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U.S. Department of Education
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NCES 2005-169

Gender Differences in Participation and Completion of Undergraduate Education and How They Have Changed Over Time

Postsecondary Education
Descriptive Analysis Reports



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Postsecondary Education
Descriptive Analysis Reports

February 2005

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Executive Summary

Between 1970 and 2001, women went from being the minority to the majority of the U.S. undergraduate population, increasing their representation from 42 percent to 56 percent of undergraduates (Freeman 2004). Projections to 2013 indicate that women's undergraduate enrollment will increase to 8.9 million or 57 percent of the undergraduate population (Gerald and Hussar 2003, table 19). Consistent with these enrollment changes, women surpassed their male peers in educational expectations and degree attainment over the last 30 years (Freeman 2004). While in the aggregate, women have made great progress in gaining access to and completing postsecondary education, gender differences are not uniform across all groups (King 2000; Horn, Peter, and Rooney 2002). For example, among all undergraduates enrolled in 1999–2000, women made up 63 percent of Black undergraduates, 62 percent of students age 40 or older, and 70 percent of single parents (Horn, Peter, and Rooney 2002, table 3.1). The purpose of this study is to draw on several publications and postsecondary datasets to provide a detailed account of gender differences in undergraduate education. Specifically, the analysis examines gender differences in rates of participation and completion of undergraduate education, focusing on changes over time in college enrollment, associate's and bachelor's degree awards, and the demographic and enrollment characteristics of undergraduate men and women. The analysis also examines trends in high school academic preparation, postsecondary persistence and degree completion, and early labor market outcomes among bachelor's degree recipients.

The findings are based on data from the following studies:

- The Integrated Postsecondary Education Data System (IPEDS) and Current Population Survey (CPS);
- Three administrations of the National Postsecondary Student Aid Study (NPSAS:90, NPSAS:96, and NPSAS:2000), a cross-sectional survey of all postsecondary students enrolled in a given academic year;
- Two high school cohorts (the High School and Beyond Longitudinal Study and the National Education Longitudinal Study of 1988), representing high school graduates in 1982 (HS&B-So:80/92) and 1992 (NELS:88/2000);
- Two administrations of the Beginning Postsecondary Students Longitudinal Study, representing students who first began their postsecondary education in 1989–90 (BPS:90/94) and 1995–96 (BPS:96/01); and
- Two cohorts of college graduates (1992–93 and 1999–2000) from the Baccalaureate and Beyond Longitudinal Studies (B&B:93/97 and B&B:2000/01).

This analysis examines differences according to gender and changes over time using standard *t*-

tests to determine statistical significance. Statistical significance is reported at $p \leq 0.05$.

Trends in Postsecondary Enrollment and Degree Awards

Nearly 14 million undergraduates were enrolled in degree-granting institutions in 2001 (U.S. Department of Education 2004, table 189). Between 1980 and 2001, women increasingly represented the majority of undergraduates, from 52 percent in 1980 to 56 percent in 2001.¹ Women also made up a majority of students awarded associate's and bachelor's degrees over the same period. The number of associate's degrees awarded to women increased from approximately 228,000, or 55 percent of associate's degrees awarded, to 357,000, or 60 percent of associate's degrees awarded (table 1-A and figure 2-A). Likewise, the number of bachelor's degrees awarded to women increased from 465,000, or 50 percent of degrees awarded, to 742,000, or 57 percent of bachelor's degrees awarded (tables 1-B and 2-B).

The aggregate gender differences in degree awards largely reflect differences in the majority or White student population. However, examining the associate's and bachelor's degrees awarded by race/ethnicity reveals similar patterns. That is, by 2001, women of all racial/ethnic groups (excluding nonresident aliens) earned a majority of the degrees awarded. In particular, Black women earned two-thirds of both associate's degrees and bachelor's degrees awarded to Black students (figures 2-A and 2-B). Hispanic and American Indian women were awarded 60 percent or more of associate's and bachelor's degrees conferred to Hispanic and American Indian

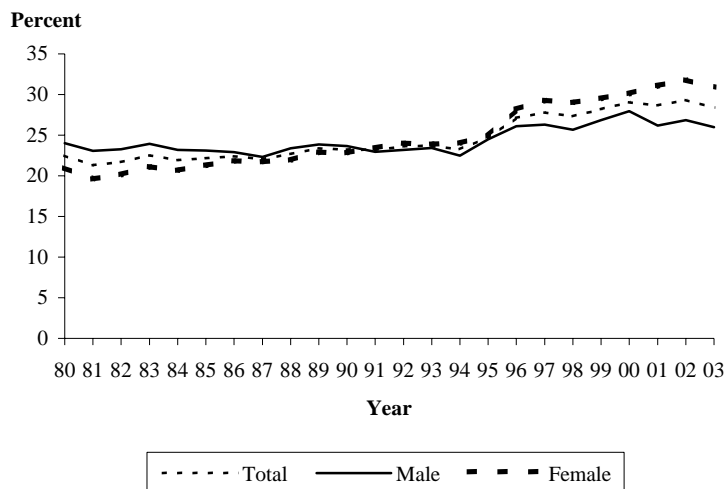
undergraduates, while Asian women earned 57 percent of associate's degrees and 55 percent of bachelor's degrees conferred to Asian students. Enrollment projections to 2013 indicate that women will continue to outpace men in completions in the foreseeable future (Gerald and Hussar, tables 26 and 27).

Changes in Undergraduate Student Profiles and Enrollment Characteristics

Over the past decade, women have generally been overrepresented among older students and adult students with families. In 1999–2000, for example, they accounted for roughly 60 percent of all students older than 29 years (table 2). However, between 1989–90 and 1999–2000, women began to increase their representation among students typically considered traditional (i.e., students who enroll in college full time immediately after graduating from high school). This growth is reflected in the increase in the percentage of students who were women among students ages 18–23 (from 53 to 55 percent), dependent students, who are typically under age 24 (from 52 to 53 percent), and independent students who had never married and had no children (from 48 to 50 percent).

These changes are also reflected in patterns of degree attainment for the younger U.S. population (i.e., 25- to 29-year-olds) over the past two decades. While the percentage of men in this age group with a bachelor's degree or higher increased from 24 to 26 percent, the percentage of women with this level of attainment increased from 21 to 31 percent (figure A). So, while 25- to 29-year-old women began the 1980s with a smaller percentage

¹ Calculated from U.S. Department of Education 2004, table 189.

Figure A. Percentage of 25- to 29-year-olds with a bachelor's degree or higher, by gender: March 1980–2003

NOTE: The Current Population Survey (CPS) questions used to obtain educational attainment were changed in 1992. In 1994, the survey instrument for the CPS was changed and weights were adjusted. For more information, see <http://www.bls.census.gov/cps>.

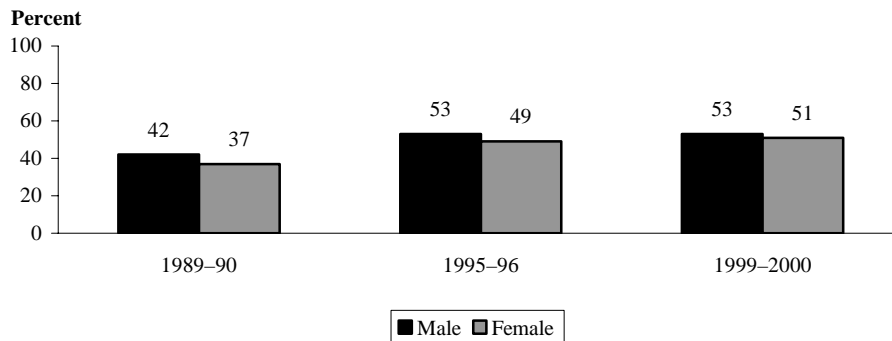
SOURCE: U.S. Department of Education, National Center for Education Statistics. (2002). *The Condition of Education 2002* (NCES 2002–025), indicator 25; and U.S. Department of Commerce, Bureau of the Census, March Current Population Surveys, 1981–2003.

with a bachelor's degree, by the mid-1990s, this trend had reversed.

In addition, as shown in figure B, it appears that women closed the gender gap for another characteristic of traditional students: full-time attendance. In 1989–90, men were more likely than women to attend full time (42 vs. 37 percent), but by 1999–2000, a statistical difference could not be detected in the gender distribution of full-time students (53 vs. 51 percent). In other words, both men and women increased their likelihood of attending full time, but the increase for women was greater.

While women have increased their representation among younger, full-time students, who tend to be more successful in completing a college degree, women continue to represent 60 percent or more of students with characteristics that place them at a disadvantage in succeeding in postsecondary education (table 2). In particular, women make up 60 percent of students in the lowest 25 percent income level, 62 percent of students age 40 or older, 62 percent of students with children or dependents (among married or separated students), and 69 percent of single parents. All of these characteristics are associated with lower rates of persistence and completion in postsecondary education (e.g., Berkner, He, and Cataldi 2002).

Figure B. Percentage of undergraduates attending full time, by gender and year enrolled: 1989–90, 1995–96, and 1999–2000



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, and NPSAS:2000).

Preparation, Persistence, and Progress Through Undergraduate Education

High School Academic Preparation and Subsequent Attainment

A comparison of 1982 and 1992 high school graduates who entered postsecondary education by the end of their second year out of high school revealed a shift in the high school academic preparation of men and women.² Between the two cohorts, women closed some existing gender gaps in academic preparation and, in some cases, even surpassed men. For example, the percentage of

men who fell in the highest 20 percent on an indicator measuring the academic intensity of high school courses taken decreased from 33 percent to 26 percent, while the percentage of women at the same level increased from 25 percent to 29 percent and, effectively, closed the gender gap (table A).³ That is, among 1982 high school graduates who went on to college, men were more likely than women to score at the highest academic intensity level, but no gender difference was evident among their 1992 counterparts.

Similar patterns were observed for other indicators of high school academic preparation. Among 1992 high school graduates, both young men and women who went on to postsecondary education were more likely to take an advanced mathematics course in high school (including

² The 1982 and 1992 high school graduate cohorts from the HS&B and NELS longitudinal studies were analyzed because they provide comprehensive and comparable measures of high school academic preparation among high school graduates who enrolled in college. More recent data from the 2000 High School Transcript Study reported in Freeman (2004) indicate young women were more likely than young men to take advanced placement (AP) courses and to take the AP exams. The same study also reported that among 2001 high school seniors, young women were more likely than their male peers to report definite plans to graduate from a 4-year college.

³ High school academic intensity is a composite measure of students' highest level of mathematics, total mathematics credits, total Advanced Placement courses, total English credits, total foreign language credits, total science credits, total core laboratory science credits, total social science credits, and total computer science credits. For more information, see Adelman, Daniel, and Berkovits (2003).

Table A. High school academic intensity of 1982 and 1992 high school graduates who entered postsecondary education within 2 years, by gender

Gender	Bottom 20 percent	Lower middle 20 percent	Middle 20 percent	Upper middle 20 percent	Top 20 percent
1982 high school graduates					
Male	9.6	12.7	17.9	26.8	33.0
Female	11.4	14.8	22.5	26.7	24.6
1992 high school graduates					
Male	9.3	18.4	17.3	28.9	26.1
Female	9.1	16.4	22.3	23.2	29.0

NOTE: Includes 1982 high school graduates who entered postsecondary education by December 1984 and 1992 high school graduates who entered postsecondary education by December 1994. High school academic intensity is a composite measure of students' highest level of math, total mathematics credits, total Advanced Placement (AP) courses, total English credits, total foreign language credits, total science credits, total core laboratory science credits, total social science credits, and total computer science credits. For more information, see Adelman, C., Daniel, B., and Berkovits, I. (2003). *Postsecondary Attainment, Attendance, Curriculum, and Performance* (NCES 2003-394). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores (HS&B-So:80/92) and National Education Longitudinal Study of 1988 (NELS:88/2000).

calculus and precalculus) and have a 3.50 or higher grade point average (GPA) in high school than their 1982 counterparts (tables 8 and 9). Nonetheless, women closed the existing gender gap in the highest mathematics course taken (14 percent of men and 13 percent of women had taken calculus), and in both cohorts, women were more likely to have a 3.5 or higher GPA than their male peers (e.g., in 1992, 21 percent of women vs. 15 percent of men had GPAs of 3.5 or higher).

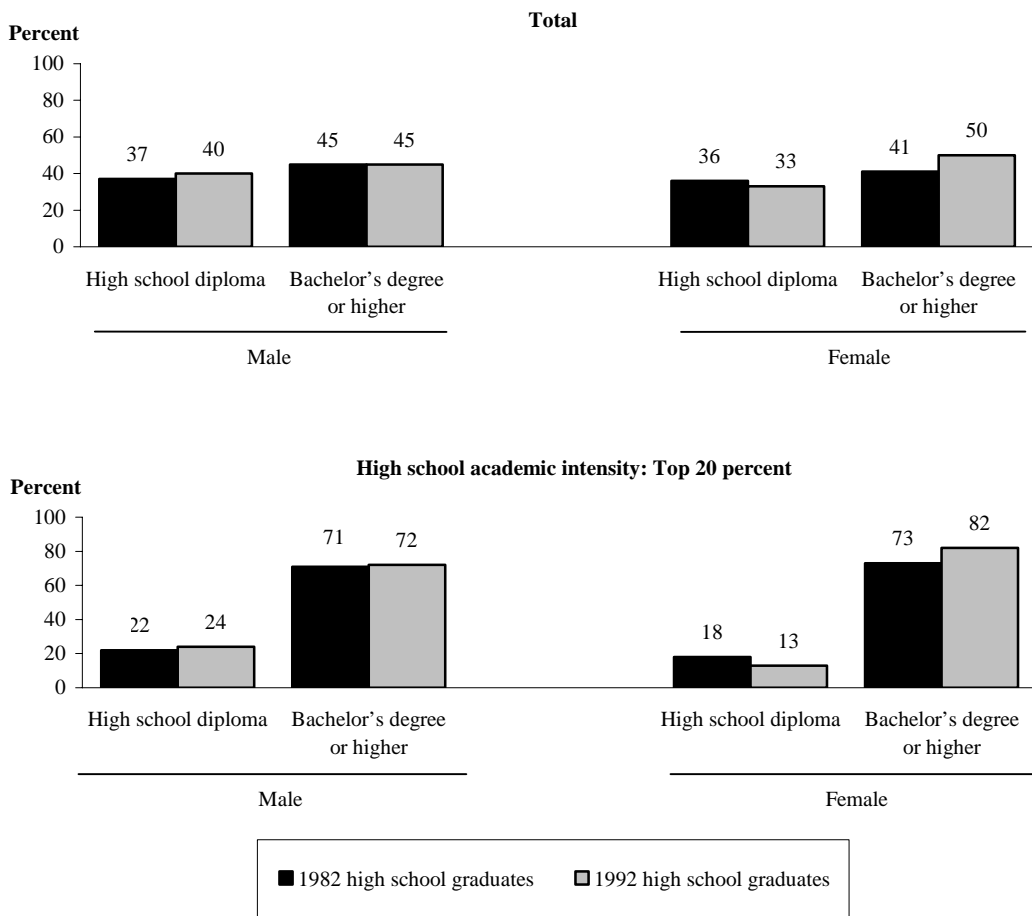
Between 41 and 50 percent of male and female 1982 and 1992 high school graduates who went on to postsecondary education by the end of their second year out of high school had earned a bachelor's degree or higher, and 33–40 percent had not attained more than a high school diploma (figure C and table 11).⁴ For both cohorts, 45 percent of men had attained a bachelor's degree or higher. For women, there was an increase between

the 1982 and 1992 cohorts in the percentage earning a bachelor's degree or higher (41 vs. 50 percent). As a result, among those 1992 high school graduates who had entered postsecondary education by December 1994, women were more likely than men to have earned a bachelor's degree or higher (50 vs. 45 percent), and men were more likely to have earned no more than a high school diploma (40 vs. 33 percent).

These relationships held even among students who fell in the highest 20 percent on the academic intensity indicator (i.e., students who are expected to go on to college and to have been academically prepared to succeed once there). So, in addition to women improving their academic preparation with respect to men, even among students who were better prepared academically in high school and had entered college, women were more likely than men to attain a bachelor's degree.

⁴ For the 1982 cohort, degrees were determined in 1992, or 10 years after enrollment, while for the 1992 cohort, degrees were determined at the time of the last follow-up in 2000, or 8 years after enrollment.

Figure C. Among 1982 and 1992 high school graduates who entered postsecondary education within 2 years, percentage whose highest attainment was a high school diploma and percentage who attained a bachelor's degree or higher, by high school academic intensity and gender: 1992 and 2000



NOTE: Includes 1982 high school graduates who entered postsecondary education by December 1984 and 1992 high school graduates who entered postsecondary education by December 1994. High school academic intensity is a composite measure of students' highest level of mathematics, total mathematics credits, total Advanced Placement courses (AP), total English credits, total foreign language credits, total science credits, total core laboratory science credits, total social science credits, and total computer science credits. For more information, see Adelman, C., Daniel, B., and Berkovits, I. (2003). *Postsecondary Attainment, Attendance, Curriculum, and Performance* (NCES 2003-394).

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores (HS&B-So:80/92) and National Education Longitudinal Study of 1988 (NELS:88/2000).

