriculum choice and placement influences both the number and type of mathematics and science courses taken

Table 3-4. Science and engineering postdoctoral appointments by sex: 1983

Field	Men	Women	Women as a % of total
All science and engineering	100%	100%	28%
Science	96%	99%	29%
Physical science	21%	9%	14%
Mathematical science	1%	1%	20%
Computer specialties	1%	1%	26%
Environmental science	4%	2%	15%
Life science	59%	73%	32%
Psychology	4%	7%	42%
Social science	7%	8%	29%
Engineering	4%	1%	8%

NOTE: Detail will not add to totals because of rounding.
SOURCE: Based on appendix table 55.

in high school. On average, whites are more likely than blacks and other racial groups to report an academic track. Types of mathematics and science coursework differ significantly across racial groups. For example, Asians are more likely than other groups to take advanced mathematics courses such as Calculus.

Different coursetaking patterns are reflected in scores on standardized tests, especially in mathematics. Blacks and native Americans score lower than do whites on both the verbal and mathematics component of the SAT. Asian-Americans score lower than do whites on the verbal component, but higher on the mathematics section. Because quantitative skills are requisite to subsequent S/E training, it is not surprising that a much higher proportion of Asian-American college-bound seniors than either white, black, or native American seniors choose science and engineering as their probable field of study at the undergraduate level.

Blacks, Asians, and native Americans earn a small fraction of the degrees awarded in science and engineering. The fractions are disproportionately low for blacks and native Americans when compared with more comprehensive statistics, such as undergraduate and graduate enrollments. The representation of Asians among those who earn S/E degrees is higher than their representation in overall enrollment patterns.

Among those earning doctoral degrees in S/E fields, blacks and native Americans are less likely than whites or Asians to receive financial support from a university. Of those receiving university support, blacks are more likely than other groups to hold teaching rather than research assistantships.

Precollege Preparation

Curriculum and Coursework

Whites are more likely than blacks to be in an academic curriculum. Among high school seniors, two-fifths of the whites compared to about one-third of the blacks were in academic programs.

Among college-bound seniors, whites were substantially more likely than blacks and native Americans and somewhat more likely than Asians to report an academic track. About four-fifths of the whites, three-quarters of the Asians, and only about two-thirds of the blacks and native Americans were in academic programs. Curriculum differences are small when futher stratified by sex (appendix table 33).

Blacks and Asians took more years of mathematics in high school than did either whites or native Americans. Two-thirds of the Asians, almost one-half of the blacks, and approximately two-fifths of both the whites and native Americans had enrolled in four or more math courses in high school. The grade point average in math, however, was much lower for blacks (1.98) than it was for either Asians (2.6), whites (2.34), or native Americans (2.19).

Although blacks and Asians took more years of mathematics coursework than did whites and native Americans, the types of mathematics courses taken differed significantly by racial group. For example, Asians were much more likely than all other groups to have taken advanced mathematics courses. This difference in coursetaking is highlighted in Calculus. Almost 20 percent of the Asians had attempted a Calculus course, compared to 8 percent of the whites and 4 percent of both the blacks and native Americans. Blacks and native Americans also were not as likely as whites and, especially, Asians to have taken Algebra I, Algebra II, Geometry, or Trigonometry (table 3-5).

Types of science courses taken differ by race. Asians enroll in more courses than other groups. More than 35 percent of the Asians had taken four or more science courses while 23 percent of the whites and about 19 percent of the blacks and native Americans had done so. The pattern in grade point average in science is similar to that in mathematics: Asians (2.69) report the highest grade point average while blacks (2.08) show the lowest.

Participation in advanced science courses is greater for Asians than for other groups (table 3-5). For example, almost three-fifths of the Asians had attempted a course in Chemistry while only two-fifths of the whites, less than one-third of the blacks, and about one-quarter of the native Americans took coursework in this subject. General physical sciences are the only courses where Asian participation was less than that of other groups, more than two-thirds of the other groups had taken this coursework while only about one-half of the Asians had done so.

Among college-bound seniors, coursetaking differentials narrow. In mathematics, the average number of years ranged from 3.4 for blacks to 3.9 for Asian-Americans in 1984. Differences in the average number of years in the physical sciences[29] range from 1.7 (blacks) to 2.1 (Asians) while almost no difference exists in the average number of years in the biological sciences. Regardless of race, males generally take more years of mathematics and the physical sciences, but about the same number of years of the biological sci-

Table 3-5. Mathematics and science coursetaking by race[1]

Coursework	White	Black	Asian	Native American
MATHEMATICS				
Algebra I	71%	64%	66%	57%
Geometry	60%	46%	68%	34%
Algebra II	38%	29%	39%	22%
Trigonometry	26%	16%	43%	14%
Calculus	8%	4%	19%	4%
SCIENCE				
Physical science	67%	71%	52%	67%
Biology	79%	80%	79%	71%
Adv. Biology	20%	16%	25%	14%
Chemistry	39%	30%	58%	24%
Chemistry II	5%	3%	9%	3%
Physics	20%	12%	36%	9%
Physics II	2%	1%	7%	0%

[1]Represents individuals in 1982 who were sophomores in high school in 1980 (High School and Beyond, First Follow-up).
SOURCE Appendix table 35

ences as do females (appendix table 36).

Further examination of the science and mathematics coursetaking experiences of college freshmen who major in S/E fields reveals a similar pattern. In mathematics, a significantly smaller percentage of blacks (61 percent) and native Americans (58 percent) had completed four or more years of mathematics coursework in high school than either whites (80 percent) or Asians (84 percent) in 1983. Differentials, however, narrow considerably for courses in physical and biological science. In the physical sciences, between 56 percent and 68 percent of all the racial groups had taken one to two years of coursework in this subject. In the biological sciences, at least 80 percent to 90 percent had taken one to two years of coursework.

Mathematics and Science Achievement

The results of the latest National Assessment of Educational Progress mathematics assessment show that blacks continue to score well below their white counterparts.[30] At age 9, the difference was 14 percentage points; at age 13, the gap was 15 points; and by age 17, the difference had increased to 18 points. Due to gains made by blacks at all age levels, the differentials have narrowed since 1978 when they were 15, 18, and 20 points, respectively The most significant increases were made by black 13 year olds. They registered statistically significant[31] increases on all components, with the largest gain being eight points on the knowledge portion of the assessment; the comparable change for whites was 3.9 percentage points (appendix table 38).

On the latest National Assessment of Educational Progress science assessment, the available data are disaggregated by sex between whites and blacks to permit additional analysis.[32] White males and females generally score higher than black males and females at all age levels (appendix table 39). The only exceptions are the performance of black males and females at ages 13 and 17 on the attitude component. On this component, blacks scored between 1 and 10 percentage points higher than did whites in 1982. Between 1977 and 1982, changes in the scores for blacks were not statistically significant at any age level regardless of component. Scores for whites, however, declined significantly in some cases. For example, there was a significant fall in the scores on the attitude section at age 13.

Characteristics of College-Bound Seniors

Scholastic Aptitude Test. Blacks and native Americans scored lower than whites on both the verbal and mathematics components of the SAT in 1984 (figure 3-6). However, since 1976, scores for whites have fallen, while those for blacks and native Americans have increased or remained stable, thus narrowing the score gap. Asian-Americans scored lower than did whites on the verbal component but higher on the mathematics section. Since 1976, Asian-American scores have fallen on the verbal section and remained virtually unchanged on the mathematics component.

About one million college-bound seniors took the SAT in 1984. Blacks (80,700) accounted for 9.1 percent of these seniors while Asian-Americans (40,000) and native Americans (4,600) represented 4.5 percent and 0.5 percent, repectively.[33]

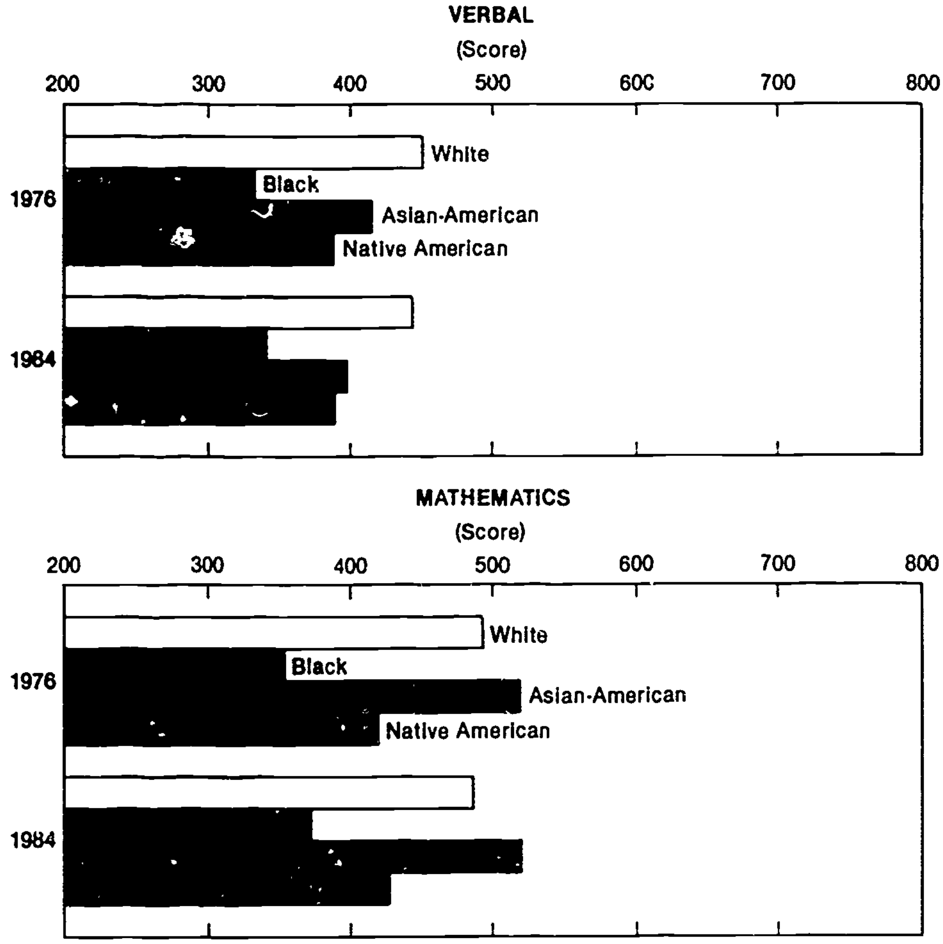
On the verbal component, blacks scored the lowest among the racial groups: 342 or 103 points lower than whites (445) in 1984. This differential has fallen from 119 points in 1976 and 110 points in 1981. Verbal scores for Asian-Americans and native Americans were 398 and 390, respectively, in 1984.

On the mathematics component, blacks (373) scored 114 points lower than whites (487) while native Americans scored (427) 60 points lower. Since 1976, these differences declined from 139 and 73 points, respectively. Asian-Americans scored 32 points (519) higher than did whites in 1984; this difference has increased from 25 points in 1976.

On the verbal component, percentile rankings show that while 3 percent of the whites scored 650 or more, .03 percent of the blacks, and only 1 percent of the native Americans did so in 1984. Among Asian-Americans, 3 percent scored in the 650 to 800 range. Percentile rankings on the mathematics component show that 1 percent of the blacks, 4 percent of the native Americans, 10 percent of the whites, and 19 percent of the Asian-Americans scored over 650. Among all college-bound seniors who scored 650 or better on this component, almost 8.4 percent were Asian-American; Asian-Americans accounted for 4.5 percent of all college-bound seniors in 1984.

Regardless of race, males scored higher than females on both components of the SAT. However, the differential varies

Figure 3-6. Scholastic Aptitude Test (SAT) scores by race



NOTE: Score range is 200 to 800
SOURCE: Appendix table 40.

by race and across components. On the verbal portion in 1984, the largest gap (20 points) occurred between native American males and females while there was only a 5-point difference between Asian-American males and females. On the math portion of the exam, a 27-point difference occurred between black males and females while among whites, Asian-Americans, and native Americans, the differences ranged from 44 and 47 points.

Achievement Test Scores. Asian-Americans scored higher than either blacks or native Americans on all five of the science and mathematics achievement tests in 1984 (table 3-6). In addition, their scores were higher than those of whites on both the Mathematics tests and the Chemistry test and about the same on the Biology and Physics exams SAT mathematics test scores also were consistently higher for Asian-Americans who had taken achievement tests in science or mathematics. For example, the SAT math score for Asian-Americans who had taken the achievement test in Mathematics Level I was 578; comparable figures for whites, blacks, and native Americans were 567, 482, and 522, respectively.

Among those who take achievement tests, a higher proportion of Asian-Americans than other groups take one or more of the science and mathematics tests. In 1984, more than 54 percent of the Asians, compared to about 48 percent of the whites, blacks, and native Americans took one or more of the tests offered in these subjects.

Advanced Placement Exam. In general, Asian-Americans scored higher on the science and mathematics AP exams than whites, native Americans, and blacks, respectively (appendix table 43). By science and mathematics test, the highest score for Asian-Americans was a 3.6 on the Math/Calculus BC test while the lowest was 3.0 on the Computer Science Test. For whites, the score range was 3.4 (Mechanical Physics) to 2.9 (General Physics). Native American scores fell between 3.4 on the Math/Calculus test to 2.3 on the Chemistry exam. Blacks scored the highest (2.9) on the Electrical and Magnetic Physics test and lowest (2.3) on the Chemistry test.

The number of candidates taking AP exams from racial minority groups is small. In 1984, about 4,500 blacks (2.5 percent of the total), 11,400 Asian-Americans (6.5 percent), and only 440 native Americans (0.2 percent) took one or more of these exams.[34] Among those who took one or more AP exams, about one-fifth of the native Americans, one-third of both the whites and blacks, and more than one-half of the Asian-Amer-

Table 3-6. Achievement test scores by race: 1984

Subject	White	Black	Asian-American	Native American
Mathematics Level I	546	461	566	507
Mathematics Level II	661	577	674	614
Chemistry	575	505	586	524
Biology	553	481	556	521
Physics	600	511	599	574

NOTE. Score range is 200 to 800
SOURCE: Appendix table 42.

icans took one or more of the exams offered in science and mathematics in 1984.

Intended Undergraduate Major. Primarily because of the large fraction who choose engineering, a much higher proportion of Asian-American college-bound seniors than either white, black, or native American seniors select science and engineering as their probable field of study at the undergraduate level (figure 3-7). In 1984, about 47 percent of the Asian-Americans indicated they would major in science or engineering. Among the other racial groups, blacks (41 percent) were more likely than either whites (39 percent) or native Americans (40 percent) to specify an S/E field.

The proportion of students who intend to major in science and engineering has risen for all racial groups since 1981. Driving this increase is the rising proportion intending to major in computer science. In 1984, more than 9 percent of the whites (up 4 percentage points), 16 percent of the blacks (up 7 percentage points), 13 percent of the Asian-Americans (up 3 points), and 11 percent of the native Americans (up 5 points) chose this field as their intended undergraduate major.

SAT mathematics scores for college-bound seniors who intend to major in either the physical or biological sciences, mathematics, or engineering generally are higher than the overall averages regardless of racial group. With the exception of whites, however, scores for those who intend to major in a social or computer science field are at or below the average for all college-bound seniors. For example, among prospective computer science majors in 1984, SAT math scores were 360 for blacks (vs. 373 overall), 518 for Asian-Americans (vs. 519), and 423 for native Americans (vs. 427).

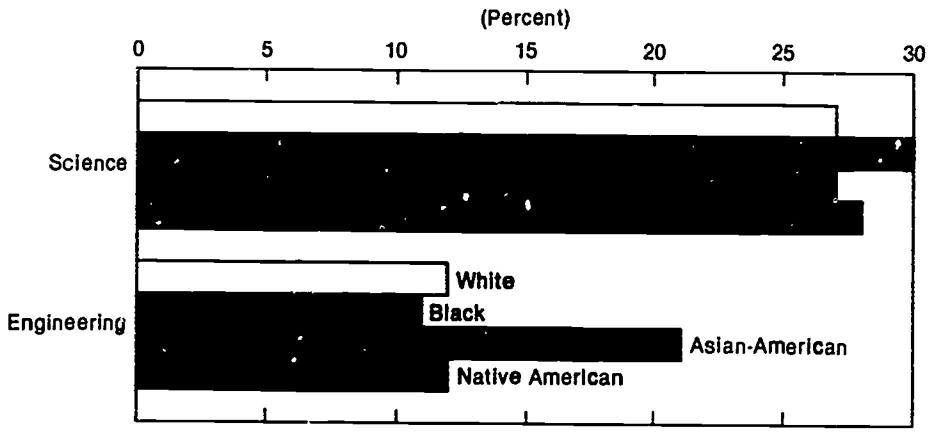
College Freshmen

College freshmen who choose to major in science and engineering achieved higher grade point averages in high school than did those choosing other fields. This differential varied by racial group (figure 3-8). Among those freshmen choosing science and engineering fields in 1983, Asians were much more likely than whites, blacks, or native Americans to have earned an "A" average in secondary school.

The proportion of college freshmen who earned "A" averages in high school varied by field of science and engineering and racial group. Among whites, for example, a larger fraction (53 percent) of those who planned to major in mathematics than those who planned majors in other S/E fields had earned an "A" average. For blacks, Asians, and native Americans, the highest proportions of "A's" were earned by physical science majors—32 percent, 68 percent, and 50 percent, respectively.

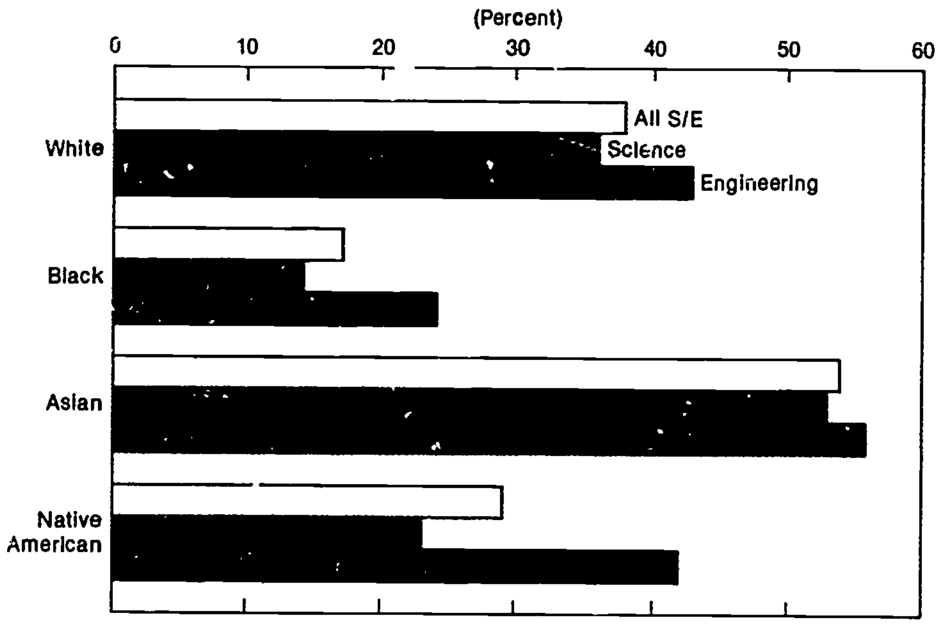
The degree aspirations of freshmen planning to pursue a science or engineering curriculum also differ by racial

Figure 3-7. Intended undergraduate major by race: 1984



NOTE Out of a possible 29 choices for college major, seven are in science and one is in engineering.
SOURCE: Appendix table 44a

Figure 3-8. Percentage of college freshmen who earned an "A" average in high school by probable major and race: 1983



SOURCE: Appendix table 45.

groups. More than one-quarter of the 1983 Asian freshmen compared to less than one-fifth of the freshmen in the other racial groups planned to study for a doctoral degree. The largest fraction of each group, however, planned to earn a master's degree—whites (37 percent), blacks (35 percent), Asians (33 percent), and native Americans (30 percent).

Undergraduate Preparation

Graduate Record Examination. Those who majored in science and engineering fields at the undergraduate level scored higher than all GRE test-takers combined regardless of racial group (figure 3-9). Among those who majored in science and engineering, whites scored higher than blacks, Asians, or native Americans on the verbal and analytical components; Asians generally scored higher than other racial groups on the quantitative section of the aptitude exam. This pattern has persisted since 1979.

Black and Asian test-takers who majored in science and engineering represented a larger fraction of all test-takers in science and engineering than of all test-takers combined.[35] In 1984, blacks represented 6 percent (4,800) while Asians accounted for 2.7 percent (2,200) of the test-takers who had majored in science and engineering fields. Less than 1 percent (500) of the test-takers from these fields were native American.

Across all racial groups, those who majored in the physical sciences or in engineering scored highest on all components, while those who majored in the social sciences scored consistently lower. Among science and engineering fields, blacks scored consistently lower on all components than did whites, Asians, or native Americans (appendix table 47).

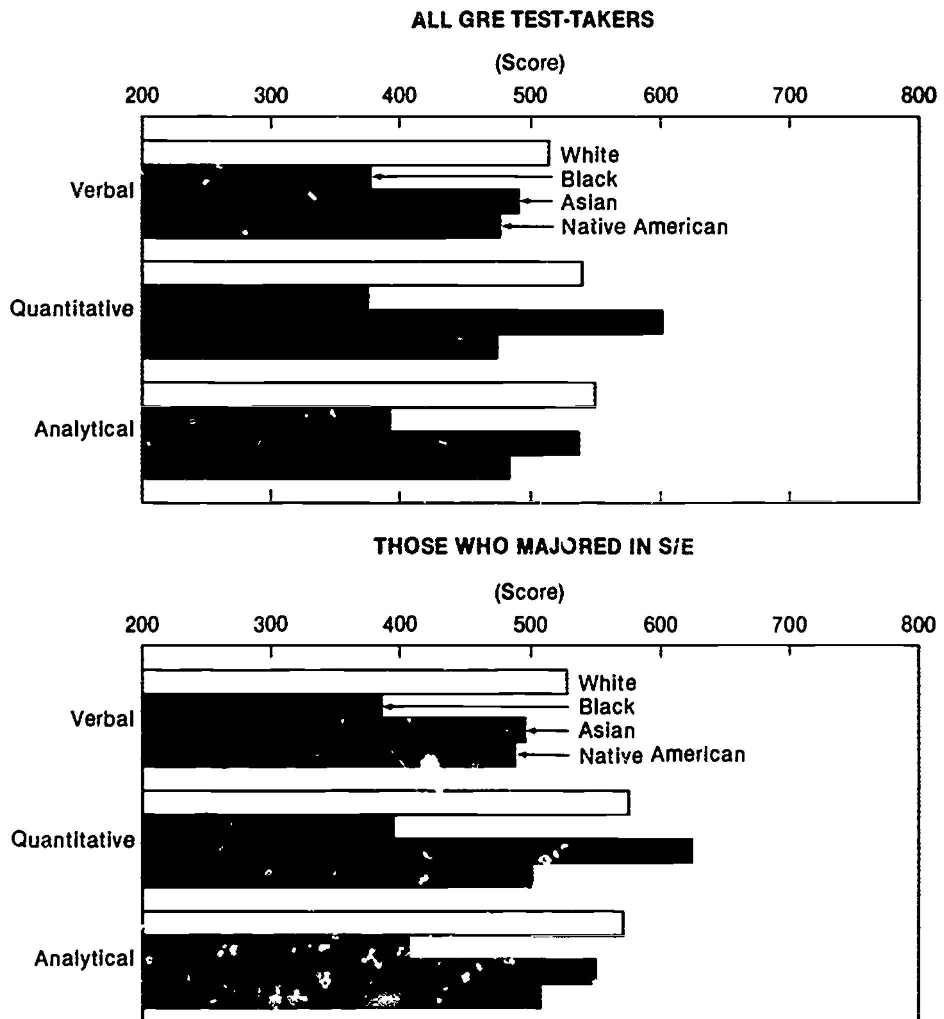
The greatest variation in scores occurred on the quantitative component. In 1984, Asians who majored in science and engineering recorded a quantitative score of 625, with those who majored in engineering (679) earning the highest score. In contrast, blacks who majored in science and engineering registered a score of 394 while those who majored in engineering scored 563.

Between 1979 and 1984, scores on all GRE components rose for those who majored in science and engineering regardless of racial group. The largest increases occurred on the quantitative and analytical sections. On the quantitative component, Asian scores (up 33 points) increased more than scores for whites (up 19 points), blacks (19 points), or native Americans (24 points). On the analytical component, the increase ranged from 41 points for blacks to 25 points among whites.

Earned Degrees

Blacks, Asians, and native Americans earn a small fraction of the degrees in science and engineering. This fraction is disproportionately low for blacks and native Americans when compared with more comprehensive statistics. In 1983, blacks earned 5.5 percent (16,799) of the S/E bachelor's degrees, 3.8 percent (1,823) of the S/E master's degrees, and only 2.2 percent (305) of the doctorates in science and engineering. Blacks, however, accounted for 10 percent of overall undergraduate enrollment and 5 percent of all graduate enrollments.[36] Native Americans earned 1,065 S/E baccalaureates (0.4 percent of the total), 157 S/E master's degrees (0.3 percent), and 28 S/E doctoral degrees (0.2 percent) in 1983. In comparison, native Americans accounted for 0.7 percent of all under-

Figure 3-9. Graduate Record Examination (GRE) scores by race: 1984



NOTE: Score range is 200 to 800
SOURCE: Appendix table 47.

graduate enrollments and 0.4 percent of the graduate enrollments. Since 1979, there has been little change in the proportions of blacks and native Americans earning science and engineering degrees at all levels.

Asian representation is higher among those who receive science and engineering degrees than among overall enrollments. In 1983, Asians earned 3.3 percent (10,150) of the S/E bachelor's degrees, 6.1 percent (2,901) of the S/E master's degrees, and about 5.7 percent (771) of the S/E doctorates. In contrast, they represented 2 percent of both undergraduate and graduate enrollments. Since 1979, the proportion of S/E degrees earned by Asians has increased at the bachelor's and master's degree levels and fallen at the doctoral level.

Bachelor's Degrees. Field distributions of baccalaureates differ substantially by race. Blacks (89 percent) and native Americans (84 percent), for example, are more likely to earn their degrees in science fields than are whites (79 percent) or Asians (67 percent). Within the science fields, more than four-fifths of the blacks earn degrees in one of three fields: psychology or the life and social sciences. Native Americans also earn most of their degrees in these three fields. More than one-third of the whites who major in science earn their degrees in the social sciences while another one-quarter earn life science degrees. Asians are more evenly distributed across the science fields; the largest fraction (about 28 percent) earn degrees in life science. This fraction is somewhat less than the 33 percent who earn engineering degrees.

Advanced Degrees. Asians continue to be far more likely than other racial groups to major in engineering at the master's degree and doctorate levels, while blacks are more highly concentrated in the social sciences and psychology. At the master's level, almost 51 percent of the Asians earned engineering degrees and 54 percent of the blacks earned social science or psychology degrees. Among whites, about 25 percent earned degrees in engineering and another 35 percent earned social science or psychology degrees. The degree distribution of native Americans showed almost one-half earning master's degrees in either the life sciences or psychology.

At the doctorate level, the field of psychology accounted for the largest fraction of the blacks (37 percent) and the native Americans (32 percent). Whites most often earned their degrees in the life sciences (30 percent). Again, engineering accounted for a larger fraction (32 percent) of Asians earning S/E doctorate degrees than science fields.

Graduate Support Status

Among those who received doctorates in science and engineering in 1984, all racial groups cited universities most frequently as the primary source of support but to differing degrees (appendix table 54). The level and type of support received for graduate education may reflect disparities among racial groups. More than one-half of the whites and Asians reported receiving university support, compared to less than two-fifths and one-quarter, respectively, of the blacks and native Americans.[37] Other frequently cited sources of support were "Federal" and "self." Native Americans (52 percent) were much more likely to cite self-support than either whites (29 percent), blacks (29 percent), or Asians (23 percent).

Of those receiving university support, with the exception of blacks, most reported holding research assistantships rather than teaching assistantships (table 3-7). While almost 59 percent of the Asians, 55 percent of the whites, and about 42 percent of the native Americans held research assistantships in 1984, only 28 percent of the blacks held these positions. This lower propensity among blacks partially may reflect differing field distributions. For example, blacks were more highly concentrated in the fields of social science and psychology where teaching assistantships are more often awarded. More than three-fifths of the blacks earned their degrees in these fields, compared with almost one-half of the native Americans, two-fifths of the whites, and about one-sixth of the Asians.

Postdoctoral Appointments

Very few minorities hold postdoctoral appointments in science and engineering although their numbers have increased: between 1973 and 1983, the number of blacks holding S/E postdoctorates increased from 28 to 215. During the same time period, Asians holding postdoctoral appointments almost doubled from 658 to 1,175. Eleven native Americans held postdoctoral appointments in 1983, up from none in 1973. In 1983, blacks, Asians, and native Americans accounted for 2 percent, 11 percent, and 0.1 percent, respectively, of the total number of appointments.

Field distributions differ among racial groups. With the exception of Asians, almost all postdoctoral holders were in the sciences in 1983. For whites, almost 65 percent were in the life sciences and another 17 percent were in the physical sciences. Blacks were concentrated most highly in the social (32 percent) and physical (32 percent) sciences. Nearly 57 percent of the Asians were in the life sciences and about 17 percent were in engineering. Although

Table 3-7. Proportion of doctorate recipients receiving graduate support from universities by type of support and race: 1984

Type of support	White	Black	Asian	Native American
Universities, total	51%	37%	56%	26%
Fellowship	5%	11%	9%	7%
Teaching Assistantship	18%	16%	15%	7%
Research Assistantship	28%	11%	33%	11%

SOURCE: Based on appendix table 54

very few native Americans hold postdoctoral appointments, most are in the life sciences.

HISPANICS

Overview

Hispanics score lower than all groups combined on tests of science and mathematics achievement with the widest differential occurring at the secondary school level. Contributing factors to this lower performance are that Hispanics are not enrolling in academic programs or taking as many science and mathematics courses in high school as are all students.

Hispanics score lower than all college-bound seniors on the SAT. However, while the average scores for all students have fallen in the last decade, those for Hispanics have either risen slightly or remained stable. About the same proportion of Hispanics as of all college-bound seniors specifies a science or engineering field as their probable undergraduate major. Hispanics, however, are not as likely as all students to take either achievement tests or AP exams in science and mathematics.

Hispanics are underrepresented among those granted degrees in science and engineering; this underrepresentation is more pronounced at advanced degree levels. Nonetheless, among those who do earn S/E degrees, Hispanics are more apt to earn degrees in the social sciences and psychology.

Precollege Preparation

Curriculum and Coursework

Hispanics were not as likely as all high school seniors to be in an academic curriculum. Slightly more than one-quarter of the Hispanic high school seniors compared to two-fifths of all seniors were on an academic track.[38] Among college-bound seniors, Hispanics also were less likely than the total to be on an academic track. In 1984, almost 78 percent of all college-bound seniors, but only 68 percent of the Mexican Americans and 64 percent of the Puerto Ricans reported being in an academic curriculum. When disaggregated by sex, Mexican American and Puerto Rican females were somewhat less likely than their male counterparts to report an academic program.

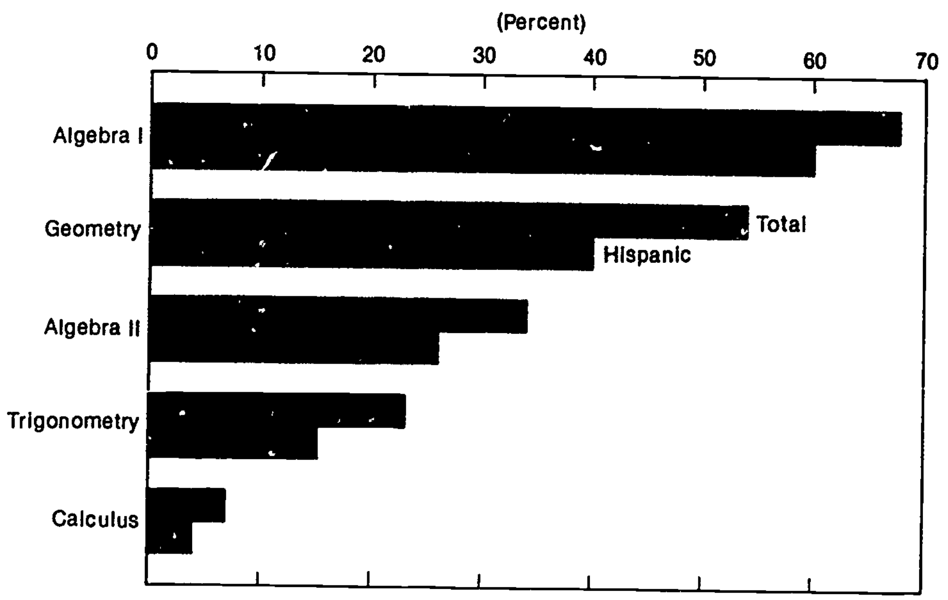
Hispanics were not as likely to have taken as many mathematics courses as did other high school students. About 36 percent of the Hispanics compared to 41 percent of all students had taken four or more mathematics courses in high school. The average grade point average in these courses also was lower for Hispanics: 2.04 versus 2.27. Hispanics do not take the same types of mathematics courses as all high school students (figure 3-10). For example, while 54 percent of the total had taken Geometry, only 40 percent of the Hispanics had done so.

Differences also exist in the number of science courses taken in high school. Slightly more than 21 percent of the total compared to 15 percent of the Hispanics had enrolled in four or more science courses. The differential in grade point average was larger in science than mathematics: 2.38 for all students and 2.07 for Hispanics. Types of science courses taken also differ between all students and Hispanics (figure 3-11). For example, over one-third of all students compared to about one-quarter of the Hispanic students had taken Chemistry.

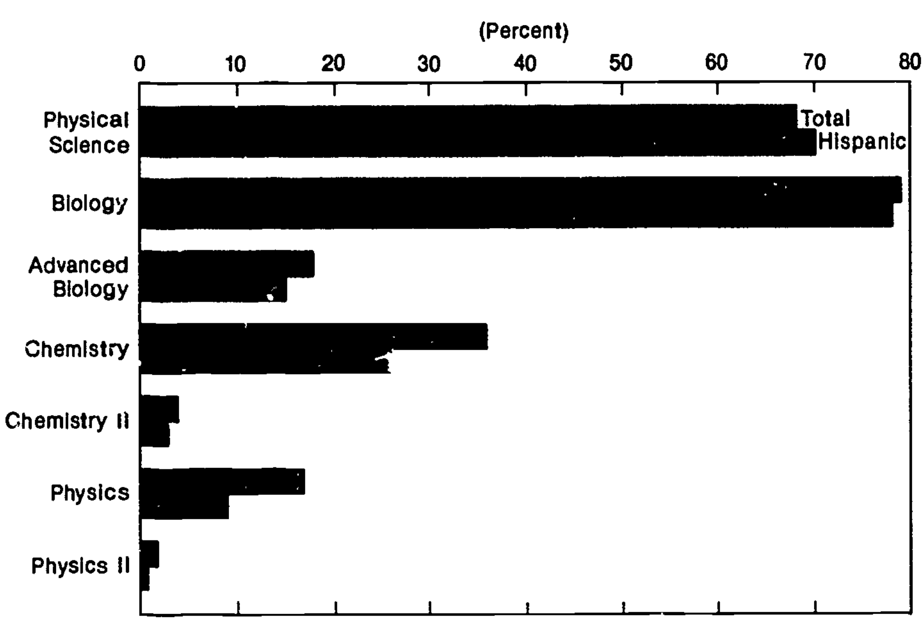
Differences in coursetaking behavior are evident among college-bound seniors. In 1984, the average number of years of mathematics was 3.7 for all college-bound seniors compared to 3.4 years for both Mexican Americans and Puerto Ricans. The average number of years of physical science courses also was higher for all college-bound seniors (1.9) than for Mexican American (1.5) or Puerto Rican (1.7) college-bound seniors. Little difference exists in the number of years of biological science coursework, averaging around 1.4 years for all three cohorts. When examined by sex, Mexican American and Puerto Rican males take more mathematics and physical science courses and about the same amount of biological science coursework compared to their female counterparts.

Hispanic college freshmen are less likely to have taken as many years of mathematics in high school as all freshmen. They do, however, take about as many years of science coursework. For Hispanic freshmen in 1983, about 69 percent had taken four or more years of mathematics in high school compared to 78 percent of all freshmen. In the sciences, a larger fraction of the Hispanics (67 percent) than the total (61 percent) had taken one or two years of coursework in the physical sciences; in

Figure 3-10. Mathematics coursetaking by ethnic status[1]



[1]Represents individuals in 1982 who were sophomores in 1980 (High School and Beyond Survey, First Follow-up).
SOURCE. Appendix table 35.



[1]Represents individuals in 1982 who were sophomores in 1980 (High School and Beyond Survey, First Follow-up)
SOURCE: Appendix table 35

the biological sciences, Hispanics (86 percent) were only slightly less likely than all freshmen (89 percent) to have taken one to two years of coursework.

Mathematics and Science Achievement

Hispanics continue to score below the national average on the mathematics assessment at all three age levels. However, the differential has narrowed at the 13 and 17 year old levels. The most recent NAEP assessment reports that Hispanic 9 and 13 year olds scored 9 percentage points lower than the national average while the gap was 11 points at the 17 year old level. In 1978, the gap was 9 points at age 9, 15 points at age 13, and 12 points at age 17.

The most statistically significant changes occurred at the 13 year old level (appendix table 38). For example, more than a 7-percentage point increase occurred among Hispanic 13 year olds on the skills component; overall, there was a 4-point increase.

Hispanics also scored lower than the national average on the National Assessment of Educational Progress science assessment at all age levels. Score differentials widen with age: at age 9, Hispanics score about 8.5 percentage points below the national average, while at age 17, the gap is almost 11 points. Regardless of age level, Hispanics scored much lower than the national average on components of the assessment that measured understanding and applications of scientific processes.

Characteristics of College-Bound Seniors

Scholastic Aptitude Test. Hispanics scored lower than all college-bound seniors on both the verbal and mathematics components of the SAT between 1976 and 1984. Scores for Mexican Americans were higher than those for Puerto Ricans on both portions of the exam (figure 3-12).

In 1984, Hispanics accounted for 3 percent of all college-bound seniors. Two-thirds of these Hispanics were Mexican American (18,200) while the remainder (8,500) were Puerto Rican.[39]

In 1984, the average verbal score for all college-bound seniors was 426; Mexican American and Puerto Rican scores were 376 and 366, respectively. Since 1976, scores for Mexican Americans have risen by 5 points; those for Puerto Ricans rose 2 points. In contrast, overall verbal scores fell by 5 points. Scores for Hispanic males were higher than those for comparable females. In 1984, Mexican American males scored 385 on this component, 16 points higher than females, while scores for Puerto Rican males (380) were 26 points higher.

On the mathematics portion in 1984, the overall average score for college-bound seniors was 471, compared to 420 for Mexican Americans and 400 for Puerto Ricans. Over the eight-year period beginning in 1976, scores for Mexican Americans rose by 10 points, while those for all college-bound seniors and Puerto Rican seniors remained virtually the same. When disaggregated by sex, differentials are greater than on the verbal section. Scores for Mexican American (444) and Puerto Rican (426) males were 45 and 47 points, respectively, higher than those for females.

