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Postsecondary Education Descriptive Analysis Report

February 2008

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Executive Summary

Introduction

College graduates enter the job market well positioned for labor market success, and most earn more than their non-college-going peers within a few short years. In 2004, full-time workers ages 25–34 with bachelor's degrees earned 60 percent more, on average, than their counterparts who were high school graduates (U.S. Department of Education 2006). Employment experiences vary, however, in relation to graduates' major field of study (Horn and Zahn 2001; Thomas and Zhang 2005).

This report examines college graduates' work experiences in the first 10 years after they graduated. It describes their labor force status, employment stability and intensity, occupations and industries, salaries and benefits, and perceptions about their jobs. The report focuses on differences across undergraduate majors, comparing the experiences of graduates who had academic versus career-oriented undergraduate majors, and within these general categories, specific majors when sample size permitted.[1]

The report uses data from the 1992–93 Baccalaureate and Beyond Longitudinal Study (B&B:93/03), a longitudinal study of students who earned a bachelor's degree during the 1992–93 academic year. Base-year information on this cohort was collected as part of the 1992–93 National Postsecondary Student Aid Study (NPSAS:93). Graduates were interviewed again in 1994, 1997, and 2003. The estimates in this report are based on the results of interviews with approximately 9,000 bachelor's degree recipients, representing about 1.2 million bachelor's degree completers from 1992–93. All comparisons made in the text were tested using Student's *t* statistic. All differences cited are statistically significant at the $p < .05$ level. The major findings are summarized below.

Academic and Career-Oriented Majors

Career-oriented majors are defined here as those that prepare students for employment in a specific occupational area. They include business, education, health, engineering, computer science, and a residual "other" category that includes career-oriented majors with too few graduates to analyze separately. All other majors are considered *academic majors*, including social and behavioral sciences, arts and humanities, biological sciences, mathematics/ physical sciences, and a residual "other" category. Students with academic majors may well have career plans, but their undergraduate programs are not specifically geared toward preparing them for work in a particular field.

[1] Recognizing the widespread interest in the experiences of graduates in science, technology, engineering, and mathematics (STEM) majors, the tables in this report also present data separately for these majors versus others. However, to simplify the discussion and in keeping with the main focus on the differences between graduates with academic and career-oriented majors, the STEM/non-STEM data are not discussed in the text.

About two-thirds of all 1992–93 bachelor's degree recipients had career-oriented majors (table 1). The most common among all majors (academic or career-oriented) was business (23 percent), followed by education (13 percent). There was no measurable difference in the percentage of men and women who chose a career-oriented major, but their choice of fields differed. A greater percentage of men than women majored in engineering, computer science, or business, while a greater percentage of women than men majored in education or health (figure A). On the academic side, a greater percentage of men than women majored in mathematics/physical sciences or biological sciences, and a greater percentage of women than men majored in "other" academic fields.

Labor Force Status

For each of the 3 years in which they were interviewed after completion (1994, 1997, and 2003), graduates were categorized as *only employed*, *only enrolled*, *both,* or *neither employed nor enrolled*. *Enrolled* refers to enrollment in a degree or certificate program at either the graduate or undergraduate level; coursetaking outside a formal program was not considered. The percentage of graduates who were only employed was stable at about 76 percent in 1994 and 1997, but increased to 80 percent in 2003 as those who had gone on to graduate school moved into jobs (table 3). Somewhat counteracting the overall pattern of movement into the labor force was an increase in the percentage neither employed nor enrolled from about 6 percent in both 1994 and 1997 to 12 percent in 2003.

This overall pattern hides a difference between men and women, however (figures B and 2). Between 4 and 6 percent of men were neither working nor enrolled in each of the 3 years, but the percentage of women in this category increased from 7–8 percent in 1994 and 1997 to 18 percent in 2003.

About half of all the graduates (51 percent) were employed and not enrolled at all three follow-ups, but the other half moved into and out of the workforce, often to pursue further education (table 4). A larger percentage of career-oriented than academic majors were only employed in all 3 years (57 vs. 38 percent) and a smaller percentage combined school and work (25 vs. 39 percent).

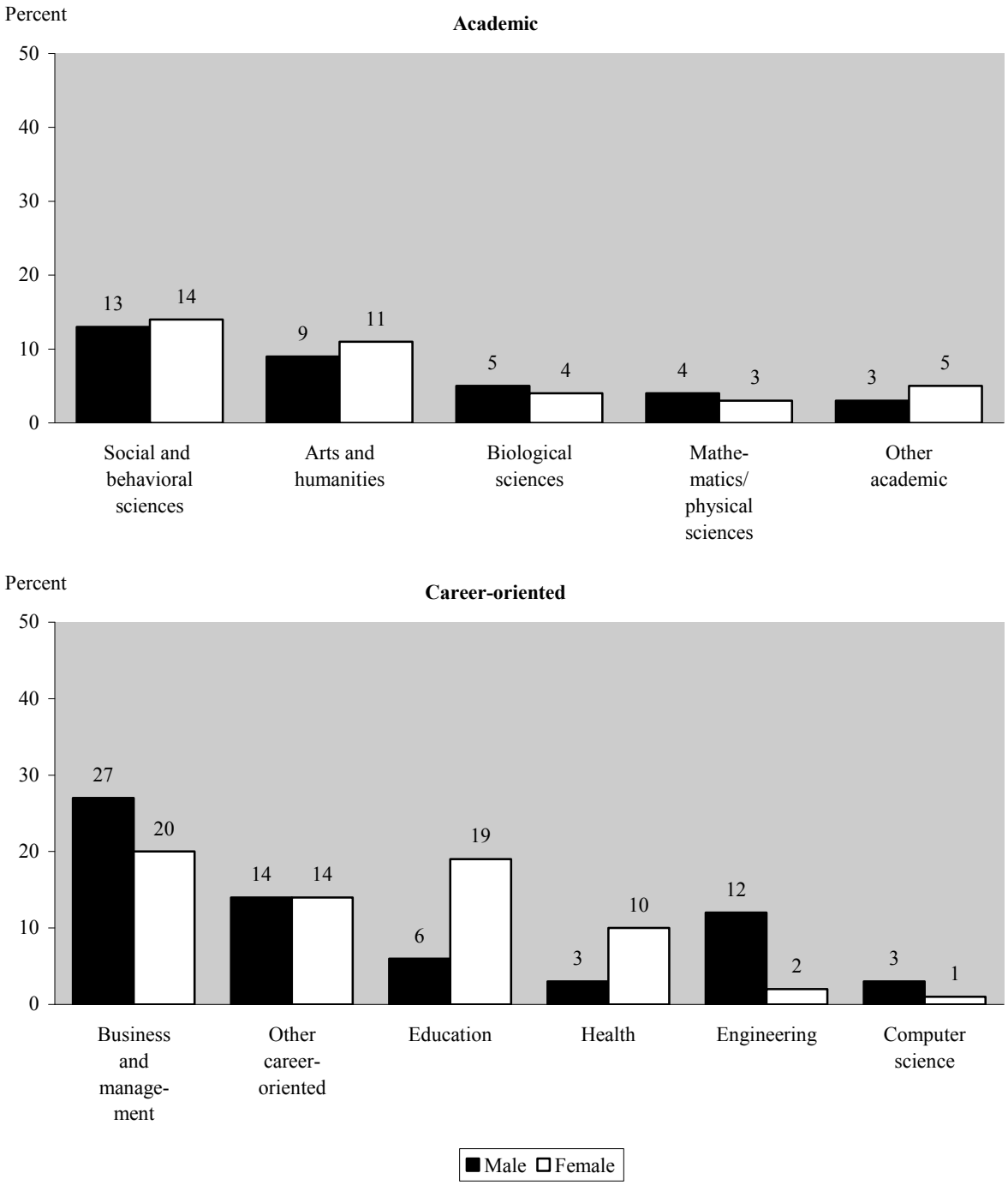
Employment Stability and Intensity

By 2003, the average bachelor's degree recipient appeared to have settled into the workforce and had been in his or her current job for 5.2 years (table 6). The work experiences of graduates with academic and career-oriented majors differed, with career-oriented majors appearing to become established in the workforce earlier. In both 1997 and 2003, graduates with career-oriented majors had been in their jobs longer, on average, than those with academic majors (5.6 vs. 4.3 years in 2003). This was true whether they had worked exclusively or if they had also pursued additional education.

In addition, proportionately more career-oriented majors than academic majors were working full time at one job in 2003 (71 vs. 67 percent) (table 7). Consistent with their greater propensity to enroll in further education, graduates with academic majors were out of the labor force at some point at higher rates than career-oriented majors (57 vs. 45 percent among men and 70 vs. 58 percent among women) (table 9).

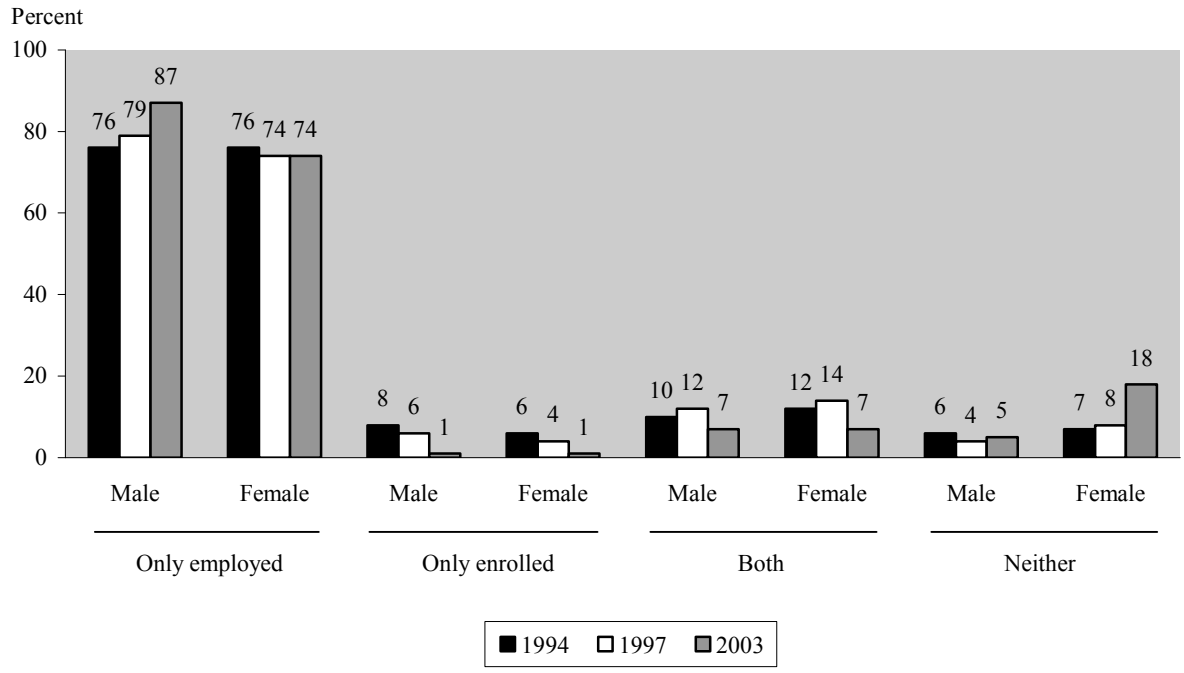
Some gender differences were apparent. In each of the 3 years, men were employed full time

Figure A. Percentage distribution of 1992–93 bachelor's degree recipients' undergraduate major, by emphasis and gender



NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Figure B. Percentage distribution of 1992–93 bachelor's degree recipients' employment and enrollment status in 1994, 1997, and 2003, by gender



NOTE: In the figure, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

at one job at higher rates than women. Their trajectories differed as well. The percentage of men employed full time at one job increased from 1994 to 1997 (from 73 to 80 percent) and then remained stable (81 percent in 2003) (figure 7). The percentage of women employed full time at one job also increased between 1994 and 1997 (from 69 to 72 percent), but then it declined to 60 percent in 2003. This decline for women was counteracted to some extent by an increase in part-time employment at one job (from 9 to 12 percent between 1997 and 2003).

Differences by family status were also observed. In 2003, about three-quarters of unmarried women worked full time at one job (regardless of whether they had children) (table 7). Relatively fewer married women without children (67 percent) and an even smaller percentage of married women with children (46 percent) worked full time at one job. Among married women with children, the percentage working full time at one job declined from 65 to 46 percent between 1997 and 2003.

By 2003, some 46 percent of graduates had ever been unemployed (not working, but looking for work) since they had graduated (table 8). The average length of time unemployed was 9 months, which could have been one long period of

unemployment or multiple short ones. Unemployment became less of an issue over time, however. In the first year after finishing college, 29 percent of graduates had at least one spell of unemployment. Over the next 3 years (from 1994 to 1997), relatively fewer were ever unemployed (22 percent) even though the time period for which this information was collected was longer. Finally, from 1997 to 2003, an even longer period covering 6 years, still fewer (13 percent) were ever unemployed.

Relatively fewer graduates with career-oriented majors than with academic majors had any spells of unemployment between 1994 and 1997 (20 vs. 25 percent) and again between 1997 and 2003 (12 vs. 15 percent). Furthermore, if they were ever unemployed, the average length of time was shorter.

Occupations

A business and managerial occupation was the most common in 1994, accounting for 23 percent of all graduates (figure 9 and table 10). Next most common were educators (16 percent) and service workers (15 percent). No other occupation accounted for more than 10 percent of the total. Business and management was still the most common occupation in 2003, accounting for 28 percent of all graduates at that time (figure C).

By 2003, graduates appeared to have moved out of occupations often characterized as relatively low-level and not always needing a bachelor's degree. For example, between 1994 and 2003, the percentage of service workers declined from 15 to 10 percent, and the percentage of administrative/clerical/legal support workers declined from 9 to 3 percent (figure 9 and table 10).

Industries

More graduates were employed in education than in any other industry in both 1997 (19 percent) and 2003 (22 percent) (figure 11 and table 11). Next most common in both years were health care (13 percent in 1997 and 15 percent in 2003) and professional services (12 and 13 percent, respectively).

The percentages working in the education and health care industries increased between 1997 and 2003 (from 19 to 22 percent and 13 to 15 percent, respectively), and the percentages working in manufacturing and in retail and wholesale trade declined (from 10 to 6 percent and 9 to 7 percent, respectively). The directions of these changes were consistent with national trends in these industries, except that employment in wholesale and retail trade was relatively flat at the national level.[2]

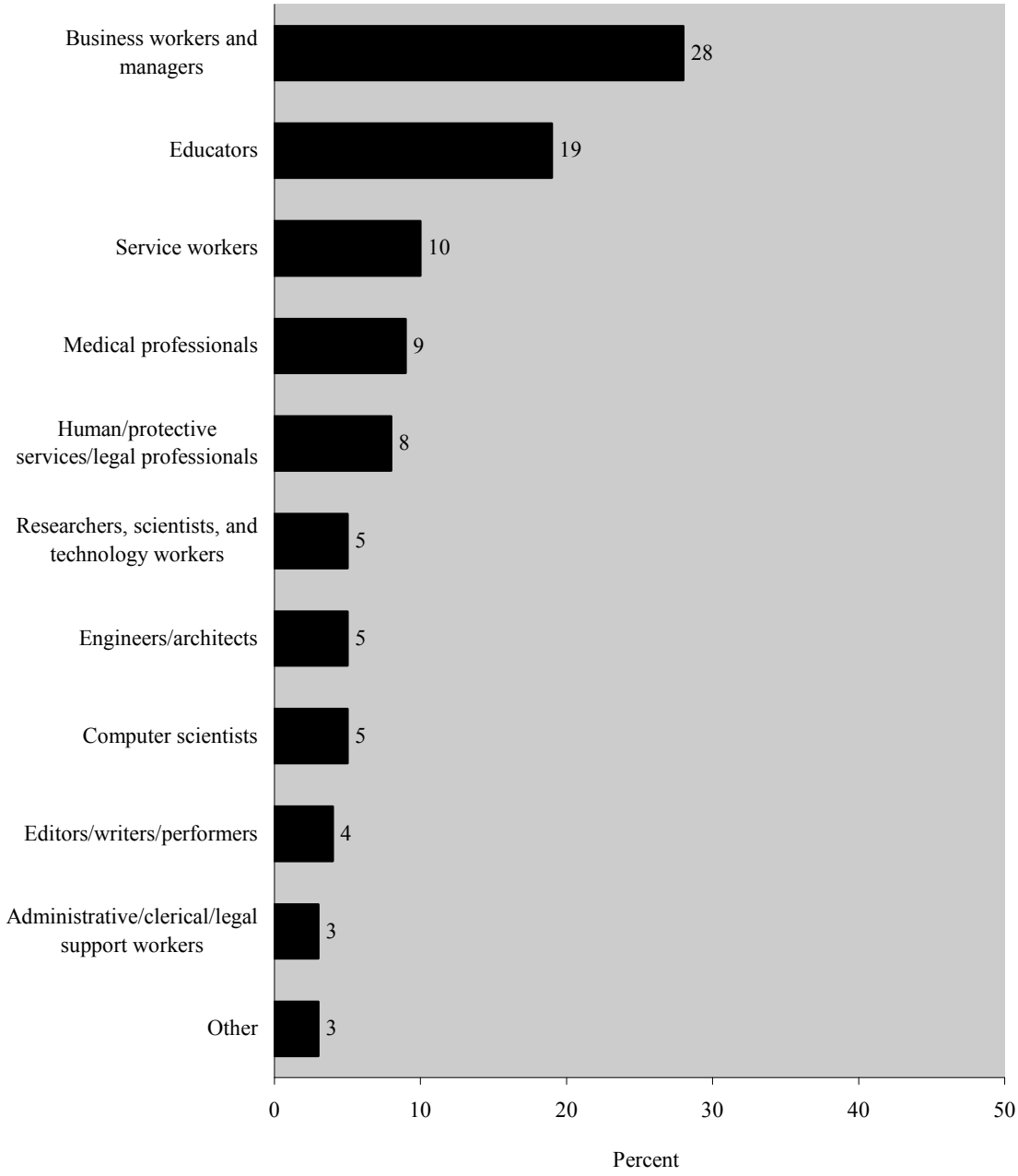
Salaries and Benefits

Adjusted for inflation, the average annual salary for bachelor's degree recipients employed full time at one job roughly doubled between 1994 and 2003, from $30,800 to $60,600 (in constant 2003 dollars) (table 12).

As a group, career-oriented majors had higher average salaries than academic majors in 2003, but the overall salary difference between academic and career-oriented majors who were employed full time was not statistically significant after

[2] During this period, national employment levels grew by 18 percent in the education/health industry, declined by 17 percent in manufacturing, declined by 1 percent in wholesale, and increased by 4 percent in retail. Retrieved February 6, 2007, from Bureau of Labor Statistics, *Industry at a Glance*, various pages: http://www.bls.gov/iag/eduhealth.htm; http://www.bls.gov/iag/manufacturing.htm; http://www.bls.gov/iag/wholeretailtrade.htm.

Figure C. Percentage distribution of 1992–93 bachelor's degree recipients' occupations in 2003



NOTE: Occupation is as of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

taking other factors into account (table 13). While some differences in characteristics related to salary favored career-oriented majors, others favored academic majors, and neither group had a clear advantage.

After taking other factors related to salary into account, men still earned an average of almost $14,000 annually more than women. Also, the population of graduates with parents who did not go to college (which included a larger proportion of career-oriented than academic majors) earned less than graduates with parents who held bachelor's degrees.

Both bachelor's institution selectivity and completion of an advanced degree were associated with higher salary for full-time workers in 2003. Graduates earned higher salaries for each year they had been with their employer, and lower salaries for each month they had spent unemployed (not working, but looking for work) since completing a bachelor's degree. In addition, each month of leave from work to care for children between 1997 and 2003 was associated with less income.

Finally, both occupation and industry were related to salary in 2003 among college graduates employed full time. Graduates in most occupations earned thousands of dollars more than educators.

As graduates established themselves in the labor force, the percentage with health and retirement benefits through their jobs increased. Among those who were employed full time at one job, 84 percent had health insurance benefits and 71 percent had retirement benefits in 1994, increasing to 96 percent and 89 percent, respectively, by 2003 (table 14).

Career Potential

It took time for some graduates to find a job with career potential that used their education, but most had done so by 2003. Among graduates employed full time at one job, the percentage in jobs they considered to have definite career potential increased from 44 percent in 1994 to 59 percent in 1997 (figure 14 and tables 15 and 16). By 2003, about 90 percent of graduates considered their current work a career (table 17). Even among those who had been in jobs without much career potential in 1994 or 1997, most (83 percent of the former and 82 percent of the latter) now had work they considered a career. Those who considered their work in 2003 a career had been in that career for an average of 7 years.

Graduates with career-oriented majors were more established in the labor force than their peers with academic majors in 2003. They considered their current work a career at a higher rate (91 vs. 87 percent). Among graduates who did consider their work a career, those with career-oriented majors had been in their career for a longer period of time (8 vs. 6 years, on average) and relatively fewer changed careers (32 vs. 41 percent).

About three-fourths (77 percent) of full-time employed graduates in 2003 reported that their job required a bachelor's degree, up from 59 percent in 1994 (tables 15 and 17). While a larger percentage of career-oriented majors than academic majors held this opinion in 1994 (62 vs. 53 percent), no measurable difference was detected between the two groups in 2003 (77 percent in each case).

Job Satisfaction

In 2003, job satisfaction was generally high. Most graduates working full time at one job

reported being satisfied with their pay (66 percent), fringe benefits (75 percent), job security (81 percent), and opportunity for promotion (65 percent) (table 18). Graduates with career-oriented undergraduate majors were more satisfied with their pay than their peers with academic majors (68 vs. 62 percent), but not with any other aspects of their jobs considered here. A smaller percentage of education majors were satisfied with their pay and benefits than were the average career-oriented or average academic major.

Summary

Ten years after finishing college, most graduates had a job they considered a career and used their education, and their average salary, adjusted for inflation, had roughly doubled since 1994. A majority were satisfied with their pay, fringe benefits, job security, and opportunity for promotion. Compared with graduates with academic undergraduate majors, those with career-oriented majors appeared to establish themselves in the labor force earlier and relatively fewer obtained additional education.

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Foreword

This report uses data from the Baccalaureate and Beyond Longitudinal Study (B&B:93/03) to examine the labor market experiences of 1992–93 bachelor's degree recipients during the 10 years after they finished college. B&B:93/03 is the longitudinal component of the 1992–93 National Postsecondary Student Aid Study (NPSAS:93), a nationally representative study of students enrolled in postsecondary education that provides detailed information on how students and their families pay for college, including the types and amounts of financial aid received. The B&B:93/03 study includes students who were identified in NPSAS:93 as having earned a bachelor's degree during the 1992–93 academic year. These bachelor's degree recipients were interviewed in 1994, 1997, and 2003 to learn about their education, employment, and other experiences after graduation.

The estimates presented in this report were produced using the B&B:93/03 Data Analysis System (DAS). The DAS is a computer application that allows users to specify and generate their own tables and produces the design-adjusted standard errors necessary for testing the statistical significance of differences between numbers shown in the tables. It is available for public use on the NCES website at http://nces.ed.gov/das. Appendix C of this report contains additional information on the DAS.

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At NCES, Paula Knepper and Marilyn Seastrom conducted careful reviews and made many helpful comments. A number of Technical Review Panel members also provided thoughtful comments, including Clifford Adelman (Institute for Higher Education Policy), Patricia Grimes (Minnesota Office of Higher Education), Lisa Hudson (NCES), and James Palmer (Illinois State University).

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Introduction

College graduates enter the job market well positioned for success in the labor market, and most earn more than their non-college-going peers within a few years. In 2004, full-time workers ages 25–34 with bachelor's degrees earned 60 percent more, on average, than their counterparts who were high school graduates (U.S. Department of Education 2006). However, the lives of new college graduates may be in flux for a period of time. Newly educated 22- to 24-year-olds often start and quit their jobs, move around the country, change career directions, return to school, marry, or have children (Neumark 2002). The Baccalaureate and Beyond Longitudinal Study (B&B) provides a unique opportunity to examine some of these patterns during the first 10 years after college. In this study, a nationally representative sample of undergraduates who earned their bachelor's degrees in 1992–93 were interviewed in 1994, 1997, and 2003 and asked about their job search activities, work experiences, further participation in degree and certificate programs, family formation, and other aspects of life after college.

This report examines graduates' work experiences, describing their labor force status; employment stability and intensity; occupations and industries; salaries and benefits; and perceptions about their jobs. It is a companion piece to other National Center for Education Statistics (NCES) studies of life after college. Reports published so far include a general overview (Bradburn, Nevill, and Cataldi 2006) and topical reports addressing education debt burden and repayment patterns (Choy and Li 2006), and the path through graduate school (Nevill and Chen 2007).

The focus of this report is on differences associated with undergraduate majors, comparing the experiences of graduates who had academic versus career-oriented undergraduate majors and within these general categories, specific majors when sample size permitted. Within a few years of bachelor's completion, undergraduate major field was associated with employment outcomes. Graduates from applied fields[1] were very likely to be employed in occupations related to their majors, and graduates with degrees in business, engineering, nursing, and other health fields earned more than their peers in humanities and arts or education (Horn and Zahn 2001). Both initial pay and early career salary growth are related to major field (Thomas and Zhang 2005). Do such differences persist over the longer run following bachelor's completion, after employment

[1] "Applied fields" in Horn and Zahn (2001) were education, business, engineering/architecture, computer science, nursing, other health fields, social work and protective services, and communications and journalism.

patterns are established and many have completed subsequent education? Answers to such questions can help inform students' decision-making, and parents' and educators' understanding, about their choices of field of study. Of course, external economic conditions also shape how graduates fare in the labor market. In selected places, information on the national labor force has been included to provide a general context within which to understand the experience of recent college graduates.

Attending college is a substantial investment. In 2003–04, the total price of attending a 4-year college or university full time (tuition and fees and other expenses) averaged $15,200 annually at public institutions and $28,300 at private not-for-profit ones (Berkner and Wei 2006). Therefore, although individual experiences vary widely, students and their families will be interested in knowing how, on average, work experiences after college might differ if students pick one major over another.

Academic Versus Career-Oriented Majors

Career-oriented majors are defined here as those that prepare students for employment in a specific occupational area. They include business, education, health, engineering, computer science, and a residual "other" category that includes career-oriented majors with too few graduates to analyze separately. All other majors are considered *academic*, including social and behavioral sciences, arts and humanities, biological sciences, mathematics/physical sciences, and a residual "other" category. Students with academic majors may well have career plans, but their undergraduate programs are not specifically geared toward preparing them for work in a particular field. Appendix B provides a detailed list of the majors included in each category. When bachelor's degree recipients reported two majors, the one they named first was recorded as their major and the one they named second was considered their second major. For this analysis, graduates were categorized according to the first-named major.

A student's major is not a perfect indicator of the extent to which a student's undergraduate program overall is academic or career oriented, because students typically take many courses outside their major field and some accumulate enough credits in another field to have a second major or a minor. Substantial preparation in a field outside a student's major is most likely to occur among students with second majors. However, second majors were not very common (7 percent had one) and tended to be in the same overall category as the first major. Among students with second majors in academic fields, 72 percent also had academic first majors, and among

students with career-oriented second majors, 63 percent had career-oriented first majors.[2] Therefore, second majors were not explicitly taken into account for this analysis.

Minors also provide exposure to other fields, although to a lesser extent than a second major, and not necessarily substantially more than an undergraduate program without a formal minor. Approximately 20 percent of bachelor's degree recipients had a minor. The majority of these had minors in the same category as the major (55 percent of those with minors in academic fields and 73 percent of those with minors in career-oriented fields).[3] This additional coursetaking was not explicitly taken into account because it is difficult to be sure that a minor (not an option at all institutions) is substantively different from other nonmajor coursetaking and relatively few had minors outside the general category of their major.

Some students who major in academic fields as undergraduates go on to career-oriented graduate work—biology majors who go to medical school, for example. Although selecting biology as an undergraduate major may be excellent preparation for medical school, undergraduate biology programs do not train students to be doctors. Medical schools provide the career-specific training. Among 1992–93 bachelor's degree recipients who majored in biology, 23 percent enrolled in a first-professional program (which includes medicine and dentistry, among other fields) by 2003 (Nevill and Chen 2007). This pattern of an academic undergraduate major followed by career-oriented graduate study is not limited to biology majors. For example, 18 percent of history majors and 14 percent of psychology majors enrolled in an education master's degree program by 2003, and 10 percent of social science majors went on to an MBA program. Because there is no way of knowing when their decisions to enroll in career-oriented graduate training were made, it would not be accurate to conclude that they chose their undergraduate major with a specific career in mind.

Sixty-five percent of all of the 1992–93 bachelor's degree recipients had career-oriented majors (table 1). The most common was business (23 percent of all graduates), followed by education (13 percent). The "other" career-oriented category (14 percent) was also common, but it includes a wide range of unrelated majors, none of which accounts for more than 1 percent of all graduates. The most common academic major was social and behavioral sciences (13 percent of all graduates).

[2] U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03); not shown in a table.

[3] U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03); not shown in a table.

Table 1. By gender, percentage distribution (in columns) of 1992–93 bachelor's degree recipients' undergraduate major

Undergraduate major	Total	Male	Female
Total	100.0	100.0	100.0
Academic	34.6	34.0	35.1
Social and behavioral sciences	13.1	12.5	13.5
Arts and humanities	9.9	9.1	10.6
Biological sciences	4.4	5.3	3.7
Mathematics/physical sciences	3.2	4.0	2.5
Other academic	4.1	3.2	4.7
Career-oriented	65.4	66.0	65.0
Business and management	23.0	27.0	19.7
Education	13.0	5.9	18.8
Health	6.8	3.4	9.6
Engineering	6.4	12.1	1.8
Computer science	2.2	3.3	1.3
Other career-oriented	14.0	14.3	13.8

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

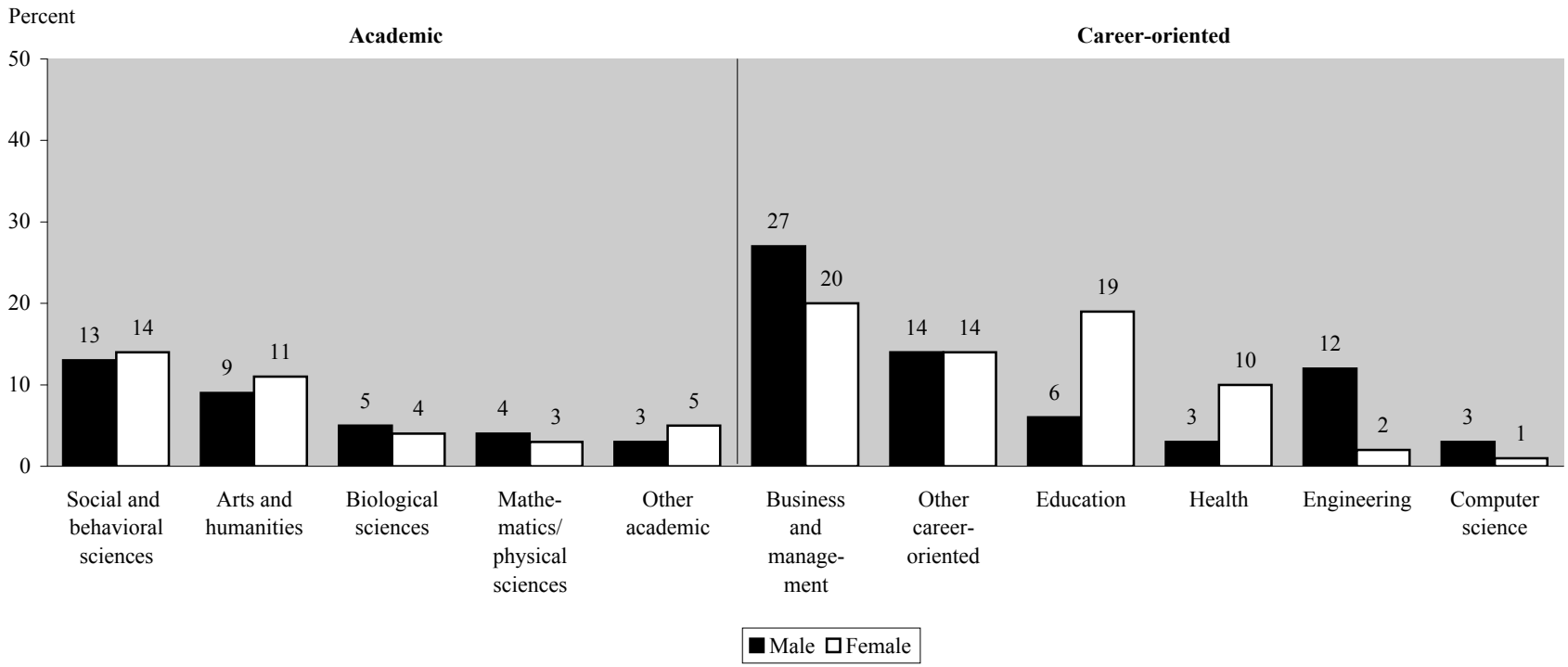
About two-thirds of both men and women chose career-oriented majors, but they chose different ones. Men were more likely than women to major in engineering, computer science, or business, and women were more likely than men to major in education or health[4] (figure 1). In the academic area, men were more likely than women to major in mathematics/physical sciences or biological sciences,[5] and women more likely than men to major in "other" academic fields.