Postsecondary Persistence and Degree Completion

Comparing students who first began their postsecondary education in 1989–90 with those who first enrolled 6 years later in 1995–96, Horn and Berger (2004) found that roughly two-thirds of students in both cohorts had either completed a postsecondary credential or were still enrolled 5

years after beginning college. The overall degree completion rate was lower for the 1995–96 cohort than for their 1989–90 counterparts, but there was an increase in the percentage of students who had not yet completed a degree but were still enrolled in a 4-year institution 5 years after they had begun. Among 1989–90 beginning students, 65 percent of women had completed a degree or certificate or were still enrolled 5 years later,

compared with 62 percent of men (table 12). Among 1995–96 beginning students, women were more likely than men to complete a degree or certificate within 5 years (49 vs. 44 percent). However, when students who were still enrolled after 5 years were included in the outcome, no difference could be detected between men and women (64 and 65 percent, respectively, had completed a degree or were still enrolled), suggesting that men in the second cohort may be taking longer than women in their effort to complete a degree.

Early Labor Market Outcomes Among Bachelor’s Degree Recipients

The majority of 1992–93 and 1999–2000 bachelor’s degree recipients were employed 1 year after graduation (over 85 percent; table 15). However, for both cohorts of college graduates, men were more likely than women to be working full time, while women were more likely than men to be working part time. For example, among 1999–2000 bachelor’s degree recipients, 81 percent of men versus 74 percent of women were working full time, and 9 percent of men versus 13 percent of women were working part time. Over the period studied, the unemployment rate for men did not change statistically (4.8 to 5.9 percent), while it increased for women (from 4.4 to 6.3 percent).⁵ Still, for the most recent cohort, no difference could be detected between men and

women in the unemployment rate for bachelor’s degree recipients.

Among bachelor’s degree recipients who were employed full time 1 year after graduation in 1994 and 2001, women earned lower average annual salaries than men in both cohorts. On average, women earned \$5,100 less than men or 84 percent of male salaries in 1994, and \$6,800 less or 83 percent of male salaries in 2001 (in constant 2001 dollars) (tables B and 16). Moreover, in 2001, 31 percent of men earned \$45,000 or more, compared with 12 percent of men in 1994. In contrast, 14 percent of women earned \$45,000 or more in 2001, compared with 7 percent in 1994. Thus in both 1994 and 2001, proportionally more men earned salaries of \$45,000 or higher than women.

Even when controlling for undergraduate field of study, men earned higher average annual salaries than women in at least one-half of the fields examined. For example, in both cohorts, men who majored in engineering, mathematics, and science fields earned higher average full-time annual salaries than women who majored in these fields (\$33,300 vs. \$27,900 in 1994 and \$45,200 vs. \$34,200 in 2001). In other words, in 1994 women with degrees in these fields earned, on average, \$5,400 less than men, or about 84 percent of what men earned, and 7 years later in 2001, women earned \$11,000 less or 76 percent of what men earned. Additionally, in 2001, men who majored in fields related to humanities and social/behavioral science or health, vocational/technical, and other technical/professional fields earned higher annual average salaries than their female counterparts, while such a difference was not detected in 1994.

⁵ The unemployment rate is constructed to approximate the definition of the unemployment rate used by the Bureau of Labor Statistics. That is, the rate is calculated as the number of people who are unemployed divided by all those who are in the labor force (unemployed plus those who are working; respondents who are out of the labor force are excluded from the calculation). The rate includes unemployed (with or without benefits) for 1992–93 bachelor’s degree recipients and includes unemployed and waiting to report to work or laid off for 1999–2000 bachelor’s degree recipients.

Table B. Average annual salary of 1992–93 and 1999–2000 bachelor’s degree recipients who were employed full time, by undergraduate field and gender: 1994 and 2001

Gender and undergraduate field of study	Average annual salary (in constant 2001 dollars)	
	1994	2001
Total		
Male	\$32,500	\$39,400
Female	27,400	32,600
Business/management		
Male	33,600	42,300
Female	29,900	39,000
Education		
Male	35,100	29,600
Female	21,900	28,100
Engineering, mathematics, and sciences ¹		
Male	33,300	45,200
Female	27,900	34,200
Humanities and social/behavioral science		
Male	27,300	34,600
Female	26,500	29,400
Health, vocational/technical, and other technical/professional fields		
Male	35,400	38,100
Female	30,300	34,300

¹Sciences include life sciences, physical sciences, and computer/information science.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/97 and 2000/01 Baccalaureate and Beyond Longitudinal Studies (B&B:93/97 and B&B:2000/01).

Conclusions

Over the past two decades, the rates at which women have enrolled in undergraduate education and attained college degrees increased faster than those of men. Part of this increase may be related to an increase in the percentage of traditional students who were women. However, women are still overrepresented among nontraditional students such as adult students with families, students in the lowest income level, and students age 40 or older.

When looking at changes in high school academic preparation among 1982 and 1992 high school graduates who entered postsecondary education within 2 years of high school completion, women had closed some existing

gender gaps and, in some cases, surpassed men over the 10-year period. Also, in the later cohort, among students who had higher levels of high school academic preparation, women were more likely than men to earn a bachelor’s degree—a difference not found in the earlier cohort. In other words, women not only narrowed the gender gap in high school academic preparation, but even among those best prepared to enter college, women were more likely than men to attain a bachelor’s degree.

Even though women have surpassed men in some aspects of academic preparation and college persistence and attainment, as of 2001, their full-time earnings were lower than those of men. Even when controlling for undergraduate field of study,

men earned higher salaries than women in several fields—including the combined field of mathematics, science, and engineering, as well as the field comprising humanities, and social and

behavioral sciences—indicating that some of the gains women made in postsecondary education may not be realized off campus.

Foreword

This study provides an in-depth look at gender differences in rates of participation and completion of undergraduate education, focusing on changes over time in college enrollment, degree awards, and demographic and enrollment characteristics of undergraduate men and women in the 50 states and District of Columbia. The analysis also examines trends in high school academic preparation, postsecondary persistence and degree completion, and early labor market outcomes among bachelor's degree recipients.

The analysis draws upon several publications and postsecondary datasets to provide a detailed account of how the undergraduate educational experiences of men and women differ. These include tables from *The Condition of Education 2002* and *Digest of Education Statistics 2003*, which compile data from the Integrated Postsecondary Education Data System (IPEDS) and Current Population Survey (CPS); three administrations of the National Postsecondary Student Aid Study (NPSAS:90, NPSAS:96, NPSAS:2000), a cross-sectional survey of all postsecondary students enrolled in a given academic year; two high school cohorts (the High School and Beyond Longitudinal Study and the National Education Longitudinal Study of 1988), representing high school graduates in 1982 (HS&B-So:80/92) and 1992 (NELS:88/2000); two administrations of the Beginning Postsecondary Students Longitudinal Study, representing students who first began their postsecondary education in 1989–90 (BPS:90/94) and 1995–96 (BPS:96/01); and two cohorts of college graduates (1992–93 and 1999–2000) from the Baccalaureate and Beyond Longitudinal Studies (B&B:93/97 and B&B:2000/01). This report and others using these datasets can be accessed and downloaded from the NCES web site (<http://nces.ed.gov>).

The estimates presented in this report were produced using the NCES Data Analysis System (DAS), a statistical application that allows users to specify and generate tables for the BPS, B&B, HS&B, NELS, and NPSAS surveys. The DAS produces the design-adjusted standard errors necessary for testing the statistical significance of differences among estimates. The DAS is available as a web-based application. For more information, consult the DAS website (<http://nces.ed.gov/das/>). Additional information on the datasets used in this report can be found in appendix B.

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Introduction

Over the last three decades, the educational gender gap favoring men, in many respects, has been reversed: women have surpassed their male peers in educational expectations, enrollment in postsecondary education, and college degree attainment (Freeman 2004). Between 1970 and 2001, women went from being the minority to the majority of all undergraduates, increasing their representation from 42 percent to 56 percent of undergraduates. Projections to 2013 indicate that women's undergraduate enrollment will increase to 8.9 million or 57 percent of the undergraduate population (Gerald and Hussar, table 19).

The apparent decline in the proportion of students enrolled in postsecondary education who are male has been the subject of much discussion among educational researchers, policymakers, and the media. Mortenson (2001) has argued that “women have done extraordinarily well in the K–12 and higher educational systems over the last three decades, and men by comparison have not done well at all” (p. 6). King (2000, p. 2) disputed this argument by claiming that past literature is “based on aggregate data on the educational achievement of all men and women, regardless of age, race/ethnicity, or socioeconomic status,” and therefore does not tell the complete story of educational equality. As King pointed out, gender differences are not uniform across race/ethnicity and socioeconomic status, and the gender gap is much greater for Black students and low-income students than it is for students from other racial/ethnic and income groups. Findings from a profile of undergraduates enrolled in postsecondary education in the academic year 1999–2000 revealed such differences. For example, while women constituted 56 percent of all undergraduates, they made up 63 percent of Black undergraduates, 62 percent of students age 40 or older, and 70 percent of single parents (Horn, Peter, and Rooney 2002, table 3.1).

This study aims to provide an in-depth look at gender differences in undergraduate education in the 50 states and District of Columbia, focusing on changes over time between 1980 and 2001. The analysis draws on several publications and postsecondary datasets to provide a detailed account of how the undergraduate educational experiences of men and women differ.

Organization of Report

The report begins with an overview of college enrollment and associate's and bachelor's degree awards, showing the trends from 1980 to the period in which most recent data are available (in most cases, 2001 or 2003). Using institutional data, the report presents trends in undergraduate participation and degree attainment for men and women and how they have changed over time.

Second, using student-level data, the report shows 10-year trends in the demographic and enrollment profile of men and women by comparing the characteristics of undergraduates enrolled in the academic years 1989–90, 1995–96, and 1999–2000. This section details gender differences with respect to race/ethnicity, age, income, and other student characteristics. It also examines changes over time in where students enrolled and whether they attended full or part time.

Third, the analysis uses longitudinal data to examine how men and women differed in their preparation for and progress through undergraduate education. Two cohorts of high school graduates (1982 and 1992) who entered postsecondary education are used to show gender differences in academic preparation, while two cohorts of first-time freshmen are used to analyze changes in rates of persistence and 5-year degree completion between those who first enrolled in 1989–90 and their counterparts who enrolled in 1995–96.

Lastly, two cohorts of recent college graduates (1992–93 and 1999–2000) are used to examine labor market participation and salaries among those who entered the labor force immediately after obtaining a bachelor's degree.

Key Questions

The report addresses these major questions:

- Over the period from 1980 to 2001, how did college enrollment and undergraduate degree awards change for men and women?
- Among undergraduates enrolled in postsecondary education in 1999–2000, were gender differences consistent across race/ethnicity, age, and income levels and other demographic characteristics? How had these characteristics changed over time between 1990 and 2000?
- How did undergraduate men and women differ with respect to the type of institution they attended and their enrollment intensity (i.e., full- vs. part-time enrollment)?

- Among 1982 and 1992 high school graduates who entered postsecondary education, how did young men and women differ in their high school academic preparation? Controlling for high school academic preparation, what were the degree completion rates for men and women?
- Comparing students who first began their postsecondary education in 1989–90 with those who first enrolled in 1995–96, what were the differences in the rates of 5-year degree completion and persistence? How did the gender gap change over time?
- Comparing bachelor’s degree recipients in 1992–93 who immediately entered the labor market without attending graduate school with their counterparts who graduated in 1999–2000, what were the employment rates and average salaries of men and women by undergraduate field of study?

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Data Sources and Methods

This report draws upon several publications and many datasets to provide a detailed account of how the undergraduate educational experiences of men and women differ. Tables from *The Condition of Education 2002* and *Digest of Education Statistics 2003* are used to present an overview of long-term trends in college enrollment and degree awards. These tables compile data from the Integrated Postsecondary Education Data System (IPEDS) and Current Population Survey (CPS). Three administrations of the National Postsecondary Student Aid Study (NPSAS:90, NPSAS:96, NPSAS:2000), a cross-sectional survey of all postsecondary students enrolled in a given academic year, are used to examine changes over a 10-year period (1990 to 2000) in the demographic characteristics of undergraduate men and women. NPSAS data are also used to examine changes in their enrollment characteristics. For consistency across surveys, analyses include only students and institutions in the 50 states and District of Columbia (i.e., respondents from Puerto Rico or outlying areas were excluded).

Two high school cohorts are used in this report to analyze changes in students' high school academic preparation and postsecondary attainment. The High School and Beyond Longitudinal Study (HS&B-So:80/92) represents high school graduates in 1982 who were last surveyed 10 years after high school graduation (HS&B:80/94), and the National Education Longitudinal Study (NELS:88/2000) represents 1992 high school graduates who were last surveyed 8 years after high school graduation. The analysis looks at how students progress through their postsecondary education program by using two administrations of the Beginning Postsecondary Students Longitudinal Study, representing students who first began their postsecondary education in 1989–90 (BPS:90/94) and 1995–96 (BPS:96/01). The BPS studies are a longitudinal component of NPSAS.

Finally, this report uses two cohorts of college graduates (1992–93 and 1999–2000) from the Baccalaureate and Beyond Longitudinal Studies (B&B:93/97 and B&B:2000/01) to analyze gender differences and changes over time in the early labor market participation and salaries of college graduates who did not immediately enroll in graduate school. The B&B studies provide data on students who received a bachelor's degree in the 1992–93 and 1999–2000 academic years, regardless of when they began their postsecondary education. Salary differences are examined 1 year after college graduation. More information about the datasets analyzed in this report may be found in appendix B.

This analysis examines differences according to gender and changes over time using standard *t*-tests to determine statistical significance. Statistical significance is reported at $p \leq 0.05$. Where applicable, comparisons are discussed in the following order: change over time (or between cohorts) for men, change over time (or between cohorts) for women, and differences by gender.

Trends in Postsecondary Enrollment and Degree Awards

Postsecondary Enrollment

Between 1980 and 2001, the total fall undergraduate enrollment in degree-granting institutions increased from 10.5 million students to 13.7 million students (U.S. Department of Education 2004, table 189; figure 1). While the number of students enrolled increased for both men and women, the increase was greater for women. Over this time period, the number of women enrolled in degree-granting institutions increased by 41 percent (from roughly 5.5 million in 1980 to 7.7 million in 2001), while the number of men enrolled increased by 20 percent (from about 5 million to 6 million).¹ Between 1980 and 2001, the percentage of all undergraduates who were women increased from 52 percent to 56 percent.

Degree Attainment

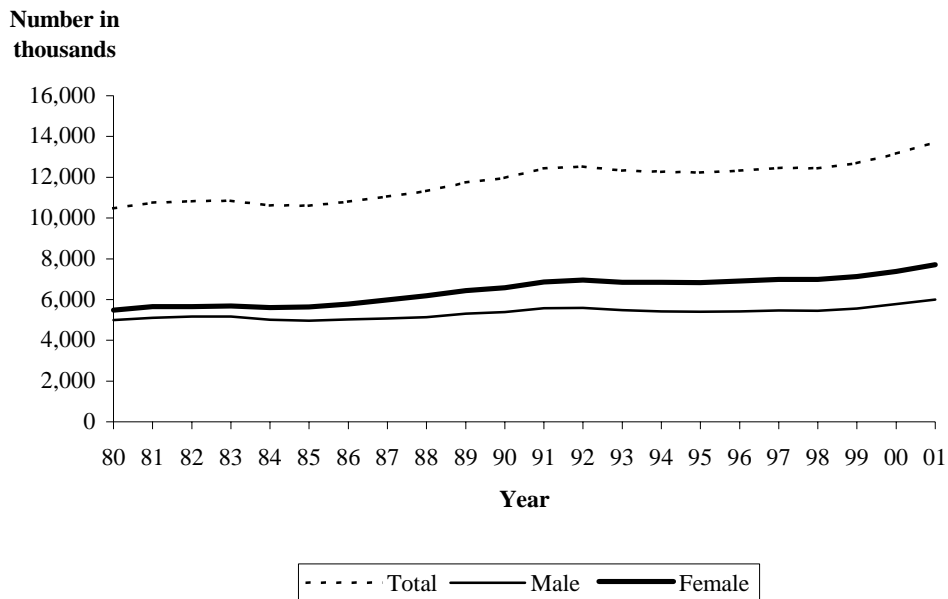
No one disputes the employment benefits of earning a college degree. The earning potential and employment opportunities of college degree recipients, especially those who attain bachelor's degrees, far surpass those of their peers whose education stops with a high school diploma (Cappelli et al. 1997; Farley 1995). In the roughly two decades between 1980 and 2001, the number of degrees awarded increased for both men and women, but as with enrollment, women experienced greater gains.

Associate's Degree Awards

For both men and women, the number of associate's degrees awarded increased between the 1980 and 2001 school years: the number of associate's degrees earned by women increased by roughly 129,000—from 228,000 in 1980–81 to 357,000 in 2001–02—while the number of degrees earned by men increased by 49,000—from 189,000 to 238,000 (table 1-A). This translates into a 57 percent increase in the associate's degrees awarded to women over the two decades, and a 26 percent increase in associate's degrees awarded to men. In other words, women went from earning 55 percent of associate's degrees awarded in 1980–81 to earning 60 percent in 2001–02 (figure 2-A).

¹ Percentages calculated from U.S. Department of Education 2004, table 189.

Figure 1. Total fall undergraduate enrollment in degree-granting institutions (in thousands), by gender: 1980–2001



NOTE: Data for 1999 are imputed. For more information, see U.S. Department of Education, National Center for Education Statistics. (2002b). *Digest of Education Statistics, 2001* (NCES 2002–130), pp. 509–510.

SOURCE: U.S. Department of Education, National Center for Education Statistics (NCES). (2004). *Digest of Education Statistics 2003* (NCES 2005–025), table 189. Data from U.S. Department of Education, NCES, 1980–86 Higher Education General Information Survey (HEGIS), “Fall Enrollment in Colleges and Universities” and Integrated Postsecondary Education Data System, “Fall Enrollment Survey” (IPEDS-EF:87–01).