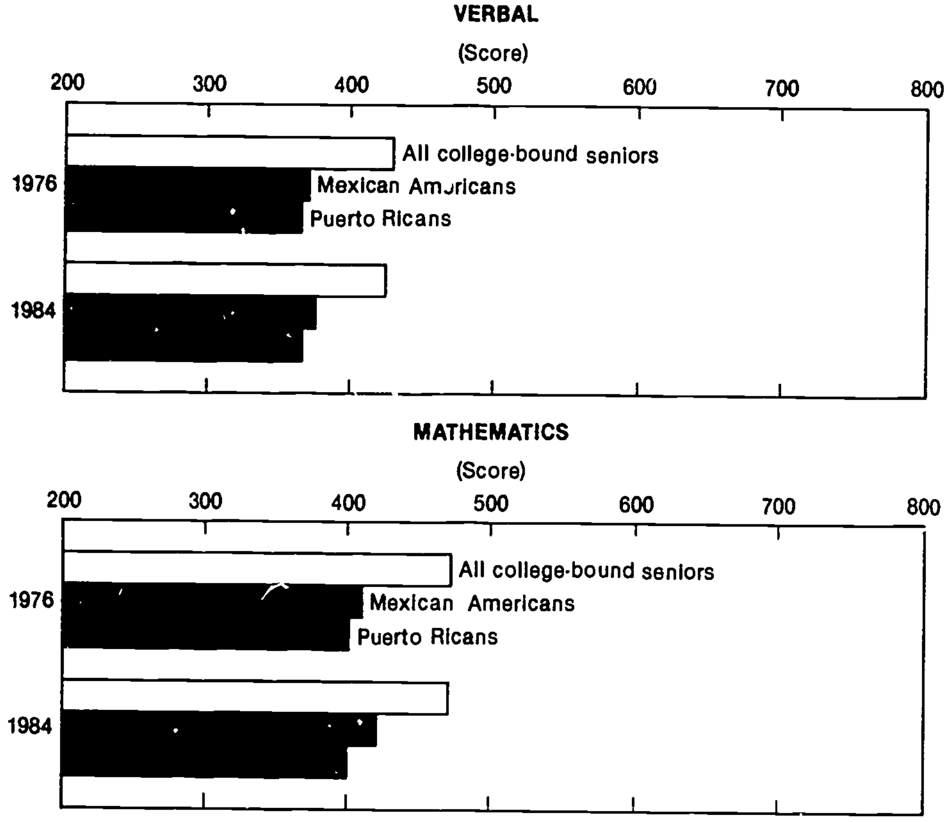
Few Hispanics scored in the highest range on either the verbal and mathematics component of the exam. On the verbal section, about 1 percent of both the Mexican Americans and Puerto Ricans, compared to 3 percent of all college-bound seniors, scored more than 650 in 1984. On the mathematics component, about 9 percent of all college-bound seniors but only 3 percent of both the Mexican Americans and Puerto Ricans scored more than 650 points.

Achievement Test Scores. Scores on the science or mathematics achievement exams were lower for Hispanics than for all college-bound seniors (table 3-8). Puerto Ricans, however, scored higher than Mexican Americans on these tests. In addition, Puerto Ricans who took an achievement test in science or mathematics had SAT mathematics scores either the same as or greater than scores for Mexican Americans (appendix table 42). Among those who took the Mathematics Level I exam in 1984, for example, SAT mathematics aptitude scores were 522 for Puerto Ricans compared to 494 for Mexican Americans.

In 1984, almost 41 percent of the Mexican Americans and 44 percent of the Puerto Ricans who took an achievement test, took one or more in science or mathematics. The comparable figure for all achievement test-takers was about 48 percent.

Advanced Placement Exam. Scores for Hispanics on AP exams are generally

Figure 3-12. Scholastic Aptitude Test (SAT) scores by ethnic group



NOTE: Score range is 200 to 800
SOURCE: Appendix Table 40

lower than those for all test-takers (appendix table 43). For example, for all AP test-takers, scores on the Biology exam were 3.25 compared to 2.46 for Mexican Americans and 2.87 for Puerto Ricans.

Very few Hispanics take AP exams. In 1984, about 1,900 Mexican Americans and only 700 Puerto Ricans took one or more of these tests. Among those who took the exams, a smaller proportion of the Hispanics than all test-takers took one or more of the tests in science or mathematics. While more than one-third of all AP test-takers took a science or mathematics exam, less than one-fifth of the Mexican Americans and about one-quarter of the Puerto Ricans did so in 1984.

Table 3-8. Achievement test scores by ethnic group: 1984

Subject	All college-bound seniors	Mexican Americans	Puerto Ricans
Mathematics Level I	542	486	510
Mathematics Level II	659	603	621
Chemistry	573	524	543
Biology	550	491	517
Physics	597	546	543

NOTE: Score range is 200 to 800.
SOURCE: Appendix table 42.

Intended Undergraduate Major. In 1984, a slightly higher percentage of the Mexican American college-bound seniors (42 percent) than all college-bound seniors (39 percent) and Puerto Rican seniors (38 percent) intended to major in a science or engineering field at the undergraduate level. Among potential science and engineering students, field distributions differ by ethnic group. Among Mexican Americans, the largest proportion—one-third—specified engineering as their prospective major while among Puerto Ricans, about the same fraction chose computer science.

Hispanics who chose to major in either biological science, physical science, mathematics, or engineering had higher average mathematics scores than those for all Hispanics in 1984. Scores for those intending to major in social science, psychology, or computer science, however, tended to be lower than or the same as the overall average. Prospective psychology majors reported the lowest scores. Mexican Americans and Puerto Ricans choosing psychology as their major field of study had SAT math scores of 395 and 376, respectively (average scores for all Hispanics were 420 and 400).

College Freshmen

Hispanic freshmen whose probable field of study is in science and engineering are more likely than those who choose non-S/E fields to achieve high school grade point averages in the "A" range. In 1983, over 39 percent earned an "A" average, compared to 23 percent of the Hispanic freshmen who chose non-S/E fields. Among all freshmen who chose S/E, this proportion was slightly more than 36 percent.

Among Hispanics whose potential major was a science or engineering field, a higher proportion of freshmen who chose engineering (50 percent) rather than scientific (33 percent) fields earned averages in the "A" range. Hispanics choosing computer science (25 percent) were the least likely to have an "A" average in high school.

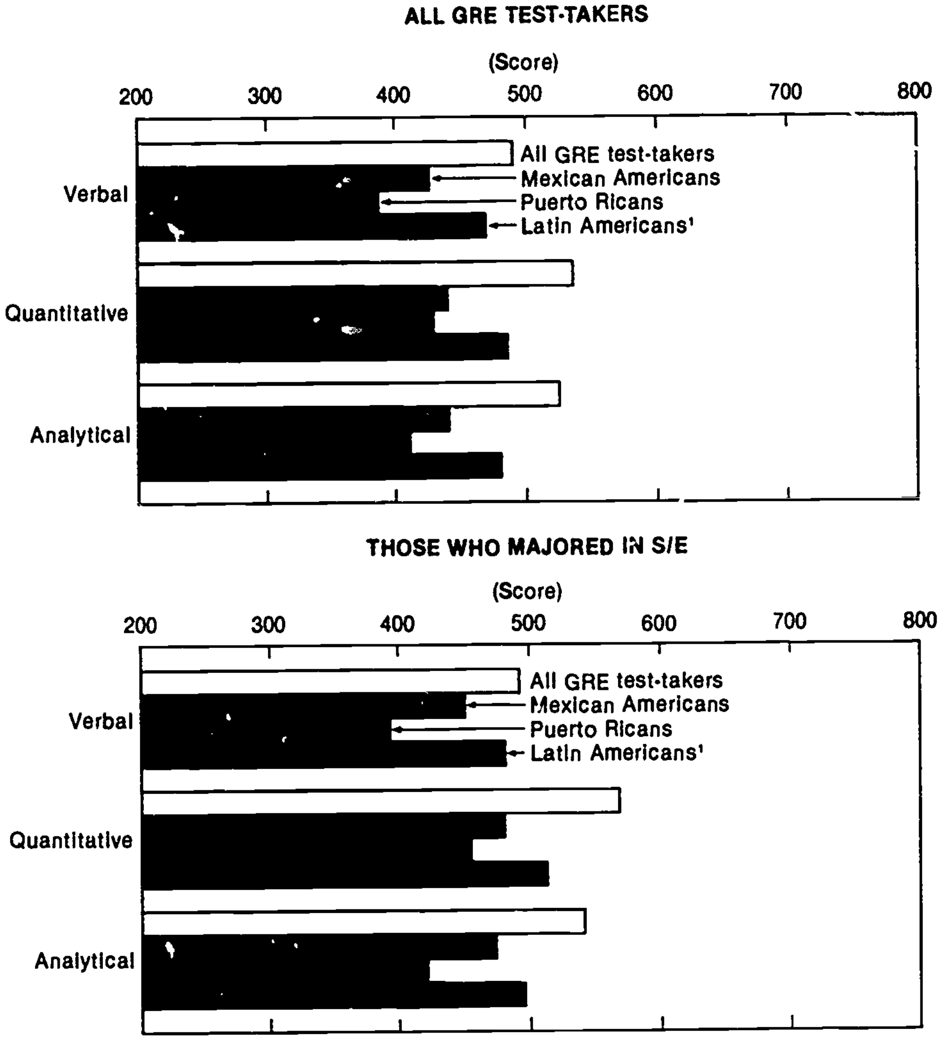
The degree aspirations of Hispanic freshmen in science and engineering rose slightly between 1974 and 1983. In 1974, more than 31 percent planned to work toward a master's degree; in 1983, this proportion was 34 percent. Likewise, the fraction choosing the bachelor's level increased from 17 percent to 19 percent. Among all freshmen, these proportions were 30 percent at the master's degree and 25 percent at the bachelor's level in 1983.

Undergraduate Preparation

Graduate Record Examination. Hispanics who majored in science and engineering scored lower than all test-takers on each of the three components in 1984 (figure 3-13). Wide variation existed, however, among the ethnic groups with Latin Americans scoring consistently higher than either Mexican Americans or Puerto Ricans. The greatest variation was on the verbal component. For example, the score range among those who majored in the physical sciences was 394 (Puerto Ricans) to 509 (Latin Americans) in 1984; the verbal score for Mexican Americans majoring in physical science was 495.

About 3 percent (4,700) of the GRE aptitude test-takers were Hispanic in 1984, similar to the percentage of college-bound seniors taking the SAT. About two-fifths of these Hispanics were Mexican American (1,800) while the remaining three-fifths were either Puerto Rican (1,500) or Latin American (1,300).[40] Hispanics accounted for about 4 percent of the test-takers who majored in an S/E field at the undergraduate level. Among Hispanic test-takers, a higher proportion of the Puerto Ricans (67 percent) than the Latin Americans (61 percent) or Mexican Americans (56 percent) had majored in science or engineering. For all test-takers, about 56 percent had majored in a science or engineering field.

Figure 3-13. Graduate Record Examination (GRE) scores by ethnic group: 1984



¹Includes "other" Hispanics
NOTE: Score range is 200 to 800.
SOURCE: Appendix table 47.

Earned Degrees

Hispanics account for a lower proportion of the individuals earning bachelor's degrees in science and engineering fields than of those enrolled in undergraduate programs although their proportions at all degree levels have increased since 1979. In 1983, about 9,700 S/E bachelor's degrees—representing 3.2 percent of the total—were awarded to Hispanics; however, they accounted for more than 4 percent of total undergraduate enrollment.[41] Among science and engineering fields, more than 30 percent of the Hispanics earned degrees in the social sciences, followed by engineering and the life sciences at 20 percent each.

Hispanics represented a smaller fraction of S/E advanced degrees granted than of S/E bachelor's degrees. In 1983, about 2.6 percent (1,248) of the S/E master's degrees were granted to Hispanics. Most of these degrees were granted in either social science, psychology, or engineering. At the S/E doctorate level, Hispanics only accounted for 1.9 percent (262) of the degrees earned; the largest number (93) of these degrees were granted in psychology.

Graduate Support Status

Of those who earned doctorates in science and engineering in 1984, Hispanics did not report universities as their primary source of support as often as all new degree holders (45 percent vs. 51 percent).[42] Of those receiving university support, Hispanics were less likely than the total to hold research assistantships. Other sources of support cited by Hispanics were Federal (19 percent) and self (28 percent) (appendix table 54).

Postdoctoral Appointments

The number of Hispanics holding

postdoctoral appointments has increased about threefold since 1973. Between 1973 and 1983, the number of Hispanics holding postdoctoral appointments in science and engineering grew from 69 in 1973, to 137 in 1981, and to 270 in 1983. In 1983, Hispanics accounted for 2.5 percent of the S/E postdoctorates. More than one-half of the Hispanics held appointments in the life sciences; another one-fifth held engineering postdoctorates.

ENDNOTES

1. Conflicting viewpoints exist concerning the measurement capabilities of standardized testing See, for example, David Owen, *None of the Above*, (New York: Houghton-Mifflin, Co., 1985).

2. For a discussion of the changing demographic patterns in this country, see Ian McNett, *Demographic Imperatives: Implications for Educational Policy*, Forum on "The Demographics of Changing Ethnic Populations and their Implications for Elementary-Secondary and Postsecondary Educational Policy," 8 June 1983, (Washington, D.C.: American Council on Education).

3. All information in this chapter on 1980 high school seniors is from U.S. Department of Education, National Center for Education Statistics, *High School and Beyond: A National Longitudinal Study for the 1980's*, (Washington, D.C., 1981).

4. All data in this chapter on college-bound seniors are from Admissions Testing Program of the College-Board, *Profiles, College-Bound Seniors*, (annual series, 1981-1984), (New York: College Entrance Examination Board).

5. In 1982, a follow-up survey was conducted of high school students who were sophomores in 1980. Data on this cohort are from U.S. Department of Education, National Center for Education Statistics, *High School and Beyond Tabulation: Mathematics Coursetaking by 1980 High School Sophomores who Graduated in 1982 and High School and Beyond Tabulation: Science Coursetaking by 1980 High School Sophomores who Graduated in 1982*, (Washington, D.C., April 1984).

6. The Higher Education Research Institute, *Data Trends Among American College Freshmen*, Report 2A, unpublished tabulations, (Los Angeles: University of California at Los Angeles, 1984).

7. The national assessment of mathematics measures achievement in four areas: (a) knowledge of mathematics fundamentals; (b) computational skills; (c) understanding of mathematical methods; and (d) applications—problem-solving ability in mathematics. The most recent mathematics assessment was conducted in 1982 The next assessment is targeted for Spring 1986.

8. Data on the mathematics assessment by sex for 1978 and 1982 are from National Assessment of Educational Progress, *The Third National Mathematics Assessment: Results, Trends, and Issues*, (Report No. 13-MA-01), April 1983, pp. 37-40.

9. Changes are significant at the 0.05 level.

10 The national assessment of science contains four components (a) knowledge and skills in areas such as biology, physical science, and earth science (science content); (b) understanding of scientific processes (science inquiry), (c) implications of science and technology for society (science-technology-society); and (d) student's orientation toward science—primarily science courses (attitudes). The last science assessment was administered in 1982 and the next is scheduled for Spring 1986.

11. Science assessment data are from Science Assessment and Research Project, University of Minnesota, *Images of Science*. (Minneapolis, MN Minnesota Research and Evaluation Center, June 1983).

12. The Admissions Testing Program of the College Board offers the SAT to college-bound seniors. The exam consists of two components. The verbal component tests reading comprehension and vocabulary skills and the mathematics component assesses problem-solving ability using arithmetic reasoning and basic algebra and geometry skills. The score range is 200 to 800.

13. In addition to the SAT, the Admissions Testing Program offers an achievement test series to college-bound seniors. The series includes one-hour multiple choice exams in 15 academic areas. About one in five of those students who take the SAT also take one or more of the achievement tests. The score range is 200 to 800.

14. Admissions Testing Program of the College Board, *Profiles, College-Bound Seniors, 1984*, (New York: College Entrance Examination Board, 1984).

15. Of the 15 academic subjects for which achievement tests were given in 1984, 5 were in science or mathematics: Chemistry, Biology, Physics, Mathematics Level I, and Mathematics Level II.

16. The College Board administers the AP Program in addition to the Admissions Testing Program. A series of exams are offered in 24 areas, 8 of which are in science and engineering A student who does well on one or more of these exams may be granted credit or appropriate placement by participating colleges. The AP grading scale ranges from 1 (no recommendation for credit) to 5 (extremely well qualified in the subject area). About 15 percent of college-bound seniors participate in the program.

17. Level of difficulty varies on AP exams, i.e., the Math/Calculus BC test is more difficult than the Math/Calculus AB test.

18. Advanced Placement Program of the College Board, *1984 Advanced Placement Program, National Summary Reports*, (New York: College Entrance Examination Board), pp. 4&5.

19. Including multiple test-takers, about 124,000 exams were taken by males and about 113,000 were taken by females.

20. Out of 29 choices for undergraduate field, 7 were in science and 1 was in engineering.

21. The Graduate School of Education at UCLA and the American Council of Education jointly sponsor the Cooperative Institutional Research Program (CIRP). The program was introduced in 1966 as a continuing longitudinal study of the American higher educational system. Its purpose is to examine the effect of college on students. One of the cornerstones of the program is the American Freshmen Norm Survey, which is conducted annually and seeks to provide information on the characteristics of the population of first-time, full-time, college freshmen.

22. All data on college freshmen are from Higher Education Research Institute, *Data Trends Among American College Freshmen*, unpublished tabulations.

23. The GRE contains a general aptitude test and offers advanced tests in 20 subject areas. The aptitude test is comprised of three components. The verbal component assesses the ability to use words in solving problems while the quantitative portion requires an ability to apply elementary mathematical skills and concepts to solve problems in quantitative settings. The analytical component is a relatively new addition to the aptitude test; it was introduced in 1979 as a measure of deductive and inductive reasoning skills. The score range on the GRE is 200 to 800.

24. Henry Roy Smith, III, *A Summary of Data Collected from Graduate Record Examination Test-Takers During 1983-84, Data Summary Report #9*, (Princeton: Educational Testing Service, 1984), p. 68.

25. For purposes of this analysis, science and engineering fields include physical science, mathematical science, engineering, biological science, behavioral science, and social science. See *Data Summary Report #9*, for an example of field classifications.

26. Total enrollment for 1981 is projected datum from U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics to 1990-91*, Vol. 1, (Washington, D.C., 1982), p. 118.

27. National Research Council, unpublished data.

28. Committee on the Education and Employment of Women in Science and Engineering, *Climbing the Ladder, An Update on the Status of Doctoral Women Scientists and Engineers*, (Washington, D.C.: National Academy Press, 1983), chpt. 3.

29. The Student Descriptive Questionnaire completed by college-bound seniors defines Physical Science to include chemistry, physics, and earth science. Other surveys of science coursework often exclude chemistry and physics from Physical Science.

30. Due to insufficient sample size, the National Assessment of Educational Progress does not include data on racial/ethnic groups other than whites, blacks, and Hispanics. In 1982, with little variation among age groups, about 80 percent of the sample was white, approximately 13 percent was black, another 5 percent was classified as Hispanic, and the remaining 2 percent was defined as "other minorities." See *The Third National Mathematics Assessment: Results, Trends, and Issues*, p. 33.

31. Significant at the 0.05 level.

32. Data are from *Images of Science*, pp. 101-119.

33. *Profiles, 1984*, p. 1.

34. *1984 Advanced Placement Program, National Summary Report*, p. 3.

35. *Data Summary Report #9*, p. 76.

36. U.S. Department of Education, National Center for Education Statistics, *The Condition of Education, 1982*, (Washington, D.C., 1982), p. 78.

37. National Research Council, unpublished data.

38. National Center for Education Statistics, *High School and Beyond*.

39. *Profiles, 1984*, p. 1.

40. *Data Summary Report #9*, p. 76.

41. National Center for Education Statistics, *Condition of Education, 1982*, p. 134.

42. National Research Council, unpublished data.

Technical Notes

CONCEPTS AND DEFINITIONS

The National Science Foundation publishes estimates on the number, work activity, type of employer, and other economic and demographic characteristics of persons who meet its particular definition of a scientist or engineer. Broadly speaking, a person is considered a scientist or engineer if at least two of the following criteria are met:

1. Highest degree in science (including social science) or engineering;
2. Employed in a science or engineering occupation· and/or
3. Professional identification as a scientist or engineer based on total education and work experience.

Composite Estimates

The composite estimates are developed as a part of the National Science Foundation's Scientific and Technical Personnel Data System (STPDS) and represent the national total of scientists and engineers. The system draws from three data sources, each designed to measure the characteristics of a particular subpopulation:

- *The Experienced Sample of Scientists and Engineers* is the biennial follow-up survey to the 1982 Postcensal Survey of Scientists and Engineers. The Postcensal Sample was drawn from those individuals who were in the labor force or labor reserve at the time of the 1980 decennial census. Both the 1982 Postcensal survey and the 1984 Experienced Sample survey were conducted for the National Science Foundation by the Bureau of Census.
- *The Survey of Recent Science and Engineering Graduates* is designed to measure the magnitude and characteristics of those who earned degrees in science and engineering after the 1980 decennial census was completed. The Institute of Survey Research, Temple University, has conducted two surveys for the National Science Foundation. (1) the graduating classes of 1980 and 1981 were surveyed in 1982; and (2) the graduating classes of 1980, 1982, and 1983 were surveyed in 1984.
- *The Roster of Doctoral Scientists and Engineers* consists of all known scientists and engineers granted doctorates in the United States since 1930. The roster serves as a panel from which a sample of doctoral scientists and engineers is drawn and surveyed. The most recent survey, conducted in 1983, covered those doctorates who received their degrees between 1940 and 1982. The Survey of Doctoral Recipients has been conducted on a biennial basis for the National Science Foundation by the Office of Scientific and Engineering Personnel, National Academy of Sciences, since 1973.

Occupation/Field of Science and Engineering

Data on field of science and engineering are derived from responses to questions on various surveys. Fields are classified as follows:

- *Physical* sciences—chemistry, physics, astronomy, and other physical sciences, including metallurgy
- *Mathematical* sciences—mathematics and statistics
- *Environmental* sciences—earth, atmospheric, and oceanographic sciences, including geophysics, seismology, and meterology
- *Life* sciences—biological, agricultural, and medical sciences (excluding those primarily engaged in patient care)
- *Social* sciences—economics, including agricultural economics, sociology, anthropology, and all other social sciences
- *Psychology*
- *Computer specialties*
- *Engineering*

Data on field of employment are derived from responses to questions that request, based on employment specialties lists included with the questionnaire, the name of the specialty most closely related to the respondent's principal employment. Those who selected an employment specialty not in science or engineering are assigned to a field of science and engineering based on the field of their degree and, for those with less than a doctorate, their professional self-identification.

Primary Work Activity

Data presented on work activities of scientists and engineers represent their *primary* work activities. The data are derived from responses to a series of questions on the survey instruments that ask individuals: (1) to specify their primary work activity; and (2) to provide a percentage distribution of their work time among 10 to 15 activities. Work activities are classified as follows:

- Management or administration of research and development
- Management or administration of other than research and development
- Teaching and training
- Basic research
- Applied research
- Development
- Report and technical writing, editing, and information retrieval
- Clinical diagnosis, psychotherapy
- Design of equipment, processes, models
- Quality control, testing, evaluation, or inspection
- Operations – production, maintenance, construction, installation, exploration
- Distribution—sales, traffic, purchasing, customer and public relations
- Statistical work—survey work, forecasting, statistical analysis
- Consulting
- Computer applications
- Other activities

Sector of Employment

Information on type of employer also is derived from survey responses. Respondents are asked to choose the category that best describes the type of organization of their principal employment from the following list:

- Self-employed
- Business or industry
- Junior college, two-year college, technical institute
- Medical school
- Four-year college or university, other than medical school
- Elementary or secondary school system
- Hospital or clinic
- Nonprofit organization, other than hospital, clinic, or educational institution
- U.S. military service, active duty, or Commissioned Corps
- U.S. Government, civilian employee
- State government
- Local or other government
- Other

Other Variables

Information on other economic and demographic variables, such as sex, race, and ethnic group, are based on individual responses to survey questions. For information on the various survey instruments used in the report, see the section entitled "Data Sources" below

Statistical Measures

Labor Force Participation Rate—The labor force is defined as those employed and those seeking employment. The labor force participation rate (LFPR) is the ratio of those employed (E) and those unemployed (U) to the population (P)

$$LFPR = \frac{E + U}{P}$$

Unemployment Rate—The unemployment rate (UE/R) shows the ratio of those who are unemployed but seeking employment (U) to the total labor force (LF = E + U).

$$UE/R = \frac{U}{E + U}$$

S/E Employment Rate—The S/E employment rate (ES/E) measures the ratio of those holding jobs in science or engineering (S/E) to the total employment (E) of scientists and engineers, including those holding non-science and engineering jobs.

$$ES/E = \frac{S/E}{E}$$

S/E Underemployment Rate—The S/E underemployment rate (UDE) shows the ratio of those who are working part-time but seeking full-time jobs (PTS), or who are working in a non-S/E job when an S/E job would be preferred (NS/E) to total employment (E).

$$UDE = \frac{PTS + NS/E}{E}$$

S/E Underutilization Rate—The S/E underutilization rate (UDU) shows the proportion of those in the total labor force (LF = E + U) who are either unemployed but seeking employment (U), working part-time but seeking full-time jobs (PTS), or working involuntarily in a non-S/E job (NS/E).

$$UDU = \frac{U + PTS + NS/E}{E + U}$$

Reliability of Science and Engineering Estimates

Estimates of scientists and engineers are derived from sample surveys and thus are subject to both sampling and nonsampling errors. The sample used for a particular survey is only one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same questionnaire and instructions were used, the estimate from each of the samples would differ. The deviation of a sample estimate from the average of all possible samples is defined as sampling error. The standard error of a survey estimate attempts to provide a measure of this variation and thus is a measure of the precision with which an estimate from the sample approximates the average results of all possible samples.

Selected tables of standard errors for the various surveys are contained on the tables listed below.

Survey	Table
1984 Composite estimate of scientists and engineers	1-6
1983 Doctoral scientists and engineers	7

The sampling errors shown were generated on the basis of approximations and must, therefore, be considered estimates rather than precise measurements. The standard error may be used to construct a confidence interval about a given estimate. Thus, when the reported standard error is added to and subtracted from an estimate, the resulting range of values reflects an interval within which about 68 percent of all sample estimates, surveyed under the same conditions, will fall. Intervals reflecting a higher confidence level may be constructed by increasing the number of standard errors for a given estimate. Thus, ± 1.6 standard errors define a 90 percent confidence interval; ± 2 standard errors, a 95 percent confidence interval. The standard errors for the 1984 composite data are estimated using the Method of Random Groups.

Nonsampling errors may be attributed to many sources: inability to obtain information about all cases; definitional difficulties; differences in the interpretation of questions; inability or unwillingness to provide correct information on the part of the respondents; mistakes in recording or coding the information; and other errors in collection, response, processing, coverage, and imputation. Nonsampling errors are not unique to sample surveys since they occur in complete canvasses as well. No systematic attempt has been made to identify or approximate the magnitude of the nonsampling errors associated with the estimates of scientists and engineers presented in this report.

Data Sources

For information on survey methods, coverage, concepts, definitions, and reliability of data used in this report, please contact the Demographic Studies Group, Division of Science Resources Studies, Room L-611, National Science Foundation, Washington, D.C. 20550.

A brief description of each survey and copies of the survey instruments may be found in *A Guide to NSF Science Resources Data*. A copy is available from the Editorial and Inquiries Unit, Division of Science Resources Studies, Room L-611, National Science Foundation, Washington, D.C. 20550.

Table 1. Standard errors for estimates of total scientists and engineers: 1984

Size of estimate	Physical scientists: Chemist	Physical scientists: Physicist/ Astronomer	Physical scientists: Other Physical scientist	Mathematical scientists: Mathe-matician	Mathematical scientists: Statis-tician	Computer specialists	Environmental scientists: Earth scientist	Environmental scientists: Ocean-ographer	Environmental scientists: Atmospheric scientist
100	470	250	190	290	70	760	290	50	90
200	480	260	210	300	100	760	290	90	110
500	500	300	250	330	160	780	320	190	180
700	520	320	270	360	200	790	330	240	220
1,000	540	350	310	390	260	800	350	310	280
2,500	640	520	500	560	520	870	460	540	520
5,000	800	780	770	830	810	1,000	630	1,200	750
10,000	1,100	1,200	1,200	1,300	1,100	1,200	920		1,000
25,000	1,900	2,200	1,800	2,400	3,500	1,900	1,500		
50,000	2,700	3,000		3,300		3,000	1,900		
75,000	3,100	3,900		3,800		3,900	2,200		
80,000	3,100	4,100		4,000		4,100	2,300		
100,000	3,300	6,000		4,900		4,700	3,100		
125,000	3,400			7,500		5,400			
150,000	3,600					6,100			
175,000	4,200					6,600			
200,000	5,200					7,100			
225,000						7,600			
250,000						8,000			
275,000						8,400			
300,000						8,700			
400,000						10,200			
500,000						12,200			

Table 1. (cont.)

Size of estimate	Life scientists: Biologist	Life scientists: Agricultural scientist	Life scientists: Medical scientist	Psychologists	Social scientists: Economist	Social scientists: Sociologist/ Anthro-pologist	Social scientists: Other Social scientist	Engineers: Chemical engineer	Engineers: Aeronautical/ Astronautical engineer
100	710	400	90	630	550	370	640	400	290
200	710	410	120	640	560	380	650	410	300
500	730	440	190	650	580	420	680	430	320
700	740	460	230	670	600	440	700	440	340
1,000	760	490	300	680	620	480	730	460	360
2,500	830	640	590	770	740	660	890	560	480
5,000	960	870	980	920	930	960	1,100	720	670
10,000	1,200	1,300	1,400	1,200	1,300	1,500	1,500	1,000	1,000
25,000	1,800	2,200	1,800	2,000	2,100	2,700	2,400	1,800	1,700
50,000	2,600	3,100	8,900	3,100	2,900	4,000	2,900	2,600	2,300
75,000	3,000	4,000		3,900	3,400	5,000	2,900	3,000	2,700
80,000	3,100	4,300		4,100	3,400	5,200	2,900	3,100	2,800
100,000	3,200	5,700		4,600	3,800	6,500	3,000	3,100	3,700
125,000	3,300	9,100		5,200	4,500	9,500	4,200	3,100	6,000
150,000	3,400	15,000		5,700	6,000		7,100	3,000	10,200
175,000	3,500			6,200			12,500	3,100	
200,000	3,800			6,700					
225,000	4,300			7,300					
250,000	5,100			8,000					
275,000				8,900					
300,000									
400,000									
500,000									

Table 1. (cont.)

Size of estimate	Engineers: Civil engineer	Electrical/ Electronics engineer	Mechanical engineer	Materials engineer	Mining engineer	Nuclear engineer	Petroleum engineer	Industrial engineer	Other engineer
100	500	790	660	310	80	70	190	360	710
200	510	800	670	320	100	90	200	360	720
500	520	800	680	350	150	140	240	390	730
700	530	810	690	370	190	170	260	410	740
1,000	550	820	700	400	[illegible]	220	300	430	750
2,500	620	870	760	540	480	440	470	550	810
5,000	740	940	860	750	770	730	710	750	910
10,000	970	1,100	1,000	1,100	1,100	1,100	1,000	1,100	1,100
25,000	1,600	1,500	1,600	1,600	2,000	1,600	1,500	2,000	1,600
50,000	2,500	2,100	2,500	[illegible]				3,000	2,400
75,000	3,200	2,700	3,200	5,100				3,500	3,100
80,000	3,300	2,800	3,400	6,200				3,600	3,200
100,000	3,700	3,200	3,900					4,000	3,600
125,000	4,000	3,600	4,500					4,500	4,100
150,000	4,300	3,900	5,100					5,500	4,500
175,000	4,500	4,200	5,500					7,200	4,800
200,000	4,600	4,500	6,000						5,000
225,000	4,800	4,700	6,300						5,300
250,000	5,000	4,900	6,600						5,500
275,000	5,300	5,100	6,900						5,600
300,000	5,600	5,300	7,200						5,800
400,000	8,800	6,300	7,900						6,900
500,000		7,800	8,400						9,200

SOURCE: Mathematica Policy Research, Inc.

Table 2. Standard errors for estimates of male and female scientists and engineers: 1984

A. MALES

Size of estimate	Physical scientists			Mathematical scientists		Computer specialists	Environmental scientists		
	Chemist	Physicist/ Astronomer	Other Physical scientist	Mathematician	Statistician		Earth scientist	Oceanographer	Atmospheric scientist
100	520	200	190	160	110	640	240	60	40
200	530	210	210	180	140	640	250	100	80
500	550	250	250	230	210	660	280	200	170
700	560	280	280	260	250	670	290	250	230
1,000	590	320	320	310	310	690	320	310	310
2,500	700	500	530	530	530	780	450	590	550
5,000	870	790	820	860	710	930	640	3,300	630
10,000	1,200	1,300	1,300	1,400	1,000	1,200	980		1,100
25,000	2,000	2,300	1,800	2,200		2,000	1,600		
50,000	2,800	3,000		2,300		3,200	1,900		
75,000	3,200	3,800		3,400		4,200	2,600		
80,000	3,200	4,200		4,000		4,300	2,900		
100,000	3,400					5,000			
125,000	3,700					5,700			
150,000	4,300					6,200			
175,000	5,600					6,800			
200,000						7,200			
225,000						7,700			
250,000						8,200			
275,000						8,700			
300,000						9,300			
400,000									
500,000									

Table 2. (cont.)

Size of estimate	Life scientists: Biologist	Life scientists: Agricultural scientist	Life scientists: Medical scientist	Psychologists	Social scientists: Economist	Social scientists: Sociologist/ Anthropologist	Social scientists: Other Social scientist	Engineers: Chemical engineer	Engineers: Aeronautical/ Astronautical engineer
100	400	450	0	480	160	210	520	360	280
200	410	460	30	490	180	220	540	370	290
500	430	490	120	520	220	270	570	390	310
700	450	510	180	540	250	310	600	400	330
1,000	470	540	260	570	290	360	640	430	360
2,500	580	680	630	700	490	590	820	530	480
5,000	760	900	1,100	920	800	960	1,100	710	670
10,000	1,100	1,300	1,400	1,300	1,300	1,600	1,600	1,000	1,000
25,000	1,900	2,200	2,000	2,300	2,300	2,800	2,400	1,800	1,700
50,000	2,600	3,300		3,400	2,600	3,600	2,700	2,700	2,300
75,000	2,900	4,600		4,100	2,500	4,700	3,300	3,000	2,700
80,000	2,900	4,900		4,200	2,500		3,700	3,100	2,800
100,000	2,800	7,000		4,700	3,400		6,100	3,100	3,700
125,000	2,600	11,600		5,500	6,700			3,100	6,200
150,000	2,500			6,800				3,200	10,900
175,000	2,600			9,000					
200,000									
225,000									
250,000									
275,000									
300,000									
400,000									
500,000									

Table 2. (cont.)

Size of estimate	Engineers: Civil engineer	Electrical/ Electronics engineer	Mechanical engineer	Materials engineer	Mining engineer	Nuclear engineer	Petroleum engineer	Industrial engineer	Other engineer
100	480	730	560	300	80	70	160	330	560
200	490	740	570	310	100	90	180	340	570
500	500	750	580	340	150	140	220	360	580
700	510	750	590	370	190	180	250	380	590
1,000	530	760	600	400	250	230	300	410	610
2,500	610	810	670	550	480	450	490	540	680
5,000	730	890	770	760	780	740	760	740	790
10,000	980	1,100	990	1,100	1,100	1,100	1,100	1,100	1,000
25,000	1,600	1,500	1,600	1,700	2,100	1,700	1,600	2,100	1,600
50,000	2,600	2,200	2,500	2,500				3,100	2,500
75,000	3,200	2,700	3,300	6,000				3,700	3,300
80,000	3,300	2,800	3,500	7,300				3,800	3,400
100,000	3,700	3,200	4,000					4,200	3,800
125,000	4,100	3,600	4,600					4,800	4,300
150,000	4,300	3,900	5,100					5,900	4,600
175,000	4,500	4,200	5,600					7,800	4,900
200,000	4,700	4,400	6,000						5,100
225,000	4,900	4,600	6,300						5,200
250,000	5,100	4,800	6,600						5,400
275,000	5,400	5,000	6,800						5,500
300,000	5,900	5,100	7,000						5,700
400,000		6,000	7,900						6,900
500,000		7,800	9,100						10,300

B. FEMALES

Size of estimate	Physical scientists: Chemist	Physical scientists: Physicist/ Astronomer	Physical scientists: Other Physical scientist	Mathematical scientists: Mathe-matician	Mathematical scientists: Statis-tician	Computer specialists	Environmental scientists: Earth scientist	Environmental scientists: Ocean-ographer	Environmental scientists: Atmospheric scientist
100	160	110	60	230	40	560	120	50	60
200	170	130	70	250	60	560	130	90	100
500	190	170	120	290	130	580	160	190	190
700	200	190	150	330	170	590	170	250	250
1,000	230	230	190	370	230	610	200	310	330
2,500	340	420	390	590	450	700	330	580	570
5,000	510	700	690	920	630	840	520	3,200	650
10,000	840	1,200	1,100	1,500	950	1,100	850		1,100
25,000	1,600	2,200	1,700	2,300		1,900	1,500		
50,000	2,400	2,900		2,400		3,100	1,800		
75,000	2,800	3,800		3,400		4,100	2,500		
80,000	2,800	4,100		4,000		4,200	2,800		
100,000	3,000					4,900			
125,000	3,300					5,600			
150,000	4,000					6,200			
175.000	5,200					6,700			
200,000						7,100			
225,000						7,600			
250,000						8,100			
275,000						8,600			
300,000						9,300			
400,000									
500,000									

Table 2. (cont.)

Size of estimate	Life scientists: Biologist	Life scientists: Agricultural scientist	Life scientists: Medical scientist	Psychologists	Social scientists: Economist	Social scientists: Sociologist/ Anthro-pologist	Social scientists: Other Social scientist	Engineers: Chemical engineer	Engineers: Aeronautical/ Astronautical engineer
100	400	100	120	430	290	280	400	110	60
200	410	110	150	440	310	300	410	120	70
500	430	140	250	470	350	350	450	140	90
700	450	160	300	490	380	380	480	150	110
1,000	470	190	390	510	420	430	520	180	130
2,500	580	330	760	650	620	670	700	280	260
5,000	760	550	1,200	860	940	1,000	970	460	450
10,000	1,100	960	1,500	1,300	1,500	1,700	1,400	780	790
25,000	1,900	1,900	2,100	2,300	2,500	2,900	2,300	1,600	1,500
50,000	2,700	3,000		3,400	2,800	3,700	2,600	2,400	2,000
75,000	2,900	4,200		4,100	2,600	4,700	3,200	2,800	2,500
80,000	2,900	4,600		4,200	2,700		3,500	2,800	2,600
100,000	2,800	6,700		4,600	3,500		6,000	2,900	3,500
125,000	2,600	11,200		5,500	6,800			2,900	6,000
150,000	2,500			6,800				2,900	10,600
175,000	2,600			9,000					
200,000									
225,000									
250,000									
275,000									
300,000									
400,000									
500,000									

Table 2. (cont.)

Size of estimate	Engineers: Civil engineer	Electrical/ Electronics engineer	Mechanical engineer	Materials engineer	Mining engineer	Nuclear engineer	Petroleum engineer	Industrial engineer	Other engineer
100	130	230	290	40	20	30	60	90	330
200	140	230	290	50	40	50	70	90	340
500	150	240	300	80	100	100	120	120	350
700	160	250	310	100	140	130	140	140	360
1,000	180	260	330	140	190	180	190	170	380
2,500	260	310	390	280	430	410	380	290	450
5,000	380	390	500	500	720	690	650	500	560
10,000	630	550	710	850	1,000	1,000	1,000	890	790
25,000	1,300	1,000	1,300	1,400	2,100	1,600	1,500	1,800	1,400
50,000	2,200	1,700	2,200	2,200				2,900	2,300
75,000	2,900	2,200	3,000	5,700				3,400	3,000
80,000	3,000	2,300	3,200	7,000				3,500	3,200
100,000	3,400	2,700	3,700					3,900	3,600
125,000	3,700	3,100	4,300					4,500	4,100
150,000	4,000	3,400	4,900					5,700	4,400
175,000	4,200	3,700	5,300					7,600	4,700
200,000	4,300	3,900	5,700						4,900
225,000	4,500	4,100	6,000						5,000
250,000	4,800	4,300	6,300						5,100
275,000	5,100	4,500	6,500						5,300
300,000	5,600	4,600	6,800						5,400
400,000		5,500	7,600						6,700
500,000		7,300	8,800						10,000

SOURCE: Mathematica Policy Research, Inc.

