

Students Entering and Leaving Postsecondary Occupational Education: 1995-2001

U.S. Department of Education
NCES 2007-041

Statistical Analysis Report





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CAREER/TECHNICAL
EDUCATION STATISTICS



U.S. Department of Education
NCES 2007-041

March 2007

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Suggested Citation

Hudson, L., Kienzl, G., and Diehl, J. (2007). *Students Entering and Leaving Postsecondary Occupational Education: 1995-2001* (NCES 2007-041). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

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Executive Summary

This report examines the issues of occupational student enrollment, persistence, attainment, and labor market outcomes for a cohort of first-time, credential-seeking postsecondary students. Occupational students are defined here as subbaccalaureate students (i.e., students seeking associate's degrees or certificates) in occupational (rather than academic) fields of study.¹ The report's focus on these students derives from a congressional mandate for NCES to report information on career/technical education, which is defined as occupationally oriented education at the subbaccalaureate level. (The mandate and definition are in the 2006 Carl D. Perkins Career and Technical Education Improvement Act, P.L. 109-270.) Specifically, the report examines three broad issues concerning occupational education that are key indicators of the status of occupational education and are emphasized in the Perkins Act:

- Who enters postsecondary occupational education?
- To what extent do occupational students persist in postsecondary education and to what extent do they complete their credential goals (i.e., earning a postsecondary certificate or degree)?
- What are the labor market outcomes for postsecondary occupational students who earn credentials?

Of specific interest in this report is the extent to which occupational students differ from baccalaureate students and from academic subbaccalaureate students in terms of the questions listed above. However, since occupational students are more likely than academic subbaccalaureate students to seek certificates, the report also examines the extent to which

¹ Occupational fields of study (referred to as career fields of study at the baccalaureate level) are those that focus on occupation-specific skills and knowledge: agriculture and natural resources; business and marketing; communications and design; computer sciences; education; engineering and architectural sciences; health care; personal and consumer services; public, social, and human services; and trade and industry. Academic fields of study are typically more theoretical and decontextualized (from a labor market perspective). These fields of study are fine and performing arts, humanities, mathematics, science, and social sciences. See exhibit 1.1 in the report for more detail on the subjects included in each field of study.

occupational and academic associate's degree seekers do not differ from each other, but do differ from occupational certificate seekers.

The data used in this report are from the Beginning Postsecondary Students Longitudinal Study (BPS), including the 1995–96 base-year survey and its two follow-up surveys in 1997–98 and 2000–01 (BPS:96/01). The base-year BPS surveyed a nationally representative sample of all beginning postsecondary students in academic year 1995–96. For this report, this sample was restricted by excluding (1) students who had not previously attained a high school diploma or its equivalent, and (2) students who did not expect to earn a postsecondary credential (certificate or degree) at their first postsecondary institution. These restrictions reduced the size of the base-year BPS:96 sample for this analysis from 12,080 to 9,221 first-time credential-seeking students. The sample was further restricted by the use of sampling weights, which were available for 7,274 of the 9,221 students.

The report presents mainly simple bivariate comparisons of estimates among different groups of students. These comparisons were tested using Student's *t* statistic, at the .05 level of significance. The analysis of students' labor market outcomes also includes a series of regression analyses, using both logistic regression (to predict dichotomous outcome variables) and semi-log regression (to predict a continuous outcome variable with a skewed distribution).

Who Enters Occupational Education

The first section of the report focuses on the characteristics of students who enter occupational education. The characteristics of these students are important not just to describe occupational students, but also to provide a context in which to interpret their educational progress and outcomes. This section examines students with different educational intentions as of 1995–96. Three groups of subbaccalaureate students are compared—those intending to earn

- occupational certificates;
- occupational associate’s degrees; and
- academic associate’s degrees.²

The main question addressed in this section is:

Who are the students who enter occupational education programs and how do they compare to other students in postsecondary education?

Beginning occupational students (combining those seeking either a certificate or an associate’s degree) in 1995–96 were predominantly female (57 percent), with 16 percent being Black and 9 percent Hispanic. Their average age was 24. Ten percent had parents who had not completed high school, 46 percent had parents who had completed high school, and 44 percent had parents with a college degree. Over half (56 percent) delayed their enrollment into postsecondary education (entering one or more years after high school completion), 60 percent enrolled full time, and 45 percent worked while enrolled.

Occupational subbaccalaureate students were more likely than academic subbaccalaureate students to be female and to be Black. Occupational subbaccalaureate students were also more likely than academic subbaccalaureate students to have completed high school with a General Educational Development (GED) credential and to have parents with lower educational backgrounds. Occupational students were also older and more likely to have delayed their enrollment than were academic subbaccalaureate students. Although no differences were detected in these students’ tendency to enroll full time or to work while enrolled, occupational students were more likely than their academic peers to self-identify as “enrolled employees” rather than “working students.” Occupational students also had higher tuition costs than academic subbaccalaureate students and were more likely than their academic peers to enroll in for-profit institutions.

² The body of the report also compares baccalaureate and subbaccalaureate students. Baccalaureate students differed from occupational subbaccalaureate students on every measure examined except race/ethnicity.

On some characteristics, these differences between occupational and academic subbaccalaureate students disappear when one compares only students who are seeking an associate's degree (rather than those seeking a certificate). For other characteristics, both occupational certificate and associate's degree seekers are different from academic associate's degree seekers. Even on these characteristics, however, occupational certificate students often stand out in that they have different backgrounds from both academic and occupational associate's degree seekers.

More specifically, occupational and academic associate's degree seekers differ only in terms of the percentage who are Black, the type of institution attended, tuition costs, whether they delay enrollment, and whether they view themselves as "enrolled employees." Occupational certificate students, in comparison, differ from academic associate's degree seekers on the measures listed immediately above as well as age, sex, educational background, parents' educational background, family socioeconomic status (SES), full-time enrollment, full-time work status, and whether they view themselves as "working students." They also differ from occupational associate's degree seekers on all of these measures except sex, family SES, full-time enrollment, and full-time work status. Thus, the overall differences in student background between subbaccalaureate occupational and academic students (i.e., age, sex, educational background, parents' educational background) largely reflect differences in the background of occupational certificate students versus the two groups of associate's degree seekers. (The proportion of students who are Black is the notable exception.) In comparison, only one of the enrollment characteristics examined here (i.e., percent who consider themselves "working students") reflects differences in occupational certificate students' enrollment patterns. Other enrollment differences—the type of institution attended, tuition costs, delayed enrollment, and whether students consider themselves "enrolled employees"—reflect differences among both occupational certificate and associate's degree seeking students as compared to academic associate's degree seekers, although occupational certificate students tend to be the outliers on these measures as well.

Student Persistence and Completion

Obtaining a postsecondary credential and persisting toward a credential are important educational outcomes and are examined in the second section of the report. This section addresses the following questions:

To what extent do occupational students persist in and complete postsecondary education over a 6-year time period? How do their persistence and completion rates compare to other postsecondary students?

As of 2001, 60 percent of 1995–96 beginning students who intended to earn a subbaccalaureate credential in occupational areas had earned a postsecondary credential or were still enrolled in school. Forty-eight percent of these credential seekers had earned a credential.

Although occupational students had a lower persistence and attainment rate than baccalaureate students, this appears to be a general subbaccalaureate versus baccalaureate difference; both occupational and academic subbaccalaureate students persist or attain at lower rates than their baccalaureate peers but are not measurably different from each other. The same pattern is found when looking at only credential attainment. However, these findings mask one important difference among the subbaccalaureate groups: Occupational associate’s degree seeking students are more likely than their academic counterparts to “downgrade” their credential when they attain one—that is, to get a certificate rather than a degree. This downgrading is one reason academic associate’s degree seekers are more likely than their occupational counterparts to obtain at least an associate’s degree; another reason for this attainment difference is that academic associate’s degree seekers switch to occupational associate’s degrees at a relatively high rate. Finally, occupational certificate students fare better than occupational associate’s degree seekers, as they are more likely than both groups of associate’s degree seekers to earn a credential over a 6-year period.

To what extent do occupational students meet or exceed their initial credential expectations? How do they compare to other postsecondary students on this measure of success? When students do not attain their intended credential, what do they do instead?

Most occupational students who earned a credential met or exceeded their initial credential goal. However, these students do not fare as well as baccalaureate students on this measure. Occupational students are not only less likely than baccalaureate students to attain a credential within 6 years of initial enrollment, but even among those who do attain a credential, occupational credential seekers are less likely than their baccalaureate counterparts to meet or exceed their initial credential goal, as 80 percent of the former met or exceeded their initial goal, compared to 93 percent of the latter. Occupational students compare more favorably to academic subbaccalaureate students. Just as no differences were detected in the percentage of occupational and academic subbaccalaureate students who attained a credential, there were also no differences detected in the rates at which these students met or exceeded their credential goal when they did earn a credential. However, occupational associate's degree seekers were less likely than academic associate's degree seekers to meet or exceed their credential goal when they earned a credential.

Occupational certificate students who started in 1995–96 and did not attain a certificate by 2001 were more likely to drop out of school than to remain in school until 2001. Among associate's degree seekers who did not meet their initial credential goal, academic students were more likely than their occupational peers to switch their area of study (into occupational education), while occupational students were more likely to downgrade to a certificate.

Why do occupational students leave postsecondary education without attaining a credential? Do their reasons for leaving differ from those of other postsecondary students?

The most common reason for leaving without a credential given by the 40 percent of occupational students who had done so by 2001 was job or financial demands, followed by family demands and moving to another city or state. At least the first two of these reasons for

leaving could also motivate students to switch to a shorter educational program (downgrade), as well as to leave school.

Compared to baccalaureate students, both academic and occupational subbaccalaureate students are more likely to report leaving for a variety of reasons, including job or financial demands, family demands, moving, and having taken the classes they desire (even though all of these students had originally said they were seeking a credential).³ In contrast, occupational and academic subbaccalaureate students report leaving school for similar reasons, although academic subbaccalaureate students are less likely to report leaving due to dissatisfaction or academic problems than are occupational students. Finally, occupational certificate students are less likely than other subbaccalaureate students to report leaving due to job or financial demands.

What is the distribution of credentials attained by beginning postsecondary students? What percentage earned occupational credentials?

Among the 55 percent of 1995–96 beginning credential-seeking students who obtained a credential by 2001, 37 percent earned an occupational credential, with 21 percent earning an occupational certificate and 18 percent earning an occupational associate’s degree (2 percent earned both). Academic subbaccalaureate credentials were less common, with 7 percent of completers earning these credentials. Occupational fields were also relatively common among those earning baccalaureate degrees; 35 percent of all completers earned baccalaureate degrees in career fields (equivalent to occupational fields at the subbaccalaureate level) compared to 25 percent who earned academic baccalaureate degrees.

Labor Market Outcomes

Ultimately, postsecondary occupational education is expected to provide labor market benefits for the students who complete such an education. Thus, the final section of the report compares the labor market outcomes of students who earned occupational credentials to those who were seeking such credentials but had not earned them as of 2001. Two types of analyses

³ Only occupational subbaccalaureate students differed from baccalaureate students on this last measure.

were done in this section—the first was a simple bivariate comparison of student groups (as in the rest of the report), and the second was regression analysis. The regression analysis tests whether earning an occupational credential or years of postsecondary education completed are related to selected labor market outcomes (employment rate, full-time employment among labor force members, and workers' salaries) after controlling for a number of student background characteristics. Using students' self-reports of their labor force status in 2001, this section answers the following questions:

To what extent do occupational program completers participate in the labor market and to what extent are they employed? How do occupational completers compare to noncompleters on these employment characteristics? How do occupational associate's degree completers compare to certificate completers?

Labor force participation rate. The labor force participation rate was 94 percent for occupational certificate completers and 93 percent for occupational associate's degree completers. No measurable differences were found between occupational certificate completers and noncompleters, between occupational associate's degree completers and noncompleters, or between occupational certificate and associate's degree completers in the percentage of students who were in the labor force in 2001.

Employment rate. Overall, 87 percent of both occupational certificate completers and occupational associate's degree completers were employed in 2001. No measurable difference was found in the employment rates of associate's degree completers and noncompleters, but occupational certificate completers had a higher rate of employment than did noncompleters. This difference was not found in the regression analysis, however, suggesting that the difference in employment rates is associated with student background differences that are controlled for in the regression, rather than with the attainment of an occupational certificate.

Full-time employment. Seventy-three percent of occupational certificate completers and 79 percent of occupational associate's degree completers worked full time in 2001. Employed occupational certificate completers were less likely than employed occupational associate's

degree completers to work full time (84 versus 91 percent, respectively). It is unclear, however, whether this difference is unique to program completers, as a difference of similar size—although not statistically significant—was detected among occupational certificate and associate’s degree noncompleters. For both occupational certificate and occupational associate’s degree students, completers were not found to differ from noncompleters in their likelihood of working full time. This was true both among occupational students overall and among those who were employed. Similarly, in the regression analysis, no relationship was found between either credential attainment or years of education and the outcome of full-time employment (among workers).

Unemployment rate. The unemployment rate for both groups of occupational program completers was 7 percent. No measurable differences were found in the employment rate for any of the student groups (certificate versus associate’s degree completers, and completers versus noncompleters at each credential level).

To what extent are occupational program completers employed in jobs related to their field of study? Are occupational completers more likely to have related jobs than are noncompleters? How do occupational associate’s degree completers and occupational certificate completers compare on this measure?

Most occupational completers who worked (70 percent) reported that they were employed in a job related to their field of study. Occupational associate’s degree completers were more likely than occupational associate’s degree noncompleters to work in a job related to their field of study (75 versus 43 percent, respectively). Although 68 percent of occupational certificate completers worked in a job related to their field of study, compared to 58 percent of occupational certificate noncompleters, this difference was not statistically significant, possibly due to the relatively large standard error for occupational certificate noncompleters.

What is the average salary earned by occupational program completers, and how does this compare to the salary earned by noncompleters? Do occupational associate's degree completers earn a higher salary than certificate completers?

The average 2001 salary reported by occupational certificate completers was \$25,900, lower than the average salary reported by occupational associate's degree completers, at \$30,100. However, at least some of this difference appears to be due to the higher rate of full-time employment among associate's degree completers. Among full-time workers, there is no measurable difference in the 2001 salaries of these groups.

Credential completion was not found to be related to salary levels, in either the bivariate analysis or a regression analysis that predicted salary from a number of variables, including students' completion status and their years of education. However, the regression analysis did find an interaction effect between years of education and the relatedness of the student's job to his or her education. The interaction revealed that average salary increased with years of education—but only among students who were employed in a job that was related to their education. These findings for credential attainment and years of education suggest a relationship between skill development (rather than credential attainment per se) and labor market outcomes.

Foreword

In 1987, the National Center for Education Statistics (NCES) instituted a new approach to collecting and reporting data on career/technical education (CTE). Under the new approach, CTE data are collected primarily through general-purpose surveys rather than separate questionnaires or studies on CTE. Separate reports on CTE issues are also produced. This data collection and reporting system constitutes the NCES Career/Technical Education Statistics (CTES) program.

To collect information on student participation in career/technical (or occupational) education at the postsecondary level, the CTES system relies primarily on three NCES data sources: The Integrated Postsecondary Education Data System (IPEDS), National Postsecondary Student Aid Study (NPSAS), and Beginning Postsecondary Students Longitudinal Study (BPS; drawn from NPSAS samples in the base year). Unlike the cross-sectional IPEDS and NPSAS data collections, the longitudinal BPS allows for an examination of student persistence and completion, as well as of labor market outcomes among those students who have left postsecondary education. This report is based on the BPS:96/01 survey, which tracks students who entered postsecondary education for the first time in 1995–96 through the year 2001.

Information on the NCES CTES program and publications may be found at the following website: <http://nces.ed.gov/surveys/ctes>. Your comments about NCES CTES publications are welcome and may be sent to Lisa Hudson, NCES, 1990 K Street, NW, Suite 900, Washington, DC 20006 or lisa.hudson@ed.gov.

Acknowledgments

This report benefited from the contributions of many people. Two individuals previously at Education Statistics Services Institute, David Hurst and Sally Aquilino, helped lay the foundation for the report. The DOVE Technical Review Panel provided helpful ideas and input as the report progressed. The text of the report was improved by constructive reviews from Shelley Burns, Jim Griffith, John Ralph, and Val Plisko of NCES, as well as Duc-Le To from the Institute of Education Sciences; Andrew Abrams, Ricardo Hernandez, and Wade Smith from the Office of Vocational and Adult Education; Kevin Bromer, Akemi Kinukawa, Stephen Mistler, Aparna Sundaram, Jared Tank, and Xiaolie Wong of the American Institutes for Research, and two anonymous reviewers. Bruce Taylor of NCES and Vince Iannacchione of RTI also provided valuable methodological input. Joanna Bujard of Kforce Government Solutions assisted with the editing, formatting, and production of the report.

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Chapter 1: Introduction

Changes in the workplace continue to increase pressure on the American educational system to prepare students for skilled occupations. Much of this preparation takes place in career/technical education, also known as occupational education, in less-than-4-year (subbaccalaureate) postsecondary institutions. This sector of education is also of interest because the National Center for Education Statistics (NCES) has a congressional mandate within the 2006 Carl D. Perkins Career and Technical Education Improvement Act (P.L. 109-270, Section 114(a)(3)) to report information on career/technical education, including subbaccalaureate occupationally oriented education.¹

One of the objectives of postsecondary occupational education is to provide students with the requisite skills for employment in a specific field or career area. One would expect employers to reward labor market participants for having the requisite skills (or set of skills) by preferentially hiring these skilled workers and by offering them relatively high wages. In turn, students are expected to respond positively to these incentives by enrolling in and completing the degree programs sought by employers. This report uses data from a recent longitudinal survey of postsecondary students to examine these issues of occupational student enrollment, persistence, attainment, and labor market outcomes.

As discussed in later chapters, a few studies have examined this occupational sector of postsecondary education in some detail. These analyses tend to be relatively infrequent, however, in part because data with occupational student samples large enough to permit detailed analysis are rare. The richest available source of national data on this population of students is the NCES Beginning Postsecondary Students Longitudinal Study (BPS; discussed in more detail

¹ Although one can consider 4-year programs in applied fields such as engineering and education as occupational education, the 2006 Perkins Act (Section 3(5)(A)(ii)) defines career/technical education as subbaccalaureate education. This report uses the federal definition; thus, the term *occupational education* refers to subbaccalaureate education and *occupational students* include only subbaccalaureate students (i.e., students seeking credentials below the baccalaureate level).

below). The BPS is used in this report to examine three broad issues that are key indicators of the status of occupational education and are emphasized in the Perkins Act:

- Who enters postsecondary occupational education?
- To what extent do occupational students persist in postsecondary education and to what extent do they complete their credential goals (i.e., earning a postsecondary certificate or degree)?
- What are the labor market and economic outcomes for postsecondary occupational students who earn credentials?

Of specific interest in this report is the extent to which occupational students differ from baccalaureate students and from academic subbaccalaureate students in terms of the questions listed above. However, since occupational students are (as seen later in the report) more likely than academic subbaccalaureate students to seek certificates, the report also examines the extent to which occupational and academic associate's degree seekers are similar to and different from occupational certificate seekers. Thus, although the data tables include a broad range of postsecondary students, the text of the report focuses on a limited set of comparisons. The next section of this chapter describes the data source and analytic student groups in more detail.

Data Source and Terminology

The data used in this report are from the Beginning Postsecondary Students Longitudinal Study, including the 1995–96 base-year survey and its two follow-up surveys in 1997–98 and 2000–01 (BPS:96/01). The base-year BPS includes the students who participated in the 1995–96 National Postsecondary Student Aid Study (NPSAS:96) and who were enrolled in postsecondary education for the first time in 1995–96. The BPS:96/01 students are a nationally representative sample of all beginning postsecondary students in academic year 1995–96, including older students and students attending less-than-2-year, 2-year, and 4-year institutions. Additional details on the data are provided in appendix A and in the BPS:96/01 methodology report (Wine et al. 2002).

The sample of beginning postsecondary students examined in this report is a subset of the full BPS:96/01 sample. To provide a relatively clean definition of postsecondary students, first-time students who had not previously attained a high school diploma or its equivalent, such as a General Educational Development (GED) certificate, are excluded from the analysis. In addition, students who did not expect to either transfer to another postsecondary institution or earn a postsecondary credential (certificate or degree) at their first institution, did not know which credential they expected to earn, or did not provide a response to this question about their intentions are also omitted. These restrictions reduced the size of the base-year BPS:96 sample for this analysis by 24 percent, from 12,080 first-time postsecondary students to 9,221 first-time credential-seeking students.² The sample was further restricted by the use of sampling weights, which were available for 7,274 of the 9,221 first-time credential-seeking students. (Sampling weights were not available for students who did not respond to the BPS:2001 follow-up.)

A few terms are used in this report to indicate students' educational goals and outcomes in ways that may differ from common usage. First, students' *areas of study* are classified as occupational, career, or academic, based on students' reported major at their initial postsecondary institution. Second, *credential goal* is used to refer to students' reported educational intentions at the institution in which they first enrolled. Finally, *earned credential* (or just *credential*) refers to the highest undergraduate credential (certificate, associate's degree, or bachelor's degree) earned by students as of 2000–01. These terms are defined in more detail below.³

Area of study. For students with declared majors, areas of study are divided into *occupational education*, *career education*, and *academic education* based on students' self-reported major in 1995–96. As indicated in exhibit 1.1, occupational and career education encompass the same applied education programs (e.g., business, engineering, and education), but occupational education is the term used to define these programs at the subbaccalaureate level,

² About 17 percent of students were lost due to missing responses on the question about credential goals (including refusals and “don't know” responses); about 6 percent were lost because they reported that they had no credential goal, and the remainder (about 1 percent) were lost because they did not have a high school diploma or equivalent.

³ Appendix A provides additional detail on how these and all other variables in this report were defined.

**Exhibit 1.1. Categorization of Beginning Postsecondary Students Longitudinal Study
(BPS:96/01) student majors, by area of study**

Academic Education	Occupational/Career Education	
Fine and Performing Arts	Agriculture and Natural Resources	Health Care
Art history/fine art	Agriculture	Audiology
Film arts	Agricultural science	Clinical health
Music	Forestry	Community/mental health
Speech/drama	Natural resources	Dental and medical technology
Humanities	Business and Marketing	Dentistry
Letters	Accounting	Dietetics
Philosophy	Business support	Health/hospital administration
Religious studies	Business/management systems	Medicine
Spanish	Finance	Nurse assisting
Other foreign languages	Management/business administration	Nursing
Interdisciplinary studies	Secretarial	Public health
Liberal studies	Marketing/distribution	Veterinary medicine
Mathematics	Communications and Design	All other health
Science	Commercial art	Personal and Consumer Services
Chemistry	Design	Child care
Life sciences	Communications	Cosmetology
Physics	Communications technology	Home economics
Other science	Journalism	Leisure studies/parks
Social Sciences	Computer Sciences	Textiles
American civilization	Computer/information sciences	Other consumer services
Anthropology/archeology	Computer programming	Public, Social and Human Services
Area studies	Data processing technology	Clinical pastoral care
Economics	Education	Law and paralegal
Ethnic studies	Early childhood education	Library/archival sciences
Geography	Elementary education	Military sciences
History	Secondary education	Protective services
International relations	Special education	Public administration
Political science	Other education	Trade and Industry
Psychology	Engineering & Architectural Science	Construction
Sociology	Architecture	Electronics
Women's studies	City planning	Precision production
	Engineering	Transportation
	Engineering technology	Transportation mechanics
		All other mechanics

NOTE: Categorizations are based on Classification of Instructional Program (CIP) codes (U.S. Department of Education 2002).

whereas career education is the term used at the baccalaureate level. Academic education encompasses programs traditionally considered as arts and sciences (e.g., letters, biology, music, and visual arts). This term is used at both educational levels. Students who had not yet decided on a major (or, in a few cases, whose major was unknown) were classified into a separate *undeclared* category.

Credential goal. This variable classifies students based on the level of the credential they intend to earn at their first institution (including their intention to transfer to another institution⁴), combined with their area of study. At the broadest level, the credential goal variable divides credential-seeking students into subbaccalaureate and baccalaureate, as follows:

- *Subbaccalaureate students* include all students who were initially enrolled at a less-than-4-year institution and all students who initially enrolled at a 4-year institution and were seeking a credential below the baccalaureate level at their initial institution or were seeking to transfer to a less-than-4-year institution. Ninety-six percent of students defined as subbaccalaureate for this report were initially enrolled in a less-than-4-year institution (not shown in tables).
- *Baccalaureate students* include all students who were initially enrolled at a 4-year institution and were seeking a bachelor's or higher degree at that institution or who were seeking to transfer to another 4-year institution.

Next, subbaccalaureate students were divided into those seeking a certificate and those seeking an associate's degree. The latter category includes subbaccalaureate students whose stated goal was to transfer to another less-than-4-year institution or to a 4-year institution.⁵ Finally, students at each level were classified into occupational, academic, or undeclared areas of study, as defined above. The final credential goal categories are listed in exhibit 1.2.