Examining associate’s degrees awarded to women within racial/ethnic groups also reflected the overall increase in degrees awarded to women. By 2001–02, women of all racial/ethnic groups earned a majority of degrees conferred. Black and American Indian women in particular earned two-thirds of associate’s degrees awarded to Black and American Indian students, respectively. Among Asian and Hispanic students, women went from being in the minority (36 and 47 percent, respectively) to the majority of associate degree recipients (57 and 60 percent, respectively).

Bachelor’s Degree Awards

As with associate’s degrees, the number of bachelor’s degrees awarded to both men and women increased between the 1980 and 2001 school years, but the increase for women was greater. The number of bachelor’s degrees earned by women increased by roughly 277,000—from 465,000 in 1980–81 to 742,000 in 2001–02—while the number of degrees earned by men increased by 80,000—from 470,000 to 550,000 (table 1-B). In other words, women experienced

Table 1-A. Number of associate's degrees conferred by degree-granting institutions, by race/ethnicity and gender: 1980–81, 1990–91, and 2001–02

Years	Total	American Indian	Asian/ Pacific Islander	Black	White	Hispanic	Non-resident alien
Male							
1980–81 ¹	188,638	1,439	7,164	14,143	161,858	10,738	3,292
1990–91	198,634	1,439	7,164	14,143	161,858	10,738	3,292
2001–02	238,109	2,306	13,259	22,800	170,627	23,963	5,154
Female							
1980–81 ¹	227,739	1,476	4,093	21,040	187,925	9,473	2,348
1990–91	283,086	2,432	8,093	24,692	229,406	14,802	3,661
2001–02	357,024	4,524	17,688	44,537	247,112	36,040	7,123

¹Total includes 4,819 men and 1,384 women whose racial/ethnic group was not available.

NOTE: For years 1990–91 and 2001–02, reported racial/ethnic distributions of students by level of degree, field of degree, and gender were used to estimate race/ethnicity for students whose race/ethnicity was not reported. American Indian includes Alaska Native, Black includes African American, Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics (NCES). (2004). *Digest of Education Statistics 2003* (NCES 2005–025), table 261. Data from U.S. Department of Education, NCES, Higher Education General Information Survey (HEGIS), “Degrees and Other Formal Awards Conferred” and Integrated Postsecondary Education Data System, “Completions Survey” (IPEDS-C:1990–91 and 2001–02).

Table 1-B. Number of bachelor's degrees conferred by degree-granting institutions, by race/ethnicity and gender: 1980–81, 1990–91, and 2001–02

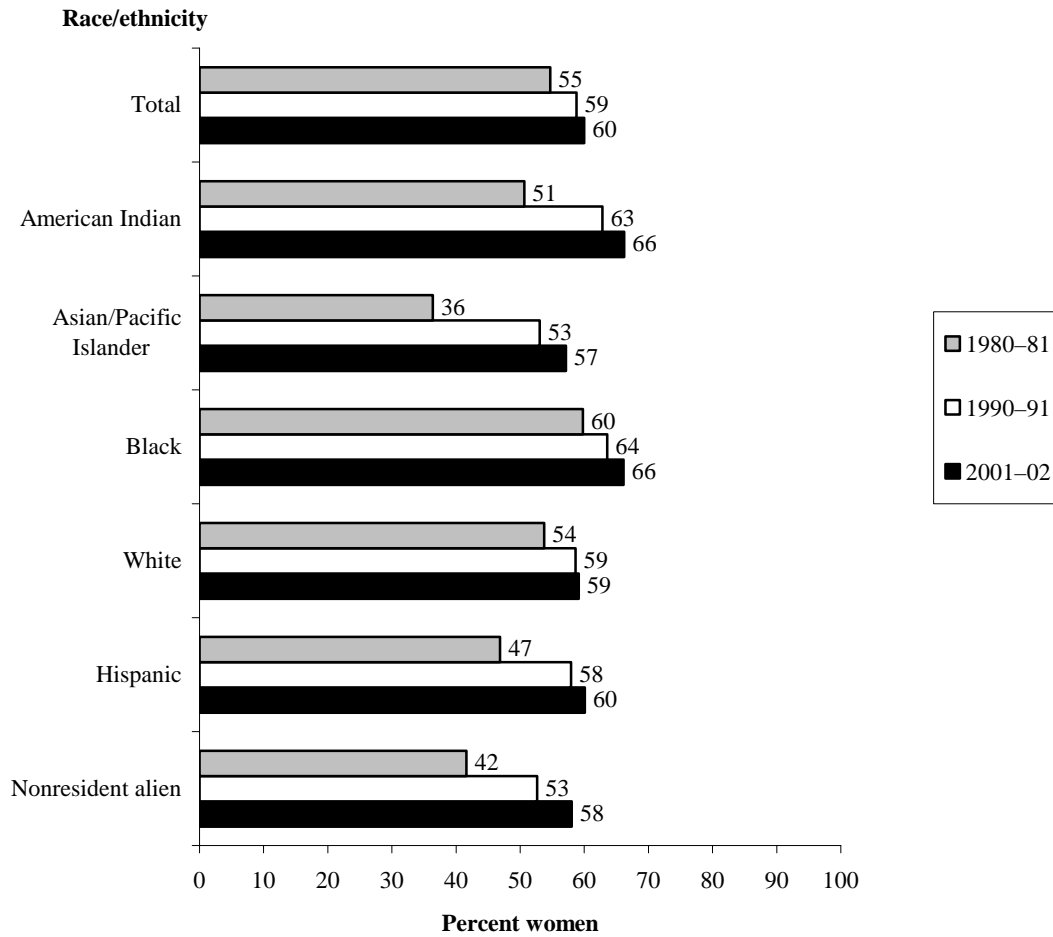
Years	Total	American Indian	Asian/ Pacific Islander	Black	White	Hispanic	Non-resident alien
Male							
1980–81 ¹	469,883	1,700	10,107	24,511	406,173	10,810	16,324
1990–91	504,045	1,938	21,203	24,800	421,290	16,598	18,216
2001–02	549,816	3,625	37,666	39,194	414,885	32,953	21,493
Female							
1980–81 ¹	465,257	1,893	8,687	36,162	401,146	11,022	6,265
1990–91	590,493	2,645	21,326	41,575	492,803	20,744	11,400
2001–02	742,084	5,540	45,435	77,430	543,700	50,016	19,963

¹Total includes 258 men and 82 women whose racial/ethnic group was not available.

NOTE: For years 1990–91 and 2001–02, reported racial/ethnic distributions of students by level of degree, field of degree, and gender were used to estimate race/ethnicity for students whose race/ethnicity was not reported. American Indian includes Alaska Native, Black includes African American, Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics (NCES). (2004). *Digest of Education Statistics 2003* (NCES 2005–025), table 264. Data from U.S. Department of Education, NCES, Higher Education General Information Survey (HEGIS), “Degrees and Other Formal Awards Conferred” and Integrated Postsecondary Education Data System, “Completions Survey” (IPEDS-C:1990–91 and 2001–02).

Figure 2-A. Percentage of associate’s degrees awarded to women, by race/ethnicity: 1980–81, 1990–91, and 2001–02

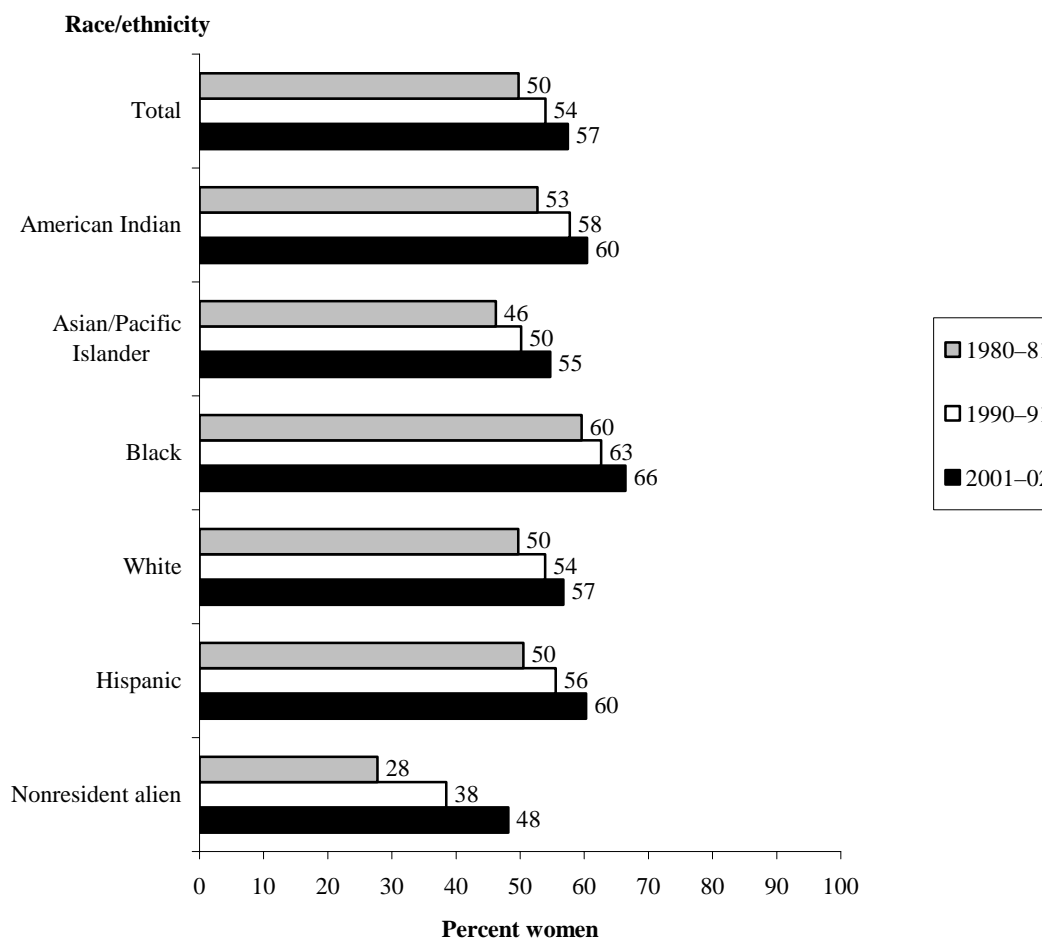


NOTE: For years 1990–91 and 2001–02, reported racial/ethnic distributions of students by level of degree, field of degree, and gender were used to estimate race/ethnicity for students whose race/ethnicity was not reported. American Indian includes Alaska Native, Black includes African American, Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics (NCES). (2004). *Digest of Education Statistics 2003* (NCES 2005–025), table 261. Data from U.S. Department of Education, NCES, Higher Education General Information Survey (HEGIS), “Degrees and Other Formal Awards Conferred” and Integrated Postsecondary Education Data System, “Completions Survey” (IPEDS-C:1990–91 and 2001–02).

a 59 percent increase in the degrees awarded over the two decades, compared with a 17 percent increase in degrees awarded to men. Of all bachelor’s degrees awarded, women earned 50 percent in 1980–81 and 57 percent in 2001–02 (figure 2-B).

By 2001–02, women in all racial/ethnic groups earned 55 percent or more of bachelor’s degrees awarded. Black women earned 66 percent of bachelor’s degrees awarded to Black

Figure 2-B. Percentage of bachelor's degrees awarded to women, by race/ethnicity: 1980–81, 1990–91, and 2001–02

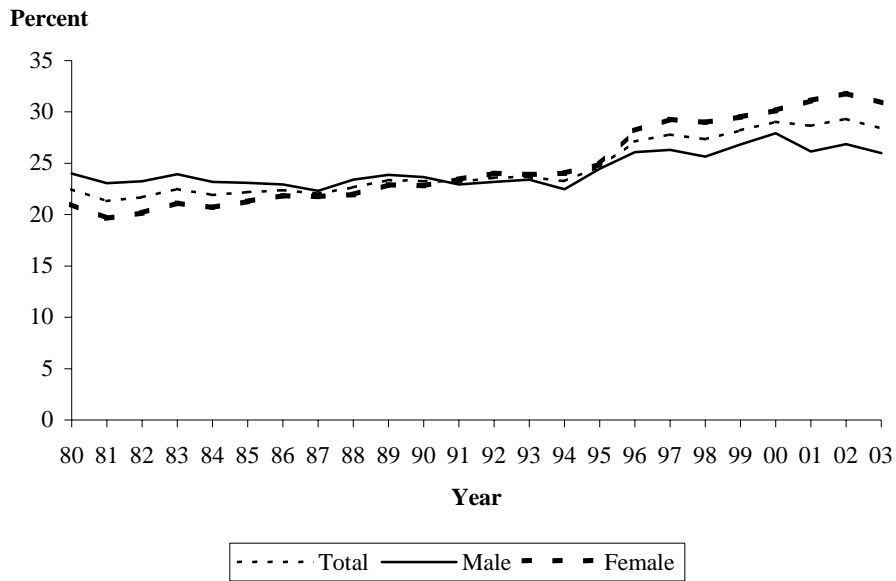
NOTE: For years 1990–91 and 2001–02, reported racial/ethnic distributions of students by level of degree, field of degree, and gender were used to estimate race/ethnicity for students whose race/ethnicity was not reported. American Indian includes Alaska Native, Black includes African American, Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics (NCES). (2004). *Digest of Education Statistics 2003* (NCES 2005–025), table 264. Data from U.S. Department of Education, NCES, Higher Education General Information Survey (HEGIS), “Degrees and Other Formal Awards Conferred” and Integrated Postsecondary Education Data System, “Completions Survey” (IPEDS-C:1990–91 and 2001–02).

undergraduates, while American Indian and Hispanic women earned 60 percent of degrees awarded to American Indian and Hispanic students, respectively.

The rate of bachelor's degree attainment among 25- to 29-year-olds provides a useful summary of completions because most people who will obtain a bachelor's degree enter college soon after high school graduation. The percentage of 25- to 29-year-olds with a bachelor's degree or higher increased from 23 percent in 1980 to 28 percent in 2003 (figure 3). The percentage of

Figure 3. Percentage of 25- to 29-year-olds with a bachelor's degree or higher, by gender: March 1980–2003



NOTE: The Current Population Survey (CPS) questions used to obtain educational attainment were changed in 1992. In 1994, the survey instrument for the CPS was changed and weights were adjusted. For more information, see <http://www.bls.census.gov/cps>.

SOURCE: U.S. Department of Education, National Center for Education Statistics. (2002). *The Condition of Education 2002* (NCES 2002–025), indicator 25 and U.S. Department of Commerce, Bureau of the Census, March Current Population Surveys, 1981–2003.

men in this age group with a bachelor's degree increased from 24 percent to 26 percent—with no more than 28 percent of 25- to 29-year-old men with a bachelor's degree in any year between 1980 and 2003. For women, the percentage in this age group with a bachelor's degree increased from 21 percent to 31 percent over the period. Throughout the 1980s, a greater percentage of men in the 25- to 29-year-old age group had a bachelor's degree, but by the mid-1990s, women in this age group had surpassed their male counterparts in attainment. So, while in the beginning of the period, smaller percentages of women than men had a bachelor's degree, by 2003 more women than men in this age group had reached this level of attainment.

Changes in Undergraduate Student Profiles and Enrollment Characteristics

Women accounted for 55 percent of undergraduates in the 1989–90 academic year, 57 percent in 1995–96, and 56 percent in 1999–2000 (table 2). Over the past decade, women have generally been overrepresented among older students and students with characteristics that place them at risk of not completing postsecondary education (see following discussion for definition of risk). In 1999–2000, for example, they accounted for roughly 60 percent of all students older than 29 years and 57 percent of students with any risk characteristics. However, the analysis that follows shows a small but significant increase in the percentage of traditional students (i.e., students who enroll in college full time immediately after graduating from high school) who were women.

Student Profiles

Persistence Risk Factors

Research by Horn and Premo (1995) identified specific risk characteristics associated with students' likelihood of leaving postsecondary education without attaining a credential (includes bachelor's degree, associate's degree, or vocational certificate). These persistence risk factors include dropping out of high school (including dropouts who later complete a General Educational Development [GED] or high school equivalency certificate), delaying postsecondary enrollment more than a year after high school graduation, having dependents other than a spouse, being a single parent, attending school part time, being financially independent, and working full time (35 or more hours per week) while enrolled.² Students with none of these risk characteristics are typically considered to be “traditional” college students—those who enroll in college full time immediately after graduating from high school.

As shown in figure 2, the percentage of women ages 25 to 29 years with a bachelor's degree increased from 23 percent in 1990 to 30 percent in 2000. Consistent with these findings, between 1989–90 and 1999–2000, a slight increase was detected in the percentage of traditional students (i.e., those with no risk characteristics) who were women, from 54 to 55 percent (table 2).

² For more information, see Horn and Premo (1995).