Table 3. Standard errors for estimates of scientists and engineers by racial/ethnic group: 1984

A. WHITE, NON-HISPANIC

Size of estimate	Physical scientists: Chemist	Physical scientists: Physicist/ Astronomer	Physical scientists: Other Physical scientist	Mathematical scientists: Mathematician	Mathematical scientists: Statistician	Computer specialists	Environmental scientists: Earth scientist	Environmental scientists: Oceanographer	Environmental scientists: Atmospheric scientist
100	430	120	170	80	100	520	250	60	100
200	440	140	190	100	120	520	260	90	120
500	460	180	230	150	180	540	280	180	180
700	480	210	260	180	220	550	300	240	230
1,000	500	250	310	230	270	570	330	310	280
2,500	620	460	510	470	520	660	440	550	520
5,000	810	770	800	830	850	810	630	760	770
10,000	1,200	1,300	1,200	1,400	1,200	1,100	950		1,100
25,000	2,000	2,400	1,800	2,600	1,700	1,900	1,600		
50,000	2,700	3,100		3,100		3,100	2,000		
75,000	2,900	4,500		4,100		4,100	2,400		
80,000	2,900	5,000		4,600		4,300	2,500		
100,000	2,900			7,900		4,900	3,600		
125,000	2,900					5,600			
150,000	3,200					6,100			
175,000	4,000					6,600			
200 000						7,000			
225,000						7,300			
250,000						7,600			
275,000						7,900			
300,000						8,200			
400,000						10,300			
500,000									

Table 3. (cont.)

Size of estimate	Life scientists: Biologist	Agricultural scientist	Medical scientist	Psychologists	Social scientists: Economist	Sociologist/ Anthropologist	Other Social scientist	Engineers: Chemical engineer	Aeronautical/ Astronautical engineer
100	600	330	100	470	280	280	250	250	240
200	600	340	120	480	300	300	270	260	250
500	620	370	190	500	330	340	320	290	270
700	640	390	240	520	360	370	350	310	290
1,000	660	430	310	540	390	410	400	330	310
2,500	750	590	610	650	570	630	620	460	440
5,000	910	840	1,000	830	850	960	970	660	630
10,000	1,200	1,300	1,500	1,200	1,300	1,500	1,600	1,000	970
25,000	1,900	2,300	1,900	2,100	2,400	2,800	2,700	1,900	1,700
50,000	2,700	3,100	11,000	3,300	3,000	4,000	3,100	2,600	2,200
75,000	3,100	4,000		4,100	3,200	5,300	2,900	2,800	2,600
80,000	3,100	4,200		4,200	3,300	5,800	2,900	2,800	2,700
100,000	3,200	5,900		4,700	3,800	8,500	3,700	2,800	3,600
125,000	3,300	10,000		5,200	5,900		6,900	2,700	6,000
150,000	3,300	17,200		5,600	10,200		14,100	3,000	
175,000	3,600			6,200					
200,000	4,200			7,000					
225,000	5,300			8,100					
250,000	7,000			9,600					
275,000				11,700					
300,000									
400,000									
500,000									

Table 3. (cont.)

Size of estimate	Engineers: Civil engineer	Electrical/ Electronics engineer	Mechanical engineer	Materials engineer	Mining engineer	Nuclear engineer	Petroleum engineer	Industrial engineer	Other engineer
100	440	610	600	280	0	80	150	240	630
200	450	610	600	290	30	100	160	250	640
500	460	620	610	320	100	150	210	280	650
700	470	630	620	340	150	180	240	300	660
1,000	490	640	630	380	220	230	290	330	670
2,500	570	700	700	530	520	460	500	470	740
5,000	690	800	810	770	840	740	770	700	850
10,000	940	990	1,000	1,100	1,000	1,100	1,100	1,100	1,100
25,000	1,600	1,500	1,600	1,700	2,100	1,700	1,600	2,100	1,700
50,000	2,500	2,300	2,500	2,600				3,000	2,500
75,000	3,100	2,900	3,400	6,700				3,400	3,200
80,000	3,200	3,000	3,500	8,200				3,500	3,400
100,000	3,500	3,400	4,100					3,800	3,800
125,000	3,800	3,800	4,700					4,500	4,300
150,000	4,000	4,200	5,300					6,100	4,600
175,000	4,200	4,400	5,800					9,000	4,900
200,000	4,300	4,600	6,300						5,100
225,000	4,500	4,800	6,600						5,200
250,000	4,800	5,000	7,000						5,400
275,000	5,200	5,200	7,300						5,600
300,000	5,800	5,400	7,600						5,800
400,000		6,600	8,500						7,200
500,000		9,400	9,600						

B. MINORITIES

Size of estimate	Physical scientists: Chemist	Physical scientists: Physicist/ Astronomer	Physical scientists: Other Physical scientist	Mathematical scientists: Mathematician	Mathematical scientists: Statistician	Computer specialists	Environmental scientists: Earth scientist	Environmental scientists: Oceanographer	Environmental scientists: Atmospheric scientist
100	210	220	50	250	40	630	120	30	20
200	210	240	60	260	60	640	130	60	50
500	240	280	110	310	120	660	150	160	110
700	250	310	140	350	160	670	170	210	150
1,000	[illegible]	350	180	400	220	690	190	290	210
2,500	400	560	380	630	470	780	310	520	450
5,000	580	880	670	1,000	790	920	490	740	700
10,000	920	1,400	1,100	1,600	1,200	1,200	810		1,000
25,000	1,700	2,500	1,700	2,700	1,700	2,000	1,400		
50,000	2,500	3,200		3,300		3,200	1,900		
75,000	2,700	4,600		4,300		4,200	2,200		
80,000	2,700	5,100		4,700		4,400	2,400		
100,000	2,700			8,000		5,000	3,500		
125,000	2,700					5,700			
150,000	3,000					6,200			
175,000	3,800					6,700			
200,000						7,100			
225,000						7,400			
250,000						7,700			
275,000						8,000			
300,000						8,400			
400,000						10,400			
500,000									

Table 3. (cont.)

Size of estimate	Life scientists: Biologist	Life scientists: Agricultural scientist	Life scientists: Medical scientist	Psychologists	Social scientists: Economist	Social scientists: Sociologist/ Anthropologist	Social scientists: Other Social scientist	Engineers: Chemical engineer	Engineers: Aeronautical/ Astronautical engineer
100	350	200	60	360	390	260	410	270	170
200	360	210	80	370	410	280	420	270	180
500	380	240	160	390	440	320	470	300	210
700	390	260	200	410	470	350	500	320	230
1,000	410	300	270	430	500	400	550	340	250
2,500	500	460	580	540	680	610	780	470	380
5,000	660	710	970	720	960	940	1,100	670	570
10,000	950	1,200	1,400	1,100	1,500	1,500	1,700	1,000	910
25,000	1,700	2,100	1,900	2,000	2,500	2,800	2,900	1,900	1,600
50,000	2,400	3,000	11,000	3,200	3,100	3,900	3,300	2,700	2,100
75,000	2,800	3,800		4,000	3,300	5,300	3,100	2,800	2,500
80,000	2,900	4,100		4,100	3,400	5,700	3,100	2,800	2,600
100,000	3,000	5,800		4,600	3,900	8,400	3,800	2,800	3,500
125,000	3,000	9,800		5,000	6,000		7,100	2,700	5,900
150,000	3,100	17,100		5,500	10,300		14,300	3,000	
175,000	3,300			6,100					
200,000	3,900			6,900					
225,000	5,000			8,000					
250,000	6,700			9,500					
275,000				11,600					
300,000									
400,000									
500,000									

Table 3. (cont.)

Size of estimate	Engineers: Civil engineer	Electrical/ Electronics engineer	Mechanical engineer	Materials engineer	Mining engineer	Nuclear engineer	Petroleum engineer	Industrial engineer	Other engineer
100	310	470	370	110	80	40	60	200	360
200	320	470	370	120	110	60	80	210	360
500	340	480	380	150	190	110	130	240	380
700	350	490	390	180	230	140	160	260	390
1,000	360	500	410	210	300	190	210	290	400
2,500	440	560	470	370	600	410	410	440	470
5,000	570	660	580	600	920	700	690	670	580
10,000	810	840	790	960	1,100	1,000	1,000	1,100	800
25,000	1,500	1,400	1,400	1,500	2,200	1,700	1,500	2,100	1,400
50,000	2,300	2,100	2,300	2,400				3,000	2,300
75,000	3,000	2,800	3,100	6,500				3,400	3,000
80,000	3,100	2,900	3,300	8,000				3,500	3,100
100,000	3,400	3,300	3,900					3,800	3,500
125,000	3,700	3,700	4,500					4,500	4,000
150,000	3,900	4,000	5,100					6,100	4,300
175,000	4,000	4,300	5,600					9,000	4,600
200,000	4,200	4,500	6,000						4,800
225,000	4,400	4,700	6,400						5,000
250,000	4,600	4,900	6,800						5,100
275,000	5,000	5,000	7,100						5,300
300,000	5,600	5,200	7,300						5,500
400,000		6,400	8,300						6,900
500,000		9,200	9,400						

SOURCE: Mathematica Policy Research, Inc.

Table 4. Standard errors for estimates of male scientists and engineers by racial/ethnic group: 1984

A. WHITE, NON-HISPANIC MALES

Size of estimate	Physical scientists: Chemist	Physical scientists: Physicist/ Astronomer	Physical scientists: Other Physical scientist	Mathematical scientists: Mathematician	Mathematical scientists: Statistician	Computer specialists	Environmental scientists: Earth scientist	Environmental scientists: Oceanographer	Environmental scientists: Atmospheric scientist
100	380	180	130	140	110	480	210	50	70
200	390	200	150	160	130	490	220	80	100
500	420	240	200	210	190	510	250	170	190
700	440	270	230	250	230	530	260	220	240
1,000	470	310	280	310	280	550	290	300	300
2,500	600	520	520	570	510	660	430	580	540
5,000	810	830	850	960	770	830	640	560	680
10,000	1,200	1.400	1,300	1,500	1,200	1,200	990		1,100
25,000	2,100	2,400	1,900	2,200		2,100	1,600		
50,000	2,800	3,100		2,300		3,400	2,000		
75,000	3,000	4,400		6,000		4,300	2,800		
80,000	3,000	4,900		7,700		4,500	3,200		
100,000	3,000					5,100			
125,000	3,300					5,700			
150,000	4,300					6,100			
175,000						6,500			
200,000						7,000			
225,000						7,400			
250,000						8,000			
275,000						8,800			
300,000						9,800			
400,000									
500,000									

Table 4. (cont.)

Size of estimate	Life scientists: Biologist	Life scientists: Agricultural scientist	Life scientists: Medical scientist	Psychologists	Social scientists: Economist	Social scientists: Sociologist/ Anthro-pologist	Social scientists: Other Social scientist	Engineers: Chemical engineer	Engineers: Aeronautical/ Astronautical engineer
100	350	290	40	450	160	230	310	210	220
200	360	300	80	460	180	250	330	220	230
500	390	330	170	490	230	300	380	250	260
700	400	360	230	510	260	340	420	270	280
1,000	430	390	310	540	310	400	470	290	300
2,500	550	560	670	690	560	660	720	420	430
5,000	760	820	1,100	930	930	1,100	1,100	630	630
10,000	1,100	1,300	1,400	1,400	1,500	1,700	1,700	1,000	970
25,000	2,000	2,300	2,100	2,400	2,500	2,800	2,500	1,900	1,700
50,000	2,700	3,300		3,500	2,400	4,200	2,700	2,700	2,200
75,000	2,900	4,700		4,100	2,100		4,300	2,800	2,500
80,000	2,800	5,200		4,200	2,300		5,100	2,800	2,700
100,000	2,700	7,800		4,800	4,300		11,000	2,700	3,600
125,000	2,500	14,000		6,100				2,700	6,200
150,000	2,700			8,500				3,200	
175,000	3,400			12,400					
200,000									
225,000									
250,000									
275,000									
300,000									
400,000									
500,000									

Table 4. (cont.)

Size of estimate	Engineers: Civil engineer	Electrical/ Electronics engineer	Mechanical engineer	Materials engineer	Mining engineer	Nuclear engineer	Petroleum engineer	Industrial engineer	Other engineer
100	410	570	520	200	0	70	120	240	480
200	420	580	520	210	30	90	140	250	480
500	440	590	540	250	110	140	190	280	500
700	450	600	550	280	150	180	220	300	510
1,000	460	610	560	320	220	230	280	330	520
2,500	550	670	630	490	520	460	500	480	600
5,000	680	770	750	750	830	750	800	720	730
10,000	930	960	970	1,200	1,000	1,100	1,200	1,200	980
25,000	1,600	1,500	1,600	1,700	2,300	1,800	1,800	2,200	1,700
50,000	2,500	2,300	2,600	2,800				3,100	2,600
75,000	3,200	2,900	3,400	8,000				3,600	3,400
80,000	3,300	3,000	3,600	9,900				3,700	3,500
100,000	3,600	3,400	4,200					4,000	4,000
125,000	3,900	3,800	4,800					4,900	4,400
150,000	4,000	4,100	5,300					6,600	4,700
175,000	4,200	4,400	5,800					9,800	5,000
200,000	4,400	4,500	6,200						5,100
225,000	4,600	4,700	6,600						5,200
250,000	4,900	4,800	6,900						5,400
275,000	5,500	5,000	7,100						5,500
300,000	6,200	5,200	7,400						5,700
400,000		6,400	8,500						7,500
500,000		9,600	10,300						

B. MINORITY MALES

Size of estimate	Physical scientists: Chemist	Physical scientists: Physicist/ Astronomer	Physical scientists: Other Physical scientist	Mathematical scientists: Mathe-matician	Mathematical scientists: Statis-tician	Computer specialists	Environmental scientists: Earth scientist	Environmental scientists: Ocean-ographer	Environmental scientists: Atmospheric scientist
100	240	180	60	150	50	450	110	20	20
200	240	200	80	170	80	450	120	50	50
500	270	240	130	230	140	470	150	140	130
700	290	270	160	270	180	490	170	200	180
1,000	320	310	210	320	230	510	200	280	240
2,500	450	520	440	590	460	620	340	560	480
5,000	660	830	770	970	710	790	550	540	620
10,000	1,000	1,400	1,200	1,600	1,100	1,100	900		1,000
25,000	1,900	2,400	1,800	2,200		2,100	1,500		
50,000	2,700	3,100		2,300		3,300	1,900		
75,000	2,800	4,400		6,000		4,300	2,700		
80,000	2,900	4,900		7,700		4,500	3,100		
100,000	2,900					5,000			
125,000	3,200					5,600			
150,000	4,100					6,100			
175,000						6,500			
200,000						6,900			
225,000						7,400			
250,000						8,000			
275,000						8,800			
300,000						9,800			
400,000									
500,000									

Table 4. (cont.)

Size of estimate	Life scientists: Biologist	Life scientists: Agricultural scientist	Life scientists: Medical scientist	Psychologists	Social scientists: Economist	Social scientists: Sociologist/ Anthro-pologist	Social scientists: Other Social scientist	Engineers: Chemical engineer	Engineers: Aeronautical/ Astronautical engineer
100	250	220	0	260	200	170	270	250	170
200	260	230	20	270	210	190	280	260	180
500	280	270	110	310	270	240	340	290	210
700	300	290	170	330	300	260	370	310	230
1,000	320	320	250	360	350	340	420	330	250
2,500	450	490	620	510	600	600	670	460	380
5,000	650	750	1,000	750	970	990	1,000	670	580
10,000	1,000	1,200	1,400	1,200	1,600	1,600	1,600	1,100	920
25,000	1,900	2,200	2,100	2,200	2,700	2,500	1,900	1,900	1,600
50,000	2,600	3,200		3,300	2,400	4,100	2,600	2,700	2,100
75,000	2,700	4,700		3,900	2,200		4,200	2,900	2,500
80,000	2,700	5,100		4,100	2,300		5,100	2,800	2,600
100,000	2,600	7,800		4,600	4,300		10,900	2,800	3,600
125,000	2,400	13,900		5,900				2,800	6,200
150,000	2,600			8,300				3,200	
175,000	3,300			12,200					
200,000									
225,000									
250,000									
275,000									
300,000									
400,000									
500,000									

Table 4. (cont.)

Size of estimate	Engineers								
	Civil engineer	Electrical/ Electronics engineer	Mechanical engineer	Materials engineer	Mining engineer	Nuclear engineer	Petroleum engineer	Industrial engineer	Other engineer
100	310	440	350	130	80	40	70	190	320
200	320	450	360	140	110	60	80	210	320
500	340	460	370	180	190	120	140	240	340
700	350	470	380	210	230	150	170	260	350
1,000	360	480	390	250	300	200	220	290	360
2,500	450	540	460	430	600	430	450	440	440
5,000	580	640	580	690	910	720	750	670	570
10,000	830	840	800	1,100	1,100	1,100	1,100	1,100	820
25,000	1,500	1,400	1,400	1,700	2,300	1,700	1,700	2,100	1,500
50,000	2,400	2,100	2,400	2,700				3,100	2,500
75,000	3,100	2,800	3,300	7,900				3,600	3,200
80,000	3,200	2,900	3,400	9,800				3,600	3,300
100,000	3,500	3,300	4,000					4,000	3,800
125,000	3,800	3,700	4,600					4,800	4,200
150,000	3,900	4,000	5,200					6,600	4,600
175,000	4,100	4,200	5,600					9,700	4,800
200,000	4,300	4,400	6,000						5,000
225,000	4,500	4,600	6,400						5,100
250,000	4,800	4,700	6,700						5,200
275,000	5,400	4,900	7,000						5,400
300,000	6,100	5,000	7,200						5,500
400,000		6,300	8,300						7,300
500,000		9,500	10,100						

SOURCE: Mathematica Policy Research, Inc.

Table 5. Standard errors for estimates of female scientists and engineers by racial/ethnic group: 1984

A. WHITE, NON-HISPANIC FEMALES

Size of estimate	Physical scientists			Mathematical scientists			Environmental scientists		
	Chemist	Physicist/ Astronomer	Other Physical scientist	Mathematician	Statistician	Computer specialists	Earth scientist	Oceanographer	Atmospheric scientist
100	180	60	70	110	60	410	110	50	60
200	190	80	90	130	80	420	120	80	90
500	210	120	140	190	140	440	150	160	180
700	230	150	170	230	180	460	170	220	230
1,000	260	190	220	280	240	480	200	300	290
2,500	390	400	450	550	460	580	340	580	530
5,000	600	710	780	930	720	760	550	560	670
10,000	980	1,300	1,300	1,500	1,100	1,100	900		1,100
25,000	1,900	2,300	1,800	2,200		2,000	1,500		
50,000	2,600	3,000		2,300		3,300	1,900		
75,000	2,800	4,300		6,000		4,300	2,700		
80,000	2,800	4,800		7,600		4,400	3,100		
100,000	2,800					5,000			
125,000	3,100					5,600			
150,000	4,100					6,100			
175,000						6,500			
200,000						6,900			
225,000						7,400			
250,000						8,000			
275,000						8,700			
300,000						9,700			
400,000									
500,000									

Table 5. (cont.)

Size of estimate	Life scientists: Biologist	Life scientists: Agricultural scientist	Life scientists: Medical scientist	Psychologists	Social scientists: Economist	Social scientists: Sociologist/ Anthropologist	Social scientists: Other Social scientist	Engineers: Chemical engineer	Engineers: Aeronautical/ Astronautical engineer
100	330	100	110	350	170	190	240	70	50
200	340	110	140	360	180	210	260	80	60
500	370	140	230	390	240	260	310	100	90
700	390	170	290	410	270	300	340	120	110
1,000	410	200	380	440	320	360	400	150	130
2,500	540	370	740	590	570	620	640	280	260
5,000	740	630	1,200	840	940	1,000	1,000	490	460
10,000	1,100	1,100	1,500	1,300	1,600	1,700	1,600	870	810
25,000	2,000	2,100	2,200	2,300	2,500	2,700	2,500	1,800	1,500
50,000	2,700	3,100		3,400	2,400	4,200	2,600	2,500	2,000
75,000	2,800	4,500		4,000	2,200		4,200	2,700	2,400
80,000	2,800	5,000		4,100	2,300		5,000	2,700	2,500
100,000	2,700	7,600		4,700	4,300		10,900	2,600	3,400
125,000	2,500	13,800		6,000				2,600	6,000
150,000	2,700			8,400				3,000	
175,000	3,400			12,300					
200,000									
225,000									
250,000									
275,000									
300,000									
400,000									
500,000									

Table 5. (cont.)

Size of estimate	Engineers: Civil engineer	Electrical/ Electronics engineer	Mechanical engineer	Materials engineer	Mining engineer	Nuclear engineer	Petroleum engineer	Industrial engineer	Other engineer
100	130	210	250	60	20	40	60	70	290
200	140	210	250	70	50	60	80	80	290
500	160	220	270	110	120	110	130	120	310
700	170	230	280	140	170	140	170	140	320
1,000	180	240	290	170	240	190	220	170	340
2,500	270	310	360	350	540	420	450	320	410
5,000	400	410	470	610	850	710	750	550	540
10,000	660	600	700	1,000	1,000	1,100	1,100	990	790
25,000	1,300	1,100	1,300	1,600	2,300	1,700	1,700	2,000	1,500
50,000	2,200	1,900	2,300	2,600				3,000	2,400
75,000	2,900	2,500	3,200	7,800				3,400	3,200
80,000	3,000	2,700	3,300	9,800				3,500	3,300
100,000	3,300	3,000	3,900					3,900	3,800
125,000	3,600	3,400	4,500					4,700	4,200
150,000	3,800	3,800	5,100					6,500	4,500
175,000	3,900	4,000	5,500					9,600	4,800
200,000	4,100	4,200	5,900						4,900
225,000	4,300	4,300	6,300						5,100
250,000	4,700	4,500	6,600						5,200
275,000	5,200	4,600	6,900						5,300
300,000	6,000	4,800	7,100						5,500
400,000		6,100	8,200						7,300
500,000		9,200	10,000						

B. MINORITY FEMALES

Size of estimate	Physical scientists: Chemist	Physical scientists: Physicist/ Astronomer	Physical scientists: Other Physical scientist	Mathematical scientists: Mathematician	Mathematical scientists: Statistician	Computer specialists	Environmental scientists: Earth scientist	Environmental scientists: Oceanographer	Environmental scientists: Atmospheric scientist
100	30	60	0	130	10	380	20	20	10
200	40	80	10	150	30	380	30	50	40
500	70	120	70	200	90	400	60	140	120
700	80	150	100	240	130	420	80	200	170
1,000	110	190	150	300	180	440	110	270	240
2,500	240	400	380	560	410	550	240	550	470
5,000	450	710	710	950	670	720	450	530	610
10,000	840	1,300	1,200	1,500	1,100	1,100	810		1,000
25,000	1,700	2,300	1,700	2,200		2,000	1,400		
50,000	2,500	3,000		2,300		3,200	1,800		
75,000	2,600	4,300		6,000		4,200	2,600		
80,000	2,600	4,800		7,700		4,400	3,000		
100,000	2,700					5,000			
125,000	3,000					5,600			
150,000	3,900					6,000			
175,000						6,400			
200,000						6,800			
225,000						7,300			
250,000						7,900			
275,000						8,700			
300,000						9,700			
400,000									
500,000									

Table 5. (cont.)

Size of estimate	Life scientists: Biologist	Life scientists: Agricultural scientist	Life scientists: Medical scientist	Psychologists	Social scientists: Economist	Social scientists: Sociologist/ Anthropologist	Social scientists: Other Social scientist	Engineers: Chemical engineer	Engineers: Aeronautical/ Astronautical engineer
100	230	30	60	170	200	130	190	110	10
200	240	40	90	180	220	150	210	120	10
500	270	80	180	210	270	200	260	140	40
700	280	100	240	230	310	240	300	160	60
1,000	310	130	320	260	360	300	350	190	80
2,500	430	300	690	410	610	560	600	320	210
5,000	630	560	1,000	650	980	950	970	530	410
10,000	1,000	1,000	1,400	1,100	1,600	1,600	1,600	910	760
25,000	1,900	2,000	2,100	2,100	2,600	2,700	2,400	1,800	1,500
50,000	2,600	3,100		3,200	2,400	4,100	2,600	2,500	2,000
75,000	2,700	4,500		3,800	2,200		4,200	2,700	2,300
80,000	2,700	4,900		4,000	2,400		5,000	2,700	2,500
100,000	2,600	7,600		4,600	4,300		10,800	2,600	3,400
125,000	2,400	13,700		5,800				2,600	6,000
150,000	2,600			8,200				3,000	
175,000	3,300			12,100					
200,000									
225,000									
250,000									
275,000									
300,000									
400,000									
500,000									

Table 5. (cont.)

Size of estimate	Engineers: Civil engineer	Electrical/ Electronics engineer	Mechanical engineer	Materials engineer	Mining engineer	Nuclear engineer	Petroleum engineer	Industrial engineer	Other engineer
100	40	80	80	0	100	10	10	30	130
200	40	80	90	0	130	30	30	40	130
500	60	100	100	40	200	80	80	70	150
700	70	100	110	70	250	120	120	90	160
1,000	90	120	120	110	320	170	170	120	180
2,500	170	180	190	280	620	390	400	270	250
5,000	300	280	310	550	930	690	690	510	380
10,000	560	470	530	950	1,100	1,000	1,000	940	630
25,000	1,200	1,000	1,200	1,500	2,400	1,700	1,700	2,000	1,300
50,000	2,100	1,600	2,100	2,600				2,900	2,300
75,000	2.800	2,400	3,000	7,800				3,400	3,000
80,000	2,900	2,500	3,100	9,700				3,500	3,200
100,000	3,200	2,900	3,700					3,800	3,600
125,000	3,500	3,300	4,400					4,700	4,100
150,000	3,700	3,600	4,900					6,400	4,400
175,000	3,800	3,900	5,400					9,600	4,600
200,000	4,000	4,000	5,800						4,800
225,000	4,200	4,200	6,100						4,900
250,000	4,600	4,300	6,400						5,000
275,000	5,100	4,500	6,700						5,200
300,000	5,900	4,700	7,000						5,400
400,000		5,900	8,100						7,100
500,000		9,100	9,800						

SOURCE: Mathematica Policy Research, Inc.

64

Table 6. Generalized standard errors of statistical rates for male and female scientists and engineers by racial/ethnic group, size of rate, and size of base: 1984

A. WHITE, NON-HISPANIC MALES

Size of base	Size of rate										
	0.01	0.02	0.05	0.1	0.25	0.5	0.75	0.9	0.95	0.98	0.99
100	0.013	0.015	0.021	0.029	0.047	0.052	0.038	0.025	0.020	0.018	0.017
200	0.013	0.015	0.021	0.029	0.047	0.052	0.038	0.025	0.020	0.018	0.017
500	0.013	0.015	0.021	0.029	0.047	0.052	0.038	0.025	0.020	0.018	0.017
700	0.013	0.015	0.021	0.029	0.047	0.052	0.038	0.025	0.020	0.018	0.017
1,000	0.013	0.015	0.021	0.029	0.047	0.052	0.038	0.025	0.020	0.018	0.017
2,500	0.012	0.014	0.020	0.029	0.046	0.052	0.038	0.025	0.020	0.017	0.016
5,000	0.012	0.014	0.020	0.029	0.046	0.052	0.038	0.024	0.020	0.017	0.016
10,000	0.011	0.013	0.019	0.028	0.045	0.051	0.037	0.023	0.019	0.016	0.015
25,000	0.009	0.011	0.017	0.025	0.043	0.048	0.034	0.021	0.017	0.014	0.013
50,000	0.006	0.008	0.014	0.022	0.040	0.045	0.031	0.018	0.013	0.011	0.010
75,000	0.003	0.005	0.011	0.020	0.037	0.043	0.029	0.015	0.011	0.008	0.007
80,000	0.003	0.005	0.011	0.019	0.037	0.042	0.028	0.015	0.010	0.008	0.007
100,000	0.001	0.003	0.009	0.018	0.035	0.041	0.027	0.014	0.009	0.006	0.005
125,000		0.002	0.008	0.017	0.034	0.039	0.025	0.012	0.008	0.005	0.004
150,000		0.001	0.007	0.016	0.033	0.039	0.025	0.011	0.007	0.004	0.003
175,000		0.001	0.006	0.015	0.033	0.038	0.024	0.011	0.006	0.003	0.002
200,000		0.000	0.006	0.015	0.032	0.038	0.024	0.011	0.006	0.003	0.002

B. MINORITY MALES

Size of base	Size of rate										
	0.01	0.02	0.05	0.1	0.25	0.5	0.75	0.9	0.95	0.98	0.99
100	0.015	0.019	0.032	0.051	0.094	0.121	0.093	0.052	0.034	0.023	0.019
200	0.015	0.019	0.032	0.051	0.094	0.121	0.093	0.052	0.034	0.023	0.019
500	0.014	0.019	0.031	0.051	0.094	0.120	0.093	0.052	0.034	0.022	0.018
700	0.014	0.019	0.031	0.050	0.094	0.120	0.092	0.051	0.034	0.022	0.018
1,000	0.014	0.018	0.031	0.050	0.093	0.120	0.092	0.051	0.033	0.022	0.018
2,500	0.012	0.016	0.029	0.048	0.091	0.117	0.090	0.049	0.031	0.019	0.015
5,000	0.008	0.013	0.025	0.045	0.088	0.114	0.087	0.046	0.028	0.016	0.012
10,000	0.004	0.008	0.021	0.040	0.083	0.110	0.082	0.041	0.023	0.012	0.008
25,000		0.002	0.015	0.034	0.077	0.104	0.076	0.035	0.017	0.006	0.002
50,000		0.002	0.015	0.034	0.077	0.104	0.076	0.035	0.017	0.006	0.002
75,000				0.011	0.055	0.081	0.053	0.012			
80,000				0.000	0.044	0.070	0.043	0.001			

65

Table 6. (cont.)

C. WHITE, NON-HISPANIC FEMALES

Size of base	Size of rate 0.01	0.02	0.05	0.1	0.25	0.5	0.75	0.9	0.95	0.98	0.99
100	0.019	0.022	0.032	0.047	0.078	0.095	0.075	0.048	0.036	0.029	0.027
200	0.019	0.022	0.032	0.046	0.078	0.095	0.074	0.047	0.036	0.029	0.027
500	0.018	0.022	0.031	0.046	0.077	0.094	0.074	0.047	0.036	0.029	0.026
700	0.018	0.021	0.031	0.045	0.077	0.094	0.074	0.046	0.035	0.028	0.026
1,000	0.017	0.021	0.030	0.045	0.076	0.094	0.073	0.046	0.035	0.028	0.025
2,500	0.015	0.018	0.028	0.042	0.074	0.091	0.070	0.043	0.032	0.025	0.023
5,000	0.011	0.014	0.024	0.038	0.070	0.087	0.066	0.039	0.028	0.021	0.018
10,000	0.004	0.007	0.017	0.031	0.063	0.080	0.059	0.032	0.021	0.014	0.011
25,000			0.004	0.018	0.050	0.067	0.046	0.019	0.008	0.001	0.000
50,000			0.001	0.015	0.047	0.064	0.043	0.016	0.005	0.000	0.000
75,000			0.008	0.020	0.052	0.069	0.049	0.021	0.010	0.003	0.001
80,000			0.007	0.021	0.053	0.070	0.049	0.022	0.011	0.004	0.001
100,000			0.003	0.017	0.049	0.066	0.045	0.018	0.007		
125,000					0.019	0.036	0.016				

D. MINORITY FEMALES

Size of base	Size of rate 0.01	0.02	0.05	0.1	0.25	0.5	0.75	0.9	0.95	0.98	0.99
100	0.012	0.017	0.032	0.054	0.098	0.118	0.088	0.056	0.045	0.037	0.035
200	0.012	0.017	0.032	0.054	0.098	0.118	0.088	0.056	0.045	0.038	0.035
500	0.012	0.018	0.032	0.054	0.099	0.118	0.088	0.057	0.045	0.038	0.035
700	0.012	0.018	0.032	0.054	0.099	0.118	0.088	0.057	0.045	0.038	0.035
1,000	0.012	0.018	0.032	0.054	0.099	0.118	0.088	0.057	0.045	0.038	0.035
2,500	0.010	0.015	0.030	0.051	0.096	0.115	0.085	0.054	0.042	0.035	0.033
5,000		0.005	0.019	0.041	0.086	0.105	0.075	0.044	0.032	0.025	0.022
10,000				0.018	0.063	0.082	0.052	0.020	0.009	0.002	
25,000											
50,000											
75,000											
80,000											

SOURCE: Mathematica Policy Research, Inc.

Table 7. Standard errors for estimates of doctoral scientists and engineers: 1983

Standard errors of totals: Size of estimate	Standard errors of totals: Estimated sampling error	Standard errors of percent: Base of percent	Estimated percent: 1/99	2/98	5/95	10/90	25/75	50
100	35	500	1.53	2.15	3.35	4.62	6.66	7.69
200	50	1,000	1.08	1.52	2.37	3.26	4.71	5.44
500	75	2,000	0.77	1.08	1.68	2.31	3.33	3.85
1,000	110	5,000	0.48	0.68	1.06	1.46	2.11	2.43
2,000	150	10,000	0.34	0.48	0.75	1.03	1.49	1.72
5,000	240	15,000	0.28	0.39	0.61	0.84	1.22	1.40
10,000	340	20,000	0.24	0.34	0.53	0.73	1.05	1.22
15,000	410	30,000	0.20	0.28	0.43	0.60	0.86	0.99
20,000	470	40,000	0.17	0.24	0.37	0.52	0.74	0.86
30,000	570	50,000	0.15	0.22	0.34	0.46	0.67	0.77
40,000	650	75,000	0.13	0.18	0.27	0.38	0.54	0.63
50,000	720	100,000	0.11	0.15	0.24	0.33	0.47	0.54
75,000	840	150,000	0.10	0.12	0.19	0.27	0.38	0.44
100,000	930	200,000	0.08	0.11	0.17	0.23	0.33	0.38
150,000	1,030	250,000	0.07	0.10	0.15	0.21	0.30	0.34
200,000	1,040	275,000	0.07	0.09	0.14	0.20	0.28	0.33
250,000	980	300,000	0.06	0.09	0.14	0.19	0.27	0.31
300,000	820	325,000	0.06	0.08	0.13	0.18	0.26	0.30

Employed Women

Standard errors of totals: Size of estimate	Standard errors of totals: Estimated sampling error	Standard errors of percent: Base of percent	Estimated percent: 1/99	2/98	5/95	10/90	25/75	50
100	20	500	0.96	1.35	2.10	2.89	4.17	4.82
200	30	1,000	0.68	0.95	1.49	2.05	2.95	3.41
500	50	2,000	0.48	0.67	1.05	1.45	2.09	2.41
1,000	65	5,000	0.30	0.43	0.66	0.91	1.32	1.52
2,000	95	10,000	0.21	0.30	0.47	0.65	0.93	1.08
5,000	140	15,000	0.18	0.25	0.38	0.53	0.76	0.88
10,000	190	20,000	0.15	0.21	0.33	0.46	0.66	0.76
15,000	220	25,000	0.14	0.19	0.30	0.41	0.59	0.68
20,000	230	30,000	0.12	0.17	0.27	0.37	0.54	0.62
30,000	230	35,000	0.11	0.16	0.25	0.35	0.50	0.58
40,000	180	40,000	0.11	0.15	0.23	0.32	0.47	0.54

SOURCE: National Science Foundation

67

Statistical Tables

Appendix table 1. Employed scientists and engineers by field and sex: 1976, 1982, & 1984

Field	1976			1982			1984		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Total scientists and engineers	2,331,200	2,131,600	199,700	3,253,000	2,864,000	388,900	3,995,500	3,482,900	512,600
Scientists	959,500	781,300	178,200	1,405,700	1,075,100	330,600	1,781,400	1,343,300	438,100
Physical scientists	188,900	172,700	16,200	227,400	205,100	22,300	254,100	225,800	28,300
Chemists	132,800	119,100	13,700	154,100	136,400	17,700	168,600	146,300	22,300
Physicists/astronomers	44,300	42,600	1,700	47,600	45,200	2,500	61,200	58,200	3,000
Other physical scientists	11,800	10,900	800	25,600	23,500	2,100	24,300	21,200	3,100
Mathematical scientists	48,600	37,100	11,500	79,400	54,000	25,300	100,400	78,500	21,900
Mathematicians	43,400	33,700	9,700	62,500	44,600	17,900	83,900	65,900	17,900
Statisticians	5,200	3,400	1,800	16,900	9,400	7,500	16,500	12,500	4,000
Computer specialists	119,000	98,400	20,600	299,000	220,300	78,700	436,800	322,700	114,100
Environmental scientists	54,800	50,900	3,900	87,200	74,800	12,400	98,100	87,800	10,300
Earth scientists	46,500	42,900	3,600	73,600	62,500	11,100	82,300	73,500	8,800
Oceanographers	4,400	4,400	(1)	3,400	2,900	400	3,200	2,700	500
Atmospheric scientists	3,800	3,600	300	10,300	9,400	900	12,600	11,600	1,000
Life scientists	213,500	179,600	33,900	337,100	268,500	68,600	353,300	270,700	82,600
Biological scientists	139,400	115,300	24,100	233,800	184,200	49,600	236,600	176,100	60,400
Agricultural scientists	40,700	39,100	1,600	73,800	61,800	12,000	88,700	72,400	16,300
Medical scientists	33,300	25,100	8,200	29,500	22,500	7,000	27,900	22,200	5,800
Psychologists	112,500	76,900	35,600	138,400	83,000	55,400	209,500	121,100	88,400
Social scientists	222,300	165,700	56,600	237,200	169,300	67,900	329,200	236,800	92,400
Economists	62,500	54,600	8,000	103,100	84,600	18,400	125,600	106,900	18,600
Sociologists/ anthropologists	33,900	22,500	11,400	57,000	32,700	24,200	77,700	45,700	32,000
Other social scientists	125,900	88,700	37,200	77,200	52,000	25,200	125,900	84,200	41,800

Appendix table 1. - continued

Field	1976			1982			1984		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Engineers	1,371,700	1,350,300	21,400	1,847,200	1,788,900	58,300	2,214,100	2,139,600	74,500
Aeronautical/ astronautical	56,800	56,400	400	80,800	78,700	2,100	97,200	94,900	2,200
Chemical	77,500	75,000	2,500	107,700	101,600	6,100	140,100	131,300	8,800
Civil	188,200	182,200	5,400	258,200	252,200	6,100	312,700	303,400	9,300
Electrical/electronics	283,000	284,400	1,600	437,700	428,600	9,100	500,700	488,500	12,200
Industrial	NA	NA	NA	113,100	108,600	4,500	131,700	126,400	5,300
Materials	NA	NA	NA	39,200	37,500	1,700	51,300	49,100	2,200
Mechanical	276,200	273,900	2,300	357,900	350,700	7,100	445,600	434,600	10,900
Mining	NA	NA	NA	14,200	13,700	500	16,500	15,900	600
Nuclear	NA	NA	NA	18,200	17,900	400	22,100	21,300	800
Petroleum	NA	NA	NA	27,700	26,300	1,400	33,300	31,300	2,000
Other engineers	490,000	480,900	9,100	392,500	373,200	19,300	463,000	442,900	20,100

(1) Too few cases to estimate.

