

STATS IN BRIEF

U.S. DEPARTMENT OF EDUCATION FEBRUARY 2018 NCES 2018-421

First-Generation Students

College Access, Persistence, and Postbachelor's Outcomes

AUTHORS

Emily Forrest Cataldi
Christopher T. Bennett
Xianglei Chen
RTI International

PROJECT OFFICER

Sean A. Simone
National Center for Education Statistics

Statistics in Brief publications present descriptive data in tabular formats to provide useful information to a broad audience, including members of the general public. They address simple and topical issues and questions. They do not investigate more complex hypotheses, account for inter-relationships among variables, or support causal inferences. We encourage readers who are interested in more complex questions and in-depth analysis to explore other NCES resources, including publications, online data tools, and public- and restricted-use datasets. See nces.ed.gov and references noted in the body of this document for more information.

In recent decades, an increasing proportion of the U.S. population has enrolled in college and earned a bachelor's degree (Snyder, de Brey, and Dillow 2016). The percentage of U.S. adults age 25 and over who held a bachelor's degree increased from 21 percent in 1990 to 33 percent in 2015 (Snyder, de Brey, and Dillow 2016). Accompanying this trend is a shrinking share of children whose parents have not attended college; Cahalan et al. (2006), studying two cohorts of high school sophomores, noted that in 1980 some 77 percent of high school sophomores' parents had not enrolled in postsecondary education; by 2002, the percentage had declined to 62 percent.

The share of students enrolled in postsecondary education whose parents had not attended college (often referred to as "first-generation students" in the literature¹) has also declined: between 1999–2000 and 2011–12, the proportion decreased from 37 percent to 33 percent (Skomsvold 2015; Staklis and Chen 2010).

¹ See, for example, Ishitani (2006) and Nunez and Cuccaro-Alamin (1998).

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Looking specifically at bachelor's degree recipients, among those who received a bachelor's degree in the United States in 1992–93, some 31 percent had parents who had not attended college; by 2007–08, that proportion had become 20 percent (Staklis 2016). Although it has become proportionally smaller over time, the group of U.S. undergraduates whose parents had not attended college remains sizeable: one-third of students enrolled in U.S. postsecondary institutions in 2011–12 (Skomsvold 2015).

A considerable body of research indicates that students whose parents have not attended college often face significant challenges in accessing postsecondary education, succeeding academically once they enroll, and completing a degree (e.g., Choy 2001; Ishitani 2006; Pascarella et al. 2004; Stephens et al. 2012; Woosley and Shepler 2011). When they do enroll, first-generation students cannot benefit from their parents' college-going experience—a valuable source of cultural capital that helps students navigate college (e.g., understanding the significance of the syllabus, what “office hours” means, or how to cite sources in written assignments) (Collier and Morgan 2008). This lack of cultural capital negatively affects even those first-generation students who are academically well prepared for college.

Many first-generation students are also at greater risk of not persisting in or not completing credential programs because of such challenges as being less well prepared academically, having children of their own, and working full time while enrolled (Chen and Carroll 2005; Horn and Premo 1995; Mangan 2015; Nunez and Cuccaro-Alamin 1998; Terenzini et al. 1996). In addition, first-generation students often possess other demographic and enrollment characteristics (low socioeconomic status and lower enrollment intensity, among others) that are associated with dropping out. All of these factors and interactions among them increase first-generation students' risk of failing to persist in postsecondary education relative to that of many of their continuing-generation peers (Choy 2001; Lohfink and Paulsen 2005).

Updating a prior report on first-generation students (Nunez and Cuccaro-Alamin 1998) and complementing a recent report on first-generation students who were high school sophomores in 2002 (Redford and Hoyer 2017), this Statistics in Brief focuses on first-generation students' entrance into postsecondary education, persistence and completion once they enroll in college, labor market outcomes, and further education enrollment and attainment after bachelor's

degree completion. In this report, *first-generation students* are defined as undergraduate students whose parents had not participated in postsecondary education.² The experiences and outcomes of these students are compared with those of two groups whose parents had attended college, sometimes referred to as *continuing-generation students* in this report: students with at least one parent who earned a bachelor's degree and students with at least one parent who attended college but no parent who had earned a bachelor's degree.