⁴ Students who intended to transfer to another institution are considered credential seekers in this report, on the assumption that transfer is an intermediate step on the way to the attainment of a credential.

⁵ The Bailey et al. study also classifies all students enrolled at less-than-4-year institutions as either certificate or associate's degree seekers (Bailey et al. 2004a, 2004b). Although students at these institutions who plan to transfer to a 4-year institution may be seeking a bachelor's degree, both the Bailey et al. study and this study consider enrollment at a subbaccalaureate institution to override this goal for classification purposes.

Exhibit 1.2. Categorization of Beginning Postsecondary Students Longitudinal Study (BPS:96/01) students, by the level and area of their credential goal

Subbaccalaureate students	Baccalaureate students
Occupational	Career
Occupational certificate	
Occupational associate’s degree	
Academic	Academic
Academic certificate	
Academic associate’s degree	
Undeclared	Undeclared

There were too few academic certificate students in the BPS:96/01 sample ($n = 16$) to analyze separately in this report. Thus, this student category is not discussed in the remainder of the report, and the term “certificate students” is sometimes used as a shorthand for occupational certificate students. Students with undeclared majors are also not discussed, as this report focuses on comparisons of occupational, career, and academic students. All student groups, however, are included in the tables.

As seen in table 1.1 and figure 1.1, most first-time beginning credential-seeking students in 1995–96 (58 percent) were seeking a subbaccalaureate credential, and most were seeking an occupational (subbaccalaureate) or career (baccalaureate) credential (55 percent). Overall, 36 percent of beginning students were occupational students; 11 percent were occupational certificate seekers, and 25 percent were occupational associate’s degree seekers. Academic subbaccalaureate students were a smaller group than occupational students, with 9 percent of beginning students seeking an academic subbaccalaureate credential, almost all of whom were seeking an associate’s degree.

Table 1.1. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students, and of credential-seeking subbaccalaureate students, and number of students, by initial credential goal: 1996

Students' initial credential goal	Percent of all students	Percent of sub-baccalaureate students	Number of all students
Total, all credential goals	100.0	†	2,472,000
Subbaccalaureate credential	57.8	100.0	1,429,000
Occupational subbaccalaureate	36.1	62.5	893,000
Certificate	11.3	19.5	279,000
Associate's degree	24.9	43.0	614,000
Academic subbaccalaureate	9.4	16.3	233,000
Certificate	0.3 !	0.5 !	6,000
Associate's degree	9.2	15.9	227,000
Undeclared subbaccalaureate	12.2	21.2	302,000
Baccalaureate credential	42.2	†	1,043,000
Career baccalaureate	18.9	†	468,000
Academic baccalaureate	10.4	†	258,000
Undeclared baccalaureate	12.8	†	317,000

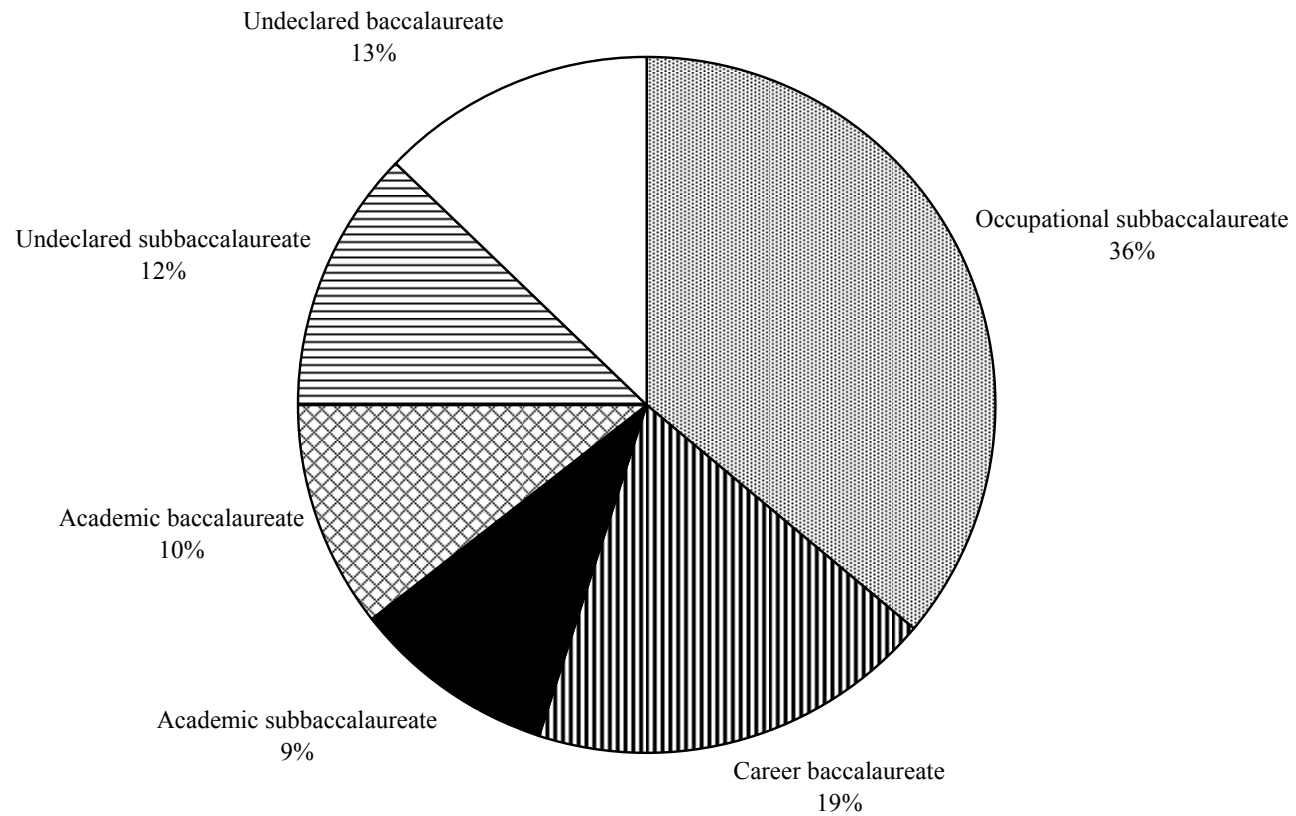
† Not applicable.

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to totals because of rounding.

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

Figure 1.1. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by initial credential goal: 1996



8

NOTE: Student categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

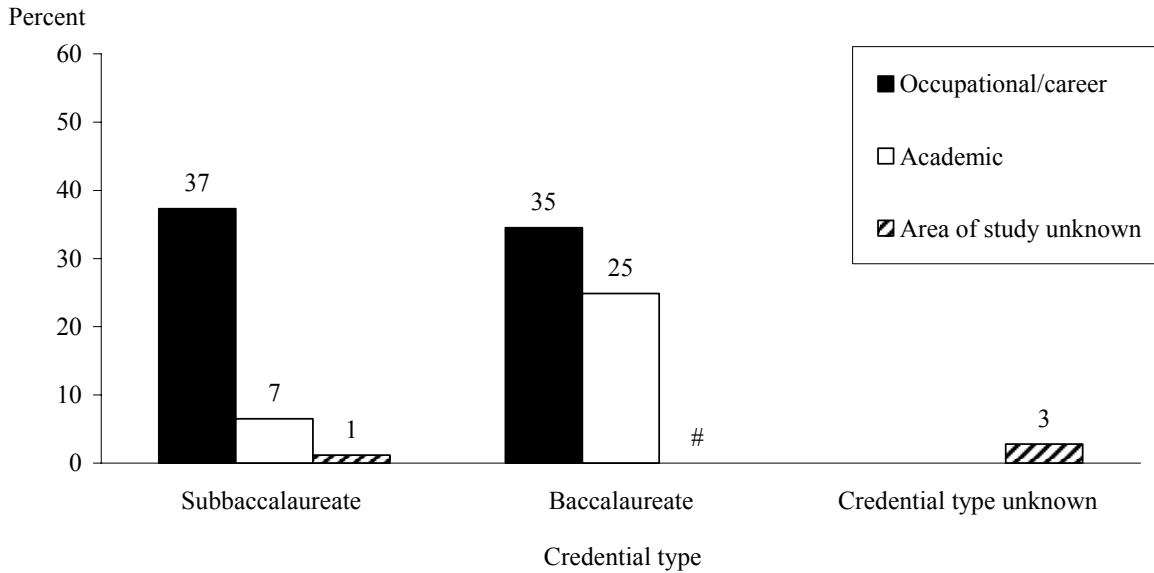
Earned credentials. Chapter 4 examines economic and labor market outcomes for students who earned various postsecondary credentials. To classify students by earned credentials, the report uses students' self-reports on the type of credential(s) they had earned as of 2000–01, as well as on their area of study at the time of attainment.⁶ Since the BPS:96/01 does not ask students about further degrees once a baccalaureate degree has been obtained, the earned credential categories are certificate, associate's degree, and bachelor's degree. These credentials are classified as occupational, career, or academic, using the framework outlined in exhibit 1.1. For a small percentage of students, the subject area of the credential could not be determined; these students are classified as having earned a credential in an unknown subject area. For the analysis in chapter 4, students who earned more than one credential during the 6-year time period were classified based on their highest attained degree. If a student earned more than one credential at the same level, the student was classified based on his or her most recent area of study. Figure 1.2 shows the distribution of earned credentials by type.

Overview of Report

The subsequent chapters of this report examine each of the three research questions listed above. The second chapter examines the sociodemographic background and enrollment characteristics of entrants into occupational education, comparing them to other postsecondary students. The third chapter explores the issues of persistence and attainment, again comparing occupational students to other postsecondary students. The fourth chapter examines the economic and labor market outcomes attained by students who earn occupational credentials, in this case comparing these outcomes to those of students who initially intended to earn an occupational credential but left school without doing so.

⁶ The reliability of self-reported data on earned credentials is discussed in appendix A, under "Data Reliability." As explained in appendix A, the subject area of the credential had to be imputed when students earned credentials in non-survey years.

Figure 1.2. Percentage of 1995–96 credential-seeking beginning postsecondary students who earned each type of credential: 2001



Estimate rounds to zero.

NOTE: Credential categories are defined in exhibit 1.1. Detail sums to greater than 100 because some students earned more than one credential.

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

Each chapter includes a brief literature review of the topic covered by the chapter, then addresses a set of specific questions related to each topic (e.g., “Who are the students who enter occupational education programs and how do they compare to other students in postsecondary education?”). Details on the data and statistical procedures used in the analysis, including a description of the variables used and how they were constructed, are provided in appendix A. Standard errors for estimates in the tables are included in appendix B.

Chapter 2: Entrants Into Occupational Education

The persistence of students in postsecondary education depends in part on the characteristics of the students who enroll and on their enrollment patterns. Past studies have found, for example, that students who complete high school through a GED or other alternative means and students from low socioeconomic backgrounds are less likely to persist in postsecondary education than are their peers with high school diplomas and from higher socioeconomic backgrounds (Horn 1996). Students who delay their entry to postsecondary education, enroll at older ages, or who enroll part time are also less likely to persist than those who enter immediately after high school or who enroll full time (Berkner, Cuccaro-Alamin, and McCormick 1996; Berkner, He, and Cataldi 2002; Horn 1996). One study that focused exclusively on community college students also found that high school preparation, socioeconomic status (SES), and having one or more risk factors⁷ were related to persistence and completion among this group of postsecondary students (Hoachlander, Sikora, and Horn 2003).

Thus, before turning to an examination of persistence, attainment, and economic outcomes, it is important to note who enters occupational education, as well as where and how they enter. Few data exist on this student population. One recent study that did examine the background of occupational students was conducted by Bailey et al. (2004a) for the Community College Research Center (CCRC), using the 1999–2000 NPSAS data. The CCRC study concluded that occupational students comprise “the group of postsecondary students from the most disadvantaged backgrounds with the greatest barriers to educational achievement” (Bailey et al. 2004b, p. 5). Occupational students were found to be less likely than academic subbaccalaureate students to be female and more likely to be minority, to have economically disadvantaged backgrounds, and to delay their enrollment. Further, occupational certificate students were described as “a sub-population distinct from other community college occupational students, and they can be seen as outliers within the postsecondary universe” (ibid, p. 3). These students were the most likely to be minority, older, economically disadvantaged, to

⁷ The risk factors were delayed enrollment, part-time enrollment, high school completion via GED, working full time while enrolled, financial independence (as defined for financial aid purposes), having dependents other than a spouse, and single parenthood.

have a less rigorous educational background, to delay their postsecondary enrollment, and to enroll part time.

This chapter provides a similar analysis of the characteristics of occupational students, using the 1995–96 BPS sample. While the results of this analysis generally follow those found by Bailey et al. (2004b), there are some differences. These differences can be attributed to any of the following major differences between this report and the Bailey et al. report:⁸

- The two studies differ in the year in which the data were collected. Bailey et al. used NPSAS:2000 to describe undergraduate students in postsecondary education as of 1999–2000, while this study describes first-time, credential-seeking undergraduate students as of 1995–96.
- Also, because Bailey et al. looked at all undergraduate students rather than just first-time, credential-seeking postsecondary students, the former study is likely to include a greater proportion of students who persist in postsecondary education. However, Bailey et al. also included non-credential-seeking students in their sample, a group that is less likely than other students to persist and to attain a credential.
- Another implication of the use of NPSAS:2000 is that the Bailey et al. sample is larger than the 1995–96 BPS sample, providing more reliable data and more powerful statistical tests.
- A final key difference concerns the definition of “occupational” and “academic” education. This report categorizes programs into these areas using a taxonomy developed in conjunction with an NCES technical review panel.⁹ The NCES taxonomy codes as occupational the following areas of study that were coded as academic by Bailey et al.: architecture, communications, education, law/legal studies, leisure studies, library science, military technologies, natural resources, parks/recreation studies, public administration, and clinical pastoral care.

⁸ There are other differences between the studies, such as whether non-degree-seeking students or students without high school diplomas were included in the analysis, but these differences are likely to be minor because they apply to only a small proportion of the postsecondary student population.

⁹ See Hudson and Shafer (2004) for more information on this taxonomy and its development.

This chapter first presents an overview of new entrants to occupational and career education in 1995–96, focusing on the scope of this education within postsecondary education. The chapter then examines the background and enrollment characteristics of beginning credential-seeking occupational students, comparing them to their peers in baccalaureate education and in subbaccalaureate academic education. In addition to sociodemographic characteristics, students are compared in terms of their enrollment patterns, including their tuition costs and work status. Where relevant, the text compares findings from this study with those of Bailey et al. (2004b).

The Scope of Postsecondary Occupational Education

In 1995–96, about 2,472,000 credential-seeking students entered postsecondary education for the first time (table 1.1). As mentioned in chapter 1, most of these students (55 percent) intended to earn a credential in an occupational or career area, and most (58 percent) were subbaccalaureate students. Overall, 36 percent of these beginning students (or about 893,000 students) were occupational students.¹⁰

More beginning students were seeking an occupational or career credential than were seeking an academic credential at both the subbaccalaureate and baccalaureate levels. Sixty-three percent of subbaccalaureate students were seeking an occupational credential, compared to 16 percent seeking an academic credential (table 1.1); 45 percent of baccalaureate students were seeking a career credential compared to 25 percent seeking an academic credential (not shown in tables). Among subbaccalaureate students, associate’s degree seekers outnumbered certificate seekers in both occupational and academic areas of study.

As will be seen below, occupational and academic subbaccalaureate students differ in terms of their credential goals. At least initially, half of occupational students intended to earn an associate’s degree at their current institution (table 2.1). A smaller proportion, about one-third,

¹⁰ Using NPSAS:2000, Bailey et al. (2004b) found that 30 percent of students were subbaccalaureate occupational students. One reason the percentage in this report may be higher is that, as noted above, a number of majors coded here as occupational were coded by Bailey et al. as academic.

intended to earn a certificate at their current institution, and 16 percent intended to transfer to another institution rather than earn a certificate or degree at their current institution.¹¹ Academic

Table 2.1. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by specific goal at first institution, and initial credential goal: 1996

Students' initial credential goal	Specific goal at first institution				
	Transfer to 2-year institution	Transfer to 4-year institution	Certificate	Associate's degree	Bachelor's or higher degree
Total, all credential goals	2.8	14.5	12.7	29.5	40.6
Subbaccalaureate credential	4.9	19.9	21.9	51.0	2.3
Occupational subbaccalaureate	3.9	12.5	31.2	49.4	3.0
Certificate	†	†	100.0	†	†
Associate's degree	5.7	18.2	†	71.9	4.3 !
Academic subbaccalaureate	6.8 !	30.7	2.8 !	58.9	0.9 !
Certificate	‡	‡	‡	‡	‡
Associate's degree	7.0 !	31.5	†	60.6	0.9 !
Undeclared subbaccalaureate	6.4	33.3	9.4	49.4	1.6 !
Baccalaureate credential	†	7.1	†	†	92.9
Career baccalaureate	†	6.6	†	†	93.4
Academic baccalaureate	†	6.7	†	†	93.3
Undeclared baccalaureate	†	8.1	†	†	91.9

† Not applicable.

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

‡ Reporting standards not met. Too few cases to report.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

¹¹ Bailey et al. (2004b) found that 65 percent of occupational subbaccalaureate students were seeking an associate's degree and 33 percent were seeking a certificate. (The remaining two percent were not seeking a credential.) One reason the Bailey et al. study reported a higher percentage seeking an associate's degree is that their study counted students intending to transfer to a less-than-4-year institution as seeking an associate's degree (this report finds 53 percent in both groups); another reason is that Bailey et al. used NPSAS data, which may include a higher proportion of associate's degree students (relative to certificate or non-credential students).

subbaccalaureate students were more likely than occupational students to state that they intended to transfer to a 4-year institution and less likely to plan to earn a certificate.¹²

The rest of this chapter compares different groups of beginning, credential-seeking students, to show how occupational students compare to baccalaureate students and academic subbaccalaureate students. As will be seen, occupational students often look different from both baccalaureate students and academic subbaccalaureate students; however, when the two groups of subbaccalaureate students do differ, those differences sometimes arise from the different backgrounds of occupational certificate students (as Bailey et al. [2004b] also found). Occupational and academic associate's degree students often do not differ in their backgrounds.

The chapter presents a series of comparisons of students' background and enrollment characteristics (see exhibit 2.1). First, occupational students are compared to academic subbaccalaureate students and to baccalaureate students. Because baccalaureate students with career and academic degree goals did not differ measurably on virtually all of the background and enrollment measures,¹³ these students are combined into one group for most of this analysis. Second, to determine whether differences between the two subbaccalaureate groups are due primarily to differences in the population of students seeking an occupational certificate, three groups of subbaccalaureate students are compared: occupational certificate students (sometimes referred to more simply as certificate students), occupational associate's degree students, and academic associate's degree students. (Academic certificate students could not be examined separately because there were too few students in this group to provide reliable data on them.) The chapter looks first at who enters occupational education, then at the enrollment characteristics of entrants, answering a series of questions about each issue.

¹² The 10 percentage point difference between occupational and academic subbaccalaureate students intending to earn an associate's degree was not significantly different, possibly because these estimates had relatively large standard errors (table B-2.1).

¹³ One exception is sex. On this measure, career and academic baccalaureate students are examined separately. Another exception is the percentage of students who attended a for-profit postsecondary institution; 2 percent of career baccalaureate students attended this type of institution, compared to less than 1 percent of academic baccalaureate students. However, given the small size of the difference between these baccalaureate groups, they were combined for the analysis of this variable.

Exhibit 2.1. Comparison groups and questions addressed in analyses of the backgrounds of Beginning Postsecondary Students Longitudinal Study (BPS:96/01) occupational students

Comparison group	Questions addressed
Occupational subbaccalaureate vs. baccalaureate students	To what extent do occupational subbaccalaureate students differ from other students? To what extent are differences between baccalaureate and subbaccalaureate students specific to occupational students? To what extent are occupational and academic subbaccalaureate students similar to each other and to what extent do they differ?
Occupational subbaccalaureate vs. academic subbaccalaureate students	
Occupational certificate vs. occupational associate’s degree vs. academic associate’s degree students	To what extent are the three major groups of subbaccalaureate students similar or different? To what extent are differences between occupational and academic subbaccalaureate students specific to occupational certificate students? To what extent are occupational certificate students different from other subbaccalaureate (associate’s degree) students?

Who Enters Occupational Education

Who are the students who enter occupational education programs and how do they compare to other students in postsecondary education?

A number of individual and family sociodemographic characteristics are used to answer this question: age, sex, race/ethnicity, high school completion, parents’ education level, and family SES.

Age. As seen in table 2.2, beginning occupational students were 24 years old, on average, which makes them an average of 3 years older than academic subbaccalaureate students (21 years old), and 5 years older than bachelor’s degree students (19 years old). However, the difference between subbaccalaureate students appears to be due to occupational certificate students. No difference was detected in the average age of occupational and academic associate’s degree seekers (21–22 years old), while occupational certificate students were older on average

(27 years old) than both occupational and academic associate's degree students. Bailey et al. (2004b) also found this pattern of age differences.

Table 2.2. Average age of 1995–96 credential-seeking beginning postsecondary students, and percentage distribution by age, sex, and initial credential goal: 1996

Students' initial credential goal	Average age	Age				Sex	
		18 years or younger	19 years old	20–23 years old	24 years or older	Male	Female
Total, all credential goals	21.2	47.0	23.4	12.9	16.7	45.8	54.2
Subbaccalaureate credential	22.9	34.4	22.4	17.2	26.0	46.2	53.8
Occupational subbaccalaureate	23.6	30.0	19.6	19.4	31.0	42.9	57.1
Certificate	26.8	14.8	14.5	21.0	49.6	39.3	60.7
Associate's degree	22.1	36.8	21.9	18.7	22.6	44.5	55.5
Academic subbaccalaureate	21.0	45.3	23.8	15.8	15.2	53.6	46.4
Certificate	‡	‡	‡	‡	‡	‡	‡
Associate's degree	20.9	46.1	23.3	16.2	14.4	53.7	46.3
Undeclared subbaccalaureate	22.1	39.3	29.5	11.6	19.6	50.5	49.5
Baccalaureate credential	19.0	64.2	24.8	7.0	4.0	45.3	54.7
Career baccalaureate	19.1	62.7	26.0	6.6	4.8	49.4	50.6
Academic baccalaureate	18.9	66.2	23.4	7.6	2.7	39.6	60.4
Undeclared baccalaureate	19.0	64.8	24.2	7.2	3.8	43.8	56.2

‡ Reporting standards not met. Too few cases to report.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

Sex. Beginning occupational students were predominantly (57 percent) female (table 2.2). These occupational students were more likely than both baccalaureate career students and subbaccalaureate academic students to be female (57 versus 51 and 46 percent, respectively). Bailey et al. (2004b) found the opposite pattern: Academic subbaccalaureate students were more likely than their occupational peers to be female. This difference between studies could be due to the different majors included as occupational education in each study and/or to the restriction to beginning students in this study.

It is not clear whether the sex difference at the subbaccalaureate level is due to occupational certificate students. No difference was found in the percentage of occupational and academic associate's degree-seeking students who were female, while occupational certificate students were more likely to be female than were academic associate's degree seekers. This finding should be viewed cautiously, however, because occupational associate's degree seekers were 10 percentage points more likely than their academic counterparts to be female (56 versus 46 percent, respectively); this difference may not have been statistically significant because of the relatively large standard errors for these estimates (table B-2.2). Nonetheless, other evidence suggests that occupational certificate students may be more likely than occupational associate's degree students to be female. Data from the Integrated Postsecondary Education Data System (IPEDS) shows that in 2001–02, a higher proportion of certificates than associate's degrees were awarded in traditionally female occupational areas such as consumer and personal services (5 versus 2 percent), health (29 versus 13 percent), and home economics (4 versus 2 percent) (Snyder, Tan, and Hoffman 2004, p. 315, table 251).

Race/ethnicity. Beginning occupational students were 70 percent White, 16 percent Black, 9 percent Hispanic, and 5 percent “other” race (table 2.3).¹⁴ The statistics on race/ethnicity tend to have relatively large standard errors (table B-2.3). To minimize that problem, this section compares only the percentages of students in different program areas who are Black and who are Hispanic. Bailey et al. (2004b) found that occupational students were more likely than academic subbaccalaureate students to be minority, with occupational certificate students being the most likely to be minority. This report finds the same pattern for Black enrollments, but not for Hispanic enrollments.

No differences were detected in the percentage of baccalaureate students who were Black, compared to academic and occupational subbaccalaureate students. However, occupational students were more likely to be Black than were their academic subbaccalaureate peers (16 versus 7 percent). The difference between the two subbaccalaureate groups does not

¹⁴ To aid readability, the text refers to the non-Hispanic groups as White, Black, and other. Hispanic students can be of any race.