NA: Not available

Note: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Appendix table 2. Employed scientists and engineers by field and racial/ethnic group: 1976, 1982, 1984

Field	1976					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	2,331,200	2,141,900	38,100	106,600	NA	NA
Scientists	959,500	870,900	21,400	48,500	NA	NA
Physical scientists	188,900	172,400	3,200	4,700	NA	NA
Chemists	132,800	121,200	2,800	6,800	NA	NA
Physicists/astronomers	44,300	40,500	300	600	NA	NA
Other physical scientists	11,800	10,700	100	200	NA	NA
Mathematical scientists	48,600	44,200	2,600	1,600	NA	NA
Mathematicians	43,400	39,700	2,300	1,200	NA	NA
Statisticians	5,200	4,500	200	400	NA	NA
Computer specialists	119,000	110,700	1,600	4,000	NA	NA
Environmental scientists	54,800	48,300	2,000	3,200	NA	NA
Earth scientists	46,500	42,400	200	2,700	NA	NA
Oceanographers	4,400	2,600	1,800	100	NA	NA
Atmospheric scientists	3,800	3,400	(3)	400	NA	NA
Life scientists	213,500	200,700	4,900	5,300	NA	NA
Biological scientists	139,400	131,000	3,000	3,700	NA	NA
Agricultural scientists	40,700	38,800	500	900	NA	NA
Medical scientists	33,300	30,900	1,400	700	NA	NA
Psychologists	112,500	105,100	3,800	1,000	NA	NA
Social scientists	222,300	189,400	3,300	25,800	NA	NA
Economists	62,500	54,500	800	6,700	NA	NA
Sociologists/ anthropologists	33,900	30,200	500	1,100	NA	NA
Other social scientists	125,900	104,700	2,000	18,000	NA	NA

Appendix table 2. - continued

Field	1976					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Engineers	1,371,700	1,271,000	16,700	58,100	NA	NA
Aeronautical/ astronautical	56,800	54,100	300	1,600	NA	NA
Chemical	77,500	72,200	1,500	2,400	NA	NA
Civil	188,200	165,700	1,600	14,800	NA	NA
Electrical/electronics	283,000	262,500	2,900	13,800	NA	NA
Industrial	NA	NA	NA	NA	NA	NA
Materials	NA	NA	NA	NA	NA	NA
Mechanical	276,200	258,700	2,400	9,700	NA	NA
Mining	NA	NA	NA	NA	NA	NA
Nuclear	NA	NA	NA	NA	NA	NA
Petroleum	NA	NA	NA	NA	NA	NA
Other engineers	490,000	457,800	8,000	15,800	NA	NA

Appendix table 2. - continued

Field	1982					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	3,253,000	2,991,900	71,500	134,600	15,600	70,000
Scientists	1,405,700	1,294,200	40,000	48,000	6,500	28,100
Physical scientists	227,400	212,700	3,500	8,200	600	3,600
Chemists	154,100	143,100	2,900	6,400	500	2,200
Physicists/astronomers	47,500	45,200	400	1,200	100	900
Other physical scientists	25,600	24,400	200	600	(3)	500
Mathematical scientists	79,400	72,300	3,600	2,700	100	1,400
Mathematicians	62,500	57,100	2,600	2,100	100	100
Statisticians	16,900	15,300	1,000	600	(3)	500
Computer specialists	299,000	272,300	8,900	13,100	1,100	4,600
Environmental scientists	87,200	80,900	600	3,600	900	1,400
Earth scientists	73,600	68,500	500	2,900	700	1,200
Oceanographers	3,400	2,900	(3)	100	200	(3)
Atmospheric scientists	10,300	9,400	(3)	600	(3)	100
Life scientists	337,100	316,900	8,000	7,800	1,300	6,700
Biological scientists	233,800	219,200	6,400	5,200	700	4,300
Agricultural scientists	73,800	70,000	1,300	1,600	600	1,500
Medical scientists	29,500	27,700	400	1,000	100	900
Psychologists	138,400	130,400	4,500	1,200	1,000	2,300
Social scientists	237,200	208,700	10,900	11,300	1,500	8,000
Economists	103,100	91,200	2,400	7,200	900	2,300
Sociologists/ anthropologists	57,000	49,300	4,200	1,700	400	3,000
Other social scientists	77,200	68,200	4,400	2,400	100	2,800

Appendix table 2. - continued

Field	1982					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Engineers	1,847,200	1,697,700	31,500	86,600	9,100	41,900
Aeronautical/ astronautical	80,800	76,000	1,200	2,600	200	1,600
Chemical	107,700	97,700	1,000	7,300	200	3,000
Civil	258,200	231,190	3,700	17,700	1,000	8,000
Electrical/electronics	437,700	397,200	9,700	23,800	2,300	9,000
Industrial	113,100	106,900	2,200	2,700	400	2,700
Materials	39,200	36,100	400	2,400	200	300
Mechanical	357,900	332,800	3,800	15,600	1,900	7,000
Mining	14,200	13,500	(3)	200	400	100
Nuclear	18,200	16,700	100	1,100	(3)	200
Petroleum	27,700	25,900	300	500	500	900
Other engineers	392,500	363,800	9,100	12,800	2,000	9,200

Appendix table 2. - continued

Field	1984					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	3,995,500	3,641,200	90,500	186,500	20,400	86,600
Scientists	1,781,400	1,623,800	53,400	69,100	8,600	38,800
Physical scientists	254,100	230,700	6,100	12,500	1,100	4,300
Chemists	168,600	151,500	5,300	8,500	900	3,200
Physicists/astronomers	61,200	56,400	600	2,800	200	800
Other physical scientists	24,300	22,800	200	1,100	(3)	300
Mathematical scientists	100,400	88,900	4,700	4,700	400	2,700
Mathematicians	83,900	74,100	4,300	3,800	200	2,400
Statisticians	16,500	14,800	400	900	200	400
Computer specialists	436,800	392,600	12,100	24,600	1,800	8,200
Environmental scientists	98,100	94,200	600	1,800	300	1,800
Earth scientists	82,300	79,200	400	1,300	200	1,500
Oceanographers	3,200	3,000	(3)	100	(3)	100
Atmospheric scientists	12,600	12,000	100	400	(3)	300
Life scientists	353,300	329,300	6,700	10,400	2,100	7,300
Biological scientists	236,600	218,900	5,600	7,600	900	5,600
Agricultural scientists	88,700	84,200	800	1,700	1,100	1,300
Medical scientists	27,900	26,300	300	1,100	100	400
Psychologists	209,500	196,000	7,300	2,000	1,800	4,200
Social scientists	329,200	292,100	15,900	13,100	1,200	10,200
Economists	125,600	113,000	4,400	5,600	700	2,500
Sociologists/ anthropologists	77,700	67,000	4,700	3,600	200	4,300
Other social scientists	125,900	112,100	6,800	3,900	200	3,400

Appendix table 2. - continued

Field	1984					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Engineers	2,214,100	2,017,400	37,100	117,500	11,700	47,800
Aeronautical/ astronautical	97,200	90,200	1,200	4,900	200	1,300
Chemical	140,100	125,100	1,500	10,300	700	2,900
Civil	312,700	275,000	4,800	23,800	1,700	8,100
Electrical/electronics	500,700	447,700	11,400	31,100	3,900	11,300
Industrial	131,700	123,700	3,000	2,800	600	3,400
Materials	51,300	46,600	800	3,100	200	100
Mechanical	445,600	412,100	4,800	21,300	2,500	9,200
Mining	16,500	15,800	100	300	400	100
Nuclear	22,100	20.500	100	1,300	(3)	100
Petroleum	33,300	31,100	300	700	500	1,000
Other engineers	463,000	429,500	9,100	18,000	1,000	10,400

(1) Detail will not add to total employed because a) racial and ethnic categories are not mutually exclusive and b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

NA: Not available

SOURCE: National Science Foundation

Appendix table 3. Employed scientists and engineers by field, sex, and racial/ethnic group: 1982 & 1984

Field and sex	1982					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	3,253,000	2,991,900	71,500	134,600	15,600	70,000
Men	2,864,000	2,652,200	48,500	115,700	13,700	60,500
Women	388,900	339,800	23,000	18,900	1,900	9,500
Scientists	1,405,700	1,294,200	40,000	48,000	6,500	28,100
Men	1,075,100	1,001,400	22,200	33,600	4,900	20,400
Women	330,600	292,900	17,800	14,400	1,600	7,700
Physical scientists	227,400	212,700	3,500	8,200	600	3,600
Men	205,100	193,000	2,700	6,600	600	3,200
Women	22,300	19,800	800	1,600	(3)	500
Mathematical scientists	79,400	72,300	3,600	2,700	100	1,400
Men	54,000	50,600	900	2,100	100	800
Women	25,300	21,800	2,600	700	(3)	600
Computer specialists	299,000	272,300	8,900	13,100	1,100	4,600
Men	220,300	204,400	3,900	8,300	800	3,700
Women	78,700	67,900	5,000	4,700	300	900
Environmental scientists	87,200	80,900	600	3,600	900	1,400
Men	74,800	68,800	500	3,500	800	1,200
Women	12,400	12,100	100	100	(3)	200
Life scientists	337,100	316,900	8,000	7,800	1,300	6,700
Men	268,500	253,400	6,700	5,500	900	4,700
Women	68,600	63,600	1,300	2,300	400	2,000
Psychologists	138,400	130,400	4,500	1,200	1,000	2,300
Men	83,000	78,800	2,200	500	700	1,000
Women	55,400	51,600	2,300	700	300	2,300
Social scientists	237,200	208,700	10,900	11,300	1,500	8,000
Men	169,300	152,500	5,200	7,100	900	5,800
Women	67,900	56,100	5,700	4,200	600	2,200
Engineers	1,847,200	1,697,700	31,500	86,600	9,100	41,900
Men	1,788,900	1,658,000	26,200	82,100	8,800	40,100
Women	58,300	46,900	5,200	4,500	300	1,800

Appendix table 3. - continued

Field and sex	1984					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	3,995,500	3,641,200	90,500	186,500	20,400	86,600
Men	3,482,900	3,189,000	67,600	159,500	18,900	71,400
Women	512,600	452,200	22,900	27.000	1,500	15,200
Scientists	1,781,400	1,623,800	53,400	69,100	8,600	38,800
Men	1,343,300	1,235,000	33,500	48,100	7,400	26,200
Women	438,100	388,800	19,800	20,900	1,300	12,700
Physical scientists	254,100	230,700	6,100	12,500	1,100	4,300
Men	225,800	206,700	4,900	9,700	1,100	3,500
Women	28,300	24,000	1,200	2,800	(3)	800
Mathematical scientists	100,400	88,900	4,700	4,700	400	2,700
Men	78,500	69,600	3,000	4,200	400	2,000
Women	21,900	19,300	1,700	600	(3)	700
Computer specialists	436,800	392,600	12,100	24,600	1,800	8,200
Men	322,700	292,900	6,600	17,400	1,600	5,100
Women	114,100	99,600	5,600	7,200	100	3,100
Environmental scientists	98,100	94,200	600	1,800	300	1,800
Men	87,800	84,300	500	1,700	200	1,600
Women	10,300	9,900	100	100	(3)	200
Life scientists	353,300	329,300	6,700	10,400	2,100	7,300
Men	270,700	255,600	4,500	6,200	1,600	4,600
Women	82,500	73,700	2,100	4,200	500	2,700
Psychologists	209,500	196,[illegible]00	7,300	2,000	1,800	4,200
Men	121,100	114,400	3,000	800	1,500	2,000
Women	88,400	81,600	4,300	1,200	300	2,200
Social scientists	329,200	292,100	15,900	13,100	1,200	10,200
Men	236,800	211,500	11,000	8,300	1,000	7,300
Women	92,400	80,600	4,800	4,800	200	2,900
Engineers	2,214,100	2,017,400	37,100	117,500	11,700	47,800
Men	2,139,600	1,953,900	34,100	111,400	11,500	45,200
Women	74,500	63,500	3,100	6,100	200	2,600

(1) Detail will not add to total employed because a) racial and ethnic categories are not mutually exclusive and b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 4. Employed doctoral scientists and engineers by field and sex: 1973, 1981, and 1983

Field	1973			1981			1983		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Total scientists and engineers	220,300	203,400	16,900	344,000	303,000	41,000	369,300	320,500	48,800
Scientists	184,600	167,800	16,800	286,900	246,700	40,200	307,800	260,000	47,800
Physical scientists	48,500	46,600	1,900	63,100	59,300	3,800	64,000	59,800	4,200
Chemists	30,800	29,300	1,500	41,900	38,800	3,200	4 ,300	37,800	3,500
Physicists/astronomers	17,800	17,300	400	21,200	20,600	600	22,700	22,000	700
Mathematical scientists	12,100	11,400	800	15,600	14,300	1,300	16,400	15,000	1,400
Mathematicians	10,700	10,000	700	13,000	12,000	1,000	13,600	12,500	1,100
Statisticians	1,500	1,400	100	2,500	2,300	300	2,800	2,500	300
Computer specialists	2,700	2,600	100	9,100	8,400	700	12,200	10,900	1,300
Environmental scientists	10,300	10,100	300	15,900	15,100	900	16,500	15,600	900
Earth scientists	8,600	8,300	200	12,000	11,400	600	12,500	11,900	600
Oceanographers	1,100	1,100	(1)	1. 00	1,600	200	1,700	1,600	200
Atmospheric scientists	600	600	(1)	2,100	2,000	100	2,200	2,100	100
Life scientists	56,700	50,600	6,100	84,900	71,600	13,300	92,800	76,600	16,200
Biological scientists	36,800	31,900	4,900	49,600	40,600	9,000	55,200	44,600	10,600
Agricultural scientists	9,200	9,100	100	13,500	13,100	400	14,500	13,900	700
Medical scientists	10,700	9,600	1,100	21,800	17,800	3,900	23,100	18,100	4,900
Psychologists	24,800	20,000	4,800	42,800	31,100	11,700	46,600	33,000	13,700
Social scientists	29,400	26,500	2,900	55,500	47,000	8,600	59,300	49,300	10,100
Economists	9,700	9,200	500	16,000	14,800	1,200	17,000	15,500	1,400
Sociologists/ anthropologists	6,500	5,300	1,200	11,000	8,100	2,900	12,100	8,600	3,500
Other social scientists	13,200	12,000	1,200	28,500	24,100	4,400	30,300	25,200	5,100

Appendix table 4. - continued

Field	1973			1981			1983		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Engineers	35,800	35,600	100	57,000	56,300	800	61,500	60,500	1,100
Aeronautical/ astronautical	1,700	1,700	(1)	2,500	2,500	(1)	3,700	3,600	100
Chemical	4,500	4,500	(1)	7,100	7,100	100	7,000	6,900	100
Civil	3,100	3,100	(1)	6,100	6,000	100	5,300	5,200	100
Electrical/electronics	7,100	7,000	(1)	10,600	10,500	100	12,700	12,500	200
Materials	4,500	4,400	(1)	6,100	6,000	100	7,400	7,300	200
Mechanical	3,300	3,300	(1)	5,400	5,300	(1)	5,700	5,600	100
Nuclear	1,300	1,300	(1)	2,100	2,000	(1)	2,300	2,300	(1)
Other engineers	10,500	10,500	100	17,100	16,900	300	17,400	17,100	400

(1) Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Appendix table 5. Employed doctoral scientists and engineers by field and racial/ethnic group: 1973, 1981, and 1983

Field	1973					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	220,300	202,200	2,000	10,300	100	1,600
Scientists	184,600	170,400	1,900	7,300	100	1,400
Physical scientists	48,500	44,200	500	2,400	(3)	300
Chemists	30,800	28,200	400	1,400	(3)	200
Physicists/astronomers	17,800	16,100	100	900	(3)	100
Mathematical scientists	12,100	11,100	100	600	(3)	100
Mathematicians	10,700	9,700	100	500	(3)	100
Statisticians	1,500	1,400	(3)	100	(3)	(3)
Computer specialists	2,700	2,500	(3)	100	(3)	(3)
Environmental scientists	10,300	9,700	(3)	300	(3)	(3)
Earth scientists	8,600	8,100	(3)	300	(3)	(3)
Oceanographers	1,100	1,100	(3)	(3)	(3)	(3)
Atmospheric scientists	600	600	(3)	(3)	(3)	(3)
Life scientists	56,700	52,300	600	2,600	100	600
Biological scientists	36,800	33,800	500	1,700	(3)	400
Agricultural scientists	9,200	8,800	(3)	300	(3)	100
Medical scientists	10,700	9,800	100	600	(3)	100
Psychologists	24,800	23,500	300	200	(3)	200
Social scientists	29,400	27,000	400	1,100	(3)	200
Economists	9,700	8,800	100	500	(3)	100
Sociologists/ anthropologists	6,500	6,100	100	200	(3)	(3)
Other social scientists	13,200	12,200	200	500	(3)	100

Appendix table 5. - continued

Field	1973					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Engineers	35,800	31,800	100	3,000	(3)	200
Aeronautical/ astronautical	1,700	1,300	(3)	100	(3)	(3)
Chemical	4,500	4,000	(3)	400	(3)	(3)
Civil	3,100	2,500	(3)	500	(3)	(3)
Electrical/electronics	7,100	6,300	(3)	500	(3)	100
Materials	4,500	4,100	(3)	200	(3)	(3)
Mechanical	3,300	2,800	(3)	400	(3)	(3)
Nuclear	1,300	1,200	(3)	(3)	(3)	(3)
Other engineers	10,500	9,400	(3)	800	(3)	(3)

Appendix table 5. - continued

Field	1981					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	344,000	308,600	4,200	27,300	400	4,800
Scientists	286,900	261,400	4,000	18,300	400	4,000
Physical scientists	63,100	56,100	600	5,800	(3)	900
Chemists	41,900	37,300	400	3,900	(3)	600
Physicists/astronomers	21,200	18,900	200	1,900	(3)	300
Mathematical scientists	15,600	13,900	200	1,200	(3)	200
Mathematicians	13,000	11,700	200	900	(3)	200
Statisticians	2,500	2,200	(3)	300	(3)	(3)
Computer specialists	9,100	8,000	(3)	900	(3)	100
Environmental scientists	15,900	15,000	(3)	700	(3)	200
Earth scientists	12,000	11,300	(3)	500	(3)	100
Oceanographers	1,800	1,700	(3)	100	(3)	100
Atmospheric scientists	2,100	2,000	(3)	100	(3)	(3)
Life scientists	84,900	76,900	1,000	6,300	100	1,200
Biological scientists	49,600	44,700	600	4,000	(3)	700
Agricultural scientists	13,500	12,700	100	700	(3)	200
Medical scientists	21,800	19,600	300	1,600	(3)	300
Psychologists	42,800	40,900	800	600	100	600
Social scientists	55,500	50,500	1,300	2,900	100	800
Economists	16,000	14,400	200	1,200	100	300
Sociologists/ anthropologists	11,000	10,200	300	300	(3)	200
Other social scientists	28,500	25,900	800	1,400	(3)	300

Appendix table 5. - continued

Field	1981					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Engineers	57,000	47,200	300	9,000	(3)	800
Aeronautical/ astronautical	2,500	2,200	(3)	300	(3)	(3)
Chemical	7,100	5,600	(3)	1,600	(3)	(3)
Civil	6,100	4,800	(3)	1,200	(3)	100
Electrical/electronics	10,600	8,900	(3)	1,600	(3)	100
Materials	6,100	5,100	(3)	800	(3)	200
Mechanical	5,400	4,300	(3)	1,000	(3)	(3)
Nuclear	2,100	1,600	(3)	400	(3)	(3)
Other engineers	17,100	14,600	100	2,200	(3)	300

Appendix table 5. - continued

Field	1983					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	369,300	328,500	4,900	29,700	400	5,400
Scientists	307,800	278,700	4,500	19,300	400	4,400
Physical scientists	64,000	56,500	700	5,700	100	900
Chemists	41,300	36,300	400	3,900	(3)	700
Physicists/astronomers	22,700	20,200	200	1,800	(3)	200
Mathematical scientists	16,400	14,500	200	1,400	(3)	200
Mathematicians	13,600	12,200	200	1,000	(3)	200
Statisticians	2,800	2,300	(3)	400	(3)	(3)
Computer specialists	12,200	11,000	(3)	900	(3)	200
Environmental scientists	16,500	15,500	(3)	800	(3)	200
Earth scientists	12,500	11,700	(3)	600	(3)	200
Oceanographers	1,700	1,700	(3)	100	(3)	(3)
Atmospheric scientists	2,200	2,100	(3)	100	(3)	(3)
Life scientists	92,800	83,400	1,100	6,800	100	1,300
Biological scientists	55,200	49,500	600	4,200	(3)	700
Agricultural scientists	14,500	13,400	100	800	(3)	300
Medical scientists	23,100	20,500	400	1,700	(3)	300
Psychologists	46,600	44,200	1,000	600	100	700
Social scientists	59,300	53,600	1,500	3,100	100	1,000
Economists	17,000	15,000	300	1,300	100	300
Sociologists/anthropologists	12,100	11,100	400	400	(3)	200
Other social scientists	30,300	27,500	800	1,400	(3)	400

Appendix table 5. - continued

Field	1983					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Engineers	61,500	49,700	400	10,500	(3)	900
Aeronautical/ astronautical	3,700	3,100	(3)	500	(3)	(3)
Chemical	7,000	5,400	(3)	1,500	(3)	100
Civil	5,300	4,200	(3)	1,100	(3)	100
Electrical/electronics	12,700	10,300	100	2,100	(3)	200
Materials	7,400	6,100	(3)	1,200	(3)	200
Mechanical	5,700	4,400	100	1,200	(3)	100
Nuclear	2,300	1,900	(3)	400	(3)	(3)
Other engineers	17,400	14,400	200	2,600	(3)	300

(1) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 6. Employed doctoral scientists and engineers by field, sex, and racial/ethnic group: 1981 and 1983

Field and sex	1981					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	344,000	308,600	4,200	27,300	400	4,800
Men	303,000	271,900	3,200	24,400	400	4,300
Women	41,000	36,700	1,100	2,900	(3)	600
Scientists	286,900	261,400	4,000	18,300	400	4,000
Men	246,700	225,300	2,900	15,500	300	3,500
Women	40,200	36,100	1,100	2,800	(3)	500
Physical scientists	63,100	56,100	600	5,800	(3)	900
Men	59,300	53,100	500	5,100	(3)	800
Women	3,800	3,000	(3)	600	(3)	100
Mathematical scientists	15,600	13,900	200	1,200	(3)	200
Men	14,300	12,800	200	1,000	(3)	200
Women	1,300	1,100	(3)	200	(3)	(3)
Computer specialists	9,100	8,000	(3)	900	(3)	100
Men	8,400	7,500	(3)	800	(3)	100
Women	700	600	(3)	100	(3)	(3)
Environmental scientists	15,900	15,000	(3)	700	(3)	200
Men	15,100	14,200	(3)	700	(3)	200
Women	900	800	(3)	(3)	(3)	(3)
Life scientists	84,900	76,900	1,000	6,300	100	1,200
Men	71,600	65,300	700	5,000	100	1,100
Women	13,300	11,700	300	1,300	(3)	100
Psychologists	42,800	40,900	800	600	100	600

Appendix table 6. - continued

Field and sex	1981					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Psychologists						
Men	31,100	30,000	400	300	(3)	500
Women	11,700	11,000	400	300	(3)	200
Social scientists	55,500	50,500	1,300	2,900	100	800
Men	47,000	42,600	1,000	2,600	100	700
Women	8,600	7,900	300	300	(3)	200
Engineers	57,000	47,200	300	9,000	(3)	800
Men	56,300	46,600	300	8,900	(3)	800
Women	800	600	(3)	100	(3)	(3)

Appendix table 3. - continued

Field and sex	1983					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	369,300	328,500	4,900	29,700	400	5,400
Men	320,500	285,100	3,600	26,300	400	4,700
Women	48,800	43,300	1,400	3,400	(3)	700
Scientists	307,800	278,700	4,500	19,300	400	4,400
Men	260,000	236,200	3,200	16,100	300	3,800
Women	47,800	42,600	1,300	3,200	(3)	700
Physical scientists	64,000	56,500	700	5,700	100	900
Men	59,800	53,100	600	5,000	100	800
Women	4,200	3,400	100	700	(3)	100
Mathematical scientists	16,400	14,500	200	1,400	(3)	200
Men	15,000	13,400	200	1,200	(3)	200
Women	1,400	1,200	(3)	200	(3)	(3)
Computer specialists	12,200	11,000	(3)	900	(3)	200
Men	10,900	9,900	(3)	800	(3)	200
Women	1,300	1,100	(3)	100	(3)	(3)
Environmental scientists	16,500	15,500	(3)	800	(3)	200
Men	15,600	14,600	(3)	700	(3)	200
Women	900	800	(3)	100	(3)	(3)
Life scientists	92,800	83,400	1,100	6,800	100	1,300
Men	76,600	69,200	700	5,300	100	1,100
Women	16,200	14,100	400	1,500	(3)	200
Psychologists	46,600	44,200	1,000	600	100	700
Men	33,000	31,500	500	400	100	500
Women	13,700	12,700	500	300	(3)	200

Appendix table 6. - continued

Field and sex	1983					
	Total (1)	White	Black	Asian	Native American	Hispanic (2)
Social scientists	59,300	53,600	1,500	3,100	100	1,000
Men	49,300	44,400	1,100	2,700	100	800
Women	10,100	9,200	400	400	(3)	200
Engineers	61,500	49,700	400	10,500	(3)	900
Men	60,500	48,900	400	10,200	(3)	900
Women	1,100	800	(3)	200	(3)	(3)

(1) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 7. Selected characteristics of physically handicapped scientists and engineers: 1984

Field	Type of physical handicap				
	Total population	Visual	Auditory	Ambulatory	Other
Total scientists and engineers	91,600	20,000	15,700	21,400	34,400
Scientists	40,200	3,800	8,500	9,100	13,800
Physical scientists	6,500	1,600	800	1,800	2,300
Mathematical scientists	2,500	400	900	500	700
Computer specialists	10,000	2,000	3,100	2,000	2,900
Environmental scientists	2,900	600	500	600	1,200
Life scientists	5,700	1,600	800	1,000	2,200
Psychologists	7,500	1,500	1,100	1,400	3,500
Social scientists	5,300	1,200	1,300	1,800	1,000
Engineers	51,300	11,300	7,200	12,300	20,700

Appendix table 7. - continued

Field	Labor force status				
	Total population	Labor Force	Total Employed	Employed in S/E	Unemployed
Total scientists and engineers	91,600	76,300	74,800	64,200	1,500
Scientists	40,200	37,100	36,500	28,400	600
Physical scientists	6,500	5,500	5,500	4,500	(1)
Mathematical scientists	2,500	2,500	2,400	2,000	(1)
Computer specialists	10,000	9,900	9,800	7,300	(1)
Environmental scientists	2,900	2,400	2,300	2,000	100
Life scientists	5,700	4,800	4,700	4,000	100
Psychologists	7,500	7,300	6,900	5,000	400
Social scientists	5,300	4,800	4,800	3,700	(1)
Engineers	51,300	39,200	38,300	35,800	900

Appendix table 7. - continued

Field	Reason Outside Labor Force			
	Total Outside Labor Force	Retired	Illness	Other
Total scientists and engineers	15,300	10,400	4,500	400
Scientists	3,100	2,300	500	300
Physical scientists	900	800	100	(1)
Mathematical scientists	(1)	(1)	(1)	(1)
Computer specialists	100	(1)	(1)	100
Environmental scientists	500	400	100	(1)
Life scientists	900	800	100	100
Psychologists	200	(1)	200	(1)
Social scientists	500	300	(1)	100
Engineers	12,200	8,100	4,000	100

(1) Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Appendix table 8. Employed scientists and engineers by field, racial/ ethnic group, and years of professional experience: 1984

Field and racial/ethnic group	Total Employed (1)	Professional Experience								
		Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Total scientists and engineers (1)	3,995,500	115,000	571,200	554,300	634,100	523,700	466,800	382,900	377,300	285,300
White	3,641,200	102,400	514,500	495,600	562,300	471,400	423,700	354,600	359,700	278,400
Black	90,500	4,600	15,700	15,600	18,500	11,100	10,500	7,600	4,200	1,800
Asian	186,500	4,200	23,200	31,500	42,200	31,400	24,600	14,600	8,000	3,600
Native American	20,400	700	1,800	2,500	2,400	3,300	2,400	3,000	2,100	1,200
Hispanic (2)	86,600	4,100	19,200	13,800	13,000	12,400	8,300	6,600	4,600	3,000
Scientists	1,781,400	83,900	335,200	286,700	311,300	236,000	179,800	129,600	111,600	74,000
White	1,623,800	75,300	301,400	260,800	277,700	216,500	164,600	117,800	105,800	71,900
Black	53,400	3,300	11,600	8,600	10,100	5,600	5,800	5,300	1,900	600
Asian	69,100	2,400	11,600	12,500	19,000	9,200	6,300	5,000	2,000	700
Native American	8,600	400	900	1,000	500	1,700	1,400	500	1,400	700
Hispanic	38,800	2,700	12,300	6,000	5,900	5,400	2,500	2,500	600	400
Physical scientists	254,100	5,600	28,400	32,400	35,100	34,600	36,800	26,200	27,000	22,100
White	230,700	5,000	26,000	28,600	30,500	31,000	33,700	23,500	25,500	21,300
Black	6,100	300	600	1,400	700	700	600	800	700	100
Asian	12,500	200	800	2,200	2,500	2,600	1,400	1,500	600	500
Native American	1,100	(3)	(3)	(3)	(3)	(3)	700	200	(3)	200
Hispanic	4,300	200	500	400	700	600	500	700	(3)	300
Mathematical scientists	100,400	2,000	11,400	13,000	18,400	17,200	15,700	11,600	5,700	4,800
White	88,900	1,700	10,800	12,100	16,200	15,200	13,200	8,900	5,400	4,700
Black	4,700	100	300	200	1,000	200	1,700	1,100	(3)	100
Asian	4,700	100	100	600	700	1,200	600	1,400	100	(3)
Native American	400	(3)	(3)	(3)	(3)	(3)	100	100	100	(3)
Hispanic	2,700	(3)	600	100	700	800	400	(3)	(3)	(3)
Computer specialists	436,800	7,000	88,300	93,500	96,100	71,400	41,400	21,600	9,700	3,700
White	392,600	5,900	77,500	83,200	83,900	66,300	38,600	20,100	9,600	3,500
Black	12,100	400	2,600	3,500	2,800	1,400	700	400	100	200
Asian	24,600	600	5,700	5,100	8,900	2,000	1,500	600	100	(3)
Native American	1,800	(3)	100	200	200	900	100	100	(3)	(3)
Hispanic	8,200	200	2,600	1,800	1,500	1,500	500	100	100	(3)

Appendix table 8. - continued

Field and racial/ethnic group	Total Employed (1)	Professional Experience								
		Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Environmental scientists	98,100	4,200	17,200	18,400	14,400	7,700	8,300	9,300	10,300	6,500
White	94,200	4,100	16,700	17,300	13,500	7,400	8,000	8,900	10,200	6,400
Black	600	100	100	200	100	100	100	100	(3)	(3)
Asian	1,800	(3)	100	300	600	200	200	300	(3)	(3)
Native American	300	(3)	(3)	200	(3)	(3)	(3)	(3)	(3)	100
Hispanic	1,800	(3)	300	600	100	100	100	300	100	100
Life scientists	353,300	23,800	73,000	52,600	53,400	40,800	29,900	28,900	26,800	16,800
White	329,300	22,300	67,400	49,700	48,200	37,400	27,800	28,200	25,000	16,400
Black	6,700	400	1,300	400	1,900	1,500	400	200	300	(3)
Asian	10,400	500	1,700	1,500	2,800	1,700	1,100	400	300	100
Native American	2,100	100	100	300	(3)	200	100	(3)	1,200	100
Hispanic	7,300	600	2,700	800	900	800	100	1,000	300	(3)
Psychologists	209,500	14,600	33,500	33,800	38,800	28,200	23,400	13,200	13,300	5,900
White	196,000	13,200	29,900	32,100	36,800	27,100	21,700	11,800	13,000	5,500
Black	7,300	700	1,500	1,000	1,200	400	1,100	1,100	100	200
Asian	2,000	100	400	300	500	300	100	100	100	(3)
Native American	1,800	200	400	200	200	200	400	(3)	(3)	200
Hispanic	4,200	500	2,200	500	600	100	200	200	(3)	(3)
Social scientists	329,200	26,700	83,300	43,000	55,200	36,100	24,400	18,900	18,800	14,100
White	292,100	23,100	73,000	37,700	48,500	32,200	21,700	16,400	17,200	14,000
Black	15,900	1,300	5,200	1,900	2,500	1,200	1,200	1,700	800	(3)
Asian	13,100	900	2,700	2,600	3,000	1,200	1,300	700	700	(3)
Native American	1,200	200	200	100	100	400	(3)	100	100	100
Hispanic	10,200	1,100	3,400	1,800	1,400	1,400	700	100	100	(3)
Engineers	2,214,100	31,100	236,100	267,600	322,800	287,700	286,900	253,400	265,700	211,300
White	2,017,400	27,100	213,100	234,800	284,600	254,900	259,100	236,800	253,900	206,500
Black	37,100	1,300	4,100	7,000	8,300	5,500	4,800	2,300	2,200	1,200
Asian	117,500	1,800	11,600	19,000	23,300	22,100	18,300	9,600	6,100	2,900
Native American	11,700	200	1,000	1,500	1,800	1,600	1,000	2,500	700	600
Hispanic	47,800	1,400	6,900	7,800	7,100	7,000	5,800	4,200	4,000	2,600

(1) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 9. Employed men scientists and engineers by field, racial/ethnic group, and years of professional experience: 1984

Field and racial/ethnic group	Total Employed (1)	Professional Experience								
		Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Total scientists and engineers (1)	3,482,900	76,000	408,900	444,100	548,500	476,900	441,100	368,500	365,600	278,000
White	3,189,000	68,700	369,200	398,900	488,900	430,100	401,100	341,800	349,400	271,300
Black	67,600	2,200	10,000	10,000	13,800	9,300	9,700	6,200	4,000	1,700
Asian	159,500	2,700	17,100	24,900	35,600	28,100	23,000	14,300	7,300	3,500
Native American	18,900	600	1,300	2,200	2,100	3,300	2,400	3,000	1,700	1,200
Hispanic (2)	71,400	2,600	11,800	11,900	11,200	10,900	7,900	6,200	4,500	2,900
Scientists	1,343,300	47,900	203,100	196,800	234,200	192,500	156,700	117,300	101,900	67,800
White	1,235,000	44,200	183,100	181,300	210,600	177,700	143,600	107,200	97,400	65,800
Black	33,500	1,200	6,900	4,000	6,000	4,100	5,000	4,000	1,700	500
Asian	48,100	900	6,800	7 600	14,000	6,400	5,600	4,800	1,300	700
Native American	7,400	400	500	800	300	1,700	1,400	500	1,100	700
Hispanic	26,200	1,300	6,000	4,800	4,500	4,100	2,100	2,000	600	400
Physical scientists	225,600	4,100	20,700	27,300	30,900	31,300	34,800	24,900	25,900	21,400
White	206,700	3,700	19,100	24,200	27,400	28,400	32,100	22,400	24,500	20,600
Black	4,900	200	500	1,200	500	600	500	700	700	100
Asian	9,700	100	500	1,800	1,700	2,000	1,100	1,400	600	500
Native American	1,100	(3)	(3)	(3)	(3)	(3)	700	200	(3)	200
Hispanic	3,500	100	300	400	600	600	300	700	(3)	300
Mathematical scientists	78,500	1,300	7,100	8,000	13,300	15,600	13,100	10,900	5,400	3,500
White	69,600	1,100	6,800	7,500	11,900	13,800	10,900	8,800	5,100	3,400
Black	3,000	100	200	100	300	100	1,500	600	(3)	100
Asian	4,200	100	100	400	600	1,100	500	1,400	100	(3)
Native American	400	(3)	(3)	(3)	(3)	(3)	100	100	100	(3)
Hispanic	2,000	(3)	200	100	600	700	400	(3)	(3)	(3)
Computer specialists	322,700	4,400	56,500	61,000	70,300	58,200	36,100	19,900	9,500	3,500
White	292,900	3,800	49,800	55,400	61,200	54,800	33,700	18,500	9,400	3,300
Black	6,600	100	1,600	1,300	1,800	600	600	400	100	200
Asian	17,400	400	3,700	3,100	6,900	1,200	1,400	500	100	(3)
Native American	1,600	(3)	(3)	100	200	900	100	100	(3)	(3)
Hispanic	5,100	100	1,300	1,300	900	900	500	(3)	100	(3)

Appendix table 9. - continued

Field and racial/ethnic group	Total Employed (1)	Professional Experience								
		Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Environmental scientists	87,800	3,100	12,900	16,100	12,900	7,400	8,000	9,200	10,200	6,400
White	84,300	3,000	12,500	15,100	12,100	7,100	7,700	8,800	10,200	6,300
Black	500	(3)	(3)	100	100	100	100	100	(3)	(3)
Asian	1,700	(3)	100	200	600	200	200	300	(3)	(3)
Native American	200	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)	100
Hispanic	1,600	(3)	200	600	100	100	100	300	100	100
Life scientists	270,700	14,500	41,500	38,700	43,500	33,400	26,700	26,900	24,000	15,500
White	255,600	13,700	38,900	36,600	40,500	30,700	25,100	26,200	22,600	15,100
Black	4,500	200	700	300	1,100	1,300	400	200	200	(3)
Asian	6,200	100	600	900	[illegible]	1,200	1,000	300	200	100
Native American	1,600	(3)	100	300	[illegible]	200	100	(3)	800	100
Hispanic	4,600	400	900	600	[illegible]	700	100	700	300	(3)
Psychologists	121,100	5,300	14,700	18,100	21,700	18,500	17,100	8,200	10,200	4,600
White	114,400	4,600	12,900	17,400	21,300	17,900	15,900	7,400	10,100	4,200
Black	3,000	300	700	300	100	200	800	500	(3)	100
Asian	800	(3)	(3)	(3)	200	100	(3)	100	100	(3)
Native American	1,500	200	200	200	(3)	200	400	(3)	(3)	200
Hispanic	2,000	300	1,100	300	100	(3)	(3)	200	(3)	(3)
Social scientists	236,800	15,400	49,700	27,600	41,700	28,000	20,900	17,400	16,600	13,000
White	211,500	14,300	43,200	25,000	36,100	25,100	18,300	15,100	15,700	12,800
Black	11,000	300	3,200	800	2,100	1,100	1,100	1,500	700	(3)
Asian	8,300	100	1,800	1,200	2,400	600	1,300	700	100	(3)
Native American	1,000	200	100	(3)	100	400	(3)	100	100	100
Hispanic	7,300	400	2,000	1,700	1,400	1,000	700	100	100	(3)
Engineers	2,139,600	28,100	205,800	247,300	314,300	284,400	284,400	251,200	263,700	210,200
White	1,953,900	24,400	186,100	217,600	278,400	252,400	257,500	234,700	251,900	205,500
Black	34,100	1,000	3,100	6,000	7,900	5,200	4,700	2,200	2,200	1,200
Asian	111,400	1,800	10,300	17,300	21,700	21,700	17,500	9,500	6,100	2,800
Native American	11,500	200	900	1,400	1,800	1,600	1,000	2,500	700	600
Hispanic	45,200	1,300	5,800	7,100	6,700	6,800	5,800	4,200	4,000	2,600

(1) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 10. Employed women scientists and engineers by field, racial/ethnic group, and years of professional experience: 1984