Graduates with academic and career-oriented undergraduate majors differed demographically. Relatively more career-oriented majors were age 30 or older when they graduated (18 vs. 12 percent) (table 2). Reflecting their older age, relatively more also were married with children in 2003 (49 vs. 40 percent). Furthermore, proportionately more graduates with career-oriented majors had parents who did not go to college (34 vs. 26 percent), and relatively fewer had a parent with an advanced degree (23 vs. 33 percent). In addition to these demographic differences, proportionately fewer graduates with career-oriented majors attended a very selective institution or earned an advanced degree by 2003.

[4] Nursing accounts for the largest proportion of health majors.

[5] There were no measurable gender differences in the percentages majoring in social and behavioral sciences or in arts and humanities.

Figure 1. Percentage distribution of 1992–93 bachelor's degree recipients' undergraduate major, by emphasis and gender



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SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Table 2. By undergraduate major, percentage distribution (in columns) of 1992–93 bachelor's degree recipients' selected characteristics

		Academic						Career-oriented						
Selected characteristics	All	Total	Social/ behavioral sciences	Arts and humanities	Biological science	Mathematics/ physical science	Other academic	Total	Business and management	Education	Health	Engineering	Computer science	Other career-oriented
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Age at bachelor's														
22 or younger	46.6	53.6	54.5	51.6	60.3	55.9	46.4	43.0	42.8	48.3	28.8	41.1	36.8	47.2
23–24	25.2	24.4	24.1	26.8	24.3	21.9	21.6	25.6	22.4	23.5	23.7	35.6	27.2	28.8
25–29	12.2	10.2	10.1	10.9	9.5	10.2	9.8	13.2	14.2	9.6	18.5	13.7	19.0	11.0
30 or older	16.0	11.8	11.4	10.8	5.9	12.1	22.2	18.3	20.6	18.5	29.1	9.6	17.1	13.0
Gender														
Male	45.0	44.3	43.1	41.3	53.9	56.3	35.4	45.5	52.9	20.5	22.7	84.9	67.3	46.0
Female	55.0	55.7	56.9	58.7	46.1	43.7	64.6	54.5	47.1	79.5	77.3	15.1	32.7	54.0
Parents' highest education														
High school or less	31.1	25.5	27.0	23.4	26.4	23.6	26.9	34.0	37.5	35.9	33.8	23.1	35.6	31.3
Some college/associate's	18.6	17.6	17.2	18.0	18.1	12.3	21.2	19.2	19.7	16.8	22.8	19.1	18.3	19.0
Bachelor's	24.3	24.2	25.6	22.7	23.9	26.1	22.3	24.3	22.7	23.2	23.4	28.4	22.4	27.0
Advanced degree	26.0	32.7	30.2	36.0	31.6	38.1	29.7	22.5	20.1	24.1	20.0	29.4	23.8	22.8
Race/ethnicity[1]														
American Indian	0.5	0.7	0.5	0.7	0.4	0.2	2.0	0.5	0.4	0.5	0.7	0.3	0.6	0.6
Asian/Pacific Islander	4.8	5.4	3.8	7.2	8.4	7.5	1.7	4.5	4.4	2.2	4.8	11.3	13.7	2.2
Black	6.0	6.0	7.4	4.1	4.9	5.2	7.9	5.9	6.5	3.7	5.9	4.8	9.7	7.1
Hispanic	5.1	5.8	6.9	4.9	6.4	3.2	5.9	4.7	4.2	4.8	4.8	3.9	7.3	5.4
White	83.6	82.1	81.5	83.1	79.9	83.8	82.5	84.4	84.5	88.9	83.9	79.7	68.7	84.7
Undergraduate GPA														
Less than 2.75	28.1	27.9	33.9	23.0	24.7	24.6	26.6	28.1	31.2	16.9	18.4	36.1	28.0	34.7
2.75–3.74	61.5	61.9	58.8	62.4	68.5	63.9	61.4	61.3	58.5	69.3	67.0	56.1	66.4	57.3
3.75 or higher	10.5	10.3	7.3	14.6	6.9	11.5	12.1	10.5	10.3	13.8	14.6	7.8	5.7	8.0

See notes at end of table.

Table 2. By undergraduate major, percentage distribution (in columns) of 1992–93 bachelor's degree recipients' selected characteristics—Continued

		Academic						Career-oriented						
Selected characteristics	All	Total	Social/ behavioral sciences	Arts and humanities	Biological science	Mathematics/ physical science	Other academic	Total	Business and management	Education	Health	Engineering	Computer science	Other career-oriented
Bachelor's institution selectivity														
Very selective	32.4	41.4	38.7	45.2	49.7	43.1	31.7	27.5	22.6	24.4	24.9	49.0	38.0	28.1
Moderately selective	54.0	48.3	50.1	46.1	42.7	48.7	53.3	57.0	61.7	56.6	57.8	42.6	46.7	57.7
Minimally selective	10.0	8.2	9.1	7.0	6.1	6.2	11.8	10.9	10.9	14.3	13.3	5.5	10.1	9.4
Open admission	3.7	2.1	2.2	1.7	1.5	1.9	3.2	4.5	4.8	4.7	4.0	2.9	5.3	4.7
Bachelor's institution sector														
Public doctorate	42.0	40.5	46.1	34.6	45.0	41.6	31.4	42.7	37.7	38.1	47.5	63.1	38.1	44.3
Public 4-year nondoctorate	23.3	22.4	22.9	19.3	17.0	22.4	34.4	23.7	22.2	32.8	19.8	12.3	30.6	23.7
Private not-for-profit doctorate	13.6	16.1	13.8	18.6	18.7	19.1	12.7	12.3	11.5	10.8	11.5	18.0	11.0	12.7
Private not-for-profit 4-year nondoctorate	17.7	17.7	16.3	19.8	17.3	14.4	20.3	17.7	24.6	16.7	15.9	2.7	19.3	14.9
For-profit/other	3.5	3.2	0.9	7.6	2.0	2.6	1.2	3.6	3.9	1.6	5.3	3.9	1.1	4.5
Highest degree by 1994														
Bachelor's degree	97.2	96.8	96.5	97.6	95.1	97.1	97.7	97.4	98.3	95.6	96.2	98.0	97.5	98.1
Any graduate degree	2.8	3.2	3.5	2.4	4.9	2.9	2.3	2.6	1.7	4.4	3.8	2.0	2.5	2.0
Highest degree by 1997														
Bachelor's degree	88.5	85.5	85.8	87.5	84.0	83.3	83.3	90.1	93.0	87.3	87.7	85.3	95.4	90.4
Master's degree	9.6	11.2	10.4	10.3	9.1	15.6	14.7	8.7	6.1	12.0	10.5	13.9	4.2	7.5
Doctoral/professional degree	1.9	3.3	3.9	2.3	6.9	1.2	2.0	1.2	0.9	0.7	1.8	0.9	0.4	2.1
Highest degree by 2003														
Bachelor's degree	73.9	66.4	68.6	72.4	53.9	53.1	68.9	78.0	82.3	69.3	77.3	72.7	82.8	80.8
Master's degree	20.2	21.8	22.0	21.6	14.6	26.1	26.4	19.2	15.5	28.2	19.4	23.4	16.4	15.4
Doctoral/professional degree	5.9	11.7	9.4	6.0	31.5	20.8	4.8	2.8	2.2	2.5	3.2	3.9	0.9	3.8

See notes at end of table.

Table 2. By undergraduate major, percentage distribution (in columns) of 1992–93 bachelor's degree recipients' selected characteristics—Continued

		Academic						Career-oriented						
Selected characteristics	All	Total	Social/ behavioral sciences	Arts and humanities	Biological science	Mathematics/ physical science	Other academic	Total	Business and management	Education	Health	Engineering	Computer science	Other career-oriented
Family status in 1994														
Unmarried without children	67.6	75.7	76.2	76.4	81.7	77.0	64.7	63.2	62.7	56.1	51.2	71.2	71.2	71.7
Unmarried with children	4.0	3.6	4.4	1.9	2.6	3.2	6.6	4.3	4.1	4.4	7.5	0.4	1.5	5.0
Married without children	13.8	10.9	9.3	13.5	8.7	12.0	11.8	15.4	14.3	18.4	16.9	18.1	11.3	12.9
Married with children	14.6	9.8	10.1	8.3	7.0	7.9	16.9	17.2	18.9	21.2	24.4	10.3	16.1	10.4
Family status in 1997														
Unmarried without children	57.8	65.2	62.9	67.9	72.9	63.3	58.7	53.6	53.3	45.1	41.5	58.2	63.4	63.0
Unmarried with children	4.0	3.4	3.8	1.9	2.0	2.0	8.2	4.4	4.2	4.5	8.7	0.9	0.6	4.7
Married without children	26.7	23.8	24.7	23.9	20.7	26.6	21.9	28.3	27.2	32.2	30.4	35.4	21.1	23.5
Married with children	11.6	7.7	8.6	6.3	4.3	8.1	11.3	13.8	15.2	18.2	19.3	5.5	14.8	8.8
Family status in 2003														
Unmarried without children	26.7	31.9	30.8	35.9	29.6	32.4	28.2	23.9	25.9	19.4	20.3	21.3	23.5	27.8
Unmarried with children	5.1	4.3	4.0	5.1	2.2	5.6	5.0	5.5	5.1	4.9	7.4	3.5	4.9	6.8
Married without children	22.3	23.9	23.9	24.2	27.8	21.1	21.4	21.3	21.2	19.6	20.8	23.7	20.2	22.5
Married with children	46.0	39.8	41.4	34.9	40.5	40.9	45.5	49.3	47.8	56.2	51.5	51.6	51.4	42.9

[1] American Indian includes Alaska Native, Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin unless specified.
NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Engineering majors differed from the average student with a career-oriented major, however. A greater percentage was under 30 years old at graduation, a greater percentage had a parent who had gone to college, and a greater percentage attended a very selective college.

Science, Technology, Engineering, and Mathematics (STEM)

In addition to presenting data separately for academic and career-oriented majors, the tables distinguish between *science, technology, engineering, and mathematics (STEM) majors* and *non-STEM majors.* These data can serve as a resource for those interested in the outcomes of students in STEM fields. To simplify the discussion and keep the focus of the report on the differences between graduates with academic and career-oriented majors, the STEM/non-STEM data are not discussed in the text. The STEM fields include both career-oriented majors (engineering and computer science) and academic ones (biological sciences, mathematics, and physical sciences).

Data and Methodology

This report uses data from the Baccalaureate and Beyond Longitudinal Study (B&B), based upon data gathered from undergraduates in the 1992–93 National Postsecondary Student Aid Study (NPSAS:93) who earned a bachelor's degree in 1992–93. The analysis includes graduates who participated in all three B&B interviews: 1994, 1997, and 2003. Information that was missing in 1994 or 1997 was updated in 2003 when possible and a panel weight was created for graduates who responded to all three surveys. Consequently, estimates presented here may differ slightly from previously published data based on the 1994 or 1997 interviews.

NPSAS:93 collected information on a nationally representative sample of undergraduate, graduate, and first-professional students enrolled in postsecondary education institutions in the United States. One of a series of similar studies conducted every 4 to 5 years since 1987, NPSAS:93 represents more than 16 million undergraduates who were enrolled at some time between July 1, 1992, and June 30, 1993. The survey frames for NPSAS were built from the 1990–91 "Institutional Characteristics Survey" of the Integrated Postsecondary Education Data System (IPEDS-IC); lists of students were obtained from each participating institution (about 1,100). The estimates presented in this report are based on the results of interviews with approximately 9,000 bachelor's degree recipients each year from a sampling frame of about 12,500; these bachelor's degree recipients represent the approximately 1.2 million bachelor's degree completers in the United States (U.S. Department of Education 2002). Excluded from the final sample were 760 students who were determined during the B&B interview or from transcripts not to have earned a bachelor's degree during the 1992–93 academic year (see

appendix C for more details). The weighted overall response rate was 74 percent, reflecting an institution response rate (in 1992) of 88 percent and a student response rate (in 2003) of 83 percent. The data presented in this report cover the 50 states, District of Columbia (DC), and Puerto Rico.

All comparisons made in the text were tested using Student's *t* statistic. All differences cited are statistically significant at the .05 level. Appendix C provides information about the formula used and more detail on significance levels. Standard errors for all estimates are available at http://nces.ed.gov/das/library/reports.asp.

Organization of the Report

The report begins with a description of graduates' labor force status in each of the follow-up years and how it has changed over time, followed by an examination of employment stability and intensity. Next, it looks at the occupations and industries in which they were employed, as well as the salaries and benefits they received. A multivariate analysis of workers' salaries in 2003 is included. The last section of the report describes graduates' perceptions of the career potential of their jobs and their job satisfaction at each interview.

Labor Force Status

During the 10 years after graduation, the 1992–93 bachelor's degree recipients moved into and out of the labor force in a variety of ways. While B&B does not provide a complete history of their activities during this period, it does capture information at three key points in time: approximately 1 year after they graduated (1994) and then about 4 and 10 years after they graduated (1997 and 2003). For this analysis, graduates were categorized in each of these years as *only employed, only enrolled, both,* or *neither.*

In the following discussion, *only employed* means that the graduate had a job, but was not enrolled in a degree or certificate program at the same time. *Only enrolled* refers to enrollment in a degree or certificate program (either a graduate or professional program or another undergraduate program). Coursetaking outside a formal program is not considered. Graduates categorized as *neither* were not enrolled and may have been either unemployed—meaning that they were not working but looking for work—or out of the labor force entirely for reasons other than enrollment, such as for childrearing.

The rest of this section examines graduates' labor force status from three different perspectives, in each case comparing those who had career-oriented and academic majors and pointing out differences between men and women:

- Status in each of the 3 years;
- Changes in status between 1994 and 1997 and then between 1997 and 2003; and
- Summary of their status across all 3 years (always only employed, etc.) and the timing of enrollment and employment combinations.

Labor Force Status in 1994, 1997, and 2003

The percentage of 1992–93 bachelor's degree recipients who were only employed was about 76 percent in 1994 and 1997 and then increased to 80 percent in 2003 (table 3).[6]

[6] Nationally, 62 percent of the civilian population age 16 or older were employed in 2003 (U.S. Department of Labor, Bureau of Labor Statistics, table 1. Retrieved May 8, 2007, from http://www.bls.gov/cps/cpsaat1.pdf). Among the civilian population age 25 or older with a bachelor's or higher degree in 2003, 76 percent were employed (U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey data. Retrieved May 8, 2007, from http://www.bls.gov/webapps/legacy/cpsatab4.htm).

Table 3. Percentage distribution of 1992–93 bachelor's degree recipients' employment and enrollment status in 1994, 1997, and 2003, by undergraduate major and previous employment and enrollment status

Undergraduate major and previous employment and enrollment status	Only employed	Only enrolled	Both	Neither
1994				
Total	75.6	6.7	11.3	6.4
Academic	67.8	10.4	14.2	7.6
Social and behavioral sciences	72.1	8.3	13.4	6.1
Arts and humanities	72.5	7.9	12.4	7.1
Biological sciences	52.8	20.0	17.3	9.9
Mathematics/physical sciences	57.8	17.5	18.7	6.0
Other academic	66.9	6.7	14.2	12.3
Career-oriented	79.7	4.8	9.7	5.8
Business and management	85.2	2.5	7.0	5.3
Education	74.8	6.1	13.8	5.2
Health	76.3	6.0	11.8	5.8
Engineering	71.5	8.4	12.9	7.2
Computer science	84.3	4.9	6.0	4.8
Other career-oriented	80.2	5.0	8.4	6.4
Science/technology/engineering/ mathematics (STEM)[1]	65.5	12.9	14.3	7.4
Non-STEM fields	77.6	5.5	10.7	6.2
1997				
Total	76.3	4.8	13.0	5.9
Academic	67.2	9.4	15.9	7.5
Social and behavioral sciences	69.6	6.7	17.2	6.6
Arts and humanities	72.1	6.2	12.7	9.0
Biological sciences	49.0	27.3	16.1	7.6
Mathematics/physical sciences	61.6	13.6	16.6	8.2
Other academic	70.9	3.9	19.3	5.9
Career-oriented	81.1	2.4	11.5	5.0
Business and management	86.0	1.7	7.5	4.8
Education	69.6	2.4	21.1	6.9
Health	80.6	3.1	9.3	7.0
Engineering	80.1	4.4	13.9	1.7
Computer science	88.2	2.6	7.1	2.1
Other career-oriented	83.3	2.4	9.7	4.6
Science/technology/engineering/ mathematics (STEM)[1]	69.3	12.1	14.1	4.6
Non-STEM fields	77.6	3.5	12.8	6.1
Employment and enrollment status in 1994				
Only employed	80.5	3.3	11.6	4.5
Only enrolled	58.3	20.9	10.5	10.3
Both	65.0	5.9	24.8	4.4
Neither	64.3	4.6	10.9	20.3

See notes at end of table.

Table 3. Percentage distribution of 1992–93 bachelor's degree recipients' employment and enrollment status in 1994, 1997, and 2003, by undergraduate major and previous employment and enrollment status—Continued

Undergraduate major and previous employment and enrollment status	Only employed	Only enrolled	Both	Neither
2003				
Total	79.9	1.1	7.1	11.9
Academic	76.1	1.5	8.8	13.6
Social and behavioral sciences	75.0	1.7	10.2	13.1
Arts and humanities	73.5	1.3	7.7	17.4
Biological sciences	81.2	1.6	8.5	8.7
Mathematics/physical sciences	83.4	1.6	7.6	7.3
Other academic	74.2	0.8	8.5	16.5
Career-oriented	82.0	0.9	6.2	10.9
Business and management	85.9	0.4	4.8	8.8
Education	69.7	1.3	10.2	18.8
Health	80.6	0.7	7.2	11.5
Engineering	86.7	0.9	6.7	5.8
Computer science	83.0	2.5	4.5	10.0
Other career-oriented	85.4	1.3	4.4	9.0
Science/technology/engineering/ mathematics (STEM)[1]	84.1	1.4	7.1	7.5
Non-STEM fields	79.2	1.1	7.1	12.7
Employment and enrollment status in 1997				
Only employed	82.2	0.8	6.5	10.4
Only enrolled	80.1	3.1	10.2	6.7
Both	77.7	1.7	11.3	9.4
Neither	56.5	1.8	4.6	37.1

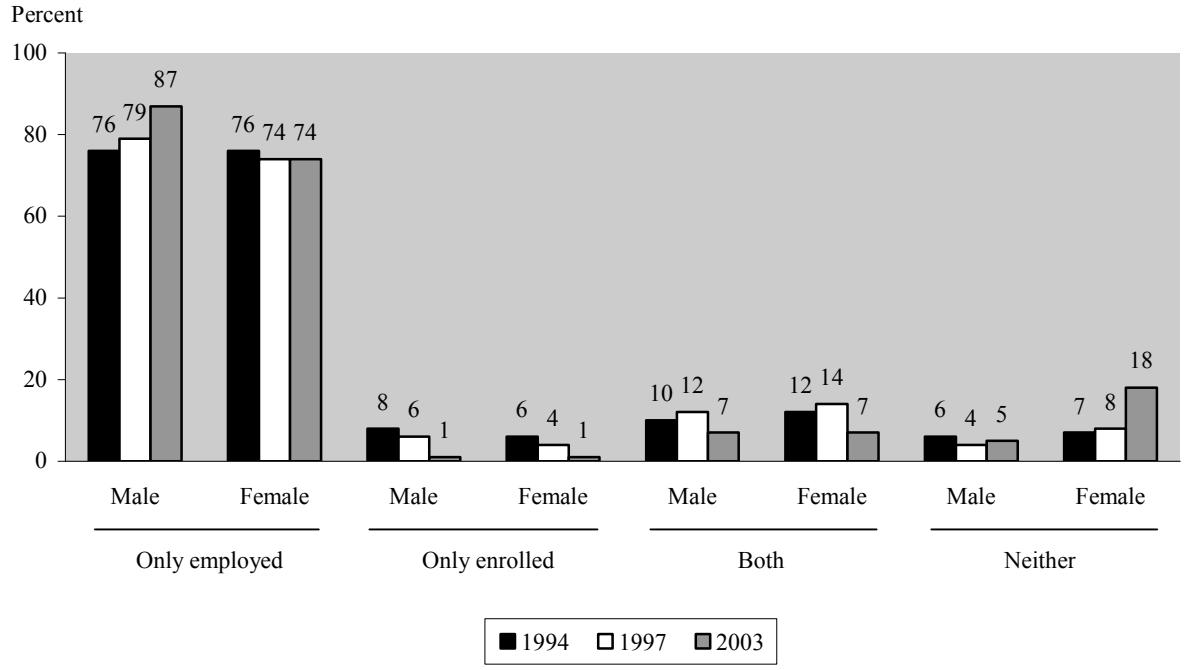
[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.
NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Enrollment without working was relatively uncommon even in 1994 (7 percent) and declined over time (to 5 percent in 1997 and then 1 percent in 2003). More prevalent each year were the proportions of recipients who combined enrollment and work, increasing from 11 to 13 percent between 1994 and 1997 and then dropping to 7 percent in 2003. Thus, about 87 percent of the graduates were working in 2003 (when most were in their 30s). To place this in context, the national employment rate for the population ages 30–39 was 79 percent in 2004 (U.S. Department of Labor 2005).

Somewhat counteracting the overall pattern of movement into the labor force was an increase in the percentage neither employed nor enrolled from about 6 percent in both 1994 and

1997 to 12 percent in 2003. This overall pattern hides a difference between men and women, however (figure 2). Between 4 and 6 percent of men were neither working nor enrolled in each of the 3 years, but the percentage of women neither working nor enrolled increased from 7–8 percent in 1994 and 1997 to 18 percent in 2003.

Figure 2. Percentage distribution of 1992–93 bachelor's degree recipients' employment and enrollment status in 1994, 1997, and 2003, by gender



NOTE: In the figure, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Differences by Major

At each interview, a greater percentage of graduates with career-oriented majors than with academic majors were only employed (80–82 percent vs. 67–76 percent), and, generally, smaller percentages were in any of the other categories[7] (table 3). Education majors differed from the average career-oriented major, however. In each of the 3 years, a greater percentage of education majors were both enrolled and working.

[7] The one exception was that in 2003, just 1 percent of graduates in each category were only enrolled.

Among academic majors, a greater than average percentage of those in the biological sciences were only enrolled in both 1994 and 1997.[8] This reflects, at least in part, the fact that many biological sciences majors enroll in medical school or other first-professional programs (Nevill and Chen 2007) and that students in these programs tend to enroll full time (Choy and Cataldi 2006).

Changes in Labor Force Status

The overall patterns described above hide a considerable amount of movement among categories. For example, although 76 percent of all graduates were in the only employed category in both 1994 and 1997, it was not the same 76 percent. Figures 3–5 summarize graduates' movement among categories between 1994 and 1997 and between 1997 and 2003. In these figures, each arrow leads to a pie chart showing the percentage distribution of the graduates in the original group according to their reported activity at the subsequent interview. Figure 3 shows, for example, that among the 76 percent of graduates who in 1994 were only employed, 81 percent were also only employed in 1997, 3 percent were only enrolled, 12 percent were combining school and work, and 5 percent were doing neither. Figure 3 shows the changes in labor force status for all graduates, and figures 4 and 5 show the changes for academic and career majors separately.

1994 to 1997

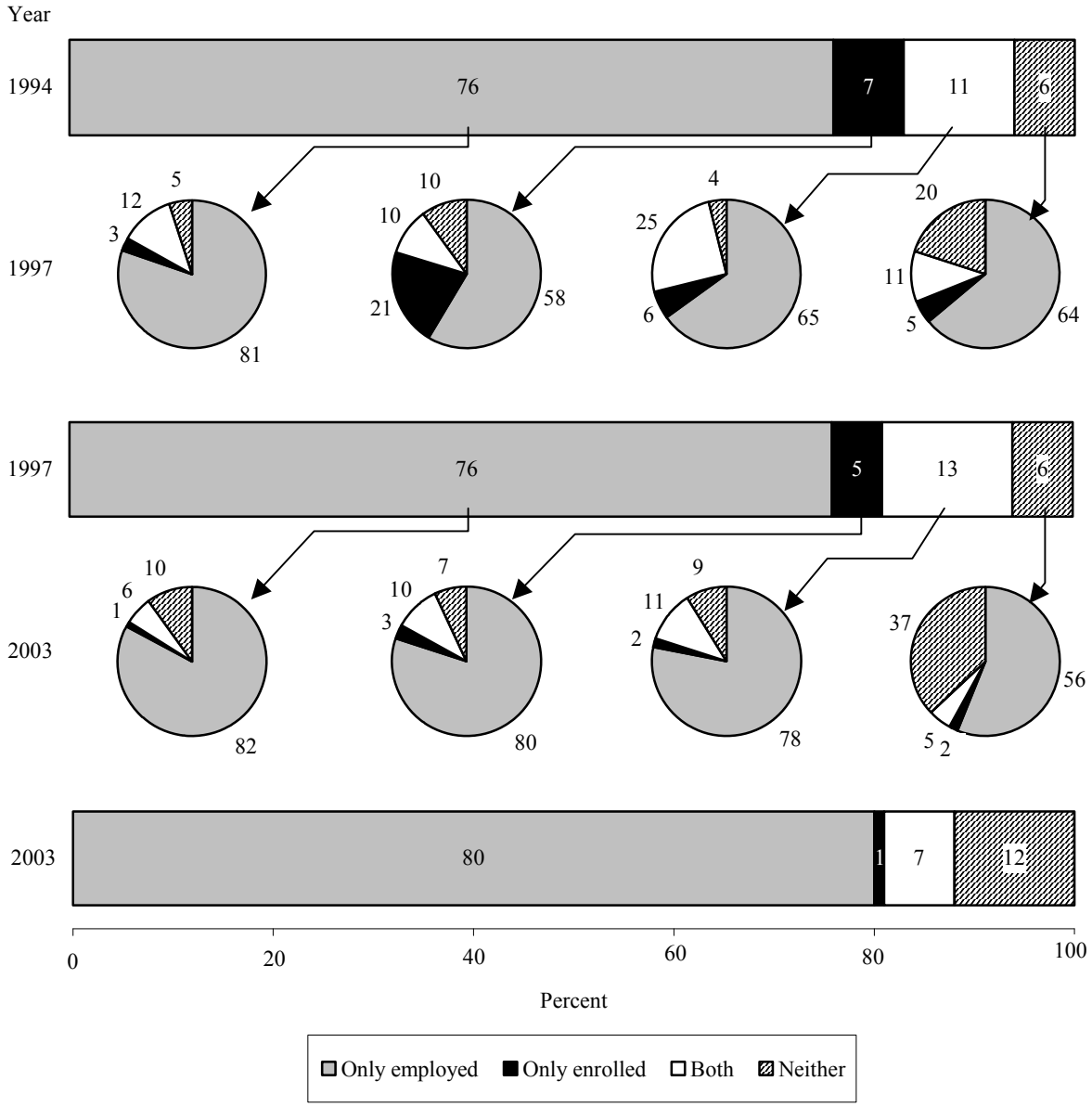
Depending on their labor force status category in 1994, from 58 to 81 percent were in the only employed category in 1997. Of those who started off only employed in 1994, four out of five (81 percent) were still in that category in 1997. Joining them were 58 percent of those who had been only enrolled in 1994 and 64 percent of those who had been neither enrolled nor employed. In addition, 65 percent of those who had been combining school and work in 1994 had finished or left school and moved into the only employed category.

The movement of graduates from other categories into work was offset by the movement of some of those who were only employed in 1994 into other categories in 1997, most commonly to combine school and work (12 percent). Smaller proportions moved into the only enrolled category (3 percent) or were neither working nor enrolled (5 percent).

Among those who had been only enrolled in 1994, some 21 percent were still in that category in 1997. Another 10 percent were still enrolled but were working as well.

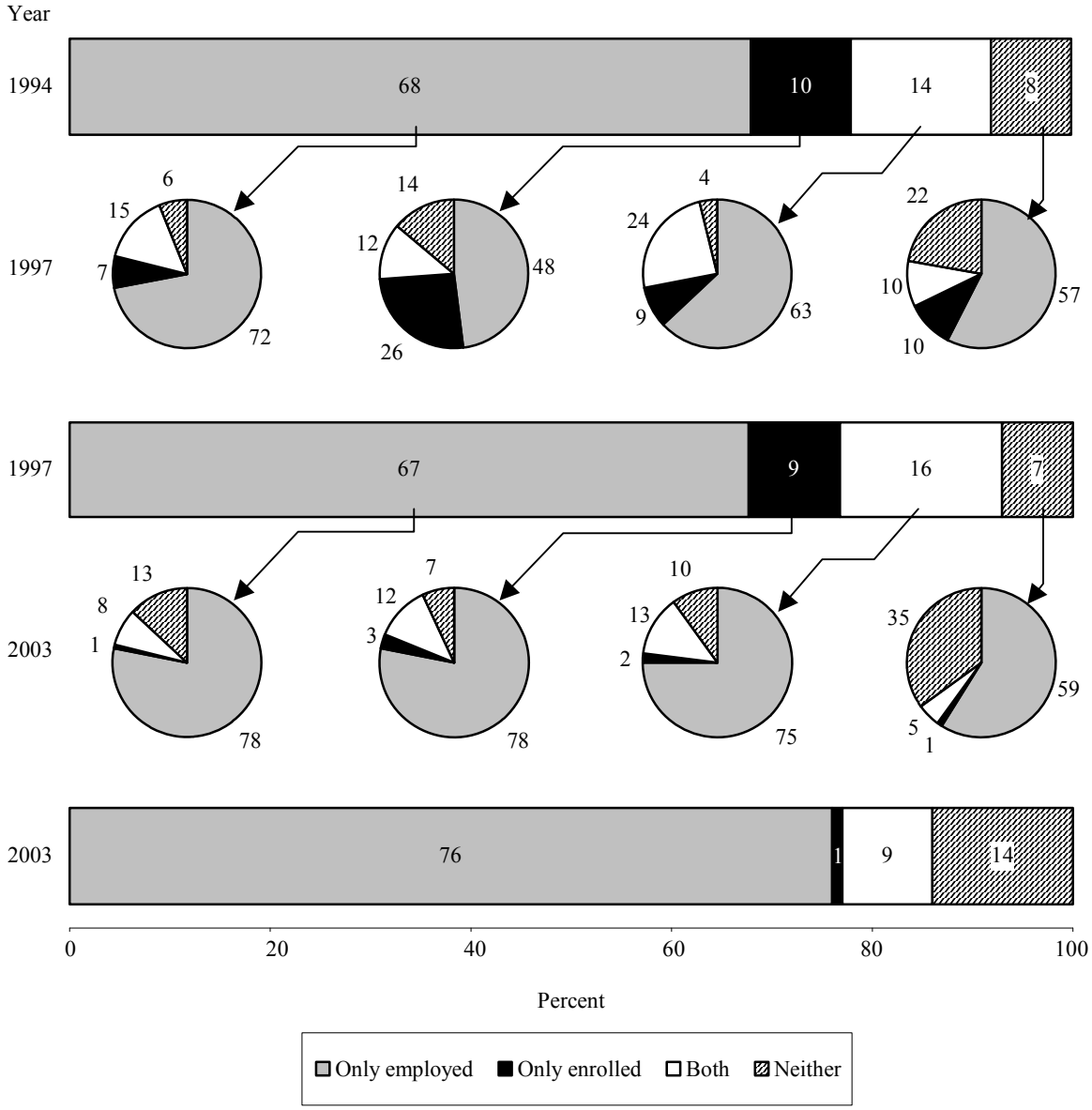
[8] The apparent difference for mathematics/physical science majors is not statistically significant.