Table 2. Percentage of undergraduates who were women, by student characteristics and academic year: 1989–90, 1995–96, and 1999–2000

Student characteristics	1989–90	1995–96	1999–2000
U.S. Total (excluding Puerto Rico)	55.3	56.8	56.3
Risk status for not completing ¹			
No risk factors (traditional students)	53.6	54.4	55.2
One or more risk factors	56.0	56.4	56.8
Race/ethnicity ²			
American Indian	47.9	65.1	60.7
Asian/Pacific Islander	48.1	51.3	51.4
Black	63.3	63.1	63.5
White	55.1	56.0	55.6
Hispanic	52.2	57.5	55.6
Age			
18–23	52.5	54.4	55.0
24–29	52.0	55.2	53.5
30–39	62.2	61.3	60.1
40 or older	66.1	64.5	62.2
Income level			
Low income	59.3	60.2	60.2
Middle low income	56.3	56.5	56.3
Middle high income	55.7	55.7	56.0
High income	50.9	54.5	53.4
Dependency status			
Dependent	51.7	52.6	53.3
Independent			
Never married, no children	47.5	49.2	50.0
Married/separated, no children	60.1	66.8	57.7
Married/separated, children	62.4	61.2	61.8
Single parent	80.6	73.0	68.9
Hours worked per week while enrolled			
Did not work	62.1	59.5	58.7
1–24 hours	60.6	59.8	59.7
25–34 hours	57.2	51.8	56.7
More than 34 hours	48.3	52.7	53.3

¹Risk factors include delaying enrollment, not having a high school diploma, enrolling part time, being financially independent (typically students over 24), having dependents other than a spouse, being a single parent, and working full time while enrolled. For more information, see Horn, L.J., and Premo, M.D. (1995). *Profile of Undergraduates in U.S. Postsecondary Education Institutions: 1992–93, With an Essay on Undergraduates at Risk* (NCES 96–237).

²American Indian includes Alaska Native, Black includes African American, Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, and NPSAS:2000).

However, in 1999–2000, at-risk students still were more likely than traditional students to be women: 55 percent of students with no risk factors were women, compared with 57 percent of students with one or more risk factors.

Age and Dependency Status

Between 1989–90 and 1999–2000, the percentage of 18- to 23-year-olds who were women increased from 53 to 55 percent and the percentage of 24- to 29-year-olds who were women increased from 52 to 54 percent (table 2). Conversely, the percentage of students in the 40 or older age group who were women declined from 66 percent in 1989–90 to 62 percent in 1999–2000.

Consistent with the findings for the younger age groups, between 1989–90 and 1999–2000, the percentage of undergraduates who were women increased for both dependent students (typically students under age 24) and independent students who had never married and had no children. In 1989–90, 52 percent of dependent students were women and 48 percent of independent students who had never married and had no children were women, compared with 53 percent and 50 percent, respectively, in 1999–2000. The percentage of single parents who were women declined, although in 1999–2000 women were still overrepresented in this group (69 percent of single parents were women vs. 56 percent of all students).

Income and Hours Worked

Between 1989–90 and 1999–2000, the percentage of high-income students who were women increased (from 51 percent to 53 percent; table 2). No difference was detected in the percentage of low-income students who were women in each survey year. Nonetheless, in 1999–2000, women were still overrepresented among low-income students (60 percent were women) and underrepresented among high-income students (53 percent) when compared with all students (56 percent).

Over the time period studied, the percentage of women among students who did not work declined from 62 percent to 59 percent, while their representation among students who worked more than 34 hours per week while enrolled increased from 48 percent to 53 percent. The increase in the percentage of women among students who worked more than 34 hours per week is consistent with the same increase among independent students who had never married and had

no children.³ Still, in 1999–2000, women made up a greater proportion of students who did not work than among those who worked more than 34 hours per a week while enrolled.

Race/Ethnicity

Few changes were detected over the three survey periods in the percentage of undergraduates who were women by race/ethnicity (table 2). The exception was that the percentage of Hispanic students who were women increased from 1989–90 to 1995–96 (from 52 to 58 percent). While it appears that the percentage of American Indian students who were women increased from 1989–90 to 1995–96 as well, the apparent difference was not statistically significant.

In 1999–2000, women made up a greater percentage of Black students than they did among White, Hispanic, and Asian/Pacific Islander students (64 percent vs. 56, 56, and 51 percent, respectively). In fact, when compared with all 1999–2000 undergraduates, a greater percentage of Black students were women by almost 8 percentage points (56 percent of all undergraduates were women vs. 64 percent of Black students). As was shown in table 1, in 2000–01, Black women also earned a greater percentage of the degrees awarded than their male counterparts. While it appears that women made up a greater percentage of American Indian students than they did among White, Hispanic, and Asian/Pacific Islander students, the apparent difference was not statistically significant and no other differences could be detected in the percentages of undergraduates who were women by racial/ethnic group in 1999–2000.

Enrollment Characteristics

Type of Institution

In 1999–2000, the majority of undergraduates attended public institutions (Horn, Peter, and Rooney 2002). Forty-three percent of men and women were enrolled in public 2-year institutions, and 30–33 percent were enrolled in public 4-year institutions (table 3). Between 13 and 14 percent were enrolled in private not-for-profit 4-year institutions, and 4–5 percent were enrolled in for-profit institutions.

Examining changes over time by the type of institution attended revealed similar patterns by gender. Between 1989–90 and 1999–2000, for both men and women, the percentage attending public 2-year institutions increased, and, in 1999–2000, no difference could be detected between

³ In 1999–2000, 58 percent of independent female students who had never married and had no children worked more than 34 hours per a week (data not shown).

Table 3. Percentage distribution of undergraduates by type of institution, by gender and academic year: 1989–90, 1995–96, and 1999–2000

Gender	Public 4-year	Private not-for-profit 4-year	Public 2-year	All for-profit	Other
			1989–90		
Male	31.5	13.1	36.6	5.9	12.9
Female	28.3	12.0	38.6	7.7	13.4
			1995–96		
Male	32.4	13.7	42.7	4.5	6.6
Female	28.8	13.7	44.4	5.7	7.4
			1999–2000		
Male	32.7	13.1	42.7	4.4	7.1
Female	30.4	13.6	42.8	5.1	8.2

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, and NPSAS:2000).

men and women in the percentage who attended public 2-year institutions. In 1989–90, 37 percent of male undergraduates and 39 percent of female undergraduates attended public 2-year institutions, compared with 43 percent of both groups in 1999–2000. Over the same period, the percentage of women attending public and private not-for-profit 4-year institutions increased by about 2 percentage points, although women were less likely than men to attend public 4-year institutions in 1999–2000 (30 vs. 33 percent).

Attendance Status

Consistent with the increase in the proportion of traditional students discussed earlier, the percentage attending full time increased between 1989–90 and 1999–2000 for both men and women (from 42 to 52 percent for men and from 37 to 51 percent for women; table 4). In 1989–90 and 1995–96, men were more likely than women to attend full time, but by 1999–2000, there was no measurable difference.

Similar patterns were found when examining changes in attendance status by type of institution. In 1989–90, men at public and private not-for-profit 4-year institutions were more likely than women to attend full time, but in 1999–2000, there were no measurable differences.

Table 4. Percentage of undergraduates who attended full time, by academic year, type of institution, and gender: 1989–90, 1995–96, and 1999–2000

Gender	1989–90	1995–96	1999–2000
		Total ¹	
Male	42.1	53.4	52.3
Female	37.3	49.3	51.2
		Public 4-year	
Male	62.3	68.3	67.2
Female	57.4	65.9	66.1
		Private not-for-profit 4-year	
Male	71.4	72.2	73.7
Female	62.8	70.2	71.0
		Public 2-year	
Male	20.5	31.0	31.2
Female	18.1	26.9	29.9

¹Includes students at institutions not shown separately.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, and NPSAS:2000).

For all survey years, no difference could be detected in the percentage of men and women attending full time at public 2-year institutions.⁴

Degree Field

In 2000–01, almost half of all degrees awarded to men were in three main fields of study: one-quarter of bachelor’s degrees awarded to men were business degrees, 12 percent were social sciences and history degrees, and 11 percent were engineering degrees (table 5). Although these fields accounted for the largest percentages of degrees awarded to men throughout the previous two decades, there was a slight decrease in the percentage of degrees awarded in business and engineering from 1980 to 2001. In 2000–01, 18 percent of degrees awarded to women were business degrees, followed by 11 percent in education and between 8 and 9 percent each in social sciences and history, health professions and related sciences, and psychology. About 2 percent of degrees awarded to women were in engineering. Between 1980 and 2001, the proportion of women earning degrees in education and health professions and related sciences declined while the proportion earning business degrees increased, especially during the first half of the decade.

⁴ Even though it appears as though a higher percentage of men than women attended public 2-year institutions full time in 1995–96, the apparent difference was not statistically significant.

Table 5. Percentage distribution of bachelor's degrees by field of study, by gender of student: 1980–81, 1990–91, and 2000–01

Field of study	Male			Female		
	1980–81	1990–91	2000–01	1980–81	1990–91	2000–01
Total ¹	100.0	100.0	100.0	100.0	100.0	100.0
Business	26.7	26.1	25.1	15.8	19.9	18.5
Education	5.8	4.6	4.6	17.4	14.8	11.4
Social sciences and history	11.9	13.6	11.5	9.5	9.6	9.3
Health professions and related sciences	2.2	1.9	2.2	11.4	8.4	8.6
Psychology	3.1	3.2	3.1	5.7	7.2	8.0
Communications	3.0	4.1	4.2	3.7	5.4	5.1
Visual and performing arts	3.1	3.1	4.7	5.5	4.5	5.1
Biological sciences/life sciences	5.1	3.9	4.6	4.1	3.4	5.1
English language and literature/letters	2.4	3.4	3.0	4.5	5.9	4.9
Computer and information sciences	2.2	3.5	5.7	1.1	1.2	1.6
Engineering	14.3	13.4	11.0	1.7	1.8	1.8
Agriculture and natural resources	3.2	1.8	2.4	1.4	0.7	1.5
Physical sciences	3.8	2.2	2.0	1.3	0.9	1.0
Mathematics	1.4	1.6	1.1	1.0	1.2	0.8

¹Includes other fields not shown separately.

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

SOURCE: U.S. Department of Education, National Center for Education Statistics (NCES). (2003). *Digest of Education Statistics 2002* (NCES 2003–060), tables 246 and 276–297. Data from U.S. Department of Education, NCES, Higher Education General Information Survey (HEGIS), “Degrees and Other Formal Awards Conferred” surveys, and Integrated Postsecondary Education Data System, “Completions Survey” (IPEDS-C:86–87 through 2000–01).

There was also an increase in the percentage of degrees awarded to women in the field of psychology. Despite these changes, in both 1980–81 and 2000–01, men were more likely than women to earn degrees in business, engineering, and social sciences and history, while women were more likely to earn degrees in education, health professions and related sciences, and psychology.

Summary

Over the past decade, women have generally been overrepresented among older students and students with characteristics that place them at risk of not completing postsecondary education. Women are overrepresented among single parents, among those 40 years or older, and among those in the lowest income group. In addition, when compared to all 1999–2000 undergraduates, a greater percentage of Black students were women by almost 8 percentage points (56 percent of all undergraduates were women vs. 64 percent of Black students). As was

shown in table 1, in 2000–01, Black women also earned a greater percentage of the degrees awarded than their male counterparts.

However, comparisons between the three cohorts also reveal a small but significant shift toward more women who are traditional students than in previous years. These trends are reflected in changes that include an increase in the percentage of women among traditional students (i.e., students with no persistence risk characteristics), among students in younger age groups (18–29 years old), among dependent students (those under age 24), and among independent students who had never married and had no children. Further, it appears that women have closed the gender gap in the likelihood of attending full time; that is, while both men and women increased their likelihood of attending full time, women increased more.

Despite changes in field of degree, relationships by gender held strong for the top three fields of study. That is, in both 1980–81 and 2000–01, men were more likely than women to earn bachelor's degrees in business, engineering, and social sciences and history, while women were more likely to earn degrees in education, health professions and related sciences, and psychology.

Preparation, Persistence, and Progress Through Undergraduate Education

Over the past two decades, the number of high school completers declined (from roughly 3.1 million in 1980 to 2.8 million in 2002; table 6). Conversely, the number of high school completers who immediately enrolled in college increased (from 1.5 million in 1980 to 1.8 million in 2002). As a result, the percentage of high school completers who immediately enrolled in college increased from 49 percent in 1980 to 65 percent in 2002. This was true for both men and women: there was a decline in the number of high school completers over the period and an increase in the number of high school completers who immediately enrolled in college. Sixty-two percent of male high school completers immediately enrolled in college in 2002, up from 47 percent in 1980 (an increase of 15 percentage points), and 68 percent of female high school completers immediately enrolled in college in 2002, up from 52 percent in 1980 (an increase of 16 percentage points). Although it appears that women were more likely than men to enroll in college immediately after high school in every year since 1996, in 1999 and 2001, the apparent difference was not statistically significant.

High School Academic Preparation and Subsequent Attainment

High School Academic Preparation

A comparison of 1982 and 1992 high school graduates who entered postsecondary education by the end of their second year after leaving high school revealed a shift in the high school academic preparation of men and women. Between the two cohorts, women closed some existing gender gaps in high school academic preparation and, in some cases, even surpassed men.

The following discussion on high school academic preparation is based on students who graduated high school in 1982 and 1992 and subsequently entered postsecondary education within 2 years. Thus, the findings reflect the level of high school academic preparation in the early 1980s and 1990s, respectively. In 1982, more women than men completed high school (1,592,000 vs. 1,509,000) but in 1992, no difference could be detected between men and women in the number of high school completers (table 6). Between 1982 and 1992, the percentage of high school completers who immediately enrolled in college increased for both men and women

Table 6. Immediate college enrollment rates of high school completers (in thousands), by gender: 1980–2002

Year	Total high school completers ¹			Enrolled in college ²					
	Total	Male	Female	Total		Male		Female	
				Number	Percent	Number	Percent	Number	Percent
1980	3,088	1,498	1,589	1,523	49.3	700	46.7	823	51.8
1981	3,056	1,491	1,565	1,648	53.9	817	54.8	831	53.1
1982	3,100	1,509	1,592	1,569	50.6	741	49.1	828	52.0
1983	2,963	1,389	1,573	1,562	52.7	721	51.9	841	53.4
1984	3,012	1,429	1,584	1,663	55.2	801	56.0	862	54.5
1985	2,668	1,287	1,381	1,540	57.7	755	58.6	785	56.8
1986	2,786	1,332	1,454	1,498	53.8	743	55.8	755	51.9
1987	2,647	1,278	1,369	1,503	56.8	746	58.3	757	55.3
1988	2,673	1,334	1,339	1,575	58.9	761	57.1	814	60.7
1989	2,450	1,204	1,246	1,460	59.6	693	57.6	767	61.6
1990	2,362	1,173	1,189	1,420	60.1	680	58.0	740	62.2
1991	2,276	1,140	1,136	1,423	62.5	660	57.9	763	67.1
1992	2,397	1,216	1,180	1,483	61.9	729	60.0	754	63.8
1993	2,342	1,120	1,223	1,467	62.6	670	59.9	797	65.2
1994	2,517	1,244	1,273	1,559	61.9	754	60.6	805	63.2
1995	2,599	1,238	1,361	1,610	61.9	775	62.6	835	61.3
1996	2,660	1,297	1,363	1,729	65.0	779	60.1	950	69.7
1997	2,769	1,354	1,415	1,856	67.0	860	63.6	995	70.3
1998	2,810	1,452	1,358	1,844	65.6	906	62.4	938	69.1
1999	2,897	1,474	1,423	1,822	62.9	905	61.4	917	64.4
2000	2,756	1,251	1,505	1,745	63.3	749	59.9	996	66.2
2001	2,545	1,275	1,270	1,569	61.7	762	59.7	808	63.6
2002	2,796	1,412	1,384	1,824	65.2	877	62.1	947	68.4

¹Individuals ages 16–24 who graduated from high school or completed a GED during the preceding 12 months.

²Enrollment in college as of October of each year for individuals ages 16–24 who completed high school during the preceding 12 months.

NOTE: Data are based upon sample surveys of the civilian population. High school graduates include GED recipients.

SOURCE: U.S. Department of Education, National Center for Education Statistics. (2004). *Digest of Education Statistics 2003* (NCES 2005–025), table 186. Data from American College Testing Program, unpublished tabulations, derived from statistics collected by the U.S. Bureau of the Census and U.S. Department of Labor, “College Enrollment of High School Graduates,” 1980–2002.

(from 49 to 60 percent of men and from 52 to 64 percent of women). For both years, no difference could be detected by gender in the percentage of students who immediately enrolled in college.

High School Academic Intensity

High school academic intensity is a composite measure of students’ highest mathematics courses, total mathematics credits, total Advanced Placement (AP) courses, total English credits, total foreign language credits, total science credits, total core laboratory science credits, total

social science credits, and total computer science credits.⁵ Table 7 shows the percentage distribution of 1982 and 1992 high school graduates who entered postsecondary education by level of high school academic intensity. Among 1982 and 1992 high school graduates who entered postsecondary education by the end of their second year out of high school, roughly half were in the top two levels or top 40 percent as measured by the academic intensity indicator; 1 in 10 were in the lowest 20 percent.

Table 7. Percentage distribution of 1982 and 1992 high school graduates who entered postsecondary education within 2 years, by high school academic intensity and gender

Gender	Bottom 20 percent	Lower middle 20 percent	Middle 20 percent	Upper middle 20 percent	Top 20 percent
1982 high school graduates					
Male	9.6	12.7	17.9	26.8	33.0
Female	11.4	14.8	22.5	26.7	24.6
1992 high school graduates					
Male	9.3	18.4	17.3	28.9	26.1
Female	9.1	16.4	22.3	23.2	29.0

NOTE: Includes 1982 high school graduates who entered postsecondary education by December 1984 and 1992 high school graduates who entered postsecondary education by December 1994. High school academic intensity is a composite measure of students' highest level of mathematics, total mathematics credits, total Advanced Placement courses (AP), total English credits, total foreign language credits, total science credits, total core laboratory science credits, total social science credits, and total computer science credits. For more information, see Adelman, C., Daniel, B., and Berkovits, I. (2003). *Postsecondary Attainment, Attendance, Curriculum, and Performance* (NCES 2003-394). Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores (HS&B-So:80/92) and National Education Longitudinal Study of 1988 (NELS:88/2000).