Using data from multiple sources (discussed in the following section) about various points in the education pipeline and beyond, this report examines the personal, enrollment, academic, and career characteristics of students whose parents had not attended college. The intent of the report is to describe the experiences of first-generation students during and after enrollment in school, with a specific focus on enrollment and labor market outcomes, and compare their experiences with those of their peers whose parents enrolled in or completed college. All comparisons of estimates were tested for statistical significance using the Student's *t* statistic, and all differences cited are statistically significant at the $p < .05$ level.³

² The “first generation” designation is based on parents' educational attainment and not on the student's immigrant status. Parents' highest education level reflects the highest degree earned by either parent.

³ No adjustments for multiple comparisons were made.

DATA

The data used in this Statistics in Brief are drawn from three sources: the Education Longitudinal Study of 2002 (ELS:2002), the 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09), and the 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12). Each study provides a different perspective on first-generation students and, notably, draws from a distinct population. The ELS:2002 data followed a representative sample of high school sophomores in 2002 and 2004 high school graduates, that is, young people of traditional-college-going age. In contrast, BPS:04/09 represents first-year beginning college students in 2003–04, regardless of age, and B&B:08/12 represents college graduates in 2007–08, who vary in age and in their paths to a bachelor’s degree. This report relies on these three data sources to address its research questions. For research question 1, estimates and standard errors from two previously published reports (Chen et al. 2017; Planty, Bozick, and Ingels 2006) were used to create figures 1–3 and perform statistical significance testing to establish the findings presented in this report. Analyses to address research questions 2 and 3 were conducted for this report.

ELS:2002 surveyed a nationally representative sample of more than 15,000 high school sophomores from public and private high schools during the 2001–02 academic year. Follow-up surveys of the sampled students were administered in 2004, 2006, and 2012.⁴ The ELS:2002 data provide opportunities to study students’ transitions from high school to postsecondary education or early careers. In this Statistics in Brief, ELS:2002 provides measures of high school coursetaking and students’ immediate and eventual enrollment in postsecondary education. More information on data collected in ELS:2002 is available at <https://nces.ed.gov/surveys/els2002/>

BPS:04/09 is a nationally representative sample survey of nearly 17,000 beginning postsecondary students who were first-time entrants to postsecondary education in the 2003–04 academic year. The BPS:04/09 base-year sample was identified in the 2003–04 National Postsecondary Student Aid Study (NPSAS:04),⁵ and the follow-up surveys of this cohort of beginning postsecondary students were conducted in 2006 and 2009. BPS:04/09 data used in this report

include measures of college persistence and degree attainment, and analyses are restricted to individuals who participated in the base survey and both follow-up surveys. More information on data collected in BPS:04/09 is available at <https://nces.ed.gov/surveys/bps/>

Finally, B&B:08/12 is a nationally representative, longitudinal sample survey of more than 17,000 students who completed the requirements for a bachelor’s degree during the 2007–08 academic year. The base-year sample of B&B:08/12 was identified in the 2007–08 National Postsecondary Student Aid Study (NPSAS:08), and sample members were surveyed again in 2009 and 2012.⁶ This report uses data from B&B:08/12 to examine the labor market outcomes and further education enrollment of bachelor’s recipients. To provide a longitudinal look at students’ outcomes 4 years after they had earned a bachelor’s degree in 2007–08, these analyses are restricted to graduates who participated in the base-year, first follow-up, and second follow-up surveys. More information on data collected in B&B:08/12 is available at <https://nces.ed.gov/surveys/B&B/>

⁴ The ELS:2002 third follow-up data collection began in July 2012 and continued until early February 2013. For brevity, this report refers to students’ current status “as of 2012,” although some students were interviewed in 2013.

⁵ NPSAS is a comprehensive study that examines how undergraduates and graduate and professional students and their families pay for postsecondary education.

⁶ The B&B:08/12 data collection began in August 2012 and continued until April 2013. For brevity, this report refers to graduates’ current status “as of 2012,” although some graduates were interviewed in 2013.

STUDY QUESTIONS

1 How do high school students whose parents did not enroll in college fare in high school compared with their peers whose parents attended at least some college? At what rates do these groups transition to college and in what types of institutions do they enroll?

2 Compared with students whose parents attended at least some college, how do first-generation students fare after enrolling in postsecondary education? At what rates do they attain degrees or certificates or remain enrolled?

3 Among bachelor's degree recipients, how do first-generation students fare compared with their continuing-generation peers in the labor market or further postsecondary enrollment?