Table 2.3. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by race/ethnicity, high school completion, and initial credential goal: 1996

Students' initial credential goal	Race/ethnicity ¹				High school completion	
	White, non-Hispanic	Black, non-Hispanic	Hispanic	Other, non-Hispanic	Diploma	GED ²
Total, all credential goals	73.0	11.9	8.5	6.7	94.1	5.9
Subbaccalaureate credential	72.5	12.0	9.8	5.8	91.0	9.0
Occupational subbaccalaureate	70.4	15.5	9.2	4.9	88.5	11.5
Certificate	65.6	17.7	13.5	3.2	82.1	17.9
Associate's degree	72.6	14.5	7.2	5.6	91.4	8.6
Academic subbaccalaureate	78.6	7.3 !	7.1 !	7.0 !	92.9	7.1
Certificate	‡	‡	‡	‡	‡	‡
Associate's degree	79.3	6.7 !	6.8 !	7.2 !	93.4	6.6
Undeclared subbaccalaureate	73.8	5.1 !	13.5 !	7.7 !	96.7	3.3
Baccalaureate credential	73.7	11.7	6.8	7.8	98.4	1.6
Career baccalaureate	75.6	11.4	7.1	5.9	98.6	1.4
Academic baccalaureate	73.7	10.4	7.3	8.6	98.5	1.5
Undeclared baccalaureate	71.1	13.2	5.7	9.9	98.1	1.9 !

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

‡ Reporting standards not met. Too few cases to report.

¹ Black, non-Hispanic includes African American, Hispanic includes Latino, and Other, non-Hispanic includes Asian, Native Hawaiian, Other Pacific Islander, American Indian, and Alaska Native.

² GED stands for General Educational Development.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

appear to be due to certificate students, as no difference was detected in the percentage of occupational certificate and associate's degree-seeking students who were Black, while both groups were more likely than academic associate's degree-seeking students to be Black (18 and 15 versus 7 percent, respectively).

With one exception, there were no measurable differences in the percentage of students in each of the groups who were Hispanic. The one exception is that more occupational certificate seekers than occupational associate's degree seekers were Hispanic (13 versus 7 percent). Except

for occupational certificate seekers, between 7 and 9 percent of students in each group were Hispanic (table 2.3).

High school completion. Eighty-nine percent of occupational students completed high school with a regular diploma (rather than with a GED or other equivalency; table 2.3). Baccalaureate students were the most likely to have completed high school with a regular diploma, followed by academic subbaccalaureate students, then occupational students (98, 93, and 89 percent, respectively). The difference between occupational and academic subbaccalaureate students appears to be due to the educational background of certificate students. There was no statistical difference in the percentage of occupational and academic associate's degree-seeking students who had a regular high school diploma, while occupational certificate students were less likely than either associate's degree-seeking group to have a regular diploma. These findings are similar to those of Bailey et al. (2004b), who found little difference in the educational background of occupational and academic subbaccalaureate students but did find that occupational certificate students had a lower educational background than other postsecondary students.

Parents' education level. Overall, 10 percent of occupational students had parents who had not completed high school, 46 percent had at least one parent whose highest educational attainment was high school, and 44 percent had at least one parent with some postsecondary education (table 2.4). Across student groups, the findings for parents' education level closely mirror those for students' high school completion. Baccalaureate students were the most likely to have parents with postsecondary education (at 73 percent), followed by academic subbaccalaureate students (60 percent), and then occupational students (44 percent). The opposite pattern was found for the percentage of students whose parents had not completed high school.

The relatively low level of parents' education among occupational students appears to be due to occupational certificate students. There was no statistical difference in the percentage of occupational and academic associate's degree seekers whose parents had not completed high school or who had postsecondary education. However, occupational certificate students were

Table 2.4. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by parents' highest education level, family socioeconomic status, and initial credential goal: 1996

Students' initial credential goal	Parents' highest education level ¹			Family socioeconomic status		
	Less than high school	High school graduate	Post-secondary education	Lowest quartile	Middle quartiles	Highest quartile
Total, all credential goals	5.7	34.6	59.6	24.9	50.5	24.7
Subbaccalaureate credential	8.6	42.0	49.4	28.8	53.0	18.2
Occupational subbaccalaureate	9.8	46.3	43.9	30.1	52.7	17.2
Certificate	16.7	53.4	29.9	33.6	54.3	12.1
Associate's degree	6.8	43.1	50.1	28.6	51.9	19.5
Academic subbaccalaureate	4.6	35.5	59.9	22.6	55.5	21.9
Certificate	‡	‡	‡	‡	‡	‡
Associate's degree	3.9 !	35.9	60.2	22.6	55.9	21.5
Undeclared subbaccalaureate	7.8 !	34.3	57.9	29.5	52.0	18.5
Baccalaureate credential	2.0	24.7	73.3	19.5	47.0	33.5
Career baccalaureate	2.0	27.3	70.7	19.8	48.7	31.6
Academic baccalaureate	1.8 !	24.6	73.6	19.4	46.8	33.8
Undeclared baccalaureate	2.0 !	20.9	77.1	19.2	44.6	36.1

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

‡ Reporting standards not met. Too few cases to report.

¹ Highest education level of either the mother or father of the respondent.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

more likely to have parents who had not completed high school, and less likely to have parents with postsecondary education, than were either academic or occupational associate's degree seekers. Bailey et al. (2004b) also found lower parental education levels among occupational students, especially occupational certificate students.

Family socioeconomic status. When all beginning credential-seeking students were divided into SES quartiles, 30 percent of occupational students were found to come from the lowest SES quartile (table 2.4). This is a higher proportion of low-SES students than was found

among baccalaureate students (30 versus 20 percent). Although there was a 7 percentage point difference in the proportion of occupational and academic subbaccalaureate students in the lowest SES quartile (30 versus 23 percent, respectively), this difference was not statistically significant, possibly due to the relatively large standard errors for these estimates (table B-2.4). However, occupational certificate students were more likely to come from the lowest SES quartile than were academic associate's degree students (34 versus 23 percent). Bailey et al. (2004b) found that occupational students had lower family income backgrounds than their academic peers, with occupational certificate students having the lowest income backgrounds.

Enrollment Patterns in Occupational Education

When and how do occupational students enroll in postsecondary education, and how do their enrollment patterns compare to those of other postsecondary students?

This question is addressed by examining the percentage of students who delayed entry into postsecondary education (i.e., entered more than one year after high school graduation), and the percentage who enrolled exclusively full time in their first year.

As one might expect given the relatively older age of occupational students, these students are also relatively more likely to delay their entry into postsecondary education (table 2.5). Over half (56 percent) of occupational students delayed their enrollment in postsecondary education, a higher proportion than among academic subbaccalaureate students (35 percent) and baccalaureate students (11 percent). As was true for age, the difference between the subbaccalaureate groups appears to be due to the relatively high rate at which occupational certificate students delayed enrollment. Although occupational associate's degree-seeking students were more likely than academic associate's degree-seeking students to have delayed enrollment, occupational certificate students were more likely than both associate's degree-seeking groups to have delayed enrollment. Almost three-quarters of occupational certificate students (73 percent) had delayed their enrollment, compared to 48 percent of occupational associate's degree seekers and 34 percent of academic associate's degree seekers. These findings parallel those of Bailey et al. (2004b).

Table 2.5. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by delayed enrollment, enrollment intensity, and initial credential goal: 1996

Students' initial credential goal	Delayed enrollment		Enrollment intensity		
	Yes	No	Exclusively full-time	Exclusively part-time	Mixed/ other
Total, all credential goals	33.6	66.4	68.1	14.9	17.0
Subbaccalaureate credential	50.1	49.9	54.7	23.1	22.2
Occupational subbaccalaureate	55.8	44.2	60.1	19.5	20.5
Certificate	73.3	26.7	67.7	20.8	11.5 !
Associate's degree	48.1	51.9	56.6	18.8	24.6
Academic subbaccalaureate	34.5	65.5	52.6	21.1	26.3
Certificate	‡	‡	‡	‡	‡
Associate's degree	33.8	66.2	52.7	20.3	26.9
Undeclared subbaccalaureate	45.6	54.4	40.2	35.6	24.2
Baccalaureate credential	11.4	88.6	86.3	3.7	9.9
Career baccalaureate	11.9	88.1	88.0	2.8	9.2
Academic baccalaureate	10.9	89.1	86.7	2.9	10.4
Undeclared baccalaureate	11.1	88.9	83.6	5.7	10.6

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

‡ Reporting standards not met. Too few cases to report.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

Sixty percent of occupational students enrolled exclusively full time in their first year (table 2.5). Both occupational and academic subbaccalaureate students were less likely than baccalaureate students to enroll exclusively full time during their first year (60 and 53 versus 86 percent, respectively). Although there was a 7 percentage point difference in the proportion of occupational and academic subbaccalaureate students who enrolled full time, this difference was not statistically significant, possibly due to the relatively large standard errors for these estimates (table B-2.5). Among the three subbaccalaureate credential groups, occupational certificate

students were more likely than academic associate's degree students to enroll full time. In comparison, Bailey et al. (2004b) found that occupational students were less likely than their academic peers to enroll full time, full year, with occupational certificate students being the least likely to have this enrollment pattern.

In which types of institutions do occupational subbaccalaureate students enroll, and how does this compare to other postsecondary students?

As noted in chapter 1, 96 percent of subbaccalaureate students were enrolled in less-than-4-year institutions, while (by definition) all baccalaureate students were enrolled in 4-year institutions. This section examines the level and control of the institutions in which students enroll (i.e., public, for-profit, and not-for-profit). These data are reported in table 2.6.

Seventy-three percent of occupational students initially enrolled in a public institution, 24 percent enrolled in a for-profit institution, and 3 percent enrolled in a not-for-profit institution.¹⁵ Occupational students tend to enroll in different institutions than do academic subbaccalaureate students and baccalaureate students. Occupational students were the most likely of the three student groups to enroll in for-profit institutions. They were less likely than academic subbaccalaureate students but more likely than baccalaureate students to enroll in public institutions, and they were less likely than baccalaureate students to enroll in not-for-profit institutions.

In this case, both certificate and associate's degree-seeking students appear to account for the different enrollment patterns of occupational and academic subbaccalaureate students in public institutions and for-profit institutions. Among subbaccalaureate students, occupational certificate students were the least likely of the three credential groups to enroll in public institutions, with higher enrollments among occupational associate's degree seekers, and the

¹⁵ Bailey et al. (2004b) reported that over 82 percent of occupational students attended public institutions in 1999–2000. This difference probably reflects differences in the distribution of the total undergraduate population (in the Bailey et al. study) versus beginning students (in this report), as well as differences in how occupational education was defined in the two studies.

Table 2.6. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by control of initial institution, tuition cost, and initial credential goal: 1996

Students' initial credential goal	Institution control			Tuition cost
	Public	Not-for-profit	For-profit	
Total, all credential goals	73.1	17.5	9.4	\$4,000
Subbaccalaureate credential	81.5	2.9	15.6	1,800
Occupational subbaccalaureate	72.9	3.3	23.9	2,300
Certificate	43.2	1.8 !	55.0	3,600
Associate's degree	86.3	3.9	9.7	1,700
Academic subbaccalaureate	96.9	2.1	1.1	1,300
Certificate	‡	‡	‡	‡
Associate's degree	97.3	1.6	1.1	1,300
Undeclared subbaccalaureate	95.2	2.6	2.3 !	1,000
Baccalaureate credential	61.6	37.4	1.1	7,000
Career baccalaureate	65.6	32.1	2.3	6,200
Academic baccalaureate	62.3	‡	‡	7,100
Undeclared baccalaureate	55.0	45.0	†	8,100

† Not applicable.

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

‡ Reporting standards not met. Too few cases to report.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

highest enrollments among academic associate's degree seekers (43 versus 86 versus 97 percent, respectively). Similarly, occupational certificate students were the most likely of the three subbaccalaureate groups to enroll in for-profit institutions, with lower enrollments among occupational associate's degree seekers and the lowest enrollments among academic associate's degree seekers (55 versus 10 versus 1 percent, respectively).

What are the average tuition costs incurred by occupational students, and how do these costs compare to those incurred by other postsecondary students?

BPS:96/01 collects information on the tuition charged to students in the 1995–96 school year (table 2.6). Both occupational and academic subbaccalaureate students had lower tuition costs than baccalaureate students. For example, occupational students had an average tuition cost of about \$2,300 compared to about \$7,000 for baccalaureate students. Occupational certificate students—who are the most likely of the three subbaccalaureate groups to attend for-profit institutions and to enroll full time—have higher average tuition costs than either occupational or academic associate’s degree seekers: about \$3,600 for occupational certificate students compared to about \$1,700 or less for associate’s degree seekers.

What is the work status of occupational students—how likely are they to work, how much do they work, and in what occupational areas—and how do they compare to other students in terms of their work status?

About three-quarters of occupational students (74 percent) worked during their first year of school, although more of these working students were self-defined as “students working to meet expenses” (hereafter “working students,” 45 percent) rather than as “employees enrolled in school” (hereafter “enrolled employees,” 29 percent) (table 2.7). Both occupational and academic subbaccalaureate students were more likely to work than were baccalaureate students (74 and 76 versus 62 percent, respectively), but no measurable difference was found between the percentage of occupational and academic subbaccalaureate students who worked. Nonetheless, among subbaccalaureate students, occupational certificate students were less likely to work than were both occupational and academic associate’s degree-seeking students (61 versus 80 and 76 percent, respectively).

Occupational and academic subbaccalaureate students are more likely to work than are baccalaureate students because more of the former than the latter were “enrolled employees.” Specifically, more occupational students than baccalaureate students were “enrolled employees”

Table 2.7. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by work status in the first year, intensity of work, and initial credential goal: 1996

Students' initial credential goal	Work status in first year				Intensity of work ¹	
	Did not work in first year	Worked in first year			Part-time	Full-time
		Total	Student meeting expenses	Employee enrolling in classes		
Total, all credential goals	29.7	70.3	52.7	17.6	70.0	30.0
Subbaccalaureate credential	24.0	76.0	50.1	25.9	60.7	39.3
Occupational subbaccalaureate	26.3	73.7	45.1	28.5	57.0	43.0
Certificate	39.5	60.5	29.8	30.7	51.1	48.9
Associate's degree	20.4	79.6	52.0	27.6	59.1	40.9
Academic subbaccalaureate	24.1	75.9	60.0	15.9	67.8	32.2
Certificate	‡	‡	‡	‡	‡	‡
Associate's degree	24.3	75.7	59.5	16.2	67.5	32.5
Undeclared subbaccalaureate	17.0	83.0	57.1	25.9	65.0	35.0
Baccalaureate credential	37.6	62.4	56.3	6.2	85.7	14.3
Career baccalaureate	36.4	63.6	57.5	6.1	85.1	14.9
Academic baccalaureate	38.8	61.2	55.8	5.4	88.4	11.6
Undeclared baccalaureate	38.3	61.7	54.8	6.9	84.4	15.6

‡ Reporting standards not met. Too few cases to report.

¹ Part-time is defined as working 1–34 hours per week. Full-time is defined as working 35 or more hours per week.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

(29 versus 6 percent), while fewer were “working students” (45 versus 56 percent). Academic subbaccalaureate students were also more likely than baccalaureate students to be “enrolled employees,” but no measurable difference was found in their likelihood of being “working students.” Although there were no measurable differences between occupational and academic subbaccalaureate students in their overall likelihood of working, occupational students were more likely to be “enrolled employees” and less likely to be “working students” than were

academic subbaccalaureate students. Occupational certificate students were less likely than other subbaccalaureate students to be “working students” (which accounts for their lower likelihood of working overall). In contrast, both occupational certificate and occupational associate’s degree-seeking students were more likely to be “enrolled employees” than were academic associate’s degree seekers.

Among those students who worked, 43 percent of occupational students worked full time (table 2.7). In line with the fact that they are more likely than baccalaureate students to be enrolled employees, occupational students are also more likely to work full time (43 versus 14 percent). However, even though occupational students are more likely than academic subbaccalaureate students to be enrolled employees, no difference was detected in the likelihood that these two student groups worked full time when they did work. In comparison, working occupational certificate students were more likely than working academic associate’s degree seekers to work full time.

Summary

Other studies have noted differences in the background and enrollment characteristics of baccalaureate and subbaccalaureate students (Bailey et al. 2004b; Berkner, He, and Cataldi 2002; Berkner, Cuccaro-Alamin, and McCormick 1996). This chapter examined the characteristics of these students across occupational, career, and academic areas of study. As seen here, baccalaureate students in career and academic areas typically have similar backgrounds, with measurable differences found only in their sex distribution (more academic students than career students are female, table 2.2).¹⁶ In contrast, as summarized below and in exhibit 2.2, occupational and academic subbaccalaureate students often have different background and enrollment characteristics.

Occupational and academic subbaccalaureate students differ in terms of their age, sex, minority status (the percentage who are Black), educational background, parents’ educational

¹⁶ A relatively small difference of 2 percentage points was also found in the likelihood that career and academic baccalaureate students enroll in for-profit institutions (2 percent vs. less than 1 percent, respectively; table 2.6).

Exhibit 2.2. Summary of comparisons of the background and enrollment characteristics of the three groups of students with subbaccalaureate credential goals: 1996

Background and enrollment characteristics	Students' credential goals		
	Occupational associate's degree vs. academic associate's degree	Occupational certificate vs. academic associate's degree	Occupational certificate vs. occupational associate's degree
Background characteristic			
Age	-	↑	↑
Female	-	↑	-
Black, non-Hispanic	↑	↑	-
Hispanic	-	-	↑
High school diploma (vs. GED)	-	↓	↓
Parents have no high school	-	↑	↑
Parents have some college	-	↓	↓
Lowest family SES quartile	-	↓	-
Enrollment characteristic			
Delayed entry	↑	↑	↑
Enrolled exclusively full time in first year	-	↑	-
First enrolled in public institution	↓	↓	↓
First enrolled in for-profit institution	↑	↑	↑
First enrolled in not-for-profit institution	‡	‡	‡
First-year tuition costs	↑	↑	↑
Working during first year	-	↓	↓
“Enrolled employees”	↑	↑	-
“Working students”	-	↓	↓
Working full time during first year	-	↑	-

‡ Reporting standards not met. Standard error is greater than or equal to half the estimate.

NOTE: GED stands for General Educational Development. SES stands for socioeconomic status.

- Indicates no measurable difference between the two student groups.

↑ Indicates the first group was measurably higher than the second group.

↓ Indicates the first group was measurably lower than the second group.

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

background, delayed enrollment, enrollment in public and for-profit institutions, tuition costs, and their student versus employee work role (tables 2.2–2.7). For some characteristics, however, differences between occupational and academic subbaccalaureate students disappear when one compares only students who are seeking an associate's degree (rather than those seeking a certificate). For other characteristics, both occupational certificate and associate's degree seekers are different from academic associate's degree seekers. Even on these characteristics, however,

occupational certificate students often stand out, in that they have different backgrounds from both academic and occupational associate's degree seekers.

More specifically, occupational and academic associate's degree seekers differ in terms of the percentage who are Black, the type of institution attended, tuition costs, whether they delay enrollment, and whether they view themselves as "enrolled employees" (tables 2.3, 2.5–2.7). Occupational certificate students, in comparison, differ from academic associate's degree seekers on every measure for which occupational and academic subbaccalaureate students differ; in addition to the measures listed immediately above, they differ in age, sex, educational background, parents' educational background, family SES, full-time enrollment, full-time work status, and whether they view themselves as "working students" (tables 2.3–2.5, 2.7). Certificate students also differ from occupational associate's degree seekers on most of these measures.

Thus, the overall differences in student background between occupational and subbaccalaureate academic students (i.e., age, sex, educational background, parents' educational background) largely reflect differences in the background of occupational certificate students. (The proportion of students who are Black is the notable exception.) In comparison, only one of the enrollment characteristics examined here (i.e., percent who are "working students," table 2.7) seems to reflect exclusively a difference in occupational certificate students' enrollment patterns. Other enrollment differences—the type of institution attended, tuition costs, and whether students delay enrollment or are "enrolled employees,"—reflect differences among all three groups of subbaccalaureate students, although even on these characteristics certificate students tend to be the outliers (tables 2.5–2.7). For example, 34 percent of academic associate's degree seekers had delayed enrollment, compared to 48 percent of occupational associate's degree seekers and 73 percent of occupational certificate students (table 2.5). The percentages enrolled in public and in for-profit institutions show similar patterns, as do tuition costs (table 2.6).

Finally, some of the background and enrollment differences between occupational and academic subbaccalaureate students are related to student progress (the topic of the next chapter). Specifically, occupational associate's degree seekers are more likely than academic associate's degree seekers to be Black and to have delayed postsecondary enrollment (tables 2.3, 2.5), both

of which are associated with lower persistence and attainment rates (Berkner, Cuccaro-Alamin, and McCormick 1996). Occupational certificate students also differ from academic associate's degree students on these measures and on the following characteristics associated with lower postsecondary persistence or attainment: being older, being Hispanic, working full time while in school, and having a lower educational background and a lower SES background (ibid; Berkner, He, and Cataldi 2002) (tables 2.2–2.4, 2.7).

Chapter 3: Educational Persistence and Attainment

This chapter examines the educational outcomes of beginning postsecondary students who had different credential goals. These outcomes are assessed as of June 2001, approximately 6 years after the BPS:96/01 students had begun their postsecondary education. A number of educational outcomes are compared among these students: rates of persistence and credential attainment, the proportion of completing students who met or exceeded their initial credential goals, and the reasons noncompleters left without attaining a postsecondary credential. As was true in the previous chapter, baccalaureate students in career programs were not measurably different from baccalaureate students in academic programs on these outcomes, so these two groups were combined into one overall baccalaureate group in this chapter. The final section of the chapter provides an overview of the credentials attained by beginning students; this categorization is used in the next chapter to examine the labor market outcomes of postsecondary completers.

BPS:96/01 provides a rich data source for examining student persistence and attainment, and a number of past studies have used these data to examine these outcomes. Most of these studies have focused on identifying the demographic and enrollment characteristics that are associated with lower probabilities of persistence and attainment—factors such as poor high school preparation, enrolling at an older age, low socioeconomic background, being Black or Hispanic, being a single parent, delayed entry to postsecondary education, attending part time, attending multiple institutions, and working full time while enrolled (Berkner, Cuccaro-Alamin, and McCormick 1996; Horn and Carroll 1996; Horn, Cataldi, and Sikora 2005; Horn and Kojaku 2001; Peter and Cataldi 2005). As seen in the previous chapter, occupational students differ from academic associate's degree seekers on some of these characteristics, with the occupational groups being more likely to have the characteristics associated with lower rates of persistence and attainment.

A few recent studies using BPS:96/01 are roughly comparable to the analysis in this report and are thus worth discussing in further detail. Berkner, He, and Cataldi (2002) used

BPS:96/01 to examine persistence and attainment among beginning postsecondary students in general. They found that over this 6-year period, 51 percent of beginning students attained a credential, 14 percent were still enrolled in postsecondary education (without having attained a credential), and 35 percent did not have a credential and were no longer enrolled. Thus, the overall *persistence and attainment rate* for 1995–96 beginning students as of 2001 was 65 percent. Berkner, He, and Cataldi (2002) also examined persistence and attainment for students who began at 4-year institutions and at public 2-year institutions. Those who began at 4-year institutions were more likely to persist or attain a credential, with 79 percent doing so, compared to 53 percent of those who began at public 2-year institutions.

Hoachlander, Sikora and Horn (2003) used BPS:96/01 to examine students enrolled in community colleges (public 2-year institutions) who were seeking to earn a credential or transfer to a 4-year institution. These analysts found that 51 percent of these students attained a credential or transferred by 2001.¹⁷ In addition, credential attainment rates were higher among community college students who initially sought a certificate than among those who sought an associate's degree (42 versus 38 percent).

Finally, the Community College Research Center (CCRC) used BPS:96/01 to examine the persistence and attainment of occupational students in particular (Alfonso, Bailey, and Scott 2004; Bailey et al. 2004a). These researchers used a definition of student persistence and attainment that is similar to but more stringent than the definition typically used in NCES reports (including this one). NCES reports typically examine whether students are still enrolled in postsecondary education or have left after attaining any postsecondary credential. In the CCRC studies, successful persistence and attainment was more narrowly defined as persistence *in a 4-year institution* or attainment of a credential *at or above* the level initially sought. Using this measure, the CCRC study found that baccalaureate students were most likely to persist or attain, followed by certificate students, then associate's degree students. Comparing occupational and academic students at each credential level, the CCRC study found no differences in student persistence and attainment at the certificate and baccalaureate levels, but occupational associate's

¹⁷ The persistence estimates from Berkner, He, and Cataldi (2002) and Hoachlander, Sikora, and Horn (2003) differ slightly because the latter study was restricted to students who were seeking a credential or transfer and because the latter study did not include enrollment in less-than-4-year institutions as successful persistence.

degree students were less likely to persist or attain than were academic associate's degree students. Further, the study found that this persistence/attainment gap was reduced, but not eliminated, when a variety of student background and enrollment characteristics was held constant.

This chapter examines student persistence and attainment in postsecondary education using the rate typically used in NCES studies (i.e., persistence or attainment at any level). After that analysis, the chapter looks at the likelihood that students attain at least the level of credential they originally sought, and at the reasons for leaving postsecondary education given by noncompleters (those who left without attaining a credential). Finally, the chapter examines the distribution of credentials attained by 1995–96 beginning students as of June 2001. The chapter does not attempt to explain observed differences in student persistence and attainment; it merely describes the progress of students who initially enrolled in each type of credential program. As seen in the previous chapter (and in previous research), these students differ in their background characteristics, so the observed differences in progress should not be attributed to any given student or program characteristic.