Figure 3. Percentage distribution of employment status in 1994, 1997, and 2003 for all 1992–93 bachelor's degree recipients, with detail showing change in each employment status category between 1994 and 1997 and between 1997 and 2003



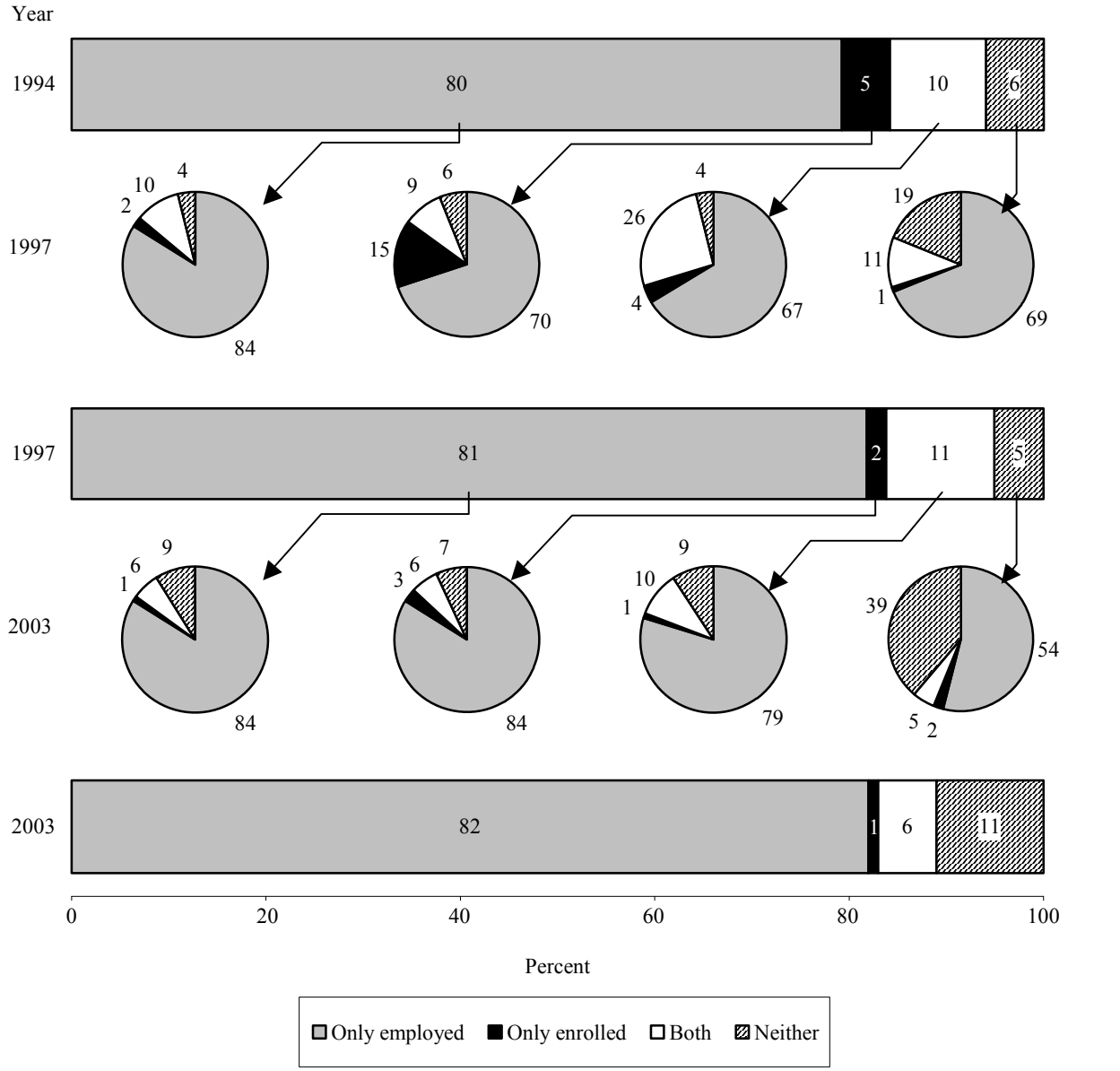
NOTE: In the figure, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Figure 4. Percentage distribution of employment status in 1994, 1997, and 2003 for 1992–93 bachelor's degree recipients with academic majors, with detail showing change in each employment status category between 1994 and 1997 and between 1997 and 2003



NOTE: In the figure, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Figure 5. Percentage distribution of employment status in 1994, 1997, and 2003 for 1992–93 bachelor's degree recipients with career-oriented majors, with detail showing change in each employment status category between 1994 and 1997 and between 1997 and 2003



NOTE: In the figure, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

1997 to 2003

Among those in the only employed category in 1997, some 82 percent were still there in 2003. Six percent had returned to school, combining it with work, 11 percent were neither working nor enrolled, and the remaining 1 percent were only enrolled.

There was additional movement from school to employment only, with 80 percent of those who had been only enrolled in 1997 and 78 percent of those who had been combining school and work moving into the only employed category in 2003.

Academic Versus Career-Oriented Majors

The overall patterns described above were generally consistent for both academic and career-oriented undergraduate majors. However, a larger percentage of academic majors were in school in both 1994 and 1997, either only enrolled or combining school and work (figures 4 and 5). By 2003, there was no measurable difference between the two groups in the rate at which they were only enrolled (1 percent in each case), but greater percentages of academic majors were both enrolled and employed (9 vs. 6 percent) or neither (14 vs. 11 percent).

Summary of Labor Force Status Across All 3 Years

Graduates' labor force status across all 3 years is summarized in table 4, taking into account various combinations of employment, enrollment, and being neither employed nor enrolled. About half of all the 1992–93 bachelor's degree recipients (51 percent) were only employed at all three follow-ups. Another 30 percent had employment/enrollment combinations. That is, they were enrolled for further education in at least one of the years (either only enrolled or combining school and work) and, in each of the 3 years, they were either employed, enrolled, or both. Another 14 percent were employed in 1 or 2 of the years, but had at least 1 year in which they were neither employed nor enrolled. None in this group were enrolled in any of the 3 years. The remaining 6 percent of the graduates (not shown in table 4) followed a variety of other patterns (enrolled all 3 years, never enrolled or employed, etc.), none of which accounted for more than 1 percent of all graduates.

Greater percentages of career-oriented majors than academic majors were only employed in all 3 years (57 vs. 38 percent) and smaller percentages combined school and work (25 vs. 39 percent). Among the academic majors, a smaller than average percentage of biological science majors combined school and work (53 vs. 39 percent). In addition, a larger percentage of biological science majors combined school and work than only worked (53 vs. 25 percent).

Table 4. Percentage of 1992–93 bachelor's degree recipients with selected employment and enrollment patterns across 1994, 1997, and 2003, by undergraduate major

Undergraduate major	Only employed[1]	Combination of employed and enrolled[2]	Combination of employed and neither employed nor enrolled[3]
Total	50.5	29.7	13.7
Academic	38.0	38.7	14.1
Social and behavioral sciences	39.3	39.1	13.9
Arts and humanities	42.2	32.2	15.9
Biological sciences	24.6	53.1	10.8
Mathematics/physical sciences	36.4	44.4	9.0
Other academic	38.8	33.4	17.5
Career-oriented	57.2	25.0	13.4
Business and management	67.3	16.9	12.5
Education	38.6	36.1	17.3
Health	54.7	27.9	12.2
Engineering	52.3	34.6	9.8
Computer science	67.2	16.8	13.2
Other career-oriented	59.7	23.4	13.6
Science/technology/engineering/ mathematics (STEM)[4]	43.9	39.0	10.4
Non-STEM fields	51.8	27.9	14.3

[1] These graduates were "only employed" in each of the 3 years.

[2] In at least 1 of the 3 years, these graduates were enrolled (either only enrolled or working as well as enrolled), and in each of the 3 years, they were either employed, enrolled, or both; they were never doing neither.

[3] In at least 1 of the 3 years, these graduates were neither enrolled nor employed, and in each of the 3 years, they were either only employed or neither enrolled nor employed; they were never enrolled.

[4] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

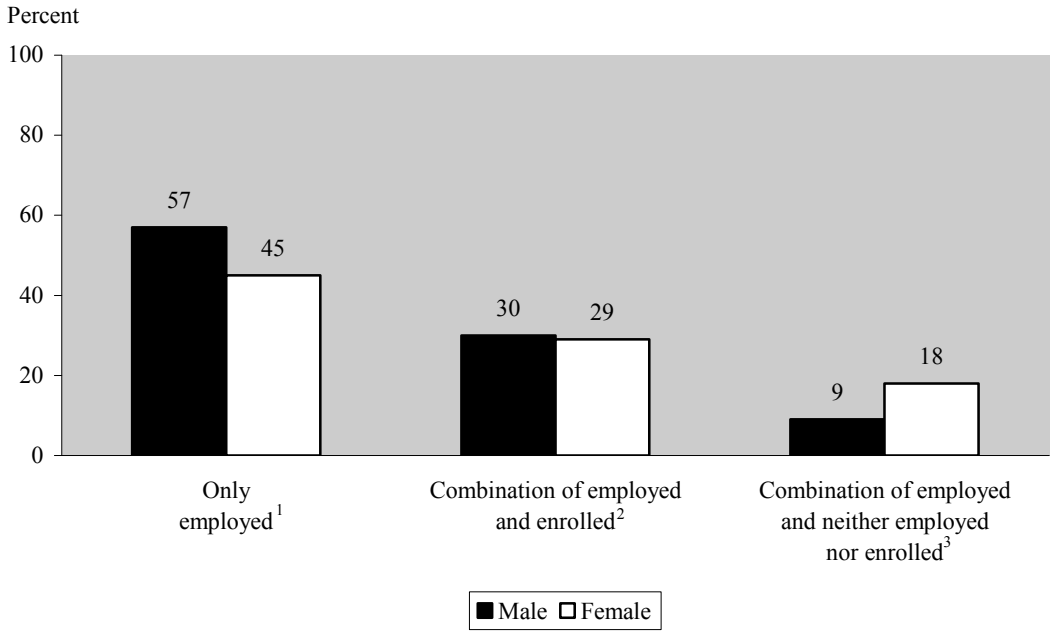
NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). At each interview, respondents could be employed only, enrolled only, both, or neither. The 6 percent of graduates not shown in this table followed a variety of other patterns (enrolled all 3 years, never enrolled or employed, etc.), none of which accounted for more than 1 percent of all graduates. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Among career-oriented majors, a greater than average proportion of engineering and education majors had participated in a combination of school and work activities.

Gender differences were apparent as well. Relatively fewer women than men were only employed in all 3 years, and relatively more combined being employed with being neither employed nor enrolled (figure 6).

Figure 6. Percentage of 1992–93 bachelor's degree recipients with selected employment and enrollment patterns across 1994, 1997, and 2003, by gender



[1] These graduates were "only employed" in each of the 3 years.
[2] In at least 1 of the 3 years, these graduates were enrolled (either only enrolled or working as well as enrolled), and in each of the 3 years, they were either employed, enrolled, or both; they were never doing neither.
[3] In at least 1 of the 3 years, these graduates were neither enrolled nor employed, and in each of the 3 years, they were either only employed or neither enrolled nor employed; they were never enrolled.
NOTE: In the figure, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Graduates not shown in this figure followed a variety of other patterns (enrolled all 3 years, never enrolled or employed, etc.), none of which accounted for more than 1 percent of all graduates. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Enrollment Timing

Overall, 35 percent of the graduates were enrolled in a degree or certificate program in at least one of the years 1994, 1997, or 2003, with academic majors enrolling at a higher rate than career-oriented majors (47 vs. 29 percent) (table 5). Note that not all additional enrollment is

Table 5. Percentage of 1992–93 bachelor's degree recipients enrolled in 1994, 1997, or 2003 and their enrollment patterns, by undergraduate major

		Enrollment pattern[1]							
Undergraduate major	Enrolled in 1994, 1997, or 2003 (Total)	Enrolled, then employed	Both, then employed	Employed, enrolled, employed	Employed, both, employed	Employed, then enrolled or both	Always enrolled or both	Enrolled or both, then employed, sometimes followed by more enrolled or both	One or more years neither employed nor enrolled
Total	35.1	4.1	8.1	2.0	6.9	5.7	0.8	2.1	5.4
Academic	46.8	5.9	9.9	3.7	8.0	7.0	1.4	3.0	8.1
Social and behavioral sciences	45.9	4.1	10.2	2.9	9.2	8.9	1.2	2.6	6.9
Arts and humanities	39.9	5.0	8.5	3.4	6.8	5.8	1.1	1.6	7.7
Biological sciences	63.7	12.2	10.4	9.5	6.7	5.7	2.6	6.3	10.4
Mathematics/physical sciences	54.6	11.6	11.7	3.2	6.1	6.2	2.0	3.7	10.2
Other academic	42.3	2.8	10.2	1.1	9.9	5.7	0.8	3.2	8.7
Career-oriented	29.0	3.2	7.2	1.2	6.3	5.0	0.5	1.7	3.9
Business and management	19.9	1.6	4.9	1.1	4.3	3.5	0.4	1.2	3.0
Education	43.6	3.4	10.0	0.9	10.1	8.7	0.8	2.4	7.5
Health	31.5	4.3	8.7	0.7	5.6	6.9	0.4	1.3	3.6
Engineering	37.7	6.7	10.1	2.4	8.0	4.2	0.5	2.8	3.0
Computer science	19.6	1.0	4.7	0.4	4.1	4.2	1.8	2.5	1.0
Other career-oriented	26.6	4.0	6.7	1.3	6.0	3.8	0.3	1.4	3.2
Science/technology/engineering/ mathematics (STEM)[2]	45.5	8.3	9.7	4.2	6.7	5.0	1.5	3.9	6.1
Non-STEM fields	33.2	3.3	7.8	1.6	6.9	5.8	0.7	1.8	5.2

[1] The first activity could cover 1 or 2 of the 3 years. For example, graduates who were enrolled, then employed could have been enrolled in 1994, then working in 1997 and 2003 or enrolled in 1994 and 1997 and working in 2003. "Enrolled" means only enrolled; "employed" means only employed.

[2] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). At each interview, respondents could be employed only, enrolled only, both, or neither. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

captured here because some graduates entered and left or completed a program during the intervals between interviews. Choy and Li (2006) indicated that 48 percent of all 1992–93 bachelor's degree recipients had enrolled in another degree or certificate program by 2003 (including additional undergraduate work). See Nevill and Chen (2007) for a detailed look at rates of graduate enrollment, persistence, and completion.

Overall, 8 percent of graduates started by combining enrollment and employment and then worked only. Another 7 percent started by working only, then enrolled while continuing to work, and then worked again. Smaller proportions enrolled before working (4 percent) or took a break from work to enroll only before returning to work (2 percent).

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Employment Stability and Intensity

Employment stability and intensity are indicators of how quickly graduates settle into the workforce. This section describes the length of time graduates had been in their jobs, whether they were working full or part time, their experience with unemployment, and their absences from the labor force. In addition to making distinctions between graduates with academic and career-oriented majors, tables in this section present (for each type of major) differences according to graduates' overall employment and enrollment pattern across the 3 survey years: 1994, 1997, and 2003. The table rows are the three categories shown in table 4: (1) graduates who were employed but not enrolled in all 3 years (only employment); (2) those who were enrolled in at least 1 year and in all 3 years were employed, enrolled, or both (employment and enrollment); and (3) those who were neither employed nor enrolled in at least 1 year and who were employed but not enrolled in the other year(s) (employment and neither).

Length of Time in Job

In 1994, employed 1992–93 bachelor's degree recipients reported holding their current job for an average of 1.7 years (table 6). Because graduates were interviewed only about a year after most earned their bachelor's degree, this indicates that some continued to work at a previously held job. In addition, graduates who earned their degrees early in the academic year (July 1992 to January 1993) and then went directly to work could have been working at their current job for more than a year by the time they were interviewed in 1994.

Business majors had been with their current employer for an average of 2.3 years, which was longer than the average across all graduates.[9] In 1997 (approximately 4 years after graduating), graduates had been at their current jobs for an average of 3.0 years, and in 2003 (10 years after graduating), an average of 5.2 years. To place these numbers in context nationally, the median tenure with the current employer in 2002 was 2.7 years for workers ages 25–34, and 4.6 years for workers ages 35–44 (U.S. Department of Labor 2006). The age range in 2003 for most of the graduates in this analysis would be ages 32–40, with about 16 percent being older (table 2).

[9] The apparent difference for health majors compared with all graduates was not statistically significant due to a larger standard error than for business majors, attributable at least in part to a smaller number of health majors.

Table 6. Average number of years at employer for 1992–93 bachelor's degree recipients who were employed in 1994, 1997, and 2003, by selected characteristics

Selected characteristics	1994	1997	2003
Total	1.7	3.0	5.2
Academic	1.4	2.5	4.3
Social and behavioral sciences	1.4	2.6	4.4
Arts and humanities	1.2	2.2	4.3
Biological sciences	1.2	2.5	3.7
Mathematics/physical sciences	1.1	2.5	4.5
Other academic	2.1	2.8	4.8
Career-oriented	1.9	3.2	5.6
Business and management	2.3	3.5	5.9
Education	1.4	2.9	5.1
Health	2.4	3.7	5.8
Engineering	1.3	3.1	5.9
Computer science	2.0	3.3	6.2
Other career-oriented	1.4	2.7	5.2
Science/technology/engineering/ mathematics (STEM)[1]	1.4	2.9	5.1
Non-STEM fields	1.8	3.0	5.2
Employment/enrollment status across 1994, 1997, and 2003			
Academic			
Only employment	1.2	2.6	4.8
Employment and enrollment	1.6	2.4	3.9
Employment and "neither"	1.5	2.4	3.6
Career-oriented			
Only employment	1.8	3.4	6.1
Employment and enrollment	1.9	2.9	4.9
Employment and "neither"	1.7	3.1	4.0
Gender and family status[2]			
Men	1.7	3.0	5.2
Unmarried without children	1.1	2.4	4.5
Unmarried with children	1.7	3.7	5.4
Married without children	1.6	2.7	5.2
Married with children	4.8	5.3	5.6
Women	1.7	3.0	5.1
Unmarried without children	1.1	2.3	4.6
Unmarried with children	3.2	4.9	6.2
Married without children	1.7	2.4	5.5
Married with children	4.0	5.0	5.2

[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

[2] Family status is for the interview year identified in the column.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

In both 1997 and 2003, graduates with career-oriented majors had been in their jobs longer, on average, than those with academic majors. This was true regardless of whether they had always worked only or if they had some work and some school experience.

Full- and Part-Time Employment

In 2003, some 70 percent of all graduates were employed full time (i.e., 35 hours or more per week) at one job, 8 percent were employed part time at one job, and 9 percent had multiple jobs (table 7).[10] The rest were not working: 1 percent were only enrolled, and 12 percent were neither working nor enrolled (table 3).

A greater percentage of career-oriented than academic majors were working full time at one job in 2003 (71 vs. 67 percent). Among career-oriented majors, a greater than average percentage of those in health fields had part-time or multiple jobs.

Gender differences were also apparent in the percentages working full time at one job. In each of the 3 years, proportionately more men than women were employed full time at one job. Their employment trajectories differed as well. The percentage of men employed full time at one job increased from 1994 to 1997 (from 73 to 80 percent) and then remained stable (81 percent in 2003) (figure 7). The percentage of women employed full time at one job also increased between 1994 and 1997 (from 69 to 72 percent), but then declined to 60 percent in 2003. This decline for women was counteracted to some extent by an increase in their part-time employment at one job (from 9 to 12 percent between 1997 and 2003). In contrast, relatively few men (4 percent) were working part time at one job in 2003. About 1 in 10 men (10 percent) and women (9 percent) had multiple jobs in 2003.

Employment intensity was related to having children for married women and men, but in different ways. For women, having children meant that a *smaller* percentage worked full time at one job (this was true in each of the 3 years). However, for men, having children meant that a *larger* percentage worked full time at one job in 2003 (with no detectable difference earlier).

In 2003, about three-quarters of unmarried women worked full time at one job (regardless of whether they had children). Also in 2003, relatively fewer married women without children

[10] Nationally, 5.5 percent of employed persons ages 25–54 held multiple jobs in 2004 (U.S. Department of Labor, Bureau of Labor Statistics, table 36. Retrieved February 6, 2007, from http://www.bls.gov/cps/#tables). The reasons given in 2002 by 35- to 44-year-olds for working at more than one job were to meet expenses or pay off debt (30 percent), to earn extra money (34 percent), to build a business or get experience in a different job (4 percent), and enjoys the second job (18 percent) and other reasons (13 percent) (U.S. Department of Labor 2002).

Table 7. Percentage of all 1992–93 bachelor's degree recipients who were employed at various levels in 1994, 1997, and 2003, by selected characteristics

Selected characteristics	Full time at one job			Part time at one job			At multiple jobs		
	1994	1997	2003	1994	1997	2003	1994	1997	2003
Total	70.7	75.9	69.5	13.1	6.7	8.1	3.2	6.7	9.4
Academic	63.6	67.1	66.9	15.2	8.8	8.5	3.4	7.2	9.5
Social and behavioral sciences	70.0	73.4	68.5	12.9	6.8	8.4	2.8	6.6	8.4
Arts and humanities	61.0	65.3	61.6	18.2	11.7	9.8	5.7	7.8	10.0
Biological sciences	52.3	50.9	69.4	15.3	8.6	8.3	2.5	5.7	12.1
Mathematics/physical sciences	59.4	63.1	76.3	15.6	7.2	6.7	1.5	7.9	8.1
Other academic	64.2	71.7	65.0	14.9	10.1	7.2	2.2	8.5	10.5
Career-oriented	74.5	80.5	70.9	12.0	5.6	7.9	3.1	6.5	9.4
Business and management	83.6	86.9	76.7	7.1	3.8	6.4	1.5	2.8	7.6
Education	62.7	68.2	64.3	19.8	8.3	7.6	6.2	14.2	8.0
Health	69.3	70.8	51.2	14.0	10.0	19.3	4.9	9.1	17.3
Engineering	73.8	89.6	84.3	10.4	2.4	3.8	0.3	2.0	5.3
Computer science	84.5	90.9	77.7	5.1	0.7	4.3	0.7	3.7	5.5
Other career-oriented	71.6	80.1	70.1	13.3	6.2	7.6	3.8	6.7	12.1
Science/technology/engineering/ mathematics (STEM)[1]	66.6	74.2	77.8	12.0	4.7	5.6	1.2	4.4	7.7
Non-STEM fields	71.5	76.2	68.0	13.3	7.1	8.6	3.6	7.2	9.8
Employment/enrollment status across 1994, 1997, and 2003									
Academic									
Only employment	84.3	88.0	83.1	10.8	4.9	8.4	4.9	7.1	8.5
Employment and enrollment	54.0	57.9	71.8	23.2	12.3	11.4	2.8	8.9	13.5
Employment and "neither"	61.1	58.8	32.9	7.7	9.2	5.1	2.2	4.6	4.3
Career-oriented									
Only employment	88.0	90.8	81.6	9.0	3.1	7.9	3.0	6.2	10.5
Employment and enrollment	61.3	73.1	75.8	19.3	8.9	10.5	3.9	9.3	11.1
Employment and "neither"	57.4	61.9	31.5	9.4	7.8	5.1	2.2	3.1	3.9
Gender and family status[2]									
Men	73.0	80.4	80.8	10.6	4.5	3.6	2.7	5.6	9.6
Unmarried without children	70.8	77.0	72.7	11.8	5.8	5.6	2.5	5.5	12.2
Unmarried with children	60.0	63.7	66.2	13.5	7.9	6.0	3.3	17.5	13.8
Married without children	78.5	83.9	81.8	7.9	3.4	4.9	3.7	3.4	7.6
Married with children	81.3	84.2	86.7	6.0	3.1	1.6	2.6	7.6	8.6
Women	68.8	72.2	60.3	15.1	8.5	11.8	3.7	7.7	9.2
Unmarried without children	69.6	74.1	75.8	15.1	6.4	4.6	4.0	8.5	11.3
Unmarried with children	67.0	77.4	75.4	13.5	4.8	8.0	4.2	11.6	10.9
Married without children	76.5	80.5	66.8	11.2	6.1	9.1	3.0	7.4	11.6
Married with children	59.6	64.9	46.4	18.9	13.0	17.6	3.3	8.1	6.7

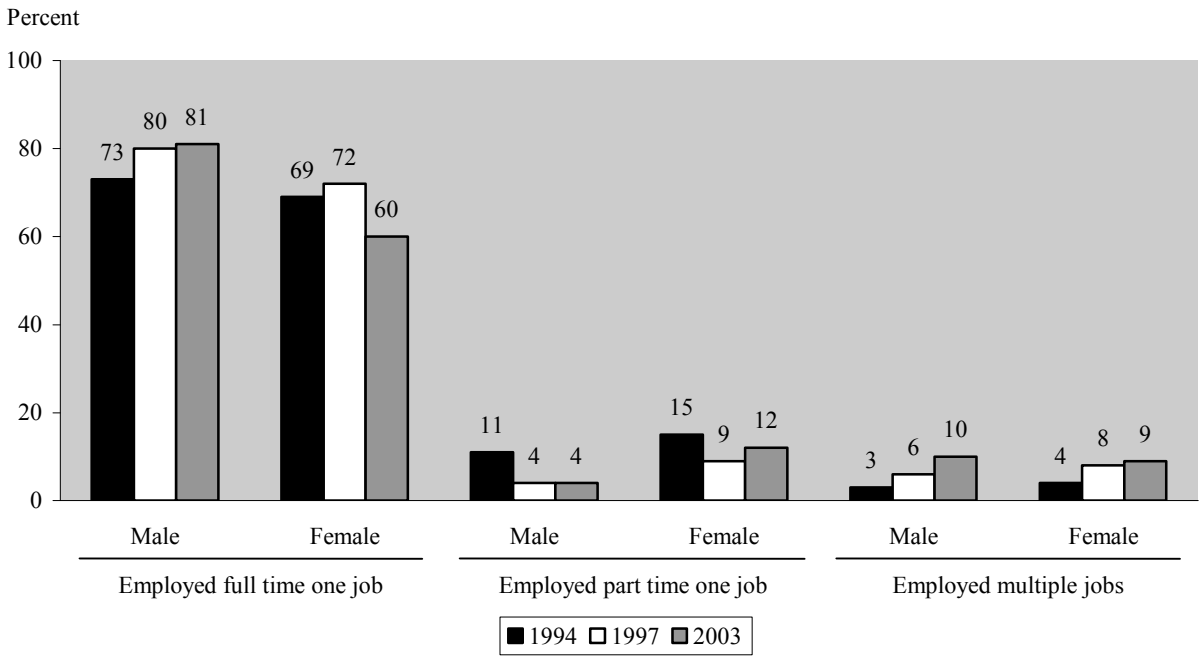
[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

[2] Family status is for the interview year identified in the column.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Figure 7. Percentage of 1992–93 bachelor's degree recipients who were employed full or part time at one job or in multiple jobs in 1994, 1997, and 2003, by gender



NOTE: In the figure, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

worked full time at one job (67 percent), and an even smaller percentage of married women with children (46 percent). Among married women with children, the percentage working full time at one job declined from 65 to 46 percent between 1997 and 2003.

Unemployment

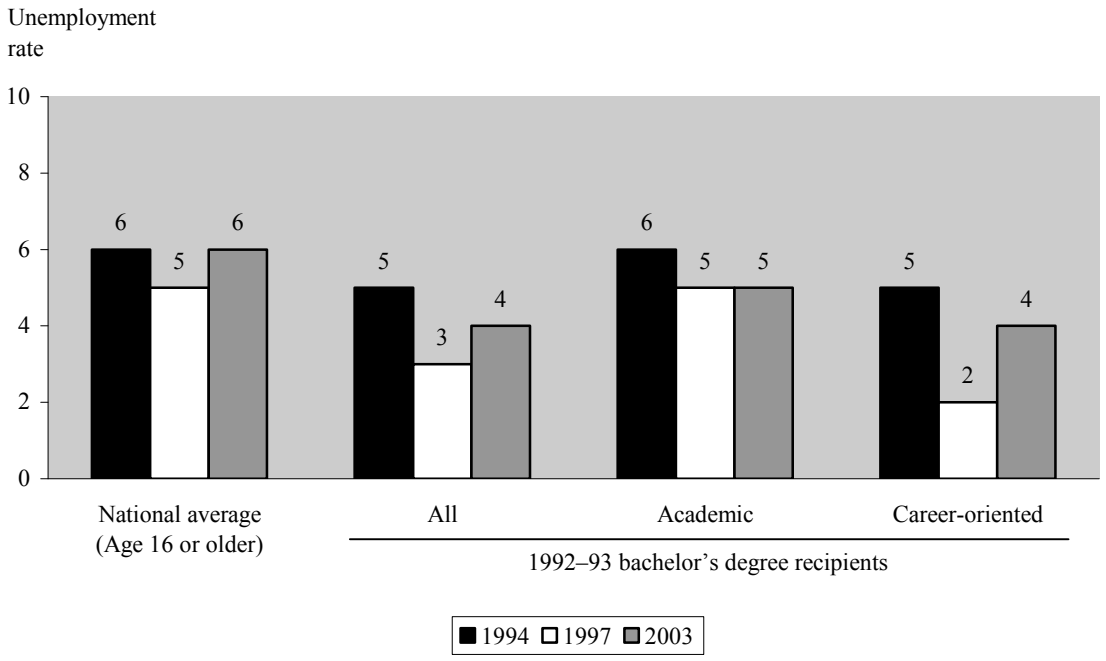
Experience with unemployment is another aspect of graduates' experience in the labor market. The proportion who were unemployed (i.e., not working but looking for work), at what times, and for how long are all relevant.[11]

[11] By this definition, students who were enrolled full time and not working were not considered unemployed unless they were looking for work.