When comparing the two cohorts, an upward shift in the proportion of women in the upper high school academic intensity levels was evident, accompanied by a downward shift for men. That is, among high school graduates who went to college the percentage of women in the top 20 percent increased (from 25 percent to 29 percent), while the percentage of women in the lowest 20 percent decreased (from 11 percent to 9 percent). Conversely, the percentage of men in the top 20 percent decreased from 33 percent to 26 percent, while the percentage of men in the second to the lowest group increased from 13 to 18 percent.

Ultimately, among 1982 high school graduates who went on to postsecondary education, men were more likely than women to be in the top 20 percent, but among their 1992 counterparts, no such difference was detected. Still, among the 1992 high school graduates, men

⁵ For more information, see Adelman, Daniel, and Berkovits (2003).

were more likely than women to be in the upper middle group (i.e., second to the highest level), a difference not found among the 1982 high school graduates.

Highest Mathematics Course

Similar patterns were found for other high school academic preparation indicators. Both male and female 1992 high school graduates who entered postsecondary education by the end of their second year out of high school were more likely than their 1982 counterparts to have taken an advanced mathematics course in high school (including calculus and precalculus) and less likely to have taken no mathematics course beyond algebra 1 (table 8).

Table 8. Percentage distribution of 1982 and 1992 high school graduates who entered postsecondary education within 2 years, by highest mathematics course taken in high school and gender

Gender	Less than Algebra 1	Algebra 1	Geometry	Algebra 2	Trigonometry	Precalculus	Calculus
1982 high school graduates							
Male	9.2	14.7	15.2	29.2	14.6	7.9	9.3
Female	8.4	18.6	19.4	30.0	11.2	6.1	6.3
1992 high school graduates							
Male	2.8	10.6	13.0	30.2	14.2	15.2	14.0
Female	2.5	9.6	14.0	32.1	13.3	15.1	13.4

NOTE: Includes 1982 high school graduates who entered postsecondary education by December 1984 and 1992 high school graduates who entered postsecondary education by December 1994. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores (HS&B-So:80/92) and National Education Longitudinal Study of 1988 (NELS:88/2000).

Furthermore, it appears that women closed the existing gender gap in terms of the highest mathematics course taken in high school. Among the 1982 cohort, men were more likely than women to take trigonometry, precalculus, and calculus, but among the 1992 cohort, no gender differences could be detected in the highest mathematics course taken in high school. Among the earlier cohort, in total, 32 percent of men and 24 percent of women took trigonometry, precalculus, or calculus, and among the later cohort, 43 percent of men and 42 percent of women did so.

Grade Point Average

Between 1982 and 1992, the high school grade point average (GPA) of graduates who entered postsecondary education by the end of their second year out of high school increased for

both men and women (table 9). For men, the average GPA increased from 2.68 in the first cohort to 2.74 in the second cohort, and for women the average GPA increased from 2.85 to 2.91. In both cohorts, the average GPA for women was 0.17 points higher than that of men.

Table 9. Percentage distribution of 1982 and 1992 high school graduates who entered postsecondary education within 2 years, by high school grade point average (GPA) and gender

Gender	Less than 2.50	2.50–2.99	3.00–3.49	3.50 or greater	Average
1982 high school graduates					
Male	41.9	25.2	20.4	12.5	2.68
Female	31.6	24.3	26.3	17.8	2.85
1992 high school graduates					
Male	34.7	29.5	21.3	14.5	2.74
Female	24.1	26.7	28.2	21.0	2.91

NOTE: Includes 1982 high school graduates who entered postsecondary education by December 1984 and 1992 high school graduates who entered postsecondary education by December 1994. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores (HS&B-So:80/92) and National Education Longitudinal Study of 1988 (NELS:88/2000).

Of 1982 and 1992 high school graduates who entered postsecondary education by the end of their second year after high school, the percentage of students in the lowest high school GPA category (less than 2.50) decreased (from 42 percent to 35 percent for men and from 32 to 24 percent for women). However, for men, the corresponding increase was in the second to lowest GPA category (2.50–2.99, where it increased from 25 percent to 30 percent); for women, the increase was in the highest GPA category (3.50 or greater, where it increased from 18 percent to 21 percent).

For both cohorts, women were more likely than men to have a GPA of 3.00 or greater, and conversely, men were more likely to have a GPA of less than 2.50. Among the latter cohort, for example, 49 percent of women and 36 percent of men had a GPA of 3.00 or greater, while 24 percent of women and 35 percent of men had a GPA of less than 2.50.

Senior Test Score

In their senior year in high school, students completed a series of cognitive tests. The combined tests included 116 items to be completed in 85 minutes and covered four subject areas, including reading comprehension; mathematics; science; and history, citizenship, and geography. Table 10 shows the senior test scores for both cohorts as a percentage distribution by five levels. Among high school graduates who went to college, over half were in the top 40 percent, and 10

Table 10. Percentage distribution of 1982 and 1992 high school graduates who entered postsecondary education within 2 years, by senior test level and gender

Gender	Bottom 20 percent	Lower middle 20 percent	Middle 20 percent	Upper middle 20 percent	Top 20 percent
1982 high school graduates					
Male	5.3	12.6	18.1	26.2	37.9
Female	8.2	16.5	20.2	25.0	30.1
1992 high school graduates					
Male	9.3	11.7	20.9	25.2	32.9
Female	8.0	14.8	21.5	26.0	29.7

NOTE: Includes 1982 high school graduates who entered postsecondary education by December 1984 and 1992 high school graduates who entered postsecondary education by December 1994. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores (HS&B-So:80/92) and National Education Longitudinal Study of 1988 (NELS:88/2000).

percent or less were in the lowest 20 percent. Between 1982 and 1992, the percentage of men who scored in the top 20 percent on the senior test decreased, while the percentage in the lowest 20 percent increased. For women, no difference could be detected between the two cohorts in the percentage distribution by senior test levels.

Thus, in the 1982 cohort, women who went on to college were more likely than their male counterparts to be in the lowest 40 percent, but in the 1992 cohort, no such difference could be detected. Although the gap in senior test scores by gender seems to have narrowed, for both cohorts, men were more likely than women to score in the top 20 percent (38 vs. 30 percent among the 1982 cohort and 33 vs. 30 percent among the 1992 cohort). In other words, although senior test scores for women were similar in both cohorts, men did not perform as well in the second cohort. As a result, the gender gap in senior test scores narrowed, although men were still more likely to be in top 20 percent.

As noted earlier, the academic preparation data presented above is based on cohorts of men and women who graduated from high school in 1982 and 1992. Although the same data is not available for any cohorts of high school graduates in the current decade, Freeman (2004) reported gender differences in educational expectations and college preparatory coursework. In particular, 2000 high school transcript data revealed that young women were more likely to complete advanced placement (AP) courses and to take the AP exams. The same study also reported that female high school seniors in 2001 were more likely than their male peers to report definite plans to graduate from a 4-year college.

Attainment by High School Academic Intensity

Between 33 and 40 percent of male and female 1982 and 1992 high school graduates who had entered postsecondary education by the end of their second year after high school had not attained more than a high school diploma by 1992 or 2000, respectively, and 41–50 percent had attained a bachelor’s degree or higher⁶ (table 11). For men, no difference could be detected in the percentage of 1982 and 1992 high school graduates who had entered postsecondary education and had earned a bachelor’s degree or higher (45 percent in both years). For women, the percentage earning a bachelor’s degree or higher increased between the 1982 and 1992 cohorts: 41 percent of women in the earlier cohort had attained a bachelor’s degree or higher by 1992, while half of the women in the later cohort had reached this level of attainment by 2000. No difference could be detected between the two cohorts in the percentage earning no more than a high school degree, a pattern that held for both men and women.

Among 1992 high school graduates who entered postsecondary education by December 1994, women were more likely than men to earn a bachelor’s degree or higher (50 vs. 45 percent), and men were more likely than women to earn no more than a high school diploma (40 vs. 33 percent). This pattern differed from that for the earlier cohort, in which no difference could be detected by gender in the percentage whose highest degree earned was a high school diploma or bachelor’s degree or higher. In this case, it appears that the gender disparity in bachelor’s degree attainment is a result of an increase between the cohorts in attainment rates for women.

High School Academic Intensity: Highest Level

Students performing at the highest academic intensity level for high school preparation are expected to go on to college and to be academically prepared to succeed once there. The attainment patterns for all students who graduated high school and went on to postsecondary education generally held for students in the top 20 percent in the academic intensity indicator. For men in the top 20 percent, no differences were detected between the two cohorts in the percentage who had attained a bachelor’s degree or higher or had earned no more than a high school diploma (table 11). For women in the top 20 percent, the percentage who had earned a bachelor’s degree increased between the two cohorts (from 73 percent to 82 percent), while no

⁶ Degree attainment was determined 10 years after high school graduation for the 1982 cohort and 8 years after for the 1992 cohort. Therefore, it might be expected that attainment rates would be higher for the earlier cohort given the longer time frame. However, this did not appear to be the case. On the contrary, women increased the rate at which they earned bachelor’s degrees in the later cohort, while no difference was detected between cohorts for men. Moreover, for this analysis the main comparison is between men and women within cohorts rather than between time periods. Men and women do not differ in the rate at which they earn a bachelor’s degree in more than 6 years according to findings based on all bachelor’s degree recipients using the Baccalaureate and Beyond survey (McCormick and Horn 1996).

Table 11. Percentage distribution of 1982 and 1992 high school graduates who entered postsecondary education within 2 years, by highest degree attained, high school academic intensity, and gender: 1992 and 2000

Gender	High school	Certificate	Associate's	Bachelor's degree or higher		
				Total	Bachelor's	Post-bachelor's
Total						
1982 high school graduates						
Male	36.8	8.2	9.6	45.4	37.1	8.3
Female	35.6	11.0	12.5	41.0	34.9	6.0
1992 high school graduates						
Male	39.5	6.3	8.9	45.2	40.7	4.6
Female	32.9	7.8	9.3	50.0	44.1	6.0
High school academic intensity: Top 20 percent¹						
1982 high school graduates						
Male	21.9	2.5	4.7	70.8	53.8	17.0
Female	17.7	3.5	6.1	72.7	58.6	14.1
1992 high school graduates						
Male	23.8	1.3	3.1	71.9	61.0	10.9
Female	13.0	1.9	2.8	82.3	70.3	12.0
High school academic intensity: Middle 60 percent¹						
1982 high school graduates						
Male	41.9	8.8	12.0	37.3	32.5	4.8
Female	39.0	11.8	13.7	35.4	31.3	4.2
1992 high school graduates						
Male	42.0	6.3	10.9	40.7	37.6	3.1
Female	34.3	8.8	12.6	44.3	39.7	4.6
High school academic intensity: Bottom 20 percent¹						
1982 high school graduates						
Male	58.4	21.1	11.6	8.9	8.9	0.0
Female	50.2	20.9	21.6	7.3	6.7	0.6
1992 high school graduates						
Male	58.6	14.1	15.8	11.5	11.2	0.3
Female	53.9	19.4	13.9	12.7	12.4	0.4

¹High school academic intensity is a composite measure of students' highest level of mathematics, total mathematics credits, total Advanced Placement courses (AP), total English credits, total foreign language credits, total science credits, total core laboratory science credits, total social science credits, and total computer science credits. For more information, see Adelman, C., Daniel, B., and Berkovits, I. (2003). *Postsecondary Attainment, Attendance, Curriculum, and Performance* (NCES 2003-394).

NOTE: Includes 1982 high school graduates who entered postsecondary education by December 1984 and 1992 high school graduates who entered postsecondary education by December 1994. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond Longitudinal Study of 1980 Sophomores (HS&B-So:80/92) and National Education Longitudinal Study of 1988 (NELS:88/2000).

statistical difference could be detected between the two cohorts in the percentage earning no more than a high school diploma.

Among 1992 high school graduates who scored in the top 20 percent for the academic intensity indicator and who went on to college, men were more likely than women to earn no more than a high school diploma, while women were more likely than men to earn a bachelor's degree or higher, differences not detected in the 1982 cohort. That is, in the 1992 cohort, 24 percent of men and 13 percent of women had earned no more than a high school diploma by 2000, while 72 percent of men and 82 percent of women had earned a bachelor's degree or higher. No differences could be detected between men and women in the percentage earning a certificate or associate's degree in the same cohort. So, in addition to improving their academic preparation relative to men, even among students who were better prepared academically in high school and had entered college, women were more likely than men to attain a bachelor's degree.

High School Academic Intensity: Lowest Level

As would be expected, students who scored in the bottom 20 percent of the academic intensity indicator had lower rates of postsecondary attainment (table 11). In both cohorts, between 50 and 59 percent of high school graduates who scored in the bottom 20 percent for the academic intensity indicator and who went on to college earned no more than a high school diploma. For men in the bottom 20 percent, no differences could be detected between the two cohorts in the highest degree attained. For women, the percentage earning a bachelor's degree or higher increased over time (from 7 percent to 13 percent) and the percentage earning an associate's degree decreased (from 22 percent to 14 percent). Thus, it appears that even among women who are less academically prepared for college, those in the later cohort increased their chances of attaining a bachelor's degree, compared with their counterparts in the earlier cohort. Nonetheless, for both cohorts, no differences could be detected between men and women in the bottom 20 percent of the academic intensity scale in their rates of postsecondary attainment, with one exception: in 1982 women were more likely than men to earn an associate's degree.

Postsecondary Persistence and Degree Completion

The following section compares two cohorts of students who began their postsecondary education in 1989–90 and 1995–96. Unlike the previous section, this includes all beginning postsecondary students, not just recent high school graduates. Comparing students who first began their postsecondary education in 1989–90 with those who first enrolled 6 years later in 1995–96, Horn and Berger (2004) found that roughly two-thirds of students in both cohorts had either completed a postsecondary credential or were still enrolled 5 years after beginning their

postsecondary studies. The total degree completion rate was lower for the 1995–96 beginners than for their 1989–90 counterparts; however, the study detected no changes in bachelor’s degree completion rates for either men or women. At the same time, an increase was observed in the percentage of students who had not yet completed a degree but were still enrolled in a 4-year institution 5 years after beginning their postsecondary studies. The apparent decrease in the percentage of students who had completed a postsecondary credential between the two cohorts was statistically significant only for women: 53 percent of women completed a certificate, associate’s, or bachelor’s degree in the first cohort, and 49 percent did so in the second. However, when persistence was included in the measure (i.e., either completed or were enrolled 5 years later), no difference could be detected between the two cohorts in the percentage who completed or persisted for either men or women. Their findings suggest that women in the second cohort may be taking longer than 5 years to attain a credential and that ultimately, they may have similar rates of attainment as those of their counterparts in the first cohort.

The current study determined that among 1989–90 beginning postsecondary students, women were more likely than men to complete each type of degree and less likely to be not enrolled without a degree (table 12). In the first cohort, 53 percent of women had attained a degree and 46 percent of men had done so, while 36 percent of women had left without a degree and 38 percent of men had done so. In the second cohort, it also appears that women still were more likely than men to complete a degree in 5 years (49 vs. 44 percent), but the apparent difference was not statistically significant. Similarly, when persistence was included, no difference could be detected in the 5-year persistence and completion rates between men and women.

Persistence and attainment was also analyzed for specific types of institutions. For both men and women, the percentage who completed or persisted at public 4-year institutions increased between the two cohorts (from 70 to 76 percent for men and from 75 to 79 percent for women). While women were more likely than men to complete or persist at public 4-year institutions in the first cohort, no difference could be detected by gender in the second cohort. For private not-for-profit 4-year institutions and public 2-year institutions, no difference could be detected in the rates of persistence and completion between men and women in each cohort.

Traditional College Students and Persistence

For students identified as “traditional” college students—that is, dependent students who enrolled in postsecondary education full time immediately after high school graduation—gender differences in persistence and completion rates portray a different pattern. Among men who were traditional students, no difference could be detected between the two cohorts in the likelihood of

Table 12. Percentage of 1989–90 and 1995–96 beginning postsecondary students who had completed a degree or were still enrolled 5 years after beginning postsecondary education, by type of first institution attended, gender, and year enrolled

Gender	Total completed	Highest degree completed			Persistence status		Total completed or persisted	No degree, not enrolled
		Certificate	Associate's degree	Bachelor's degree	Still enrolled at 2-year or less	Still enrolled at 4-year		
Total¹								
1989–90								
Male	45.9	11.3	10.2	24.4	5.6	10.0	61.6	38.4
Female	53.3	14.4	12.1	26.7	4.8	6.3	64.5	35.5
1995–96								
Male	44.0	9.6	10.6	23.8	6.6	13.7	64.3	35.7
Female	49.0	13.4	9.1	26.5	6.6	9.5	65.1	34.9
Public 4-year								
1989–90								
Male	49.3	2.4	4.8	42.1	2.1	19.1	70.4	29.6
Female	59.2	3.8	4.7	50.6	2.5	13.8	75.4	24.6
1995–96								
Male	48.8	1.9	3.6	43.3	5.0	22.2	76.1	23.9
Female	57.6	3.2	4.1	50.3	2.7	18.9	79.3	20.7
Private not-for-profit 4-year								
1989–90								
Male	70.4	2.2	2.3	65.9	0.6	9.2	80.2	19.8
Female	73.5	2.4	3.7	67.4	1.8	5.4	80.7	19.3
1995–96								
Male	66.6	1.5	2.6	62.5	2.3	12.9	81.8	18.2
Female	73.9	1.6	2.6	69.7	1.8	8.4	84.1	15.9
Public 2-year								
1989–90								
Male	33.8	12.7	15.5	5.6	10.5	6.7	50.9	49.1
Female	39.6	13.2	19.4	7.0	8.7	3.7	51.9	48.1
1995–96								
Male	32.2	9.0	16.4	6.8	9.7	12.0	53.8	46.2
Female	31.8	9.6	15.0	7.2	11.3	7.1	50.3	49.7

¹Includes students at institutions not shown separately.