Persistence and Completion

To what extent do occupational students persist in and complete postsecondary education over a 6-year time period? How do their persistence and completion rates compare to other postsecondary students?

Berkner, He, and Cataldi (2002) reported an overall persistence and attainment rate of 53 percent for students who began at public 2-year institutions and 79 percent for those who began at 4-year institutions. In comparison, this analysis found that among *credential-seeking* beginning students, 60 percent of subbaccalaureate students and 82 percent of baccalaureate students had earned a postsecondary credential or were still enrolled without a credential as of

2001 (table 3.1).¹⁸ The overall persistence and attainment rates for both occupational and academic subbaccalaureate students (60 and 64 percent, respectively) were lower than for baccalaureate students (82 percent), while no difference was detected in the persistence and attainment rate for the two subbaccalaureate groups. Likewise, no differences were detected in the persistence and attainment rates for occupational certificate students and the two groups of associate's degree seekers (figure 3.1). In other words, occupational and academic subbaccalaureate students are both more likely than baccalaureate students to leave postsecondary education without earning a credential, but the different groups of subbaccalaureate students are not measurably different in their likelihood of leaving without a credential.

Looking just at credential attainment, a similar pattern is found for subbaccalaureate and baccalaureate students. Baccalaureate students attained a credential by 2001 at a higher rate than either occupational or academic subbaccalaureate students, while the two subbaccalaureate groups did not differ in their credential attainment rates. However, persistence rates show a different pattern, with academic subbaccalaureate students being more likely to persist in postsecondary education than either baccalaureate students or occupational students. This relatively high rate of persistence among academic subbaccalaureate students might be due in part to transfers to 4-year institutions. Students who intend to transfer to 4-year institutions may be more likely to persist over 6 years than other students,¹⁹ and academic subbaccalaureate students are more likely than occupational students to intend to transfer to 4-year institutions.

¹⁸ The current study found an overall persistence and attainment rate of 70 percent, compared to 65 percent in Berkner, He, and Cataldi (2002). The figures in this report may be higher than those obtained by the previous study because the current study excluded students who were not initially seeking a credential and students who had not completed high school, two groups that are likely to have lower persistence and attainment rates. Berkner, He, and Cataldi (2002), for example, found persistence and attainment rates of 44 percent for students with no credential goal, compared to 56–77 percent for those with specific credential goals. Likewise, those analysts found persistence and attainment rates of 67 percent for beginning students who had a high school diploma, compared to 53 percent for students with a GED/other equivalency, and 41 percent for students with no high school credential.

¹⁹ Berkner, He, and Cataldi (2002) found that 25 percent of students at public 2-year institutions who first transferred to a 4-year institution persisted as of 2001, compared to 12 percent of these students who did not transfer.

Table 3.1. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by persistence and attainment status, and initial credential goal: 2001

Students' initial credential goal	Total attained or persisted ¹	Highest degree attained					
		Total	Certificate	Associate's degree	Bachelor's degree	No degree, still enrolled	No degree, not enrolled
Total, all credential goals	69.7	54.7	11.5	10.3	32.9	15.0	30.3
Subbaccalaureate credential	60.4	44.9	18.4	16.1	10.5	15.5	39.6
Occupational subbaccalaureate	59.9	48.4	25.4	15.4	7.5	11.6	40.1
Certificate	65.6	62.2	56.9	4.6 !	0.7 !	3.4 !	34.4
Associate's degree	57.4	42.1	11.2	20.3	10.6	15.3	42.6
Academic subbaccalaureate	63.6	43.5	3.0 !	20.6	20.0	20.1	36.4
Certificate	‡	‡	‡	‡	‡	‡	‡
Associate's degree	63.0	43.8	2.3 !	21.0	20.5	19.3	37.0
Undeclared subbaccalaureate	59.6	35.9	9.6	14.5	11.8	23.6	40.4
Baccalaureate credential	82.3	68.0	2.0	2.5	63.5	14.3	17.7
Career baccalaureate	82.5	68.6	2.2	2.9	63.5	13.8	17.6
Academic baccalaureate	82.5	69.4	1.7	2.0	65.7	13.2	17.5
Undeclared baccalaureate	81.9	66.1	1.9 !	2.4	61.8	15.8	18.1

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

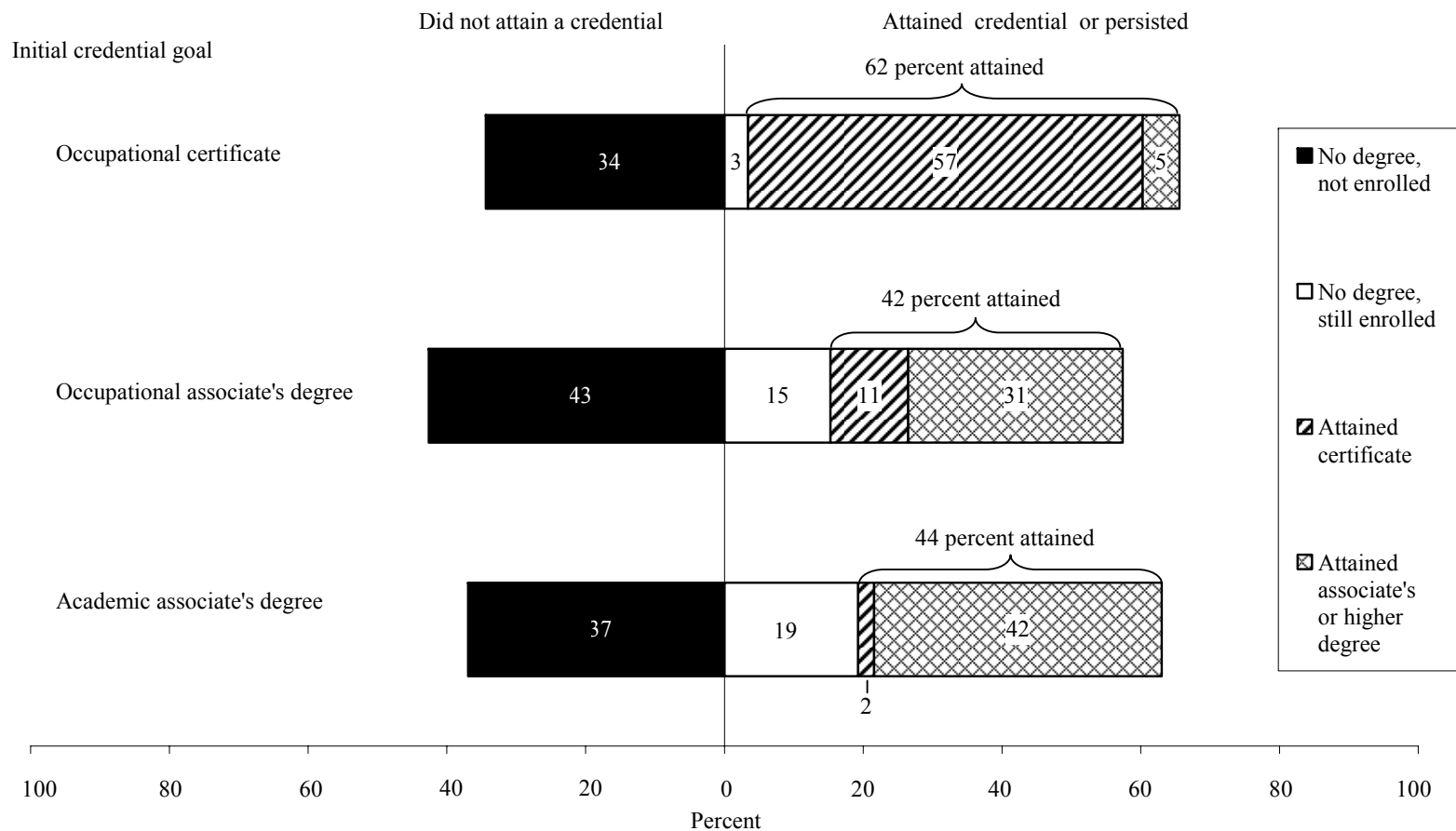
‡ Reporting standards not met. Too few cases to report.

¹ *Persisted* includes students still enrolled in a postsecondary institution but with no degree.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to totals because of rounding.

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

Figure 3.1. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students according to persistence and attainment status, by initial credential goal: 2001



NOTE: Student categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

Although occupational certificate students were not measurably different from occupational and academic associate's degree seekers in their overall persistence and attainment rates, these student groups did differ in their rates of attainment (figure 3.1). Specifically, occupational certificate students were more likely than other subbaccalaureate students to attain a credential; this pattern probably reflects at least in part the shorter time typically required to attain certificates rather than associate's or higher degrees. However, in spite of the relatively short time required to complete a certificate, no measurable difference was found in the 6-year credential attainment rate between certificate students and baccalaureate students.

Contrary to these findings, Bailey et al. (2004a) found that students seeking occupational associate's degrees were less likely than their academic peers to persist or complete (using their more stringent definition that requires obtaining a credential at the level initially sought). This difference in findings may be due to a "downgrading" of occupational associate's degree seekers from obtaining an associate's (or higher) degree to obtaining a certificate. Table 3.1 and figure 3.1 show the percentage of occupational and academic associate's degree seekers who attained (as their highest credential) a certificate and the percentage who attained an associate's or higher degree; more occupational associate's degree seekers attained a certificate than did their academic subbaccalaureate peers (11 versus 2 percent, respectively), and fewer attained an associate's or higher degree (31 versus 42 percent, respectively). The next section examines in more detail students' likelihood of attaining the level of credential they initially sought.

Meeting Expectations

To what extent do occupational students meet or exceed their initial credential expectations? How do they compare to other postsecondary students on this measure of success?

This section presents findings on the percentage of completers (credential attainers) who received a credential lower than their initial goal (e.g., a student who had an initial goal of an associate's degree, but attained a certificate) or who met or exceeded their initial goal (e.g., a student who had an initial goal of a certificate, but attained an associate's degree).²⁰ Thus, by definition, all certificate seekers who earned a credential met or exceeded their goal, since a certificate is the lowest credential available.

As seen in table 3.2, most occupational students who earned a credential (80 percent) met or exceeded their initial credential goal. By definition, all credential attainers who initially sought an occupational certificate met or exceeded their initial goal, as did 66 percent of those who sought an occupational associate's degree. The 34 percent of attaining occupational associate's degree seekers who attained a certificate as their highest credential (table 3.2) corresponds to the 11 percent of all occupational associate's degree seekers "downgrading" to a certificate seen in table 3.1 and figure 3.1.

Occupational students do not fare as well as baccalaureate students on this measure. Occupational students are not only less likely than baccalaureate students to attain a credential, but even among those who do attain a credential, students seeking an occupational credential are less likely than their baccalaureate counterparts to meet or exceed their initial credential goal; 80 percent of the former met or exceeded their initial goal compared to 93 percent of the latter (table 3.2). Among occupational and academic subbaccalaureate students, just as no differences were detected in the percentage of subbaccalaureate students with each goal who attained a credential,

²⁰ The statistics for credential completers are presented in table 3.2 and discussed in the text. Analogous statistics for all beginning students are presented in table 3.1; those statistics are not discussed in the text.

Table 3.2. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students who earned a credential, by whether they met or exceeded their initial credential goal, and initial credential goal: 2001

Students' initial credential goal	Earned lower credential than goal	Met or exceeded credential goal
Total, all credential goals	12.9	87.1
Subbaccalaureate credential	19.9	80.1
Occupational subbaccalaureate	20.4	79.6
Certificate	†	100.0
Associate's degree	34.0	66.0
Academic subbaccalaureate	12.7 !	87.3
Certificate	‡	‡
Associate's degree	13.0 !	87.0
Undeclared subbaccalaureate	24.4	75.6
Baccalaureate credential	6.6	93.4
Career baccalaureate	7.5	92.5
Academic baccalaureate	5.3	94.7
Undeclared baccalaureate	6.5	93.5

† Not applicable.

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

‡ Reporting standards not met. Too few cases to report.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

there were also no differences detected in the rates at which these students met or exceeded their credential goal when they did earn a credential. However, this finding results in part from the fact that (by definition) all completers who had a certificate goal met or exceeded their goal.

For the two groups of associate's degree seekers, those seeking an occupational associate's degree were less likely than those seeking an academic associate's degree to meet or exceed their goal when they did attain a credential (66 versus 87 percent, respectively). Thus,

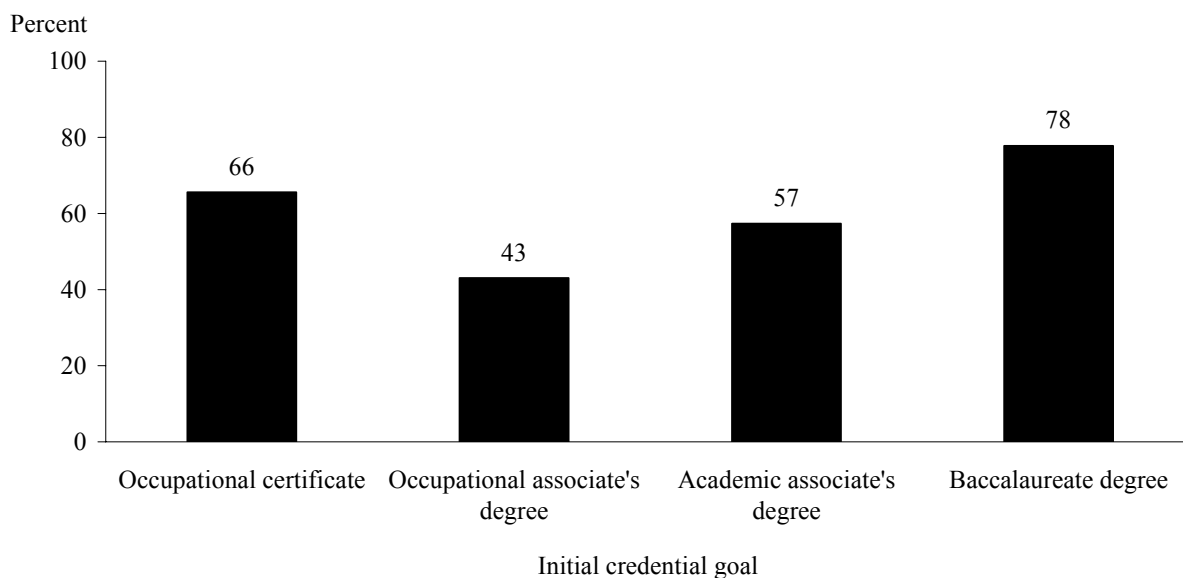
even though no difference was detected in the percentage of occupational and academic associate's degree seekers who attain a credential, the level of credentials they earn are different, with occupational students being more likely to downgrade to a certificate. This difference may occur in part because the relatively wide range of occupational (relative to academic) certificates available at many less-than-4-year institutions provides more opportunity for "downgrading" in occupational fields.

These data can also be examined in a way that more closely approximates the definition of successful completion used by CCRC. To do so, this analysis looks at the percentage of all beginning students (not just completers) who met their credential goals and includes those students who are still enrolled as meeting their goal. Using this measure, which might be called "on target" persistence and attainment, this study finds results similar to those found by CCRC (figure 3.2): Baccalaureate students are the most likely to have "on target" persistence and attainment, followed by the two groups of academic associate's degree seekers and occupational certificate students, and with occupational associate's degree seekers being the least likely to remain "on target."²¹

For the two associate's degree-seeking groups, the difference appears to result from a difference in attainment, as occupational associate's degree students were less likely than their academic counterparts to attain an associate's or higher degree, but no difference was detected in the rates at which these two student groups persisted in postsecondary education. One reason academic associate's degree seekers are more likely than their occupational peers to have "on target" attainment is the downgrading discussed above. However, another factor is that these students are relatively likely to switch to an occupational degree; this finding is discussed in more detail in the next section. It is worth noting here, however, that 25 percent of the academic associate's degree seekers who earned a credential did so by earning an occupational degree (not shown in tables).

²¹ This definition is not exactly the same as that used by CCRC, because this report does not distinguish enrollment at a 4-year from a less-than-4-year institution. This definition of "on target" is thus somewhat biased toward baccalaureate students, since persisting baccalaureate students who transferred to 2-year institutions are counted here as "on target."

Figure 3.2. Percentage of 1995–96 credential-seeking beginning postsecondary students who met or exceeded their initial credential goal or who are still enrolled, by initial credential goal: 2001



NOTE: Student categories are defined in exhibit 1.1.

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

When students don't attain their intended credential, what do they do instead?

This analysis focuses on the three groups of subbaccalaureate students: those seeking an occupational certificate, those seeking an occupational associate's degree, and those seeking an academic associate's degree. These students are divided into the following groups based on their status in 2001:

- those who attained a credential at the level and in the area of study (occupational versus academic) that they had originally intended to attain (regardless of any other credential that was also attained);
- those who attained a credential at the intended level but who switched areas of study (occupational to academic or vice versa);

- those who upgraded to a higher-level credential (in any area of study);²²
- those who downgraded to a lower-level credential (in any area of study);
- those who are still enrolled; and
- those who dropped out.

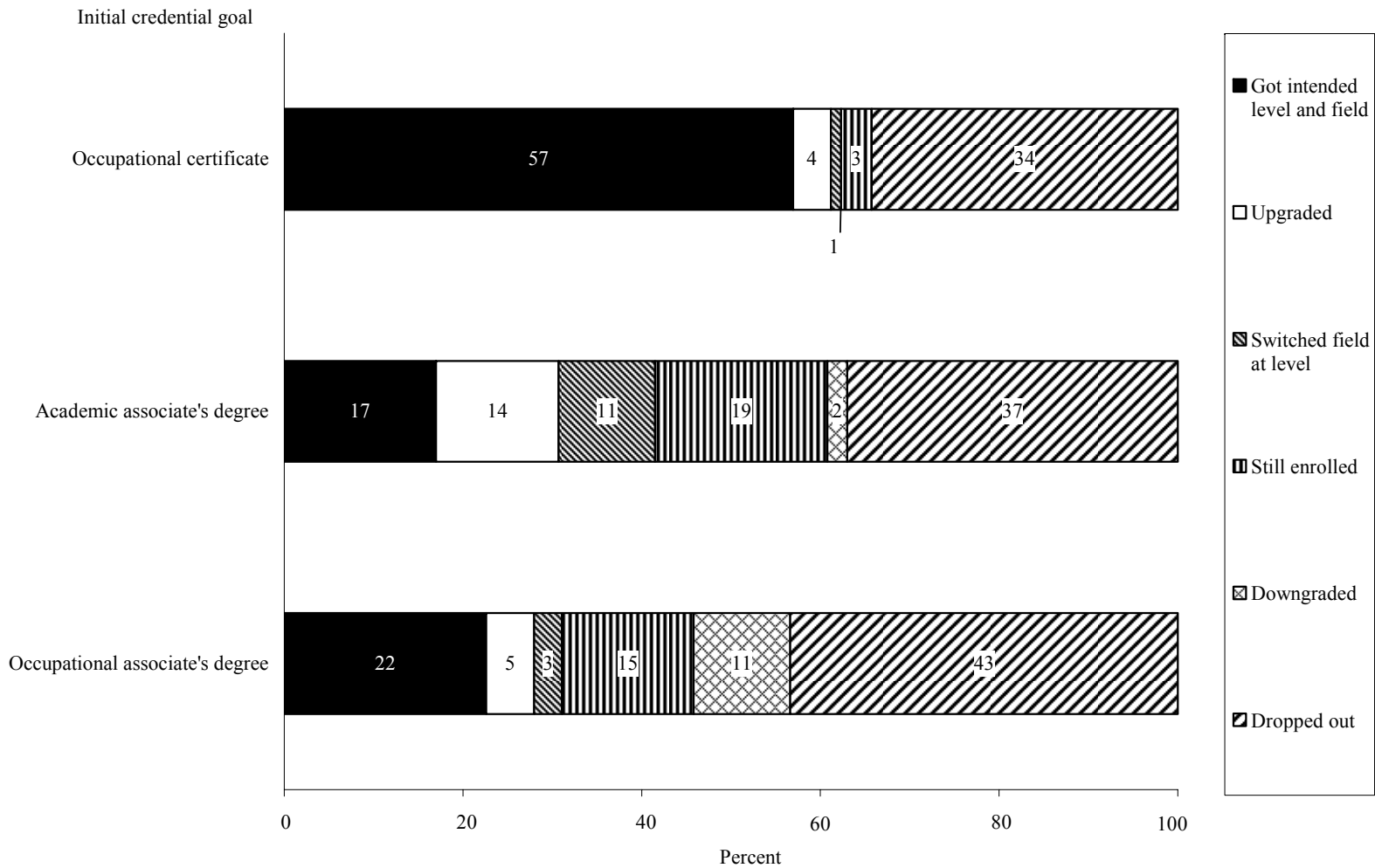
Figure 3.3 shows how the groups are distributed on these educational outcomes.

The analysis above showed that 62 percent of occupational certificate seekers attained a credential. This percentage does not change substantially when restricted to the percentage who attained an occupational certificate (57 percent). These statistics imply that about 90 percent of the occupational certificate seekers who earned a credential got the level and type of credential they initially sought (the remainder switched areas of study or upgraded to a higher credential). Figure 3.3 shows that, in general, occupational certificate students tend to have one of two outcomes—dropping out or attaining the level and type of credential they originally sought; 92 percent of occupational certificate seekers fall into these categories. As noted above, occupational certificate students were not found to differ from associate’s degree seekers in the rate at which they dropped out of school; however, they were more likely to attain a credential. This analysis shows that these students are not just more likely than associate’s degree seekers to attain a credential, but also more likely to attain the credential they originally sought.

Occupational and academic associate’s degree seekers show a more complicated pattern of educational outcomes. As noted above, these students were not measurably different in their rates of attaining a degree by 2001. They also were not measurably different in the rate at which they attained the level and type of degree they originally sought. However, among both groups, fewer students attained the level and type of degree they originally sought than attained any degree; the percentages for each group dropped at least 20 percentage points, from roughly 40 to 20 percent, implying that about half of each group of associate’s degree seekers who attained a

²² Although the associate’s degree group includes students intending to transfer to a 4-year institution (and thus presumably intending to earn a bachelor’s degree), these students were all counted as “upgrading” if they attained a bachelor’s degree. This decision was made based on the fact that all the transfer-seeking students in this group were initially enrolled in less-than-4-year institutions, so attaining a bachelor’s degree was in some sense a step up.

Figure 3.3. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students according to educational outcome, by initial credential goal: 2001



NOTE: Student categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.
 SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

credential did so at the associate's degree level and in the broad area of study they had originally sought (table 3.1 and figure 3.3). Losses from the attained-level-and-type outcome differ for the two student groups, however. As previously discussed, occupational associate's degree seekers are more likely than their academic counterparts to downgrade to a certificate, while academic students are more likely than their occupational counterparts to remain enrolled *and* to switch to an occupational associate's degree. Eleven percent of academic associate's degree seekers switched to attain an occupational associate's degree, compared to three percent of occupational associate's degree seekers switching to academic associate's degrees (figure 3.3).²³

Reasons for Leaving

Why do occupational students leave postsecondary education without attaining a credential? Do their reasons for leaving differ from those of other postsecondary students?

As reported in table 3.1, 30 percent of all beginning credential-seeking students did not attain a credential and were no longer enrolled after 6 years. Moreover, occupational students (as well as academic subbaccalaureate students) were more likely than baccalaureate students to leave school without a credential; 40 percent of occupational students (and 36 percent of academic subbaccalaureate students) left without a credential, compared to 18 percent of baccalaureate students. No measurable differences were detected in the rates at which the three subbaccalaureate groups left.

These findings raise the question of why students leave school prior to earning a credential, and whether occupational students leave for different reasons than other students. BPS:96/01 asks students who left (and had not returned) by 2001 their main reason for doing so; based on the categories available in the data file, students' reasons for leaving were aggregated for this analysis into the following six categories: *Dissatisfaction or academic problems, done*

²³ This switching of study areas explains why academic associate's degree seekers are more likely than their occupational counterparts to earn at least the level of degree they initially sought, although they were not found to be more likely to earn the level and type of degree they initially sought. It also should be noted that academic associate's degree seekers appear to be more likely than their occupational counterparts to earn a bachelor's degree (21 vs. 11 percent in table 3.1; 14 vs. 5 percent "upgrading" in figure 3.3), but these differences were not statistically significant, possibly due to large standard errors for the academic student group.

taking desired classes, family demands, job or financial demands, moved to another city or state, and other/unknown reasons (e.g., taking time off, pursuing other interests, or not reported).

As seen in table 3.3, the most common reason occupational students gave for leaving school was job or financial demands (14 percent of all occupational students, or 34 percent of the occupational students who left), followed by family demands and a move to another city or state (6 percent each). Dissatisfaction or academic problems and having finished taking desired classes were less common reasons for leaving among this group of credential-seeking students (2 and 3 percent, respectively). Job or financial demands was also the most common reason for leaving given by academic subbaccalaureate students and by baccalaureate students; however, as discussed below, baccalaureate students were less likely than subbaccalaureate students to leave for this reason.