Field and racial/ethnic group	Total Employed (1)	Professional Experience								
		Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Total scientists and engineers (1)	512,600	39,000	162,300	110,200	85,600	46,800	25,600	14,400	11,700	7,300
White	452,200	33,800	145,300	96,700	73,400	41,200	22,600	12,800	10,300	7,100
Black	22,900	2,400	5,700	5,600	4,600	1,800	800	1,300	200	100
Asian	27,000	1,600	6,100	6,600	6,600	3,200	1,500	300	700	100
Native American	1,500	100	500	400	200	(3)	(3)	(3)	300	(3)
Hispanic (2)	15,200	1,500	7,400	1,900	1,800	1,400	500	500	100	(3)
Scientists	438,100	35,900	132,000	90,000	77,000	43,500	23,100	12,200	9,700	6,200
White	388,800	31,100	118,300	79,500	67,100	38,700	21,000	10,700	8,400	6,100
Black	19,800	2,200	4,700	4,700	4,200	1,500	800	1,300	200	100
Asian	20,900	1,500	4,700	4,900	5,000	2,800	700	200	700	(3)
Native American	1,300	100	400	300	200	(3)	(3)	(3)	300	(3)
Hispanic	12,700	1,400	6,300	1,100	1,400	1,300	400	500	100	(3)
Physical scientists	28,300	1,500	7,700	5,100	4,200	3,300	2,000	1,300	1,100	700
White	24,000	1,300	7,000	4,300	3,100	2,600	1,600	1,100	1,100	700
Black	1,200	100	200	200	200	200	100	100	(3)	(3)
Asian	2,800	100	400	500	800	600	300	100	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	800	100	200	100	200	100	200	(3)	(3)	(3)
Mathematical scientists	21,900	700	4,300	5,100	5,200	1,600	2,600	700	300	1,400
White	19,300	700	4,100	4,700	4,300	1,400	2,300	100	300	1,400
Black	1,700	100	100	100	700	100	200	500	(3)	(3)
Asian	600	(3)	(3)	200	100	100	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	700	(3)	400	(3)	100	100	(3)	(3)	(3)	(3)
Computer specialists	114,100	2,600	31,800	32,500	25,800	13,100	5,300	1,700	200	200
White	99,600	2,100	27,700	27,900	22,700	11,500	4,900	1,600	200	200
Black	5,600	300	1,100	2,300	1,000	800	100	(3)	(3)	(3)
Asian	7,200	100	2,000	1,900	2,000	800	200	100	(3)	(3)
Native American	100	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	3,100	100	1,200	400	600	600	(3)	100	(3)	(3)

Appendix table 10. - continued

Field and racial/ethnic group	Total Employed (1)	Professional Experience: Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Environmental scientists	10,300	1,100	4,300	2,300	1,400	300	300	100	(3)	100
White	9,900	1,100	4,200	2,200	1,400	300	300	100	(3)	100
Black	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	100	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Life scientists	82,600	9,400	31,500	13,900	9,900	7,400	3,300	2,000	2,900	1,300
White	73,700	8,500	28,500	13,100	7,800	6,700	2,700	2,000	2,300	1,300
Black	2,100	200	700	200	800	200	(3)	(3)	100	(3)
Asian	4,200	400	1,100	600	1,200	600	200	(3)	(3)	(3)
Native American	500	100	(3)	(3)	(3)	(3)	(3)	(3)	300	(3)
Hispanic	2,700	300	1,700	200	(3)	100	(3)	300	(3)	(3)
Psychologists	88,400	9,300	18,800	15,700	17,000	9,700	6,300	5,000	3,000	1,400
White	81,600	8,600	17,100	14,700	15,500	9,200	5,800	4,400	3,000	1,300
Black	4,300	400	800	700	1,100	200	300	600	(3)	100
Asian	1,200	100	400	300	200	200	100	(3)	(3)	(3)
Native American	300	(3)	200	(3)	200	(3)	(3)	(3)	(3)	(3)
Hispanic	2,200	100	1,100	200	500	(3)	200	(3)	(3)	(3)
Social scientists	92,400	11,300	33,600	15,400	13,500	8,000	3,500	1,400	2,200	1,200
White	80,600	8,800	29,800	12,700	12,500	7,100	3,400	1,300	1,500	1,200
Black	4,000	1,000	2,000	1,200	400	(3)	(3)	100	(3)	(3)
Asian	4,800	800	900	1,400	600	600	(3)	(3)	600	(3)
Native American	200	(3)	100	100	100	(3)	(3)	(3)	(3)	(3)
Hispanic	2,900	800	1,400	200	100	400	(3)	(3)	100	(3)
Engineers	74,500	3,000	30,300	20,200	8,500	3,300	2,500	2,200	2,000	1,100
White	63,500	2,700	27,000	17,200	6,300	2,500	1,600	2,100	1,900	1,000
Black	3,100	200	1,000	1,000	500	300	(3)	(3)	(3)	(3)
Asian	6,100	(3)	1,400	1,700	1,600	400	800	100	(3)	100
Native American	200	(3)	100	100	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	2,600	100	1,100	800	400	100	(3)	(3)	(3)	(3)

(1) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 11. Employed doctoral scientists and engineers by field, racial/ethnic group, and years of professional experience: 1983

Field and racial/ethnic group	Total Employed (1)	Years of professional experience								
		1 or less	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Total scientists and engineers	369,300	4,700	31,500	60,800	64,400	50,200	36,600	26,900	21,500	15,400
White	328,500	4,000	26,900	53,100	57,600	45,200	33,200	25,300	20,500	14,900
Black	4,900	(3)	500	800	900	600	400	400	200	200
Asian	29,700	600	3,700	6,300	5,300	4,100	2,800	1,100	800	300
Native American	400	(3)	(3)	100	100	100	(3)	(3)	(3)	(3)
Hispanic (2)	5,400	100	500	1,100	1,200	600	500	300	300	100
Scientists	307,800	4,000	27,100	52,800	54,400	40,400	29,200	22,100	17,400	12,500
White	278,700	3,600	24,200	47,700	49,700	36,800	26,900	20,700	16,600	12,100
Black	4,500	(3)	500	800	800	600	400	300	100	100
Asian	19,300	300	2,200	3,900	3,500	2,800	1,700	900	600	200
Native American	400	(3)	(3)	100	100	100	(3)	(3)	(3)	(3)
Hispanic	4,400	100	400	800	1,000	400	400	200	200	100
Physical scientists	64,000	800	5,200	9,100	10,100	9,800	7,000	5,500	4,000	3,400
White	56,500	700	4,400	7,600	8,800	8,700	6,300	5,200	3,900	3,300
Black	700	(3)	100	100	100	100	100	(3)	(3)	(3)
Asian	5,700	(3)	700	1,300	1,100	1,000	600	200	100	(3)
Native American	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	900	(3)	100	100	200	200	100	(3)	100	(3)
Mathematical scientists	16,400	100	1,100	2,300	2,700	2,500	1,800	1,100	800	700
White	14,500	100	900	2,000	2,400	2,400	1,600	1,000	800	600
Black	200	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	1,400	(3)	200	300	200	100	200	100	100	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)

Appendix table 11. - continued

Field and racial/ethnic group	Total Employed (1)	Years of professional experience								
		1 or less	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Computer specialists	12,200	200	1,000	2,600	2,800	1,500	900	500	500	200
White	11,000	200	900	2,300	2,600	1,400	800	500	400	200
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	900	(3)	100	300	200	100	(3)	(3)	100	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	(3)	100	100	(3)	(3)	(3)	(3)	(3)
Environmental scientists	16,500	300	1,400	2,600	3,000	2,400	1,600	1,100	1,000	900
White	15,500	300	1,300	2,400	2,800	2,300	1,500	1,100	1,000	900
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	800	(3)	100	100	200	100	100	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)	(3)
Life scientists	92,800	1,800	10,400	16,400	16,500	10,800	8,800	6,300	5,300	3,400
White	83,400	1,500	9,400	14,900	14,700	9,700	8,200	5,800	5,000	3,400
Black	1,100	(3)	100	200	200	100	100	100	100	(3)
Asian	6,800	200	800	1,200	1,400	900	500	300	200	(3)
Native American	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	1,300	100	200	200	300	100	200	100	(3)	(3)
Psychologists	46,600	500	4,600	10,400	8,400	4,700	3,800	3,100	2,600	1,200
White	44,200	400	4,400	9,900	8,100	4,500	3,700	3,000	2,600	1,200
Black	1,000	(3)	100	300	200	100	100	(3)	(3)	100
Asian	600	(3)	100	200	100	100	100	(3)	(3)	(3)
Native American	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	700	(3)	100	200	200	(3)	(3)	(3)	100	(3)

Appendix table 11. - continued

Field and racial/ethnic group	Total Employed (1)	Years of professional experience								
		1 or less	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Social scientists	59,300	500	3,400	9,400	11,000	8,700	5,300	4,600	3,000	2,600
White	53,600	400	2,900	8,600	10,300	7,800	4,900	4,200	2,900	2,500
Black	1,500	(3)	100	200	300	200	100	100	(3)	(3)
Asian	3,100	(3)	300	500	300	600	300	200	100	100
Native American	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	1,000	(3)	100	200	200	100	100	100	100	(3)
Engineers	61,500	700	4,300	8,000	10,000	9,800	7,400	4,800	4,100	2,900
White	49,700	400	2,700	5,400	8,000	8,400	6,300	4,600	3,900	2,800
Black	400	(3)	(3)	100	100	(3)	(3)	(3)	(3)	(3)
Asian	10,500	300	1,600	2,400	1,900	1,300	1,100	200	200	100
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	900	(3)	(3)	300	200	200	(3)	100	(3)	(3)

(1) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 12. Employed doctoral men scientists and engineers by field, racial/ethnic group, and years of professional experience: 1983

Field and racial/ethnic group	Total Employed (1)	Years of professional experience								
		1 or less	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Total scientists and engineers	320,500	3,500	23,800	48,500	55,700	45,400	33,600	25,200	20,400	14,400
White	285,100	3,000	20,100	42,000	49,800	40,900	30,500	23,800	19,400	13,900
Black	3,600	(3)	300	500	700	400	300	300	100	100
Asian	26,300	500	3,200	5,300	4,800	3,800	2,700	1,000	700	300
Native American	400	(3)	(3)	100	100	100	(3)	(3)	(3)	(3)
Hispanic (2)	4,700	100	400	1,000	1,100	600	400	200	200	100
Scientists	260,000	2,900	19,700	40,800	45,900	35,700	26,200	20,400	16,200	11,500
White	236,200	2,700	17,500	36,900	41,900	32,600	24,200	19,200	15,600	11,100
Black	3,200	(3)	300	500	600	400	300	300	100	100
Asian	16,100	200	1,600	3,000	3,000	2,500	1,600	800	500	200
Native American	300	(3)	(3)	(3)	100	100	(3)	(3)	(3)	(3)
Hispanic	3,800	100	300	600	900	400	400	200	200	100
Physical scientists	59,800	600	4,400	8,200	9,500	9,400	6,700	5,300	3,900	3,200
White	53,100	600	3,700	6,900	8,300	8,300	6,100	5,100	3,700	3,200
Black	600	(3)	100	100	100	100	100	(3)	(3)	(3)
Asian	5,000	(3)	500	1,100	1,000	900	500	200	100	(3)
Native American	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	800	(3)	100	100	200	200	100	(3)	100	(3)
Mathematical scientists	15,000	100	1,000	1,900	2,400	2,400	1,700	1,000	800	600
White	13,400	100	800	1,700	2,200	2,300	1,500	900	800	600
Black	200	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	1,200	(3)	200	200	100	100	100	100	100	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)

Appendix table 12. - continued

Field and racial/ethnic group	Total Employed (1)	Years of professional experience								
		1 or less	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Computer specialists	10,900	200	800	2,300	2,400	1,300	800	500	400	200
White	9,900	200	800	2,000	2,200	1,200	800	500	400	200
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	800	(3)	(3)	200	200	100	(3)	(3)	100	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	(3)	100	100	(3)	(3)	(3)	(3)	(3)
Environmental scientists	15,600	300	1,300	2,300	2,900	2,300	1,500	1,100	1,000	900
White	14,600	200	1,200	2,100	2,700	2,300	1,400	1,100	1,000	800
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	700	(3)	100	100	200	100	100	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)	(3)
Life scientists	76,600	1,200	7,500	12,700	13,700	9,200	7,600	5,600	4,900	3,000
White	69,200	1,000	6,800	11,600	12,200	8,400	7,100	5,300	4,600	3,000
Black	700	(3)	100	100	100	100	100	100	100	(3)
Asian	5,300	100	600	900	1,200	700	500	200	200	(3)
Native American	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	1,100	(3)	100	100	300	100	200	100	(3)	(3)
Psychologists	33,000	200	2,500	6,500	6,100	3,500	3,000	2,600	2,300	1,000
White	31,500	200	2,400	6,200	5,900	3,400	2,900	2,500	2,300	900
Black	500	(3)	(3)	200	100	(3)	(3)	(3)	(3)	100
Asian	400	(3)	(3)	100	(3)	100	100	(3)	(3)	(3)
Native American	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	500	(3)	100	100	100	(3)	(3)	(3)	(3)	(3)

Appendix table 12. - continued

Field and racial/ethnic group	Total Employed (1)	Years of professional experience								
		1 or less	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Social scientists	49,300	300	2,200	7,000	8,900	7,500	4,800	4,200	2,800	2,400
White	44,400	300	1,800	6,400	8,400	6,700	4,400	3,800	2,800	2,400
Black	1,100	(3)	100	200	200	200	100	100	(3)	(3)
Asian	2,700	(3)	200	400	300	600	300	200	100	(3)
Native American	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	800	(3)	100	100	200	100	100	100	100	(3)
Engineers	60,500	600	4,100	7,700	9,800	9,700	7,400	4,800	4,100	2,900
White	48,900	300	2,500	5,200	7,800	8,400	6,300	4,600	3,900	2,800
Black	400	(3)	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)
Asian	10,200	300	1,600	2,300	1,800	1,300	1,100	200	200	100
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	900	(3)	(3)	300	200	200	(3)	100	(3)	(3)

(1) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 13. Employed doctoral women scientists and engineers by field, racial/ethnic group, and years of professional experience: 1983

Field and racial/ethnic group	Total Employed (1)	Years of professional experience								
		1 or less	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Total scientists and engineers	48,800	1,200	7,700	12,400	8,700	4,800	3,000	1,700	1,100	1,000
White	43,300	1,000	6,800	11,000	7,900	4,300	2,800	1,500	1,000	1,000
Black	1,400	(3)	200	300	200	200	100	100	(3)	(3)
Asian	3,400	100	600	1,000	500	300	100	100	100	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic (2)	700	(3)	100	200	100	(3)	(3)	(3)	(3)	(3)
Scientists	47,800	1,200	7,400	12,000	8,500	4,700	3,000	1,700	1,100	1,000
White	42,600	1,000	6,600	10,800	7,700	4,200	2,800	1,500	1,000	1,000
Black	1,300	(3)	200	300	200	100	100	100	(3)	(3)
Asian	3,200	100	600	900	500	300	100	100	100	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	700	(3)	100	200	100	(3)	(3)	(3)	(3)	(3)
Physical scientists	4,200	100	800	900	600	400	300	100	100	200
White	3,400	100	600	700	500	300	200	100	100	100
Black	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	700	(3)	100	200	100	100	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Mathematical scientists	1,400	(3)	200	300	300	1(	100	100	(3)	(3)
White	1,200	(3)	100	300	200	100	100	100	(3)	(3)
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	200	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)

Appendix table 13. - continued

Field and racial/ethnic group	Total Employed (1)	Years of professional experience								
		1 or less	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Computer specialists	1,300	(3)	200	300	400	100	(3)	(3)	(3)	(3)
White	1,100	(3)	100	300	300	100	(3)	(3)	(3)	(3)
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Environmental scientists	900	(3)	200	300	100	100	(3)	(3)	(3)	(3)
White	800	(3)	100	300	100	100	(3)	(3)	(3)	(3)
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Life scientists	16,200	600	2,800	3,700	2,800	1,500	1,200	600	400	400
White	14,100	500	2,500	3,300	2,500	1,300	1,100	500	400	400
Black	400	(3)	(3)	100	100	100	(3)	(3)	(3)	(3)
Asian	1,500	100	200	400	200	200	(3)	100	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Psychologists	13,700	300	2,100	3,900	2,300	1,200	800	400	300	300
White	12,700	200	2,000	3,700	2,200	1,100	800	400	300	300
Black	500	(3)	100	100	100	100	(3)	(3)	(3)	(3)
Asian	300	(3)	100	100	(3)	(3)	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)

Appendix table 13. - continued

Field and racial/ethnic group	Total Employed (1)	Years of professional experience								
		1 or less	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Social scientists	10,100	200	1,200	2,500	2,100	1,200	500	300	200	200
White	9,200	100	1,100	2,200	1,900	1,100	500	300	200	200
Black	400	(3)	100	100	100	(3)	(3)	(3)	(3)	(3)
Asian	400	(3)	100	100	100	(3)	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	200	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Engineers	1,100	(3)	200	300	200	100	(3)	(3)	(3)	(3)
White	800	(3)	200	200	100	100	(3)	(3)	(3)	(3)
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	200	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)

(1) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 14. Employed scientists and engineers by field, racial/ethnic group, and selected sector of employment: 1984

Field and racial/ethnic group	Total Employed (1)	Sector of Employment		
		Industry	Educational institutions	Federal Government
Total scientists and engineers (2)	3,995,500	2,512,500	537,000	307,100
White	3,641,200	2,299,700	486,500	276,700
Black	90,500	49,600	14,400	11,900
Asian	186,500	116,900	28,100	13,000
Native American	20,400	12,200	1,700	1,300
Hispanic (3)	86,600	51,000	9,900	6,000
Scientists	1,781,400	840,300	454,900	139,900
White	1,623,800	765,700	416,400	127,100
Black	53,400	23,600	12,500	6,600
Asian	69,100	34,000	19,700	4,100
Native American	8,600	3,800	1,600	500
Hispanic	38,800	17,900	8,700	2,000
Physical scientists	254,100	138,700	61,200	24,500
White	230,700	125,700	56,400	22,400
Black	6,100	3,300	1,200	800
Asian	12,500	7,100	2,900	1,100
Native American	1,100	700	200	(4)
Hispanic	4,300	1,700	1,200	400
Mathematical scientists	100,400	39,000	46,300	8,600
White	88,900	35,600	40,200	7,500
Black	4,700	1,500	2,400	700
Asian	4,700	1,100	3,000	200
Native American	400	100	100	100
Hispanic	2,700	800	1,500	100
Computer specialists	436,800	329,800	30,200	29,200
White	392,600	297,700	26,100	26,100
Black	12,100	8,000	1,100	1,800
Asian	24,600	18,000	2,600	1,000
Native American	1,800	1,500	(4)	100
Hispanic	8,200	6,200	600	300

Appendix table 14. - continued

Field and racial/ethnic group	Total Employed (1)	Sector of Employment		
		Industry	Educational institutions	Federal Government
Environmental scientists	98,100	47,800	15,700	14,900
White	94,200	46,300	14,800	14,000
Black	600	100	100	300
Asian	1,800	600	600	400
Native American	300	(4)	(4)	(4)
Hispanic	1,800	900	400	300
Life scientists	353,300	107,800	131,100	38,700
White	329,300	101,300	121,800	35,600
Black	6,700	1,500	2,500	1,300
Asian	10,400	3,300	4,400	900
Native American	2,100	200	1,000	200
Hispanic	7,300	2,700	2,100	600
Psychologists	209,500	47,300	75,600	5,000
White	196,000	43,200	72,200	4,400
Black	7,300	2,100	2,000	300
Asian	2,000	500	600	100
Native American	1,800	400	200	(4)
Hispanic	4,200	1,900	800	100
Social scientists	329,200	129,800	94,700	19,000
White	292,100	115,800	84,800	17,100
Black	15,900	7,000	3,200	1,400
Asian	13,100	3,400	5,700	400
Native American	1,200	700	200	100
Hispanic	10,200	3,600	2,300	300
Engineers	2,214,100	1,672,200	82,200	167,100
White	2,017,400	1,534,100	70,200	149,600
Black	37,100	26,000	1,800	5,300
Asian	117,500	82,900	8,500	9,000
Native American	11,700	8,400	100	800
Hispanic	47,800	33,100	1,200	4,000

(1) Includes state/local/other governments, military, nonprofit organizations, hospitals/clinics, other, and no report.
(2) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
cludes members of all racial groups.
o few cases to estimate.

SOURCE: National Science Foundation

Appendix table 15. Employed men scientists and engineers by field, racial/ethnic group, and selected sector of employment: 1984

Field and racial/ethnic group	Total Employed (1)	Sector of Employment		
		Industry	Educational institutions	Federal Government
Total scientists and engineers (2)	3,482,900	2,256,000	420,600	275,600
White	3,189,000	2,076,800	381,500	249,400
Black	67,600	36,700	11,000	9,400
Asian	159,500	101,700	22,400	11,500
Native American	18,900	11,600	1,000	1,300
Hispanic (3)	71,400	43,400	6,700	5,000
Scientists	1,343,300	642,000	342,500	113,600
White	1,235,000	592,400	314,500	104,200
Black	33,500	13,100	9,400	4,400
Asian	48,100	23,500	14,500	3,000
Native American	7,400	3,500	1,000	500
Hispanic	26,200	12,100	5,500	1,500
Physical scientists	225,800	123,200	54,300	22,600
White	206,700	112,900	50,200	20,800
Black	4,900	2,500	1,200	600
Asian	9,700	5,200	2,400	1,000
Native American	1,100	700	200	(4)
Hispanic	3,500	1,300	900	300
Mathematical scientists	78,500	29,200	37,700	6,500
White	69,600	27,300	32,200	5,600
Black	3,000	300	2,100	500
Asian	4,200	900	2,700	200
Native American	400	100	100	100
Hispanic	2,000	600	1,000	100
Computer specialists	322,700	246,900	20,400	20,700
White	292,900	225,200	17,100	18,900
Black	6,600	4,600	600	1,100
Asian	17,400	12,300	2,400	400
Native American	1,600	1,400	(4)	100
Hispanic	5,100	4,000	(4)	100

Appendix table 15. - continued

Field and racial/ethnic group	Total Employed (1)	Sector of Employment		
		Industry	Educational institutions	Federal Government
Environmental scientists	87,800	43,200	13,700	13,200
White	84,300	41,800	12,900	12,400
Black	500	100	100	300
Asian	1,700	600	500	400
Native American	200	(4)	(4)	(4)
Hispanic	1,600	800	400	300
Life scientists	270,700	83,400	97,700	32,100
White	255,600	79,700	92,000	29,500
Black	4,500	1,200	1,600	1,000
Asian	6,200	1,900	2,700	600
Native American	1,600	200	600	200
Hispanic	4,600	1,800	1,200	600
Psychologists	121,100	26,200	48,000	3,700
White	114,400	24,400	46,500	3,400
Black	3,000	600	1,000	100
Asian	800	200	200	(4)
Native American	1,500	400	(4)	(4)
Hispanic	2,000	1,100	200	(4)
Social scientists	236,800	89,900	70,800	14,800
White	211,500	81,100	63,600	13,600
Black	11,000	3,800	2,900	700
Asian	8,300	2,500	3,600	300
Native American	1,000	600	(4)	100
Hispanic	7,300	2,400	1,700	200
Engineers	2,139,600	1,614,000	78,000	162,000
White	1,953,900	1,484,400	67,000	145,300
Black	34,100	23,600	1,600	5,000
Asian	111,400	78,200	7,900	8,600
Native American	11,500	8,100	100	800
Hispanic	45,200	31,300	1,200	3,600

(1) Includes state/local/other governments, military, nonprofit organizations, hospitals/clinics, other, and no report.
(2) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 16. Employed women scientists and engineers by field, racial/ethnic group, and selected sector of employment: 1984

Field and racial/ethnic group	Total Employed (1)	Sector of Employment		
		Industry	Educational institutions	Federal Government
Total scientists and engineers (2)	512,600	256,400	116,500	31,500
White	452,200	222,900	105,100	27,200
Black	22,900	12,900	3,400	2,500
Asian	27,000	15,200	5,800	1,500
Native American	1,500	600	700	(4)
Hispanic (3)	15,200	7,600	3,300	1,000
Scientists	438,100	198,300	112,300	26,300
White	388,800	173,300	101,900	22,900
Black	19,800	10,500	3,100	2,200
Asian	20,900	10,500	5,200	1,100
Native American	1,300	300	700	(4)
Hispanic	12,700	5,800	3,200	600
Physical scientists	28,300	15,500	6,900	1,900
White	24,000	12,800	6,200	1,600
Black	1,200	700	100	200
Asian	2,800	1,900	500	100
Native American	(4)	(4)	(4)	(4)
Hispanic	800	400	200	100
Mathematical scientists	21,900	9,800	8,700	2,100
White	19,300	8,300	8,000	1,900
Black	1,700	1,200	300	200
Asian	600	200	200	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	700	200	500	(4)
Computer specialists	114,100	82,900	9,800	8,500
White	99,600	72,500	9,000	7,200
Black	5,600	3,400	500	600
Asian	7,200	5,800	200	600
Native American	100	100	(4)	(4)
Hispanic	3,100	2,200	500	200

Appendix table 16. - continued

Field and racial/ethnic group	Total Employed (1)	Sector of Employment		
		Industry	Educational institutions	Federal Government
Environmental scientists	10,300	4,700	2,000	1,700
White	9,900	4,500	1,900	1,700
Black	100	(4)	(4)	(4)
Asian	100	(4)	100	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	200	100	(4)	(4)
Life scientists	82,600	24,400	33,400	6,700
White	73,700	21,600	29,800	6,000
Black	2,100	400	900	300
Asian	4,200	1,400	1,800	300
Native American	500	100	300	(4)
Hispanic	2,700	1,000	900	(4)
Psychologists	88,400	21,000	27,600	1,200
White	81,600	18,900	25,700	1,000
Black	4,300	1,500	1,000	200
Asian	1,200	300	400	(4)
Native American	300	(4)	200	(4)
Hispanic	2,200	800	600	100
Social scientists	92,400	39,900	24,000	4,200
White	80,600	34,700	21,200	3,400
Black	4,800	3,200	300	700
Asian	4,800	900	2,100	100
Native American	200	100	100	(4)
Hispanic	2,900	1,200	600	100
Engineers	74,500	58,200	4,100	5,200
White	63,500	49,600	3,200	4,400
Black	3,100	2,400	200	300
Asian	6,100	4,700	600	400
Native American	200	200	(4)	(4)
Hispanic	2,600	1,900	(4)	400

(1) Includes state/local/other governments, military, nonprofit organizations, hospitals/clinics, other, and no report.
(2) Detail will not add to total employed because a) racial and ethnic categories are not mutually exclusive and b) total employed includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 17. Employed scientists and engineers by field, racial/ethnic group, and selected primary work activity: 1984

Field and racial/ethnic group	Total Employed (1)	Research & Development	Management of R&D	General management	Teaching	Production/ inspection	Reporting, statistical, & computing work
Total scientists and engineers (2)	3,995,500	1,129,600	356,000	794,000	299,200	540,500	375,100
White	3,641,200	1,013,100	328,500	738,900	272,700	491,600	337,200
Black	90,500	20,500	7,000	18,700	9,100	13,000	11,500
Asian	186,500	73,800	14,400	22,600	13,700	23,900	20,000
Native American	20,400	4,200	2,000	5,600	800	2,600	1,100
Hispanic (3)	86,600	23,100	7,400	14,700	6,600	13,200	9,000
Scientists	1,781,400	401,100	136,700	323,900	250,800	138,100	281,200
White	1,623,800	366,600	124,400	295,900	230,200	123,200	252,400
Black	53,400	7,700	3,700	13,400	7,600	4,800	8,900
Asian	69,100	19,900	5,500	8,700	9,900	5,900	14,700
Native American	8,600	1,100	800	2,600	700	800	600
Hispanic	38,800	6,400	3,700	6,000	5,900	3,200	6,800
Physical scientists	254,100	99,900	37,700	29,700	37,400	31,500	6,100
White	230,700	89,500	35,400	27,700	35,900	25,900	5,600
Black	6,100	1,700	300	1,400	300	1,900	200
Asian	12,500	6,600	1,300	500	900	2,700	200
Native American	1,100	400	400	(4)	200	100	(4)
Hispanic	4,300	1,600	200	1,000	600	400	300
Mathematical scientists	100,400	14,900	14,300	14,900	38,200	2,900	11,600
White	88,900	13,800	12,200	14,100	32,500	2,600	10,200
Black	4,700	400	1,200	200	2,300	100	400
Asian	4,700	500	100	400	2,700	(4)	900
Native American	400	(4)	200	(4)	100	100	(4)
Hispanic	2,700	400	600	100	1,400	(4)	200
Computer specialists	436,800	81,800	27,500	51,100	14,400	13,000	213,200
White	392,600	73,300	24,600	46,800	13,800	10,800	190,100
Black	12,100	2,100	1,400	800	200	100	6,600
Asian	24,600	5,800	1,400	2,500	300	1,800	12,000
Native American	1,800	(4)	100	900	(4)	(4)	600
Hispanic	8,200	1,200	400	700	500	100	4,400

Appendix table 17. - continued

Field and racial/ethnic group	Total Employed (1)	Research & Development	Management of R&D	General management	Teaching	Production/ inspection	Reporting, statistical, & computing work
Environmental scientists	98,100	35,100	5,500	11,800	7,300	23,000	6,700
White	94,200	33,500	5,400	11,100	7,000	22,200	6,300
Black	600	200	(4)	100	(4)	100	100
Asian	1,800	900	(4)	100	100	300	200
Native American	300	100	(4)	(4)	(4)	100	(4)
Hispanic	1,800	400	100	100	300	500	100
Life scientists	353,300	113,400	25,300	66,700	54,400	41,900	10,000
White	329,300	103,800	22,600	62,500	51,800	40,100	9,500
Black	6,700	2,100	400	2,100	900	200	300
Asian	10,400	4,500	2,100	500	1,200	700	200
Native American	2,100	500	100	1,200	100	100	(4)
Hispanic	7,300	2,500	700	800	900	900	200
Psychologists	209,500	14,900	8,800	45,100	35,300	9,800	4,000
White	196,000	14,100	8,600	42,800	33,100	7,500	3,500
Black	7,300	400	(4)	1,600	1,300	1,200	400
Asian	2,000	200	100	400	300	(4)	100
Native American	1,800	(4)	(4)	(4)	200	300	(4)
Hispanic	4,200	(4)	200	900	400	800	200
Social scientists	329,200	41,100	17,600	104,500	63,900	16,100	29,700
White	292,100	38,500	15,600	90,800	56,100	14,100	27,300
Black	15,900	600	400	7,100	2,600	1,200	900
Asian	13,100	1,400	400	4,300	4,400	400	1,200
Native American	1,200	100	100	400	200	100	(4)
Hispanic	10,200	400	1,600	2,400	1,700	400	1,400
Engineers	2,214,100	728,500	219,300	470,100	68,400	402,500	93,900
White	2,017,400	646,500	204,100	443,000	42,500	368,300	84,800
Black	37,100	12,800	3,400	5,300	1,500	8,200	2,600
Asian	117,500	53,900	8,900	13,900	3,800	18,100	5,300
Native American	11,700	3,200	1,200	3,000	(4)	1,900	400
Hispanic	47,800	16,700	3,700	8,800	700	10,000	2,200

(1) Includes consulting, other, and no report.
(2) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 18. Employed men scientists and engineers by field, racial/ethnic group, and selected primary work activity: 1984

Field and racial/ethnic group	Total Employed (1)	Research & Development	Management of R&D	General management	Teaching	Production/ inspection	Reporting, statistical, & computing work
Total scientists and engineers (2)	3,482,900	1,011,000	332,200	723,300	236,600	494,500	278,100
White	3,189,000	910,300	309,500	675,700	215,400	452,000	251,900
Black	67,600	16,900	4,700	15,800	7,600	10,000	6,200
Asian	159,500	64,200	12,300	19,200	11,100	21,400	15,100
Native American	18,900	4,000	2,000	5,100	500	2,600	1,000
Hispanic (3)	71,400	19,500	6,700	13,000	4,000	11,900	5,900
Scientists	1,343,300	312,000	116,000	261,000	191,600	108,300	191,300
White	1,235,000	288,200	107,700	239,600	175,800	98,200	173,200
Black	33,500	5,200	1,400	11,100	6,200	2,500	3,900
Asian	48,100	13,300	4,100	5,600	7,600	4,200	10,400
Native American	7,400	1,000	800	2,100	500	700	500
Hispanic	26,200	4,000	3,100	4,600	3,400	2,500	4,000
Physical scientists	225,800	88,400	36,600	28,400	33,000	25,200	4,600
White	206,700	80,100	34,300	26,700	31,800	20,900	4,200
Black	4,900	1,200	300	1,300	200	1,500	100
Asian	9,700	5,200	1,300	400	700	1,700	100
Native American	1,100	400	400	(4)	200	(4)	(4)
Hispanic	3,500	1,300	200	900	400	400	200
Mathematical scientists	78,500	12,300	10,700	12,100	30,200	2,500	8,300
White	69,600	11,400	9,700	11,400	25,100	2,300	7,400
Black	3,000	300	100	200	2,100	100	200
Asian	4,200	400	100	400	2,500	(4)	700
Native American	400	(4)	200	(4)	100	100	(4)
Hispanic	2,000	300	600	100	1,000	(4)	100
Computer specialists	322,700	61,700	23,600	42,000	9,500	10,100	147,400
White	292,900	56,300	21,800	38,000	9,000	8,500	132,900
Black	6,600	1,900	600	800	100	(4)	2,600
Asian	17,400	3,200	1,100	2,200	300	1,300	8,600
Native American	1,600	(4)	100	900	(4)	(4)	500
Hispanic	5,100	500	400	500	(4)	100	2,900

Appendix table 18. - continued

Field and racial/ethnic group	Total Employed (1)	Research & Development	Management of R&D	General management	Teaching	Production/ inspection	Reporting, statistical, & computing work
Environmental scientists	87,800	30,100	5,100	11,100	6,400	21,200	5,700
White	84,300	28,800	5,000	10,500	6,200	20,500	5,500
Black	500	200	(4)	100	(4)	100	100
Asian	1,700	800	(4)	100	100	300	200
Native American	200	100	(4)	(4)	(4)	100	(4)
Hispanic	1,600	300	100	100	300	400	100
Life scientists	270,700	80,300	21,900	57,200	42,000	32,000	7,500
White	255,600	74,500	20,000	54,100	40,300	30,700	7,100
Black	4,500	1,100	200	1,800	700	200	300
Asian	6,200	2,800	1,500	300	700	500	100
Native American	1,600	400	100	800	100	100	(4)
Hispanic	4,600	1,300	600	600	300	700	100
Psychologists	121,100	8,800	6,200	28,500	23,600	5,900	2,000
White	114,400	8,400	6,000	27,400	22,400	4,700	1,900
Black	3,000	200	(4)	800	700	100	100
Asian	800	(4)	100	200	200	(4)	(4)
Native American	1,500	(4)	(4)	(4)	(4)	300	(4)
Hispanic	2,000	(4)	(4)	400	200	700	(4)
Social scientists	236,800	30,400	11,900	81,700	46,900	11,500	15,800
White	211,500	28,700	10,900	71,600	40,900	10,500	14,300
Black	11,000	400	100	6,000	2,400	500	600
Asian	8,300	800	100	2,200	3,100	300	700
Native American	1,000	(4)	100	400	100	100	(4)
Hispanic	7,300	300	1,200	2,000	1,200	200	500
Engineers	2,139,600	699,000	216,200	462,300	45,000	386,200	86,800
White	1,953,900	622,100	201,800	436,100	39,700	353,800	78,700
Black	34,100	11,700	3,300	4,800	1,300	7,500	2,300
Asian	111,400	50,900	8,200	13,600	3,500	17,200	4,800
Native American	11,500	3,000	1,200	3,000	(4)	1,900	400
Hispanic	45,200	15,500	3,700	8,400	600	9,400	1,900

(1) Includes consulting, other, and no report.
(2) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 19. Employed women scientists and engineers by field, racial/ethnic group, and selected primary work activity: 1984

Field and racial/ethnic group	Total Employed (1)	Research & Development	Management of R&D	General management	Teaching	Production/ inspection	Reporting, statistical, & computing work
Total scientists and engineers (2)	512,600	118,600	23,800	70,600	62,600	45,900	96,900
White	452,200	102,700	18,900	63,100	57,200	39,600	85,300
Black	22,900	3,600	2,400	2,800	1,500	2,900	5,300
Asian	27,000	9,600	2,100	3,400	2,600	2,500	4,900
Native American	1,500	300	(4)	400	300	100	100
Hispanic (3)	15,200	3,500	700	1,700	2,500	1,300	3,100
Scientists	438,100	89,000	20,700	62,800	59,200	29,700	89,800
White	388,800	78,400	16,700	56,300	54,400	25,000	79,200
Black	19,800	2,500	2,200	2,300	1,400	2,300	4,900
Asian	20,900	6,700	1,300	3,100	2,200	1,700	4,300
Native American	1,300	100	(4)	400	300	100	100
Hispanic	12,700	2,400	700	1,400	2,500	700	2,800
Physical scientists	28,300	11,500	1,100	1,300	4,400	6,400	1,500
White	24,000	9,500	1,100	1,100	4,200	4,900	1,300
Black	1,200	500	(4)	100	(4)	300	100
Asian	2,800	1,400	(4)	100	100	1,000	100
Native American	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Hispanic	800	400	100	(4)	200	100	100
Mathematical scientists	21,900	2,600	3,600	2,800	7,900	300	3,200
White	19,300	2,400	2,500	2,600	7,400	300	2,800
Black	1,700	100	1,100	(4)	300	(4)	200
Asian	600	100	(4)	100	200	(4)	200
Native American	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Hispanic	700	100	(4)	(4)	400	(4)	100
Computer specialists	114,100	20,100	3,900	9,100	4,900	2,900	65,800
White	99,600	17,100	2,800	8,800	4,700	2,300	57,100
Black	5,600	200	800	(4)	100	100	4,000
Asian	7,200	2,600	300	300	(4)	400	3,400
Native American	100	(4)	(4)	(4)	(4)	(4)	100
Hispanic	3,100	600	(4)	200	500	(4)	1.500

Appendix table 19. - continued

Field and racial/ethnic group	Total Employed (1)	Research & Development	Management of R&D	General management	Teaching	Production/ inspection	Reporting, statistical, & computing work
Environmental scientists	10,300	5,000	400	700	900	1,800	900
White	9,900	4,800	400	700	800	1,700	900
Black	100	(4)	(4)	(4)	(4)	(4)	(4)
Asian	100	100	(4)	(4)	(4)	(4)	(4)
Native American	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Hispanic	200	100	(4)	(4)	(4)	100	(4)
Life scientists	82,600	33,100	3,400	9,500	12,400	9,900	2,500
White	73,700	29,300	2,600	8,400	11,500	9,300	2,400
Black	2,100	1,100	200	300	200	100	100
Asian	4,200	1,700	700	200	500	200	100
Native American	500	(4)	(4)	400	(4)	(4)	(4)
Hispanic	2,700	1,100	100	200	600	200	(4)
Psychologists	88,400	6,100	2,600	16,700	11,700	3,900	2,000
White	81,600	5,600	2,600	15,400	10,700	2,800	1,600
Black	4,300	300	(4)	700	600	1,100	300
Asian	1,200	200	(4)	300	100	(4)	100
Native American	300	(4)	(4)	(4)	100	(4)	(4)
Hispanic	2,200	(4)	200	500	200	100	200
Social scientists	92,400	10,700	5,600	22,800	17,000	4,700	13,800
White	80,600	9,800	4,700	19,200	15,100	3,600	13,000
Black	4,800	200	200	1,200	200	700	300
Asian	4,800	500	300	2,200	1,300	(4)	500
Native American	200	100	(4)	(4)	100	(4)	(4)
Hispanic	2,900	100	300	400	500	200	900
Engineers	74,500	29,500	3,100	7,800	3,400	16,200	7,100
White	63,500	24,400	2,200	6,800	2,800	14,600	6,100
Black	3,100	1,100	100	500	100	700	300
Asian	6,100	3,000	700	300	400	800	500
Native American	200	200	(4)	(4)	(4)	(4)	(4)
Hispanic	2,600	1,100	(4)	300	(4)	600	300