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1990/94 Beginning Postsecondary Students Longitudinal Study (BPS:90/94) and 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

completing a degree or certificate (table 13). However when persistence is taken into account, the percentage who either completed or were still enrolled after 5 years increased from 72 percent to 76 percent. For women who were traditional students, the percentage completing a degree decreased between the two cohorts, from 69 percent to 62 percent due to a decline in associate's degree or certificate completion. However, no difference could be detected between the two cohorts in the percentage who completed a degree or were still enrolled 5 years after they had begun postsecondary education (79 percent each).

Among 1989–90 and 1995–96 beginning postsecondary students identified as traditional college students, women were more likely than men to complete a postsecondary credential (certificate, associate's degree, or bachelor's degree) within 5 years. Among the first cohort, 69 percent of women and 55 percent of men had completed a postsecondary credential, and among the second cohort, 62 percent of women and 54 percent of men had done so. However, once persistence and completion were considered together, no significant difference could be detected between men and women in the second cohort, again, indicating that men may be taking longer than women to complete a credential. This pattern held in all institution types: among the 1995–96 cohort, no difference could be detected by gender in total completion and persistence rates for traditional students at public 4-year institutions, private not-for-profit 4-year institutions, and public 2-year institutions.

Reasons for Leaving Postsecondary Education

Thirty-two percent of 1995–96 beginning postsecondary students had left college without earning a credential within 3 academic years (Bradburn 2003). Those beginning postsecondary students who had left by 1998 without a credential gave a variety of reasons for their departure (table 14). Students could identify up to three reasons for leaving postsecondary education, and about one-quarter did not cite any of the reasons.

Men were most likely to report that they had left because they needed to work (28 percent). Twelve percent cited other financial reasons, 10 percent each said they were not satisfied or had completed the classes they wanted, and 6–7 percent said that they were taking time off from their studies, had conflicts with their job, conflicts at home or personal problems, or academic problems. Four percent of men cited a change in their family status as a reason for leaving college. For women, 17–18 each percent reported that they had left because they needed to work or had other financial reasons, 14 percent cited conflicts at home or personal problems, 12 percent cited a change in family status, and 11 percent said they were done taking their desired classes. Between 5 and 7 percent of women gave conflicts with job, taking time off, and not satisfied as reasons for their departure, and 2 percent of women cited academic problems.

Table 13. Percentage of 1989–90 and 1995–96 beginning postsecondary students identified as traditional college students who had completed a degree or were still enrolled 5 years after beginning postsecondary education, by type of first institution attended, gender, and year enrolled

Gender	Total completed	Highest degree completed		Persistence status		Total completed or persisted	No degree, not enrolled	
		Certificate	Associate's degree	Bachelor's degree	Still enrolled at 2-year or less			Still enrolled at 4-year
Total¹								
1989–90								
Male	55.4	4.2	11.4	39.8	2.4	13.7	71.5	28.5
Female	69.1	8.4	13.5	47.3	1.6	8.7	79.3	20.7
1995–96								
Male	53.7	3.0	11.0	39.7	4.9	17.3	75.9	24.1
Female	61.7	5.3	8.4	48.0	4.5	12.6	78.8	21.2
Public 4-year								
1989–90								
Male	54.8	1.9	4.8	48.0	2.2	19.5	76.4	23.6
Female	64.0	3.2	3.7	57.1	2.0	14.9	80.9	19.1
1995–96								
Male	54.3	1.2	3.6	49.5	4.9	21.1	80.3	19.7
Female	62.8	2.2	3.2	57.4	2.4	18.7	84.0	16.0
Private not-for-profit 4-year								
1989–90								
Male	72.8	1.2	1.9	69.6	0.6	9.3	82.6	17.4
Female	80.4	2.0	3.3	75.1	1.6	4.2	86.2	13.8
1995–96								
Male	71.8	0.4	2.7	68.7	1.8	12.9	86.4	13.6
Female	78.5	0.9	2.1	75.6	1.4	7.8	87.7	12.3
Public 2-year								
1989–90								
Male	42.2	4.9	27.3	10.0	4.8	11.8	58.8	41.2
Female	64.2	9.0	36.9	18.3	1.0	4.9	70.1	29.9
1995–96								
Male	40.7	3.9	23.6	13.3	7.0	17.6	65.2	34.8
Female	44.8	6.5	20.7	17.6	9.0	10.5	64.3	35.7

¹Includes students at institutions not shown separately.

NOTE: Traditional college students are defined as dependent students who enrolled in postsecondary education full time immediately after high school graduation. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1990/94 Beginning Postsecondary Students Longitudinal Study (BPS:90/94) and 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

Table 14. Percentage of 1995–96 beginning postsecondary students leaving by spring 1998 who gave various reasons for their departure, by gender

	Academic problems	Done taking desired classes	Not satisfied	Taking time off	Change in family status	Conflicts at home/ personal problems	Conflicts with job/ military	Needed to work	Other financial reasons
Male	5.9	10.0	10.2	6.5	3.9	5.9	6.7	28.4	12.2
Female	2.2	10.9	7.1	5.7	12.0	14.2	4.9	18.1	17.0

NOTE: Includes students who left postsecondary education without a credential and without returning by spring 1998. Excludes students who began at private not-for-profit less-than-4-year institutions, public less-than-2-year institutions, or private for-profit institutions. Students could identify up to three reasons for leaving postsecondary education, and about one-quarter did not cite any of the reasons.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

Men were more likely than women to cite academic problems (6 vs. 2 percent) or the need to work (28 vs. 18 percent) as reasons for their departure, while women were more likely to cite a change in family status (12 vs. 4 percent) or conflicts at home or personal problems (14 vs. 6 percent).

Summary

A comparison of 1982 and 1992 high school graduates who entered postsecondary education by the end of their second year out of high school revealed a change in the high school academic preparation of men and women. Between the two cohorts, some existing gender gaps in high school academic preparation narrowed and, in some cases, women even surpassed men. For example, in the case of GPA, although both men and women improved between the two cohorts, women improved more. In addition, among the two cohorts of high school graduates who went on to college, the percentage of women who earned a bachelor’s degree increased, while there was no corresponding increase among men. Thus, no gender difference could be detected in the percentage of 1982 high school graduates who entered college by December 1984 whose highest attainment was a high school diploma or bachelor’s degree or higher. On the other hand, among 1992 high school graduates who entered postsecondary education by December 1994, women were more likely than men to earn a bachelor’s degree or higher, and men were more likely to earn no more than a high school diploma. These relationships held for those in the highest level of academic intensity in high school. So, in addition to improving their academic preparation with respect to men, even among students who were better prepared academically in high school and had entered college, women were more likely than men to attain a bachelor’s degree.

Gender differences were also found for attainment among beginning postsecondary students. For 1989–90 beginning postsecondary students, women were more likely than men to complete some type of degree and less likely to have left without a degree. Among the 1995–96 cohort, women were still more likely than men to complete a degree within 5 years; however, no difference could be detected between men and women in the percentage who completed a degree or were still enrolled 5 years after they had begun postsecondary education.

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Early Labor Market Outcomes Among Bachelor's Degree Recipients

Employment Status

The majority of 1992–93 and 1999–2000 bachelor's degree recipients (over 85 percent) were employed 1 year after graduation (table 15). Among men, those who graduated in 1999–2000 were more likely than those who graduated in 1992–93 to be working 1 year later (89 vs. 86 percent). The percentage of men who were out of the labor force decreased (from 9 percent to 5 percent), and no difference was detected in the unemployment rate between the two groups. Among women, the unemployment rate increased between the two cohorts, from 5 percent to 7 percent, but no difference was detected in the overall percentage of those who were working or who were out of the labor force. There was, however, an increase in the percentage of women who were working full time (from 72 percent in 1994 to 74 percent in 2001) and a decrease in the percentage who were working part time (from 16 percent to 13 percent).

Among the second cohort, men were more likely than women to be working 1 year after graduation (89 vs. 86 percent), and women were more likely than men to be out of the labor force (8 vs. 5 percent). Among 1992–93 bachelor's degree recipients, no difference was detected between men and women in the percentages who were working, the percentages who were out of the labor force, or the unemployment rate. For both cohorts, men were more likely than women to be working full time, and women were more likely than men to be working part time. In 1999–2000, 81 percent of men were working full time and 9 percent were working part time, compared with 74 and 13 percent, respectively, among women.

Average Annual Salary

Comparing 1992–93 with 1999–2000 bachelor's degree recipients who were employed full time 1 year after graduation, the average annual salary earned (in constant 2001 dollars) increased for both men and women (table 16). For men, the average annual salary earned increased from \$32,500 to \$39,400. Further, the percentage of men earning less than \$25,000 declined by 22 percentage points (from 36 percent to 14 percent), while the percentage earning \$45,000 or more increased by 19 percentage points (from 12 percent to 31 percent). For women, the average annual salary earned increased from \$27,400 to \$32,600. Most notably, for women, the

Table 15. Percentage distribution of 1992–93 and 1999–2000 bachelor's degree recipients by their employment status and the corresponding unemployment rate 1 year after graduation, by gender

Gender	Employment status					Unemployment rate ²
	Total	Working		Unemployed ¹	Out of labor force	
		Full time	Part time			
1992–93 bachelor's degree recipients						
Male	86.4	75.1	11.3	4.8	8.8	5.3
Female	87.3	71.5	15.8	4.4	8.4	4.8
1999–2000 bachelor's degree recipients						
Male	89.3	80.5	8.9	5.9	4.8	6.2
Female	86.1	73.6	12.5	6.3	7.6	6.8

¹Includes unemployed (with or without benefits) for 1992–93 bachelor's degree recipients and includes unemployed and waiting to report to work or laid off for 1999–2000 bachelor's degree recipients.

²The unemployment rate is constructed to approximate the definition of the unemployment rate used by the Bureau of Labor Statistics. In this table, the rate is calculated as the number of people who are unemployed divided by all those who are in the labor force (unemployed plus those who are working; respondents who are out of the labor force are excluded from the calculation).

NOTE: Detail may not sum to totals because rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/97 and 2000/01 Baccalaureate and Beyond Longitudinal Studies (B&B:93/97 and B&B:2000/01).

proportion of graduates working full time and earning an average annual salary of less than \$25,000 decreased from about one-half of 1992–93 bachelor's degree recipients (52 percent) to one-quarter of 1999–2000 graduates.

For both 1992–93 and 1999–2000 bachelor's degree recipients who were employed full time 1 year after graduation, women had a lower average salary than men: on average, women earned \$5,100 less than men or roughly 84 percent of what men earned in 1994; in 2001 women earned \$6,800 less than men or 83 percent of what men earned in 2001. In 2001, 31 percent of men and 14 percent of women earned \$45,000 or more—a difference of 17 percentage points. Among the first cohort, 12 percent of men and 7 percent of women were earning \$45,000 or more 1 year out of college—a difference of 5 percentage points. It appears that, in addition to men earning higher average salaries than women in both cohorts, the gender gap in salaries may, in fact, be widening.

Average Annual Salary by Degree Field

Even when controlling for undergraduate field of study, men earned higher average annual salaries than women in roughly half of the fields examined. In addition, the data in table 16

Table 16. Among 1992–93 and 1999–2000 bachelor's degree recipients who were employed full time 1 year after graduation, percentage distribution by amount earned and average amount earned, undergraduate field of study, and gender: 1994 and 2001

Gender	Average annual amount earned (in constant 2001 dollars)					Average annual salary
	\$1–24,999	\$25,000–29,999	\$30,000–34,999	\$35,000–44,999	\$45,000 or more	
Total						
1994						
Male	36.4	18.7	14.5	18.0	12.4	\$32,500
Female	52.4	21.2	9.8	10.0	6.5	27,400
2001						
Male	14.3	13.3	17.4	24.3	30.7	39,400
Female	24.1	20.6	20.9	20.3	14.1	32,600
Business/management						
1994						
Male	29.6	19.6	16.7	21.0	13.1	33,600
Female	43.3	21.6	12.7	12.6	9.8	29,900
2001						
Male	7.1	9.4	18.5	31.4	33.7	42,300
Female	10.6	13.0	19.5	32.9	24.1	39,000
Education						
1994						
Male	53.5	22.2	9.3	4.7	10.3	35,100
Female	66.0	24.2	7.0	1.9	0.9	21,900
2001						
Male	22.7	31.7	24.4	12.2	8.9	29,600
Female	26.6	34.4	27.5	8.9	2.6	28,100
Engineering, mathematics, and sciences¹						
1994						
Male	25.8	16.9	16.6	25.9	14.8	33,300
Female	51.4	17.9	10.6	13.3	6.8	27,900
2001						
Male	7.9	5.9	11.5	23.2	51.4	45,200
Female	24.1	15.7	14.3	21.7	24.2	34,200

See notes at end of table.

Table 16. Among 1992–93 and 1999–2000 bachelor's degree recipients who were employed full time 1 year after graduation, percentage distribution by amount earned and average amount earned, undergraduate field of study, and gender: 1994 and 2001—Continued

Gender	Average annual amount earned (in constant 2001 dollars)					Average annual salary
	\$1–24,999	\$25,000–29,999	\$30,000–34,999	\$35,000–44,999	\$45,000 or more	
Humanities and social/behavioral science						
1994						
Male	49.1	19.8	11.4	11.9	7.7	27,300
Female	61.2	24.1	7.3	5.3	2.1	26,500
2001						
Male	23.2	18.0	19.6	20.6	18.6	34,600
Female	32.7	21.6	22.6	15.6	7.6	29,400
Health, vocational/technical, and other technical/professional fields						
1994						
Male	43.5	16.2	13.5	12.9	14.0	35,400
Female	40.3	16.2	12.0	18.3	13.1	30,300
2001						
Male	16.7	15.7	18.3	25.1	24.2	38,100
Female	19.9	19.1	18.5	23.8	18.8	34,300

¹Sciences include life sciences, physical sciences, and computer/information science.

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/97 and 2000/01 Baccalaureate and Beyond Longitudinal Studies (B&B:93/97 and B&B:2000/01).

suggest that the disparity may be increasing in some cases. For example, in both cohorts, men who majored in engineering, mathematics, and science fields earned higher average annual salaries than women who majored in these fields (\$33,300 vs. \$27,900 in 1994 and \$45,200 vs. \$34,200 in 2001, respectively). In other words, women with degrees in these fields earned, on average, \$5,400 less than men or roughly 84 percent of what men earned in 1994, and about \$11,000 less than men or 76 percent of what men earned in 2001. Also, in 2001, about one-half of men in these fields (51 percent) earned \$45,000 or more, compared with about one-fourth of women.

In some fields, gender disparities in annual salaries were evident in the later cohort that were not observed earlier. In 2001, men with bachelor's degrees in fields comprising humanities and social/behavioral sciences, health fields, vocational/technical fields, and other technical/professional fields earned higher full-time salaries than women in the same fields.

These differences were not detected in the 1994 cohort. Although it appears that men in the first cohort with bachelor's degrees in health fields, vocational/technical fields, and other technical/professional fields earned higher average salaries than their female counterparts, the apparent difference was not statistically significant. In business/management fields it also appears that men earned higher average annual salaries than women, but the difference was only statistically significant in 1994. Still, 34 percent of men with a business degree were earning \$45,000 or more in 2001, compared with 24 percent of their female peers. Although it appears that men in the first cohort with bachelor's degrees in education earned higher average salaries than their female counterparts, the apparent difference was not statistically significant. For both years, no gender difference was detected in the average annual salary of graduates with a degree in education.

Summary

One year after attaining their bachelor's degree, men and women displayed different patterns of employment. While both men and women were more likely to be working full time than part time, for both cohorts, men were more likely than women to be working full time, and women were more likely than men to be working part time. Over the period studied, the unemployment rate for men held steady, while it increased for women. Among bachelor's degree recipients who were employed full time 1 year after graduation in 1994 and 2001, women earned less than men in both cohorts. Furthermore, the gender gap in salaries may have been widening. Even when controlling for undergraduate field of study, men earned higher salaries than women in several fields.

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Conclusions

Over the past two decades, the rates at which women have enrolled in undergraduate education and attained college degrees increased at faster rates than those of men. Part of this increase may be related to an increase in the percentage of traditional students who were women, although women are still overrepresented among nontraditional students. In addition, in 1999–2000, women made up a greater percentage of Black students than they did among White, Hispanic, and Asian/Pacific Islander students and Black women earned proportionally more associate’s and bachelor’s degrees than Black men.

When looking at high school academic preparation among 1982 and 1992 high school graduates who entered postsecondary education within 2 years of high school completion, women closed some existing gender gaps and, in some cases, surpassed men. In the later cohort, even among students who had higher levels of high school academic preparation, women were more likely than men to earn a bachelor’s degree—a difference not found in the earlier cohort.

Among 1989–90 beginning postsecondary students, women were more likely than men to complete a degree and less likely to have left without a degree. Among the 1995–96 cohort, women were still more likely than men to complete a degree within 5 years. No difference could be detected, however, between men and women 5 years after they had begun postsecondary education in their combined rate of completion and persistence, suggesting that men may be taking longer than women to complete their degrees.