Comparing the percentage of subbaccalaureate and baccalaureate students who gave each reason for leaving suggests that occupational and academic subbaccalaureate students typically leave for the same reasons, and that these two groups leave more often than baccalaureate students for reasons that may be related to the older age and stronger work affiliation of the former two groups: The two groups of subbaccalaureate students were more likely than baccalaureate students to leave due to job or financial demands, family demands, having taken desired classes, and a move to another city or state.²⁴ In comparison, dissatisfaction or academic problems was a more common reason for leaving among occupational students and baccalaureate students than among academic subbaccalaureate students.

In one case, these findings are qualified when one examines certificate and associate's degree-seeking students separately (figure 3.4). Although occupational and academic associate's degree seekers were not measurably different in their likelihood of leaving because of job or financial demands, occupational certificate students were less likely than both groups of associate's degree seekers to report leaving for this reason.

²⁴ There was one exception to this pattern: Although no difference was detected in the percentage of occupational and academic subbaccalaureate students who left school because they were done taking desired classes, and occupational students were more likely than baccalaureate students to leave for this reason, no difference was detected in the percentage of academic subbaccalaureate students and baccalaureate students who left for this reason.

Table 3.3. Percentage of 1995–96 credential-seeking beginning postsecondary students who left school without a credential and had not returned as of 2001, by the reason for leaving, and initial credential goal: 2001

Students' initial credential goal	Total percentage who left	Reason for leaving					
		Not satisfied/ academic problems	Done with desired classes	Family demands	Job/ financial demands	Moved to another city/state	Other or unknown reason
Total, all credential goals	30.3	2.0	1.8	4.0	10.7	4.0	7.8
Subbaccalaureate credential	39.6	2.0	2.8	5.3	14.4	5.9	9.2
Occupational subbaccalaureate	40.1	2.5	2.7	6.0	13.5	6.1	9.2
Certificate	34.4	2.1	5.5	3.2 !	6.5	9.1	8.1
Associate's degree	42.6	2.7 !	1.5 !	7.3	16.6	4.8	9.8
Academic subbaccalaureate	36.4	0.4 !	1.8 !	5.3	16.6	5.5 !	6.7 !
Certificate	‡	‡	‡	‡	‡	‡	‡
Associate's degree	37.0	‡	‡	5.4	17.1	5.5 !	6.8 !
Undeclared subbaccalaureate	40.4	1.7 !	3.7 !	3.4 !	15.3	5.6	10.8
Baccalaureate credential	17.7	2.0	0.5	2.3	5.6	1.4	5.9
Career baccalaureate	17.6	2.1	0.6 !	1.7	5.7	1.5	5.9
Academic baccalaureate	17.5	1.6 !	0.5 !	2.6	5.7	1.3 !	5.7
Undeclared baccalaureate	18.1	2.3	0.4 !	2.8	5.4	1.3	5.9

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

‡ Reporting standards not met. Too few cases to report.

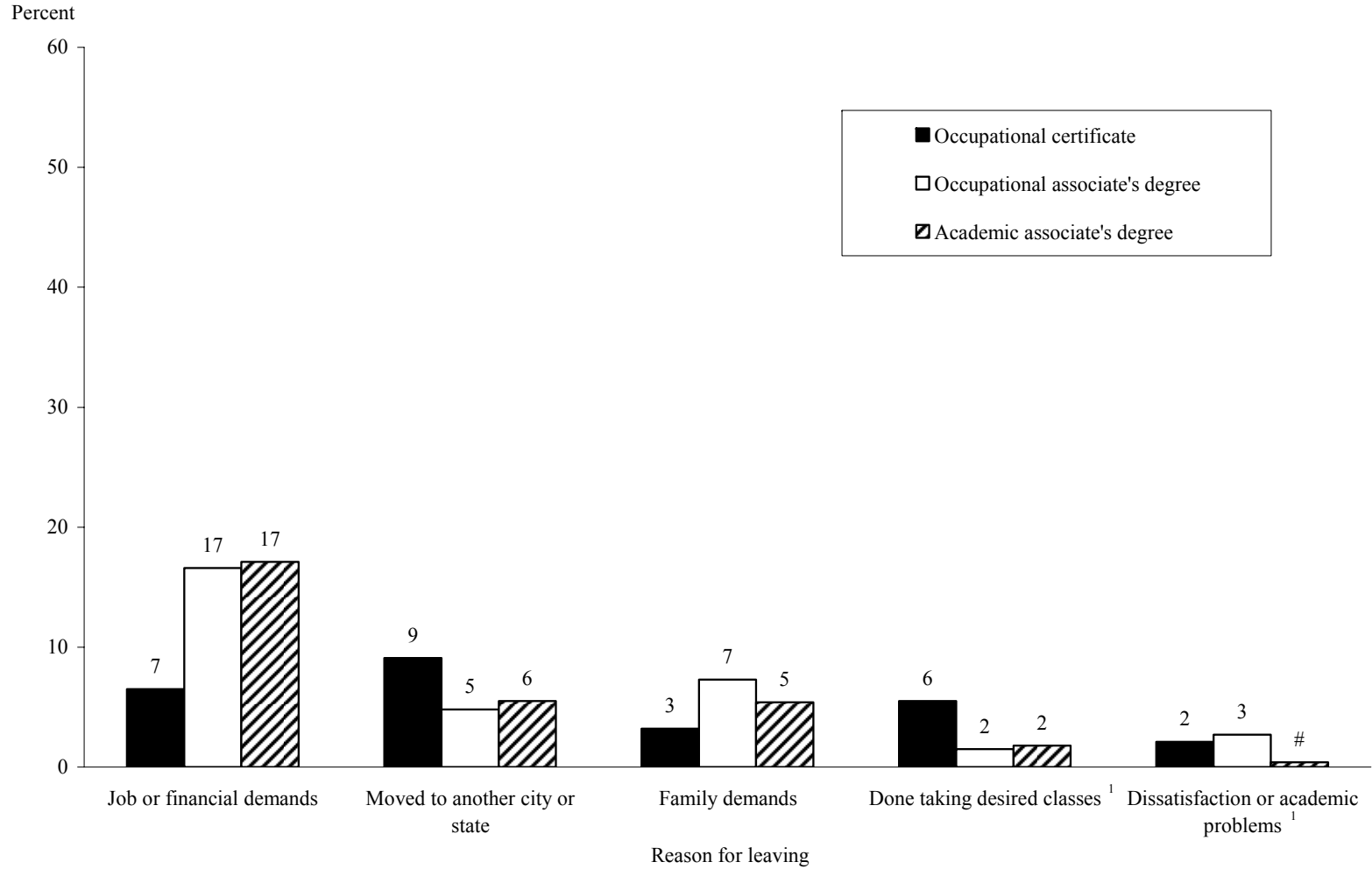
NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. Detail may not sum to totals because of rounding.

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

The Role of Academic Achievement

Although these data suggest that low academic achievement is a relatively infrequent reason for students leaving school, it is possible that this reason is more common than suggested by these data, as students may be reluctant to report that this is why they left. One way to address whether academic problems might be a more common problem would be to see how many students had a low cumulative grade point average (GPA) through their last enrollment. Ideally, these GPA data would be obtained from institutional records, the most reliable source for this information. In BPS:96/01, however, GPA data are obtained from student reports. These data

Figure 3.4. Percentage of 1995–96 credential-seeking beginning postsecondary students who gave each reason for leaving school, by initial credential goal: 2001



Estimate rounds to zero.

¹ Due to small cell sizes, the academic student group includes associate's degree-seeking students and certificate students.

NOTE: Student categories are defined in exhibit 1.1.

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

may also be influenced by students' desire to appear academically strong, but since they are arguably more objective data than "reason for leaving" responses, they are presumed to be less subject to this type of social desirability bias.

Using a cutoff of 2.25 as representing a low GPA that might signify academic problems, table 3.4 shows that overall, about 5 percent of students reported a GPA this low. Since 30 percent of students left school without a credential, these data do suggest that low academic achievement is not the main factor for leaving in most cases. Based on these findings, if all students with a GPA less than 2.25 had left school without a credential, this would account for only about 16 percent of all leavers. A second perspective leads to the same conclusion. Although (as one might expect) students with low GPAs are more likely to leave school without a credential than are those with higher GPAs, only 12 percent of students who left without completing a credential reported a GPA below 2.25.

These same data could suggest that academic problems are underestimated as a reason for leaving (even if they are an infrequent reason), since 12 percent of leavers had low GPAs, but fewer (7 percent) reported leaving due to dissatisfaction or academic problems. However, students may incur low GPAs due to constraints caused by work or family responsibilities, and thus may (justifiably) report those responsibilities as the cause of their leaving, rather than academic problems. To fully understand the role of academic achievement in motivating students to leave postsecondary education would require more extensive analysis than is possible here, including detailed questioning of *how* work and family life affect students' academic performance and persistence.

Attained Credentials

What is the distribution of credentials attained by beginning postsecondary students? What percentage earned occupational credentials?

Thus far, this report has examined students based on their initial credential goals. In this section, beginning students are categorized according to the type of credential they earned rather

Table 3.4. Percentage of 1995–96 credential-seeking beginning postsecondary students with cumulative GPA below 2.25, by persistence and attainment status, and initial credential goal: 2001

Students' initial credential goal	All students	Still enrolled or attained credential	Not enrolled, no credential
Total, all credential goals	4.8	3.3	11.9
Subbaccalaureate credential	5.9	4.6	9.6 !
Occupational subbaccalaureate	5.4	3.5	10.4 !
Certificate	4.8 !	‡	‡
Associate's degree	5.5	3.4 !	11.3 !
Academic subbaccalaureate	7.5 !	6.7 !	‡
Certificate	‡	‡	‡
Associate's degree	7.7 !	7.0 !	‡
Undeclared subbaccalaureate	5.4 !	5.0 !	‡
Baccalaureate credential	3.8	2.3	16.6
Career baccalaureate	4.3	2.8	17.3
Academic baccalaureate	3.3	1.4 !	19.0
Undeclared baccalaureate	3.6	2.2	14.2

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

‡ Reporting standards not met. Too few cases to report.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

than their initial credential goal; in other words, students are now categorized based on their educational endpoint rather than their starting point. The credential groupings are similar to those in the previous sections but include an additional category for students who attained a credential of undetermined type. This analysis delineates the credentials earned by 1995–96 beginning credential-seeking students as of 2001, with the constraint that credentials beyond the bachelor's degree are not included (because BPS:96/01 did not collect information on credentials beyond the baccalaureate).

Since students can earn more than one credential over a 6-year period, students' credential attainment is categorized in two ways:

1. Percentage of students who attained a specific type of credential at any point during their 1995–2001 postsecondary experience (overlapping categories); and
2. Percentage of students who attained a specific type of credential as their highest credential award from 1995 to 2001 (nonoverlapping or mutually exclusive categories).

Both sets of percentages are listed in table 3.5.²⁵ The two analyses yield similar results, as multiple-credential attainment was not common over this 6-year period. The next chapter of the report, which focuses on the economic outcomes of postsecondary occupational education, examines students based on their highest credential attainment (the rightmost column in table 3.5). This table thus serves as an introduction to the population for the analysis of economic outcomes.

Table 3.5 shows that among the 1995–96 beginning credential-seeking students who obtained a credential by 2001, 37 percent earned occupational credentials, with 21 percent earning occupational certificates and 18 percent earning occupational associate’s degrees. (Two percent earned both.) Academic subbaccalaureate credentials were less common, with only 7 percent of completers earning these credentials. Occupational fields were also relatively common among baccalaureate degree earners; 35 percent of completers earned baccalaureate degrees in career fields compared to 25 percent who earned academic baccalaureate degrees.

Because about 5 percent of these completers obtained a bachelor’s degree as well as a subbaccalaureate credential, the percentage of completers who obtained a subbaccalaureate credential as their highest credential declines to 39 percent (from the 44 percent who earned a subbaccalaureate credential). Academic subbaccalaureate credentials are sometimes intended as transfer credentials, so it may not be surprising that although 7 percent of students earned academic subbaccalaureate credentials, only 4 percent earned these credentials as their highest

²⁵ Table 3.5 presents percentages of completers (students with credentials) with each type of credential while table 3.1 presents percentages of credential seekers with each type of credential; thus, the percentages in the two tables are not comparable.

Table 3.5. Percentage of 1995–96 credential-seeking beginning postsecondary students with a credential who earned each type of credential, and who earned each type of credential as their highest credential: 2001

Type of credential earned	Percent who earned credential ¹	Percent who earned credential as highest ²
Total, all credential attainers	100.0	100.0
Subbaccalaureate credential	43.7	38.5
Occupational subbaccalaureate	37.3	33.4
Certificate	20.6	19.2
Associate's degree	17.8	14.2
Academic subbaccalaureate	6.5	4.2
Certificate	1.0 !	0.5 !
Associate's degree	5.8	3.7
Subbaccalaureate, major unknown	1.2	0.9 !
Baccalaureate credential	58.8	58.8
Career baccalaureate	34.5	33.6
Academic baccalaureate	24.9	24.8
Baccalaureate, major unknown	0.4 !	0.4 !
Attained credential, level and major unknown	2.8	2.8

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

¹ Detail sums to more than 100 because students could earn more than one credential.

² Detail may not sum to totals because of rounding.

NOTE: Occupational, career, and academic categories are defined in exhibit 1.1.

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

credential. However, even some occupational credentials were combined with higher credentials; although 37 percent of students earned subbaccalaureate occupational credentials, a smaller percentage (33 percent) earned them as their highest credential.

Finally, it is interesting to compare the findings in table 1.1, showing the percentage of beginning students intending to attain each credential, with table 3.5, showing the percentage of credential attainers who received each credential. The differences in the tables reflect losses due to students dropping out of school, as well as students who are still enrolled and student mobility across credentials of different levels and types. For example, in 1995–96, 58 percent of

beginning students expected to attain a subbaccalaureate credential and 42 percent expected to attain a baccalaureate credential; in 2001, however, these percentages were reversed, with 44 percent of students who had attained a credential having earned a subbaccalaureate credential and 59 percent having earned a baccalaureate credential. As noted earlier in this chapter, baccalaureate-seeking students are more likely to attain a credential than are their subbaccalaureate peers; this reversal reflects in part the effects of that attainment rate difference.

Summary

Obtaining a postsecondary credential and persisting toward a credential are important educational outcomes. According to this analysis, 60 percent of 1995–96 beginning students who intended to earn a credential in occupational areas had earned a postsecondary credential or were still enrolled as of 2001, and 48 percent of these credential seekers had earned a credential (table 3.1).

Compared to baccalaureate students, occupational students do not fare as well, as they are less likely than baccalaureate students to persist or attain a credential; however, this appears to be a subbaccalaureate versus baccalaureate difference, as both occupational and academic subbaccalaureate students have lower persistence-and-attainment rates than their baccalaureate peers, but are not measurably different from each other on this outcome (table 3.1). The same pattern is found when comparing credential attainment rates. However, these findings mask one important difference among the subbaccalaureate groups: Occupational *associate's degree-seeking* students are more likely than their academic counterparts to “downgrade” their credential when they attain one—that is, to get a certificate rather than a degree (figure 3.3). Another reason academic associate's degree seekers are more likely than their occupational counterparts to get at least an associate's degree is that they switch to occupational associate's degrees at a relatively high rate. Finally, occupational certificate students fare better than occupational associate's degree seekers, as they are more likely than both groups of associate's degree seekers to earn a credential over a 6-year period (table 3.1).

Students in BPS:96/01 were not asked why they attained a credential that was lower than their initial goal, but those who left school were asked why they did so, and these reasons may also be relevant to the “downgrading” issue. The most common reason for leaving given by the 40 percent of occupational students who had done so by 2001 was job or financial demands, followed by family demands and moving to another city or state (table 3.3). At least the first two of these reasons for leaving could also motivate students to switch to a shorter educational program (downgrade), as well as to leave school.

Overall, occupational and academic subbaccalaureate students leave school for similar reasons, although academic subbaccalaureate students are less likely to leave due to dissatisfaction or academic problems than are occupational students (table 3.3). Compared to baccalaureate students, subbaccalaureate students are more likely to leave for a variety of reasons, including job or financial demands, family demands, moving, and having taken desired classes (even though all of these students had originally said they were seeking a credential). Many of these reasons are likely a result of the older age and stronger connection to the labor market (i.e., more working students, more students identified as “enrolled employees”) characteristic of subbaccalaureate students, and many can indirectly affect student performance. However, dissatisfaction and academic problems do not appear to (directly) motivate subbaccalaureate students to leave more often than baccalaureate students, at least according to students’ reports. Finally, certificate students are less likely than other subbaccalaureate students to leave because of job or financial demands. This finding suggests the value of short, skills-focused programs for some students; these programs may interfere less with jobs and can provide at least entry-level labor market skills relatively quickly. The extent to which these advantages translate into labor market benefits is an issue addressed in the next chapter.

Chapter 4: Labor Market Outcomes of Occupational Education

Postsecondary education can be costly for both individuals and for society.²⁶ These costs are presumed to be outweighed by the benefits education provides in terms of increased earnings and productivity in the labor market, making education a good investment for individuals and society. Human capital theory provides a framework for understanding these educational benefits (Becker 1962, 1975). This theory postulates that education has positive labor market benefits because it provides individuals with the skills and knowledge (i.e., human capital) needed by employers, who then reward this attainment through their hiring and salary practices. As discussed below, extensive literature documents these labor market benefits of education (or the “returns to education,” in economic terms), based on the years of education completed and the level of the educational credential attained. This section of the report uses BPS:96/01 data to examine the labor market benefits received by students who complete an occupational credential (i.e., an occupational certificate or associate’s degree). First, however, this section summarizes some of the more recent literature that focuses specifically on the attainment of subbaccalaureate credentials.

An earlier NCES study used BPS data from 1995–96 to 1998 (BPS:96/98) and the National Education Longitudinal Study of 1988 (NELS:88, a longitudinal study of students who were in the eighth grade in 1988) to examine community college students’ reports of the effect of their education on their labor market outcomes (Hoachlander, Sikora, and Horn 2003).²⁷ In both the BPS:96/98 and NELS:88 analyses, community college students who completed a credential reported more positive labor market outcomes than those who had not completed a credential. These data suggest positive labor market outcomes for attaining a subbaccalaureate credential, but they are based on subjective, indirect measures of those outcomes. Other studies have used

²⁶ Individuals’ costs include not just tuition and fees but also foregone earnings for those who do not work or work only part time while in school; society’s costs include financial aid support and other education subsidies as well as lost tax revenues from foregone earnings.

²⁷ The outcomes reported in Hoachlander, Sikora, and Horn (2003) were whether enrollment improved salary, increased job responsibilities, or increased job opportunities (from BPS:96/98) and whether postsecondary education led to a higher salary, better jobs, more responsibility, promotion opportunities, or improved job performance (from NELS:88).

national-level data to examine more objective, direct measures of labor market outcomes, such as earnings and labor force participation. For example, using the Current Population Survey, Day and Newburger (2002) reported that the average annual earnings of full-time, year-round workers between 1997 and 1999 for those who had earned an associate's degree was \$38,200, which was \$1,400 more than individuals with some college but no credential, and \$7,800 more than high school graduates with no postsecondary education.

In recent reviews of studies on the returns to a subbaccalaureate education, Grubb (1997, 2002) concludes that the evidence is mixed for an economic payoff to subbaccalaureate education that does not lead to an associate's degree (after controlling for students' background characteristics). Grubb's later study summarized the findings from several national longitudinal datasets²⁸ and, in some cases, found measurable gains in the earnings of men who obtain a certificate in engineering and computer fields, and for both men and women with certificates in health-related fields, compared to individuals with no additional schooling beyond high school; however, most other students who earned a certificate did not experience improved economic outcomes. On the other hand, Grubb finds that individuals who complete an associate's degree earn, on average, between 20 to 30 percent more than high school graduates without any additional education. Similarly, Kane and Rouse (1995) found that individuals (particularly women) with associate's degrees have higher earnings than similar individuals with a high school diploma only.

In a recent report conducted for the National Assessment of Vocational Education, Bailey, Kienzl, and Marcotte (2004) used three nationally representative longitudinal datasets—High School and Beyond, NELS:88, and BPS:1989/94—to analyze economic returns among students with differing amounts of postsecondary education accumulated with and without a credential, as well as by the type of credential earned and area of study (occupational or academic). In general, the evidence presented in their study suggests a positive benefit to a subbaccalaureate education when compared to high school graduation (only), but no greater benefit for occupational subbaccalaureate rather than academic subbaccalaureate students. For

²⁸ The following longitudinal datasets were used by the studies reviewed by Grubb (2002): National Longitudinal Survey of the Class of 1972, High School and Beyond, National Longitudinal Survey of Youth, Survey of Income and Program Participation, and National Adult Literacy Survey.

example, their findings from NELS:88 show that subbaccalaureate students are more likely than high school graduates to participate in the labor force, be employed full time, and have higher wage rates and earnings. Their analysis of BPS:1989/94 compared credential completers to students who completed less than three full-time equivalent (FTE) months of postsecondary school; this analysis found mixed results, with increased salaries for younger women (age 24 or less) and for older men (over age 24) who earned occupational associate's degrees.

Comparisons of postsecondary credential completers with those who never entered postsecondary education are most useful for showing the effects of each additional year of postsecondary education beyond high school and for showing the “full effect” of attaining a postsecondary credential versus not entering postsecondary education at all. However, this “full effect” includes a selection effect, as those who do not enter postsecondary education may differ from those who do enter on a number of dimensions that may also be related to labor market outcomes (e.g., motivation, intelligence, long-term career focus).²⁹ In other words, part of the reason students with an associate's degree earn more than those who never entered postsecondary education may be that those who enter postsecondary education are simply more motivated to make money than those who do not enter postsecondary education, which leads both to the former group's postsecondary credential and—independent of that credential—higher earnings (e.g., by being more motivated to work longer hours on the job, participate in job training, etc.). To remove this selection effect, one needs a different study design—specifically, a study that uses a data set like BPS, limited to individuals who all entered postsecondary education.

Another advantage to using BPS data is that it allows for an examination of the “sheepskin effect.” This term refers to a common empirical issue in the returns to education literature (Belman and Heywood 1991; Blair, Finn, and Stevenson 1981; Card 1999; Heywood 1994; Jaeger and Page 1996)—does attaining a credential provide added benefits beyond staying in school for however long it takes to earn the credential? If it does, the credential is said to confer a sheepskin effect, as the credential itself has value beyond the years of education

²⁹ Some studies attempt to control for these potential differences (e.g., by controlling for high school grades or standardized test scores; see Card 1999, Heckman 1979, Kienzl 2005, Willis and Rosen 1979); however, such controls are proxy measures and thus likely to be imperfect.

completed. Some analysts have found that in terms of effects on earnings, a credential may matter more than the years of schooling completed in order to attain the credential, especially for women and minorities (Belman and Heywood 1991, Card 1999).

Thus, the main questions of interest in this chapter are: Do students who earn occupational credentials have better labor market outcomes than students who enroll in postsecondary education but do not earn a postsecondary credential? Does the type of credential (certificate versus associate's degree) matter? Are labor market benefits fully explained by the years of education that students complete (a proxy for human capital development), or is there an additional sheepskin effect? To examine these issues, the chapter focuses on a different group of students than was examined in previous chapters. Instead of looking at students who intend to earn an occupational credential, this chapter focuses on 1995–96 beginning students who *attained* an occupational credential by 2001 (regardless of their initial credential goal), categorized by the type of credential they attained (as listed in table 3.5 in the previous chapter). The labor market outcomes of these credential completers are compared to those of students who intended to earn an occupational credential but who, as of 2000, had left school without attaining any credential (i.e., the chapter compares occupational completers with occupational noncompleters).³⁰

This chapter also uses regression analyses to control for differences in students' backgrounds that may make educational effects on labor market outcomes more difficult to observe. The regression analyses also allow for an examination of sheepskin effects, by allowing for the simultaneous control of credential attainment and years of education. Thus, the chapter begins with descriptive, cross-tabular analyses showing the labor market outcomes of occupational completers and noncompleters, then presents a series of regression equations on selected outcomes to help disentangle the effects of student background, credential attainment, and years of education on labor market outcomes. In the cross-tabular analyses, both occupational certificate and occupational associate's degree completers are compared to, respectively, occupational certificate and occupational associate's degree noncompleters, to determine whether there is an advantage to earning either credential over earning no

³⁰ Students enrolled in school in 2001 were excluded from this analysis.

postsecondary credential. In addition, occupational certificate completers are compared to occupational associate's degree completers, to determine whether there is an added advantage to earning an associate's degree above any advantage to earning a certificate.

The outcomes examined in this chapter are listed below; each outcome is constructed based on former students' self-reports of their labor force status in 2001:

- labor force participation rate (defined below);
- employment rate (defined below);
- unemployment rate (defined below);
- percent of employed former students who are working full time;
- percent of employed former students who are working in an occupation related to their field of study; and
- average annual salary of employed former students.