Unemployment Rates

The unemployment rate for a population is calculated by dividing the number of unemployed but looking for work by the number of employed plus the number unemployed (expressed as a percentage). The unemployment rates for bachelor's degree recipients appeared to be lower than the national averages in all 3 years (as one would expect because of their educational advantage), but followed the same pattern over time (figure 8). That is, the unemployment rate declined between 1994 and 1997 and then increased in 2003. The unemployment rate for 1992–93 bachelor's degree recipients was 5 percent in 1994, dipped to 3 percent in 1997, and then increased to 4 percent in 2003. Nationally, the April unemployment

Figure 8. National unemployment rate for individuals age 16 years or older and unemployment rate for 1992–93 bachelor's degree recipients, by type of undergraduate major: 1994, 1997, and 2003



NOTE: Unemployment rates are for April of the year indicated, except that the 2003 rate for bachelor's degree recipients refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003).
SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey, table generated February 12, 2008, from http://www.bls.gov/webapps/legacy/cpsatab7.htm; and U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

rates for all individuals age 16 years or older in these 3 years were 6 percent, 5 percent, and 6 percent, respectively.[12] For the civilian population age 25 or older with bachelor's degrees, the annual unemployment rate was 3 percent in 1994, 2 percent in 1997, and 3 percent in 2003.[13]

In 1997 and 2003 (but not in 1994), the unemployment rate for graduates with career-oriented majors was lower than that for graduates with academic majors.[14] Although there appeared to be some differences by individual majors, most were not statistically significant because of the large standard errors associated with small sample sizes. Detail by major therefore is not presented here.

Periods of Unemployment

By 2003, some 46 percent of graduates had been unemployed at some point during the 10-year period (table 8). The average period of unemployment was a total of 9 months, which could have been one long period of unemployment or multiple short ones. Unemployment became less of an issue over time, however. In the first year after finishing college, 29 percent of graduates had at least one spell of unemployment. Over the next 3 years (from 1994 to 1997), relatively fewer were unemployed (22 percent), even though the time period for collecting this information was longer. Finally, from 1997 to 2003, an even longer period covering 6 years, still fewer (13 percent) were unemployed.

Between 1994 and 1997 and again between 1997 and 2003, graduates with career-oriented majors were less likely than their peers with academic majors to have any spells of unemployment, and if they were unemployed, the average length of time was shorter. Graduates' experience with unemployment also varied by individual major. Among all graduates, 46 percent had been unemployed. Compared with this average, a larger percentage of arts and humanities majors and a smaller percentage of health majors had been unemployed (55 and 31 percent, respectively). During the final period—1997 through 2003—biological sciences, health, and education majors were less likely than the overall average to have any unemployment spells (7–9 vs. 13 percent), and arts and humanities majors were more likely than average to do so (22 vs. 13 percent).

[12] U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey. Retrieved May 8, 2007, from http://www.bls.gov/cps/cpsaat1.pdf.

[13] U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey. Retrieved May 8, 2007, from http://www.bls.gov/webapps/legacy/cpsatab4.htms.

[14] The apparent difference in 1994 was not statistically significant.

Table 8. Unemployment experience overall and between interviews among 1992–93 bachelor's degree recipients, by undergraduate major and employment/enrollment trajectory: 1993–2003

Undergraduate major and employment/enrollment trajectory	Bachelor's completion through 2003 interview		Bachelor's completion through April 1994		May 1994 through April 1997		May 1997 through 2003 interview	
	Percent unemployed any time	Average months	Percent unemployed any time	Average months	Percent unemployed any time	Average months	Percent unemployed any time	Average months
Total	46.1	8.8	29.0	5.3	22.0	6.9	13.1	7.9
Academic	49.8	9.7	29.0	5.3	25.5	7.9	15.4	8.7
Social and behavioral sciences	49.7	9.8	29.9	5.2	25.6	7.7	14.6	10.0
Arts and humanities	54.8	9.1	31.1	4.8	25.3	7.6	22.2	7.8
Biological sciences	41.5	9.4	26.3	5.8	23.4	7.7	8.1	7.1
Mathematics/physical sciences	45.7	11.0	24.2	5.9	26.9	10.0	11.6	8.2
Other academic	50.3	10.0	27.8	6.2	26.4	8.1	12.9	9.5
Career-oriented	44.1	8.2	29.0	5.3	20.2	6.3	11.8	7.3
Business and management	41.3	8.4	27.5	5.6	15.8	6.5	13.0	7.0
Education	50.3	8.1	33.8	4.9	27.4	6.5	8.8	8.0
Health	30.7	7.0	18.6	5.2	15.2	5.6	7.0	5.0
Engineering	46.5	9.1	32.3	6.1	17.5	7.2	12.5	8.3
Computer science	44.3	8.3	31.3	5.6	15.0	‡	15.4	‡
Other career-oriented	48.4	8.1	30.4	4.7	25.2	5.8	14.0	7.4
Science/technology/engineering/ mathematics (STEM)[1]	44.7	9.5	28.9	5.9	20.6	7.8	11.5	8.1
Non-STEM fields	46.4	8.6	29.1	5.2	22.3	6.8	13.3	7.8
Employment/enrollment status across 1994, 1997, and 2003								
Academic								
Only employment	49.0	6.9	30.8	4.2	19.9	5.6	14.1	7.2
Employment and enrollment	45.1	9.8	25.5	4.8	24.2	8.3	11.9	10.8
Career-oriented								
Only employment	40.0	6.0	28.1	4.1	13.7	5.2	8.9	6.2
Employment and enrollment	42.1	8.8	24.3	5.5	22.5	7.4	10.0	7.1

‡ Reporting standards not met. (Too few cases for a reliable estimate.)

[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

NOTE: Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Labor Force Absences

Between graduation in 1992–93 until 2003, about half (49 percent) of male graduates and 63 percent of female graduates were ever out of the labor force for some reason (including enrollment) (table 9). Consistent with their greater propensity to enroll for an additional degree or certificate, graduates with academic majors were ever out of the labor force at higher rates than career-oriented majors among both men and women over the 10-year period and for each interval between interviews.

Among married women, having children was associated with a higher rate of absence from the labor force over the 10-year period, but the reverse was true among married men. In 2003, graduates were asked if they had taken a leave from work to have or raise children since the last interview (1997): 35 percent of women and 14 percent of men reported they had done so. Among women, career-oriented majors took leaves for this purpose at a higher rate than academic majors, but this difference was not observed among men.

Summary

By 2003, the average bachelor's degree recipient appears to have settled into the workforce and had been in his or her current job for about 5 years. Men and women had different employment patterns. For men, the percentage employed full time at one job increased from 1994 to 1997 and then remained stable in 2003. For women, the percentage employed full time at one job increased from 1994 to 1997 but then declined in 2003, offset in part by an increase in part-time employment at one job. The work experiences of graduates with academic and career-oriented majors differed, with career-oriented majors appearing to be more established in the workforce earlier—greater percentages had been in their jobs for a longer period and had full-time jobs and smaller percentages had been unemployed. However, women with career-oriented majors took leaves to raise children at a higher rate than academic majors.

Table 9. Labor force absences overall and between interviews for 1992–93 bachelor's degree recipients, by gender, undergraduate major, and family status: 1993–2003

Gender, undergraduate major, and family status	Bachelor's completion through 2003 interview		Bachelor's completion through April 1994		May 1994 through April 1997		May 1997 through 2003 interview			
	Percent out of labor force any time[1]	Average months	Percent out of labor force any time[1]	Average months	Percent out of labor force any time[1]	Average months	Percent out of labor force any time[1]	Average months	Percent leave for child care	Average months
Male										
Total	48.9	18.2	37.6	12.8	22.0	12.5	7.7	18.0	13.6	2.0
Academic	57.3	21.4	41.6	12.4	33.8	14.7	11.3	20.4	12.3	1.7
Mathematics/physical sciences	62.2	24.3	51.7	12.2	42.6	14.6	14.0	‡	12.6	‡
Biological sciences	75.0	31.0	55.2	12.0	56.7	22.0	13.9	30.4	11.8	2.5
Social and behavioral sciences	52.7	16.9	36.0	12.6	27.0	11.1	10.0	14.2	13.2	1.6
Arts and humanities	53.1	19.0	39.0	12.4	28.0	10.9	11.2	22.3	9.8	1.8
Other academic	52.6	19.3	35.8	12.6	28.2	14.3	9.1	‡	17.1	‡
Career-oriented	44.5	16.1	35.5	13.1	15.9	10.2	5.9	15.6	14.3	2.1
Engineering	47.9	16.9	42.7	12.9	15.9	11.3	4.3	‡	15.7	2.4
Computer science	39.7	16.0	33.6	12.6	12.0	‡	2.2	‡	26.0	‡
Health	59.9	18.1	47.8	12.5	26.9	14.0	5.4	‡	16.2	‡
Business and management	41.9	14.8	31.6	13.2	12.6	9.3	6.5	13.9	10.6	1.8
Education	47.0	16.5	36.8	13.4	18.1	10.1	8.4	‡	15.0	1.5
Other career-oriented	43.0	16.9	33.8	13.3	19.3	8.3	6.1	19.2	16.9	2.5
Science/technology/engineering/ mathematics (STEM)[2]	54.9	22.3	45.6	12.5	28.4	16.9	7.6	23.0	15.7	2.2
Non-STEM fields	46.9	16.7	35.0	12.9	19.9	10.4	7.8	16.3	13.0	1.9
Family status[3]										
Unmarried without children	53.8	18.6	42.0	12.6	26.3	12.3	10.0	18.5	0.2	‡
Unmarried with children	56.7	17.2	28.0	‡	28.1	‡	4.5	‡	20.7	‡
Married without children	52.1	18.4	32.8	13.5	21.2	13.9	10.1	18.6	1.5	‡
Married with children	43.7	18.0	20.6	14.0	13.4	10.5	5.6	17.0	26.6	2.1

See notes at end of table.

Table 9. Labor force absences overall and between interviews for 1992–93 bachelor's degree recipients, by gender, undergraduate major, and family status: 1993–2003—Continued

Gender, undergraduate major, and family status	Bachelor's completion through 2003 interview		Bachelor's completion through April 1994		May 1994 through April 1997		May 1997 through 2003 interview			
	Percent out of labor force any time[1]	Average months	Percent out of labor force any time[1]	Average months	Percent out of labor force any time[1]	Average months	Percent out of labor force any time[1]	Average months	Percent leave for child care	Average months
Female										
Total	62.5	22.8	40.0	12.7	28.1	11.6	28.3	22.2	35.3	8.4
Academic	70.1	24.3	46.6	12.6	37.7	12.2	32.4	21.8	32.1	9.7
Mathematics/physical sciences	67.7	21.7	40.7	12.5	37.4	13.1	24.4	20.4	40.6	8.1
Biological sciences	80.6	26.1	52.5	11.6	52.1	15.8	33.3	21.0	29.5	5.1
Social and behavioral sciences	68.2	23.8	44.1	12.6	33.5	11.4	33.8	21.7	34.3	9.8
Arts and humanities	68.6	24.6	47.3	12.9	39.5	12.3	31.7	20.9	27.3	10.3
Other academic	72.2	24.7	50.6	12.5	35.2	10.0	33.4	25.3	33.4	12.9
Career-oriented	58.4	21.7	36.5	12.8	22.9	11.1	26.0	22.4	37.1	7.8
Engineering	58.1	25.2	44.1	12.1	22.9	‡	25.1	‡	45.0	5.4
Computer science	54.8	19.4	34.4	‡	14.3	‡	23.1	‡	34.3	‡
Health	61.6	22.3	39.7	12.5	19.1	13.2	32.1	20.7	44.0	9.2
Business and management	51.2	21.2	30.9	12.6	18.9	11.4	21.3	23.3	32.1	6.6
Education	65.9	22.6	42.2	13.0	30.3	10.2	29.1	23.9	42.0	8.8
Other career-oriented	56.3	20.5	33.4	12.9	21.9	11.1	24.6	20.0	32.0	7.3
Science/technology/engineering/ mathematics (STEM)[2]	69.1	24.0	45.1	12.1	37.1	14.3	27.9	21.8	36.2	6.0
Non-STEM fields	61.8	22.6	39.5	12.8	27.2	11.3	28.2	22.2	35.2	8.7
Family status[3]										
Unmarried without children	54.9	18.4	42.5	12.4	29.0	10.5	11.9	18.2	0.9	‡
Unmarried with children	50.6	19.5	23.4	12.2	20.3	8.6	20.2	24.4	39.8	7.6
Married without children	54.4	20.6	39.6	13.7	23.0	9.9	18.5	19.0	7.0	4.8
Married with children	72.4	25.7	36.5	13.1	29.4	15.3	44.0	23.4	69.5	8.7

‡ Reporting standards not met. (Too few cases for a reliable estimate.)

[1] Includes periods of enrollment without working.

[2] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

[3] Family status is for the date at the end of the interval identified in the column heading.

NOTE: Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

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Occupations and Industries

This section describes the occupations of the 1992–93 graduates and the industries in which they worked at the time of each interview. Graduates were spread across a large number of occupations and industries, but they did reflect their undergraduate majors. To facilitate comparisons, the occupations and industries listed in tables 10 and 11 and in figures 9–12 are ordered from largest to smallest according to the percentage of graduates in each category in 1994. Appendix B includes a list of the occupations in each category.

Occupation

Overall Patterns

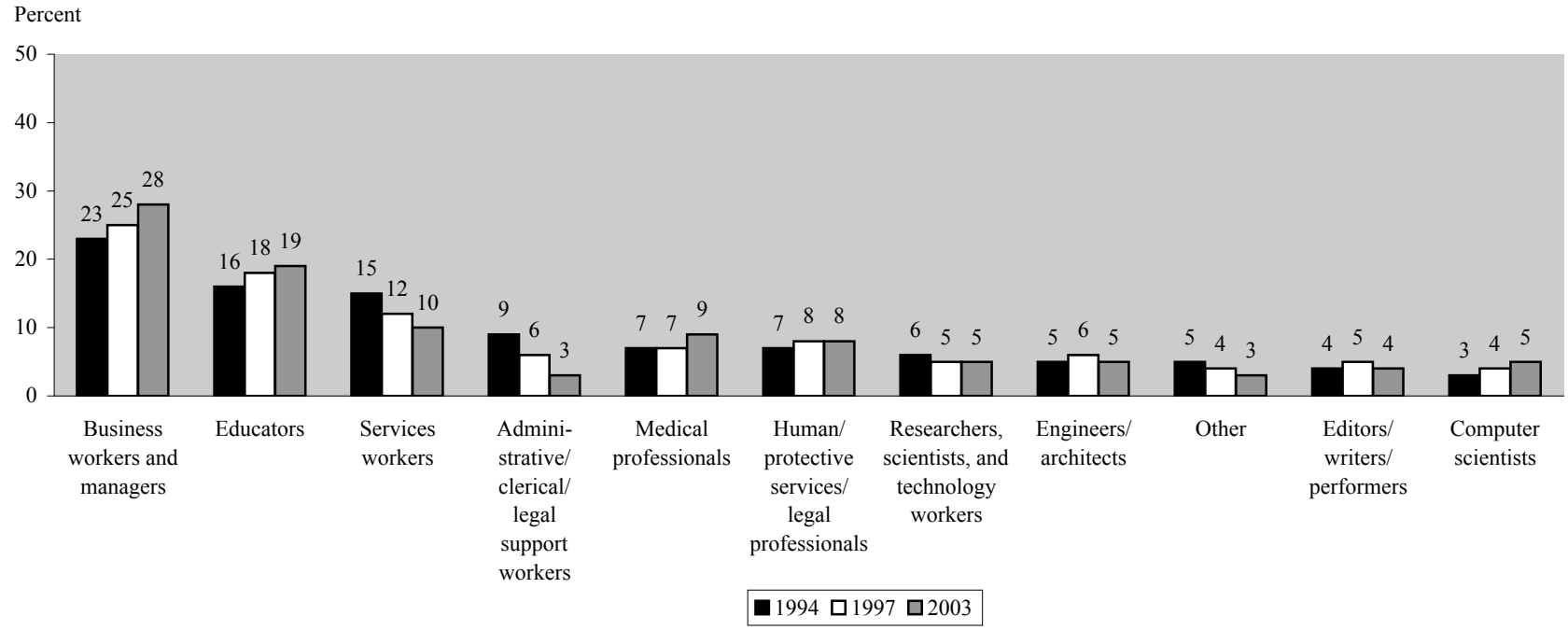
A business or managerial occupation was the most common in 1994, accounting for 23 percent of all graduates. The next most common occupations were educator (16 percent) and service worker (15 percent) (figure 9 and table 10). No other occupation accounted for more than 10 percent of the total. Business and management was still the most common occupation in 2003, accounting for 28 percent of all graduates at that time.

By 2003, graduates appeared to have moved out of occupations often characterized as relatively low-level and not always needing a bachelor's degree. For example, between 1994 and 2003, the percentage in service positions declined from 15 to 10 percent, and the percentage in administrative/clerical/legal support occupations declined from 9 to 3 percent.

Occupations by Undergraduate Major

Graduates with academic majors tended to be spread out across more occupations than graduates with career-oriented majors, most of whom stayed in occupations closely related to their undergraduate fields of study. Figure 10 shows, for each undergraduate major, the percentage of graduates who were in the occupations that included at least 10 percent of the graduates in either 1994 or 2003.

Figure 9. Percentage distribution of 1992–93 bachelor's degree recipients' occupations in 1994, 1997, and 2003



NOTE: In the figure, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Table 10. Percentage distribution of 1992–93 bachelor's degree recipients' occupations in 1994, 1997, and 2003, by undergraduate major

Undergraduate major	Business workers and managers			Educators			Service workers			Administrative/ clerical/legal support workers			Medical professionals		
	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003
Total	23.4	24.9	28.0	16.5	17.9	18.5	14.7	12.5	10.2	9.3	5.8	3.4	6.9	7.3	9.5
Academic	19.1	21.2	23.0	16.5	19.2	19.4	15.4	13.0	10.0	12.4	7.3	4.6	3.1	4.6	9.7
Social and behavioral sciences	26.4	29.1	29.9	9.3	12.6	15.0	18.3	14.8	12.1	15.7	8.2	4.1	2.2	2.5	4.8
Arts and humanities	16.0	18.9	20.1	20.3	22.2	23.8	14.0	15.2	12.5	12.5	7.2	7.3	1.7	3.0	2.9
Biological sciences	8.5	9.4	11.3	12.5	14.3	12.3	12.8	9.5	6.5	5.5	4.8	1.2	11.8	18.6	42.7
Mathematics/physical sciences	13.8	13.2	19.3	33.0	32.0	21.8	8.6	4.7	3.1	7.5	4.4	2.3	2.2	4.9	10.5
Other academic	16.4	17.5	23.2	23.0	28.3	29.0	16.4	11.1	6.4	10.8	8.6	5.4	2.6	2.4	5.0
Career-oriented	25.4	26.8	30.6	16.5	17.3	18.1	14.4	12.2	10.3	7.8	5.0	2.8	8.6	8.7	9.4
Business and management	51.7	54.7	55.7	3.1	3.4	6.2	21.5	19.5	15.0	8.9	5.7	3.1	0.9	0.8	1.8
Education	6.9	7.1	9.4	66.7	68.0	65.1	8.7	7.2	5.7	6.9	4.5	2.3	2.2	1.9	3.3
Health	4.5	5.7	9.8	4.9	6.5	6.3	2.8	3.6	4.3	3.8	0.7	0.8	72.3	71.8	68.8
Engineering	6.6	7.3	22.6	3.3	2.1	1.7	5.0	3.6	3.8	2.1	0.3	0.1	#	0.4	1.2
Computer science	11.6	10.4	17.5	6.0	4.3	3.9	9.0	3.6	3.5	6.3	1.3	2.8	0.5	1.6	1.3
Other career-oriented	19.0	20.5	24.6	5.1	7.7	10.5	18.3	14.3	13.8	11.4	9.3	4.7	2.0	2.7	3.6
Science/technology/engineering/ mathematics (STEM)[1]	9.2	9.4	18.2	11.5	10.9	8.8	8.1	5.2	4.4	4.6	2.3	1.2	3.3	5.7	14.2
Non-STEM fields	25.8	27.7	29.9	17.4	19.2	20.4	15.9	13.8	11.3	10.1	6.4	3.8	7.5	7.6	8.6

See notes at end of table.

Table 10. Percentage distribution of 1992–93 bachelor's degree recipients' occupations in 1994, 1997, and 2003, by undergraduate major—Continued

Undergraduate major	Human/protective services/legal professionals			Researchers, scientists, and technology workers			Engineers/ architects			Other			Editors/writers/ performers			Computer scientists		
	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003
Total	6.8	7.7	8.2	6.3	5.3	4.6	4.8	5.6	5.0	4.8	4.2	3.1	3.8	4.5	4.4	2.9	4.4	5.0
Academic	9.4	10.8	11.8	10.1	9.5	8.3	0.8	0.9	1.6	6.0	4.9	2.9	5.7	6.2	5.3	1.5	2.5	3.4
Social and behavioral sciences	14.7	18.5	18.8	5.6	4.8	5.1	0.1	0.5	1.1	4.2	5.1	2.5	1.9	2.4	3.5	1.7	1.4	3.1
Arts and humanities	5.8	5.6	8.5	5.5	4.0	4.9	1.1	0.4	1.4	6.3	4.4	3.4	15.6	15.8	12.4	1.3	3.3	2.9
Biological sciences	4.0	3.5	2.4	31.4	29.6	14.9	0.8	1.3	2.7	10.8	6.0	2.1	0.7	0.7	1.8	1.3	2.4	2.2
Mathematics/physical sciences	2.2	2.1	5.0	22.3	25.6	23.5	2.3	4.3	4.3	5.0	2.5	2.6	0.8	1.2	1.0	2.4	5.1	6.8
Other academic	11.1	11.5	12.4	8.1	8.1	7.4	1.3	0.6	0.4	7.5	5.9	4.3	1.7	3.9	2.0	1.2	2.2	4.7
Career-oriented	5.5	6.1	6.4	4.5	3.1	2.7	6.8	8.0	6.8	4.3	3.9	3.2	2.9	3.7	3.9	3.5	5.3	5.9
Business and management	1.7	2.3	2.8	3.8	1.7	2.3	0.5	0.8	1.1	4.0	3.7	4.7	1.1	1.7	1.4	2.9	5.7	5.9
Education	3.2	4.9	4.9	1.1	1.1	1.3	0.2	0.4	0.3	2.7	2.0	2.2	1.1	2.6	4.0	0.5	0.5	1.5
Health	7.2	6.6	4.2	2.4	3.1	3.2	0.1	0.3	0.8	1.0	0.8	0.7	0.2	0.3	0.3	0.9	0.7	0.8
Engineering	0.2	0.9	0.8	12.5	6.8	4.0	56.7	63.3	48.4	7.5	7.1	3.7	0.4	0.1	0.6	5.8	8.3	13.2
Computer science	#	0.4	0.8	4.7	3.0	3.0	12.6	15.2	17.8	2.7	3.6	1.5	#	1.1	#	46.6	55.6	48.0
Other career-oriented	16.4	16.5	17.9	6.4	5.8	3.7	3.8	3.7	4.1	6.7	6.1	3.1	10.4	11.6	11.7	0.6	1.8	2.3
Science/technology/engineering/ mathematics (STEM)[1]	1.4	1.6	2.0	17.6	15.1	10.6	26.4	30.3	23.3	7.1	5.5	2.7	0.5	0.6	0.9	10.4	13.4	13.6
Non-STEM fields	7.7	8.8	9.4	4.4	3.5	3.5	1.0	1.1	1.5	4.5	4.0	3.2	4.4	5.3	5.1	1.5	2.7	3.4

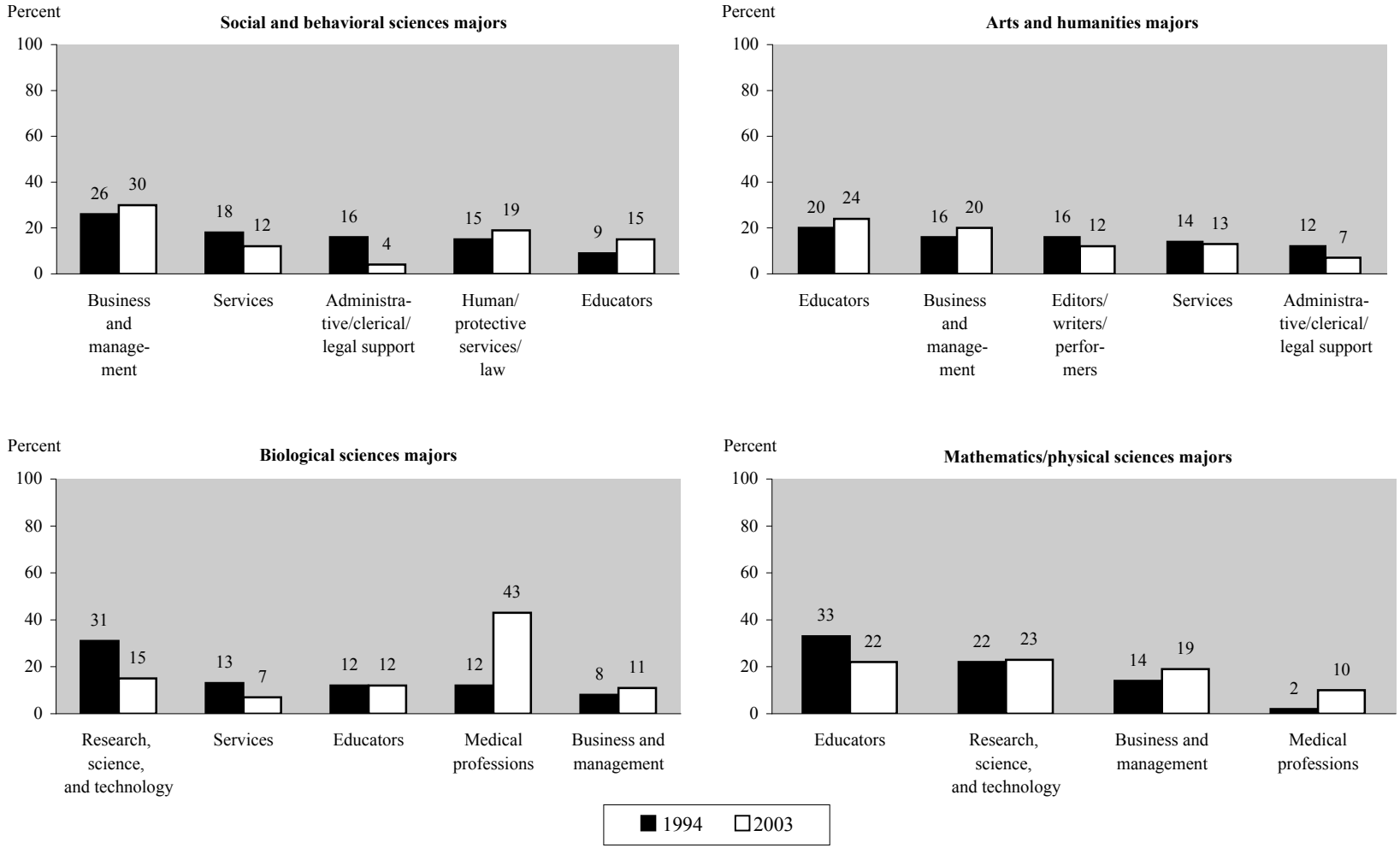
Rounds to zero.

[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

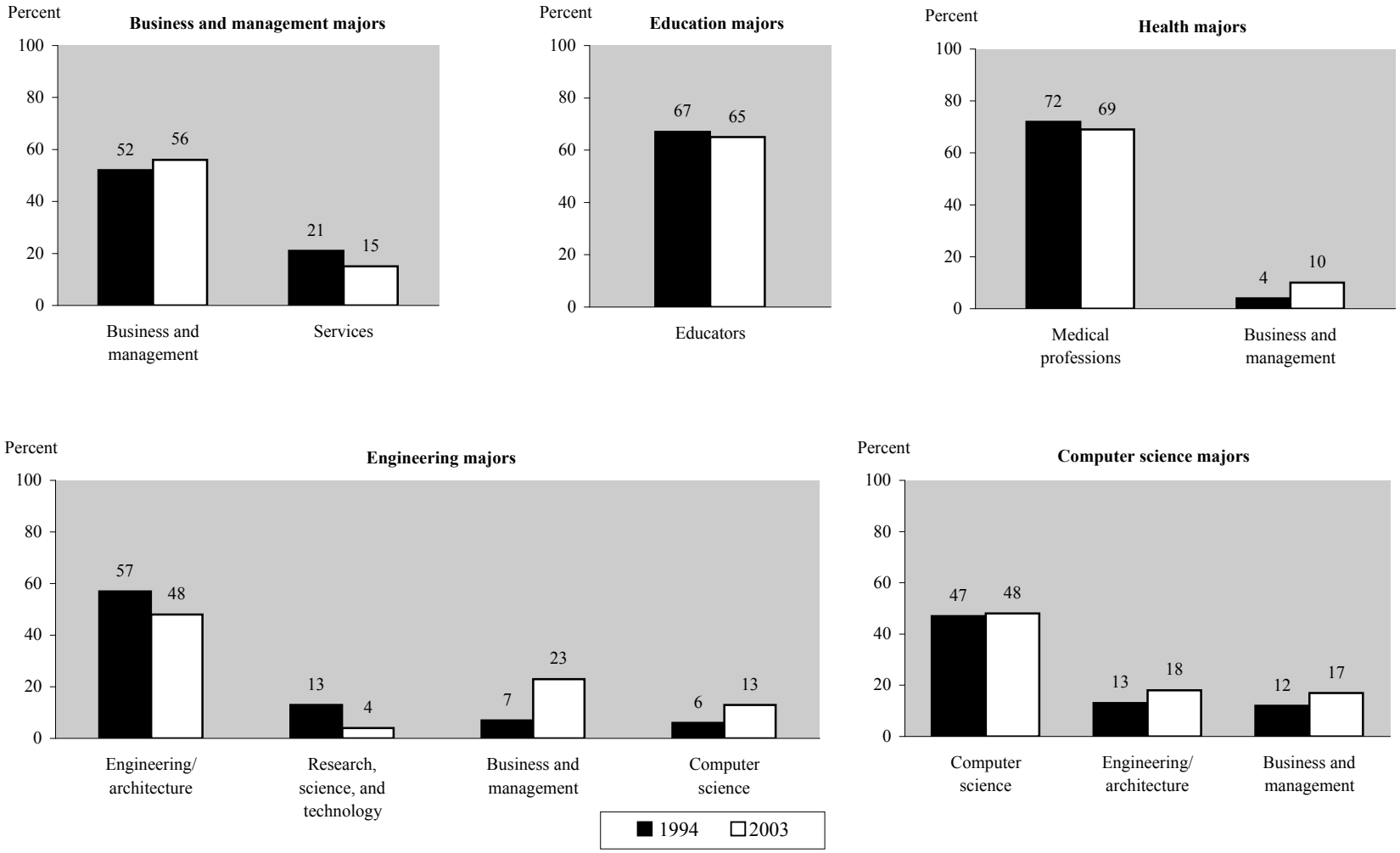
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Figure 10. Percentage of 1992–93 bachelor's degree recipients in selected occupations in 1994 and 2003, by undergraduate major



See notes at end of figure.

Figure 10. Percentage of 1992–93 bachelor's degree recipients in selected occupations in 1994 and 2003, by undergraduate major—Continued



NOTE: In the figure, 1994 refers to April 1994, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). The figure shows occupations that accounted for at least 10 percent of graduates in each major in either 1994 or 2003. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Academic fields

Social and behavioral sciences: Graduates who had majored in these fields were distributed across a number of occupational groups in 1994, but business and management accounted for the largest proportion (26 percent). By 2003, the percentages in service and administrative/clerical/ legal support occupations had declined, and the percentage who were educators had increased.

Arts and humanities: Graduates with majors in these fields were also distributed across numerous occupations. The proportion who were administrative/clerical/legal support workers declined from 12 percent in 1994 to 7 percent in 2003, but there were no other statistically significant changes in the percentages in the occupations shown in figure 10.

Biological sciences: In 1994, the most common occupation for biological sciences undergraduate majors was researcher/scientist/technology worker (31 percent), but the proportion in that occupational group declined to 15 percent in 2003. Offsetting this decline was an increase in the proportion of medical professionals between the 2 years, from 12 to 43 percent. This reflects the fact that many medical occupations require fairly lengthy postbaccalaureate training and would not have been open to this cohort in 1994.