Despite these changes, as of 2001, women were still less likely to be employed full time 1 year after graduation. Between 1994 and 2001, the unemployment rate for men who had graduated the previous year held steady, while it increased for women. Still, for the more recent cohort, no difference could be detected in the unemployment rate for bachelor’s degree recipients by gender. Considering bachelor’s degree recipients who were employed full time 1 year after graduation in 2001, the average earnings for women were lower than for men. Further, the gender gap in salaries may, in fact, be widening.

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NPSAS

Age

AGE

Indicates student's age on December 31 of the sampled academic year.

- 18–23
- 24–29
- 30–39
- 40 years or older

Attendance intensity

ATTNSTAT

Indicates undergraduates who attended full time during the academic year.

Dependency status

DEPEND5A

Student dependency status for financial aid including marital status. Students were considered independent if they met one of the following criteria:

- 1) Student was 24 years old or older as of December 31 of the sampled academic year;
- 2) Student was a veteran of the U.S. Armed Forces;
- 3) Student was enrolled in a graduate or professional program (beyond a bachelor's degree) during the sampled academic year;
- 4) Student was married;
- 5) Student was an orphan or ward of the court; or
- 6) Student had legal dependents other than spouse.

- Dependent
- Independent
 - Never married, no children
 - Married/separated, no children
 - Married/separated, children
 - Single parent

Gender

GENDER

Student's gender.

- Male
- Female

Hours worked per week while enrolled***DAS Variable Name******EMWKHR3 (1990)******HRSWORK (1996)******NDHOURS (2000)***

Response to the question “how many hours did you work per week while you were enrolled?” This variable was asked in the CATI.

Did not work
1–24 hours
25–34 hours
More than 34 hours

Income level***PCTPVRTY (1990)******PCTPOV94 (1996)******PCTPOV98 (2000)***

Indicates income level for all students based on the percent poverty levels for the given year. Low-income levels represent those whose family income did not exceed 125 percent of the established poverty level. The remaining levels are evenly distributed above the low-income group. The source of income for dependent students is their parents or guardians; the source for independent students is their own earnings and assets.

Low income
Middle low income
Middle high income
High income

Race/ethnicity***RACE (1990, 1996)******RACE1 (2000)***

Student’s race/ethnicity, including Hispanic/Latino.

American Indian
Asian/Pacific Islander
Black
White
Hispanic

Risk status for not completing***RISKNDX2 (1990, 1996)******RISKNDX (2000)***

Represents an index of risk from 0–7 related to 7 characteristics known to adversely affect persistence and attainment. This variable was derived from items asked in the CATI. Characteristics included are the following:

- a) Delayed enrollment after high school
- b) No high school diploma (including GED recipients)
- c) Part-time enrollment
- d) Financial independence
- e) Having dependents other than spouse
- f) Single parent status
- g) Working full time while enrolled (35 hours or more)

No risk factors
One or more risk factors

DAS Variable Name

Type of institution

AIDSECT

Indicates the level and control of the institution attended.

Public 4-year
Private not-for-profit 4-year
Public 2-year
All for-profit
Other

HS&B and NELS

Gender

SEX (HS&B)
F4SEX (NELS)

Student's gender.

Male
Female

Grade point average

SST_GPA (HS&B)
GPA (NELS)

Student grade point average (GPA) for all high school courses taken for a grade on a 4.0 scale.

Less than 2.50
2.50–2.99
3.00–3.49
3.50 or greater

High school academic intensity

ACCURHSQ

A composite measure of students' highest level of mathematics, total mathematics credits, total Advanced Placement courses, total English credits, total foreign language credits, total science credits, total core laboratory science credits, total social science credits, and total computer science credits.

Bottom 20 percent
Lower middle 20 percent
Middle 20 percent
Upper middle 20 percent
Top 20 percent

Highest degree attained***DAS Variable Name******HIGHDEG (HS&B)******F4HHDG (NELS)***

Highest postsecondary degree attained as of 1992 and 2000 for 1982 and 1992 high school graduates, respectively.

High school
 Certificate
 Associate's
 Bachelor's degree or higher
 Bachelor's
 Post-bachelor's

Highest mathematics course***HIGHMATH***

Highest level of mathematics completed in high school.

Less than Algebra 1
 Algebra 1
 Geometry
 Algebra 2
 Trigonometry
 Pre-calculus
 Calculus

Senior test quintile***SRTSQUIN***

In their senior year in high school, students completed a series of cognitive tests. The combined tests included 116 items to be completed in 85 minutes and covered four subject areas including reading comprehension; mathematics; science; and history, citizenship, and geography. Senior test score shown in quintiles.

Bottom 20 percent
 Lower middle 20 percent
 Middle 20 percent
 Upper middle 20 percent
 Top 20 percent

BPS

Degree attainment and persistence

ATTENRST (1994)
PRENRL2A (2001)

Indicates the highest degree the student attained or the level of the institution in which the student is still enrolled if no degree had been attained, as of June 1994 and 2001.

- Total completed
 - Certificate
 - Associate’s degree
 - Bachelor’s degree
- Still enrolled at 2-year or less
- Still enrolled at 4-year
- Total completed or persisted
- No degree, not enrolled

Gender

H_GENDR (1994)
SBGENDER (2001)

Student’s gender.

- Male
- Female

Reasons for leaving (BPS:96/01)

- | | |
|--|------------------------|
| <i>Academic problems</i> | <i>RLACADB1</i> |
| <i>Done taking desired classes</i> | <i>RLDONEB1</i> |
| <i>Not satisfied</i> | <i>RLNOTSB1</i> |
| <i>Taking time off</i> | <i>RLTIMEB1</i> |
| <i>Change in family status</i> | <i>RLFAMIB1</i> |
| <i>Conflicts at home/personal problems</i> | <i>RLHOMEB1</i> |
| <i>Conflicts with job/military</i> | <i>RLJOBBI</i> |
| <i>Needed to work</i> | <i>RLWORKBI</i> |
| <i>Other financial reasons</i> | <i>RLFINAB1</i> |

Applies to 1995–96 beginning postsecondary students who left postsecondary education without a degree by spring 1998. Students were asked why they left. Up to three responses collected and coded into the proper category.

Risk status

RISKNDX2

Represents an index of risk from 0–7 related to 7 characteristics known to adversely affect persistence and attainment. For this report, students with no risk characteristics were considered traditional students. Characteristics included are the following:

- a) Delayed enrollment after high school
- b) No high school diploma (including GED recipients)
- c) Part-time enrollment
- d) Financial independence

DAS Variable Name

- e) Having dependents other than spouse
- f) Single parent status
- g) Working full time while enrolled (35 hours or more)

No risk factors
One or more risk factors

Type of first institution

OFCO8990 (1994)
ITNPSAS (2001)

Level and control of the first institution attended. Students who began at for-profit institutions were not included in breakout analysis.

Public 4-year
Private not-for-profit 4-year
Public 2-year

B&B*Annual salary*

APRANSAL (1997)
CEANNERN (2001)

Average annual amount earned 1 year after graduation in constant 2001 dollars. Salary distribution and average annual salary are presented.

\$1–24,999
\$25,000–29,999
\$30,000–34,999
\$35,000–44,999
\$45,000 or more

Employment status

B2EM9404 (1997)
EMPOLF (2001)

Employment status 1 year after graduation.

Working	Working full time or part time
Full time	Working full time
Part time	Working part time
Unemployed	Not working, but looking for work; laid off; or waiting to report to work
Out of labor force	Not working and not looking for work; homemaker; or disabled
Unemployment rate	The number of people who are unemployed divided by all those who are in the labor force (unemployed plus those who are working; respondents who are out of the labor force are excluded from the calculation).

Gender	DAS Variable Name
	B2RSEX (1997)
	GENDER (2001)
Male	
Female	
 Undergraduate field of study	 MAJORS3 (1997)
	BMAJORS3 (2001)
Major field of study for the bachelor's degree.	
Business/management	
Education	
Engineering, mathematics, and sciences	
Humanities and social/behavioral science	
Health, vocational/technical, and other technical/professional fields	

Appendix B—Technical Notes and Methodology

This analysis uses data from several surveys: three administrations of the National Postsecondary Student Aid Study (NPSAS:90, NPSAS:96, NPSAS:2000); the High School and Beyond Longitudinal Study (HS&B-So:80/92); the National Education Longitudinal Study (NELS:88/2000); two administrations of the Beginning Postsecondary Students Longitudinal Study (BPS:90/94 and BPS:96/01); and two cohorts from the Baccalaureate and Beyond Longitudinal Studies (B&B:93/97 and B&B:2000/01). In addition, this report uses previously published data from the Integrated Postsecondary Education Data System (IPEDS) and the Current Population Survey (CPS).

The survey data underwent several data quality evaluations, which included both on-line data editing procedures and post-data collection editing. The on-line data editing ensured that the data collected fell within legitimate ranges and where feasible, items were cross-checked against other related items. After data collection, the data were cleaned and edited using several steps including verification of one-way frequencies for each item, cross-tabulations of related items, standard variable recoding and formatting (such as dates), the determination of outlier values, and logical imputations. After the data were cleaned and edited, composite variables for specific data analyses were created, which were subjected to similar cleaning and checking procedures.

The following is a description of all surveys used. Analyses from each survey used a representative sample of the 50 states and the District of Columbia. Thus, for surveys such as NPSAS that include Puerto Rico and outlying areas in the sample, these respondents were not included in the analysis.

Integrated Postsecondary Education Data System

The Integrated Postsecondary Education Data System (IPEDS) is the core program that the U.S. Department of Education’s National Center for Education Statistics (NCES) uses for collecting data on postsecondary education (before IPEDS some of the same information was collected by the Higher Education General Information Survey [HEGIS]). IPEDS is a single, comprehensive system that encompasses all identified institutions whose primary purpose is to provide postsecondary education.

IPEDS consists of institution-level data that can be used to describe trends in postsecondary education at the institution, state, and/or national levels. Data are collected from approximately 9,900 postsecondary institutions, including the following: baccalaureate or higher degree-granting institutions, 2-year award institutions, and less-than-2-year institutions (i.e., institutions whose awards usually result in terminal occupational awards or are creditable toward a formal 2-year or higher award). The completion of all IPEDS surveys is mandatory for all institutions that participate or are applicants for participation in any federal financial assistance program authorized by Title IV of the Higher Education Act of 1965.

IPEDS data for this report was initially published in the *Digest of Education Statistics 2003* (NCES 2005–025), tables 186, 189, 246, 261, 264, and 276–297. Further information on the IPEDS can be found at <http://nces.ed.gov/ipeds/>. Further information on the *Digest of Education Statistics* can be found at <http://nces.ed.gov/programs/digest/>.

The Current Population Survey

The Current Population Survey (CPS) is a monthly survey of a nationally representative sample of approximately 50,000 households from the 50 states and the District of Columbia. The CPS has been conducted for more than 50 years. The Bureau of the Census conducts the survey for the Bureau of Labor Statistics, asking a knowledgeable adult household member (known as the “household respondent”) to answer all the questions on all of the month’s questionnaires for all members of the household.

The CPS collects data on the social and economic characteristics of the civilian, noninstitutional population, including information on income, education, and participation in the labor force. However, the CPS does not collect all this information every month. Each month a “basic” CPS questionnaire is used to collect data about participation in the labor force of each household member, 15 years old and above, in every sampled household. In addition, different supplemental questionnaires are administered each month to collect information on other topics.

CPS data for this report was initially published in *The Condition of Education 2002* (NCES 2002–025), indicator 25. Further information on the CPS can be found at <http://www.bls.census.gov/cps>. Further information on *The Condition of Education* can be found at <http://nces.ed.gov/programs/coe/>.

National Postsecondary Student Aid Study

The National Postsecondary Student Aid Study (NPSAS) is a comprehensive nationwide study conducted by NCES to determine how students and their families pay for postsecondary education.¹ It also describes demographic and other characteristics of students enrolled. The NPSAS study is based on a nationally representative sample of all students in postsecondary education institutions, including undergraduate, graduate, and first-professional students. Information is collected from institutions, student interviews, and government data files. For this study, data were analyzed for undergraduates from three administrations of the NPSAS survey: NPSAS:90, NPSAS:96, and NPSAS:2000. These surveys each represent more than 16 million undergraduates who were enrolled at some point between July 1 and June 30 of the survey years. The institutional weighted response rates for these NPSAS administrations all exceeded 85 percent as discussed in the next section.

The NPSAS:90 survey achieved an overall weighted response rate of 86 percent among institutions. For the student Computer Assisted Telephone Interviews (CATI), the response rate was 76 percent.² NPSAS:96 had an institutional response rate of 91 percent and a student CATI response rate of 76 percent.³ For NPSAS:2000, the institutional response rate was 97 percent and the weighted overall student interview response rate was 66 percent.⁴ Because the student telephone interview response rate for NPSAS:2000 was less than 70 percent in some institutional sectors, an analysis was conducted to determine if estimates were significantly biased due to CATI nonresponse. Considerable information was known for CATI nonrespondents and these data were used to analyze and estimate the bias. The distributions of several variables using the design-based, adjusted weights for study respondents (study weights) were found to be biased before CATI nonresponse adjustments. The CATI nonresponse and poststratification procedures, however, adjusted for the bias in these variables; and the remaining relative bias ranged from 0 to 0.35 percent.⁵

¹ For more information on NPSAS, consult the methodology reports for each survey: U.S. Department of Education, National Center for Education Statistics, *Methodology Report for the 1990 National Postsecondary Student Aid Study* (NCES 92–080) (Washington, DC: 1992), *National Postsecondary Student Aid Study, 1995–96 (NPSAS:96), Methodology Report* (NCES 98–073) (Washington, DC: 1997), and *National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000), Methodology Report* (NCES 2002–152) (Washington, DC: 2002).

² U.S. Department of Education, National Center for Education Statistics, *Methodology Report for the 1990 National Postsecondary Student Aid Study* (NCES 92–080) (Washington, DC: 1992).

³ U.S. Department of Education, National Center for Education Statistics, *National Postsecondary Student Aid Study, 1995–96 (NPSAS:96), Methodology Report* (NCES 98–073) (Washington, DC: 1997).

⁴ U.S. Department of Education, NCEs, *National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000), Methodology Report* (NCES 2002–152) (Washington, DC: 2002).

⁵ For nonresponse bias analysis, see U.S. Department of Education, National Center for Education Statistics, *National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000), CATI Nonresponse Bias Analysis Report* (NCES 2002–03) (Washington, DC: 2002), available at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=200203>.

The NPSAS:90 survey had only one weight, the study weight (WTA00), while NPSAS:96 and NPSAS:2000 had two weights, the study weight (WTA00), used for analysis of variables derived from sources other than the student interview, and the CATI weight (WTB00), used for analysis of variables asked in or derived from the student interview. In this study, the study weight was used for analyzing all the variables except hours worked while enrolled and students' risk status, which were derived from the CATI. In tables where these variables are included, the NPSAS:96 and NPSAS:2000 CATI weight was used.

High School and Beyond Longitudinal Study

The High School and Beyond Longitudinal Study (HS&B:80/92) followed two cohorts of students.⁶ It began in the spring of 1980 with the collection of Base-Year questionnaire and test data on a nationally representative sample of more than 58,000 high school seniors and sophomores. An extensive survey was administered in the base year along with a battery of cognitive tests. Both cohorts were followed up at 2-year intervals through 1986, and the sophomore cohort was followed up a fourth time in 1992. The sample used in this report was the based on the 1980 sophomore cohort and adjusted to reflect only those students who graduated in 1982 and entered postsecondary education by December 1984.

Cognitive tests were administered to the sophomore cohort during the first follow-up survey, when most were high school seniors. In addition, high school transcripts were collected and coded. The fourth follow-up included a collection of postsecondary transcripts for members of the sophomore cohort who had continued their education beyond high school. The HS&B Postsecondary Education Transcript Study (PETS) includes transcript information to September 1993. The CATI survey response rate was 85.3 percent and the transcript level response rate was 90.1 percent. The weight used for the analysis of data from the HS&B-So:80/92 was WTH00, which includes students who entered postsecondary education.

National Education Longitudinal Study

The National Education Longitudinal Study of 1988 (NELS:88) is a survey that began with a nationally representative sample of 1988 8th-graders and surveyed them every 2 years until 1994 and again in 2000.⁷ Respondents' teachers and schools were also surveyed in 1988, 1990,

⁶ For more information on HS&B:80/92, consult U.S. Department of Education, National Center for Education Statistics, *High School and Beyond Fourth Follow-Up Methodology Report* (NCES 95-426) (Washington, DC: 1995).

⁷ For more information on NELS:88/2000, consult U.S. Department of Education, National Center for Education Statistics, *National Education Longitudinal Study of 1988: Base-Year to Fourth Follow-up Data File User's Manual* (NCES 2002-323) (Washington, DC: 2002).

and 1992, while parents were surveyed in 1988 and 1992. In contrast to previous longitudinal studies, NELS:88 began with 8th-graders in order to collect data regarding the transition from elementary to secondary education. For the purpose of providing a comparison group to 1980 sophomores surveyed in one High School and Beyond Institutional Study (HS&B), the NELS:88 sample was also “freshened” with new participants who were 10th-graders in 1990. The sample was also “freshened” in order to create a representative sample of 1992 seniors for the purpose of conducting trend analyses with the 1972 and 1982 senior classes (NLS-72 and HS&B).