Labor force participation rate. Consistent with the Bureau of Labor Statistics (BLS),³¹ this rate indicates the proportion of the total population that is either employed or not employed but looking for work:

$$\text{Labor force participation} = (\text{Number employed} + \text{Number not employed but looking for work}) / \text{Number in total population}$$

By including both those in employment and those seeking employment, the labor force participation rate provides an indicator of labor force interest (i.e., of the extent to which individuals choose to participate in the labor force, regardless of whether they are able to get a job).

³¹ Bureau of Labor Statistics definitions for the three labor force terms defined here can be found at <http://bls.gov/bls/glossary.htm>.

Employment rate. Consistent with BLS (which uses the term “employment-population ratio”), the employment rate indicates the proportion of the total population that is employed:

$$\text{Employment rate} = \text{Number employed} / \text{Number in total population}$$

Thus, the employment rate provides an overall measure of the extent of employment, regardless of whether individuals seek to be employed. This measure is useful as an indicator of the extent to which individuals are both willing and able to get a job, (i.e., the extent to which employment is “achieved” among a population).

Unemployment rate. As traditionally calculated by BLS, the unemployment rate is a measure of the extent to which those who want a job are unable to find one:

$$\text{Unemployment rate} = \text{Number not employed but looking for work} / (\text{Number employed} + \text{Number not employed but looking for work})$$

The unemployment rate can thus be considered an indicator of how successful labor force participants are at finding work.

Descriptive Findings

As discussed below, the descriptive analyses found few measurable differences in labor market outcomes between occupational certificate completers and noncompleters, between occupational associate’s degree completers and noncompleters, and between completers who earned an occupational associate’s degree rather than an occupational certificate.

To what extent do occupational program completers participate in the labor market and to what extent are they employed? How do occupational completers compare to noncompleters on these employment characteristics? How do occupational associate’s degree completers compare to certificate completers?

Labor force participation rate. The labor force participation rate was 94 percent for occupational certificate completers and 93 percent for occupational associate’s degree completers (table 4.1). Labor force participation rates were not found to be related to program completion: No measurable differences were found between occupational certificate completers and noncompleters, between occupational associate’s degree completers and noncompleters, or between occupational certificate and associate’s degree completers in the percentage who were in the labor force in 2001.

Table 4.1. Percentage of 1995–96 credential-seeking beginning postsecondary students with each labor force characteristic, by students' completion and credential status: 2001

Completion and credential status	Percent of all respondents			Percent of workers employed full time	Unemployment rate ¹
	In labor force	Employed	Employed full time		
Occupational subbaccalaureate completer	94.0	87.0	75.1	86.4	7.4
Certificate completer	94.4	87.1	72.8	83.6	7.8
Associate's degree completer	93.3	86.9	79.3	91.2	6.9 !
Occupational subbaccalaureate noncompleter	92.9	85.2	75.4	88.5	8.3
Certificate noncompleter	88.9	74.4	61.3	82.3	16.3 !
Associate's degree noncompleter	94.3	89.2	80.6	90.4	5.4 !

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

¹ *Unemployment rate* is the number of individuals who are not working and are seeking work divided by the number of individuals in the labor force (working, or not working and seeking work).

NOTE: Occupational categories are defined in exhibit 1.1.

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

Employment rate. Eighty-seven percent of occupational certificate completers and of occupational associate’s degree completers were employed in 2001 (table 4.1). Certificate completers had a higher rate of employment than did certificate noncompleters (87 versus 74 percent), although no measurable difference was found in the employment rates of associate’s degree completers and noncompleters (87 and 89 percent, respectively). Thus, occupational certificate completion, but not occupational associate’s degree completion, was associated with a higher rate of entry into employment (compared to noncompletion). This finding, in combination with the finding for labor force participation rates, suggests that occupational certificate

noncompleters may have a higher unemployment rate than certificate completers. Unfortunately, as seen below, the findings for unemployment rate do not help to resolve this issue.

Full-time employment. Seventy-three percent of occupational certificate completers and 79 percent of occupational associate's degree completers worked full time in 2001 (table 4.1). For both occupational groups, completers were not found to differ from noncompleters in their likelihood of working full time. This was true both among former students overall, and among those who were employed. Among former students who were employed, certificate completers were less likely than associate's degree completers to work full time (84 versus 91 percent, respectively). It is unclear, however, whether this difference is unique to program completers; a difference of similar size—although not statistically significant—was observed among occupational certificate and associate's degree noncompleters.³²

Unemployment rate. As seen in table 4.1, the unemployment rate was 8 percent for occupational certificate completers and 7 percent for occupational associate's degree completers. Occupational noncompleters do not appear to have a more difficult time finding a job than do completers; no measurable relationship was found between unemployment rates and any of the completion/noncompletion groups, although occupational certificate noncompleters had an 8 percentage point higher unemployment rate than did occupational certificate completers (8 versus 16 percent). The relatively large standard error for these noncompleters may account for this lack of statistical relationship (table B-4.1).

To what extent are occupational program completers employed in jobs related to their field of study? Are occupational completers more likely than noncompleters to have related jobs? How do occupational associate's degree completers and occupational certificate completers compare on this measure?

Most occupational program completers who worked reported that they were employed in a job related to their field of study (table 4.2). There are many reasons why students who

³² These percentages were 82 and 90 percent respectively, and the standard error for certificate noncompleters was relatively large (table B-4.1).

Table 4.2. Percentage distribution of 1995–96 credential-seeking beginning postsecondary students who were working, by relatedness of their job to their classes, and students' completion and credential status: 2001

Completion and credential status	Closely or somewhat related	Not related
Occupational subbaccalaureate completer	70.1	29.9
Certificate completer	67.6	32.4
Associate's degree completer	74.5	25.5
Occupational subbaccalaureate noncompleter	46.2	53.8
Certificate noncompleter	57.8	42.3
Associate's degree noncompleter	42.6	57.4

NOTE: Occupational categories are defined in exhibit 1.1. Detail may not sum to 100 because of rounding.

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

complete an occupational program might be more likely than noncompleters to end up in a job related to their field of study. The most obvious reason is that program completers have acquired the skills and credentials necessary for a job in their study field, while noncompleters have fewer skills and no educational credential. In addition, noncompleters may have failed to complete their educational program because they realized they did not have sufficient interest or ability to pursue that field of study (and work), while completers presumably had sufficient interest and ability. Given these factors, it is perhaps not surprising to find that, among those who worked, occupational associate's degree completers were more likely than noncompleters to work in a job related to their field of study (75 versus 43 percent, respectively). Although 68 percent of occupational certificate completers were employed in a job related to their field of study, compared to 58 percent of occupational certificate noncompleters, this difference was not statistically significant, possibly due to the relatively large standard error for certificate noncompleters (table B-4.2). No measurable difference was found in the likelihood that occupational certificate versus associate's degree completers worked in a job related to their field of study.

What is the average salary earned by occupational program completers, and how does this compare to the salary earned by noncompleters? Do occupational associate's degree completers earn a higher salary than certificate completers?

The average 2001 salary of occupational certificate completers was \$25,900. This was lower than the average salary of occupational associate's degree completers, which was \$30,100 (table 4.3). However, at least some of this difference appears to be due to the higher rate of full-time employment among associate's degree completers. Comparing only full-time workers, there was no measurable difference in the 2001 salaries of these groups (\$27,900 versus \$30,700, respectively). No measurable relationship was found between average 2001 salary and credential completion for either former certificate or associate's degree students overall or for those working full time. As will be seen below, however, there is one subgroup of former students for whom occupational education is linked to higher salaries.

Table 4.3. Average annual salary in 2000 of 1995–96 credential-seeking beginning postsecondary students who worked, by students' completion and credential status: 2001

Completion and credential status	All workers	Part-time workers	Full-time workers
Occupational subbaccalaureate completer	\$27,400	\$17,000	\$29,000
Certificate completer	25,900	15,200	27,900
Associate's degree completer	30,100	23,000	30,700
Occupational subbaccalaureate noncompleter	26,200	12,800	28,000
Certificate noncompleter	24,400	14,100 !	26,600
Associate's degree noncompleter	26,700	12,100	28,400

! Interpret data with caution. Standard error is more than one-third as large as the estimate.

NOTE: Occupational categories are defined in exhibit 1.1.

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

Regression Analysis

The results above suggest there is not much of a labor market advantage to completing a postsecondary credential (beyond attending postsecondary education at all). However, it is possible that these descriptive findings mask an underlying effect. For example, males earn more

than females at equivalent education levels (Ryan 2005), so if males are more likely than females to drop out of postsecondary occupational programs, their higher earnings could mask an education effect in these data. Similarly, workers with more experience tend to earn more than workers with less experience (Heckman, Lochner, and Todd 2006; Mincer 1974), so if older workers (who tend to be more experienced) are more likely to drop out than are younger workers, this also could mask an education effect. To control for these and other differences in the sociodemographic backgrounds of (former) students, this section of the chapter presents a regression analysis predicting three key outcomes—employment rate, full-time employment, and average salary—from the variables listed below:

- whether students earned an occupational certificate as their highest credential;
- whether students earned an occupational associate’s degree as their highest credential;
- years of education completed (in full-time equivalency, or FTE);
- students’ sex;
- students’ age;
- students’ race/ethnicity;
- family SES at initial school entry (unless student is independent, then own SES); and
- whether students were “employees enrolled in school” (a proxy measure to control for labor market experience).

Particularly for occupational subbaccalaureate students, it is possible that years of education is more strongly related to labor market outcomes than is credential attainment. The regression analyses tested this hypothesis by including the amount of education completed as well as the attainment of an occupational certificate or associate’s degree as independent variables.³³ It is also possible that salary benefits accrue only to students who enter an occupation related to their study area. So the variable indicating whether (former) students are working in an occupation related to their field of study was included in the regression predicting average salary.

³³ Regression equations were first run with the attained credentials variable but not with years of education; however, those regressions found no significant effects for credential attainment. Thus, only the regression analyses that include years of education are presented here. The analyses include only students who were seeking or had received a sub-baccalaureate credential; however, the years of education variable includes all education these students received during the 6-year period, at either the sub-baccalaureate or baccalaureate level.

Finally, interactions were tested between sex and highest credential earned, between sex and years of education completed, and between working in a related occupation and years of education completed;³⁴ most of these interactions were found to be nonsignificant and thus were dropped from the final regression models. The one significant interaction (between working in a related occupation and years of education completed) in the prediction of salary was retained in the regression equation predicting that outcome.

Linear regression methods assume a continuous, normally distributed outcome variable. When the outcome variable does not meet these assumptions, a different regression method must be used. Thus, to predict the dichotomous outcomes of employment and full-time employment, logistic regression was used. To predict the non-normally distributed (skewed) continuous salary outcome, semi-log regression was used (Mincer 1974). These regression methods are more fully explained in appendix A.

Some Caveats

Three cautions are in order before presenting the regression results. First, regression is a correlational analysis method and thus does not support causal inference. In other words, finding that one or more predictor variables (covariates) are related to an “outcome” variable (e.g., that years of education is related to salary) does not mean that the covariate is the cause of the outcome. For example, another variable not included in the regression model could be related to both the covariate and outcome variable and be the cause of both. However, education’s effects on labor market outcomes are generally accepted within the framework of human capital theory (e.g., Becker 1962, 1975; Cameron and Heckman 1998; Card 1999; Heckman 1979; Mincer 1974; Willis and Rosen 1979).

Second, it is important to bear in mind that this analysis examines only short-term labor market outcomes measured, on average, about 3 years after students had completed their education. It is possible that the labor market benefits that accrue to students who earn

³⁴ The hypothesis for this last interaction, derived from human capital theory, is that years of education is related to salary only when individuals are employed in jobs related to their education (i.e., only when their human capital is of the correct currency).

credentials come not immediately after they enter the labor market, but years later, as their credentials are transferred to job skills that then are rewarded over time (Hollenbeck 1993; Leigh and Gill 1997). A different analysis, using a longitudinal study over a longer time frame, would be necessary to examine the relationship between education and labor market benefits over one's lifetime. In addition, these labor market outcomes are also point-in-time measures that do not capture individuals' full labor market history since leaving school; a richer employment outcome variable could produce different findings.

Finally, the regression analyses performed here are relatively basic and are not assumed to present a complete analysis of the issue of educational labor market outcomes. The intention here is to merely move a step beyond the simple bivariate analyses to see if relationships between educational attainment and labor market outcomes can be found when some of the more obvious possible confounding variables are controlled. It is left to the research community to provide a more thorough analysis, using these or other data.

Likelihood of being employed. This regression model (table 4.4) predicted whether a former student was employed, from among those in and out of the labor force. No relationship was detected between a former student's likelihood of being employed and whether or not the student attained either an occupational certificate or an occupational associate's degree. Likewise, no differences were found in the likelihood that former students with more years of education were employed compared to students with fewer years of education. These results differ from the bivariate analysis, where those with an occupational certificate were more likely to be employed than those without a certificate (and where students' background characteristics were not held constant).

Full-time employment. The analysis of "likelihood of being employed" combines former students' participation in the labor force with their ability to get a job. The second regression focused on only former students who were employed, thus removing labor force participation rates from the equation, and focused on a more stringent outcome, full-time

Table 4.4. Logistic regression results for 1995–96 credential-seeking beginning postsecondary occupational students, estimating employment from students' educational and demographic characteristics: 2001

Educational and demographic characteristics	Coefficient	Standard error	Marginal effect	Standard error
Years of full-time equivalent postsecondary education	0.20	0.151	0.02	0.014
Highest credential attained (Reference category: <i>Did not attain a credential or still enrolled</i>)				
Attained certificate	0.36	0.309	0.04	0.028
Attained associate's degree	-0.02	0.292	#	†
Sex (Reference category: <i>Male</i>)				
Female	-0.91	0.492	-0.09	0.035
Race/ethnicity ¹ (Reference category: <i>White, non-Hispanic</i>)				
Black, non-Hispanic	0.14	0.651	0.01	0.057
Hispanic	1.03 *	0.323	0.10	0.019
Other, non-Hispanic	0.62	0.682	0.06	0.044
Age (Reference category: <i>16–18 years old</i>)				
19 years old	-0.62	0.543	-0.06	0.070
20–23 years old	-0.82	0.621	-0.08	0.095
24 years or older	-0.91 *	0.311	-0.09	0.040
Family socio-economic status (Reference category: <i>Middle quartiles</i>)				
Lowest quartile	-0.28	0.364	-0.03	0.039
Highest quartile	0.67	0.511	0.06	0.032
Student/employee role (Reference category: <i>Student working to meet expenses</i>)				
Employee enrolled in classes	0.16	0.379	0.02	0.036
Intercept (constant)	2.44 *	0.591		
Adjusted R-squared	0.046 *			
Number of observations	1,193			

† Not applicable.

Estimate rounds to zero.

* $p < .05$.

¹ Black, non-Hispanic includes African American, Hispanic includes Latino, and Other, non-Hispanic includes Asian, Native Hawaiian, Other Pacific Islander, American Indian, and Alaska Native.

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

employment (table 4.5). However, even among this population of workers, no differences were found in the probability of full-time employment for those with and without an occupational credential, or for those with more or fewer years of education. These findings mirror those of the bivariate analysis.

Table 4.5. Logistic regression results for 1995–96 credential-seeking beginning postsecondary occupational students who were employed, estimating full-time employment from students' educational and demographic characteristics: 2001

Educational and demographic characteristics	Coefficient	Standard error	Marginal effect	Standard error
Years of full-time equivalent postsecondary education	-0.10	0.084	-0.02	0.012
Highest credential attained (Reference category: <i>Did not attain a credential or still enrolled</i>)				
Attained certificate	-0.01	0.288	#	†
Attained associate's degree	0.62	0.316	0.09	0.035
Sex (Reference category: <i>Male</i>)				
Female	-0.93 *	0.348	-0.14	0.049
Race/ethnicity ¹ (Reference category: <i>White, non-Hispanic</i>)				
Black, non-Hispanic	-0.06	0.484	-0.01	0.073
Hispanic	-0.33	0.551	-0.05	0.095
Other, non-Hispanic	-0.62	0.506	-0.09	0.103
Age (Reference category: <i>16–18 years old</i>)				
19 years old	-0.03	0.536	#	†
20–23 years old	-0.41	0.548	-0.06	0.095
24 years or older	-0.46	0.395	-0.07	0.064
Family socio-economic status (Reference category: <i>Middle quartiles</i>)				
Lowest quartile	0.07	0.216	0.01	0.031
Highest quartile	0.19	0.478	0.03	0.064
Student/employee role (Reference category: <i>Student working to meet expenses</i>)				
Employee enrolling in classes	0.71	0.389	0.10	0.046
Intercept (constant)	2.23 *	0.511		
Adjusted R-squared	0.036 *			
Number of observations	1,106			

† Not applicable.

Estimate rounds to zero.

* $p < .05$.

¹ Black, non-Hispanic includes African American, Hispanic includes Latino, and Other, non-Hispanic includes Asian, Native Hawaiian, Other Pacific Islander, American Indian, and Alaska Native.

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

Average salary. Employment outcomes may not be a robust indicator of success in the labor market, particularly when unemployment rates are low, as they were during 2001.³⁵ When obtaining a job is relatively easy, salary may be a more useful measure of labor market success. The third regression analysis thus predicted the average salary earned by former students, for those who were employed full time (table 4.6). As was true in the bivariate analysis, this analysis also did not find a relationship between earning an occupational credential and salary; however, there was an interaction based on years of education and the relatedness of the job to one’s field of study. Figure 4.1 plots this interaction, for the “average” former student who worked full time in 2001. As seen in that figure, average salary increased with years of education—but only for former students who were employed in a job that was related to their field of study. For former students who did not work in a job related to their field of study, years of education did not appear to have an effect; average salary was not found to differ for those with more or fewer years of education.

Summary

This examination of labor market outcomes is relatively simple and is based only on correlational analyses. More rigorous studies should be conducted to provide more conclusive evidence of the relationship between earning a postsecondary occupational credential, years of education, and labor market outcomes. In this study, obtaining a postsecondary occupational credential was not found to be related to employment rates or to salary, but years of education was related to salary (only) among those in jobs related to their education (tables 4.4–4.6). This finding is consistent with human capital theory, which postulates that the skills and knowledge (human capital) attained through education are valuable commodities in the labor market. Under this theory, the job-specific skills provided through occupational education should have labor market benefits only if the worker is employed in a job that uses those skills. These findings also are consistent with the role of skill development (rather than a “sheepskin”) in fostering labor market success. In sum, the relationship between salary and years of education for those in training-related jobs supports the argument that in the short term, postsecondary occupational

³⁵ In 2001, the average monthly unemployment rate was 4.74. It averaged 5.59 in the 4 years after that (2002–2005), and averaged 6.59 from 1991–1995 and 4.61 from 1996–2000 (U.S. Department of Labor 2006).

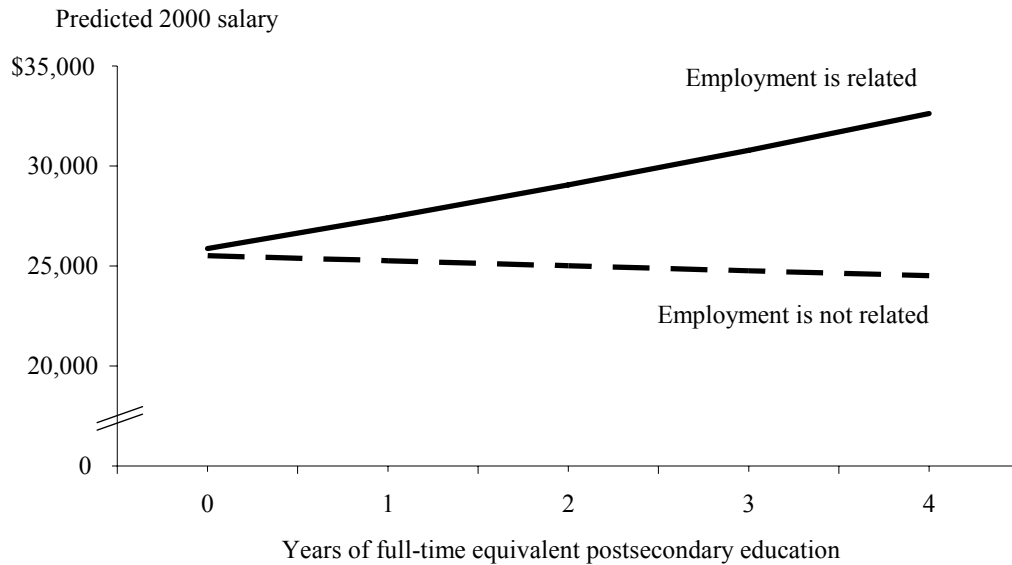
Table 4.6. Semi-log regression results for 1995–96 credential-seeking beginning postsecondary occupational students who were working full time, estimating annual salary in 2000 from students' educational and selected demographic characteristics: 2001

Educational and demographic characteristics	Coefficient	Standard error
Years of full-time equivalent (FTE) postsecondary education	-0.01	0.029
Highest credential attained (Reference category: <i>Did not attain a credential or still enrolled</i>)		
Attained certificate	0.01	0.055
Attained associate's degree	0.03	0.059
Sex (Reference category: <i>Male</i>)		
Female	-0.29 *	0.045
Race/ethnicity ¹ (Reference category: <i>White, non-Hispanic</i>)		
Black, non-Hispanic	0.01	0.076
Hispanic	-0.09	0.068
Other, non-Hispanic	0.07	0.125
Age (Reference category: <i>16–18 years old</i>)		
19 years old	-0.08	0.057
20–23 years old	-0.09	0.065
24 years or older	-0.03	0.064
Family socio-economic status (Reference category: <i>Middle quartiles</i>)		
Lowest quartile	-0.06	0.038
Highest quartile	0.04	0.081
Student/employee role (Reference category: <i>Student working to meet expenses</i>)		
Employee enrolling in classes	0.09	0.055
Relatedness of employment (Reference category: <i>Not related</i>)		
Employment is related to field of study	0.01	0.069
Interaction of relatedness of employment and years of FTE postsecondary education	0.07 *	0.024
Intercept (constant)	10.24 *	0.081
Adjusted R-squared	0.198 *	
Number of observations	817	

* $p < .05$.

¹ Black, non-Hispanic includes African American, Hispanic includes Latino, and Other, non-Hispanic includes Asian, Native Hawaiian, Other Pacific Islander, American Indian, and Alaska Native.
 SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

Figure 4.1. Predicted 2000 salary for 1995–96 credential-seeking beginning students who are full-time employees in 2000, by whether employment is related to field of study and years of full-time equivalent postsecondary education: 2001



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

education provides valuable job skills that are rewarded in the labor market (via salary)—as long as one works in a field that uses those skills.

These findings may have implications for a number of educational decisions students make, such as whether to enroll in a shorter versus longer educational program, how long to remain in school, and the importance of having clear career goals. Although these findings do not provide evidence of the need for students to earn a subbaccalaureate credential as part of their postsecondary education, at least having the goal of completing a credential may be important in order to provide students with (a) the motivation to stay in school (and thus acquire more skills) and (b) a portfolio of coursework designed to maximize skill development within one’s chosen field. These are issues beyond the scope of this report but suggest avenues for further analysis and research.

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Appendix A: Technical Notes and Methodology

The data in this report come from the 1995–96 Beginning Postsecondary Students Longitudinal Study, including the 1995–96 base-year survey and its 1998 and 2001 follow-ups (BPS:96/01). This appendix provides more detail on the technical features of this survey and on the analyses conducted for this report. Included here is information on survey response rates, data reliability, weighting procedures, statistical analyses and testing procedures, and variables created for the analyses (i.e., derived variables).

1995–96 Beginning Postsecondary Students Longitudinal Study

The 1995–96 Beginning Postsecondary Students Longitudinal Study is composed of a subset of the students who participated in the 1995–96 National Postsecondary Student Aid Study (NPSAS:96). NPSAS:96 consisted of a nationally representative sample of students enrolled in all levels of postsecondary education during the 1995–96 academic year. The BPS sample was derived from that sample and comprises a nationally representative sample of students who began postsecondary education for the first time in 1995–96.

Respondents were selected for inclusion in NPSAS:96 using a two-stage sampling design; the first stage involved selecting eligible institutions (derived from the 1993–94 Integrated Postsecondary Education Data System Institutional Characteristics [IPEDS IC] file), and the second stage was the selection of eligible respondents within each eligible institution. Approximately 9,500 institutions were identified in the IPEDS IC file. These eligible institutions were then partitioned into institutional strata based on level and control, and additional implicit stratification was done within each institution type by region and size. Sampling frames for selecting students consisted of enrollment lists or data files provided by the institutions for students enrolled during the NPSAS:96 year. The final NPSAS:96 sample included over 900 postsecondary institutions and 62,000 postsecondary students, including 50,000 undergraduates.