(1) Includes consulting, other, and no report.
(2) Detail will not add to total employed because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 20. Doctoral scientists and engineers in four-year colleges and universities by field, racial/ethnic group, and tenure status: 1983

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Tenure status		
		Tenure-track: Tenured	Tenure-track: Not tenured	Non-tenure track
Total scientists and engineers (2)	187,600	116,200	28,100	18,700
White	168,900	106,000	25,100	16,600
Black	3,100	1,600	700	200
Asian	12,400	6,800	2,000	1,600
Native American	300	200	(4)	(4)
Hispanic (3)	2,600	1,500	400	300
Scientists	167,300	103,200	24,900	17,700
White	151,600	94,400	22,600	15,900
Black	2,900	1,500	600	200
Asian	10,000	5,600	1,500	1,400
Native American	300	200	(4)	(4)
Hispanic	2,300	1,300	400	200
Physical scientists	26,500	16,200	2,300	3,200
White	23,600	14,700	2,000	2,800
Black	400	200	100	(4)
Asian	2,000	900	200	300
Native American	100	100	(4)	(4)
Hispanic	400	300	(4)	(4)
Mathematical scientists	12,800	9,400	1,900	500
White	11,500	8,500	1,700	500
Black	100	100	(4)	(4)
Asian	1,000	700	200	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	200	100	(4)	(4)

Appendix table 20. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Tenure status		
		Tenure-track: Tenured	Tenure-track: Not tenured	Non-tenure track
Computer specialists	3,900	1,800	700	600
White	3,600	1,600	600	600
Black	(4)	(4)	(4)	(4)
Asian	300	200	100	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	100	(4)	(4)
Environmental scientists	6,500	3,600	1,000	900
White	6,200	3,500	900	800
Black	(4)	(4)	(4)	(4)
Asian	300	100	(4)	100
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	(4)	(4)
Life scientists	57,300	32,100	9,100	7,900
White	51,500	29,300	8,300	6,800
Black	700	400	100	100
Asian	4,200	2,000	600	900
Native American	100	(4)	(4)	(4)
Hispanic	800	400	100	100
Psychologists	19,400	11,900	3,200	2,000
White	18,300	11,400	2,900	1,900
Black	500	200	100	100
Asian	300	100	100	100
Native American	(4)	(4)	(4)	(4)
Hispanic	200	100	(4)	(4)

Appendix table 20. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Tenure status		
		Tenure-track: Tenured	Tenure-track: Not tenured	Non-tenure track
Social scientists	41,000	28,100	6,700	2,600
White	37,000	25,400	6,100	2,500
Black	1,100	600	300	100
Asian	2,100	1,600	300	100
Native American	100	100	(4)	(4)
Hispanic	600	300	200	(4)
Engineers	20,200	13,000	3,200	1,000
White	17,300	11,600	2,500	800
Black	200	(4)	100	(4)
Asian	2,400	1,200	600	200
Native American	(4)	(4)	(4)	(4)
Hispanic	300	200	100	100

(1) Includes tenure status unknown and no report.
(2) Detail will not add to total because
a) racial and ethnic categories are not mutually exclusive and
b) total includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 21. Doctoral men scientists and engineers in four-year colleges and universities by field, racial/ethnic group, and tenure status: 1983

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Tenure status		
		Tenure-track: Tenured	Tenure-track: Not tenured	Non-tenure track
Total scientists and engineers (2)	160,600	105,600	22,400	13,400
White	144,900	96,500	19,900	11,900
Black	2,400	1,300	500	100
Asian	10,600	6,300	1,800	1,100
Native American	300	200	(4)	(4)
Hispanic (3)	2,200	1,300	400	200
Scientists	140,600	92,700	19,300	12,400
White	127,800	85,000	17,500	11,200
Black	2,200	1,200	400	100
Asian	8,200	5,100	1,200	900
Native American	300	200	(4)	(4)
Hispanic	1,900	1,200	300	100
Physical scientists	24,600	15,500	2,000	2,700
White	22,000	14,100	1,800	2,400
Black	400	200	100	(4)
Asian	1,700	900	200	200
Native American	100	100	(4)	(4)
Hispanic	300	200	(4)	(4)
Mathematical scientists	11,700	8,900	1,600	400
White	10,600	8,100	1,400	400
Black	100	100	(4)	(4)
Asian	800	600	200	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	100	(4)	(4)

Appendix table 21. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Tenure status		
		Tenure-track: Tenured	Tenure-track: Not tenured	Non-tenure track
Computer specialists	3,600	1,800	600	500
White	3,300	1,600	500	500
Black	(4)	(4)	(4)	(4)
Asian	300	200	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	100	(4)	(4)
Environmental scientists	6,100	3,500	900	800
White	5,800	3,400	900	700
Black	(4)	(4)	(4)	(4)
Asian	200	100	(4)	100
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	(4)	(4)
Life scientists	46,300	28,600	7,200	5,000
White	41,900	26,200	6,600	4,300
Black	500	300	100	(4)
Asian	3,200	1,700	500	500
Native American	(4)	(4)	(4)	(4)
Hispanic	700	400	100	100
Psychologists	14,100	9,600	2,000	1,200
White	13,500	9,300	1,800	1,200
Black	300	200	100	(4)
Asian	100	100	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	100	(4)	(4)

Appendix table 21. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Tenure status		
		Tenure-track: Tenured	Tenure-track: Not tenured	Non-tenure track
Social scientists	34,200	24,800	5,000	1,800
White	30,800	22,300	4,500	1,700
Black	900	500	200	100
Asian	1,800	1,500	200	100
Native American	100	100	(4)	(4)
Hispanic	500	300	100	(4)
Engineers	19,900	12,900	3,100	1,000
White	17,100	11,500	2,400	700
Black	200	(4)	100	(4)
Asian	2,400	1,200	600	200
Native American	(4)	(4)	(4)	(4)
Hispanic	300	200	100	100

(1) Includes tenure status unknown and no report.
(2) Detail will not add to total because
a) racial and ethnic categories are not mutually exclusive and
b) total includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 22. Doctoral women scientists and engineers in four-year colleges and universities by field, racial/ethnic group, and tenure status: 1983

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Tenure status		
		Tenure-track: Tenured	Tenure-track: Not tenured	Non-tenure track
Total scientists and engineers (2)	27,000	10,600	5,700	5,300
White	24,000	9,500	5,200	4,700
Black	800	300	200	100
Asian	1,800	500	300	500
Native American	(4)	(4)	(4)	(4)
Hispanic (3)	400	100	100	100
Scientists	26,700	10,500	5,600	5,300
White	23,700	9,500	5,100	4,700
Black	800	300	200	100
Asian	1,800	500	300	500
Native American	(4)	(4)	(4)	(4)
Hispanic	400	100	100	100
Physical scientists	1,900	700	300	500
White	1,600	600	300	400
Black	(4)	(4)	(4)	(4)
Asian	200	(4)	(4)	100
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)
Mathematical scientists	1,100	600	300	100
White	900	500	300	100
Black	(4)	(4)	(4)	(4)
Asian	100	100	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)

Appendix table 22. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Tenure status		
		Tenure-track: Tenured	Tenure-track: Not tenured	Non-tenure track
Computer specialists	300	100	100	100
White	300	100	100	100
Black	(4)	(4)	(4)	(4)
Asian	(4)	(4)	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)
Environmental scientists	400	100	100	100
White	300	100	100	100
Black	(4)	(4)	(4)	(4)
Asian	(4)	(4)	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)
Life scientists	11,000	3,500	1,900	3,000
White	9,600	3,100	1,700	2,600
Black	300	100	(4)	(4)
Asian	1,000	200	100	400
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	(4)	(4)
Psychologists	5,300	2,300	1,200	800
White	4,800	2,100	1,100	700
Black	200	100	100	(4)
Asian	100	100	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	(4)	(4)

Appendix table 22. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Tenure status		
		Tenure-track: Tenured	Tenure-track: Not tenured	Non-tenure track
Social scientists	6,800	3,300	1,700	800
White	6,200	3,100	1,600	700
Black	200	100	100	(4)
Asian	200	100	100	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	(4)	(4)
Engineers	300	100	100	(4)
White	200	100	100	(4)
Black	(4)	(4)	(4)	(4)
Asian	100	(4)	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)

(1) Includes tenure status unknown and no report.
(2) Detail will not add to total because
a) racial and ethnic categories are not mutually exclusive and
b) total includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 23. Doctoral scientists and engineers in four-year colleges and universities by field, racial/ethnic group, and academic rank: 1983

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Academic rank		
		Full professor	Associate Professor	Assistant Professor
Total scientists and engineers (2)	187,600	77,300	48,200	32,600
White	168,900	70,800	43,300	29,000
Black	3,100	900	1,000	700
Asian	12,400	4,300	3,100	2,300
Native American	300	100	100	(4)
Hispanic (3)	2,600	700	900	500
Scientists	167,300	67,500	43,400	29,800
White	151,600	62,100	39,100	27,000
Black	2,900	800	800	700
Asian	10,000	3,500	2,700	1,700
Native American	300	100	100	(4)
Hispanic	2,300	700	700	400
Physical scientists	26,500	12,500	5,000	2,600
White	23,600	11,300	4,500	2,400
Black	400	200	100	(4)
Asian	2,000	800	200	200
Native American	100	(4)	(4)	(4)
Hispanic	400	200	100	(4)
Mathematical scientists	12,800	6,100	3,700	2,300
White	11,500	5,600	3,200	2,000
Black	100	100	100	(4)
Asian	1,000	300	400	200
Native American	(4)	(4)	(4)	(4)
Hispanic	200	100	(4)	(4)

Appendix table 23. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Academic rank		
		Full professor	Associate Professor	Assistant Professor
Computer specialists	3,900	1,000	1,100	800
White	3,600	900	1,000	700
Black	(4)	(4)	(4)	(4)
Asian	300	100	100	100
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	100	(4)
Environmental scientists	6,500	2,600	1,400	1,200
White	6,200	2,500	1,300	1,100
Black	(4)	(4)	(4)	(4)
Asian	300	100	100	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	(4)	(4)
Life scientists	57,300	21,300	14,300	10,700
White	51,500	19,400	12,900	9,700
Black	700	200	200	200
Asian	4,200	1,300	1,000	700
Native American	100	(4)	(4)	(4)
Hispanic	800	200	200	100
Psychologists	19,400	7,500	5,500	4,000
White	18,300	7,200	5,200	3,700
Black	500	(4)	200	200
Asian	300	100	(4)	100
Native American	(4)	(4)	(4)	(4)
Hispanic	200	(4)	100	100

Appendix table 23. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Academic rank		
		Full professor	Associate Professor	Assistant Professor
Social scientists	41,000	16,600	12,400	8,200
White	37,000	15,200	11,000	7,300
Black	1,100	400	300	300
Asian	2,100	700	900	400
Native American	100	100	100	(4)
Hispanic	600	100	200	100
Engineers	20,200	9,800	4,900	2,700
White	17,300	8,800	4,300	2,000
Black	200	(4)	100	(4)
Asian	2,400	800	400	600
Native American	(4)	(4)	(4)	(4)
Hispanic	300	100	200	100

(1) Includes instructor, other, and no report.
(2) Detail will not add to total because
a) racial and ethnic categories are not mutually exclusive and
b) total includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 24. Doctoral men scientists and engineers in four-year colleges and universities by field, racial/ethnic group, and academic rank: 1983

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Academic rank		
		Full professor	Associate Professor	Assistant Professor
Total scientists and engineers (2)	160,600	72,700	41,200	24,700
White	144,900	66,600	37,100	21,900
Black	2,400	700	800	500
Asian	10,600	4,100	2,700	1,800
Native American	300	100	100	(4)
Hispanic (3)	2,200	700	800	400
Scientists	140,600	62,900	36,500	22,100
White	127,800	57,900	32,900	20,000
Black	2,200	700	600	500
Asian	8,200	3,300	2,300	1,200
Native American	300	100	100	(4)
Hispanic	1,900	600	600	300
Physical scientists	24,600	12,100	4,600	2,200
White	22,000	10,900	4,200	2,000
Black	400	100	100	(4)
Asian	1,700	800	200	100
Native American	100	(4)	(4)	(4)
Hispanic	300	200	100	(4)
Mathematical scientists	11,700	5,800	3,400	1,900
White	10,600	5,400	2,900	1,700
Black	100	(4)	100	(4)
Asian	800	300	300	200
Native American	(4)	(4)	(4)	(4)
Hispanic	100	100	(4)	(4)

Appendix table 24. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Academic rank		
		Full professor	Associate Professor	Assistant Professor
Computer specialists	3,600	1,000	1,000	700
White	3,300	800	900	700
Black	(4)	(4)	(4)	(4)
Asian	300	100	100	100
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	100	(4)
Environmental scientists	6,100	2,600	1,400	1,100
White	5,800	2,500	1,200	1,000
Black	(4)	(4)	(4)	(4)
Asian	200	100	100	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	(4)	(4)
Life scientists	46,300	19,700	11,700	7,800
White	41,900	18,000	10,600	7,200
Black	500	200	100	100
Asian	3,200	1,200	800	500
Native American	(4)	(4)	(4)	(4)
Hispanic	700	200	200	100
Psychologists	14,100	6,500	4,100	2,300
White	13,500	6,400	3,900	2,100
Black	300	(4)	100	100
Asian	100	100	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	100	(4)

Appendix table 24. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Academic rank		
		Full professor	Associate Professor	Assistant Professor
Social scientists	34,200	15,300	10,300	6,000
White	30,800	13,900	9,100	5,300
Black	900	300	300	200
Asian	1,800	700	800	300
Native American	100	100	100	(4)
Hispanic	500	100	200	100
Engineers	19,900	9,800	4,800	2,600
White	17,100	8,800	4,200	1,900
Black	200	(4)	100	(4)
Asian	2,400	800	400	600
Native American	(4)	(4)	(4)	(4)
Hispanic	300	100	200	100

(1) Includes instructor, other, and no report.
(2) Detail will not add to total because
a) racial and ethnic categories are not mutually exclusive and
b) total includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 25. Doctoral women scientists and engineers in four-year colleges and universities by field, racial/ethnic group, and academic rank: 1983

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Academic rank		
		Full professor	Associate Professor	Assistant Professor
Total scientists and engineers (2)	27,000	4,600	7,000	7,900
White	24,000	4,200	6,300	7,100
Black	800	100	200	300
Asian	1,800	200	400	500
Native American	(4)	(4)	(4)	(4)
Hispanic (3)	400	100	100	100
Scientists	26,700	4,600	6,900	7,800
White	23,700	4,200	6,200	7,000
Black	800	100	200	300
Asian	1,800	200	400	400
Native American	(4)	(4)	(4)	(4)
Hispanic	400	100	100	100
Physical scientists	1,900	400	400	400
White	1,600	400	300	400
Black	(4)	(4)	(4)	(4)
Asian	200	(4)	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)
Mathematical scientists	1,100	200	300	400
White	900	200	300	300
Black	(4)	(4)	(4)	(4)
Asian	100	(4)	100	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)

Appendix table 25. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Academic rank		
		Full professor	Associate Professor	Assistant Professor
Computer specialists	300	(4)	100	100
White	300	(4)	100	100
Black	(4)	(4)	(4)	(4)
Asian	(4)	(4)	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)
Environmental scientists	400	100	100	100
White	300	100	100	100
Black	(4)	(4)	(4)	(4)
Asian	(4)	(4)	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)
Life scientists	11,000	1,600	2,600	2,800
White	9,600	1,400	2,300	2,600
Black	300	100	100	100
Asian	1,000	100	200	200
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	(4)	(4)
Psychologists	5,300	900	1,400	1,700
White	4,800	900	1,300	1,600
Black	200	(4)	100	100
Asian	100	(4)	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	(4)	(4)

Appendix table 25. - continued

Field and racial/ethnic group	Total, four-year colleges & universities (1)	Academic rank		
		Full professor	Associate Professor	Assistant Professor
Social scientists	6,800	1,300	2,100	2,200
White	6,200	1,300	1,900	2,000
Black	200	(4)	100	100
Asian	200	(4)	100	100
Native American	(4)	(4)	(4)	(4)
Hispanic	100	(4)	100	(4)
Engineers	300	(4)	100	100
White	200	(4)	100	100
Black	(4)	(4)	(4)	(4)
Asian	100	(4)	(4)	(4)
Native American	(4)	(4)	(4)	(4)
Hispanic	(4)	(4)	(4)	(4)

(1) Includes instructor, other, and no report.
(2) Detail will not add to total because
a) racial and ethnic categories are not mutually exclusive and
b) total includes other and no report.
(3) Includes members of all racial groups.
(4) Too few cases to estimate.

SOURCE: National Science Foundation

Appendix table 26. Selected employment characteristics of scientists and engineers by field, racial/ethnic group and sex: 1984

Field and racial/ethnic group	Labor force participation rate			Unemployment rate			S/E employment rate		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Total scientists and engineers	95.6	95.8	94.3	1.6	1.3	3.[illegible]	86.7	88.2	77.0
White	95.5	95.7	94.1	1.5	1.2	3.4	86.8	88.2	77.0
Black	98.2	98.7	96.8	2.7	2.0	4.7	81.3	84.7	71.0
Asian	96.6	97.1	93.2	2.4	2.5	1.6	90.8	92.1	83.1
Native American	97.7	97.8	96.1	3.4	1.9	18.0	78.3	78.8	71.4
Hispanic	96.0	96.3	94.6	2.1	2.0	2.7	80.3	81.9	72.6
Scientists	96.0	96.6	94.2	2.1	1.6	3.5	78.8	80.3	74.1
White	96.0	96.6	94.1	2.0	1.5	3.5	78.9	80.4	74.3
Black	97.7	98.4	96.7	2.9	2.1	4.3	73.1	75.6	69.0
Asian	95.7	97.0	92.8	2.1	2.5	1.4	83.2	85.2	78.6
Native American	97.6	97.1	100.0	3.4	(3)	19.3	63.5	63.1	65.9
Hispanic	93.2	92.8	94.0	2.0	1.6	2.7	68.0	67.8	68.3
Physical scientists	94.6	94.9	92.1	1.8	1.6	3.8	92.1	92.1	91.8
White	94.6	94.8	92.9	1.6	1.4	3.9	92.4	92.3	92.6
Black	98.0	98.8	94.5	5.6	5.5	6.0	79.0	78.0	83.6
Asian	92.5	94.9	84.8	2.3	2.6	1.3	92.5	93.3	89.7
Native American	84.6	84.1	100.0	(3)	(3)	(3)	100.0	100.0	100.0
Hispanic	91.1	92.4	85.3	3.3	3.4	2.4	91.5	90.1	98.2
Mathematical scientists	95.4	96.2	92.8	2.1	2.0	2.8	86.7	86.9	86.0
White	95.3	96.2	92.3	1.7	1.4	2.6	85.8	86.0	85.4
Black	98.2	98.0	98.6	2.6	(3)	6.7	92.1	89.5	96.8
Asian	95.4	95.9	91.9	9.5	10.6	(3)	95.2	95.8	91.1
Native American	100.0	100.0	100.0	(3)	(3)	(3)	91.6	100.0	19.6
Hispanic	100.0	100.0	100.0	(3)	(3)	(3)	95.7	96.9	92.1
Computer specialists	98.8	99.4	97.3	.6	.5	.8	77.9	78.0	77.8
White	99.0	99.6	97.3	.5	.4	.8	77.7	77.8	77.3
Black	99.4	100.0	98.8	1.5	1.2	1.7	81.3	78.9	84.2
Asian	98.4	99.2	96.4	.9	1.0	.5	84.6	86.9	79.2
Native American	100.0	100.0	100.0	(3)	(3)	(3)	23.9	[illegible]7.6	100.0
Hispanic	91.3	89.9	93.8	(3)	(3)	(3)	66.2	63.6	70.6

Appendix table 26. - continued

Field and racial/ethnic group	Labor force participation rate			Unemployment rate			S/E employment rate		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Environmental scientists	95.9	96.3	92.6	3.1	2.6	7.1	91.6	92.0	88.1
White	95.9	96.3	92.4	3.1	2.6	7.3	91.4	91.8	87.8
Black	85.9	82.8	100.0	2.5	1.1	7.9	98.6	98.3	100.0
Asian	98.9	98.8	100.0	(3)	(3)	(3)	97.4	98.3	81.6
Native American	94.2	93.0	100.0	(3)	(3)	(3)	100.0	100.0	100.0
Hispanic	96.7	96.3	100.0	4.2	4.7	(3)	96.5	97.1	91.0
Life scientists	94.1	95.2	90.9	2.2	1.5	4.4	83.2	83.5	82.5
White	94.1	95.2	90.6	2.1	1.5	4.3	83.1	83.3	82.7
Black	95.0	97.2	90.9	1.0	1.2	.6	81.6	78.8	87.4
Asian	92.7	93.2	91.9	3.6	3.0	4.5	89.8	94.4	83.0
Native American	100.0	100.0	100.0	(3)	(3)	(3)	61.9	76.1	11.7
Hispanic	92.3	92.3	92.4	1.5	1.8	.8	78.2	77.1	80.1
Psychologists	96.3	97.0	95.4	2.5	2.1	3.1	72.5	76.7	66.8
White	96.3	97.2	95.2	2.5	2.0	3.2	72.9	76.9	67.4
Black	98.0	96.6	99.0	2.9	3.1	2.8	69.8	86.3	58.2
Asian	94.6	89.4	98.2	1.1	(3)	1.8	72.0	87.2	62.3
Native American	100.0	100.0	100.0	(3)	(3)	(3)	78.3	73.1	100.0
Hispanic	94.5	89.2	100.0	2.0	3.2	1.0	32.1	30.6	33.4
Social scientists	95.6	96.4	93.7	3.5	2.5	5.9	62.5	63.7	59.4
White	95.4	96.2	93.5	3.6	2.7	5.9	63.2	64.5	60.0
Black	97.7	99.1	95.0	3.8	1.6	8.4	56.0	63.6	38.8
Asian	96.4	99.1	92.2	.7	1.1	(3)	61.8	57.0	70.1
Native American	100.0	100.0	100.0	20.7	(3)	59.3	49.2	38.1	100.0
Hispanic	93.3	93.6	92.7	3.4	1.0	8.9	54.3	49.6	66.1
Engineers	95.3	95.3	94.7	1.2	1.2	2.9	93.1	93.1	93.9
White	95.1	95.1	94.6	1.1	1.0	2.8	93.1	93.0	93.9
Black	98.8	99.0	97.2	2.3	1.8	7.2	93.0	93.8	84.1
Asian	97.1	97.2	94.7	2.5	2.5	2.1	95.3	95.1	98.4
Native American	97.8	98.3	78.2	3.3	3.1	10.3	89.1	88.9	100.0
Hispanic	98.3	98.4	97.2	2.3	2.3	2.6	90.2	90.0	93.8

Appendix table 26. - continued

Field and racial/ethnic group	Underemployment rate			Underutilization rate		
	Total	Men	Women	Total	Men	Women
Total scientists and engineers	2.6	1.8	7.8	4.1	3.1	10.9
White	2.5	1.8	7.4	3.9	3.0	10.5
Black	6.6	3.6	15.7	9.1	5.4	19.6
Asian	1.8	1.5	3.6	4.1	3.9	5.1
Native American	2.9	1.5	20.0	6.2	3.4	34.4
Hispanic	4.2	2.5	12.3	6.3	4.5	14.6
Scientists	4.5	3.1	8.8	6.5	4.7	12.0
White	4.3	3.0	8.3	6.2	4.5	11.5
Black	9.3	4.8	16.9	12.0	6.8	20.5
Asian	3.2	2.7	4.4	5.3	5.1	5.8
Native American	6.3	3.2	23.8	9.5	3.2	38.6
Hispanic	8.1	5.0	14.3	9.9	6.6	16.6
Physical scientists	2.1	2.0	3.1	3.9	3.5	6.7
White	1.9	1.8	2.5	3.5	3.1	6.3
Black	3.4	1.8	10.3	8.8	7.2	15.7
Asian	5.5	6.2	3.2	7.7	8.6	4.4
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	2.6	2.1	4.6	5.7	5.5	6.9
Mathematical scientists	2.9	2.0	6.1	4.9	3.9	8.8
White	2.8	1.9	5.9	4.4	3.3	8.3
Black	3.5	5.0	1.1	6.0	5.[illegible]	7.7
Asian	2.0	1.4	6.0	11.2	11.[illegible]	6.0
Native American	8.4	(3)	80.4	8.4	(3)	80.4
Hispanic	2.0	(3)	7.9	2.0	(3)	7.9
Computer specialists	2.2	2.2	2.3	2.8	2.6	3.1
White	2.0	2.1	1.7	2.5	2.5	2.6
Black	5.5	3.6	7.9	6.9	4.8	9.4
Asian	2.9	1.9	5.4	3.7	2.8	5.9
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	4.8	4.6	5.2	4.8	4.6	5.2

Appendix table 26. - continued

Field and racial/ethnic group	Underemployment rate			Underutilization rate		
	Total	Men	Women	Total	Men	Women
Environmental scientists	3.9	3.2	10.1	6.9	5.7	16.5
White	3.9	3.1	10.5	6.9	5.6	17.0
Black	1.4	1.7	(3)	3.9	2.8	7.9
Asian	3.4	3.6	(3)	3.4	3.6	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	2.1	1.1	10.1	6.2	5.7	10.1
Life scientists	4.9	3.7	9.0	7.0	5.1	13.0
White	4.8	3.7	8.9	6.8	5.1	12.8
Black	5.5	3.7	9.4	6.5	4.8	9.9
Asian	5.3	2.6	9.3	8.7	5.5	13.5
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	9.9	6.3	15.8	11.2	8.0	16.6
Psychologists	7.5	4.4	11.8	9.8	6.3	14.6
White	6.8	4.0	10.7	9.2	6.0	13.6
Black	17.7	4.4	27.1	20.1	7.3	29.1
Asian	2.5	3.6	1.8	3.6	3.6	3.6
Native American	19.8	14.5	42.2	19.8	14.5	42.2
Hispanic	21.9	20.3	23.3	23.5	22.8	24.1
Social scientists	7.7	4.6	15.8	11.0	7.0	20.8
White	7.5	4.6	15.3	10.8	7.1	20.3
Black	14.2	7.6	29.2	17.5	9.2	35.2
Asian	.6	.9	(3)	1.3	2.0	(3)
Native American	12.5	2.7	57.8	30.6	2.7	82.9
Hispanic	8.7	4.1	20.3	11.9	5.1	27.4
Engineers	1.0	1.0	1.9	2.2	2.2	4.7
White	1.0	1.0	1.7	2.0	2.0	4.4
Black	2.8	2.3	8.0	5.0	4.1	14.6
Asian	1.0	1.0	1.0	3.4	3.4	3.1
Native American	.4	.4	(3)	3.7	3.5	10.3
Hispanic	1.1	1.1	2.1	3.4	3.3	4.7

(1) Detail will not average to the total because a) racial and ethnic categories are not mutually exclusive and b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

NOTE: See Technical Notes for definition of rates.

SOURCE: National Science Foundation

Appendix table 27. Selected employment characteristics of doctoral scientists and engineers by field, racial/ethnic group, and sex: 1983

Field and racial/ethnic group	Labor force participation rate			Unemployment rate			S/E employment rate		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Total scientists and engineers (1)	94.4	94.8	91.8	1.0	0.7	2.5	88.6	88.9	87.1
White	94.1	94.6	91.5	1.0	.7	2.5	88.8	89.0	87.6
Black	95.7	95.1	97.2	1.9	1.8	2.3	80.0	81.6	75.8
Asian	97.3	97.7	94.4	1.1	.9	3.1	91.0	91.5	88.0
Native American	95.9	95.9	96.1	1.6	1.9	(3)	95.7	96.2	91.8
Hispanic (2)	96.2	96.8	92.3	1.2	.7	4.4	87.4	87.6	85.9
Scientists	93.9	94.4	91.7	1.1	.8	2.5	88.1	88.3	86.9
White	93.7	94.1	91.4	1.0	.8	2.5	88.4	88.6	87.4
Black	95.4	94.7	97.2	2.1	2.0	2.3	78.9	80.3	75.6
Asian	97.3	97.9	94.3	1.5	1.1	3.3	89.3	89.7	87.3
Native American	95.5	95.6	95.3	1.8	2.0	(3)	98.2	99.1	90.2
Hispanic	95.8	96.4	92.3	1.5	.9	4.5	89.6	90.3	85.5
Physical scientists	93.1	93.4	89.3	1.2	1.1	2.7	88.1	88.1	86.7
White	92.6	92.8	88.5	1.2	1.1	2.5	88.2	88.2	87.5
Black	94.7	94.5	96.4	3.2	3.5	(3)	82.5	81.9	88.9
Asian	98.4	99.1	93.6	1.6	1.3	3.9	90.2	91.1	93.4
Native American	98.5	98.5	(3)	(3)	(3)	(3)	100.0	100.0	(3)
Hispanic	97.0	97.7	89.6	.8	.4	5.8	86.3	85.7	93.8
Mathematical scientists	95.0	95.3	91.1	.6	.6	.5	87.2	87.3	85.9
White	94.6	95.0	90.6	.6	.7	.3	87.9	87.9	88.0
Black	98.4	100.0	90.3	[illegible]	1.3	(3)	90	90.0	92.9
Asian	98.1	98.9	93.1	.6	.4	1.6	8[illegible]	83.4	75.4
Native American	42.9	42.9	(3)	(3)	(3)	(3)	100	100.0	(3)
Hispanic	85.3	84.2	93.1	(3)	(3)	(3)	97.	98.2	88.9

Appendix table 27. - continued

Field and racial/ethnic group	Labor force participation rate			Unemployment rate			S/E employment rate		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Computer specialists	98.9	98.9	98.3	(3)	(3)	(3)	98.6	93.5	99.4
White	98.9	98.9	98.8	(3)	(3)	(3)	98.8	98.7	99.4
Black	87.8	80.6	100.0	(3)	(3)	(3)	95.3	92.0	100.0
Asian	99.0	99.9	93.9	(3)	(3)	(3)	97.5	97.1	99.3
Native American	100.0	100.0	(3)	(3)	(3)	(3)	100.0	100.0	(3)
Hispanic	100.0	100.0	100.0	(3)	(3)	(3)	100.0	100.0	100.0
Environmental scientists	96.7	96.7	95.2	0.6	0.5	2.9	95.0	95.0	95.1
White	96.6	96.6	95.5	.6	.5	3.1	95.0	95.0	95.1
Black	100.0	100.0	100.0	(3)	(3)	(3)	78.8	75.0	100.0
Asian	99.7	100.0	96.7	(3)	(3)	(3)	95.8	96.1	93.1
Native American	100.0	100.0	(3)	(3)	(3)	(3)	100.0	100.0	(3)
Hispanic	95.2	96.3	84.2	1.0	1.1	(3)	98.0	98.9	87.5
Life scientists	92.7	93.2	90.3	1.3	.9	3.0	92.6	92.7	91.9
White	92.5	93.0	89.9	1.2	.9	3.1	92.8	92.9	91.9
Black	94.6	92.8	97.8	1.9	1.4	2.7	86.9	91.6	78.8
Asian	95.9	96.7	93.3	1.7	1.3	2.9	94.6	93.9	97.1
Native American	91.0	91.5	88.9	7.7	9.3	(3)	96.4	95.6	100.0
Hispanic	92.8	93.5	89.5	1.3	1.2	2.0	92.9	93.1	92.0
Psychologists	94.9	95.7	93.1	1.1	.9	1.6	89.4	89.6	88.9
White	94.8	95.6	92.9	1.1	.9	1.4	90.0	90.1	89.8
Black	97.2	96.7	97.7	1.1	.8	1.5	79.6	83.8	74.6
Asian	99.5	100.0	99.0	2.3	(3)	5.1	82.2	87.0	75.9
Native American	100.0	100.0	100.0	(3)	(3)	(3)	97.3	100.0	89.5
Hispanic	96.6	98.6	92.2	2.5	.4	7.5	87.6	89.4	82.8

Appendix table 27. - continued

Field and racial/ethnic group	Labor force participation rate			Unemployment rate			S/E employment rate		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Social scientists	94.1	94.5	92.3	1.1	0.6	3.5	76.4	76.8	74.2
White	93.9	94.3	92.0	1.0	.5	3.5	76.7	77.1	74.8
Black	95.0	94.5	96.3	2.5	2.2	3.5	68.7	68.9	67.9
Asian	96.4	96.4	96.3	1.8	1.4	4.6	76.6	78.1	66.4
Native American	100.0	100.0	100.0	(3)	(3)	(3)	98.5	100.0	66.7
Hispanic	99.6	100.0	97.7	2.3	1.7	4.7	84.0	85.6	75.9
Engineers	96.9	96.9	96.1	.4	.4	1.3	91.3	91.2	95.8
White	96.7	96.8	96.3	.4	.4	1.5	91.2	91.1	95.9
Black	98.8	98.7	100.0	(3)	(3)	(3)	92.4	92.5	90.9
Asian	97.4	97.5	95.8	.5	.5	.8	94.2	94.2	96.4
Native American	100.0	100.0	100.0	(3)	(3)	(3)	71.8	64.5	100.0
Hispanic	98.3	98.5	90.5	(3)	(3)	(3)	77.0	76.6	100.0

Appendix table 27. - continued

Field and racial/ethnic group	Underemployment rate			Underutilization rate		
	Total	Men	Women	Total	Men	Women
Total scientists and engineers	1.5	1.2	3.9	2.5	1.9	6.3
White	1.5	1.2	3.9	2.5	1.9	6.2
Black	3.3	2.7	4.8	5.1	4.4	7.0
Asian	1.1	.8	3.7	2.3	1.7	6.7
Native American	.5	(3)	4.1	2.1	1.9	4.1
Hispanic	1.1	.8	3.2	2.3	1.5	7.4
Scientists	1.7	1.3	3.9	2.8	2.1	6.4
White	1.7	1.2	3.9	2.7	2.0	6.3
Black	3.6	3.0	4.9	5.6	4.9	7.1
Asian	1.7	1.3	3.8	3.2	2.4	7.0
Native American	.5	(3)	4.9	2.3	2.0	4.9
Hispanic	1.2	.9	3.2	2.7	1.8	7.6
Physical scientists	1.3	1.2	2.5	2.5	2.3	5.1
White	1.2	1.1	2.7	2.4	2.2	5.2
Black	5.4	5.8	(3)	8.4	9.1	(3)
Asian	1.7	1.7	1.5	3.3	3.0	5.4
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	.2	(3)	3.1	1.0	.4	8.7
Mathematical scientists	1.0	.9	2.3	1.6	1.5	2.7
White	1.1	1.0	2.1	1.7	1.6	2.5
Black	(3)	(3)	(3)	1.1	1.3	(3)
Asian	.4	(3)	3.2	1.0	.4	4.7
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	5.6	4.7	11.1	5.6	4.7	11.1

Appendix table 27. - continued

Field and racial/ethnic group	Underemployment rate			Underutilization rate		
	Total	Men	Women	Total	Men	Women
Computer specialists	1.0	0.8	2.2	1.0	0.8	2.2
White	1.0	.9	1.9	1.0	.9	1.9
Black	16.3	(3)	38.9	16.3	(3)	38.9
Asian	(3)	(3)	(3)	(3)	(3)	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	(3)	(3)	(3)	(3)	(3)	(3)
Environmental scientists	1.4	1.3	3.3	2.0	1.8	6.1
White	1.4	1.3	3.6	2.1	1.8	6.6
Black	6.1	7.1	(3)	6.1	7.1	(3)
Asian	1.0	1.1	(3)	1.0	1.1	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	2.5	1.6	12.5	3.5	2.7	12.5
Life scientists	1.1	.9	2.2	2.4	1.7	5.2
White	1.0	.8	2.1	2.3	1.7	5.1
Black	2.5	2.6	2.4	4.4	4.0	5.0
Asian	1.0	.5	2.5	2.6	1.8	5.4
Native American	(3)	(3)	(3)	7.7	9.3	(3)
Hispanic	.6	.5	1.5	1.9	1.7	3.4
Psychologists	2.4	1.5	4.4	3.5	2.5	5.9
White	2.3	1.5	4.4	3.4	2.4	5.8
Black	3.1	1.9	4.4	4.1	2.6	5.8
Asian	1.4	(3)	3.2	3.7	(3)	8.2
Native American	2.7	(3)	10.5	2.7	(3)	10.5
Hispanic	2.3	1.6	4.0	4.7	2.0	11.2

Appendix table 27. - continued

Field and racial/ethnic group	Underemployment rate			Underutilization rate		
	Total	Men	Women	Total	Men	Women
Social scientists	3.0	2.1	7.3	4.0	2.7	10.6
White	2.9	2.0	7.0	3.8	2.5	10.3
Black	3.9	2.6	8.2	6.4	4.7	11.4
Asian	4.7	3.2	15.2	6.5	4.6	19.0
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	1.4	1.1	2.5	3.6	2.9	7.1
Engineers	.8	.8	.8	1.2	1.2	2.1
White	.9	.9	.5	1.3	1.3	2.0
Black	(3)	(3)	(3)	(3)	(3)	(3)
Asian	.0	(3)	1.2	.6	.5	2.0
Native American	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	.5	.5	(3)	.5	.5	(3)

(1) Detail will not average to the total because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

NOTE: See Technical Notes for definition of rates.