Mathematics/physical sciences: In 1994, one-third of graduates who had majored in these fields were educators which would include those working as teaching assistants while in graduate school as well as K–12 or college faculty and administrators; 22 percent researchers, scientists, or technology workers; and 14 percent were in business and management occupations. By 2003, the percentage of educators had declined to 22 percent, which could be a result of finishing graduate school and leaving graduate teaching assistant positions as well leaving other types of teaching positions. Between 1994 and 2003, the percentage in research, science, and technology occupations remained stable at 22 to 23 percent, and the proportion working as medical professionals increased from 2 to 10 percent. The apparent increase in the percentage in business and management occupations was not statistically significant.

Career-oriented fields

Engineering: About half (57 percent) of graduates with majors in engineering were working in engineering/architecture occupations in 1994; the apparent decline by 2003 was not statistically significant. However, by 2003, the proportion of graduates in business and management and computer science occupations had increased, and the proportion in research, science, and technology had declined. Whether the movement into business and management represents career shifts or simply progression to higher levels of responsibility within their fields

cannot be determined from these data, but some engineering majors did later enroll in MBA programs (12 percent by 2003; Nevill and Chen 2007).

Computer science: Roughly half (47–48 percent) of computer science majors were computer scientists in both 1994 and 2003. The apparent increases in engineering/architecture and business and management were not statistically significant.

Health: In both 1994 and 2003, a majority of health majors were medical professionals (72 and 69 percent). Although relatively few were in business and management in 1994 (4 percent), the proportion did increase to 10 percent in 2003. Again, whether the movement into business and management represents career shifts or simply progression to higher levels of responsibility within the health field cannot be determined.

Business and management: In 1994, about half (52 percent) of graduates with career-oriented undergraduate majors were in business and management occupations, with the proportion remaining relatively stable in 2003 (56 percent). Another 21 percent were service workers in 1994, but that proportion declined to 15 percent in 2003.

Education: About two-thirds of all education majors were educators in both 1994 and 2003. No other occupation accounted for as many as 10 percent of these graduates.

Industry

The figures and discussion in this section compare industry data only for 1997 and 2003, because of a lack of fully comparable data across all years. In 1994, education and health care industries were included in professional and related services, making it impossible to gauge how employment in these industries has changed. However, table 11 shows data for all 3 years for readers who wish to compare 1994 with other years for other industries. Graduates were employed in a variety of industries, with education, health, and professional services being the most common in both 1997 and 2003.

Overall Patterns

More graduates were employed in education than any other industry in both 1997 (19 percent) and 2003 (22 percent) (figure 11 and table 11). The next most common industries in which graduates worked in both years were health care (13 percent in 1997 and 15 percent in 2003) and professional services (12 and 13 percent).

Table 11. Percentage distribution of 1992–93 bachelor's degree recipients' industries in 1994, 1997, and 2003, by undergraduate major

Undergraduate major	Education			Health care			Professional and related services			Manufacturing			Finance, insurance, and real estate			Retail and wholesale trade		
	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003
Total	—	18.8	21.5	—	12.5	14.6	38.9	12.4	13.1	8.7	9.9	6.5	10.1	9.8	9.9	13.9	9.3	6.7
Academic	—	21.3	23.2	—	12.0	15.4	40.0	14.0	14.7	6.3	6.6	3.9	10.5	8.9	8.2	16.2	9.4	7.5
Social and behavioral sciences	—	14.3	18.1	—	12.6	12.1	36.7	15.2	16.9	5.1	5.2	4.3	14.1	13.3	12.0	17.0	9.2	6.3
Arts and humanities	—	24.0	26.5	—	5.1	6.2	36.7	14.5	15.8	6.8	7.0	3.8	9.4	6.3	6.9	19.2	13.6	11.7
Biological sciences	—	19.4	18.4	—	32.1	49.3	49.6	8.8	8.2	7.1	9.1	2.8	4.1	4.3	3.1	13.0	6.6	1.8
Mathematics/physical sciences	—	32.2	27.6	—	8.6	15.0	47.6	12.7	14.1	8.3	9.2	5.1	9.7	9.5	7.1	8.6	5.4	6.4
Other academic	—	31.1	34.3	—	11.0	11.5	44.9	14.6	12.6	6.9	6.3	3.0	7.5	4.9	5.2	14.8	5.4	8.5
Career-oriented	—	17.5	20.6	—	12.8	14.1	38.3	11.6	12.2	9.9	11.5	7.8	9.9	10.2	10.8	12.7	9.2	6.2
Business and management	—	4.8	8.6	—	5.1	6.6	18.9	11.1	11.6	13.3	14.7	10.0	21.5	21.5	22.2	17.2	13.5	9.5
Education	—	65.6	66.6	—	5.1	6.3	76.3	5.4	4.7	1.8	1.8	1.1	2.9	2.8	3.4	6.9	4.9	2.4
Health	—	6.1	7.8	—	75.7	76.1	80.4	1.8	2.2	1.6	2.0	1.2	1.1	1.6	1.5	8.8	5.6	3.5
Engineering	—	2.7	2.9	—	1.8	2.7	17.3	18.0	21.6	31.5	38.4	26.4	1.3	2.3	4.3	6.0	5.8	3.9
Computer science	—	3.9	7.3	—	6.6	11.9	16.2	14.0	22.3	16.8	16.5	7.4	11.2	13.9	14.4	7.5	6.3	5.6
Other career-oriented	—	8.8	15.3	—	8.7	8.9	27.8	19.4	19.1	5.4	6.5	4.9	4.7	5.5	5.7	16.3	10.0	6.7
Science/technology/engineering/ mathematics (STEM)[1]	—	12.5	12.5	—	11.1	18.9	30.5	14.2	16.6	19.1	22.6	13.3	5.1	5.9	5.9	8.4	6.0	4.1
Non-STEM fields	—	19.9	23.3	—	12.8	13.7	40.3	12.1	12.4	6.9	7.5	5.1	11.0	10.5	10.7	14.8	9.9	7.2

See notes at end of table.

Table 11. Percentage distribution of 1992–93 bachelor's degree recipients' industries in 1994, 1997, and 2003, by undergraduate major—Continued

Undergraduate major	Utilities, communications, transportation			Personal/hospitality services, entertain-ment/recreation			Business services			Public safety and administration			Agriculture, mining, oil, construction			Other		
	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003	1994	1997	2003
Total	5.8	7.1	7.2	4.0	5.8	5.0	9.2	5.3	3.4	5.0	4.4	4.1	2.9	3.3	4.2	1.6	1.5	3.9
Academic	3.3	6.1	5.4	5.1	7.6	6.1	9.7	5.1	3.1	4.9	5.0	5.0	2.3	2.7	2.9	1.7	1.3	4.6
Social and behavioral sciences	3.9	6.3	5.5	4.8	6.1	4.9	8.4	5.5	4.2	6.3	8.1	8.1	1.7	3.3	3.3	2.0	1.1	4.3
Arts and humanities	3.6	7.5	8.1	6.8	11.4	10.9	12.2	5.6	2.2	2.5	2.4	2.1	1.5	1.6	1.7	1.4	1.1	4.4
Biological sciences	1.3	2.7	1.3	4.3	4.3	4.0	10.7	4.5	1.7	3.3	2.6	2.7	5.4	4.0	4.2	1.2	1.6	2.5
Mathematics/physical sciences	1.2	6.3	3.6	3.2	2.7	2.0	9.3	2.9	3.2	5.8	4.3	4.0	4.6	2.4	3.1	1.8	3.8	8.8
Other academic	4.1	4.9	4.6	3.7	9.6	4.1	6.8	5.0	3.1	7.7	4.0	5.0	1.6	2.4	2.9	2.0	0.9	5.2
Career-oriented	7.0	7.6	8.2	3.4	5.0	4.5	9.0	5.4	3.5	5.0	4.1	3.7	3.2	3.7	4.8	1.6	1.5	3.6
Business and management	7.8	8.9	8.9	4.6	6.1	5.0	8.5	6.6	6.1	4.3	3.1	2.8	2.4	3.4	4.9	1.5	1.4	3.9
Education	2.4	2.8	3.1	1.9	5.9	4.6	3.4	2.6	1.5	2.3	1.8	2.0	0.9	0.6	2.2	1.3	0.8	2.1
Health	1.4	1.6	1.5	1.4	1.9	1.5	1.9	0.5	0.3	2.2	1.1	2.5	0.5	0.4	0.6	0.8	1.9	1.3
Engineering	9.1	8.2	12.8	0.6	1.5	1.2	15.2	8.2	2.4	6.8	2.1	2.2	7.5	6.8	9.8	4.7	4.3	9.9
Computer science	13.5	12.9	12.3	1.1	0.0	1.4	22.4	16.3	4.1	8.0	5.2	3.4	1.0	1.1	2.3	2.4	3.2	7.6
Other career-oriented	10.5	11.4	12.1	5.6	6.2	6.8	13.8	5.4	3.2	8.6	9.9	8.1	6.5	7.4	7.2	1.0	0.8	2.0
Science/technology/engineering/ mathematics (STEM)[1]	6.4	7.3	7.8	2.0	2.2	2.2	14.1	7.5	2.6	5.9	3.1	2.8	5.4	4.5	6.0	3.0	3.4	7.4
Non-STEM fields	5.7	7.0	7.1	4.3	6.5	5.6	8.4	4.9	3.5	4.8	4.6	4.4	2.5	3.1	3.8	1.4	1.1	3.3

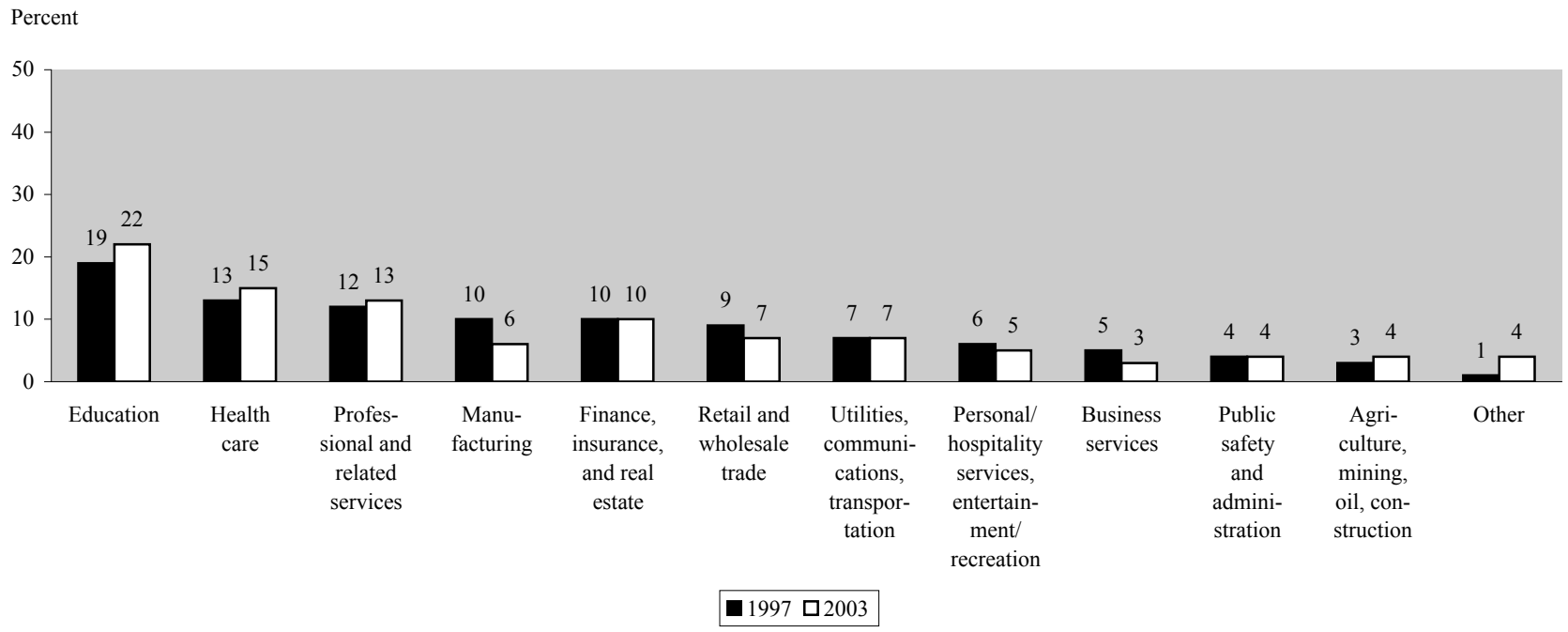
— Not available. In 1994, data for Education and Health care are not separate from Professional and related services.

[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Figure 11. Percentage distribution of 1992–93 bachelor's degree recipients' industries in 1997 and 2003



NOTE: In the figure, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

The percentages working in the education and health care industries increased between 1997 and 2003 (from 19 to 22 percent and 13 to 15 percent, respectively), and the percentages working in manufacturing and in retail and wholesale trade declined (from 10 to 6 percent and 9 to 7 percent, respectively). The directions of these changes were consistent with national trends in these industries, except that employment in wholesale and retail trade was relatively flat at the national level.[15]

Industries by Undergraduate Major

Academic fields

Social and behavioral sciences: Graduates with these undergraduate majors were distributed relatively evenly across a number of industries, with no measurable differences in 1997 in the percentages in professional and related services (15 percent), education (14 percent), health care (13 percent), and finance, insurance, and real estate (13 percent) (figure 12 and table 11). By 2003, the proportion in education had increased to 18 percent, meaning that proportionately more were working in education than in health (12 percent) or finance, insurance, and real estate (12 percent).

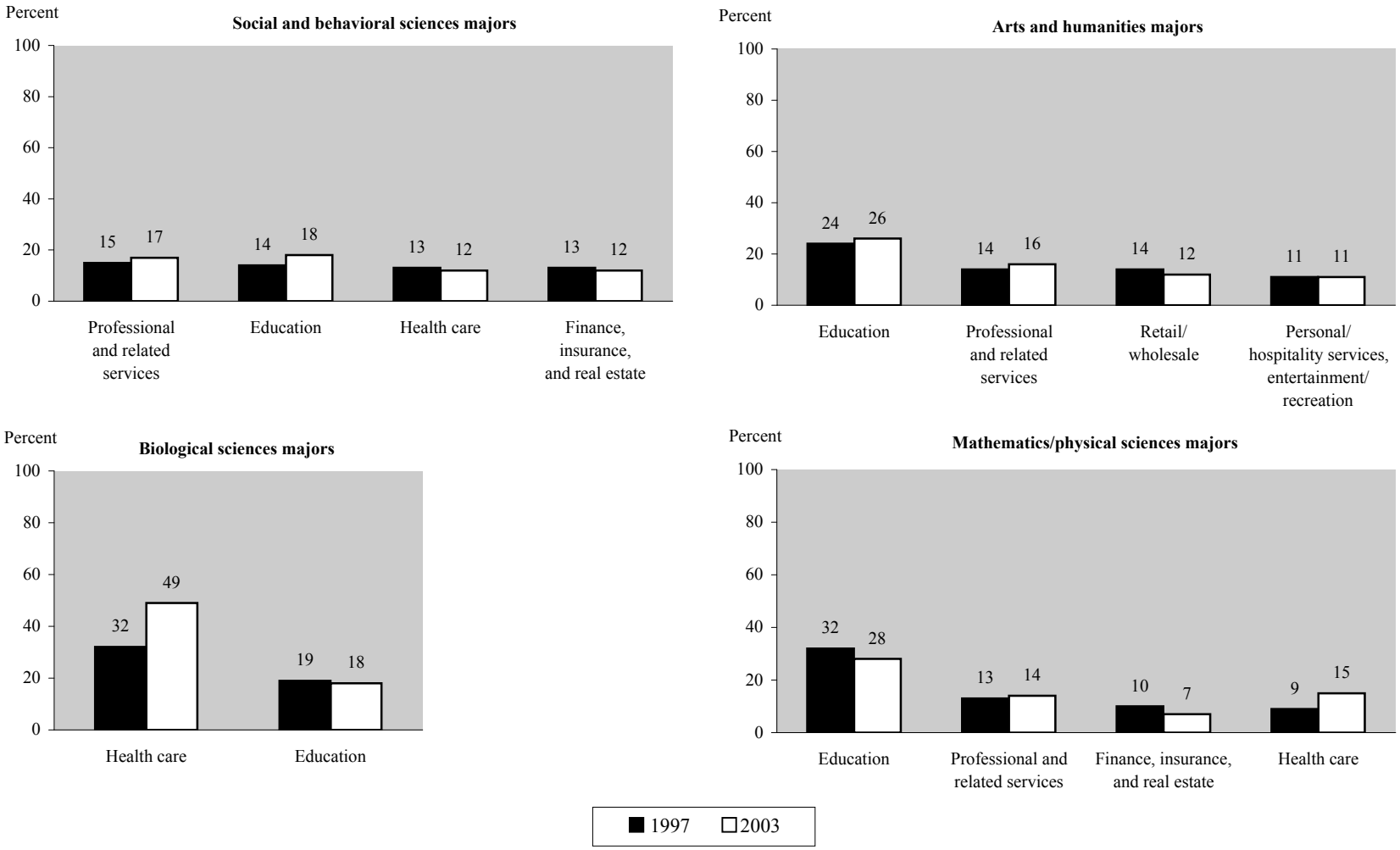
Arts and humanities: Graduates with these undergraduate majors were also spread across industries, with the most common being education, which accounted for about a quarter of the 1992–93 graduates in both 1997 and 2003. Like their peers in social and behavioral sciences, about 15 percent of arts and humanities majors were in professional and related fields in both years.

Biological sciences: Biological sciences majors were concentrated in two industries by 2003, with about half (49 percent) employed in the health care industry and another 18 percent in education. No other industry accounted for 10 percent or more of graduates in either year.

Mathematics/physical sciences: In both 1997 and 2003, more of these majors worked in education than in any other industry. Between 1997 and 2003, none of the apparent changes in the percentages working in any of the four industries shown in figure 12 were statistically significant. In 2003, there was no measurable difference between the percentage employed in the education industry (28 percent) and the percentage reporting educator as their occupation (22

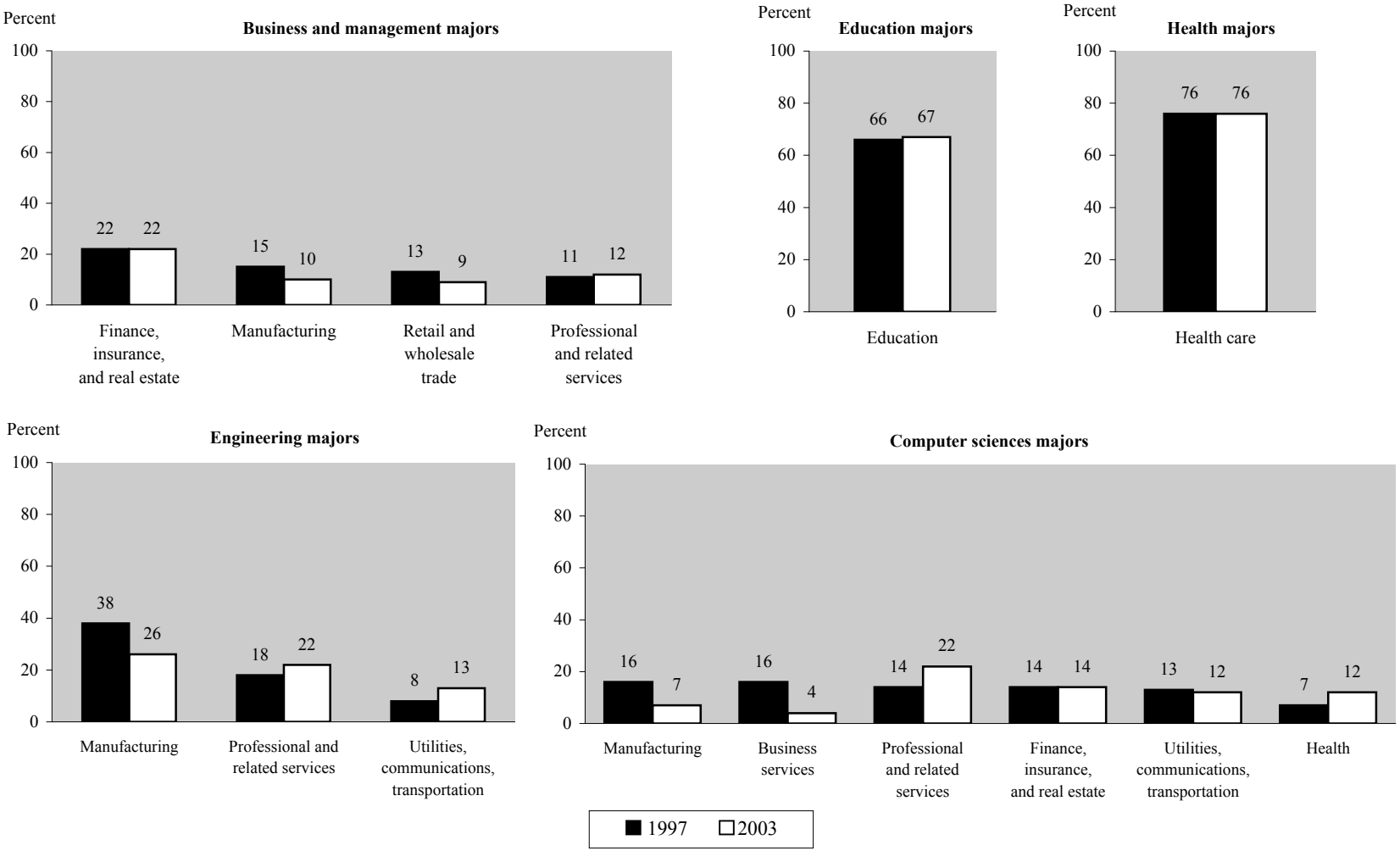
[15] During this period, national employment levels grew by 18 percent in the education/health industry, declined by 17 percent in manufacturing, declined by 1 percent in wholesale, and increased by 4 percent in retail. Retrieved February 6, 2007, from Bureau of Labor Statistics, *Industry at a Glance*, various pages: http://www.bls.gov/iag/eduhealth.htm; http://www.bls.gov/iag/manufacturing.htm; http://www.bls.gov/iag/wholeretailtrade.htm. (Comparable data are not available for bachelor's degree holders only.)

Figure 12. Percentage of 1992–93 bachelor's degree recipients in selected industries in 1997 and 2003, by undergraduate major



See notes at end of figure.

Figure 12. Percentage of 1992–93 bachelor's degree recipients in selected industries in 1997 and 2003, by undergraduate major—Continued



NOTE: In the figure, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). The figure shows industries that accounted for at least 10 percent of graduates in each major in either 1994 or 2003. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

percent). Thus, it appears that most of these majors employed in the education industry were teachers or professors.

Career-oriented fields

Business and management: Graduates with this major were spread across a number of industries. Between 1997 and 2003, the percentages in manufacturing and in retail and wholesale trades declined.

Education: Education majors were heavily concentrated in the industry closely related to their major (i.e., education) in both 1997 (66 percent) and 2003 (67 percent). No other industry accounted for 10 percent or more of these graduates.

Health: Like education majors, health majors were heavily concentrated in the industry closely related to their major (i.e., health) in both 1997 and 2003 (76 percent). This reflects the fact that 69 percent of these majors reported having medical occupations in 2003. No other industry accounted for 10 percent or more of these graduates.

Engineering/architecture: Engineering majors were most commonly employed in the manufacturing industry in 1997 (38 percent), but their representation in this industry had declined to 26 percent by 2003. (The apparent increases in any of the other industries shown in figure 12 are not statistically significant.)

Computer science: Although 48 percent of computer science majors were employed in computer science occupations in 2003, graduates with this major were spread across many industries, reflecting the broad demand for their skills. Between 1997 and 2003, however, there were declines in the percentages working in the manufacturing and business services industries.

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Salaries and Benefits

This section presents information on graduates' salaries and benefits in 1994, 1997, and 2003, comparing the experiences of academic and career-oriented majors and also examining what factors seemed to be related to salaries.

Average Salaries

Table 12 shows average salaries (in constant 2003 dollars) at each follow-up for graduates who were working full or part time at one job.[16] Adjusted for inflation, the average annual salary for bachelor's degree recipients employed full time at one job roughly doubled between 1994 and 2003, from $30,800 to $60,600.

As a group, graduates with career-oriented majors had higher average salaries than their peers with academic majors in each of the 3 years (figure 13). Graduates with academic majors earned an average of between $25,000 and $29,200 in 1994, depending on their major. The range was $52,800 to $62,300 in 2003, with the average salary for graduates with arts and humanities majors ($52,800) lagging behind the average salaries for majors in mathematics/physical sciences, biological sciences, and social and behavioral sciences ($58,200–62,300). Among graduates with career-oriented majors, education majors lagged behind the others in 2003, earning an average of $43,800 in contrast to an average of $59,300 to $74,900 for graduates who had majored in engineering, computer science, health, business, or "other" fields (table 12).

Factors Related to Salary Differences

Table 12 shows that full-time employed 1992–93 graduates with career-oriented majors earned about $3,400 more in 2003, on average, than their counterparts who had academic majors. Earnings, income, and salary have perhaps the deepest literature in the study of employment and labor markets, including some of the most sophisticated statistical analysis and understanding. Even a brief survey of recent literature demonstrates both this and the considerable range of job-related and other factors that show some statistical pattern in relation to pay, including many of

[16] While data were collected to determine whether graduates had more than one job, as well as their combined income from all jobs, many other details about their work were known only for the "primary" job. In order to determine later in this section which such work characteristics were associated with salary, we elected to describe salaries for those with only one job, the job for which details were available.

Table 12. Earnings (in constant 2003 dollars) of full- and part-time employed 1992–93 bachelor's degree recipients in 1994, 1997, and 2003, by selected characteristics

Selected characteristics	Full time at one job			Part time at one job		
	1994	1997	2003	1994	1997	2003
Total	$30,800	$39,900	$60,600	$14,300	$17,300	$41,400
Academic	26,500	36,300	58,300	11,800	14,800	42,500
Social and behavioral sciences	26,900	39,200	62,300	11,500	11,200	36,300
Arts and humanities	25,000	33,600	52,800	11,200	16,800	44,800
Biological sciences	29,200	33,900	62,200	12,200	16,100	51,500
Mathematics/physical sciences	27,100	37,800	58,200	12,000	‡	‡
Other academic	26,200	34,000	53,200	13,500	16,800	50,300
Career-oriented	32,700	41,400	61,700	16,100	19,400	40,700
Business and management	33,800	43,400	65,900	14,000	17,000	46,800
Education	26,600	31,700	43,800	14,900	15,200	24,300
Health	40,500	45,600	65,000	20,500	28,200	45,900
Engineering	38,900	51,400	74,900	15,900	‡	‡
Computer science	33,400	50,400	72,600	‡	‡	‡
Other career-oriented	29,200	37,400	59,300	17,100	20,600	38,400
Science/technology/engineering/ mathematics (STEM)[1]	33,800	45,600	68,300	13,600	15,600	47,500
Non-STEM fields	30,200	38,800	58,900	14,500	17,600	40,600
Employment/enrollment status across 1994, 1997, and 2003						
Academic						
Only employment	27,300	38,100	57,800	13,500	19,100	40,300
Employment and enrollment	25,500	34,600	59,900	11,200	13,600	47,000
Employment and "neither"	27,400	34,900	48,900	12,100	15,100	‡
Career-oriented						
Only employment	34,200	42,800	63,300	18,100	21,000	42,900
Employment and enrollment	31,300	40,100	61,400	14,500	19,400	39,100
Employment and "neither"	27,100	36,900	47,900	16,100	19,600	32,300
Months unemployed[2]						
None	32,000	41,300	‡	14,400	18,600	‡
1–3 months	27,000	33,800	49,100	15,900	15,600	‡
More than 3 months	28,700	34,400	50,000	12,500	13,600	35,000
Months out of the labor force[2]						
None	31,300	40,500	‡	15,600	19,200	‡
1–3 months	‡	35,500	56,500	‡	14,000	36,500
More than 3 months	29,800	38,000	54,500	12,100	14,100	35,800
Months of work leave for child care[2]						
None	—	—	61,700	—	—	40,800
1–6 months	—	—	57,300	—	—	42,700
More than 6 months	—	—	49,200	—	—	40,400

— Not available.

‡ Reporting standards not met. (Too few cases for a reliable estimate.)

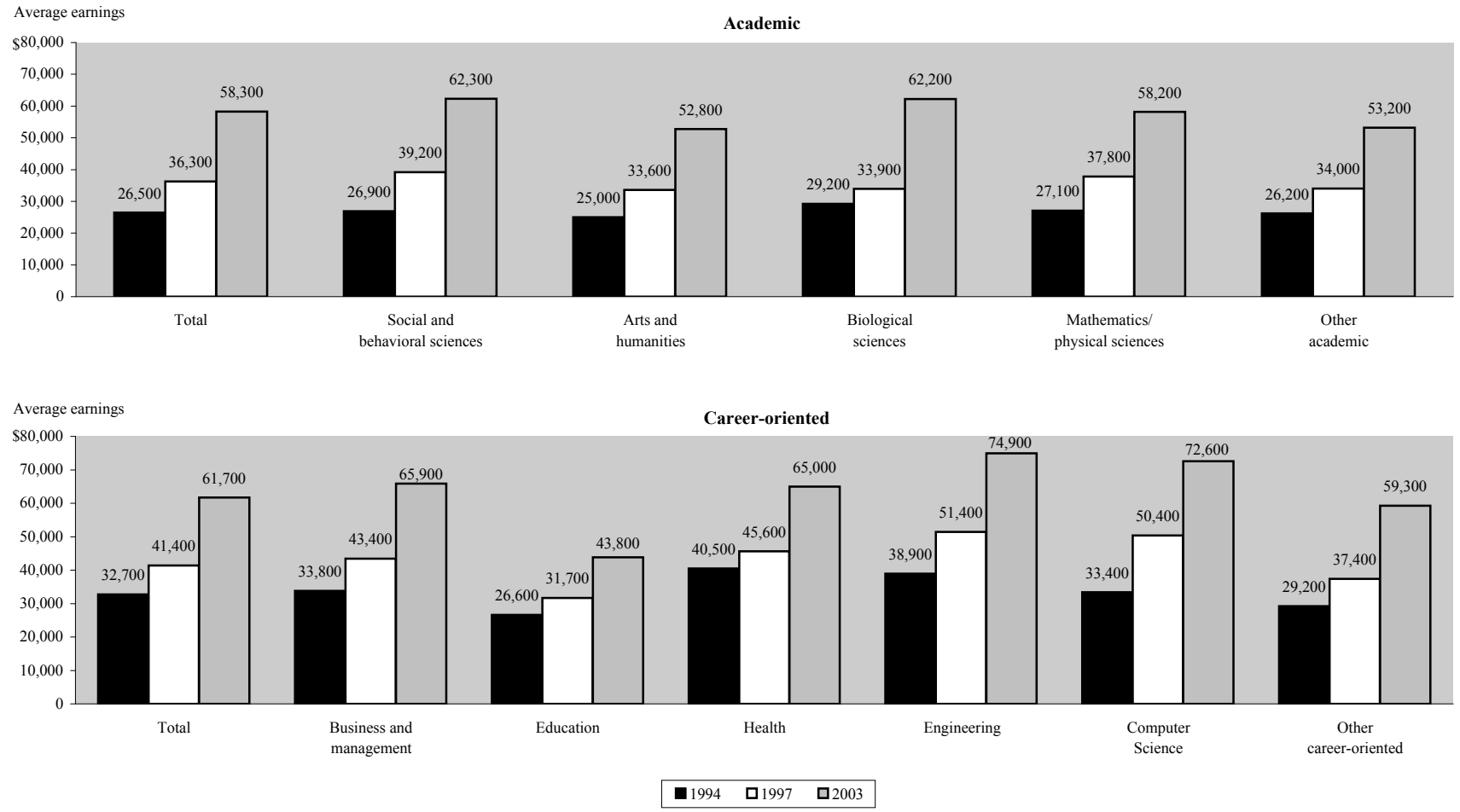
[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

[2] This variable is for the interval between interviews ending with the interview year identified in the column.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Figure 13. Average earnings (in constant 2003 dollars) for full-time employed 1992–93 bachelor's degree recipients in 1994, 1997, and 2003, by undergraduate major



NOTE: In the figure, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

the demographic, educational, and employment characteristics examined elsewhere in this report (Morgan and Arthur 2005; Thomas 2000; McCall 2000). Major field of study is strongly related to pay, and is strongly associated with salary differences by gender and other factors (McDonald and Thornton 2007; Thomas and Zhang 2005). The bivariate tabular analyses throughout this report indicate that many such factors are related to undergraduate major field, such as further educational attainment, occupation, or unemployment experience. If these factors are also related to salary, as much of the literature on pay differences suggests, a more complex approach is required to examine the unique relationship between major field and salary while taking other variables into account.[17] This approach is sometimes referred to as "commonality analysis," in which a multiple linear regression is used to look at the relationship between independent variables and an outcome variable while adjusting for the common variation among independent variables.[18] Two such regression analyses were performed here to determine whether the salary difference between academic and career-oriented majors in 2003 is still found after taking into account other characteristics found in this report to be related to major field.