The BPS sample consists of 12,080 undergraduates identified in NPSAS:96 as beginning postsecondary education for the first time in 1995–96. The first follow-up of the BPS cohort (BPS:96/98) was conducted in 1998, approximately 3 years after these students first enrolled, and the second follow-up (BPS:96/01) was conducted 6 years after the students had first enrolled. The Beginning Postsecondary Students Longitudinal Study of 1996–2001 (BPS:96/01) consists of the data gathered in all three of these survey years.

This report uses data from the base year BPS (BPS:96) to examine who enters postsecondary occupational education (in chapter 2) and data from the full BPS:96/01 for analyses of student persistence, attainment, and outcomes (in chapters 3 and 4). However, using the base-year BPS:96 data, the sample of beginning postsecondary students was further restricted for use in this report. To provide a relatively clean definition of postsecondary students, first-time students who had not previously attained a high school diploma or its equivalent, such as a general educational development (GED) certificate, were excluded from the analysis. In addition, students who did not expect to earn a postsecondary credential at their first postsecondary institution, did not know which credential they expected to earn, or did not provide a response to this question are also omitted. These restrictions reduced the size of the base-year BPS:96 sample used in this report by 24 percent, from 12,080 first-time postsecondary students to 9,221 first-time credential-seeking students in 1995–96. About 17 percent of students were lost due to missing responses on the question about credential goals (including refusals and “don’t know” responses); about 6 percent were lost because they reported that they had no credential goal, and the remainder (about 1 percent) were lost because they did not have a high school diploma or equivalent. The use of sampling weights further restricted the sample to 7,274 students. (Sampling weights were not available for students who did not respond to the BPS 2001 follow-up; see discussion below under “Sampling Errors” and in Wine et al. 2002.)

The BPS:96/01 student interviews were conducted using computer-assisted telephone interviews (CATI) and computer-assisted personal interviews (CAPI). Data were also collected from the institutions in which the students were enrolled, the Central Processing System database, and the National Student Loan Data System. The CATI and CAPI systems were programmed with range editing and consistency edits. Multiple post-interview data cleaning

steps were also used to ensure internal consistency within items and to maintain skip-pattern relationships. Logical imputations were performed where appropriate, with the goal of maximizing the number of respondents to which each item applied.

Response Rates

Students in the BPS sample were initially surveyed in 1996, at the end of their first year in postsecondary education. They were interviewed again in 1998, 3 years after they had started, and interviewed for the last time in 2001, 6 years after starting school. Approximately 10,300 of the students who first began in 1995–96 were located and interviewed in the 1998 follow-up, for an overall weighted response rate of 79.8 percent. This response rate includes those who were nonrespondents in NPSAS:96; among NPSAS:96 respondents, the response rate was 85.9 percent. For the second follow-up of the BPS cohort (BPS:96/01), all respondents to the first follow-up, as well as a subsample of nonrespondents in 1998, were eligible to be interviewed. Among these eligible students, about 9,200 students were located and interviewed, for a final weighted response rate of 83.6 percent. This rate was somewhat higher among respondents to both the 1996 and the 1998 interviews (87.4 percent).

Nonresponse among cohort members causes bias in survey estimates when the outcomes of respondents and nonrespondents are different. A bias analysis was conducted on the 2001 survey results to determine if any variables were significantly biased due to nonresponse, and weight adjustments were applied to the BPS:96/01 sample to reduce bias found due to unit nonresponse. After the weight adjustments, some variables were found to reflect zero bias, and for the remaining variables, the bias was not measurably different from zero.

For more information on the BPS:96/98 survey, consult the *Beginning Postsecondary Students Longitudinal Study First Follow-up 1996–98 (BPS:96/98) Methodology Report* (Wine et al. 2000) and for more information on the BPS:96/01 survey, consult the *Beginning Postsecondary Students Longitudinal Study: 1996–2001 (BPS:1996/2001) Methodology Report* (Wine et al. 2002).

Data Reliability

Estimates produced using data from BPS:96/01 are subject to two types of errors: sampling errors and nonsampling errors. Sampling errors occur because the data are collected from a sample rather than the whole population. Nonsampling errors are errors made in the collection and processing of data.

Nonsampling Errors

Nonsampling error is the term used to describe variations in the estimates that may be caused by population coverage limitations and data collection, processing, and reporting procedures. The sources of nonsampling errors are typically problems like unit and item nonresponse, respondents' differing interpretations of the meaning of the questions, response differences related to the particular time the survey was conducted, and mistakes in data preparation.

Another potential source of nonsampling error is response bias. Response bias occurs when respondents systematically misreport information in a study (intentionally or unintentionally). There are many different forms of response bias. One of the best known is social desirability bias, which occurs when respondents report what they believe is the response they "should" give. For example, when comparing self-reported measures of educational attainment with postsecondary transcripts from the same students, Adelman (2004) found that students tended to overstate their participation postsecondary education (although the correlation between these measures was 92 percent). Response bias may affect the accuracy of overall estimates, but it does not necessarily invalidate other results from a survey. If there are no systematic differences among specific groups under study in their tendency to give socially desirable responses, then comparisons of the different groups will accurately reflect differences among the groups.

Sampling Errors

The sample of beginning postsecondary students selected for BPS:96/01 is just one of the many possible samples that could have been selected. Therefore, estimates produced from the BPS sample may differ from estimates that would have been produced from other potential samples. This type of variability is called sampling error because it arises from surveying a sample of beginning students, rather than all beginning students.

The standard error is a measure of the variability due to sampling when estimating a statistic. Standard errors can be used as a measure of the precision expected from a particular sample. The probability that a sample estimate would differ from the population parameter obtained from a complete census count by less than 1 standard error is about 68 percent. The chance that the difference would be less than 1.65 standard errors is about 90 percent, and that the difference would be less than 1.96 standard errors, about 95 percent. These standard errors and precision estimates can be used to produce confidence intervals. For example, an estimated 36.1 percent of beginning postsecondary students in 1995–96 intended to earn an occupational credential (certificate or associate’s degree), and this figure has an estimated standard error of 2.48 (tables 1.3 and S1.1). Therefore, the estimated 95 percent confidence interval for this statistic is 31.2 to 41.0 percent ($36.1 \pm 1.96 \times 2.48$). That is, in 95 out of 100 samples from the survey population, the estimated participation rate should fall between 31.2 and 41.0 percent. Standard errors for all the estimates in the tables of this report are presented in appendix B.

To minimize both sampling and nonsampling errors, the estimates in this report are based on observations that were weighted using the probabilities of selection of the respondents and other weighting adjustments to account for nonresponse and coverage bias. For cross-sectional analyses of students in 1995–96 (chapter 2), the weight B01AWT was used; this weight applies to the beginning students who responded to NPSAS:96, but it also requires that students responded to the 2001 administration of BPS:96/01. For longitudinal analyses of students as of 2001 (chapters 3 and 4), the weight B01LWT2 was used; this weight applies to beginning

students who responded in both NPSAS:96 and the 2001 administration of BPS:96/01.¹ In addition, special procedures for estimating the standard errors of the estimates were used to account for the survey's complex sample design. Complex sample designs result in data that violate some of the assumptions that are required to properly estimate standard errors and thus to assess the statistical significance of results. Frequently, the standard errors of the estimates from a complex sample design are larger than would be expected if the sample were a simple random sample, as is assumed for traditional statistical testing. To compute approximately unbiased estimates of the standard errors, balance repeated replicates variance estimation was used to compute the standard errors for all estimates in this report.

Finally, to ensure adequate sample size to meet the assumptions of sampling theory, estimates for cells based on fewer than 30 observations are not reported. These cells are indicated in tables with a special symbol and the following text: "Reporting standards not met. Too few cases to report."

Significance Tests for Analyses

Pairwise Comparisons

Comparisons of pairs of estimates were tested using Student's t statistic. For this procedure, differences between estimates are tested against the probability of a Type I error,² or significance level. The significance levels were determined by calculating the Student's t value for the difference between each pair of estimates and comparing the t value with published tables of significance levels for two-tailed hypothesis testing.

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

¹ See Wine et al. (2002) for a description of the combination of weights and survey corrections available in BPS:96/01 data due to its stratified sampling design.

² 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 exists.

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

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

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

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

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

where p is the proportion of the total group contained in the subgroup.

A few caveats should be kept in mind when reporting these statistical tests. 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 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 issue in reporting statistical tests is the possibility that one can report 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 underlying population. Statistical tests are designed to control 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 hypothesis tests show t values at the .05 level or smaller ($p \leq .05$), this finding is treated as

rejecting the null hypothesis that there is no difference between the two quantities. However, there are cases when exercising additional caution is warranted. When a large number of related comparisons (a family of comparisons) is tested, Type I errors cannot be ignored. For example, when making paired comparisons among different occupation groups, the probability of a Type I error for these comparisons taken as a group is larger than the probability for a single comparison.

When this situation was encountered in this report, a Bonferroni correction was made to the test's alpha level. In the Bonferroni correction, comparisons are made with $p \leq .05/k$ for a particular pairwise comparison, where that comparison was one of k tests within a family. This guarantees both that the individual comparison would have $p \leq .05$ and that for k comparisons within a family of possible comparisons, the significance level for all the comparisons will sum to $p \leq .05$.³

The main use of the Bonferroni in this report was when the three subbaccalaureate credential-goal groups—occupational certificate seekers, occupational associate's degree seekers, and academic associate's degree seekers—were compared to each other. In this family of tests, when all possible comparisons are made, $k = 3$ and the significance level of each test is adjusted to $p \leq .05/3$, or $p \leq .017$. The formula for calculating family size (k) is as follows:

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

where j is the number of categories for the variable being tested. In the example with three credential-goal groups, $k = 3(2)/2 = 3$.

Regression Analysis

Many of the independent variables included in the analyses in this report are related, and to some extent, the pattern of differences found in the descriptive analyses reflects this

³ The standard that $p \leq .05/k$ for each comparison is more stringent than the criterion that the significance level of the comparisons should sum to $p \leq .05$. For tables showing the t statistic required to ensure that $p \leq .05/k$ for a particular family size and degrees of freedom, see Dunn (1961).

covariation. For example, when examining the employment rates of students who do and do not complete an occupational certificate, it is possible that some of the observed relationship is due to differences among other factors related to the outcomes, such as socioeconomic status. However, if nested tables were used to isolate all the influence of all related factors, cell sizes would become too small to support analysis. For these situations, regression analysis permits the analyst to statistically control for multiple factors without a loss of sample size.

Regression analysis was used in this report to determine the relationship between earning an occupational postsecondary occupational credential and labor market outcomes, independently of the sociodemographic background of students, and independently of years of postsecondary schooling. The reader is cautioned that regression analysis is a correlational analysis, and thus regression findings should not be viewed as indicating causal relations. For example, a finding that years of schooling is positively related to salary (with other factors controlled) is *consistent* with the hypothesis that higher years of schooling leads to increased salary, but it does not *prove* that hypothesis.

Standard linear regression analysis assumes that the outcome variable is normally distributed. The outcomes of interest in this report—annual salary and employment status—are not normally distributed. Therefore, two variants of linear regression analysis were used. The first type is logistic regression, used to predict the dichotomous employment outcomes. The second type is semi-log regression, used to predict salary, which has a skewed distribution.

Logistic Regression

The logistic regression model takes the following form:

$$\ln \left(\frac{p}{1-p} \right) = B_0 + B_1x_1 + \dots + B_kx_k \quad (5)$$

for a regression model with k predictor variables.

The $p / (1 - p)$ in this formula is referred to as an odds. Odds indicate the probability of an event occurring (p), divided by the probability that the event does not occur ($1 - p$) (e.g., the probability that an individual is employed divided by the probability that the individual is not employed). The log of the odds is used in logistic regression to convert a nonlinear probability function into a linear logarithmic function. B_0 represents the intercept in this model, which can be interpreted in this case as the log of the odds (or log-odds) of the outcome variable when all the predictor variables are zero. The coefficient B_1 represents the increase in the log-odds of the outcome variable accounted for by a one-unit increment in the predictor variable x_1 after adjusting for (controlling for) the effects of the other predictor variables in the model.

To make the predictor variables more interpretable, they are converted into probabilities or marginal effects (see Petersen 1985). For categorical variables, the marginal effect indicates the change in the probability of an event occurring for those in the selected category versus those in the comparison category, after adjusting for (controlling for) the effects of the other predictor variables in the model. For a continuous variable, the marginal effect indicates the change in the probability of an event occurring for each unit change in the continuous variable (e.g., for each year of education completed) after adjusting for the effects of the other predictor variables. Tables 4.5 and 4.6 in chapter 4 list the marginal effects (as well as B -values, or regression coefficients) for the final logistic regression equations predicting respondents' likelihood of employment and likelihood of full-time employment.

Semi-log Regression

The semi-log regression model follows the standard linear regression model, but the outcome variable is transformed into a natural logarithm (\ln) in order to normalize it. The semi-log equation is:

$$\ln Y = B_0 + B_1x_1 + \dots + B_kx_k \quad (6)$$

for a regression model with k predictor variables.

Note that coefficients from the semi-log regression predict the natural log of salary, rather than salary. Therefore, in this model, the B_0 intercept is the predicted natural log of the outcome variable when all the predictor variables are zero. The coefficient B_1 represents the increase in the natural log of the outcome variable accounted for by a one-unit increment in the predictor variable x_1 after adjusting for (controlling for) the effects of the other predictor variables in the model. Table 4.6 lists the regression coefficients (B -values) for the final semi-log regression equation predicting respondents' average 2000 salary (in natural logs). In figure 4.1, predicted salary values were calculated for the "average" respondent after converting the coefficients from the natural log of salary (from the semi-log regression equation) to coefficients for salary, using the equation $exp^B - 1$.

Derived Variables

This section lists the variables used in this report, all of which were taken directly from the restricted-use version of the BPS:96/01 data file or were derived from variables in that file. The names of derived variables are listed below in italicized lower-case text and the names of original data file variables are listed in upper-case text. The variables are organized by topic, in the following order:

1. student background characteristics;
2. initial enrollment characteristics;
3. tuition costs;
4. educational outcomes; and
5. economic outcomes.

Student Background Characteristics

Age (AGE)

AGE indicates the age of the student on December 31, 1995. Responses ranged between 16 and 84 years old but were categorized into the following four groups:

- 18 years or younger;
- 19 years old;
- 20 to 23 years old; and
- 24 years or older.

Highest parental education (PARED)

This variable is equal to the maximum of the highest level of education completed by the student's father or by the student's mother, as of 1995–96. The variable has three categories: Less than high school, High school graduate, and College degree.

High school diploma type (HSDEG)

HSDEG indicates the type of high school degree the student received. The first source of information for HSDEG was the sample institution. If the information was not available from the sample institution, student reported data was used. Students who did not have a high school degree or certificate of completion (HSDEG = 4) were not included in the analysis sample for this report. The following categories of high school diploma type were used:

- High school diploma (HSDEG = 1); and
- GED or certificate of completion (HSDEG = 2 or 3).

Race/ethnicity (SBRACE)

Students' race/ethnicity was reported in SBRACE. Three categories from the SBRACE variable—Asian/Pacific Islander, American Indian/Alaskan Native, and other—were combined into one group for this report. This procedure left the following four categories: Hispanic, non-Hispanic White, non-Hispanic Black, and non-Hispanic other.

Sex (SBGENDER)

This variable indicates the sex of the student. It is based on student- or institution-reported sex or, where student and institution data were not available, sex reported on the Free Application for Federal Student Aid. If the sex of the respondent was not available from any of these sources, it was imputed based on the student's first name.

Socioeconomic status (SFPCT294)

Using family or personal income as a measure of socioeconomic status, SFPCT294 represents the percentile rank of income in 1994 for all students. This variable was calculated separately for dependent and independent students, with each ranking comparing the student to those of the same dependency status. Parents' income was used for dependent students and the respondent's family income was used for independent students. For some analyses in this report, SFPCT294 was converted to quartiles and the lowest quartile was used to indicate low socioeconomic status.

Initial enrollment characteristics

Credential goal (studtype)

This variable classifies postsecondary students into 12 nested groups, based on their initial credential goal and major in 1995–96. The 12 groups are

1. Subbaccalaureate students
 - a. Occupational students
 - i. Occupational subbaccalaureate students seeking a certificate
 - ii. Occupational subbaccalaureate students seeking an associate's degree
 - b. Academic subbaccalaureate students
 - i. Academic subbaccalaureate students seeking a certificate
 - ii. Academic subbaccalaureate students seeking an associate's degree

- c. Undeclared subbaccalaureate students
-
- 2. Baccalaureate students
 - a. Career baccalaureate students
 - b. Academic baccalaureate students
 - c. Undeclared baccalaureate students

Three variables from the BPS:96/01 datafile were used to compute *studtype*: LEVEL (the level of the first postsecondary institution attended), EPHDEGNP (students' initial credential intention) and SEMAJ1Y1 (students' first self-reported major). All students in less-than-4-year institutions (LEVEL = 2 or 3) were defined as subbaccalaureate students. With two exceptions, all students in 4-year institutions (LEVEL = 1) were defined as baccalaureate students. The two exceptions are as follows: Students who initially attended a 4-year institution and expected to earn a certificate or associate's degree at that institution (EPHDEGNP = 4) were categorized as subbaccalaureate students. Students who initially enrolled in a 4-year institution but who intended to transfer to a 2-year institution (EPHDEGNP = 1) were also counted as subbaccalaureate students.

Baccalaureate and subbaccalaureate students were further divided based on their first self-reported major. In this step, the most detailed major variable, SEMAJ1Y1, was used to distinguish academic majors, occupational/career majors, and undeclared majors (see "area of study" below).

Level of institution (LEVEL)

This variable indicates the level of the postsecondary institution from which the student was sampled in 1995–96 and was used to define "credential goal" (*studtype*). LEVEL classifies institutions as 4-year, 2-year, or less-than-2-year. For a small number of cases, the level of the institution was reclassified on the data file in November 2000. The variable used in this report reflects this change.

Initial degree expectation (EPHDEGNP)

EPHDEGNP indicates the highest level of education the student was seeking at the initial NPSAS institution in 1995–96 and was used to define “credential goal” (*studtype*). Students who reported having no degree and no transfer expectation (EPHDEGNP = 0; $n = 702$) or for whom no expected education level was reported (EPHDEGNP = -1, -2, or -9; $n = 1,999$) were excluded from the sample. For the remaining students, the responses were categorized into the following five groups:

- transfer to a 2-year school (EPHDEGNP = 1);
- transfer to a 4-year school (EPHDEGNP = 2);
- certificate (EPHDEGNP = 3);
- associate’s degree (EPHDEGNP = 4); and
- bachelor’s degree or higher (EPHDEGNP = 5–8).

Area of study (SEMAJIY1)

SEMAJIY1 indicates the area of study for a student’s major in 1995–96. This variable was used to classify students into academic, occupational, and undeclared credential categories in order to define “credential goal” (*studtype*) as follows:

- academic major (SEMAJIY1 = 6–8, 37, 39, 61, 62, 64, 65, 67, 71, 72, 74, 75, 79–85, or 95–99);
- occupational/career major (SEMAJIY1 = 1–5, 10–36, 40–60, 63, 66, 69, 73, 77, 78, or 86–94): classified as “occupational” for subbaccalaureate students and as “career” for baccalaureate students; and
- undeclared major (SEMAJIY1 = 0 or 70).

Students who did not respond to SEMAJIY1 ($n = 5$) or who responded that they did not know their major ($n = 46$) were not included in the sample.

Delayed enrollment (ENDELAY)

This variable indicates whether students delayed their enrollment in postsecondary education, as determined by receipt of a high school diploma prior to 1995 or having reached age 20 before December 31, 1995.

Enrollment intensity (ATTNPTRN)

Enrollment intensity (exclusively full time, exclusively part time, or mixed/other) during the first year is captured with the variable ATTNPTRN. Students were considered to have enrolled exclusively full time if they were enrolled full time during all enrolled months in the first year and were considered to have enrolled exclusively part time if they were enrolled half time or less during all enrolled months. Students were considered to have “mixed/other” enrollment intensity if some other combination of full-time and part-time enrollment was reported. The recoded categories are:

- exclusively full time (ATTNPTRN = 1);
- exclusively part time (ATTNPTRN = 3, 4, or 5); and
- mixed/other (ATTNPTRN = 2 or 6).

Initial college control (ITNPSAS)

ITNPSAS identifies the first institution’s control (public, not-for-profit, or for-profit). The variable was aggregated as follows:

- public (ITNPSAS = 1, 2, or 3);
- not-for-profit (ITNPSAS = 4, 5, or 6); and
- for-profit (ITNPSAS = 7, 8, or 9).

Work status while enrolled and intensity of work (JIHOURY1)

This variable indicates the number of hours students worked during the 1995–96 enrollment period; in this report, it was used two ways. First, it was used to indicate whether students worked during their 1995–96 enrollment period and, second, for students who worked, JIHOURY1 was used to indicate the amount of time they worked in 1995–96. Students were considered “not working” if JIHOURY1 was equal to zero. If JIHOURY1 was greater than zero, then students were coded as “working.”

For students who worked, the number of hours worked per week during the 1995–96 enrollment period was collapsed into two categories: part time (1–35 hours) and full time (35 hours or more).

Student/employee role (SEROLEY1)

This variable asks students who were enrolled and working in 1995–96 to self-identify primarily as either a student working to meet expenses (SEROLEY1 = 1) or an employee who has decided to enroll in school (SEROLEY1 = 2). Values of zero were imputed for students who were enrolled but not employed during the 1995–96 academic year.

Tuition costs (TUICTION)

This variable indicates the amount of tuition and fees charged to the student for the year July 1, 1995 to June 30, 1996, as reported by the first institution. Thus, students enrolled for one term would typically have lower tuition costs than students enrolled full year. If tuition amounts were not reported, they were estimated based on the average per-credit or per-term charges for other students at the institution according to their class level, degree program, and attendance status.

Educational Outcomes

Credential attainment by academic year (DGREYX1, DGREYX2, DGREYX3, DGREYX4, DGREYX5, DGREYX6)

The variables listed above indicate whether a student attained a credential in each of the 6 academic years (1995–96 to 2000–01) covered by the survey. The value of one is assigned if a student had attained a credential in the given academic year, and a value of zero is assigned if the student did not have any attainment. The first three variables, DGREYX1, DGREYX2, and DGREYX3, were updated based on responses from the first and second follow-up surveys.

Cumulative grade point average (SEGPA2B)

SEGPA2B is a self-reported variable, derived from QCGPA and QCGPAEST, indicating the actual or estimated cumulative grade point average (GPA) by the last term as an undergraduate. If students did not know their GPA or if no grades had been awarded at the time of the interview, students were asked to choose between one of the following responses:

- mostly As (3.75 and above);
- As and Bs (3.25–3.74);
- mostly Bs (2.75–3.24);
- Bs and Cs (2.25–2.74);
- mostly Cs (1.75–2.24);
- Cs and Ds (1.25–1.74); or
- mostly Ds or below (below 1.24).

Students who were not awarded grades or whose grades were pass/fail were coded as missing on SEGPA2B. For this report, the values of SEGPA2B were recoded into a dichotomous variable. Reported GPAs below 2.25 were given the value of 1 and GPAs of 2.25 and above were given the value of 0.

Number of credentials attained (DGRENU2B)

This variable indicates the total number of credentials attained by 2001. For this report, students who earned more than two postsecondary credentials of any type ($n = 5$) or who did not respond to this item ($n = 1,947$) are not included in the educational outcomes section.

First credential attained (DGRE2B)

DGRE2B indicates the first credential attained through June 2001. The responses to the variable are

- never attained (DGRE2B = 0);
- certificate (DGRE2B = 1);
- associate's degree (DGRE2B = 2); and
- bachelor's degree (DGRE2B = 3).

Last credential attained (DGRELA2B)

DGRELA2B indicates the last credential attained through June 2001. The responses to the variable are the same as DGRE2B.

Highest degree attained (DGREHI2B)

DGREHI2B indicates the highest credential attained through June 2001. The responses to the variable are the same as DGRE2B.

Type of credential(s) attained (DGRETY2B)

This variable describes the combination of credentials that students attained through June 2001. The credential combinations are

- no credential (DGRETY2B = 0);
- certificate only (DGRETY2B = 1);
- associate's degree only (DGRETY2B = 2);
- certificate and associate's degree (DGRETY2B = 3);
- bachelor's degree only (DGRETY2B = 4);
- certificate and bachelor's degree (DGRETY2B = 5); and
- associate's degree and bachelor's degree (DGRETY2B = 6).

Similar to DGRENU2B, students who earned more than two postsecondary credentials of any type ($n = 1$) or who did not respond to this item ($n = 1,947$) are not included in the educational outcomes section.

Still enrolled (stillenr)

This variable is derived from PRAT2B and indicates whether or not the student was still enrolled as of spring 2001. Students were coded as “still enrolled” (PRAT2B = 3) if they had never attained a credential and were still enrolled after January 2001. All other values of PRAT2B were coded as “not still enrolled.”