SOURCE: National Science Foundation

Appendix table 28. Average annual salaries of scientists and engineers by field, racial/ethnic group, and years of professional experience: 1984

Field and racial/ethnic group	Total Employed (1)	Professional Experience								
		Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Total scientists and engineers	$37,400	$20,200	$23,400	$32,400	$36,900	$41,500	$43,200	$44,400	$44,800	$43,900
White	37,500	20,300	23,300	32,300	36,900	41,600	43,400	44,500	44,900	44,000
Black	32,500	15,700	21,100	30,700	34,500	36,900	35,500	43,700	40,800	36,900
Asian	38,200	24,300	26,500	34,900	38,900	41,500	42,900	43,500	43,100	42,200
Native American	40, 00	22,500	16,800	33,000	40,200	49,200	42,900	44,700	44,100	42,500
Hispanic (2)	33,100	17,800	22,500	30,700	35,000	38,600	39,900	41,500	43,200	42,700
Scientists	34,500	17,100	20,800	30,700	35,400	40,700	41,700	43,600	45,800	45,300
White	34,600	17,300	20,700	30,900	35,300	40,800	42,000	43,600	46,100	45,300
Black	30,500	14,200	18,800	28,500	33,400	37,300	32,700	44,700	39,600	38,600
Asian	36,000	19,400	26,700	30,900	37,600	40,300	42,400	43,900	41,000	52,500
Native American	41,900	17,800	21,500	34,500	35,600	48,100	49,900	41,700	44,100	44,700
Hispanic	28,400	13,500	20,000	28,100	31,300	34,800	37,600	39,900	44,600	45,500
Physical scientists	38,900	15,800	21,100	32,300	36,800	41,900	43,500	46,700	48,500	46,400
White	39,200	14,800	21,300	32,700	36,800	42,900	43,700	46,700	48,700	45,800
Black	33,800	23,800	19,600	27,400	31,300	34,900	40,900	43,100	45,200	43,300
Asian	38,100	22,000	25,300	31,000	35,400	34,400	39,800	50,500	46,600	54,500
Native American	54,900	(3)	(3)	23,000	(3)	(3)	50,300	(3)	(3)	70,000
Hispanic	31,400	18,500	18,500	15,000	30,300	25,600	42,000	53,600	(3)	50,000
Mathematical scientists	40,500	16,700	25,400	32,300	39,200	46,500	43,000	45,600	45,600	49,500
White	40,600	15,300	25,800	32,500	39,100	46,300	44,100	46,100	45,600	50,000
Black	36,100	18,900	20,500	29,600	45,200	38,600	31,200	44,700	33,100	29,300
Asian	42,600	45,000	23,400	30,400	30,200	49,700	52,300	42,700	41,200	(3)
Native American	43,700	(3)	16,500	(3)	20,700	(3)	53,500	45,200	45,000	(3)
Hispanic	32,900	(3)	27,000	27,900	30,200	41,700	27,600	47,600	(3)	(3)
Computer specialists	35,700	24,200	24,900	33,400	37,500	41,500	43,200	43,500	44,000	41,300
White	35,700	24,400	24,800	33,500	37,100	41,400	43,200	43,700	43,800	41,400
Black	32,600	15,900	22,500	30,700	36,700	41,300	45,000	39,700	46,500	39,600
Asian	36,600	24,400	26,000	33,200	42,800	41,900	42,600	44,900	57,500	(3)
Native American	46,900	(3)	26,700	32,400	38,200	53,700	45,000	40,000	(3)	(3)
Hispanic	31,100	20,300	24,500	33,400	29,600	35,600	42,200	46,000	32,000	(3)

Appendix table 28. - continued

Field and racial/ethnic group	Total Employed (1)	Professional Experience								
		Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Environmental scientists	$39,100	$16,000	$24,200	$36,600	$39,600	$43,900	$45,700	$48,200	$51,300	$50,900
White	39,100	16,100	24,400	36,400	39,800	44,000	45,700	48,300	51,300	50,700
Black	31,600	16,400	19,100	37,600	29,600	30,000	(3)	36,400	(3)	(3)
Asian	40,600	11,000	22,700	37,400	37,700	41,800	47,200	47,700	44,000	64,500
Native American	49,100	(3)	(3)	44,700	(3)	(3)	(3)	(3)	(3)	60,000
Hispanic	36,600	24,300	20,200	40,300	30,100	34,500	44,500	49,100	46,500	45,800
Life scientists	31,100	15,600	16,900	24,700	32,100	37,100	39,600	41,000	43,600	44,300
White	31,100	15,700	16,700	24,500	32,200	36,900	40,100	41,100	43,700	44,300
Black	28,100	12,300	15,300	22,000	29,900	34,700	33,100	38,700	35,300	36,000
Asian	33,600	11,700	28,500	28,800	30,900	43,500	36,900	40,200	37,700	40,100
Native American	37,600	10,000	20,300	31,200	22,500	28,400	46,800	40,800	43,900	35,800
Hispanic	29,200	11,900	16,400	22,900	37,100	38,400	36,600	34,000	54,500	29,000
Psychologists	31,700	14,000	18,000	28,000	33,900	37,500	37,500	39,900	45,100	38,600
White	31,900	14,100	17,500	28,100	34,300	37,600	38,500	39,600	45,300	39,400
Black	27,100	14,900	19,100	22,400	24,100	30,600	22,000	45,800	40,000	39,300
Asian	32,100	(3)	19,100	15,600	35,100	39,200	40,500	32,100	32,900	51,200
Native American	33,600	20,000	15,000	40,000	36,000	46,000	(3)	(3)	46,000	25,000
Hispanic	24,000	8,100	26,200	34,200	21,900	28,400	49,300	25,000	31,300	(3)
Social scientists	31,500	18,300	19,000	29,700	32,900	41,000	40,100	42,900	45,200	45,500
White	31,700	19,000	18,900	30,100	32,600	41,500	40,100	42,900	46,100	45,600
Black	28,200	11,700	17,200	28,300	33,700	39,300	34,300	46,700	36,300	36,000
Asian	32,400	16,000	28,500	28,600	34,200	34,900	45,000	32,800	37,200	(3)
Native American	35,300	(3)	22,000	15,300	39,000	40,000	(3)	39,100	(3)	45,000
Hispanic	23,100	15,000	14,000	21,800	31,700	32,000	36,200	38,300	28,500	(3)
Engineers	39,600	27,100	26,500	34,100	38,300	42,200	44,100	44,800	44,400	43,500
White	39,700	27,300	26,500	33,900	38,300	42,300	44,300	45,000	44,400	43,600
Black	35,200	20,500	27,000	33,600	35,800	36,500	39,400	41,300	42,000	35,900
Asian	39,400	29,300	26,300	37,400	39,900	42,000	43,100	43,300	43,700	38,700
Native American	39,600	29,000	15,100	31,400	41,600	50,400	35,800	45,000	44,100	39,400
Hispanic	36,600	25,000	26,200	32,600	37,700	41,600	41,000	42,400	43,000	42,300

(1) Detail will not average to the total because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

OTE: Salaries computed for individuals employed full-time.

OURCE: National Science Foundation

Appendix table 29. Average annual salaries of men scientists and engineers by field, racial/ethnic group, and years of professional experience: 1984

Field and racial/ethnic group	Total Employed (1)	Professional Experience								
		Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Total scientists and engineers	$38,700	$22,800	$24,400	$33,100	$37,600	$42,200	$43,500	$44,700	$45,200	$44,000
White	38,800	22,800	24,400	33,000	37,500	42,300	43,800	44,800	45,300	44,100
Black	34,300	18,500	22,200	31,400	36,300	37,000	35,500	45,200	40,900	37,400
Asian	39,300	27,100	27,100	36,300	39,700	42,200	43,000	43,600	44,200	42,300
Native American	41,400	24,400	16,200	33,800	40,900	49,200	42,900	44,700	46,300	42,500
Hispanic (2)	35,200	20,400	24,500	31,200	35,400	40,800	39,900	42,800	43,600	43,000
Scientists	36,700	19,600	21,900	31,700	36,500	42,000	42,400	44,300	47,300	45,700
White	36,800	19,700	21,800	31,800	36,300	42,100	42,800	44,300	47,400	45,600
Black	33,000	16,900	19,900	28,600	36,700	37,300	32,200	47,200	39,800	40,200
Asian	38,800	21,900	28,700	33,400	39,200	43,000	43,300	44,100	45,500	52,500
Native American	43,800	20,000	22,900	36,400	36,300	48,100	49,900	41,700	48,600	44,700
Hispanic	31,800	15,100	22,100	29,000	32,200	38,900	37,200	43,800	47,200	43,400
Physical scientists	40,100	15,800	21,300	32,700	37,400	43,100	43,800	47,000	49,100	46,700
White	40,300	15,100	21,600	33,100	37,100	44,000	44,000	46,900	49,200	46,100
Black	35,200	26,300	20,300	27,800	33,900	35,500	41,200	43,700	45,800	43,300
Asian	40,500	11,500	25,400	31,400	38,700	35,400	41,700	51,600	48,100	54,500
Native American	54,900	(3)	(3)	23,000	(3)	(3)	50,300	(3)	(3)	70,000
Hispanic	31,600	16,800	16,900	14,000	31,000	26,900	40,400	53,600	(3)	50,000
Mathematical scientists	41,700	19,800	28,000	32,000	37,800	47,500	44,000	45,800	46,200	47,700
White	41,900	16,100	28,300	32,000	38,000	47,200	45,400	46,200	46,300	48,400
Black	34,200	22,000	21,000	36,000	36,800	39,700	30,800	46,300	33,100	29,300
Asian	43,700	45,000	23,900	32,300	30,000	51,300	53,100	42,800	41,200	(3)
Native American	46,900	(3)	(3)	(3)	20,000	(3)	53,500	45,200	45,000	(3)
Hispanic	35,100	(3)	16,300	36,000	30,200	44,500	27,400	47,600	(3)	(3)
Computer specialists	37,300	25,500	25,200	34,300	39,000	42,500	43,600	43,700	44,200	41,300
White	37,300	25,500	25,100	34,500	38,600	42,400	43,600	44,000	44,000	41,400
Black	34,100	17,500	22,300	34,100	36,900	42,700	45,900	39,700	46,500	39,600
Asian	38,000	24.900	27,700	33,500	43,200	41,900	42,100	44,600	57,500	(3)
Native American	48,300	(3)	28,000	32,500	38,200	53,700	45,000	40,000	(3)	(3)
Hispanic	35,600	20,000	26,800	33,800	29,800	51,200	42,200	(3)	32,000	(3)

Appendix table 29. - continued

Field and racial/ethnic group	Total Employed (1)	Professional Experience								
		Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Environmental scientists	$40,100	$16,900	$24,700	$36,700	$40,400	$43,900	$45,700	$48,200	$51,300	$51,400
White	40,100	17,200	24,700	36,400	40,700	44,000	45,600	48,300	51,400	51,100
Black	30,500	11,700	18,600	36,000	28,200	30,000	(3)	36,400	(3)	(3)
Asian	41,200	11,000	22,900	39,600	37,700	41,800	47,200	47,700	44,000	64,500
Native American	57,500	(3)	(3)	55,800	(3)	(3)	(3)	(3)	(3)	60,000
Hispanic	38,700	12,800	24,300	40,300	30,100	34,500	44,500	49,100	46,500	45,800
Life scientists	33,200	17,800	18,000	25,200	33,100	38,000	40,200	41,600	45,300	44,400
White	33,200	17,800	17,600	25,100	32,900	37,800	40,600	41,700	45,400	44,400
Black	31,700	14,800	15,800	24,600	36,700	34,600	32,900	38,700	36,600	36,000
Asian	38,600	14,300	45,200	29,800	35,900	46,200	38,800	40,200	37,900	40,100
Native American	39,700	(3)	20,300	31,200	28,800	28,400	46,800	40,800	49,700	35,800
Hispanic	32,900	17,000	15,300	23,600	37,400	38,700	37,200	38,500	54,500	(3)
Psychologists	35,400	15,400	21,000	30,400	35,000	39,400	39,300	43,000	48,400	39,500
White	35,600	15,500	20,000	30,200	35,100	39,400	40,500	42,000	48,600	40,200
Black	31,300	16,900	22,500	26,900	33,200	29,500	18,600	62,800	(3)	60,000
Asian	38,900	(3)	(3)	19,000	36,100	38,700	44,000	32,100	34,100	51,200
Native American	34,100	20,000	(3)	40,000	(3)	46,000	(3)	(3)	46,000	25,000
Hispanic	29,500	9,200	33,600	44,800	27,600	32,700	(3)	25,000	31,300	(3)
Social scientists	34,400	22,200	20,100	31,800	34,600	42,700	41,100	43,500	47,400	46,600
White	34,600	22,600	20,200	32.300	34,400	43,000	41,300	43,700	48,100	46,700
Black	31,900	10,000	18,900	20,900	38,400	39,900	33,900	46,900	35,600	36,000
Asian	35,600	12,500	24,500	36,900	33,400	47,700	45,000	32,800	55,200	(3)
Native American	36,300	(3)	22,000	33,100	36,000	40,000	(3)	39,100	(3)	45,000
Hispanic	26,200	19,1[illegible]	15,400	21,800	32,100	31,600	36,500	60,800	34,000	(3)
Engineers	39,800	27,700	26,500	34,200	38,400	42,300	44,100	44,900	44,500	43,500
White	40,000	27,800	26,600	34,000	38,300	42,400	44,300	45,000	44,500	43,700
Black	35,500	20,900	26,500	33,300	36,000	36,700	39,400	41,200	42,000	35,900
Asian	39,600	29,300	26,200	37,600	40,000	42,000	42,900	43,300	43,900	38,800
Native American	40,000	29,000	14,500	31,300	41,600	50,400	35,800	45,000	44,100	39,400
Hispanic	37,100	25,200	26,800	32,600	37,600	42,000	41,000	42,400	43,000	42,300

(1) Detail will not average to the total because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

NOTE: Salaries computed for individuals employed full-time.

SOURCE: National Science Foundation 193

Appendix table 30. Average annual salaries of women scientists and engineers by field, racial/ethnic group, and years of professional experience: 1984

Field and racial/ethnic group	Total Employed (1)	Professional Experience: Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Total scientists and engineers	$27,600	$13,800	$20,600	$29,200	$32,200	$34,300	$36,000	$36,500	$34,000	$41,700
White	27,500	13,600	20,500	29,200	32,200	34,100	35,800	36,600	33,700	42,000
Black	26,800	13,300	19,200	29,400	29,800	36,200	35,900	33,500	37,500	30,900
Asian	30,600	17,800	24,800	29,000	33,700	35,500	40,900	39,300	33,200	36,300
Native American	29,400	10,000	19,200	29,000	34,800	(3)	(3)	(3)	36,400	(3)
Hispanic (2)	21,400	12,600	19,000	27,600	30,000	16,300	39,200	25,700	26,000	29,000
Scientists	26,900	13,000	19,100	28,400	31,500	34,100	35,500	36,100	33,000	41,900
White	26,900	12,900	18,900	28,500	31,600	33,900	35,800	36,300	32,400	42,100
Black	26,200	12,600	17,200	28,300	29,600	37,100	35,900	32,900	37,500	30,900
Asian	28,800	17,600	24,000	27,100	31,400	34,300	33,800	39,500	34,300	(3)
Native American	30,400	10,000	19,100	26,700	34,800	(3)	(3)	(3)	36,400	(3)
Hispanic	19,500	12,000	17,900	24,000	23,200	15,800	40,400	25,700	26,000	29,000
Physical scientists	29,400	15,500	20,400	29,900	32,300	30,500	36,200	39,000	38,500	40,200
White	29,700	14,000	20,200	30,300	34,100	30,200	37,000	40,200	39,200	40,200
Black	27,000	16,400	17,900	25,100	25,900	32,900	38,500	37,600	32,000	(3)
Asian	28,800	27,500	25,200	29,700	26,900	31,300	31,500	29,000	26,000	(3)
Native American	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	30,400	33,400	25,500	20,200	27,500	15,100	44,000	(3)	(3)	(3)
Mathematical scientists	34,800	14,500	21,100	32,800	43,800	34,700	34,300	39,400	35,200	53,300
White	34,600	14,900	21,200	33,400	43,300	34,500	34,100	42,100	35,200	53,300
Black	40,800	7,000	19,500	24,900	48,600	36,800	38,100	36,700	(3)	(3)
Asian	31,700	(3)	20,000	28,000	31,400	35,300	35,000	37,500	(3)	(3)
Native American	17,600	(3)	16,500	(3)	22,300	(3)	(3)	(3)	(3)	(3)
Hispanic	25,300	(3)	27,800	17,400	(3)	12,600	29,700	(3)	(3)	(3)
Computer specialists	30,900	21,800	24,300	31,500	33,000	36,700	40,700	40,600	34,900	41,300
White	30,800	22,200	24,400	31,700	32,500	36,000	40,500	40,200	34,900	41,300
Black	31,000	15,600	22,900	28,700	36,500	40,400	41,700	(3)	(3)	(3)
Asian	32,400	22,500	23,300	32,600	39,500	41,900	47,600	46,000	(3)	(3)
Native American	29,900	(3)	25,400	32,200	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	21,900	20,500	22,300	32,100	25,000	12,400	(3)	46,000	(3)	(3)

Appendix table 30. - continued

Field and racial/ethnic group	Total Employed (1)	Professional Experience: Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over
Environmental scientists	$29,700	$13,000	$22,900	$36,600	$32,000	$42,900	$47,100	$49,600	$44,200	$27,700
White	30,000	12,700	23,300	37,000	32,000	42,900	47,100	49,600	44,200	27,700
Black	36,200	31,000	20,900	41,500	34,000	(3)	(3)	(3)	(3)	(3)
Asian	27,300	(3)	22,100	28,900	(3)	(3)	(3)	(3)	(3)	(3)
Native American	28,000	(3)	(3)	28,000	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	21,500	30,700	15,500	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Life scientists	22,700	11,200	15,500	22,600	26,600	32,900	34,300	33,700	31,200	43,600
White	22,500	11,200	15,400	22,400	27,800	32,300	36,500	33,700	29,400	43,600
Black	20,000	11,000	14,700	17,600	20,000	35,500	35,000	(3)	32,100	(3)
Asian	25,400	10,000	17,800	27,200	24,300	38,200	25,000	40,000	36,900	(3)
Native American	32,200	10,000	(3)	(3)	20,800	(3)	(3)	(3)	36,400	(3)
Hispanic	20,190	8,900	17,400	21,200	25,000	35,500	35,000	25,300	(3)	29,000
Psychologists	25,400	13,000	15,800	24,500	31,900	32,900	29,900	34,700	33,900	35,000
White	25,500	13,100	15,700	24,900	32,600	32,900	29,700	35,300	33,900	35,600
Black	24,000	12,400	17,100	19,600	23,500	31,700	30,800	30,100	40,000	30,900
Asian	26,700	(3)	19,100	15,400	34,100	39,600	38,690	(3)	26,000	(3)
Native American	31,300	(3)	15,000	(3)	36,000	(3)	(3)	(3)	(3)	(3)
Hispanic	15,100	5,500	14,800	12,600	19,700	19,700	49,300	(3)	(3)	(3)
Social scientists	23,300	11,400	17,200	26,000	27,600	32,900	34,800	34,400	31,100	33,800
White	23,300	10,300	16,900	25,890	27,200	34,300	34,700	33,700	29,100	33,800
Black	20,700	12,200	14,900	32,900	19,700	25,000	45,000	43,600	48,000	(3)
Asian	27,200	16,500	35,000	21,900	37,400	21,700	(3)	(3)	34,900	(3)
Native American	28,400	(3)	(3)	12,000	40,[illegible]00	(3)	(3)	(3)	(3)	(3)
Hispanic	14,500	12,100	12,500	21,700	24,200	41,000	30,400	1,500	26,000	(3)
Engineers	31,400	21,400	26,500	32,700	37,400	36,500	39,300	38,800	38,700	41,100
White	31,000	21,400	26,400	32,300	37,400	36,400	36,000	3[illegible],600	39,200	41,400
Black	30,900	19,100	28,900	36,500	31,400	29,800	(3)	44,500	(3)	(3)
Asian	36,600	28,000	27,300	35,400	38,700	44,000	47,200	38,900	7,500	36,300
Native American	25,400	(3)	19,400	32,500	(3)	(3)	(3)	(3)	(3)	(3)
Hispanic	28,400	21,000	23,400	32,700	39,100	19,500	23,900	(3)	(3)	(3)

(1) Detail will not average to the total because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

NOTE: Salaries computed for individuals employed full-time.

SOURCE: National Science Foundation

Appendix table 31. Average annual salaries of doctoral scientists and engineers by field and sex/racial/ethnic group: 1983

Field and sex	Total Employed (1)	White	Black	Asian	Native American	Hispanic (2)
Total scientists and engineers	$39,700	$39,800	$36,700	$39,500	$36,600	$38,200
Men	40,800	40,900	38,500	40,500	36,600	39,200
Women	32,000	32,100	32,400	31,000	36,700	31,100
Scientists	38,400	38,600	36,100	37,000	35,600	37,600
Men	39,500	39,600	37,800	38,300	35,800	38,800
Women	31,800	31,900	32,200	30,200	32,000	30,800
Physical scientists	41,700	42,000	39,800	39,600	33,100	40,900
Men	42,200	42,500	40,300	40,500	33,100	41,700
Women	33,800	34,200	35,000	31,400	(3)	26,800
Mathematical scientists	37,900	38,000	36,400	36,800	27,500	41,300
Men	38,300	38,400	37,200	37,300	27,500	43,600
Women	33,100	33,000	33,200	34,100	(3)	25,900
Computer specialists	40,300	40,400	36,000	39,300	58,300	36,800
Men	40,900	41,100	40,000	39,600	58,300	36,800
Women	34,600	34,200	26,000	37,500	(3)	38,000
Environmental scientists	41,200	41,100	33,700	44,400	38,600	40,600
Men	41,600	41,500	34,400	45,300	38,600	41,000
Women	33,800	33,900	30,000	31,600	(3)	34,100
Life scientists	36,900	37,200	36,100	34,000	35,800	33,800
Men	38,200	38,500	38,200	35,600	36,900	34,800
Women	30,200	30,300	32,500	28,400	27,700	28,100
Psychologists	36,600	36,700	34,000	34,700	38,300	36,900
Men	38,100	38,200	36,500	36,800	38,700	38,900
Women	32,400	32,400	31,300	31,400	36,600	31,400

Appendix table 31. - continued

Field and sex	Total Employed (1)	White	Black	Asian	Native American	Hispanic (2)
Social scientists	$37,400	$37,500	$35,700	$36,500	$35,000	$38,800
Men	38,400	38,500	36,900	37,400	35,300	39,800
Women	32,300	32,400	32,500	29,700	27,000	34,200
Engineers	46,300	46,900	43,200	44,000	45,100	41,000
Men	46,500	47,100	43,300	44,000	44,000	41,100
Women	38,500	37,500	42,600	40,900	49,700	39,300

(1) Detail will not average to the total because
a) racial and ethnic categories are not mutually exclusive and
b) total employed includes other and no report.
(2) Includes members of all racial groups.
(3) Too few cases to estimate.

NOTE: Salaries computed for individuals employed full-time.

SOURCE: National Science Foundation

Appendix table 32. High school seniors by sex/racial/ethnic group and curriculum: 1980

Sex/racial/ ethnic group	Total	Academic	General	Vocational
Total	100%	39%	37%	24%
Male	100%	39%	38%	23%
Female	100%	38%	36%	26%
White	100%	40%	37%	23%
Black	100%	33%	35%	31%
Hispanic	100%	27%	42%	31%

SOURCE: National Center for Education Statistics, HIGH SCHOOL AND BEYOND: A NATIONAL LONGITUDINAL STUDY FOR THE 1980'S, (Washington, D.C., 1981), p. 3 and unpublished data.

Appendix table 33. College-bound seniors by sex, racial/ethnic group, and curriculum: 1981 & 1984

Curriculum and sex	Total	White	Black	Asian	Native American	Mexican American	Puerto Rican
				1981			
Academic	76.4%	78.9%	61.8%	72.8%	68.0%	65.8%	64.6%
Male	77.9%	80.1%	62.8%	74.1%	70.0%	69.2%	69.3%
Female	75.1%	77.[illegible]%	61.1%	71.4%	66.0%	62.7%	60.9%
General	15.5%	14.2%	20.6%	20.9%	20.3%	24.4%	16.8%
Male	15.6%	14.3%	22.0%	19.9%	19.9%	22.8%	16.9%
Female	15.4%	14.1%	19.7%	21.8%	20.6%	25.9%	16.7%
Career	7.5%	6.4%	16.4%	5.5%	10.8%	9.0%	17.3%
Male	6.1%	5.2%	14.0%	5.1%	8.9%	7.4%	12.4%
Female	8.8%	7.6%	18.0%	6.0%	12.5%	10.6%	21.2%
				1984			
Academic	77.5%	80.3%	63.5%	74.7%	66.6%	68.0%	63.7%
Male	78.6%	81.1%	64.0%	75.1%	68.2%	71.0%	67.5%
Female	76.6%	79.5%	63.1%	74.3%	65.2%	65.4%	60.7%
General	14.3%	12.9%	19.3%	19.2%	20.6%	22.2%	17.6%
Male	14.6%	13.2%	20.8%	18.9%	21.2%	20.4%	17.5%
Female	14.1%	12.6%	18.3%	19.6%	20.2%	23.9%	17.7%
Career	7.5%	6.4%	15.9%	5.0%	11.6%	9.1%	17.2%
Male	6.2%	5.3%	13.7%	4.9%	9.4%	7.9%	13.5%
Female	8.7%	7.5%	17.3%	5.1%	13.5%	10.2%	20.3%

SOURCE: Admissions Testing Program of the College Board, PROFILES, COLLEGE-BOUND SENIORS, annual series, 1981-84, (New York: College Entrance Examination Board).

Appendix table 34. Number of mathematics and science courses attempted by 1980 high school sophomores who graduated in 1982 by sex/racial/ethnic group and high school grade point average

Sex/racial/ ethnic group	1 year or less	2 yrs	3 yrs	4 yrs	5 years or more	Grade Point Average
MATHEMATICS						
Total	8.3%	22.3%	28.0%	28.6%	12.8%	2.27
Male	7.1%	20.2%	25.6%	32.0%	15.1%	2.18
Female	9.6%	24.3%	30.3%	25.3%	10.5%	2.35
White	9.1%	22.2%	27.5%	29.4%	11.8%	2.34
Black	5.5%	18.9%	28.5%	30.6%	16.5%	1.98
Asian	4.3%	8.7%	20.6%	42.7%	23.7%	2.60
Native American	6.5%	33.1%	22.3%	28.8%	9.4%	2.19
Hispanic	8.5%	25.2%	30.5%	23.6%	12.1%	2.04
SCIENCE						
Total	20.8%	33.7%	24.4%	14.8%	6.3%	2.38
Male	19.3%	30.9%	25.3%	17.3%	7.2%	2.29
Female	22.3%	36.5%	23.5%	12.3%	5.4%	2.47
White	20.2%	32.4%	24.5%	16.3%	6.6%	2.47
Black	20.6%	35.5%	24.7%	12.2%	7.0%	2.[illegible]8
Asian	13.1%	23.7%	28.1%	23.3%	11.8%	2.69
Native American	28.1%	30.2%	23.0%	15.1%	3.6%	2.13
Hispanic	23.3%	38.2%	23.5%	10.6%	4.5%	2.07

SOURCE: National Center for Education Statistics, HIGH SCHOOL AND BEYOND TABULATION: MATHEMATICS COURSETAKING BY 1980 HIGH SCHOOL SOPHOMORES WHO GRADUATED IN 1982 and HIGH SCHOOL AND BEYOND TABULATION: SCIENCE COURSETAKING BY 1980 HIGH SCHOOL SOPHOMORES WHO GRADUATED IN 1982, (Washington, D.C., April 1984).

Appendix table 35. Types of mathematics and science courses attempted by 1980 nigh school sophomores who graduated in 1982 by sex/racial/ethnic group

Sex/racial/ ethnic group	MATHEMATICS Algebra I	Geometry	Algebra II	Trigonometry	Analysis	Calculus
Total	67.7%	54.2%	34.3%	22.9%	8.9%	6.9%
Male	66.1%	53.9%	35.2%	25.8%	9.9%	8.2%
Female	69.3%	54.4%	33.5%	20.0%	7.8%	5.7%
White	71.2%	60.4%	38.1%	26.3%	11.1%	8.3%
Black	63.7%	46.3%	29.2%	16.2%	4.[illegible]%	3.6%
Asian	65.6%	68.4%	38.7%	42.7%	17.0%	19.4%
Native American	56.8%	33.8%	21.6%	13.7%	1.4%	3.6%
Hispanic	60.4%	39.7%	26.3%	14.9%	4.1%	3.6%

	SCIENCE Physical Science	Biology	Advanced Biology	Chemistry	Chemistry II	Physics	Physics II
Total	67.8%	78.8%	18.0%	35.5%	4.4%	16.9%	1.7%
Male	70.5%	77.0%	16.4%	36.4%	5.2%	22.1%	2.6%
Female	65.1%	80.7%	19.6%	34.5%	3.6%	11.6%	0.9%
White	67.1%	79.2%	19.5%	39.3%	5.1%	19.8%	2.0%
Black	71.1%	79.7%	15.5%	29.8%	2.9%	11.9%	1.0%
Asian	52.2%	78.7%	24.5%	58.1%	9.1%	35.6%	7.1%
Native American	66.9%	70.5%	13.7%	23.7%	2.9%	9.4%	0.0%
Hispanic	69.6%	77.9%	14.5%	25.6%	2.6%	9.3%	0.8%

SOURCE: National Center for Education Statistics, HIGH SCHOOL AND BEYOND TABULATION: MATHEMATICS COURSETAKING BY 1980 HIGH SCHOOL SOPHOMORES WHO GRADUATED IN 1982 and HIGH SCHOOL AND BEYOND TABULATION: SCIENCE COURSETAKING BY 1980 HIGH SCHOOL SOPHOMORES WHO GRADUATED IN 1982, (Washington, D.C., April 1984).

Appendix table 36. Average number of years of high school mathematics and science coursework taken by college-bound seniors by sex and racial/ethnic group, and type of course: 1981 & 1984

Type of course and sex	Total	White	Black	Asian	Native American	Mexican American	Puerto Rican
				1981			
Mathematics	3.52	3.55	3.26	3.74	3.31	3.25	3.22
Male	3.68	3.72	3.37	3.86	3.46	3.43	3.42
Female	3.38	3.41	3.20	3.61	3.16	3.08	3.06
Physical science	1.79	1.81	1.57	1.99	1.67	1.46	1.60
Male	2.01	2.04	1.72	2.24	1.85	1.64	1.83
Female	1.59	1.61	1.47	1.74	1.50	1.29	1.42
Biological science	1.40	1.39	1.44	1.50	1.46	1.31	1.39
Male	1.39	1.37	1.46	1.51	1.46	1.31	1.35
Female	1.41	1.40	1.43	1.48	1.47	1.32	1.43
				1984			
Mathematics	3.65	3.69	3.40	3.86	3.42	3.44	3.35
Male	3.78	3.81	3.47	3.94	3.52	3.57	3.49
Female	3.54	3.57	3.35	3.78	3.33	3.32	3.24
Physical science	1.86	1.89	1.65	2.09	1.70	1.50	1.66
Male	2.05	2.08	1.76	2.27	1.84	1.67	1.83
Female	1.69	1.71	1.58	1.91	1.58	1.35	1.52
Biological science	1.40	1.39	1.43	1.48	1.43	1.34	1.41
Male	1.38	1.37	1.43	1.47	1.41	1.33	1.38
Female	1.42	1.41	1.43	1.49	1.45	1.34	1.43

SOURCE: Admissions Testing Program of the College Board, PROFILES, COLLEGE-BOUND SENIORS, annual series, 1981-84, (New York: College Entrance Examination Board).

Appendix table 37. Number of years of mathematics and science coursework taken by college freshmen whose probable major is science and engineering by racial/ethnic group, and type of course: 1983

Racial/ethnic group and sex	MATHEMATICS 0 years	MATHEMATICS 1 or 2 years	MATHEMATICS 3 years	MATHEMATICS 4 years or more	PHYSICAL SCIENCE 0 years	PHYSICAL SCIENCE 1 or 2 years	PHYSICAL SCIENCE 3 years	PHYSICAL SCIENCE 4 years or more	BIOLOGICAL SCIENCE 0 years	BIOLOGICAL SCIENCE 1 or 2 years	BIOLOGICAL SCIENCE 3 years	BIOLOGICAL SCIENCE 4 years or more
Total	0.0%	5.5%	16.2%	78.2%	4.2%	61.2%	24.4%	10.2%	3.6%	88.5%	5.2%	2.7%
Male	0.0%	3.6%	12.8%	83.5%	2.8%	56.8%	27.7%	12.7%	4.1%	88.9%	4.6%	2.5%
Female	0.0%	8.4%	21.4%	70.2%	6.3%	68.0%	19.3%	6.5%	3.0%	88.1%	6.0%	2.9%
White	0.0%	4.6%	15.2%	80.2%	3.6%	60.7%	25.5%	10.2%	3.4%	89.2%	5.0%	2.4%
Male	0.0%	3.0%	12.1%	84.8%	2.4%	56.1%	29.0%	12.6%	3.9%	89.5%	4.4%	2.2%
Female	0.0%	7.2%	20.1%	72.7%	5.5%	68.2%	19.9%	6.4%	2.6%	88.7%	5.9%	2.8%
Black	0.0%	13.5%	25.4%	60.8%	9.2%	67.3%	14.5%	8.9%	4.9%	85 9%	6.0%	3.2%
Male	0.0%	10.5%	20.0%	69.0%	6.7%	65.7%	15.9%	11.7%	4.5%	86.2%	5.7%	3.6%
Female	0.0%	16.0%	29.9%	54.0%	11.3%	68.7%	13.3%	6.6%	5.2%	85.6%	6.3%	2.9%
Asian	0.0%	3.2%	12.9%	83.9%	2.7%	55.9%	26.9%	14.5%	4.6%	84.9%	6.6%	3.9%
Male	0.0%	2.5%	13.3%	84.2%	2.6%	50.5%	28.3%	18.6%	5.8%	82.7%	7.1%	4.3%
Female	0.0%	4.2%	12.4%	83.4%	2.9%	64.4%	24.6%	8.1%	2.6%	88.5%	5.7%	3.2%
Native American	0.0%	18.3%	24.2%	57.5%	6.1%	68.3%	21.6%	4.1%	10.9%	80.3%	5.7%	3.0%
Male	0.0%	12.2%	21.0%	66.7%	4.0%	69.8%	19.4%	6.8%	13.0%	79.8%	3.2%	4.0%
Female	0.0%	25.8%	28.1%	46.0%	8.7%	66.4%	24.2%	0.7%	8.3%	80.9%	8.9%	1.8%
Hispanic	0.0%	9.7%	21.3%	68.9%	9.8%	66.7%	16.1%	7.4%	5.3%	85.7%	4.8%	4.1%
Male	0.0%	6.1%	15.9%	77.8%	6.9%	66.6%	17.6%	8.9%	5.1%	87.7%	4.2%	3.0%
Female	0.0%	14.2%	28.0%	57.7%	13.4%	66.9%	14.0%	5.6%	5.7%	83.2%	5.6%	5.6%

NOTE: The population is defined as first-time, full-time college freshmen in four-year colleges and universities.

SOURCE: The Higher Education Research Institute, DATA TRENDS AMONG AMERICAN COLLEGE FRESHMEN, (Los Angeles: University of California at Los Angeles, 1984), unpublished tabulations.

Appendix table 38. Changes in mean performance on the mathematics assessment by sex/racial/ethnic group: 1978-1982

Sex/racial/ethnic group and age	Overall		Knowledge		Skills		Understanding		Applications	
	Score 1982	Change 1978-82	Score 1982	Change 1978-82	Score 1982	Change 1978-82	Score 1982	Change 1978-82	Score 1982	Change 1978-82
Total										
9 year olds	56.4	+1.0	68.3	+1.4	50.6	+0.8	41.2	-0.4	39.6	+0.5
13 year olds	60.5	+3.9*	73.8	+4.5*	57.6	+4.0*	60.5	+3.9*	45.6	+2.2*
17 year olds	60.2	-0.2	74.9	+0.2	60.0	+0.3	61.5	-0.3	42.4	-1.1
Male										
9 year olds	55.8	+0.5	67.4	+1.0	50.2	+0.5	41.0	-1.3	40.0	+0.4
13 year olds	60.4	+4.0*	73.8	+4.4*	57.0	+4.2*	60.8	+4.2*	46.1	+2.2*
17 year olds	61.6	-0.4	75.9	0.0	61.1	+0.2	63.1	-1.0	44.6	-1.3
Female										
9 year olds	56.9	+1.4*	69.3	+1.9*	51.1	+1.2	41.4	+0.4	39.2	+0.6
13 year olds	60.6	+3.7*	73.8	+4.5*	58.2	+3.8*	60.2	+3.7*	45.1	+2.3*
17 year olds	58.9	+0.1	73.9	+0.4	58.9	+0.4	60.0	+0.2	40.2	-1.1
White										
9 year olds	58.8	+0.7	70.8	+1.2	53.1	+0.6	43.4	-0.8	42.4	+0.6
13 year olds	63.1	+3.2*	76.1	+3.9*	60.4	+3.4*	63.6	+3.6*	47.9	+1.6*
17 year olds	63.1	-0.2	77.3	0.0	63.0	+0.3	64.7	-0.1	45.5	-1.0
Black										
9 year olds	45.2	+2.1	57.8	+3.5*	38.7	+1.6	31.4	+0.9	27.0	-0.6
13 year olds	48.2	+6.5*	63.8	+8.0*	44.0	+6.7*	46.4	5.9*	34.8	+4.4*
17 year olds	45.0	+1.3	62.6	3.0	44.2	+1.8	44.8	-0.2	26.0	-0.2
Hispanic										
9 year olds	47.7	+1.1	58.7	0.0	43.8	+2.5	32.4	-0.2	30.5	+0.6
13 year olds	51.9	+6.5*	65.3	6.3*	49.2	+7.2*	49.7	+5.9*	38.8	+6.0*
17 year olds	49.4	+0.9	66.1	+2.0	48.4	+0.5	49.7	+0.8	31.4	+0.4

*Significant at the 0.05 level

SOURCE: National Assessment of Educational Progress, THE THIRD NATIONAL MATHEMATICS ASSESSMENT RESULTS, TRENDS, AND ISSUES, (Report No. 13-MA-01), April 1983, pp. 34, 37, 38, and 51.

Appendix table 39. Changes in mean performance on the science assessment by sex/racial group: 1977-1982

Sex and racial group	Inquiry Score 1982	Inquiry Change 1977-82	Science, Technology, and Society Score 1982	Science, Technology, and Society Change 1977-82	Content Score 1982	Content Change 1977-82	Attitude (2) Score 1982	Attitude (2) Change 1977-82
Male								
9 year olds	52.8	-1.1	60.5	+3.1*	(1)		67.7	-0.8
13 year olds	58.5	-0.4	59.5	+0.9	54.7	+0.3	52.8	-2.2
17 year olds	70.2	-2.6*	68.6	-1.4	62.7	-2.2*	49.0	-0.9
White								
9 year olds	55.9	-1.3	62.7	+3.0*	(1)		68.6	-1.1
13 year olds	60.4	-0.8	61.5	+0.7	56.8	-0.2	52.6	-3.2*
17 year olds	72.8	-2.6*	71.2	-1.2	65.6	-1.7	48.0	-1.3
Black								
9 year olds	40.8	+3 4	50.7	+4.4	(1)		64.1	+1.4
13 year olds	48.8	+0.6	50.1	+1.5	44.6	+2.4	53.8	+0.8
17 year olds	58.1	-0.1	55.8	+0.3	47.8	-1.8	53.8	-0.4
Female								
9 year olds	52.5	-0.9	59.4	+2.6*	(1)		65.1	-0.4
13 year olds	57.6	-0.8	55.3	+0.3	50.2	-1.0	47.6	-2.6*
17 year olds	69.1	-2.4*	65.4	+0.3	56.9	-1.7*	46.6	+2.7*
White								
9 year olds	55.3	-1.7	61.3	+2.2	(1)		66.2	-0.5
13 year olds	59.7	-1.1	57.4	+0.4	52.4	-1.2	47.0	-2.6*
17 year olds	71.6	-2.5*	67.8	+0.2	59.3	-1.6	45.4	+3.0*
Black								
9 year olds	41.4	+1.9	51.7	+4.3	(1)		61.4	-0.2
13 year olds	49.3	+0.1	46.8	-0.8	40.6	-0.8	50.0	-1.7
17 year olds	56.7	-1.9	54.1	+2.0	44.4	-1.3	54.5	+2.0

* Change is significant at the 0.05 level
(1) Not adminstered at 9 year old level.
(2) For 13 and 17 year olds, "attitude" refers to "attitudes toward science classes."

SOURCE: Science Assessment and Research Project, University of Minnesota, IMAGES OF SCIENCE, (Minneapolis, MN: Minnesota Research and Evaluation Center), June 1983, pp. 101-119.

Appendix table 40. Scholastic Aptitude Test (SAT) scores by sex/racial/ethnic group: 1974-84

Year	Total	Male	Female	White	Black	Asian	Native American	Mexican American	Puerto Rican
				VERBAL					
1974	444	447	442	NA	NA	NA	NA	NA	NA
1975	434	437	431	NA	NA	NA	NA	NA	NA
1976	431	433	430	451	332	414	388	371	364
1977	429	431	427	448	330	405	390	370	355
1978	429	433	425	446	332	401	387	370	349
1979	427	431	423	444	330	396	386	370	345
1980	424	428	420	442	330	396	390	372	350
1981	424	430	418	442	332	397	391	373	353
1982	426	431	421	444	341	398	388	377	360
1983	425	430	420	443	339	395	388	375	365
1984	426	433	420	445	342	398	390	376	366
				MATHEMATICS					
1974	480	501	459	NA	NA	NA	NA	NA	NA
1975	472	495	449	NA	NA	NA	NA	NA	NA
1976	472	497	446	493	354	518	420	410	401
1977	470	497	445	489	357	514	421	408	397
1978	468	494	444	485	354	510	419	402	388
1979	467	493	443	483	358	511	421	410	388
1980	466	491	443	482	360	509	426	413	394
1981	466	492	443	483	362	513	425	415	398
1982	467	493	443	483	366	513	424	416	403
1983	468	493	445	484	369	514	425	417	397
1984	471	495	449	487	373	519	427	420	40[illegible]

NA: Not available

NOTE: Scores range from 200 to 800.