While the commonality analysis reflects a more complex statistical relationship than the crosstabulations in the rest of this report, this multiple regression approach remains descriptive in nature, as are NCES reports in general. That is, a significant coefficient reported in the regression tables indicates that the independent variable has a relationship with the outcome variable that is unique, or distinct from its relationship with other independent variables in the model. It does not suggest that the relationship is causal, or imply that modeling has been undertaken to explain the outcome structurally. Instead, these results are usefully viewed as suggesting various ideas to be examined further in light of other data and in the context of the extensive research literature. For further discussion of the interpretation of statistical results, the reader is encouraged to consult appendix C.

Variables and Specifications

The multivariate analysis of 2003 salary was conducted only for those graduates who were employed full time in one job in 2003 (70 percent of graduates; table 7).[19] Many of the characteristics discussed in tables 2 through 11 in this report are related to major field of study (academic or career-oriented, or further differentiated). This section cites some of the literature showing that many of the same characteristics have also been statistically related to pay.

[17] Of course, other outcomes can also be analyzed in this way. The Data Analysis System Online (DASOL) for the B&B:93/2003 data allows the interested reader to learn more about creating custom analyses of this type (http://nces.ed.gov/dasolv2/covariance/index.asp).

[18] See Technical Notes and Methodology in appendix C for more information about multivariate commonality analysis.

[19] Obviously, employment status is a major determinant of pay. There were insufficient sample sizes of respondents who were employed part time or in multiple jobs to estimate the same regression models.

Therefore, their inclusion in the regression model helps determine the extent to which undergraduate major relates to salary 10 years later over and above its relationship to intermediate experiences and correlates such as additional education and occupation.

Table 1 shows that about two-thirds of both men and women had career-oriented majors. Yet the specific fields in which they were concentrated varied; for example, women were much more likely than men to be found in education—the lowest-paid field (table 12). Gender is persistently related to pay, in large part due to pervasive occupational segregation by gender (McDonald and Thornton 2007; Morgan and Arthur 2005). Because of its particular policy and general interest, similarly essential to any multivariate study of pay with sufficient sample size to permit comparisons is race/ethnicity (Boraas and Rodgers 2003; Blau, Ferber, and Winkler 2002; Reid 1998). Gender and race/ethnicity are represented in the regression models as indicator (also known as "dummy" or "binary") variables, which are compared with a reference category. Reference categories are italicized in the regression results (table 13). For example, an indicator variable for men compares them with women (the reference category). Four indicator variables representing the racial/ethnic groups American Indian/Alaska Native, Asian/Pacific Islander, Black, and Hispanic[20] are compared with the reference group (White).

Two additional background variables included in the salary regressions were related to major field in table 2. These characteristics are age at bachelor's degree receipt (included as a continuous variable) and parents' highest education, both of which are found in many multivariate studies of pay (e.g., Burress and Zucca 2004; Thomas 2000; Blau, Ferber, and Winkler 2002). There is also evidence from other studies, if somewhat equivocal, that marital and parental status may be associated with earnings: being married carried a wage premium for men and a wage penalty for women among young adults in the 1980s (Loury 1997), while another study found that number of dependents was not a significant determinant of *early* career earnings for either men or women (Marini and Fan 1997).

As discussed previously, major field of study has been associated with salary (e.g., Thomas and Zhang 2005; Gill and Leigh 2000; Marini and Fan 1997). Because a primary focus of this report is to compare the longer-term trajectories of academic and career-oriented majors, an indicator variable for career-oriented majors compares them to academic majors. Of course, other aspects of education are related to salary and indeed make up an important part of workers' human capital, the basis for their exchange for wages in neoclassical economic theory (Becker 1993; Blau, Ferber and Winkler 2002). Educational attainment itself is fundamental to pay (U.S. Department of Education 2006; McCall 2000; McDonald and Thornton 2007), so highest degree

[20] Includes everyone of Hispanic origin, regardless of race. All other categories exclude those of Hispanic origin.

Table 13. For 1992–93 bachelor's degree recipients employed full time in 2003, least squares coefficients and standard errors representing intergroup salary differences after adjusting for covariation among variables, by selected characteristics

Selected characteristics	Without employment/ enrollment trajectory[1]		With employment/ enrollment trajectory	
	Least squares coefficient	Standard error	Least squares coefficient	Standard error
Intercept	46,945.6	2,903.99	46,955.4	2,996.42
Academic fields				
Career-oriented	2,652.1	1,445.58	2,556.6	1,462.99
Academic	†	†	†	†
Gender of student				
Male	13,684.5 *	1,507.64	13,573.3 *	1,498.95
Female	†	†	†	†
Respondent age when received bachelor's	-147.7	78.57	-135.1	78.59
Marital and parental status in 2003				
Unmarried without children	-4,866.3 *	2,372.81	-4,907.2 *	2,372.07
Unmarried with children	-6,043.2 *	2,775.69	-5,871.1 *	2,808.09
Married without children	-3,140.8	1,673.16	-3,184.1	1,679.98
Married with children	†	†	†	†
Highest education level by either parent				
High school or less	-5,020.2 *	2,507.40	-5,182.6 *	2,518.90
Some college/associate's degree	-3,602.7	2,405.43	-3,578.9	2,419.40
Advanced degree	-1,105.9	2,419.45	-1,097.0	2,420.86
Bachelor's degree	†	†	†	†
Employment and enrollment trajectory 1994–2003				
Enrollment and employment combinations (no neither)	(1)	(1)	-1095.4	1149.43
Employment and neither combinations (no enrollment)	(1)	(1)	-7378.4 *	2141.83
Some enrollment, some employment, some neither	(1)	(1)	-5988.7	3488.34
Only employment	(1)	(1)	†	†
Bachelor's institution selectivity				
Moderately selective	-4,131.4 *	1,727.94	-4,065.6 *	1,735.87
Minimally selective	-6,046.0 *	1,383.24	-6,030.4 *	1,377.47
Open admission	-4,349.0	4,249.20	-3,977.3	4,331.33
Very selective	†	†	†	†
Race/ethnicity[2]				
American Indian	14,742.6	18,330.23	15,313.5	18,318.68
Asian/Pacific Islander	318.6	3,510.10	754.9	3,502.34
Black	-2,309.7	2,338.72	-1,924.1	2,337.88
Hispanic	-584.4	2,125.14	-414.1	2,131.79
White	†	†	†	†

See notes at end of table.

Table 13. For 1992–93 bachelor's degree recipients employed full time in 2003, least squares coefficients and standard errors representing intergroup salary differences after adjusting for covariation among variables, by selected characteristics—Continued

Selected characteristics	Without employment/ enrollment trajectory[1] Least squares coefficient	Standard error	With employment/ enrollment trajectory Least squares coefficient	Standard error
Highest degree by 2003				
Master's degree	6,116.2 *	1,540.75	6,170.3 *	1,554.60
Doctoral/professional degree	25,111.3 *	3,430.67	24,962.7 *	3,494.75
Bachelor's degree	†	†	†	†
Months at employer	369.6 *	131.97	354.0 *	135.61
Total months unemployed bachelor's through 2003	-528.1 *	87.44	-441.8 *	81.13
Total months out of the labor force bachelor's through 2003	31.2	46.25	75.3	47.80
Total months of family leave 1997 through 2003	-408.0 *	138.17	-430.8 *	134.59
Occupation 2003				
Business workers and managers	20,343.8 *	1,662.83	20,310.4 *	1,653.97
Engineers/architects	17,015.2 *	2,323.93	16,954.7 *	2,340.44
Computer scientists	18,958.8 *	2,396.07	19,169.1 *	2,373.83
Medical professionals	17,474.4 *	2,025.35	17,387.0 *	2,016.75
Editors/writers/performers	13,871.6 *	4,482.96	13,807.4 *	4,507.50
Human/protective services/legal professionals	7,421.2 *	2,213.76	7,618.7 *	2,227.88
Researchers, scientists, and technology workers	3,758.3	2,189.33	3,800.0	2,257.51
Administrative/clerical/legal support workers	-2,473.2	2,597.79	-1,787.6	2,552.84
Service workers	16,044.5 *	2,683.84	16,047.1 *	2,709.01
Other	397.2	2,798.21	657.1	2,808.64
Educators	†	†	†	†
Industry 2003				
Retail and wholesale trade	-4,548.5 *	2,060.09	-4,326.9 *	2,094.12
Finance, insurance, and real estate	13,096.5 *	4,051.48	13,072.1 *	4,010.37
Business services	4,849.2	4,280.25	4,711.7	4,243.11
Manufacturing	3,662.0	2,475.83	3,708.1	2,497.62
Utilities/communications/transportation	1,326.1	1,780.61	1,419.6	1,787.27
Public safety and administration	-4,393.8 *	2,080.11	-4,405.4 *	2,015.67
Personal/hospitality services/ entertainment/recreation	-6,698.8	3,984.46	-6,505.0	3,894.25
Agriculture/mining/oil/construction	-3,525.4	3,261.85	-3,303.8	3,247.66
Other	3,557.2	2,473.06	3,883.8	2,423.90
Professional and related services	†	†	†	†

† Not applicable for the reference group.

* $p < .05$.

[1] Employment and enrollment trajectory was not included in this model; however, all full-time employed 1992–93 bachelor's degree recipients are included in both models.

[2] American Indian includes Alaska Native, Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin unless specified.

NOTE: This table includes only respondents who were employed full time in one job at the time of the 2003 interview. The italicized row for each categorical variable is the reference group for comparison.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

obtained is included in the regression analysis. College quality can influence pay and is the subject of intense competition and debate in the postsecondary community, suggesting that the measure of bachelor's institution selectivity (related to major field in table 2) is also warranted in the regression (Thomas 2000; Thomas and Zhang 2005).

Along with education, work experience is the second major component of human capital and therefore highly relevant to understanding pay (Blau, Ferber, and Winkler 2002). It is natural to expect that experience, which may be measured in terms of overall labor market experience, tenure with a particular employer, or time in a specific job, influences pay (Gill and Leigh 2000; Reid 1998; Loury 1997). To reflect variations in employment experience, several labor market involvement variables are included in the regressions. Continuous labor market experience variables from tables 6, 8, and 9 include months spent at 2003 employer, months unemployed since completing the bachelor's degree, months out of the labor force since completing the bachelor's degree, and months of family leave from work since the 1997 interview (information about family leave taken before 1997 was not available). In the crosstabulations shown in table 12, time spent unemployed (looking for work) was generally associated with lower pay for full-time workers, as was length of child care leave between 1997 and 2003.

Human capital represents one side of the pay equation—what the worker brings to the job. The demands of the job, however—what is expected of the worker *in* the job—also relate to pay, perhaps no more directly than via occupation (Morgan and Arthur 2005) and industry (Burress and Zucca 2004; Boraas and Rodgers 2003; Marini and Fan 1997). Many studies examine pay differences within a narrowly defined occupational category in order to control for the considerable variation in pay (Burress and Zucca 2004; Monks and McGoldrick 2004; Smith 2002; Morgan 2000). There are 11 occupational groups shown in table 10, and 12 categories of industry in table 11 for 2003. In the regression analysis, 10 occupational categories are compared with education (including K–12, postsecondary, and other). For some graduates, such as teachers, occupation and industry are very highly correlated. In addition, the college graduates in this sample are heavily concentrated in just three industry groups: education, health care, and other professional services. Because other industries are more rare in this sample, and to minimize estimation problems that could result from collinearity, only nine indicators for industry were included in the regression, compared with a reference category that combines education, health care, and other professional services.[21]

[21] The average salary of graduates in the combined professional services, education, and health care industries in 2003 was $55,620 for those employed full time in one job. This ranged from an average of $42,700 for those in education to $66,990 for those in professional and related services.

As indicated above, two separate regression analyses were estimated for the same sample of full-time employed graduates in 2003. The first or "basic" model includes all of the variables just described. The second model, referred to hereafter as the "trajectory" model, additionally includes a set of indicator variables for selected categories of the employment and enrollment pattern variable that summarizes the graduates' status in 1994, 1997, and 2003 (table 4). The reference group is those graduates who were only employed at all three time points (the first column in table 4). Indicators are included to compare three other groups with this reference group, "only employed." Two indicators are for the other groups shown in table 4: (1) those who were enrolled in at least 1 year and in all 3 years were employed, enrolled, or both (employment and enrollment); and (2) those who were neither employed nor enrolled in at least 1 year and who were employed but not enrolled in the other years (employment and neither). The third indicator is for the residual group—the small proportion of graduates who followed patterns other than the three described above.

Regression results for the two models are shown in table 13. The first two columns show regression coefficients and standard errors for the basic model, which does not include indicators of employment and enrollment pattern over time, and the last two columns show results for the trajectory model, which includes indicators of employment and enrollment patterns. Differences between the two models reflect the difference in how the independent variables relate to salary when the additional variable, employment and enrollment pattern across the 3 years, is taken into account. The second analysis, which includes employment and enrollment pattern, helps to determine whether employment and enrollment trajectory is uniquely related to salary. Independent variables that share some variation in common with employment and enrollment pattern may also exhibit some differences in their relationship to salary in the trajectory model. Overall, relationships were similar across the two models. References to dollar amounts are made summarizing across the two models.

Results

As shown in table 13, the overall salary difference between academic and career-oriented majors who were employed full time in 2003 is no longer statistically significant after taking other factors into account. This result was obtained in both models. As illustrated in the discussion that follows, some differences in characteristics related to salary favored career-oriented majors, others favored academic majors, and neither group had a clear advantage.

Among demographic factors related to salary in 2003, men earned an average of almost $14,000 more than women. Compared with married graduates who had children—which career-oriented majors were more likely than academic majors to be in 2003—unmarried graduates

(regardless of parental status) earned $5,000–6,000 less. Also, graduates with parents who did not go to college (which included a larger proportion of career-oriented than academic majors) earned an average of about $5,000 less than graduates whose parents held a bachelor's degree.

Both bachelor's institution selectivity and completion of an advanced degree were associated with higher salaries for full-time workers in 2003, and these educational experiences occurred at higher rates among academic than career-oriented majors (table 2). Graduates of moderately or minimally selective bachelor's institutions earned about $4,100 and $6,000 less, respectively, than graduates of very selective institutions. Compared with their peers who had a bachelor's degree, master's degree holders earned over $6,000 more, and doctoral or professional degree holders earned approximately $25,000 more.

Labor market experiences in 2003 and over the 10-year span studied here were also associated with salary among full-time employed college graduates. Graduates earned higher salaries for each month they had been with their employer, and lower salaries for each month they had spent unemployed since bachelor's degree completion. In addition, each month of leave from work to care for children between 1997 and 2003 was associated with less income. When employment and enrollment trajectory was included, graduates in the category "employed and neither"—those who had never been enrolled and had not been working in 1994 or 1997—earned $7,400 less, on average, than their counterparts who had been only employed at all three time points. No other trajectory differences in salary were detected.

Finally, both the occupation and industry in which graduates worked were related to salary in 2003 among those employed full time. Graduates in most occupations earned thousands of dollars more than educators;[22] the exceptions were researchers, scientists, and technology workers; administrative, clerical, or legal support; and a miscellaneous "other" category.[23] Industry differences were more limited. Graduates in sales (retail and wholesale trade) or in public safety and administration earned $4,300–4,500 less than those in education, health care, and other professional services, while graduates in finance, insurance, and real estate earned about $13,000 more.

[22] Although this category includes teaching assistants, who would typically receive relatively low salaries, it is unlikely that many would be working full time at this job. Therefore, their presence in this category is unlikely to have much of an effect on the average salary.

[23] Because this analysis is limited to those employed full time at one job, it is unlikely that the average salary of educators is being pulled down by lower paid graduate teaching assistants.

Health Insurance and Retirement Benefits

As graduates established themselves in the labor force, the percentage who received health and retirement benefits through their jobs increased. Among those who were employed full time at one job, 84 percent had health insurance benefits and 71 percent had retirement benefits in 1994, increasing to 96 percent and 89 percent, respectively, by 2003 (table 14).

Proportionately more graduates with career-oriented than academic majors received health insurance or retirement benefits through their jobs in 1994, but by 2003, there was no measurable difference between the two groups in the percentage with health insurance. Academic majors still lagged behind career-oriented majors in retirement benefits in 2003, but the gap had narrowed by then. Compared with the overall average, smaller percentages of arts and humanities and education majors had jobs that provided retirement benefits in 2003 (84 percent in each case vs. 89 percent for graduates overall).

Table 14. Percentage of full- and part-time employed 1992–93 bachelor's degree recipients reporting health and retirement benefits at work in 1994, 1997, and 2003, by undergraduate major and employment/enrollment trajectory

Undergraduate major and employment/enrollment trajectory	Health insurance			Retirement benefits		
	1994	1997	2003	1994	1997	2003
Full-time at one job						
Total	83.6	91.9	95.8	71.4	83.0	89.1
Academic	78.6	89.6	96.2	64.8	78.0	87.4
Social and behavioral sciences	83.5	90.8	96.8	69.4	80.5	90.5
Arts and humanities	71.9	87.9	95.6	55.8	73.3	83.7
Biological sciences	75.5	85.1	95.7	61.0	72.6	86.6
Mathematics/physical sciences	78.5	92.6	96.8	71.5	87.3	87.3
Other academic	80.2	90.7	95.9	68.0	77.7	86.8
Career-oriented	85.9	92.9	95.6	74.2	85.1	90.0
Business and management	87.2	92.8	93.4	73.3	84.3	89.7
Education	80.3	91.9	95.8	73.4	86.0	84.2
Health	94.0	95.6	98.3	86.5	88.4	94.0
Engineering	90.8	96.3	97.4	82.0	90.3	96.3
Computer science	92.6	96.9	97.8	78.1	90.3	91.0
Other career-oriented	80.4	90.4	96.8	66.5	80.9	90.4
Science/technology/engineering/ mathematics (STEM)[1]	85.7	93.7	97.0	75.1	86.6	91.5
Non-STEM fields	83.2	91.6	95.5	70.7	82.3	88.6
Employment/enrollment status across 1994, 1997, and 2003						
Academic						
Only employment	78.7	89.5	96.8	64.8	78.2	89.8
Employment and enrollment	77.8	89.8	96.1	65.7	79.3	86.3
Employment and "neither"	78.3	90.8	93.3	62.6	72.7	83.1
Career-oriented						
Only employment	86.1	93.3	95.8	74.2	85.3	91.2
Employment and enrollment	86.2	93.5	96.5	76.9	87.3	89.1
Employment and "neither"	82.1	89.0	90.2	68.3	79.2	84.4

See notes at end of table.

Table 14. Percentage of full- and part-time employed 1992–93 bachelor's degree recipients reporting health and retirement benefits at work in 1994, 1997, and 2003, by undergraduate major and employment/enrollment trajectory—Continued

Undergraduate major and employment/enrollment trajectory	Health insurance			Retirement benefits		
	1994	1997	2003	1994	1997	2003
Part-time at one job						
Total	36.4	36.2	59.9	29.4	34.0	58.4
Academic	29.4	27.0	52.8	19.8	25.6	50.9
Social and behavioral sciences	33.9	20.0	50.2	25.5	21.1	48.4
Arts and humanities	21.7	27.1	37.8	12.6	27.1	40.6
Biological sciences	35.6	35.6	62.6	20.4	32.6	48.4
Mathematics/physical sciences	37.1	‡	‡	21.0	‡	‡
Other academic	26.4	22.4	‡	23.8	21.9	‡
Career-oriented	41.2	44.0	63.5	35.9	41.1	62.1
Business and management	37.0	43.7	60.9	30.1	39.9	55.7
Education	36.0	36.6	61.9	38.3	39.5	52.5
Health	72.6	61.2	70.4	65.8	56.6	74.8
Engineering	38.1	‡	‡	25.4	‡	‡
Computer science	‡	‡	‡	‡	‡	‡
Other career-oriented	36.8	44.0	54.8	26.2	37.5	58.3
Science/technology/engineering/ mathematics (STEM)[1]	37.0	36.2	73.0	23.0	27.8	64.4
Non-STEM fields	36.3	36.3	58.4	30.6	34.9	57.7
Employment/enrollment status across 1994, 1997, and 2003						
Academic						
Only employment	39.8	21.5	56.9	31.4	46.5	60.8
Employment and enrollment	26.2	30.6	53.5	13.7	21.6	45.2
Employment and "neither"	29.8	29.1	‡	26.7	20.3	‡
Career-oriented						
Only employment	44.1	55.0	65.8	41.8	57.2	59.5
Employment and enrollment	38.6	36.0	62.8	29.8	30.7	64.8
Employment and "neither"	46.8	43.9	‡	40.2	40.0	‡

‡ Reporting standards not met. (Too few cases for a reliable estimate.)

[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

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Career Perspectives

At each interview, graduates were asked to reflect on the career potential of their job and their satisfaction with various aspects of their jobs. This section describes their responses, distinguishing between graduates with full- and part-time jobs as well as between graduates who had academic and career-oriented majors. The glossary in appendix A contains more detail on the questions.

Career Potential

It took time for some graduates to find a job with career potential in which they could use their education. However, most had done so by 2003.

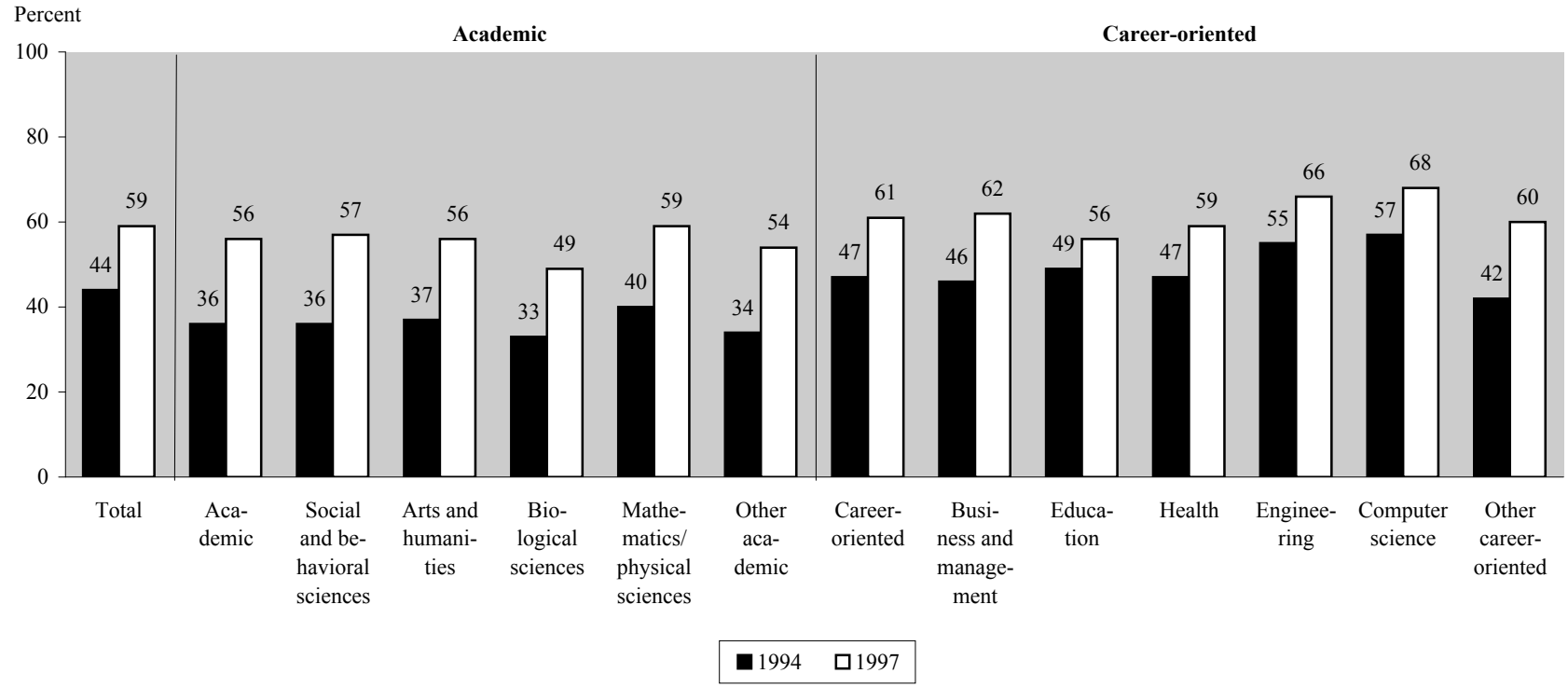
Employed in 1994

Full time

Approximately a year after graduating, less than half (44 percent) of all graduates employed full time at one job believed that their job had definite career potential (figure 14 and table 15). Another 32 percent reported being in jobs with possible career potential, and the remaining 24 percent said they were in jobs without much career potential. A majority reported that their job required a bachelor's degree (59 percent), and that their job was closely related to their undergraduate major (57 percent). Nevertheless, this meant that 41 percent of bachelor's degree recipients were not yet in jobs that required a bachelor's degree and 43 percent were not in jobs related to their major.

Graduates with career-oriented majors appeared to find work related to their major more quickly than academic majors. A year after graduating, greater percentages had jobs with definite career potential (47 vs. 36 percent), required a bachelor's degree (62 vs. 53 percent), and were closely related to their major (65 vs. 39 percent). A greater than average percentage of graduates who had majored in engineering or computer science had jobs with definite career potential (55 and 57 percent, respectively, vs. 44 percent overall). A greater percentage of health majors than others had a job closely related to their major (91 percent vs. 33–78 percent for those with other

Figure 14. Percentage of 1992–93 bachelor's degree recipients employed full time at one job who reported that their 1994 and 1997 jobs had definite career potential, by undergraduate major



NOTE: In the figure, 1994 refers to April 1994, and 1997 refers to April 1997. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Table 15. Percentage distribution of full- and part-time employed 1992–93 bachelor's degree recipients' career potential of 1994 job, percentage reporting that job required a bachelor's degree, and percentage reporting that job was closely related to their major, by undergraduate major

Undergraduate major	Career potential of April 1994 job			Job required bachelor's degree	Job closely related to major
	Definite	Possible	Not much		
Full-time at one job					
Total	43.6	32.1	24.3	59.3	57.1
Academic	36.1	31.9	32.0	53.3	39.1
Social and behavioral sciences	36.2	31.1	32.7	51.1	33.8
Arts and humanities	36.9	31.4	31.7	48.7	32.7
Biological sciences	32.7	32.9	34.4	58.3	53.4
Mathematics/physical sciences	40.0	36.0	24.0	69.0	56.3
Other academic	33.8	32.0	34.2	55.0	46.7
Career-oriented	47.1	32.0	20.9	62.0	65.0
Business and management	46.2	34.0	19.8	52.1	59.3
Education	48.7	28.3	22.9	71.1	71.7
Health	47.4	37.6	15.0	76.9	90.6
Engineering	54.5	30.3	15.2	82.8	63.3
Computer science	57.4	26.9	15.7	72.3	77.8
Other career-oriented	41.8	30.4	27.8	54.5	56.8
Science/technology/engineering/ mathematics (STEM)[1]	47.8	31.2	20.9	73.4	62.5
Non-STEM fields	42.9	32.1	25.0	56.8	56.0
Part-time at one job					
Total	24.8	28.4	46.8	35.6	46.1
Academic	19.9	25.3	54.9	31.9	36.4
Social and behavioral sciences	17.3	28.0	54.7	29.6	30.5
Arts and humanities	24.1	30.2	45.7	28.3	38.0
Biological sciences	14.4	14.9	70.7	30.9	37.8
Mathematics/physical sciences	25.1	16.1	58.9	55.9	51.7
Other academic	16.4	21.9	61.7	30.2	33.9
Career-oriented	28.1	30.5	41.4	38.1	52.6
Business and management	23.1	27.7	49.2	17.1	37.8
Education	30.9	37.3	31.8	49.1	62.2
Health	30.5	36.7	32.8	51.6	66.9
Engineering	31.6	18.4	50.0	42.6	49.5
Computer science	‡	‡	‡	‡	‡
Other career-oriented	25.8	25.8	48.4	33.3	47.3
Science/technology/engineering/ mathematics (STEM)[1]	23.9	16.1	60.0	40.8	45.0
Non-STEM fields	24.9	30.6	44.5	34.7	46.3

‡ Reporting standards not met. (Too few cases for a reliable estimate.)

[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

majors), and a greater than average percentage had a job that required a bachelor's degree (77 vs. 59 percent).

Among academic majors, graduates in mathematics/physical sciences were more likely than their peers in social and behavioral sciences or in arts and humanities to have a job that required a bachelor's degree and that was closely related to their major.

Part time

Among graduates who were employed part time at one job in 1994, just 25 percent were in jobs with definite career potential, and about half (47 percent) were in jobs without much potential (table 15). About a third (36 percent) had jobs that required a bachelor's degree. As was true with the full-time employed, relatively more part-time employed graduates with career-oriented majors than academic majors had jobs with definite career potential (28 vs. 20 percent) and jobs related to their major (53 vs. 36 percent).[24]

Employed in 1997

Full time

The proportion in jobs with definite career potential increased to 59 percent in 1997 among those working full time in one job (61 percent for career-oriented majors and 56 percent for academic majors) (figure 14 and table 16). Concurrently, the percentage in jobs without much career potential dropped to 13 percent (12 percent for career-oriented majors and 16 percent for academic majors).

About half (52 percent) of those who did not think their 1994 jobs had held much career potential were in jobs with definite career potential by 1997. They may have either found new jobs, their career plans may have changed, or their jobs may have developed in ways that provided more career potential. Of those who had considered their 1994 job closely related to their major, 62 percent thought their 1997 job had definite career potential, compared with 57 percent of those whose 1994 job had not been closely related to their major.

[24] While it appeared they were also more likely to have jobs that required a bachelor's degree, the apparent difference was not statistically significant.