Reason for leaving (RLFIRS2B)

RLFIRS2B indicates the first reason given for leaving postsecondary education, among those who left without attaining a credential and had not returned by spring 2001. This variable combines the responses given by students in 1998 (RLFIRSB1) and 2001 (QCLEAV1). If different reasons were given in the 1998 and 2001 follow-ups, the response given during the 1998 interview took priority over the response from 2001. For this report, this variable was coded as follows:

- not satisfied or academic problems (RLFIRS2B = 1 or 3);
- done with desired classes (RLFIRS2B = 5);
- family demands (RLFIRS2B = 12 or 13);

- job demands or financial demands (RLFIRS2B = 9, 10, or 11);
- moved to another city or state (RLFIRS2B = 15); and
- other or unknown reason (RLFIRS2B = 2, 4, 6, 7, 8, 14, 16 or -9).

Earned credential (degtype)

The variable *degtype* uses the type of credential(s) attained by 2001 and the student's major at the time of attainment to define the type of credential students earned. For students who did not earn a credential by 2001 (the comparison group in the regression analysis), the classification from *studtype* is used (i.e., credential intention). To compute *degtype*, MAJORS2, SEMAJ1B1, SEMAJ2B, and DGREYX1–DGREYX6 were used to classify the type (occupational, academic, and unknown) of credential earned and to flag when the credential was attained. Cases where DGREYX1–DGREYX6 did not indicate attainment were omitted from the analysis. If two credentials were earned, the highest earned credential was determined by comparing DGRE2B and DGRELA2B. For example, if the first earned credential was an associate's degree (DGRE2B = 2) and the second was a certificate (DGRELA2B = 1), the former would take precedence over the latter despite being earned first.

Major when last enrolled 1998 (SEMAJ1B1)

SEMAJ1B1 indicates a student's major or program of study in the 1997–98 academic year. This variable was used to classify the type of credential earned by students who attained a credential during or prior to the 1997–98 academic year. For students who had not earned a credential and were not in school during this time period, this variable is used to identify the program in which the student was last enrolled. Similar coding to SEMAJ1Y1 was used to classify students into academic, occupational, and other credential areas of study.

Major when last enrolled 2001 (SEMAJ2B)

SEMAJ2B indicates a student's major or program of study in the 2000–01 academic year. This variable was used to classify the type of credential earned by students who attained a

credential during or prior to the 2000–01 academic year. For students who had not earned a credential and were not in school during this time period, this variable is used to identify the program in which the student was last enrolled. Similar coding to SEMAJ1Y1 was used to classify students into academic, occupational, and other areas of study.

Full-time equivalent years of schooling (yrs_fte)

To compute the number of full-time equivalent (FTE) years of postsecondary education students had completed, reported monthly enrollment—from ENNUYX1, ENNUYX2, ENNUYX3, ENNUYX4, and ENNUYX5—were summed. These five variables indicate the number of months enrolled at any institution during a given academic year. To account for part-time attendance, months of part-time enrollment—ENPTYX1, ENPTYX2, ENPTYX3, ENPTYX4, and ENPTYX5—were also summed. If this sum (number of part-time months enrolled) was greater than zero, the value was multiplied by one-third and the product subtracted from the total number of months enrolled. The last step in the calculation was to divide this value by 9, which is the typical length of an academic year. For example, if the total number of months enrolled was 60 and the total number of part-time months enrolled was 30, the derived FTE years of schooling would be 5.6 years $(60 - (30 * 0.33) / 9)$. Enrollment during the 2000–01 academic year was not included in the calculation since the analysis of economic outcomes (the only analysis for which this variable was used) did not include individuals who were still enrolled in postsecondary education during this period.

Economic Outcomes

Current employment status (wrkout01)

This variable identifies respondents who were working at the time of the second follow-up survey in spring 2001 and, among those who were not working, whether or not the respondent was looking for work. In order to be consistent with the employment intensity variable (indicating part-time and full-time workers; defined below), two variables were used to define those who were working: QECUREMP, which indicates whether or not the respondent was

working at the time of the second follow-up, and QEHRSC, which indicates the hours typically worked each week. Respondents who did not provide a valid response to QEHRSC (i.e., missing, refused, don't know, not reached, and legitimate skip) were coded as missing. Among those who were not working (QECUREMP = 0), the JSLOOK2B distinguishes between respondents who were looking for work (JSLOOK2B = 1) and those who were not (JSLOOK2B = 0). Thus, *wrkout01* was coded as follows:

- working (QECUREMP = 1 and QEHRSC \geq 0);
- not working not looking for work (QECUREMP = 0 and JSLOOK2B = 0); and
- not working, looking for work (QECUREMP = 0 and JSLOOK2B = 1).

Unemployment (unempl01)

The variable *unempl01* indicates whether the respondent was unemployed at the time of the second follow-up survey in spring 2001. This variable was used to calculate the unemployment rate among the subsample of respondents who were employed (QECUREMP = 1 and QEHRSC \geq 0) or not employed but looking for work (QECUREMP = 0 and JSLOOK2B = 1).

Labor force participation (lfprte01)

The variable *lfprte01* indicates whether the respondent was in the labor force at the time of the second follow-up in spring 2001. Respondents were considered labor force participants if they were employed (QECUREMP = 1 and QEHRSC \geq 0) or not employed but looking for work (QECUREMP = 0 and JSLOOK2B = 1). Unlike the unemployment rate, respondents who were neither employed at the time of the second follow-up nor looking for a job (QECUREMP = 0 and JSLOOK2B = 0) were included in the calculation of the labor force participation rate.

Employment intensity (emphrs01)

The employment intensity variable indicates, among respondents who were working at the time of the second follow-up survey in 2001, whether the respondent was working part time or full time. The variable *emphrs01* was coded as follows:

- part time (QEHRSC > 0 and QEHRSC < 35); and
- full time (QEHRSC ≥ 35).

Average annual salary (QEINCEC)

This variable represents the annual salary earned by employed respondents in 2000. It is taken directly from QEINCEC unless QEINCEC = -1 (“don’t know,” $n = 47$), in which case it was calculated using QEWAGEC (reported amount for those with a pay rate) and QETIMC (pay rate). The following formula was used to calculate QEINCEC in these cases:

if QETIMC = 1 (hourly rate), then $QEINCEC = QEWAGEC * 2000$

if QETIMC = 2 (weekly rate), then $QEINCEC = QEWAGEC * 52$

if QETIMC = 3 (twice per month), then $QEINCEC = QEWAGEC * 26$

if QETIMC = 4 (monthly rate), then $QEINCEC = QEWAGEC * 12$

if QETIMC = 5 (annually), then $QEINCEC = QEWAGEC$

This above formula assumes full-time work and does not take number of hours worked per week (QEHRSC) into consideration. Outliers, such as values greater than 140,000 or less than 100, were coded as missing.

Relatedness of employment (QERELC)

QERELC asks respondents to classify how related the job they held at the time of second follow-up was to the classes they took at their most recent undergraduate postsecondary

institution. Only respondents who were working at the time of the second follow-up could respond. For this report, this variable was coded as follows:

- closely or somewhat related (QERELC = 1 or 2); and
- not related (QERELC = 3).

Appendix B: Standard Error Tables

Table B-1.1. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning postsecondary students, and of credential-seeking subbaccalaureate students, and number of students, by initial credential goal: 1996

Students' initial credential goal	Percent of all students	Percent of sub-baccalaureate students	Number of all students
Total, all credential goals	†	†	139,800
Subbaccalaureate credential	2.40	†	121,100
Occupational subbaccalaureate	2.48	2.99	93,300
Certificate	1.79	2.96	49,400
Associate's degree	2.32	3.49	72,800
Academic subbaccalaureate	1.17	1.93	33,100
Certificate	0.11	0.19	2,600
Associate's degree	1.13	1.85	32,200
Undeclared subbaccalaureate	1.72	3.00	45,700
Baccalaureate credential	2.40	†	58,400
Career baccalaureate	1.33	†	36,200
Academic baccalaureate	0.84	†	20,800
Undeclared baccalaureate	0.91	†	17,900

† Not applicable.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-2.1. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by specific goal at first institution, and initial credential goal: 1996

Students' initial credential goal	Specific goal at first institution				
	Transfer to 2-year institution	Transfer to 4-year institution	Certificate	Associate's degree	Bachelor's or higher degree
Total, all credential goals	0.38	1.70	1.79	1.86	2.23
Subbaccalaureate credential	0.62	2.73	2.97	3.17	0.45
Occupational subbaccalaureate	0.85	1.77	4.50	4.10	0.88
Certificate	†	†	†	†	†
Associate's degree	1.24	2.41	†	2.54	1.31
Academic subbaccalaureate	2.60	5.26	1.06	4.49	0.56
Certificate	†	†	†	†	†
Associate's degree	2.67	5.40	†	4.56	0.57
Undeclared subbaccalaureate	1.79	4.53	2.50	5.30	1.03
Baccalaureate credential	†	0.37	†	†	0.37
Career baccalaureate	†	0.63	†	†	0.63
Academic baccalaureate	†	0.86	†	†	0.86
Undeclared baccalaureate	†	0.84	†	†	0.84

† Not applicable.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-2.2. Standard errors for the average age of 1995–96 credential-seeking beginning postsecondary students, and percentage distribution by age, sex, and initial credential goal: 1996

Students' initial credential goal	Average age	Age				Sex	
		18 years or younger	19 years old	20–23 years old	24 years or older	Male	Female
Total, all credential goals	0.20	1.24	0.89	1.44	1.00	1.18	1.18
Subbaccalaureate credential	0.34	1.77	1.40	2.23	1.68	1.65	1.65
Occupational subbaccalaureate	0.36	2.22	1.09	2.72	2.24	2.21	2.21
Certificate	0.58	2.44	1.80	4.40	3.85	3.19	3.19
Associate's degree	0.40	2.41	1.88	2.74	2.58	2.93	2.93
Academic subbaccalaureate	0.54	3.84	5.27	3.56	3.61	3.78	3.78
Certificate	†	†	†	†	†	†	†
Associate's degree	0.58	4.27	5.61	3.61	3.70	3.92	3.92
Undeclared subbaccalaureate	0.65	3.12	2.76	2.45	2.69	4.32	4.32
Baccalaureate credential	0.12	1.29	0.77	0.94	0.60	1.48	1.48
Career baccalaureate	0.13	1.66	1.03	1.08	0.77	1.98	1.98
Academic baccalaureate	0.13	2.02	1.67	1.35	0.65	2.00	2.00
Undeclared baccalaureate	0.22	1.95	1.56	1.29	1.07	2.53	2.53

† Not applicable.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-2.3. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning post-secondary students, by race/ethnicity, high school completion, and initial credential goal: 1996

Students' initial credential goal	Race/ethnicity ¹				High school completion	
	White, non-Hispanic	Black, non-Hispanic	Hispanic	Other, non-Hispanic	Diploma	GED ²
Total, all credential goals	1.48	0.99	1.03	0.66	0.53	0.53
Subbaccalaureate credential	2.41	1.39	1.78	0.84	0.80	0.80
Occupational subbaccalaureate	2.21	1.62	1.38	0.76	1.29	1.29
Certificate	3.61	2.78	2.31	0.93	2.53	2.53
Associate's degree	3.08	1.68	1.82	0.95	1.40	1.40
Academic subbaccalaureate	3.25	2.60	2.64	3.06	1.26	1.26
Certificate	†	†	†	†	†	†
Associate's degree	3.09	2.41	2.72	3.13	1.31	1.31
Undeclared subbaccalaureate	6.78	2.77	4.48	3.13	0.93	0.93
Baccalaureate credential	1.61	1.17	0.81	0.89	0.27	0.27
Career baccalaureate	1.87	1.63	1.26	0.79	0.27	0.27
Academic baccalaureate	2.90	1.57	1.24	2.09	0.43	0.43
Undeclared baccalaureate	2.83	2.44	0.82	1.31	0.62	0.62

† Not applicable.

¹ Black, non-Hispanic includes African American, Hispanic includes Latino, and Other, non-Hispanic includes Asian, Native Hawaiian, Other Pacific Islander, American Indian, and Alaska Native.

² GED stands for General Educational Development.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-2.4. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning post-secondary students, by parents' highest education level, family socioeconomic status, and initial credential goal: 1996

Students' initial credential goal	Parents' highest education level ¹			Family socioeconomic status		
	Less than high school	High school graduate	Post-secondary education	Lowest quartile	Middle quartiles	Highest quartile
Total, all credential goals	0.75	1.57	1.83	1.53	1.39	1.48
Subbaccalaureate credential	1.23	2.20	2.64	2.34	2.03	1.75
Occupational subbaccalaureate	1.35	2.51	2.80	2.63	1.89	1.84
Certificate	1.98	3.13	3.07	3.50	3.77	1.45
Associate's degree	1.31	3.18	3.37	3.06	1.81	2.87
Academic subbaccalaureate	1.18	4.54	4.47	3.64	3.84	3.70
Certificate	†	†	†	†	†	†
Associate's degree	1.19	4.57	4.80	3.67	3.59	3.40
Undeclared subbaccalaureate	2.44	4.06	4.22	3.89	4.88	4.65
Baccalaureate credential	0.43	1.52	1.59	1.01	1.22	1.47
Career baccalaureate	0.42	1.53	1.60	1.07	1.29	1.32
Academic baccalaureate	0.71	1.72	2.02	1.84	1.97	1.82
Undeclared baccalaureate	0.65	2.39	2.60	1.40	2.02	2.56

† Not applicable.

¹ Highest education level of either the mother or father of the respondent.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-2.5. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by delayed enrollment, enrollment intensity, and initial credential goal: 1996

Students' initial credential goal	Delayed enrollment		Enrollment intensity		
	Yes	No	Exclusively full-time	Exclusively part-time	Mixed/ other
Total, all credential goals	1.73	1.73	1.67	1.02	1.31
Subbaccalaureate credential	2.59	2.59	2.87	1.83	2.30
Occupational subbaccalaureate	2.36	2.36	3.37	2.02	2.61
Certificate	3.68	3.68	6.27	4.84	3.52
Associate's degree	1.87	1.87	4.71	2.78	2.96
Academic subbaccalaureate	5.79	5.79	3.40	2.53	2.87
Certificate	†	†	†	†	†
Associate's degree	6.20	6.20	3.23	2.38	3.13
Undeclared subbaccalaureate	3.93	3.93	5.71	3.54	4.67
Baccalaureate credential	0.95	0.95	1.05	0.55	0.75
Career baccalaureate	1.17	1.17	1.21	0.77	0.94
Academic baccalaureate	1.41	1.41	1.51	0.82	1.36
Undeclared baccalaureate	1.52	1.52	1.70	0.99	1.13

† Not applicable.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1. SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

Table B-2.6. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by control of initial institution, tuition cost, and initial credential goal: 1996

Students' initial credential goal	Institution control			Tuition cost
	Public	Not-for-profit	For-profit	
Total, all credential goals	2.31	1.57	1.94	\$230
Subbaccalaureate credential	3.26	0.43	3.27	190
Occupational subbaccalaureate	4.84	0.63	4.90	270
Certificate	8.32	0.93	8.59	560
Associate's degree	2.55	0.78	2.42	110
Academic subbaccalaureate	0.70	0.55	0.27	120
Certificate	†	†	†	†
Associate's degree	0.61	0.45	0.28	130
Undeclared subbaccalaureate	1.83	0.71	1.75	110
Baccalaureate credential	2.71	2.73	0.13	340
Career baccalaureate	3.54	3.55	0.31	320
Academic baccalaureate	3.90	†	†	390
Undeclared baccalaureate	2.71	2.71	†	540

† Not applicable.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-2.7. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by work status in the first year, intensity of work, and initial credential goal: 1996

Students' initial credential goal	Work status in first year				Intensity of work ¹	
	Did not work in first year	Worked in first year			Part-time	Full-time
		Total	Student meeting expenses	Employee enrolling in classes		
Total, all credential goals	1.27	1.27	1.04	1.22	1.62	1.62
Subbaccalaureate credential	1.84	1.84	1.69	1.63	2.62	2.62
Occupational subbaccalaureate	2.47	2.47	2.30	2.37	2.32	2.32
Certificate	3.29	3.29	1.94	3.10	3.57	3.57
Associate's degree	2.70	2.70	2.10	3.02	2.78	2.78
Academic subbaccalaureate	4.90	4.90	4.34	2.66	6.77	6.77
Certificate	†	†	†	†	†	†
Associate's degree	4.90	4.90	4.34	2.83	6.75	6.75
Undeclared subbaccalaureate	3.12	3.12	3.79	3.27	5.26	5.26
Baccalaureate credential	1.22	1.22	0.96	0.64	1.09	1.09
Career baccalaureate	1.39	1.39	1.18	0.75	1.41	1.41
Academic baccalaureate	2.59	2.59	2.49	1.08	1.52	1.52
Undeclared baccalaureate	1.88	1.88	1.71	1.41	2.14	2.14

† Not applicable.

¹ Part-time is defined as working 1–34 hours per week. Full-time is defined as working 35 or more hours per week.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-3.1. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning postsecondary students, by persistence and attainment status, and initial credential goal: 2001

Students' initial credential goal	Total attained or persisted ¹	Highest degree attained					
		Total	Certificate	Associate's degree	Bachelor's degree	No degree, still enrolled	No degree, not enrolled
Total, all credential goals	1.21	1.28	1.13	1.04	1.60	1.01	1.21
Subbaccalaureate credential	2.10	1.85	1.73	1.71	1.12	1.57	2.10
Occupational subbaccalaureate	1.92	1.89	2.50	1.69	0.95	1.34	1.92
Certificate	3.08	3.60	3.74	1.90	0.45	1.99	3.08
Associate's degree	3.15	2.26	1.34	2.07	1.11	1.95	3.15
Academic subbaccalaureate	3.81	4.19	1.08	3.76	5.39	2.05	3.81
Certificate	†	†	†	†	†	†	†
Associate's degree	3.91	4.54	0.85	3.83	5.58	2.33	3.91
Undeclared subbaccalaureate	3.53	3.76	2.79	3.73	1.88	3.74	3.53
Baccalaureate credential	0.87	1.32	0.35	0.19	1.39	0.89	0.87
Career baccalaureate	1.10	1.43	0.64	0.35	1.46	1.35	1.10
Academic baccalaureate	1.16	1.97	0.39	0.55	2.29	1.20	1.16
Undeclared baccalaureate	2.08	2.31	0.62	0.52	2.46	1.14	2.08

† Not available.

¹ *Persisted* includes students still enrolled in a postsecondary institution but with no degree.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-3.2. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning postsecondary students who earned a credential, by whether they met or exceeded their initial credential goal, and initial credential goal: 2001

Students' initial credential goal	Earned lower credential than goal	Met or exceeded credential goal
Total, all credential goals	1.14	1.14
Subbaccalaureate credential	2.23	2.23
Occupational subbaccalaureate	3.22	3.22
Certificate	†	†
Associate's degree	3.93	3.93
Academic subbaccalaureate	6.19	6.19
Certificate	†	†
Associate's degree	6.30	6.30
Undeclared subbaccalaureate	3.98	3.98
Baccalaureate credential	0.53	0.53
Career baccalaureate	0.91	0.91
Academic baccalaureate	1.04	1.04
Undeclared baccalaureate	1.03	1.03

† Not applicable.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-3.3. Standard errors for the percentage of 1995–96 credential-seeking beginning postsecondary students who left school without a credential and had not returned as of 2001, by the reason for leaving, and initial credential goal: 2001

Students' initial credential goal	Total percentage who left	Reason for leaving					
		Not satisfied/ academic problems	Done with desired classes	Family demands	Job/ financial demands	Moved to another city/state	Other or unknown reason
Total, all credential goals	1.21	0.27	0.28	0.39	0.90	0.37	0.66
Subbaccalaureate credential	2.10	0.46	0.47	0.60	1.56	0.57	1.14
Occupational subbaccalaureate	1.92	0.66	0.68	0.96	1.76	0.82	1.31
Certificate	3.08	0.61	1.03	1.00	1.56	2.63	2.19
Associate's degree	3.15	0.93	0.96	1.26	2.41	0.91	1.67
Academic subbaccalaureate	3.81	0.34	1.25	1.42	3.89	2.13	2.03
Certificate	†	†	†	†	†	†	†
Associate's degree	3.91	†	†	1.46	4.04	2.18	2.11
Undeclared subbaccalaureate	3.53	1.26	1.55	1.08	2.67	1.15	2.25
Baccalaureate credential	0.87	0.23	0.16	0.35	0.48	0.20	0.05
Career baccalaureate	1.10	0.37	0.24	0.30	0.57	0.34	0.66
Academic baccalaureate	1.16	0.56	0.26	0.53	0.81	0.42	0.93
Undeclared baccalaureate	2.08	0.40	0.24	0.64	1.02	0.38	1.11

† Not applicable.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-3.4. Standard errors for the percentage of 1995–96 credential-seeking beginning postsecondary students with cumulative GPA below 2.25, by persistence and attainment status, and initial credential goal: 2001

Students' initial credential goal	All students	Still enrolled or attained credential	Not enrolled, no credential
Total, all credential goals	0.52	0.47	2.28
Subbaccalaureate credential	0.92	0.83	3.32
Occupational subbaccalaureate	1.01	0.89	4.87
Certificate	1.64	†	†
Associate's degree	1.13	1.05	5.84
Academic subbaccalaureate	2.46	2.99	†
Certificate	†	†	†
Associate's degree	2.54	3.10	†
Undeclared subbaccalaureate	2.11	2.16	†
Baccalaureate credential	0.46	0.42	2.01
Career baccalaureate	0.51	0.54	3.09
Academic baccalaureate	0.83	0.44	4.95
Undeclared baccalaureate	0.74	0.60	3.58

† Not applicable.

NOTE: Subbaccalaureate category includes all students enrolled at less-than-4-year institutions and students enrolled at 4-year institutions whose initial credential goal at that institution was a certificate, associate's degree, or transfer to a less-than-4-year institution. Baccalaureate category includes students enrolled at 4-year institutions whose initial credential goal was a baccalaureate or higher degree or transfer to a 4-year institution. Associate's degree category includes students enrolled at less-than-4-year institutions whose goal was to earn an associate's degree, transfer to a 2-year or 4-year institution, or complete a bachelor's degree. Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-3.5. Standard errors for the percentage of 1995–96 credential-seeking beginning post-secondary students with a credential who earned each type of credential, and who earned each type of credential as their highest credential: 2001

Type of credential earned	Percent who earned credential	Percent who earned credential as highest
Total, all credential attainers	†	†
Subbaccalaureate credential	2.66	2.47
Occupational subbaccalaureate	2.39	2.20
Certificate	1.99	1.94
Associate's degree	1.66	1.32
Academic subbaccalaureate	0.80	0.46
Certificate	0.32	0.16
Associate's degree	0.87	0.50
Subbaccalaureate, major unknown	0.33	0.28
Baccalaureate credential	2.63	2.63
Career baccalaureate	1.79	1.82
Academic baccalaureate	1.47	1.46
Baccalaureate, major unknown	0.20	0.20
Attained credential, level and major unknown	0.54	0.54

† Not applicable.

NOTE: Occupational, career, and academic categories are defined in exhibit 1.1.

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

Table B-4.1. Standard errors for the percentage of 1995–96 credential-seeking beginning postsecondary students with each labor force characteristic, by students' completion and credential status: 2001

Completion and credential status	Percent of all respondents			Percent of workers employed full time	Unemployment rate ¹
	In labor force	Employed	Employed full time		
Occupational subbaccalaureate completer	1.76	1.11	1.80	1.82	1.48
Certificate completer	1.72	0.94	2.65	2.19	1.57
Associate's degree completer	3.60	2.37	3.68	3.03	2.90
Occupational subbaccalaureate noncompleter	2.61	1.72	3.29	1.88	1.93
Certificate noncompleter	5.96	4.29	6.33	6.37	5.56
Associate's degree noncompleter	1.98	1.63	3.37	2.47	1.89

¹ *Unemployment rate* is the number of individuals who are not working and are seeking work divided by the number of individuals in the labor force (working, or not working and seeking work).

NOTE: Occupational categories are defined in exhibit 1.1.

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

Table B-4.2. Standard errors for the percentage distribution of 1995–96 credential-seeking beginning postsecondary students who were working, by relatedness of their job to their classes, and students' completion and credential status: 2001

Completion and credential status	Closely or somewhat related	Not related
Occupational subbaccalaureate completer	2.39	2.39
Certificate completer	3.27	3.27
Associate's degree completer	3.96	3.96
Occupational subbaccalaureate noncompleter	3.81	3.81
Certificate noncompleter	8.36	8.36
Associate's degree noncompleter	3.76	3.76

NOTE: Occupational categories are defined in exhibit 1.1.

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

Table B-4.3. Standard errors for the average annual salary in 2000 of 1995–96 credential-seeking beginning postsecondary students who worked, by students' completion and credential status: 2001

Completion and credential status	All workers	Part-time workers	Full-time workers
Occupational subbaccalaureate completer	\$ 670	\$1,950	\$ 640
Certificate completer	1,130	2,050	1,080
Associate's degree completer	1,200	4,380	1,420
Occupational subbaccalaureate noncompleter	1,220	1,760	1,230
Certificate noncompleter	2,110	5,400	1,980
Associate's degree noncompleter	1,580	1,220	1,470

NOTE: Occupational categories are defined in exhibit 1.1.

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