In spring 1992, when most of the NELS:88 samples were 12th-graders, the second follow-up took place. This survey focused on the transition from high school to both the labor force and postsecondary education. Students identified as dropouts in the first follow-up were also resurveyed in 1992. In the spring of 1994 and 2000, the third and fourth follow-up surveys were administered and provide data on students’ postsecondary persistence and attainment. The 2000 follow-up included over 12,000 completed cases with a weighted response rate of 82.71. The weight used for the analysis of data from the NELS:88/00 was WTN00, which includes students who entered postsecondary education.

Beginning Postsecondary Students Longitudinal Study

The Beginning Postsecondary Students Longitudinal Study (BPS) is based on a sample of students who enrolled in postsecondary education for the first time in a specific academic year.⁸ Two BPS surveys have been conducted thus far, one that followed students who first began their postsecondary education in 1989–90 (BPS:90/94) and a second followed students who began in 1995–96 (BPS:96/01). Unlike other NCES longitudinal surveys (such as the National Education Longitudinal Study of 1988), which follow age-specific cohorts of secondary school students, the BPS sample includes nontraditional students who have delayed their postsecondary education due to financial need or family responsibilities, or other reasons. Students who began their postsecondary studies before the base year of the study, or who stopped out, and then returned to their studies in the base year were not included, nor were students who were still enrolled in high school. Eligible students for the BPS samples were identified from participants in the two corresponding National Postsecondary Student Aid Studies (NPSAS:90 and NPSAS:96).

A computer-assisted telephone interview (CATI) was conducted with BPS students twice after the Base Year survey. The final follow-up survey for BPS:90/94 took place about 5 years

⁸ For more information on BPS, consult the methodology reports for each survey: U.S. Department of Education, National Center for Education Statistics, *Beginning Postsecondary Students Longitudinal Study Second Follow-up (BPS:90/94) Final Technical Report* (NCES 96–153) (Washington, DC:1996) and *Beginning Postsecondary Students Longitudinal Study:1996–2001 Methodology Report* (NCES 2002–171) (Washington, DC: 2002).

after college entry (in 1994), while the final follow-up survey for BPS:96/01 took place 6 years after (in 2001). The CATI collected information concerning enrollment, program completion, education financing, employment, and family formation; graduate school access and enrollment; and civic participation.

1989–90 Beginning Postsecondary Students Longitudinal Study

BPS:90/94 survey followed approximately 9,000 students from the 1989–90 National Postsecondary Student Aid Study (NPSAS:90) sample who were identified as first-time beginning (FTB) students in academic year 1989–90.⁹⁻¹⁰ These students were followed in 1992 and 1994. The unweighted BPS:90/94 response rate is 91.4 percent. The weighted response rate, using the NPSAS:90 analysis weights, is 91.0 percent. Among respondents, about 10 percent of sample members did not have sufficiently detailed enrollment histories to allow for classification in the persistence variables used in this report. The weight used for the analysis of data from the BPS:90/94 was WTA00, which includes students who responded to both the first and last follow-up surveys.

1995–96 Beginning Postsecondary Students Longitudinal Study

BPS:96/01 is based on a sample of students who were enrolled in postsecondary education for the first time in 1995–96 and participated in the 1995–96 National Postsecondary Student Aid Study (NPSAS:96).¹¹ This BPS study began with a sample of approximately 12,000 students who were identified in NPSAS:96 as having entered postsecondary education for the first time in 1995–96. The second follow-up of the BPS cohort (BPS:96/01) was conducted in 2001, 6 years following college entry. All respondents to the first follow-up, as well as a subsample of nonrespondents in 1998, were eligible to be interviewed. Over 9,100 students were located and interviewed. The weighted response rate was 83.6 percent overall, but was somewhat higher among respondents to both the 1996 and the 1998 interviews (87.4 percent). The weight used for the analysis of data from the BPS:96/01 was WTD00, which includes students who responded to both the first and last follow-up surveys.

⁹ Eligibility status could not be determined for about 6 percent of the BPS:90/94 sample.

¹⁰ For more information on BPS:90/94, consult U.S. Department of Education, National Center for Education Statistics, *Beginning Postsecondary Students Longitudinal Study Second Follow-up (BPS:90/94) Final Technical Report* (NCES 96–153) (Washington, DC:1996).

¹¹ For more information on BPS:96/01, consult U.S. Department of Education, National Center for Education Statistics, *Beginning Postsecondary Students Longitudinal Study:1996–2001 Methodology Report* (NCES 2002–171) (Washington, DC: 2002).

Baccalaureate and Beyond Longitudinal Study

The Baccalaureate and Beyond Longitudinal Study (B&B) is based on a sample of students who received baccalaureate degrees.¹² Two B&B surveys have been conducted thus far, one a study that tracks the experiences of a cohort of college graduates who received baccalaureate degrees during the 1992–93 academic year (B&B:93/97) and a second that tracks those who received baccalaureate degrees during the 1999–2000 academic year (B&B:2000/01). The data derived from this survey provide critical information about college graduates’ postsecondary education outcomes, including graduate and professional program access, labor market experience, and rates of return on investment in education. Eligible students for the B&B samples were identified from participants in the two corresponding National Postsecondary Student Aid Studies (NPSAS:93 and NPSAS:2000).

1993/97 Baccalaureate and Beyond Longitudinal Study

The First Follow-up of the Baccalaureate and Beyond Longitudinal Study (B&B:93/94), was the first follow-up interview of NPSAS:93 participants who received their bachelor’s degrees between July 1992 and June 1993.¹³ Of 12,500 NPSAS:93 respondents who were identified as potentially eligible for the first follow-up survey, about 1,500 were determined to be ineligible. The 1994 follow-up interview collected information from respondents 1 year after they received the bachelor’s degree. A total of about 10,000 eligible individuals completed the 1994 interview. The weighted overall response rate for the B&B:93/94 interview was 92 percent. These students were also followed in 1997 (B&B:93/97). The weight used for the analysis of data from the B&B:93/97 analysis file was WTB00, which includes NPSAS:93 bachelor’s degree recipients who responded to the first 1994 B&B follow-up survey.

2000/01 Baccalaureate and Beyond Longitudinal Study

The 2001 Baccalaureate and Beyond Longitudinal Study (B&B:2000/01) is a spring 2001 follow-up of bachelor’s degree recipients from the 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000).¹⁴ For B&B:2000/01, those members of the NPSAS:2000 sample who completed a bachelor’s degree between July 1, 1999 and June 30, 2000 were identified and

¹² For more information on B&B, consult the methodology reports for each survey: U.S. Department of Education, National Center for Education Statistics, *Baccalaureate and Beyond Longitudinal Study: 1993/97 Methodology Report*, (NCES 99–159) (Washington, DC: 1999) and *Methodology Report for the 2001 Baccalaureate and Beyond Longitudinal Study* (NCES 2003–156) (Washington, DC: 2003).

¹³ For more information on B&B:93/97, consult U.S. Department of Education, National Center for Education Statistics, *Baccalaureate and Beyond Longitudinal Study: 1993/97 Methodology Report* (NCES 99–159) (Washington, DC: 1999).

¹⁴ For more information on B&B:2000/01, consult U.S. Department of Education, National Center for Education Statistics, *Methodology Report for the 2001 Baccalaureate and Beyond Longitudinal Study* (NCES 2003–156) (Washington, DC: 2003).

contacted for a follow-up interview. The estimates in this report are based on the results of surveys with approximately 10,000 bachelor's degree recipients, representing about 1.3 million bachelor's degree completers from 1999–2000. The weighted overall response rate for the B&B:2000/01 interview was 74 percent, reflecting an institution response rate of 90 percent and a student response rate of 82 percent. (Because the B&B:2000/01 study includes a subsample of NPSAS:2000 nonrespondents, the overall study response rate is the product of the NPSAS:2000 institution-level response rate for BA-granting institutions and the B&B:2000/01 student-level response rate.) The weight used for the analysis of data from the B&B:2000/01 was WTA00, which includes NPSAS:2000 bachelor's degree recipients who responded to the 2001 B&B follow-up survey.

Accuracy of Estimates

The statistics in this report are estimates derived from a sample. Two broad categories of error occur in such estimates: sampling and nonsampling errors. Sampling errors occur because observations are made only on samples of students, not entire populations. Nonsampling errors occur not only in sample surveys but also in complete censuses of entire populations. Nonsampling errors can be attributed to a number of sources: inability to obtain complete information about all students in all institutions in the sample (some students or institutions refused to participate, or students participated but answered only certain items); ambiguous definitions; differences in interpreting questions; inability or unwillingness to give correct information; mistakes in recording or coding data; and other errors of collecting, processing, sampling, and imputing missing data.

Item Response Rates

Weighted item response rates were calculated for all variables used in this report. The weighted item response rates were calculated by dividing the weighted number of valid responses by the weighted population for which the item was applicable. Overall, most of the items had a high response rate. Items with weighted item response rates below 90 percent are shown in table B-1. Three variables had item response rates below 85 percent. For the three NELS:88/01 variables (ACCURHSQ, HIGHMATH, GPA), the low weighted response rate is due in large part to unavailable high school transcript data. For these variables, an analysis of item nonrespondents was conducted and no differences could be detected between respondents and nonrespondents in percentage who were female.

Table B-1. Lowest weighted item response rates for variables used in this report

Data set	Variable name	Variable label	Item response rate
Variables with response rates between 85 and 90 percent:			
NPSAS:90	ATTNSTAT	Attendance intensity	87.50
	EMWKHR3	Hours worked per a week while enrolled	86.80
	PCTPVRTY	Income level	88.60
NPSAS:96	PAREduc	Highest education completed by either parent	85.60
NELS:88/01	SRTSQUIN	Senior test quintile	87.10
BPS:90/94	ATTENRST	Degree attainment and persistence	89.40
	OFCO8990	Type of first institution	89.00
Variables with response rates lower than 85 percent:			
NELS:88/01	ACCURHSQ	High school academic intensity	83.10
	HIGHMATH	Highest mathematics course	84.10
	GPA	Grade-point average	83.80

NOTE: Weighted item response rates were calculated by dividing the total weighted number of valid responses by the weighted total population for whom the question was applicable. Bias analyses were conducted for variables with a weighted item response rate below 85 percent.

Data Analysis System

The estimates presented in this report were produced using the Data Analysis System (DAS) for each of the surveys analyzed. The DAS software makes it possible for users to specify and generate their own tables. The DAS is publicly available and designed to protect the confidentiality of individuals. With the DAS, users can replicate or expand upon the tables presented in this report. In addition to the table estimates, the DAS calculates proper standard errors¹⁵ and weighted sample sizes for these estimates. For example, table B-2 contains standard errors that correspond to table 2, generated by the DAS. If the number of valid cases is too small to produce a reliable estimate (fewer than 30 cases), the DAS prints the message “low-N” instead of the estimate. All standard errors for estimates presented in this report can be viewed at <http://nces.ed.gov/das/library/reports.asp>.

In addition to tables, the DAS will also produce a correlation matrix of selected variables to be used for linear regression models. Included in the output with the correlation matrix are the

¹⁵ None of the survey samples were based on simple random sampling procedures and, therefore, simple random sample techniques for estimating sampling error cannot be applied to these data. The DAS takes into account the complexity of the sampling procedures and calculates standard errors appropriate for such samples. The method for computing sampling errors used by the DAS is Balanced Repeated Replication (BRR).

Table B-2. Standard errors for table 2: Percentage of undergraduates who were women, by student characteristics and academic year: 1989–90, 1995–96, and 1999–2000

Student characteristics	1989–90	1995–96	1999–2000
U.S. Total (excluding Puerto Rico)	0.08	0.41	0.45
Risk status for not completing			
No risk factors	0.12	0.99	0.37
One or more risk factors	0.10	0.66	0.15
Race/ethnicity			
American Indian	0.65	6.98	3.96
Asian/Pacific Islander	0.38	1.83	2.21
Black	0.20	1.12	0.95
White	0.09	0.53	0.49
Hispanic	0.24	1.39	0.65
Age			
18–23	0.08	0.54	0.38
24–29	0.16	0.87	0.53
30–39	0.19	0.93	1.31
40 or older	0.23	0.89	0.80
Income level			
Low income	0.14	0.90	0.84
Middle low income	0.14	1.12	0.57
Middle high income	0.13	0.75	0.83
High income	0.14	1.10	0.48
Dependency status			
Dependent	0.10	0.54	0.38
Independent			
Never married, no children	0.16	1.01	0.57
Married/separated, no children	0.22	1.53	2.08
Married/separated, children	0.19	1.16	0.78
Single parent	0.24	1.19	0.89
Highest education level completed by either parent			
High school or less	0.14	0.97	0.40
Some postsecondary education	0.16	1.07	0.79
Bachelor’s degree or higher	0.11	0.88	0.40
Hours worked per a week while enrolled			
Did not work	0.11	1.36	0.50
1–24 hours	0.12	0.96	0.71
25–34 hours	0.15	1.50	0.70
More than 34 hours	0.13	1.26	0.43

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, and NPSAS:2000).

design effects (DEFTs) for each variable in the matrix. Since statistical procedures generally compute regression coefficients based on simple random sample assumptions, the standard errors

must be adjusted with the design effects to take into account the stratified sampling method used in the surveys.

For more information about the Data Analysis Systems, consult the NCES DAS web site (nces.ed.gov/das) or contact:

Aurora D’Amico
 National Center for Education Statistics
 1990 K Street, NW
 Room 8115
 Washington, DC 20006
 (202) 502-7334
 Internet address: Aurora.D’Amico@ed.gov

Statistical Procedures

Differences Between Means

The descriptive comparisons were tested in this report using Student’s *t* statistic. Differences between estimates are tested against the probability of a Type I error,¹⁶ or significance level. The significance levels were determined by calculating the Student’s *t* values for the differences between each pair of means or proportions and comparing these with published tables of significance levels for two-tailed hypothesis testing.

Student’s *t* values may be computed to test the difference between estimates with the following formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2}} \quad (1)$$

where E_1 and E_2 are the estimates to be compared and se_1 and se_2 are their corresponding standard errors. This formula is valid only for independent estimates. When estimates are not independent, a covariance term must be added to the formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2 - 2(r)se_1 se_2}} \quad (2)$$

¹⁶ A Type I error occurs when one concludes that a difference observed in a sample reflects a true difference in the population from which the sample was drawn, when no such true difference is present.

where r is the correlation between the two estimates.¹⁷ This formula is used when comparing two percentages from a distribution that adds to 100. If the comparison is between the mean of a subgroup and the mean of the total group, the following formula is used:

$$t = \frac{E_{sub} - E_{tot}}{\sqrt{se_{sub}^2 + se_{tot}^2 - 2p se_{sub}^2}} \quad (3)$$

where p is the proportion of the total group contained in the subgroup.¹⁸ The estimates, standard errors, and correlations can all be obtained from the DAS.

There are hazards in reporting statistical tests for each comparison. First, comparisons based on large t statistics may appear to merit special attention. This can be misleading since the magnitude of the t statistic is related not only to the observed differences in means or percentages but also to the number of students in the specific categories used for comparison. Hence, a small difference compared across a large number of students would produce a large t statistic.

A second hazard in reporting statistical tests for each comparison occurs when making multiple comparisons among categories of an independent variable. For example, when making paired comparisons among different race/ethnicities, the probability of a Type I error for these comparisons taken as a group is larger than the probability for a single comparison. When more than one difference between groups of related characteristics or “families” are tested for statistical significance, one must apply a standard that assures a level of significance for all of those comparisons taken together.

When significant results were detected in this analysis, which were not based on hypotheses being tested, the findings were reported only when $p \leq .05/k$ for a particular pairwise comparison, where that comparison was one of k tests within a family. This procedure guarantees both that the individual comparison would have $p \leq .05$ and that for k comparisons within a family of possible comparisons, the significance level for all the comparisons will sum to $p \leq .05$.¹⁹

For example, in a comparison of males and females, only one comparison is possible (males versus females). In this family, $k=1$, and the comparison can be evaluated without adjusting the significance level. When students are divided into five racial/ethnic categories (American Indian, Asian/Pacific Islander, Black, Hispanic, and White) and all possible

¹⁷ U.S. Department of Education, National Center for Education Statistics, *A Note from the Chief Statistician*, no. 2, 1993.

¹⁸ *Ibid.*

¹⁹ The standard that $p \leq .05/k$ for each comparison is more stringent than the criterion that the significance level of the comparisons should sum to $p \leq .05$. For tables showing the t statistic required to ensure that $p \leq .05/k$ for a particular family size and degrees of freedom, see Olive Jean Dunn, “Multiple Comparisons Among Means,” *Journal of the American Statistical Association* 56 (1961): 52–64.

comparisons are made, then $k=10$ and the significance level of each test must be $p \leq .05/10$, or $p \leq .005$. The formula for calculating family size (k) is as follows:

$$k = \frac{j(j-1)}{2} \quad (4)$$

where j is the number of categories for the variable being tested. In the case of race/ethnicity, there are five race/ethnicity groups, so substituting 5 for j in equation 4, results in the following family size.

$$k = \frac{5(5-1)}{2} = 10 \quad (5)$$

For this report, when there were comparisons in which a specific hypothesis was not being tested, tests were adjusted to account for family size. Most of comparisons made were between two groups (e.g., between men and women or between two cohorts) and, therefore, had a k of 1. Comparisons among the three NPSAS studies had a k of 3. Comparisons among categories were also adjusted to take into account multiple comparisons. For example, when comparing the proportion of women among students who did not work and among students who worked more than 34 hours in 1999–2000 (59 vs. 53 percent, table 2), the family size is 4 (did not work, 1–24 hours, 24–34 hours, more than 34 hours) and the k is 6.