Table 16. Percentage distribution of full- and part-time employed 1992–93 bachelor's degree recipients' perception of the career potential of their 1997 job, by undergraduate major and characteristics of 1994 job

Undergraduate major and characteristics of 1994 job	Definite	Possible	Not much
Full-time at one job			
Total	59.3	27.7	13.0
Academic	55.7	28.2	16.1
Social and behavioral sciences	57.0	29.3	13.7
Arts and humanities	55.7	25.3	19.1
Biological sciences	49.5	30.1	20.5
Mathematics/physical sciences	59.2	28.4	12.4
Other academic	53.9	29.4	16.7
Career-oriented	61.0	27.4	11.6
Business and management	62.1	27.1	10.8
Education	56.1	29.3	14.6
Health	58.9	26.7	14.5
Engineering	65.7	28.2	6.1
Computer science	67.9	22.8	9.3
Other career-oriented	60.1	27.2	12.7
Science/technology/engineering/ mathematics (STEM)[1]	62.0	27.7	10.3
Non-STEM fields	58.9	27.6	13.5
Career potential of 1994 job			
Definite	70.5	22.1	7.5
Possible	51.2	35.8	13.0
Not much	51.6	27.4	21.0
1994 job required bachelor's degree			
No	56.1	28.3	15.6
Yes	62.2	27.3	10.5
1994 job closely related to major			
No	56.6	28.2	15.2
Yes	61.8	27.4	10.7
Part-time at one job			
Total	33.9	27.7	38.5
Academic	32.6	24.7	42.7
Social and behavioral sciences	26.1	23.5	50.3
Arts and humanities	38.7	22.0	39.3
Biological sciences	29.6	24.4	46.0
Mathematics/physical sciences	‡	‡	‡
Other academic	27.0	27.0	46.0

See notes at end of table.

Table 16. Percentage distribution of full- and part-time employed 1992–93 bachelor's degree recipients' perception of the career potential of their 1997 job, by undergraduate major and characteristics of 1994 job—Continued

Undergraduate major and characteristics of 1994 job	Definite	Possible	Not much
Career-oriented	35.1	30.0	34.9
Business and management	29.8	25.5	44.7
Education	33.7	28.8	37.4
Health	45.6	41.9	12.5
Engineering	‡	‡	‡
Computer science	‡	‡	‡
Other career-oriented	33.8	26.2	40.0
Science/technology/engineering/ mathematics (STEM)[1]	34.1	30.5	35.4
Non-STEM fields	34.0	27.2	38.8
Career potential of 1994 job			
Definite	45.6	27.2	27.2
Possible	39.3	33.8	26.9
Not much	23.9	22.9	53.3
1994 job required bachelor's degree			
No	32.3	25.2	42.5
Yes	37.3	30.1	32.6
1994 job closely related to major			
No	28.9	24.1	47.0
Yes	40.5	30.4	29.0

‡ Reporting standards not met. (Too few cases for a reliable estimate.)
[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.
NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Part time

Among those employed part time in a single job in 1997, about one-third (34 percent) reported that their jobs had definite career potential, up from one-fourth of their 1994 counterparts. Yet 38 percent of those employed part time in 1997 still indicated that they were in jobs without much career potential.

Employed in 2003

Full time

By 2003, graduates were more established in their careers. About 90 percent of all graduates employed full time at one job considered their current work a career (table 17). Even among those who had been in jobs without much career potential in 1994 or 1997, most (83 percent of the former and 82 percent of the latter) now considered their work a career. Those who considered their work in 2003 a career had been in that career for an average of 7 years, and about one-third (35 percent) of them reported having more than one career since they earned their bachelor's degree.[25]

From several perspectives, graduates with career-oriented majors appeared more settled in the labor force than their peers with academic majors. A greater percentage considered their current work a career (91 vs. 87 percent). In addition, among graduates who did consider their work a career, those with career-oriented majors had been in their career for a longer period of time (8 vs. 6 years, on average) and a smaller percentage had changed careers (32 vs. 41 percent).

Overall, 63 percent of graduates thought that their undergraduate education was very important to their job. Of those who went to graduate school, 87 percent reported that their graduate education was very important to their job. A larger proportion of career-oriented majors than academic majors reported that their undergraduate education was very important to their work (66 vs. 56 percent). The reverse was true among those with graduate education—90 of academic majors thought that their graduate education was very important to their job, compared with 85 percent of career-oriented majors.

Just over three-fourths (77 percent) of full-time employed graduates in 2003 reported that their job required a bachelor's degree, up from 59 percent in 1994 (table 15). While a larger percentage of career-oriented majors than academic majors held this opinion in 1994, no measurable difference was detected between the two groups in 2003.

Part time

Compared with their full-time peers, a smaller proportion of part-time workers in 2003 considered their work a career, said their job required a bachelor's degree, or believed that their undergraduate education was very important to their work (table 17). Yet a majority of part-time workers did say each of these things about their jobs.

[25] It was left to the respondents to determine whether they had changed careers. See appendix A for more detail.

Table 17. Percentage of full- and part-time employed 1992–93 bachelor's degree recipients who held various perceptions of their work in 2003, by undergraduate major and characteristics of their 1994 and 1997 jobs

Undergraduate major and characteristics of their 1994 and 1997 jobs	Consider current work a career	Of those: Average years in career	Of those: Percent had more than one career in 10 years	Reported that job required bachelor's degree	Undergraduate education very important to job	Graduate education very important to job
Full-time at one job						
Total	89.6	7.3	34.9	76.7	62.7	87.0
Academic	86.7	6.4	41.0	76.6	56.1	90.0
Social and behavioral sciences	86.7	6.5	41.1	76.4	52.2	89.3
Arts and humanities	82.8	6.5	47.6	65.3	56.5	83.3
Biological sciences	89.7	5.6	29.5	86.6	65.4	93.9
Mathematics/physical sciences	91.5	5.7	42.3	89.3	59.7	97.3
Other academic	88.0	6.9	37.5	80.2	54.4	89.9
Career-oriented	91.0	7.8	31.9	76.7	65.9	84.5
Business and management	89.1	7.7	37.1	72.1	63.8	81.6
Education	94.0	8.1	26.8	85.6	70.6	86.2
Health	93.6	8.2	24.7	76.0	77.6	91.6
Engineering	92.1	7.6	28.0	84.7	68.0	88.1
Computer science	94.0	9.1	17.6	85.1	77.5	‡
Other career-oriented	89.8	7.5	34.0	71.9	58.1	82.7
Science/technology/engineering/ mathematics (STEM)[1]	91.7	7.0	29.7	86.1	67.1	92.0
Non-STEM fields	89.1	7.4	36.1	74.6	61.6	85.4
Career potential of 1994 job						
Definite	93.7	8.1	31.5	78.6	68.4	86.2
Possible	90.9	7.4	35.4	76.9	63.7	83.9
Not much	82.6	6.6	42.6	71.7	55.3	89.8
1994 job required bachelor's degree						
No	85.6	7.1	39.7	64.8	56.8	87.5
Yes	93.1	7.8	32.4	85.3	68.6	86.2
1994 job closely related to major						
No	85.9	6.7	43.2	69.8	52.0	86.9
Yes	92.9	8.1	29.6	81.5	72.7	86.5
Career potential of 1997 job						
Definite	92.2	7.8	32.6	77.8	65.7	87.9
Possible	87.7	7.2	35.6	77.7	61.4	85.8
Not much	82.1	6.3	44.5	68.1	55.4	82.8

See notes at end of table.

Table 17. Percentage of full- and part-time employed 1992–93 bachelor's degree recipients who held various perceptions of their work in 2003, by undergraduate major and characteristics of their 1994 and 1997 jobs—Continued

Undergraduate major and characteristics of their 1994 and 1997 jobs	Consider current work a career	Of those: Average years in career	Of those: Percent had more than one career in 10 years	Reported that job required bachelor's degree	Undergraduate education very important to job	Graduate education very important to job
Part-time at one job						
Total	75.1	6.8	41.8	58.7	55.4	80.1
Academic	67.7	5.7	50.9	57.1	46.8	86.1
Social and behavioral sciences	56.7	5.3	57.1	52.7	44.6	‡
Arts and humanities	72.5	5.9	47.7	52.1	49.9	‡
Biological sciences	82.2	‡	47.7	82.5	45.2	‡
Mathematics/physical sciences	‡	‡	‡	‡	‡	‡
Other academic	‡	‡	‡	‡	‡	‡
Career-oriented	79.1	7.3	37.0	59.7	60.3	76.5
Business and management	70.1	6.5	45.9	56.5	44.3	‡
Education	80.7	6.6	35.5	63.6	62.8	‡
Health	92.8	8.5	21.7	68.3	82.2	‡
Engineering	‡	‡	‡	‡	‡	‡
Computer science	‡	‡	‡	‡	‡	‡
Other career-oriented	70.4	6.9	45.0	46.4	50.9	‡
Science/technology/engineering/ mathematics (STEM)[1]	79.1	6.3	45.7	69.9	51.6	‡
Non-STEM fields	74.5	6.8	41.5	57.4	55.9	79.9
Career potential of 1994 job						
Definite	81.3	7.4	36.1	62.3	63.6	82.8
Possible	72.3	7.1	41.8	61.7	58.9	74.4
Not much	69.5	6.0	54.9	48.7	49.2	81.4
1994 job required bachelor's degree						
No	69.6	6.6	45.4	49.6	51.5	87.8
Yes	79.8	7.2	42.0	64.0	63.3	76.8
1994 job closely related to major						
No	64.3	5.7	53.4	52.2	46.7	84.7
Yes	82.7	7.6	36.7	61.8	65.6	77.5
Career potential of 1997 job						
Definite	84.1	7.4	35.6	62.3	62.0	86.5
Possible	71.4	6.3	46.3	57.5	54.8	76.7
Not much	60.7	5.9	52.4	52.3	43.2	‡

‡ Reporting standards not met. (Too few cases for a reliable estimate.)

[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Among graduates who worked part time in 2003, differences between academic and career-oriented majors followed patterns similar to those of full-time workers. That is, graduates with career-oriented majors reported more often than their counterparts with academic majors that they considered their work a career (79 vs. 68 percent) and that they had spent a longer period of time in that career (an average of 7 vs. 6 years). In addition, a larger percentage of career-oriented majors working part time in 2003 said that their undergraduate education was very important to their work. There was no statistical evidence, however, of a difference in the percentage who thought their work required a bachelor's degree (57–60 percent of academic and career-oriented majors).

Satisfaction

Employed Full Time in 2003

In 2003, job satisfaction among graduates was generally high.[26] Most graduates working full time at one job reported being satisfied with their pay (66 percent), fringe benefits (75 percent), job security (81 percent), and opportunity for promotion (65 percent) (table 18). Graduates with career-oriented undergraduate majors were more satisfied with their pay than their peers with academic majors (68 vs. 62 percent), but not with any of the other aspects of their jobs considered here. Education majors were less likely than either the average career-oriented or academic major to be satisfied with their pay and benefits.

Employed Part Time in 2003

Part-time workers were as satisfied as full-time workers with their pay, but not with some other aspects of their jobs in 2003. Like full-time workers, 66 percent of part-time workers reported being satisfied with their pay. However, they reported a lower rate of satisfaction than full-time workers with their fringe benefits and opportunity for promotion on the job.[27] Nevertheless, a majority of part-time workers were satisfied with these aspects of work as well as with their pay and job security. A larger percentage of part-time workers with career-oriented undergraduate majors were satisfied with their job security than their counterparts with academic majors (80 vs. 70 percent), but no other differences in satisfaction by major were detected among part-time workers.

[26] While job satisfaction was assessed in 1994 and 1997 as well, the aspects of job satisfaction investigated as well as the scale on which graduates were asked to rate their satisfaction was somewhat different from the 2003 data collection. Thus, only the 2003 data are discussed here.

[27] The apparent difference in satisfaction with job security was not statistically significant.

Table 18. Percentage of full- and part-time employed 1992–93 bachelor's degree recipients who were satisfied with various aspects of their work in 2003, by undergraduate major and employment/ enrollment trajectory

Undergraduate major and employment/enrollment trajectory	Pay		Fringe benefits		Job security		Opportunity for promotion	
	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time
Total	65.9	66.4	75.3	63.3	81.3	76.3	65.3	57.5
Academic	62.1	66.9	76.1	61.2	82.5	70.1	67.1	53.8
Social and behavioral sciences	60.7	64.7	77.5	54.3	80.1	69.8	67.7	49.1
Arts and humanities	60.6	65.1	75.5	66.8	83.5	63.0	65.3	55.9
Biological sciences	62.5	72.0	76.6	55.1	85.0	73.9	69.9	48.9
Mathematics/physical sciences	67.9	‡	73.0	‡	84.6	‡	63.7	‡
Other academic	64.5	‡	75.1	‡	83.2	‡	69.1	‡
Career-oriented	67.7	66.1	74.9	64.6	80.7	79.7	64.4	59.7
Business and management	70.7	63.2	78.1	56.0	79.3	80.0	65.1	68.3
Education	55.2	57.6	62.8	62.9	85.6	76.1	64.5	50.8
Health	73.0	79.2	77.8	68.1	88.6	91.2	60.0	58.0
Engineering	75.0	‡	79.6	‡	73.8	‡	65.8	‡
Computer science	76.7	‡	76.4	‡	71.5	‡	66.8	‡
Other career-oriented	65.7	56.4	75.4	70.9	81.7	71.5	63.6	53.6
Science/technology/engineering/ mathematics (STEM)[1]	70.9	74.3	77.2	65.7	78.3	76.1	66.5	58.2
Non-STEM fields	64.8	65.4	74.9	63.1	82.0	76.3	65.1	57.5
Employment/enrollment status across 1994, 1997, and 2003								
Academic								
Only employment	64.7	69.8	77.2	67.9	79.1	72.9	67.9	55.6
Employment and enrollment	59.2	67.7	75.5	60.4	86.2	67.3	67.7	55.8
Employment and "neither"	64.5	‡	73.3	‡	77.5	‡	54.5	‡
Career-oriented								
Only employment	70.3	74.3	76.1	66.3	81.4	83.3	66.4	66.2
Employment and enrollment	65.5	56.5	73.8	63.9	80.4	70.9	60.5	49.2
Employment and "neither"	57.9	55.4	69.4	69.3	74.8	87.8	62.2	64.8

‡ Reporting standards not met. (Too few cases for a reliable estimate.)

[1] STEM fields include engineering, computer science, biological sciences, mathematics, and physical sciences.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Includes respondents who were employed in only one job. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

Employment/Enrollment Trajectories

The more career potential graduates saw in their work in 1994, the higher their rate of being in the only employed category at all three follow-up interviews: 63 percent of those in jobs with career potential in 1994 reported being only employed, compared with 56 percent of those in jobs with some career potential and 52 percent of those in jobs with not much potential (table 19). One solution to a job without much career potential was to return to school: one-third of those in such jobs in 1994 combined work and school enrollment over the next 10 years, compared with one-fourth of those whose 1994 jobs had definite career potential. A similar pattern was found for those in jobs with not much career potential in 1997.

The career potential of graduates' 1994 employment was associated with their overall employment and enrollment trajectory. However, no measurable difference was detected in graduates' overall employment and enrollment paths by whether the 1994 job required a bachelor's degree or was closely related to the undergraduate major.

Graduates who considered their work in 2003 a career were more likely than those who did not to combine employment and enrollment across the 3 years (1994, 1997, and 2003), and they were less likely to have been neither working nor enrolled at one or more of the three interviews. A similar pattern was found for graduates who said their 2003 job required a bachelor's degree compared with those whose job did not.

Table 19. Percentage of employed 1992–93 bachelor's degree recipients who had various employment and enrollment trajectories from 1994 to 2003, by characteristics of 1994, 1997, and 2003 jobs

Job characteristics	Only employed[1]	Combination of employed and enrolled[2]	Combination of employed and neither employed nor enrolled[3]
Total	50.5	29.7	13.7
Career potential of 1994 job			
Definite	63.5	24.7	9.4
Possible	56.1	27.3	13.4
Not much	51.7	33.3	10.8
1994 job required bachelor's degree			
No	56.3	28.8	12.3
Yes	59.0	27.5	9.9
1994 job closely related to major			
No	56.9	27.8	12.1
Yes	58.7	28.1	10.1
Career potential of 1997 job			
Definite	55.7	27.9	12.2
Possible	52.6	27.0	15.4
Not much	40.1	37.0	15.2
Consider 2003 work a career			
No	60.3	26.1	11.2
Yes	57.6	34.0	5.8
2003 job required bachelor's degree			
No	59.9	17.3	17.9
Yes	48.3	34.8	11.1

[1] These graduates were "only employed" in each of the 3 years.

[2] In at least 1 of the 3 years, these graduates were enrolled (either only enrolled or working as well as enrolled), and in each of the 3 years, they were either employed, enrolled, or both; they were never doing neither.

[3] In at least 1 of the 3 years, these graduates were neither enrolled nor employed, and in each of the 3 years, they were either only employed or neither enrolled nor employed; they were never enrolled.

NOTE: In the table, 1994 refers to April 1994, 1997 refers to April 1997, and 2003 refers to the time of the 2003 interview (90 percent of graduates completed the interview between February and August of 2003). Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

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Summary

About two-thirds of all 1992–93 bachelor's degree recipients had career-oriented majors, the most common being business, followed by education. Overall, there was no measurable difference in the percentage of men and women who chose career-oriented majors, but they chose different fields. Proportionately more men than women majored in engineering, computer science, or business, while proportionately more women than men majored in education or health. On the academic side, proportionately more men than women majored in mathematics/physical sciences or biological sciences, and proportionately more women than men majored in "other" academic fields.

Ten years after finishing college, most graduates had a job they considered a career in which they used their education, and their average salary, adjusted for inflation, had roughly doubled since 1994. Most were satisfied with their pay, fringe benefits, job security, and opportunity for promotion. Graduates with career-oriented undergraduate majors appeared to establish themselves in the labor force earlier, while those with academic majors more often obtained additional education. Graduates with academic majors tended to be spread across more occupations and industries than those with career-oriented majors, most of whom stayed in occupations closely related to their undergraduate field of study.

Labor Force Status

For each of the 3 years in which they were interviewed (1994, 1997, and 2003), graduates were categorized as only employed, only enrolled, both, or neither employed nor enrolled. The percentage of graduates who were only employed remained stable in 1994 and 1997, but increased in 2003 as those who had gone on to graduate school moved into jobs. Counteracting to some extent this movement into the labor force was an increase in the percentage of women who were neither working nor enrolled by 2003.

About half of all the graduates were employed and not enrolled at all three follow-ups, but the other half moved into and out of the workforce, often for further education. A greater percentage of graduates with academic than career-oriented majors were enrolled in a further degree or certificate program (graduate or undergraduate) in at least 1 of the 3 years. Men and women had different employment patterns. For men, the percentage who were employed full

time at one job increased between 1994 and 1997 and then remained stable. For women, this percentage increased between 1994 and 1997, but then declined, counteracted to some extent by an increase in part-time employment at one job.

Employment Stability and Intensity

By 2003, the average bachelor's degree recipient had been working in his or her current job for about 5 years. Unemployment rates for bachelor's degree recipients appeared lower than the overall national average, and 9 out of 10 full-time employed graduates had health insurance and retirement benefits in 2003.

The work patterns of graduates with academic and career-oriented majors differed, with career-oriented majors appearing to have become more established in the workforce earlier—they had been in their jobs longer, a greater percentage had full-time jobs, and a smaller percentage had been unemployed. Consistent with their greater propensity to enroll in further education, graduates with academic majors withdrew from the labor force at higher rates than career-oriented majors.

Occupations and Industries

Graduates were employed in a variety of industries, with education, health, and professional services being the most common in both 1997 and 2003. The industries in which graduates worked reflected their occupations, which, in turn, were related to their undergraduate majors. In both 1997 and 2003, more graduates were employed in education than in any other industry. Graduates in academic fields tended to be spread out across more occupations than career-oriented majors, most of whom stayed in occupations closely related to their undergraduate fields of study.

Salaries and Benefits

Adjusted for inflation, the average salary of a bachelor's degree recipient who was employed full time at one job roughly doubled between 1994 and 2003. As a group, career-oriented majors had higher average salaries than academic majors, but the difference disappeared when other factors that affect salaries were taken into account. The average salaries for arts and humanities and education majors lagged behind the others. Nine out of 10 full-time employed graduates had health and retirement benefits in 2003.

Career Perspectives

It took time for some graduates to find a job with career potential that used their education, but most had done so by 2003. Over time, the percentage in jobs with career potential increased, and by 2003, most graduates were in jobs they considered a career and reported that the job required a bachelor's degree. While a larger proportion of career-oriented majors than academic majors said their undergraduate education was very important to their work, the reverse was true for the importance of graduate education. Two-thirds to four-fifths of full-time employed graduates were satisfied with their pay, fringe benefits, job security, and opportunity for promotion in 2003. Graduates with career-oriented undergraduate majors were more satisfied than their peers with academic majors with their pay, but not with any other aspects of their jobs.

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Appendix A—Glossary

This glossary describes the variables used in this report. The variables come from the NCES 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03) Data Analysis System (DAS), a software application developed by NCES to generate tables from the survey data. The B&B:93/03 DAS includes data collected in the base year (1992–93) and the three follow-ups conducted in 1994, 1997, and 2003. Appendix C contains descriptions of both the DAS software and the B&B surveys.

In the index below, the variables are organized by general topic and, within topic, listed in the order in which they appear in the tables. The glossary items are listed in alphabetical order by the variable name (displayed in capital letters to the right of the variable label).

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Industry (April 1997 job) B2AJOBIN
Industry (2003 job)..... B3CUIND

SALARIES AND BENEFITS

Annual salary (April 1994 job)..... APRANSAL
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Retirement benefits (2003 job)..... B3CURBD

CAREER PERSPECTIVES

Degree of career potential (April 1994 job) ..... AJOBPOTN
Bachelor's degree required (April 1994 job) ..... AJOBDEGR
Relationship to major (April 1994 job) ..... AJOBRELT
Degree of career potential (April 1997 job) B2AJBPOT
Consider current work a career..... B3CAREER
Years in career (if current work a career)... B3CARDUR
More than one career in past 10 years B3CARRCH
Bachelor's degree required (2003 job)..... B3REQBA
Importance of undergraduate education B3IMPUG
Graduate education very important to job B3GRPRA
Satisfaction with pay..... B3JOBSA
Satisfaction with fringe benefits B3JOBSB
Satisfaction with job security..... B3JOBSF
Satisfaction with opportunity for promotion... B3JOBSD

DAS Variable

Health insurance (April 1994 job) **AJBBEN01**

For respondents who were employed in April 1994, this variable identifies whether employer provided health or dental insurance. (yes/no)

Retirement benefits (April 1994 job) **AJBBEN02**

For respondents who were employed in April 1994, this variable identifies whether employer provided retirement benefits. (yes/no)

Bachelor's degree required (April 1994 job) **AJOBDEGR**

For respondents who were employed in April 1994, this variable identifies whether the respondent believed a "college degree" was required for the job. (yes/no)

Industry (April 1994 job) **AJOBIND**

For respondents who were employed in April 1994, this variable identifies the type of business or industry.

Professional and related services
Retail and wholesale trade
Finance, insurance, and real estate
Business services
Manufacturing
Utilities, communications, transportation
Public safety and administration
Personal/hospitality services, entertainment, recreation
Agriculture, mining, oil, construction
Other
See Appendix B for more details

Occupation (April 1994 job) **AJOBOCCR**

For respondents who were employed in April 1994, this derived variable identifies respondent's occupation or field of employment.

Educators
Business and management
Engineering/architecture
Computer science
Medical professions
Editing/writing/performing
Human/protective services, law
Research, science, technology
Administrative/clerical/legal support
Service occupations
Other
See Appendix B for more details

DAS Variable

Degree of career potential (April 1994 job) **AJOBPOTN**

For respondents who were employed in April 1994, this variable identifies respondent's opinion about the degree of career potential in their work.

Definite
Possible
Not much

Relationship to major (April 1994 job) **AJOBRELT**

This variable identifies how closely related job is to the respondent's field of study.

Closely
Somewhat related
Not at all

Annual salary (April 1994 job) **APRANSAL**

This variable calculates the respondent's annual salary based on his or her employment in April 1994. This derived variable was constructed by multiplying the salary per pay period by the number of pay periods a year.

Labor force participation (April 1994) **B1LFP94**

This variable identifies the labor force participation of 1992–93 graduates in April 1994, identifying those with multiple jobs separately from other employed workers. It also combines those who are unemployed with or without benefits into one category.

Full time at one job
Part time at one job
At multiple jobs
Unemployed (not working, but looking for work)
Out of the labor force (not working and not looking for work)

Years at employer (April 1994 job) **B1YRSEMP**

For respondents who were employed in April 1994, this derived variable calculates the number of years they had worked for that employer as of April 1994, based on the reported start date.

Age at bachelor's **B2AGATBA**

This variable identifies the respondent's age upon receiving the bachelor's degree in 1992–93 at the sampled institution.

Health insurance (April 1997 job) **B2AJBN01**

For respondents who were employed in April 1997, this variable identifies whether employer provided health or dental insurance. (yes/no)

DAS Variable

Retirement benefits (April 1997 job) **B2AJBN02**

For respondents who were employed in April 1997, this variable identifies whether employer provided retirement benefits. (yes/no)

Degree of career potential (April 1997 job) **B2AJBPOT**

For respondents who were employed in April 1997, this variable identifies respondent's opinion about the degree of career potential in their work.

Definite
Possible
Not much

Industry (April 1997 job) **B2AJOBIN**

For respondents who were employed in April 1997, this variable identifies the type of business or industry to which the respondent's occupation belonged. If the respondent's main job was a teaching job, this question was not asked but assigned the appropriate code for the education industry.

Professional and related services
Education
Health care
Retail and wholesale trade
Finance, insurance, and real estate
Business services
Manufacturing
Utilities, communications, transportation
Public safety and administration
Personal/hospitality services, entertainment/recreation
Agriculture, mining, oil, construction
Other
See Appendix B for more details

Occupation (April 1997 job) **B2AJOBR**

For respondents who were employed in April 1997, this derived variable identifies respondent's occupation or field of employment.

Educators
Business and management
Engineering/architecture
Computer science
Medical professions
Editing/writing/performing
Human/protective services, law
Research, science, technology
Administrative/clerical/legal support
Service occupations
Other
See Appendix B for more details

DAS Variable

Annual salary (April 1997 job) **B2APRSAL**

Total annual salary of April 1997 job was calculated using items on pay rate and salary. A few cases that had a total salary of greater than $500,000 were set to $500,000.

Race/ethnicity **B2ETHNIC**

This variable indicates the race and ethnicity of the respondent. The variable is a composite combining two items respondents reported, their race (American Indian/Alaska Native, Asian/Pacific Islander, Black, and White) and whether or not they were of Hispanic origin. The variable gives priority to Hispanic/Latino regardless of race. American Indian includes Alaska Native, Black includes African American, and Hispanic includes Latino.

American Indian
Asian/Pacific Islander
Black
Hispanic
White

Highest degree by 1997 **B2HDGPRG**

This composite identifies the highest degree a respondent received after the 1992–93 bachelor's degree, as of the 1997 interview. For this report, categories were combined as follows.

Bachelor's degree	No post-baccalaureate degree/enrollment Non-degree program Certificate or license Associate's degree Bachelor's degree Post-baccalaureate certificate
Master's degree	Master's degree Master's of Business Administration Post-master's certificate
Doctoral/professional	First-professional Doctoral degree

Labor force participation (April 1997) **B2LFP97**

This variable identifies the labor force participation of 1992–93 graduates in April 1997, identifying those with multiple jobs separately from other employed workers. It also combines those who are unemployed with or without benefits into one category.

Full time at one job
Part time at one job
At multiple jobs
Unemployed (not working, but looking for work)
Out of the labor force (not working and not looking for work)

DAS Variable

Employment/enrollment status (April 1994) **B2NM9404**

This variable indicates the respondent's employment and enrollment status for April 1994.

Only employed
Only enrolled
Both enrolled and employed
Neither enrolled nor employed

Employment/enrollment status (April 1997) **B2NM9704**

This variable indicates the respondent's employment and enrollment status for April 1997.

Only employed
Only enrolled
Both enrolled and employed
Neither enrolled nor employed

Years at employer (April 1997 job) **B2YRSEMP**

For respondents who were employed in April 1997, this derived variable calculates the number of years they had worked for that employer, based on the reported start date.

Years in career (if current work a career) **B3CARDUR**

This variable identifies the number of years in which the respondent has worked in his or her current and most recent job as of 2003. Only respondents who were employed at the time of the interview are shown for this variable in this report. Respondents were allowed to report up to 11 years.

Consider current work a career **B3CAREER**

This variable applies to respondents who were employed as of the 2003 interview. This variable identifies whether the respondent considered his or her job to be part of a career they were pursuing in their occupation or industry. (yes/no)

More than one career in past 10 years **B3CARRCH**

Respondents who had worked at some point since 1997 were asked in 2003 whether they considered their current or most recent job to be part of their career. Those who said yes were asked how long they had been in that career; those who reported less than 10 years were asked whether they had changed careers in the past 10 years. This derived variable identifies whether respondents who considered their current work a career had changed careers at some point in the past 10 years. (yes/no)

Length of leave for child care from 1997 through 2003 **B3CLEAV**

This variable identifies the length of any leave the respondent took from work (in months) to care for a child or children between the 1997 and 2003 interviews.

DAS Variable

Annual salary (2003 job) **B3CRSAL**

This derived variable identifies the salary for employed respondents as of the 2003 interview. Respondents who reported salaries greater than $500,000 were recoded to $500,000.

Industry (2003 job) **B3CUIND**

For respondents who were employed in 2003, this variable identifies the industry in which the respondent worked.

Professional and related services
Education
Health care
Retail and wholesale trade
Finance, insurance, and real estate
Business services
Manufacturing
Utilities, communications, transportation
Public safety and administration
Personal/hospitality services, entertainment/recreation
Agriculture, mining, oil, construction
Other
See Appendix B for more details

Health insurance (2003 job) **B3CURBA**

For respondents who were employed in 2003, excluding the self-employed, this variable identifies whether employer provided medical insurance.

Retirement benefits (2003 job) **B3CURBD**

For respondents who were employed in 2003, excluding the self-employed, this variable identifies whether employer provided retirement benefits such as 401(k)/403(b).

Employment/enrollment status (2003) **B3EMPEN**

This variable indicates respondent's current employment status and enrollment status at the time of the 2003 interview. Current enrollment can indicate enrollment at the graduate or undergraduate level.

Only employed
Only enrolled
Both enrolled and employed
Neither enrolled nor employed

Graduate education very important to job **B3GRPRA**

For respondents who had enrolled in a graduate or professional degree program since 1997, but were not enrolled at the time of the 2003 interview, this variable identifies whether the respondent's graduate education was very important preparation for work and career. (yes/no)

DAS Variable

Highest degree by 2003 **B3HDG03**

This variable identifies the highest degree the respondent had attained as of 2003. All respondents attained a bachelor's degree in 1993, so bachelor's degree is the minimum degree attained by all respondents.

Importance of undergraduate education **B3IMPUG**

For respondents who were employed in 2003, this variable identifies whether the respondent's undergraduate education was very important for the job. (yes/no)

Satisfaction with pay **B3JOBSA**

For respondents who were employed in 2003, this variable identifies whether respondents were satisfied with their pay. (yes/no)

Satisfaction with fringe benefits **B3JOBSB**

For respondents who were employed in 2003, this variable identifies whether respondent was satisfied with fringe benefits of the job. (yes/no)

Satisfaction with opportunity for promotion **B3JOBSD**

For respondents who were employed in 2003, this variable identifies whether respondent was satisfied with the job's opportunities for promotion. (yes/no)

Satisfaction with job security **B3JOBSF**

For respondents who were employed in 2003, this variable identifies whether respondent was satisfied with job security of the job. (yes/no)

Labor force participation (2003) **B3LFP03**

This variable indicates graduates' labor force participation as of their 2003 interview (90 percent of graduates completed the interview between February and August of 2003). It identifies number of jobs and whether they were full time or part time. Respondents who were not working were classified as unemployed or out of the labor force.

Full time (35 or more hours per week) at one job
Part time (less than 35 hours per week) at one job
At multiple jobs
Unemployed (not working, but looking for work)
Out of the labor force (not working and not looking for work)

DAS Variable

Occupation (2003 job) **B3OCCR**

For respondents who were employed in 2003, this derived variable identifies the occupational category of the respondent's job.