SOURCES: Admissions Testing Program of the College Board, NATIONAL COLLEGE-BOUND SENIORS, annual series; Lawrence Bielmiller, "Board Says Minority-Group Scores Helped Push Up Averages on SAT," CHRONICLE OF HIGHER EDUCATION, vol. XXV, no. 8, 20 October 1982, pp. 1 & 10; and Admissions Testing Program of the College Board, PROFILES, COLLEGE-BOUND SENIORS, annual series, 1981-84.

Appendix table 41. Scholastic Aptitude Test (SAT) scores for males and females by racial/ethnic group: 1981-1984

Sex and year	White	Black	Asian	Native American	Mexican American	Puerto Rican
			VERBAL			
Male						
1981	447	341	402	399	383	377
1982	448	348	402	396	386	378
1983	448	346	396	397	385	379
1984	452	349	401	401	385	380
Female						
1981	437	327	391	383	364	348
1982	440	335	395	380	367	359
1983	439	335	394	381	367	355
1984	439	336	396	381	369	354
			MATHEMATICS			
Male						
1981	508	381	538	449	439	428
1982	510	385	538	450	441	424
1983	510	388	537	451	443	427
1984	511	389	541	452	444	426
Female						
1981	459	350	487	402	392	371
1982	459	354	488	400	394	377
1983	460	356	490	402	393	374
1984	464	362	497	406	399	379

NOTE: Scores range from 200 to 800.

SOURCE: Admissions Testing Program of the College Board, PROFILES, COLLEGE-BOUND SENIORS, annual series, 1981-84, (New York: College Entrance Examination Board).

Appendix table 42. Scores for college-bound seniors on achievement tests in mathematics and science by sex/racial/ethnic group: 1984

Achievement and SAT-M tests	Total	Male	Female	White	Black	Asian	Native American	Mexican American	Puerto Rican
Mathematics Level I	542	560	524	546	481	566	507	486	510
SAT-M (1)	560	583	539	567	482	578	522	494	522
Mathematics Level II	659	671	638	661	577	674	614	603	621
SAT-M	650	664	626	655	563	655	609	594	609
Chemistry	573	586	550	575	505	586	524	524	543
SAT-M	629	644	603	632	535	650	592	590	588
Biology	550	570	533	553	481	556	521	491	517
SAT-M	579	607	556	583	490	609	536	517	524
Physics	597	608	551	600	511	599	574	546	543
SAT-M	651	656	630	655	552	663	634	610	595

(1) Score on the mathematics portion of the aptitude test.

NOTE: Scores range from 200 to 800.

SOURCE: Admissions Testing Program of the College Board, PROFILES, COLLEGE-BOUND SENIORS, 1984, (New York: College Entrance Examination Board, 1984).

Appendix table 43. Scores for college-bound seniors on advanced placement tests in mathematics and science by sex/racial/ethnic group: 1984

Sex/racial/ ethnic group	Biology	Chemistry	Computer Science	Math/ Calculus AB	Math/ Calculus BC	Physics B	Physics C Mechanical	Physics C Electrical & Magnetic
Total	3.25	3.02	3.08	3.13	3.38	2.93	3.44	3.36
Male	3.36	3.12	3.19	3.21	3.46	3.04	3.52	3.42
Female	3.12	2.76	2.43	3.00	3.20	2.50	2.98	2.94
White	3.24	3.01	3.12	3.12	3.36	2.93	3.41	3.31
Black	2.47	1.93	2.22	2.39	2.45	2.21	2.68	2.90
Asian	3.53	3.22	2.99	3.39	3.55	3.03	3.54	3.40
Native American	2.92	2.30	2.78	2.74	3.44	2.50	3.20	3.00
Mexican American	2.46	2.44	2.48	2.93	3.12	2.32	3.40	3.57
Puerto Rican	2.87	2.18	2.64	2.52	2.75	2.70	2.44	4.00
Other Hispanic	2.89	2.26	2.34	2.83	3.21	1.90	2.21	2.21

NOTE: Scores range from 1 to 5: 1 = no recommendation for college credit; 2 = possibly qualified; 3 = qualified; 4 = well qualified; and 5 = extremely well qualified.

SOURCE: Advanced Placement Program, The College Board, 1984 ADVANCED PLACEMENT PROGRAM, NATIONAL SUMMARY REPORTS, (New York: College Entrance Examination Board, 1984).

Appendix table 44a. Intended area of study of college-bound seniors by sex/racial/ethnic group: 1981 & 1984

Area of study	Total	Male	Female	White	Black	Asian	Native American	Mexican American	Puerto Rican
1981									
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Science & engineering	36.1%	46.5%	26.8%	35.7%	35.8%	43.7%	36.4%	38.3%	34.9%
Biological science	3.3%	3.4%	3.2%	3.4%	2.1%	3.8%	3.3%	2.6%	2.9%
Agriculture	1.5%	2.0%	1.0%	[illegible]	0.4%	0.5%	1.6%	1.0%	0.6%
Computer science	5.6%	6.5%	4.8%	[illegible]	9.0%	9.9%	5.7%	6.2%	6.8%
Mathematics	1.1%	1.2%	1.0%	[illegible]	0.7%	1.2%	0.7%	0.6%	0.7%
Physical science	2.0%	3.1%	1.0%	2.1%	0.8%	2.1%	1.7%	1.2%	1.1%
Engineering	11.8%	21.5%	3.2%	11.4%	10.9%	19.8%	12.0%	13.8%	10.0%
Psychology	3.4%	1.4%	5.2%	3.4%	3.8%	1.9%	3.9%	3.5%	3.9%
Social science	7.4%	7.4%	7.4%	7.4%	8.1%	4.5%	7.5%	9.4%	8.9%
Non-S/E (1)	63.9%	53.5%	73.2%	64.3%	64.2%	56.3%	63.6%	61.7%	65.1%
Business	18.5%	17.6%	19.4%	18.3%	21.7%	16.3%	17.5%	18.0%	20.9%
Education	5.7%	2.6%	8.6%	6.1%	5.0%	2.1%	6.5%	5.4%	4.9%
1984									
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Science & engineering	39.4%	50.4%	29.8%	38.6%	41.0%	47.4%	40.4%	41.7%	38.4%
Biological science	3.1%	3.0%	3.1%	3.1%	2.1%	4.3%	3.0%	2.6%	2.5%
Agriculture	1.0%	1.5%	0.6%	1.2%	0.3%	0.3%	1.2%	0.7%	0.4%
Computer science	9.7%	12.1%	7.7%	8.7%	16.2%	13.0%	11.3%	11.1%	13.6%
Mathematics	1.1%	1.2%	1.1%	1.2%	0.7%	1.2%	0.8%	0.8%	0.6%
Physical science	1.7%	2.5%	1.0%	1.8%	0.7%	1.9%	1.5%	1.0%	0.9%
Engineering	12.0%	21.4%	3.6%	11.5%	10.9%	20.7%	11.9%	13.4%	8.9%
Psychology	3.5%	1.4%	5.3%	3.6%	3.0%	1.9%	3.7%	3.6%	3.4%
Social science	7.3%	7.3%	7.4%	7.5%	7.1%	4.1%	7.0%	8.5%	8.1%
Non-S/E (1)	60.6%	49.6%	70.2%	61.4%	59.0%	52.6%	59.6%	58.3%	61.6%
Business	19.1%	17.6%	20.5%	19.3%	20.6%	15.5%	17.5%	18.3%	19.9%
Education	4.6%	2.1%	6.8%	4.9%	3.4%	1.6%	4.9%	4.9%	3.9%

(1) Detail will not add to total because other non-S/E' not included.

SOURCE: Admissions Testing Program of the College Board, PROFILES, COLLEGE-BOUND SENIORS, annual series, 1981-84, (New York: College Entrance Examination Board).

Appendix table 44b. SAT mathematics scores of college-bound seniors by intended area of study and sex/racial/ethnic group: 1981 & 1984

Area of study	Total	Male	Female	White	Black	Asian	Native American	Mexican American	Puerto Rican
1981									
Total	466	492	443	483	362	513	425	415	398
Science & engineering	---	---	---	---	---	---	---	---	---
Biological science	507	516	496	513	384	556	461	426	428
Agriculture	435	438	431	441	318	434	388	377	410
Computer science	496	520	464	519	355	528	423	423	379
Mathematics	584	602	562	591	407	597	495	499	527
Physical science	565	577	537	571	418	622	508	498	455
Engineering	541	540	549	555	416	568	500	480	464
Psychology	444	476	435	459	345	492	398	380	366
Social science	473	501	450	491	344	511	425	394	376
Non-S/E	---	---	---	---	---	---	---	---	---
Business	442	468	422	458	331	468	398	388	354
Education	415	412	415	424	310	425	376	356	352
1984									
Total	471	495	449	487	373	519	427	420	400
Science & engineering	---	---	---	---	---	---	---	---	---
Biological science	517	525	509	525	397	565	451	429	441
Agriculture	426	425	427	430	326	430	418	374	375
Computer science	481	510	446	510	360	518	423	425	384
Mathematics	584	602	571	594	428	591	538	518	505
Physical science	571	585	542	576	418	616	526	471	498
Engineering	550	549	558	564	431	575	492	483	471
Psychology	449	472	444	458	352	482	427	395	376
Social science	473	494	458	489	354	523	410	401	387
Non-S/E	---	---	---	---	---	---	---	---	---
Business	445	467	426	456	343	472	392	389	368
Education	417	413	419	429	314	427	371	366	346

RCE: Admissions Testing Program of the College Board, PROFILES, COLLEGE-BOUND SENIORS, annual series, 1981-84, (New York: College Entrance Examination Board).

Appendix table 45. Percentage of college freshmen who earned an "A" average in high school by sex/racial/ethnic group and probable major field of study: 1983

Probable major field of study	Total	Male	Female	White	Black	Asian	Native American	Hispanic
All college freshmen	27.6%	23.9%	31.1%	29.4%	10.1%	46.0%	23.1%	28.4%
Science and engineering	36.4%	33.6%	40.7%	38.1%	16.5%	54.2%	29.3%	39.1%
Science	33.4%	29.5%	37.2%	35.5%	13.5%	52.7%	23.3%	33.0%
Physical science	48.3%	44.4%	56.4%	48.5%	31.9%	67.6%	50.0%	46.7%
Mathematics	51.1%	44.4%	57.9%	52.7%	26.8%	66.4%	27.9%	26.9%
Computer science	29.2%	22.8%	37.6%	33.4%	10.5%	37.2%	12.8%	24.7%
Environmental science	28.8%	26.1%	35.9%	28.9%	6.7%	62.5%	11.8%	46.2%
Biological science	38.5%	32.5%	45.0%	39.7%	17.5%	57.8%	25.5%	36.9%
Social science	27.0%	24.3%	28.5%	28.6%	11.5%	45.4%	20.9%	31.8%
Engineering	41.6%	38.0%	59.1%	42.6%	23.9%	56.1%	41.5%	50.3%
Non-science and engineering	23.5%	17.1%	28.1%	25.3%	7.2%	37.8%	20.7%	22.7%
Business	19.6%	12.9%	26.4%	21.5%	5.5%	27.7%	16.6%	14.2%
Education	19.3%	10.1%	21.9%	21.0%	2.9%	23.1%	18.2%	13.9%

NOTE: The population is defined as first-time, full-time, college freshmen in four-year colleges and universities.

SOURCE: The Higher Education Research Institute, DATA TRENDS AMONG AMERICAN COLLEGE FRESHMEN, (Los Angeles: University of California at Los Angeles, 1984), unpublished tabulations.

Appendix table 46. Degree aspirations of college freshmen whose probable major is science and engineering by sex/racial/ethnic group: 1983

Sex/racial/ ethnic group	Total	Less than Bachelor's degree	Bachelor's degree	Master's degree	Doctorate
Male	100.0%	1.8%	27.1%	37.8%	17.1%
Female	100.0%	1.6%	23.0%	35.2%	19.4%
White	100.0%	1.5%	26.8%	37.3%	17.4%
Black	100.0%	3.4%	19.9%	35.0%	19.4%
Asian	100.0%	1.7%	12.2%	32.5%	26.3%
Native American	100.0%	3.4%	21.1%	30.4%	19.9%
Hispanic	100.0%	2.4%	19.1%	34.4%	22.3%

NOTE: The population is defined as first-time full-time college freshmen in four-year colleges and universities.

SOURCE: The Higher Education Research Institute, DATA TRENDS AMONG AMERICAN COLLEGE FRESHMEN, (Los Angeles: University of California at Los Angeles, 1984), unpublished tabulations.

Appendix table 47. Graduate Record Examination (GRE) scores by sex/racial/ethnic group and undergraduate major: 1979 & 1984

Undergraduate major and year	Total	Men	Women	White	Black	Asian	Native American	Mexican American	Puerto Rican	Latin American
VERBAL										
All majors										
1979	488	487	489	511	363	480	459	419	389	465
1984	488	488	487	515	377	489	476	427	388	470
Science and engineering										
1979	495	495	500	523	372	486	472	434	395	479
1984	493	490	497	528	386	495	488	450	392	481
Physical science										
1979	519	514	534	541	391	495	482	509	418	509
1984	510	508	513	540	412	534	501	495	394	509
Mathematical science										
1979	505	510	498	537	364	476	494	420	375	468
1984	494	497	488	545	373	473	473	450	376	466
Engineering										
1979	468	465	497	527	403	459	478	434	390	476
1984	468	463	507	536	443	472	528	481	416	475
Biological science										
1979	492	485	500	521	358	494	447	407	398	473
1984	509	506	512	531	400	514	492	461	378	489
Behavioral science										
1979	507	506	509	528	386	503	483	446	399	481
1984	506	509	503	528	390	515	495	448	408	491
Social science										
1979	454	452	457	484	343	453	451	409	363	465
1984	453	456	450	487	350	455	448	409	363	431
QUANTITATIVE										
All majors										
1979	514	555	478	525	358	566	457	422	418	468
1984	534	580	494	540	374	601	473	439	429	485
Science and engineering										
1979	544	575	502	557	375	592	476	455	437	497
1984	568	602	522	576	394	625	500	480	454	514
Physical science										
1979	630	640	600	639	462	658	581	600	532	592
1984	628	638	605	634	484	671	600	565	523	580
Mathematical science										
1979	665	682	636	682	486	660	671	595	550	626
1984	660	672	637	676	477	669	580	580	531	619

Appendix table 47. - continued

Undergraduate major and year	Total	Men	Women	White	Black	Asian	Native American	Mexican American	Puerto Rican	Latin American
Engineering										
1979	654	661	603	675	521	675	570	595	583	624
1984	667	669	659	683	563	679	678	634	590	620
Biological science										
1979	555	577	528	569	381	596	479	448	450	509
1984	570	585	556	582	420	617	534	505	448	546
Behavioral science										
1979	500	522	479	514	366	528	457	427	387	460
1984	509	536	488	521	368	551	464	438	399	468
Social science										
1979	474	501	446	496	337	494	443	413	378	429
1984	476	510	448	496	334	512	415	406	389	409
ANALYTICAL										
All majors										
1979	503	508	499	529	352	510	457	412	385	460
1984	523	533	515	549	392	537	484	440	409	481
Science and engineering										
1979	517	515	515	547	365	524	471	436	397	483
1984	541	545	535	572	406	551	507	473	421	497
Physical science										
1979	557	555	564	581	406	546	523	516	433	524
1984	570	568	576	598	444	590	560	521	443	518
Mathematical science										
1979	567	568	565	602	401	549	553	467	412	530
1984	592	594	589	638	427	572	550	512	453	521
Engineering										
1979	526	525	534	587	437	533	505	487	439	520
1984	560	554	605	624	504	559	626	547	494	533
Biological science										
1979	521	518	526	553	359	537	456	421	401	484
1984	555	550	560	580	419	561	527	483	410	525
Behavioral science										
1979	511	509	513	535	371	510	468	435	382	473
1984	523	525	521	546	399	526	491	457	403	483
Social science										
1979	471	473	469	506	333	464	455	404	362	448
1984	484	488	481	519	368	486	441	427	390	435

NOTE: Score ranges from 200 to 800.

SOURCES: Cheryl L. Wild, A SUMMARY OF DATA COLLECTED FROM GRADUATE RECORD EXAMINATION TEST-TAKERS DURING 1978-79, DATA SUMMARY REPORT #4 and Henry Roy Smith III, A SUMMARY OF DATA COLLECTED FROM GRADUATE RECORD EXAMINATION TEST-TAKERS DURING 1983-84, DATA SUMMARY REPORT #9, (Princeton, N.J.: Educational Testing Service).

Appendix table 48. Science and engineering bachelor's degree recipients by field and sex: 1970-83

Year	Total science and engineering	Physical science (1)	Engineering	Mathematical science (2)	Life science	Social science (3)
			Total			
1970	264,122	21,551	44,772	29,109	52,129	116,561
1971	271,176	21,549	45,387	27,306	51,461	125,473
1972	281,228	20,887	46,003	27,250	53,484	133,604
1973	295,391	20,809	46,989	27,258	59,486	140,579
1974	305,062	21,287	43,530	26,570	68,226	145,449
1975	294,920	20,896	40,065	23,385	72,710	137,864
1976	292,174	21,559	39,114	21,749	77,301	132,451
1977	288,543	22,618	41,581	20,729	78,472	125,143
1978	288,167	23,175	47,411	19,925	77,138	120,518
1979	288,625	23,363	53,720	20,670	75,085	115,787
1980	291,983	23,661	59,240	22,686	71,617	114,779
1981	294,867	24,175	64,068	26,406	68,086	112,132
1982	302,118	24,372	67,791	32,139	65,041	112,775
1983	307,225	23,497	72,954	37,235	63,237	110,302
			Men			
1970	195,244	18,582	44,434	18,593	40,254	73,381
1971	198,180	18,535	45,022	17,488	39,658	77,477
1972	203,557	17,739	45,502	17,466	40,790	82,060
1973	211,552	17,688	46,409	17,543	44,916	84,996
1974	213,269	17,751	42,824	16,851	50,390	85,453
1975	201,578	17,058	39,205	14,729	51,899	78,687
1976	196,577	17,420	37,671	14,071	53,512	73,903
1977	191,090	18,067	39,495	13,241	52,863	67,424
1978	188,107	18,188	43,914	12,815	50,184	63,006
1979	186,333	18,076	48,801	13,249	47,537	58,670
1980	186,009	18,010	53,226	14,439	44,021	56,313
1981	186,425	18,195	56,951	16,672	40,610	53,997
1982	188,957	18,033	59,454	19,966	38,115	53,389
1983	191,614	17,036	63,235	22,746	36,677	51,920

Appendix table 48. - continued

Year	Total science and engineering	Physical science (1)	Engineering	Mathematical science (2)	Life science	Social science (3)
			Women			
1970	68,878	2,969	338	10,516	11,875	43,180
1971	72,996	3,014	365	9,818	11,803	47,996
1972	77,671	3,148	501	9,784	12,694	51,544
1973	83,839	3,121	580	9,985	14,570	55,583
1974	91,793	3,536	706	9,719	17,836	59,996
1975	93,342	3.838	860	8,656	20,811	59,177
1976	95,597	4,139	1,443	7,678	23,789	58,548
1977	97,453	4,551	2,086	7,488	25,609	57,719
1978	100,060	4,987	3,497	7,110	26,954	57,512
1979	102,292	5,287	4,919	7,421	27,548	57,117
1980	105,974	5,651	6,014	8,247	27.596	58,466
1981	108,442	5,980	7,117	9,734	27,476	58,135
1982	113,161	6,339	8,337	12,173	26,926	59,386
1983	115,611	6,461	9,719	14,489	26,560	58,382

(1) Includes environmental sciences.
(2) Includes computer science.
(3) Includes psychology.

SOURCES: National Center for Education Statistics, EARNED DEGREES (annual series) and National Science Foundation.

Appendix table 49. Science and engineering master's degree recipients by field and sex: 1970-83

Year	Total science and engineering	Physical science (1)	Engineering	Mathematical science (2)	Life science	Social science (3)
			Total			
1970	49,318	5,948	15,597	7,107	8,590	12,076
1971	50,624	6,386	16,347	6,789	8,320	12,782
1972	53,567	6,307	16,802	7,186	8,914	14,358
1973	54,234	6,274	16,758	7,146	9,080	14,976
1974	54,175	6,087	15,393	7,116	9,605	15,974
1975	53,852	5,830	15,434	6,637	9,618	16,333
1976	54,747	5,485	16,170	6,466	9,823	16,803
1977	56,731	5,345	16,889	6,496	10,707	17,294
1978	56,237	5,576	17,015	6,421	10,711	16,514
1979	54,456	5,464	16,193	6,101	10,719	15,979
1980	54,391	5,233	16,846	6,515	10,278	15,519
1981	54,811	5,300	17,373	6,787	9,731	15,620
1982	57,025	5,526	18,594	7,666	9,824	15,415
1983	58,868	5,288	19,721	8,160	9,720	15,979
			Men			
1970	40,741	5,101	15,425	5,298	6,374	8,543
1971	41,966	5,533	16,160	5,101	6,130	9,042
1972	44,010	5,419	16,521	5,409	6,587	10,074
1973	44,474	5,427	16,470	5,416	6,843	10,318
1974	43,630	5,200	15,031	5,323	7,195	10,881
1975	42,847	4,982	15,038	4,871	7,207	10,749
1976	42,675	4,660	15,581	4,776	7,204	10,454
1977	43,577	4,458	16,156	4,730	7,696	10,537
1978	42,547	4,630	16,144	4,704	7,485	9,584
1979	40,416	4,472	15,203	4,469	7,259	9,013
1980	40,008	4,258	15,656	4,715	6,952	8,427
1981	39,797	4,213	15,967	4,939	6,451	8,227
1982	41,049	4,325	16,910	5,446	6,315	8,053
1983	41,787	4,151	17,845	5,672	6,111	8,008

Appendix table 49. - continued

Year	Total science and engineering	Physical science (1)	Engineering	Mathematical science (2)	Life science	Social science (3)
			Women			
1970	8,577	847	172	1,809	2,216	3,533
1971	8,658	853	187	1,688	2,190	3,740
1972	9,557	888	281	1,777	2,327	4,284
1973	9,760	847	288	1,730	2,237	4,658
1974	10,545	887	362	1,793	2,410	5,093
1975	11,005	848	396	1,766	2,411	5,584
1976	12,072	825	589	1,690	2,619	6,359
1977	13,154	887	733	1,766	3,011	6,757
1978	13,690	946	871	1,717	3,226	6,930
1979	14,040	992	990	1,632	3,460	6,966
1980	14,383	975	1,190	1,800	3,326	7,092
1981	15,014	1,087	1,406	1,848	3,280	7,393
1982	15,976	1,201	1,684	2,220	3,509	7,362
1983	17,081	1,137	1,876	2,488	3,609	7,971

(1) Includes environmental sciences.
(2) Includes computer science.
(3) Includes psychology.

SOURCES: National Center for Education Statistics, EARNED DEGREES (annual series) and National Science Foundation.

Appendix table 50. Science and engineering doctorate recipients by field and sex: 1970-84

Year	Total science and engineering	Physical science (1)	Engineering	Mathematical science (2)	Life science	Social science (3)
			Total			
1970	17,743	4,403	3,434	1,225	4,165	4,516
1971	18,949	4,501	3,498	1,238	4,557	5,155
1972	19,008	4,257	3,503	1,281	4,454	5,513
1973	19,001	4,078	3,354	1,233	4,503	5,823
1974	18,313	3,765	3,147	1,211	4,304	5,886
1975	18,358	3,710	3,002	1,147	4,402	6,097
1976	17,864	3,506	2,834	1,003	4,361	6,160
1977	17,417	3,415	2,643	964	4,266	6,129
1978	17,048	3,234	2,423	959	4,369	6,063
1979	17,245	3,320	2,490	979	4,501	5,955
1980	17,199	3,149	2,479	962	4,715	5,894
1981	17,633	3,210	2,528	960	4,786	6,149
1982	17,626	3,351	2,646	940	4,841	5,848
1983	17,932	3,439	2,781	987	4,751	5,974
1984	18,069	3,459	2,915	994	4,869	5,832
			Men			
1970	16,717	4,160	3,419	1,148	3,627	3,763
1971	17,008	4,256	3,483	1,142	3,897	4,230
1972	16,905	3,986	3,481	1,185	3,781	4,472
1973	16,551	3,816	3,318	1,113	3,714	4,590
1974	15,706	3,496	3,114	1,096	3,524	4,476
1975	15,522	3,416	2,950	1,038	3,553	5,565
1976	14,883	3,199	2,780	890	3,508	4,506
1977	14,310	3,112	2,569	837	3,423	4,369
1978	13,735	2,926	2,370	828	3,411	4,200
1979	13,662	2,970	2,428	833	3,470	3,961
1980	13,398	2,763	2,389	846	3,565	3,835
1981	13,610	2,845	2,429	822	3,565	3,949
1982	13,483	2,891	2,522	824	3,550	3,696
1983	13,464	2,971	2,657	838	3,387	3,611
1984	13,501	2,954	2,763	843	3,523	3,418

Appendix table 50. - continued

Year	Total science and engineering	Physical science (1)	Engineering	Mathematical science (2)	Life science	Social science (3)
			Women			
1970	1,626	243	15	77	538	753
1971	1,941	245	15	96	660	925
1972	2,103	271	22	96	673	1,041
1973	2,450	262	46	120	789	1,233
1974	2,607	269	33	115	780	1,410
1975	2,836	294	52	109	849	1,532
1976	2,981	307	54	113	853	1,654
1977	3,107	303	74	127	843	1,760
1978	3,313	308	53	131	958	1,863
1979	3,583	350	62	146	1,031	1,994
1980	3,801	386	90	116	1,150	2,059
1981	4,023	365	99	138	1,221	2,200
1982	4,143	460	124	116	1,291	2,152
1983	4,468	468	124	149	1,364	2,363
1984	4,568	505	152	151	1,346	2,414

(1) Includes environmental sciences.
(2) Includes computer science.
(3) Includes psychology.

SOURCES: National Academy of Sciences and National Science Foundation.

Appendix table 51. Graduate degree attainment rates in science and engineering by sex

Bachelor's degrees Year	Bachelor's degrees Number	Master's degrees Year	Master's degrees Number	Rate	Bachelor's degrees Year	Bachelor's degrees Number	Doctorate Year	Doctorate Number	Rate
TOTAL									
1970	264,122	1972	53,567	20.3%	1965	164,936	1972	19,008	11.5%
1971	271,176	1973	54,234	20.0%	1966	173,471	1973	19,001	11.0%
1972	281,228	1974	54,175	19.3%	1967	187,849	1974	18,313	9.7%
1973	295,391	1975	53,852	18.2%	1968	212,174	1975	18,358	8.7%
1974	305,062	1976	54,747	17.9%	1969	244,519	1976	17,864	7.3%
1975	294,920	1977	56,731	19.2%	1970	264,122	1977	17,417	6.6%
1976	292,174	1978	56,237	19.2%	1971	271,176	1978	17,048	6.3%
1977	288,543	1979	54,456	18.9%	1972	281,228	1979	17,245	6.1%
1978	288,167	1980	54,391	18.9%	1973	295,391	1980	17,199	5.8%
1979	288,625	1981	54,811	19.0%	1974	305,062	1981	17,633	5.8%
1980	291,983	1982	57,025	19.5%	1975	294,920	1982	17,626	6.0%
1981	294,867	1983	58,868	20.0%	1976	292,174	1983	17,932	6.1%
					1977	288,543	1984	18,069	6.3%
MEN									
1970	195,244	1972	44,010	22.5%	1965	128,723	1972	16,905	13.1%
1971	198,180	1973	44,474	22.4%	1966	133,989	1973	16,551	12.4%
1972	203,557	1974	43,630	21.4%	1967	143,847	1974	15,706	10.9%
1973	211,552	1975	42,847	20.3%	1968	158,711	1975	15,522	9.8%
1974	213,269	1976	42,675	20.0%	1969	181,323	1976	14,883	8.2%
1975	201,578	1977	43,577	21.6%	1970	195,244	1977	14,310	7.3%
1976	196,577	1978	42,547	21.6%	1971	198,180	1978	13,735	6.9%
1977	191,090	1979	40,416	21.2%	1972	203,557	1979	13,662	6.7%
1978	188,107	1980	40,008	21.3%	1973	211,552	1980	13,398	6.3%
1979	186,333	1981	39,797	21.4%	1974	213,269	1981	13,610	6.9%
1980	186,009	1982	41,049	22.1%	1975	201,578	1982	13,483	6.7%
1981	186,425	1983	41,787	22.4%	1976	196,577	1983	13,464	6.8%
					1977	191,090	1984	13,501	7.1%

Appendix table 51. - continued

Bachelor's degrees Year	Number	Master's degrees Year	Number	Rate	Bachelor's degrees Year	Number	Doctorate Year	Number	Rate
WOMEN									
1970	68,878	1972	9,557	13.9%	1965	36,213	1972	2,103	5.8%
1971	72,996	1973	9,760	13.4%	1966	39,482	1973	2,450	6.2%
1972	77,671	1974	10,545	13.6%	1967	44,002	1974	2,607	5.9%
1973	83,839	1975	11,005	13.1%	1968	53,463	1975	2,836	5.3%
1974	91,763	1976	12,072	13.2%	1969	63,196	1976	2,981	4.7%
1975	93,342	1977	13,154	14.1%	1970	68,878	1977	3,107	4.5%
1976	95,597	1978	13,690	14.3%	1971	72,996	1978	3,313	4.5%
1977	97,453	1979	14,040	14.4%	1972	77,671	1979	3,583	4.6%
1978	100,060	1980	14,383	14.4%	1973	83,839	1980	3,801	4.5%
1979	102,292	1981	15,014	14.7%	1974	91,763	1981	4,023	4.4%
1980	105,974	1982	15,976	15.1%	1975	93,342	1982	4,143	4.4%
1981	108,442	1983	17,081	15.8%	1976	95,597	1983	4,468	4.7%
					1977	97,453	1984	4,568	4.7%

SOURCES: National Center for Education Statistics, National Academy of Sciences, and National Science Foundation.

Appendix table 52. Science and engineering degree recipients by field, racial/ethnic group, and degree level: 1979 & 1983

Field	1979 Bachelor's (1)	1979 Master's (1)	1979 Doctorates	1983 Bachelor's (1)	1983 Master's (1)	1983 Doctorates
TOTAL (2)						
Total science and engineering	322,195	50,201	13,304	304,082	47,367	13,565
Science	264,192	38,784	11,796	240,824	35,011	12,131
Physical science (3)	22,659	4,713	2,560	21,889	4,238	2,603
Mathematical science	11,534	2,571	572	11,470	2,103	439
Computer science	8,392	2,528	166	22,152	3,965	198
Life sciences	71,442	9,697	3,612	57,152	8,268	3,917
Psychology	42,561	7,852	2,760	38,540	7,618	3,023
Social sciences	107,604	11,423	2,126	89,621	8,819	1,951
Engineering	58,003	11,417	1,508	63,258	12,356	1,434
WHITE						
Total science and engineering	284,852	45,185	11,882	266,414	41,238	12,199
Science	23[illegible],201	35,103	10,727	210,451	31,052	11,071
Physical science (3)	20,958	4,373	2,289	19,746	3,843	2,370
Mathematical science	10,229	2,352	505	10,031	1,845	395
Computer science	7,404	2,273	153	19,027	3,366	174
Life sciences	64,445	8,909	3,333	50,668	7,531	3,608
Psychology	36,648	7,078	2,550	33,106	6,758	2,765
Social sciences	92,517	10,118	1,897	77,873	7,709	1,759
Engineering	52,561	10,082	1,155	55,963	10,186	1,128

Appendix table 52. - continued

Field	1979 Bachelor's (1)	1979 Master's (1)	1979 Doctorates	1983 Bachelor's (1)	1983 Master's (1)	1983 Doctorates
BLACK						
Total science and engineering	18,743	1,988	309	16,799	1,823	305
Science	16,968	1,742	289	14,913	1,483	276
Physical science (3)	704	86	40	832	100	26
Mathematical science	652	71	11	629	68	3
Computer science	507	65	1	1,274	118	3
Life sciences	2,837	296	44	2,437	220	58
Psychology	3,218	476	115	2,995	469	112
Social sciences	9,050	748	78	6,746	508	74
Engineering	1,775	246	20	1,886	340	29
ASIAN						
Total science and engineering	7,080	1,895	865	10,150	2,901	771
Science	5,222	1,045	559	6,844	1,432	524
Physical science (3)	439	160	189	719	206	162
Mathematical science	324	104	46	530	136	34
Computer science	263	149	9	1,125	429	20
Life sciences	1,788	309	188	1,925	258	197
Psychology	781	87	36	819	88	44
Social sciences	1,627	236	91	1,726	315	67
Engineering	1,858	850	306	3,306	1,469	247

Appendix table 52. - continued

Field	1979 Bachelor's (1)	1979 Master's (1)	1979 Doctorates	1983 Bachelor's (1)	1983 Master's (1)	1983 Doctorates
NATIVE AMERICAN						
Total science and engineering	1,187	163	28	1,065	157	28
Science	1,023	139	25	899	121	27
Physical science (3)	63	29	3	66	7	8
Mathematical science	41	8	0	27	6	0
Computer science	11	16	1	72	5	1
Life sciences	233	21	3	211	34	5
Psychology	177	20	10	150	41	9
Social sciences	498	45	8	373	28	4
Engineering	164	24	3	166	36	1
HISPANIC (4)						
Total science and engineering	10,333	970	220	9,654	1,248	262
Science	8,778	755	196	7,717	923	233
Physical science (3)	495	65	39	526	82	37
Mathematical science	288	36	10	253	48	7
Computer science	207	25	2	654	47	0
Life sciences	2,139	162	44	1,911	225	49
Psychology	1,737	191	49	1,470	262	93
Social sciences	3,912	276	52	2,903	259	47
Engineering	1,555	215	24	1,937	325	29

(1) Numbers of bachelor's and master's degrees have not been adjusted to the taxonomies used by the National Science Foundation and will therefore differ from earned degree data in other NSF publications.
(2) Excludes nonresident aliens and "other."
(3) Includes environmental sciences.
(4) Exclusive of all racial groups.

SOURCES: National Center for Education Statistics and National Academy of Sciences.

Appendix table 53. Major sources of graduate support of 1984 science and engineering doctorate recipients by field and sex

Field of degree	Total Known sources (1)	Federal Fellowships & Traineeships	University Total	University Fellowships	University Teaching Assistantships	University Research Assistantships	Self
TOTAL							
Total science and engineering	11,330	1,621	5,723	608	1,983	3,132	3,232
Science	10,204	1,515	5,065	558	1,885	2,622	2,964
Physical science	1,784	147	1,397	94	385	918	183
Mathematical science	367	31	243	23	185	35	80
Computer science	161	13	91	1	16	74	38
Environmental science	416	36	269	20	47	202	93
Life science	3,400	893	1,686	180	544	962	659
Psychology	2,559	244	686	105	338	243	1,314
Social science	1,517	151	693	135	370	188	597
Engineering	1,126	106	658	50	98	510	268
MEN							
Total science and engineering	7,919	1,074	4,308	404	1,419	2,485	2,072
Science	6,871	976	3,699	356	1,329	2,014	1,818
Physical science	1,522	122	1,192	79	323	790	162
Mathematical science	297	27	194	18	147	29	65
Computer science	139	13	77	1	13	63	32
Environmental science	333	27	214	17	38	159	77
Life science	2,396	591	1,203	112	375	716	488
Psychology	1,225	106	355	51	171	133	635
Social science	959	90	464	78	262	124	359
Engineering	1,048	98	609	48	90	471	254

Appendix table 53. - continued

Field of degree	Total Known sources (1)	Federal Fellowships & Traineeships	University: Total	University: Fellowships	University: Teaching Assistantships	University: Research Assistantships	Self
			WOMEN				
Total science and engineering	3,411	547	1,415	204	564	647	1,160
Science	3,333	539	1,366	202	556	608	1,146
Physical science	262	25	205	15	62	128	21
Mathematical science	70	4	49	5	38	6	15
Computer science	22	0	14	0	3	11	6
Environmental science	83	9	55	3	9	43	16
Life science	1,004	302	483	68	169	246	171
Psychology	1,334	138	331	54	167	110	679
Social science	558	61	229	57	108	64	238
Engineering	78	8	49	2	8	39	14

(1) Detail will not add to total known sources because total includes National (non-U.S. Federal), industry, loans, and other.

SOURCE: National Research Council, unpublished data.

Appendix table 54. Major sources of graduate support of 1984 science and engineering doctorate recipients by racial/ ethnic group

Sources of support	White	Black	Asian	Native American	Hispanic
Total known sources	10,345	229	318	27	218
Federal Fellowships & Traineeships	1,460	41	48	5	41
University	5,244	85	178	7	98
Fellowhsips	522	25	27	2	19
Teaching Assistantships	1,829	36	46	2	38
Research Assistantships	2,893	24	105	3	41
Self	2,969	66	74	14	60
Other (1)	672	37	18	1	19

(1) Includes National (non-U.S. Federal), industry, loans, and other.

SOURCE: National Research Council, unpublished data.

Appendix table 55. Postdoctorates in science and engineering by field and sex/racial/ethnic group: 1973, 1981, & 1983

Field	Total	Men	Women	White	Black	Asian	Native American	Hispanic (1)
				1973				
Total scientists and engineers	5,676	[illegible],800	876	4,895	28	658	0	69
Scientists	5,446	4,570	876	4,714	28	619	0	69
Physical scientists	1,867	1,725	142	1,572	5	252	0	2
Mathematical scientists	79	75	4	73	0	6	0	2
Computer specialists	22	22	0	22	0	0	0	0
Environmental scientists	181	171	10	155	0	26	0	9
Life scientists	2,799	2,197	602	2,449	23	304	0	50
Psychologists	259	169	90	224	0	20	0	6
Social scientists	239	211	28	219	0	11	0	0
Engineers	230	230	0	181	0	39	0	0

Field	Total	Men	Women	White	Black	Asian	Native American	Hispanic (1)
				1981				
Total scientists and engineers	10,451	7,694	2,757	8,615	120	1,631	22	137
Scientists	10,230	7,485	2,745	8,457	120	1,568	22	137
Physical scientists	2,432	2,093	339	1,739	8	659	0	12
Mathematical scientists	127	121	6	124	3	0	0	16
Computer specialists	15	14	1	15	0	0	0	0
Environmental scientists	196	167	29	174	0	22	0	0
Life scientists	6,615	4,629	1,986	5,651	82	859	14	102
Psychologists	458	278	180	404	11	7	8	0
Social scientists	387	183	204	350	16	21	0	7
Engineers	221	209	12	158	0	63	0	0

Appendix table 55. - continued

Field	Total	Men	Women	White	Black	Asian	Native American	Hispanic (1)
				1983				
Total scientists and engineers	10,945	7,886	3,059	9,303	215	1,175	11	270
Scientists	10,620	7,588	3,032	9,178	215	975	11	212
Physical scientists	1,951	1,674	277	1,565	69	242	0	30
Mathematical scientists	103	82	21	101	0	2	0	0
Computer specialists	84	62	22	84	0	0	0	0
Environmental scientists	326	278	48	288	0	17	0	7
Life scientists	6,853	4,634	2,219	6,006	52	674	10	138
Psychologists	492	285	207	450	26	12	0	26
Social scientists	811	573	238	684	68	28	1	11
Engineers	325	298	27	125	0	200	0	58

(1) Includes members of all racial groups.

SOURCE: National Science Foundation