Educators
Business and management
Engineering/architecture
Computer science
Medical professions
Editing/writing/performing
Human/protective services, law
Research, science, technology
Administrative/clerical/legal support
Service occupations
Other
See Appendix B for more details

Ever out of the labor force from 1997 to 2003 **B3OLF**

This variable identifies the number of separate times that the respondent was out of the labor force between the 1997 and 2003 interviews. "Out of the labor force" is defined as not working and not looking for work.

Total number of months out of the labor force from 1997 to 2003 **B3OTIMT**

This derived variable calculates the total number of months that respondents had been out of the labor force (i.e., not working and not looking for work) between the 1997 and 2003 interviews.

Bachelor's degree required (2003 job) **B3REQBA**

Respondents who were employed when interviewed in 2003 were asked, "What kind of degree [is] required for your [current] job?" This variable is used to identify whether the respondent's 2003 job required a bachelor's (or higher) degree, with their responses grouped as follows:

Yes	Bachelor's degree
	Master's degree
	Professional degree
	Doctoral degree
No	No degree
	Associate's degree

Ever unemployed from 1997 to 2003 **B3UNEMP**

This variable identifies number of times respondent was unemployed (not working, but looking for work) between the 1997 and 2003 interviews, and is used in this report to identify whether respondents were ever unemployed during that time period.

DAS Variable

Total number of months unemployed from 1997 to 2003 **B3UTIMT**

This derived variable identifies the number of months respondent reported being unemployed (not working, but looking for work) between the 1997 and 2003 interviews.

Years at employer (2003 job) **B3YRSEMP**

For respondents who had worked at some point between the 1997 and 2003 interviews, this derived variable calculates the number of years they had worked for their current or most recent employer (regardless of job title) as of the 2003 interview date, based on the reported start date. In this report, this variable is only shown for respondents who were employed as of the 2003 interview.

Gender **GENDER**

This variable indicates whether the respondent was male or female.

Employment and enrollment status 1994, 1997, and 2003 **LMMNTRAJ**

This derived variable combines information about the employment and enrollment status of the respondents at each of the three follow-up interviews (1994, 1997, and 2003). For each follow-up, the respondents were classified according to whether they were *only employed*, *only enrolled* in school, *both enrolled and employed*, or *neither enrolled nor employed* (see the variables B2NM9404, B2NM9704, and B3EMPEN). Based on which of these four categories they were in at each interview, graduates had one of (4 x 4 x 4 =) 64 possible combinations of statuses at the three time points. These combinations were examined for similar patterns that could be discussed together. The primary categories discussed in this report are as follows:

Only employed	Status was "only employed" at all three interviews
Combination of employed and enrolled	In at least 1 of the 3 years, status was either "only enrolled" or "both enrolled and employed"; *and* in each of the 3 years, status was "only employed," "only enrolled," or "both enrolled and employed" (never "neither enrolled nor employed")
Combination of employed and neither employed nor enrolled	In at least 1 of the 3 years, status was "neither enrolled nor employed"; *and* in each of the 3 years, status was either "only employed" or "neither enrolled nor employed" (never "only enrolled" or "both enrolled or employed").

In addition, table 5 shows the following categories detailing those patterns that included enrollment at some point—that is, those combinations that involved either "only enrolled" or "both enrolled and employed" at one or more time points.

DAS Variable

Employment and enrollment status 1994, 1997, and 2003—continued **LMMNTRAJ**

Enrolled, then employed	"Only enrolled" in 1994 or in both 1994 and 1997, and "only employed" thereafter
Both, then employed	"Both enrolled and employed" in 1994 or in both 1994 and 1997, and "only employed" thereafter
Employed, enrolled, employed	"Only employed" in 1994, "only enrolled" in 1997, and "only employed" in 2003
Employed, both, employed	"Only employed" in 1994, "both enrolled and employed" in 1997, and "only employed" in 2003
Employed, then enrolled or both	"Only employed" in 1994 or in both 1994 and 1997; thereafter, "only enrolled" or "both enrolled and employed"
Always enrolled or both	"Only enrolled" or "Both enrolled and employed" at all three time points
Enrolled or both, then employed, sometimes followed by more enrolled or both	"Only enrolled" or "both enrolled and employed" in 1994 and *either* (a) "only employed" in 1997 followed by "only enrolled" or "both enrolled and employed" in 2003 *or* (b) "only enrolled" or "both enrolled and employed" in 1997 followed by "only employed" in 2003
One or more years neither employed nor enrolled	Any other enrollment combination, which also include "neither enrolled nor employed" for at least one time point

Family status (1994) **MARPAR94**

This variable combines information about the marital status and children (both inside and outside the household) of each respondent as of the first follow-up interview in 1994.

Unmarried without children
Unmarried with children
Married without children
Married with children

Family status (1997) **MARPAR97**

This variable combines information about the marital status and children (both inside and outside the household) of each respondent as of the second follow-up interview in 1997. See MARPAR94 for categories.

Family status (2003) **MARPAR03**

This variable combines information about the marital status and children (both inside and outside the household) of each respondent as of the final follow-up interview in 2003. See MARPAR94 for categories.

DAS Variable

Undergraduate GPA **NORMGPA**

Normalized calculated grade point average based on recorded grades at the sampled undergraduate institution (4.0 scale).

Less than 2.75
2.75–3.74
3.75 or higher

Ever out of the labor force from May 1994 through April 1997 **OLF9497**

This variable identifies respondents who were out of the labor force (not working and not looking for work) for any of the months from May 1994 through April 1997. (yes/no)

Ever out of labor force from BA through 2003 **OLFALL**

This variable identifies respondents who were out of labor force (not working and not looking for work) for any of the months from bachelor's degree completion through the 2003 interview. (yes/no)

Ever out of the labor force from BA through April 1994 **OLFBA94**

This variable identifies respondents who were out of the labor force (not working and not looking for work) for any of the months from bachelor's degree completion through April 1994. (yes/no)

Total number of months out of the labor force from May 1994 through April 1997 **OLFM9497**

This variable calculates the *number of months* from May 1994 through April 1997 for which the respondent was out of the labor force (not working and not looking for work).

Total number of months out of the labor force from BA through April 1994 **OLFMBA94**

This variable calculates the *number of months* from bachelor's degree completion through April 1994 for which the respondent was out of the labor force (not working and not looking for work).

Total number of months out of the labor force from BA through 2003 **OLFTOMO**

This variable calculates the *number of months* from bachelor's degree completion through the 2003 interview for which the respondent was out of the labor force (not working and not looking for work).

Parents' highest education **PAREDUC**

This variable identifies the highest education level completed by either of respondent's parents as of their bachelor's degree completion.

High school or less
Some college/associate's

DAS Variable

Parents' highest education—continued **PAREDUC**

Bachelor's
Advanced degree

Bachelor's institution sector **SECTOR_B**

This variable identifies the institutional type by level and control, combined. Institution level concerns the institution's highest offering (length of program and type of certificate, degree, or award), and control concerns the source of revenue and control of operations. The institution for the bachelor's degree recipients for B&B:93/03 was nearly always a 4-year institution, but for about 2 percent of the sample the institution is classified otherwise.

Public doctorate
Public 4-year nondoctorate
Private not-for-profit doctorate
Private not-for-profit 4-year nondoctorate
For-profit/other

Bachelor's institution selectivity **SELECTV2**

This variable indicates the level of selectivity of the graduates' bachelor's institutions derived from a combination of variables from the Integrated Postsecondary Education Data System (IPEDS). Open admission 4-year institutions were separated. For other institutions, an index of "very," "moderately," or "minimally" selective was created from two variables: the centile distribution of the percentage of students who were admitted to each institution (of those who applied), and the centile distribution of the midpoint between the 25th and 75th percentile SAT/ACT combined scores reported by each institution.

Very selective
Moderately selective
Minimally selective
Open admission

Undergraduate major **UGMJCODE**

This variable identifies the respondent's undergraduate major. The text of this report is based on the following categorization:

Academic
- Social and behavioral sciences
- Arts and humanities
- Biological sciences
- Mathematics/physical sciences
- Other academic

Career-oriented
- Business and management
- Education
- Health
- Engineering
- Computer science

DAS Variable

Undergraduate major—continued **UGMJCODE**

Other career-oriented

The respondent's undergraduate major is also shown categorized as follows:

Science/technology/engineering/mathematics (STEM)
- Engineering
- Computer science
- Biological sciences
- Mathematics/physical sciences

Non-STEM fields
- Social and behavioral sciences
- Arts and humanities
- Other academic
- Business and management
- Education
- Health
- Other career-oriented

See Appendix B for more details

Ever unemployed from May 1994 through April 1997 **UNEM9497**

This variable identifies respondents who were unemployed (not working, but looking for work) with or without benefits for any of the months from May 1994 through April 1997. (yes/no)

Ever unemployed from BA through 2003 **UNEMALL**

This variable identifies respondents who were unemployed (not working, but looking for work) for any of the months from bachelor's degree completion through the 2003 interview. (yes/no)

Ever unemployed from BA through April 1994 **UNEMPLSP**

This variable is used to identify respondents who were unemployed (not working, but looking for work) for any of the months from bachelor's degree completion through April 1994. (yes/no)

Total number of months unemployed from BA through April 1994 **UNEMPMOS**

This variable calculates the *number of months* from bachelor's degree completion through April 1994 for which the respondent was unemployed (not working, but looking for work).

Total number of months unemployed from BA through 2003 **UNEMTOMO**

This variable calculates the *number of months* from bachelor's degree completion through the 2003 interview for which respondents were unemployed (not working, but looking for work).

DAS Variable

Total number of months unemployed from May 1994 through April 1997 **UNMO9497**

This variable calculates the *number of months* from May 1994 through April 1997 for which respondents were unemployed (not working, but looking for work), with or without benefits.

Highest degree by 1994 **YRGRDEG**

This variable identifies the year of first graduate attainment following the bachelor's degree, relative to the date of degree receipt, as of the 1997 interview. It was used to determine those graduates who completed a graduate degree within 1 year of bachelor's degree completion. Those for whom YRGRDEG indicates that they "Attained graduate degree within year 1" are treated as having completed a graduate degree by 1994.

Bachelor's degree
Any graduate degree

Appendix B—Categories for Undergraduate Major, Occupation, and Industry

This appendix lists the specific contents of the categorizations for undergraduate major, occupation, and industry used in this analysis.

Undergraduate Major Field

Academic

Social and behavioral sciences	Psychology Anthropology/Archaeology Economics Geography Sociology Political Science International Relations
Arts and humanities	Spanish Foreign Languages: non-European Foreign Languages: European, NOT Spanish Letters: English/American Literature Letters: Creative/Technical Writing Letters: all other Philosophy Religious Studies History Design Speech/Drama Film Arts Music Art History/Fine Arts Fine and Performing Arts: all other
Biological sciences	Biological Sciences: Zoology Biological Sciences: Botany Biological Sciences: Biochemistry Biophysics Biological Sciences: all other

Mathematics/physical sciences	Mathematics: Statistics Mathematics: NOT Statistics Physical Sciences: Chemistry Physical Sciences: Earth Science Physical Sciences: Physics Physical Sciences: NOT Chemistry/Physics/Earth Science
Other academic	American Civilization Area Studies African-American Studies Ethnic Studies, NOT Black/Area Studies Liberal Studies Women's Studies Interdisciplinary: Environmental Studies Interdisciplinary: Biopsychology Interdisciplinary: Integrated/General Science Interdisciplinary: all other

Career-oriented

Business and management	Accounting Finance Business/Management Systems Management/Business Administration Secretarial Business Support Marketing/Distribution
Education	Education: Early Childhood Education: Elementary Education: Secondary Education: Special Education: Physical Education: Other
Health	Allied Health: Dental/Medical Technology Allied Health: Community/Mental Health Health/Phys Ed/Recreation (HPER) Allied Health: Nurse Assisting Allied Health: General and Other Health: Audiology Health: Clinical Health Science Health: Dentistry Health: Medicine Health: Veterinary Medicine Health: Nursing Health: Health/Hospital Administration

	Health: Public Health
	Health: all other
	Health: Dietetics
Engineering	Engineering: Electrical
	Engineering: Chemical
	Engineering: Civil
	Engineering: Mechanical
	Engineering: all other
	Engineering Technology
Computer science	Computer Programming
	Data Processing
	Computer and Information Sciences
Other career-oriented	Agriculture
	Agricultural Science
	Natural Resources
	Forestry
	Architecture
	Journalism
	Communications
	Communication Technology
	Cosmetology
	Consumer/Personal Services, NOT Cosmetology
	Textiles
	Home Economics: all other
	Vocational Home Econ: Child Care/Guidance
	Vocational Home Econ: Other
	Law: Paralegal, includes pre-Law
	Law
	Library/Archival Science
	Military Sciences
	Leisure Studies
	Basic/Personal Skills
	Clinical Pastoral Care
	Protective Services
	Social Work
	Public Administration, NOT Social Work
	City Planning
	Industrial Arts: Construction
	Mechanics: Transportation
	Industrial Arts: Electronics
	Mechanics: All Other
	Commercial Art
	Precision Production
	Transportation: Air
	Transportation: Not Air

Occupation

- Educators
  - K–12 teachers
  - Instructors other than K–12
- Business workers and managers
  - Business/financial support services
  - Financial services professionals
  - Executive managers
  - Midlevel managers
  - Supervisory, office, and other administrators
- Engineers/architects
  - Engineers, architects, software/systems engineers
- Computer scientists
  - Computer systems/related professional/technical
  - Computer programmers
- Medical professionals
  - Medical practice professionals
  - Medical licensed professionals
  - Medical services
- Editors/writers/performers
  - Communication specialists
  - Performers/artists
- Human/protective services, legal professionals
  - Protective services
  - Legal professionals
  - Human services
- Researchers, scientists, technology workers
  - Scientist, statistician professionals
  - Research assistant/lab technicians
  - Technical/professional workers
  - Computer and computer equipment operators
- Administrative/clerical/legal support workers
  - Secretary/receptionist
  - Cashiers, tellers, sales clerks
  - Clerks-data entry
  - Clerical-other
  - Legal support
- Service workers
  - Personal services
  - Cooks, chefs, bakers, cake decorators
  - Sales/purchasing
  - Customer service
  - Health/recreation services

Other
- Farmers, foresters, farm laborers
- Laborers (other than farm)
- Mechanics, repairers, service technicians
- Craftsmen
- Skilled operatives
- Transport operatives (other than pilot)
- Military
- Uncodable, other employed

Industry

Professional and related services
- Professional and related services

Education *(not listed separately in 1994)*
- Education

Health care *(not listed separately in 1994)*
- Health care

Retail and wholesale trade
- Retail trade, sales and rental
- Wholesale recycling and distribution

Finance, insurance, and real estate
- Finance, insurance, and real estate

Business services
- Business services

Manufacturing
- Manufacturing-durable goods
- Manufacturing-non-durable goods

Utilities, communications, transportation
- Utilities *(not listed separately in 1994)*
- Communications *(not listed separately in 1994)*
- Transportation *(not listed separately in 1994)*

Public safety and administration
- Public administration *(not listed separately in 1994)*
- Public safety *(not listed separately in 1994)*

Personal/hospitality services, entertainment/recreation
- Personal services
- Hospitality
- Entertainment and recreation services

Agriculture, mining, oil, construction
- Agriculture, forestry, fisheries
- Mining, petroleum, drilling
- Construction and allied

Other

- Military/Department of Defense
- Uncodeable
- Other

Appendix C—Technical Notes and Methodology

The 1993/03 Baccalaureate and Beyond Longitudinal Study

The estimates and statistics in the tables and figures of this report are based on data from the first, second, and third follow-ups of the 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03). This study tracks the experiences of a cohort of college graduates who received a baccalaureate degree during the 1992–93 academic year and were first interviewed as part of the 1992–93 National Postsecondary Student Aid Study (NPSAS:93), conducted by the U.S. Department of Education's National Center for Education Statistics (NCES). NPSAS is based on a nationally representative sample of all students in postsecondary education institutions, including undergraduate, graduate, and first-professional students. For NPSAS:93, information was obtained from about 1,100 postsecondary institutions on approximately 53,000 undergraduates and about 13,000 graduate and first-professional students who were enrolled at some time between July 1, 1992, and June 30, 1993.

For B&B:93/03, those members of the NPSAS:93 sample who completed a bachelor's degree between July 1, 1992, and June 30, 1993, were identified and contacted for a 1-year follow-up interview in 1994. The second follow-up of the B&B cohort occurred in 1997, approximately 4 years after graduation. The final follow-up survey, 10 years after graduation in 2003, is the focus of this report. However, the estimates in this report are based on the approximately 8,100 bachelor's degree recipients who participated in all four surveys—the NPSAS base-year survey and the three follow-ups—representing about 1.2 million bachelor's degree recipients (U.S. Department of Education 2002, table 247).

The NPSAS:93 sample, while representative and statistically accurate, was not a simple random sample. Instead, the survey sample was selected using a more complex three-step procedure with stratified samples and differential probabilities of selection at each level. Postsecondary institutions were initially selected within geographic strata. Once institutions were organized by zip code and state, they were further stratified by control (i.e., public, private not-for-profit, or private for-profit) and degree offering (less-than-2-year, 2- to 3-year, 4-year nondoctorate-granting, and 4-year doctorate-granting). The NPSAS:93 survey sample yielded an overall weighted institutional response rate of 88 percent. For more information about the

NPSAS:93 survey, refer to the *Methodology Report for the National Postsecondary Student Aid Study, 1992–93* (Loft et al. 1995).

For the first follow-up B&B interview in 1994, a total of about 10,100 eligible individuals completed the interview between June and December—using computer-assisted telephone interviewing (CATI), with field interviewing when necessary—which corresponds to a weighted response rate of 90 percent (from the NPSAS:93-identified B&B eligible sample of about 11,000 cases). Data collection for the second follow-up interview of the B&B cohort took place between April and December 1997; about 10,100 individuals completed the interview, yielding a weighted response rate of 90 percent. For more information on procedures for the first and second follow-ups, consult the respective methodology reports (Green et al. [1996] for the first follow-up and Green et al. [1999] for the second follow-up).

Between February and September 2003, the third and final follow-up of the 1992–93 cohort of bachelor's degree recipients was conducted. For the first time, students were offered the opportunity to conduct the B&B interview via the Internet. A single web-based interview was designed and programmed for use as a self-administered interview, a telephone interview, or an in person interview. All respondents to the 1997 interview were included for participation in the 2003 follow-up; a subsample of about one-third of nonrespondents from 1997 was also included, resulting in a final sample of about 10,400 individuals. Almost 9,000 members of this final sample responded, yielding a weighted response rate of 83 percent. For more details about the third follow-up survey procedures, consult the *1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03) Methodology Report* (Wine et al. 2006).

Except for having all graduated in the same academic year, the 1992–93 graduate cohort members were diverse in all other aspects. The B&B dataset contains comprehensive data on post-baccalaureate graduate enrollment, attainment, student demographic characteristics, and labor force participation and finances.

Weighting

All estimates in this report are weighted to compensate for unequal probability of selection into the survey sample and to adjust for nonresponse. The specific weight variable used in this report is WTC00, which was constructed as the panel weight for analyzing those students who responded to all four surveys: NPSAS:93 and the 1994, 1997, and 2003 B&B follow-up interviews. For more information on weighting, consult chapter 6, "Weighting and Variance Estimation," of the B&B:93/03 methodology report (Wine et al. 2006).

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 based 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. Readers interested in efforts to minimize nonsampling errors for estimates used in this report should consult the methodology reports referenced earlier in this appendix.

Overall Response Rates

As discussed earlier in this appendix, the weighted institution response rate for NPSAS:93 was 88 percent. A student respondent is defined as any sample member who is determined to be eligible for the study and has valid data for the selected set of analytical variables. The weighted student response rate was 90 percent for both the first (in 1994) and second (in 1997) follow-up B&B interviews and 83 percent for the final B&B follow-up interview (in 2003).[1] To investigate possible extent of nonresponse bias for the 2003 interview, a nonresponse bias analysis was conducted as a part of the nonresponse adjustment for the analysis weight.

Student-Level Nonresponse Bias Analysis

Possible nonresponse bias in the 2003 data was estimated for the variables known for both respondents and nonrespondents within each institution type. These variables included the following:

- Age in the base year (NPSAS:93),
- Race/ethnicity,
- Gender,
- U.S. citizenship status,
- Attendance status in the base year,
- Institution control,

[1] The unweighted response rate for the 2003 interview was 86 percent.

- Bureau of Economic Analysis Code (OBE) Region,
- Type of institution/enrollment category,
- B&B institution stratum,
- B&B student stratum,
- Whether applied for aid in the base year,
- Receipt of federal aid in the base year,
- Receipt of Pell Grant in the base year,
- Receipt of Stafford Loan in the base year,
- Receipt of state aid in the base year,
- Receipt of institution aid in the base year,
- Receipt of any aid in the base year,
- Prior respondent to either 1994 or 1997 interview,
- Income in the base year (parent income for dependent students and student income for independent students),
- Number of telephone numbers available during B&B:93/03 data collection,
- Number of times an answering machine was encountered during B&B:93/03, and
- Whether the student was located in a field cluster for B&B:93/03.

The steps for nonresponse bias analysis included estimating the nonresponse bias for each category of each of the variables above, a total of 107 categories, and testing to determine whether the bias is significant at the 5 percent level. Second, nonresponse adjustment factors were computed using a subset of variables listed above. The nonresponse adjustments were designed to significantly reduce or eliminate nonresponse bias for variables included in the corresponding models. Third, after the weights were computed, any remaining bias was estimated for the variables listed above and statistical tests were performed to determine the significance of any remaining nonresponse bias.

The weighting adjustments reduced, and in some cases eliminated, bias for students. Prior to the nonresponse weighting adjustment, the response bias was statistically significantly different from zero for 21 percent of the estimates;[2] the mean of the absolute values of the biases was 0.40 and the median was 0.20. After the nonresponse weighting adjustment, none of the biases were significantly different from zero; the mean of the absolute values of the biases was 0.01 and median was 0.002.

[2] Variables for which at least one category showed statistically significant bias before adjustment included race/ethnicity, U.S. citizenship, institution control, institution region, application for aid, receipt of institutional aid, receipt of any aid, prior respondent status, number of telephone numbers available, number of times an answering machine answered, and whether the respondent was in a field cluster (Wine et al. 2006, table 35). For more details, consult section 6.3 (Accuracy of Estimates) of the B&B:93/03 methodology report (Wine et al. 2006).

Item-Level Response Rates

Weighted item response rates were calculated for all the variables used in this report by dividing the weighted number of valid responses by the weighted population for which the item was applicable. All the variables used in this report and defined in appendix A had item response rates above 90 percent (ranging from a low of 91.9 percent to 100 percent response). Therefore, a bias analysis for individual survey items was not necessary.

Data Analysis System

All analyses included in PEDAR reports must be based on the Data Analysis System (DAS), which is available to the public online. The estimates presented in this report were produced using version 2.0 of the B&B:93/03 DAS, which combines data from the 1994, 1997, and 2003 interviews with the 1993 base year interview data. The DAS also contains a description of how each variable was created and includes question wording for items coming directly from an interview. The DAS software provides readers direct access to the findings and methods used in the report so that they may replicate or expand on the estimates presented. However, the DAS does not allow users access to the raw data.

With the DAS, users can replicate or expand upon the tables presented in this report. In addition to the table estimates, the DAS calculates the proper standard errors[3] and weighted sample sizes for these estimates. For example, table C-1 contains standard errors that correspond to estimates in table 1 in the report. 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 2.0 also includes a correlation matrix module, which allows for the specification of selected multivariate models, including a weighted least squares (WLS) regression option. This module of the DAS permits estimation of multivariate models and calculates standard errors that take into account the complex sample design of B&B:93/03. The WLS regression function was used in this report for the multivariate commonality analysis results shown in table 13 (see the section on Multivariate Commonality Analysis below).

[3] The B&B samples are not simple random samples, 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 involves approximating the estimator by balanced repeated replication of the sampled population. The procedure is typically referred to as the "balanced repeated replication technique" (BRR).

Table C-1. Standard errors for table 1: By gender, percentage distribution (in columns) of 1992–93 bachelor's degree recipients' undergraduate major

Undergraduate major	Total	Male	Female
Total	†	†	†
Academic	0.94	1.23	0.98
Social and behavioral sciences	0.62	0.90	0.76
Arts and humanities	0.51	0.61	0.64
Biological sciences	0.26	0.46	0.36
Mathematics/physical sciences	0.22	0.42	0.33
Other academic	0.31	0.40	0.41
Career-oriented	0.94	1.23	0.98
Business and management	0.75	1.13	0.91
Education	0.52	0.54	0.88
Health	0.51	0.43	0.73
Engineering	0.49	0.87	0.26
Computer science	0.20	0.36	0.18
Other career-oriented	0.46	0.70	0.60

† Not applicable.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993/03 Baccalaureate and Beyond Longitudinal Study (B&B:93/03).

The DAS can be accessed electronically at http://nces.ed.gov/das. For more information about the Data Analysis System, contact:

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Statistical Procedures

Differences Between Means

The descriptive comparisons in this report were tested using Student's *t* statistic. Differences between estimates are tested against the probability of a Type I error[4] or significance

[4] 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 difference is present.

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 ($p < .05$).

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

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

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:

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

where *r* is the correlation between the two estimates.[5] 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:

$$t = \frac{E_{sub} - E_{tot}}{\sqrt{se_{sub}^2 + se_{tot}^2 - 2p\, se_{sub}^2}} \tag{3}$$

where *p* is the proportion of the total group contained in the subgroup.[6] The estimates, standard errors, and correlations can all be obtained from the DAS.

There are some hazards in using 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 respondents in the specific categories used for comparison. Hence, a small difference compared across a large number of respondents would produce a large *t* statistic.

A second hazard in using statistical tests is the possibility of a "false positive" or Type I error. In the case of a *t* statistic, this false positive would result when a difference measured with a particular sample showed a statistically significant difference when there is no difference in the

[5] U.S. Department of Education, National Center for Education Statistics, *A Note from the Chief Statistician, no. 2*, 1993.
[6] Ibid.

underlying population. Statistical tests are designed to control for this type of error, denoted by alpha. The alpha level of .05 selected for findings in this report indicates that a difference of a certain magnitude or larger would be produced no more than one time out of 20 when there was no actual difference in the quantities in the underlying population. When researchers test hypotheses that show *t* values below the .05 significance level, they treat this finding as rejecting the null hypothesis that there is no difference between the two quantities. Failing to reject the null hypothesis (i.e., finding no difference), however, does not necessarily imply that the values are the same or equivalent.

Multivariate Commonality Analysis

There are many ways for members of the public and other researchers to make use of NCES results. The most popular way is to read the written reports. Other ways include obtaining and analyzing public use and restricted use data files, which allow researchers to carry out and publish their own secondary analyses of NCES data.

It is very important when reading NCES reports to remember that they are descriptive in nature. That is, they are limited to describing some aspect of the condition of education. These results are usefully viewed as suggesting various ideas to be examined further in light of other data, including state and local data, and in the context of the extensive research literature elaborating on the many factors predicting and contributing to educational achievement or to other outcome variables of interest.

However, some readers are tempted to make unwarranted causal inferences from simple cross tabulations. It is never the case that a simple cross tabulation of any variable with a measure of educational achievement is conclusive proof that differences in that variable are a cause of differential educational achievement or that differences in that variable explain any other outcome variable. The old adage that "correlation is not causation" is a wise precaution to keep in mind when considering the results of NCES reports. Experienced researchers are aware of the design limitations of many NCES data collections. They routinely formulate multiple hypotheses that take these limitations into account, and readers of this volume are encouraged to do likewise. As part of the Institute of Education Sciences, NCES has a responsibility to try to discourage misleading inferences from the data presented and to educate the public on the genuine difficulty of making valid causal inferences in a field as complex as education. Our reports are carefully worded to achieve this end.

This focus on description, eschewing causal analysis, extends to multivariate analyses as well as bivariate ones. Some NCES reports go beyond presenting simple cross tabulations and

present results from multiple regression equations that include many different independent ("predictor") variables. This can be useful to readers, especially those without the time or training to access the data themselves. Because many of the independent variables included in descriptive reports are related to each other and to the outcome they are predicting, a multivariate approach can help users to understand their interrelation. For example, graduates' undergraduate major and occupation are associated with each other and are both predictors of salary. What happens to the relationship between graduates' major and salary when occupational differences are accounted for? Such a question cannot be answered using bivariate techniques alone.

One way to answer the question is to create three variable tabulations, a method sometimes used in NCES reports. When the number of independent variables increases to four or more, however, the number of cases in individual cells of such a table often becomes too small to find significant differences simply because there are too few cases to achieve statistical significance. To make economical use of the many available independent variables in the same data display, other statistical methods must be used that can take multiple independent variables into account simultaneously.

Multiple linear regression is often used for this purpose: to adjust for the common variation among a list of independent variables. This approach is sometimes referred to as "commonality analysis,"[7] because it identifies lingering relationships after adjustment for "common" variation. This method is used simply to confirm statistically significant associations observed in the bivariate analysis, while taking into account the interrelationship of the independent variables.

Thus, this multiple regression approach is descriptive. Significant coefficients reported in the regression tables indicate that when the variable is deleted from (or added to) the set of independent variables, it results in a nonzero change in R-squared, which is the basis of the commonality analysis. In other words, a significant coefficient means that the independent variable has a relationship with the outcome variable that is unique, or distinct from its relationship with other independent variables in the model.

Multivariate description of this sort is distinct from both a modeling approach in which an analyst attempts to identify the smallest relevant set of causal or explanatory independent variables associated with the dependent variable or variables and an approach using one of the many varieties of structural equation modeling. In contrast, a multivariate descriptive or commonality approach provides a richer understanding of the data without needing to make any kind of causal assumptions, which is why descriptive multivariate commonality analysis is often used in NCES statistical reports. The commonality analyses discussed in this report use the

[7] For more information about commonality analysis, see Pedhazur (1997).

Weighted Least Squares (WLS) estimation method. WLS regression weights cases differentially. The size of the weight indicates the precision of the information contained in the associated observation. The weights determine the contribution of each observation to the final parameter estimates and standard errors.

When should commonality analysis be employed? It should be used in statistical analysis reports when independent variables are correlated with both the outcome variable and with each other. This will allow the analyst to determine how much of the effect of one independent variable is due to the influence of other independent variables, because in a multiple regression procedure these effects are adjusted for. For example, because the strength of the statistical relationship between undergraduate major and salary may be affected by occupation, computing a multiple regression equation that contains both variables allows the analyst to determine how much, if any, difference in salary between majors is due to differences in occupation.

Missing Data

The DAS estimates the WLS regression using listwise deletion of missing values. In regression analysis, there are several common approaches to the problem of missing data. The two simplest approaches are pairwise deletion of missing data and listwise deletion of missing data. In pairwise deletion, each correlation is calculated using all of the cases for the two relevant variables. In listwise deletion, for an observation to be included in the regression analysis, all independent variables and dependent variable must be reported for that case. Otherwise, it is excluded from the analysis. This deletion method can result in a low number of observations if a large number of variables are used or variables with large numbers of missing observations are used. In this report, the listwise deletion process for the regression resulted in the exclusion of about 14 percent of the cases (both weighted and unweighted); the weighted sample size of graduates employed full time in one job in 2003 (the sample used in the regressions) was about 700,900 (out of a total weighted number of graduates employed full time in one job in 2003 of 816,600).

Interpreting the Results

The least squares regression coefficients displayed in the regression tables in this report are expressed in dollars. Significant coefficients represent the observed differences that remain between the analysis group and the comparison group after controlling for the relationships of all selected independent variables. For example, in table 13, the least squares coefficient for men is $15,362. This means that men who were employed full time in 2003 earned over $15,000 more

than their female counterparts after controlling for the relationships among all other independent variables.