KEY FINDINGS

- Compared with 2003–04 high school graduates whose parents had a bachelor's degree, proportionally fewer students whose parents did not enroll in college took such high-level math courses as trigonometry/statistics/precalculus (27 percent vs. 43 percent) and calculus (7 percent vs. 22 percent) and earned Advanced Placement (AP) or International Baccalaureate (IB) credits (18 percent vs. 44 percent) (figure 1).
- Among 2002 high school sophomores, 72 percent of students whose parents had never attended college had enrolled in postsecondary education by 2012. In contrast, 84 percent of their peers whose parents had some college education had done so, as had 93 percent of those whose parents had earned a bachelor's degree (figure 2).
- Three years after first enrolling, comparatively more first-generation students who began postsecondary education in 2003–04 had left postsecondary education without earning a postsecondary credential (33 percent) than had their continuing-generation peers whose parents attended some college (26 percent) and whose parents earned a bachelor's degree (14 percent) (figure 4).
- Among 2007–08 bachelor's degree recipients, no statistically significant differences in the rates of full-time employment 4 years after completing their degrees were detected among groups who varied by parental education level: in all three groups (first-generation students; students whose parents attended college; and students whose parents earned a bachelor's degree) between 57 and 59 percent were employed full time (figure 6).
- Similarly, among 2007–08 bachelor's degree recipients who were employed 4 years after completing their degrees, median annualized salaries were not statistically different between first-generation graduates and their continuing-generation peers among either full-time (\$43,000–\$45,500) or part-time workers (\$12,500–\$16,100) (figure 7).
- A smaller proportion of first-generation graduates (4 percent) and those whose parents had some college (5 percent) had enrolled in doctoral or professional programs than had their counterparts whose parents had earned a bachelor's degree (10 percent) (figure 8).

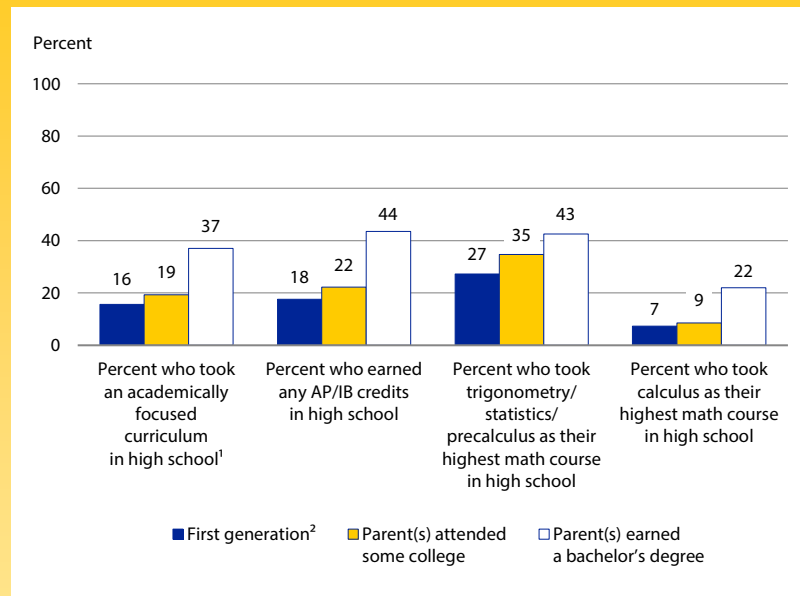
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How do high school students whose parents did not enroll in college fare in high school compared with their peers whose parents attended at least some college? At what rates do these groups transition to college and in what types of institutions do they enroll?

To assess the relative success of high school students whose parents had different levels of education, the analyses in this report use longitudinal data following a cohort of 2002 high school sophomores over 10 years. These analyses reveal several gaps in high school and postsecondary academic experiences between students whose parents did not attend college and their peers whose parents either enrolled in or completed college. Compared with students whose parents had a bachelor's degree, proportionally fewer students whose parents did not enroll in college graduated from high school having completed an academically focused curriculum⁷ (16 percent vs. 37 percent) and some AP/IB credits (18 percent vs. 44 percent). Similar differences were apparent for taking such high-level math courses as trigonometry/statistics/precalculus (27 percent vs. 43 percent) and calculus (7 percent vs. 22 percent) (figure 1).

FIGURE 1.

Percentage of 2003–04 high school graduates who took an academically focused curriculum, earned credits for Advanced Placement (AP) or International Baccalaureate (IB) courses, and highest level math courses taken, by parents' highest level of education



¹ An academically focused curriculum includes a minimum of four credits of English; one credit of mathematics higher than algebra II and any two other credits in math; one science credit higher than general biology and any two other credits in science; one credit of social studies in U.S. or world history and any two other credits in social studies; and two credits in a single foreign language.

² First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents' highest education level reflects the highest degree earned by either parent.

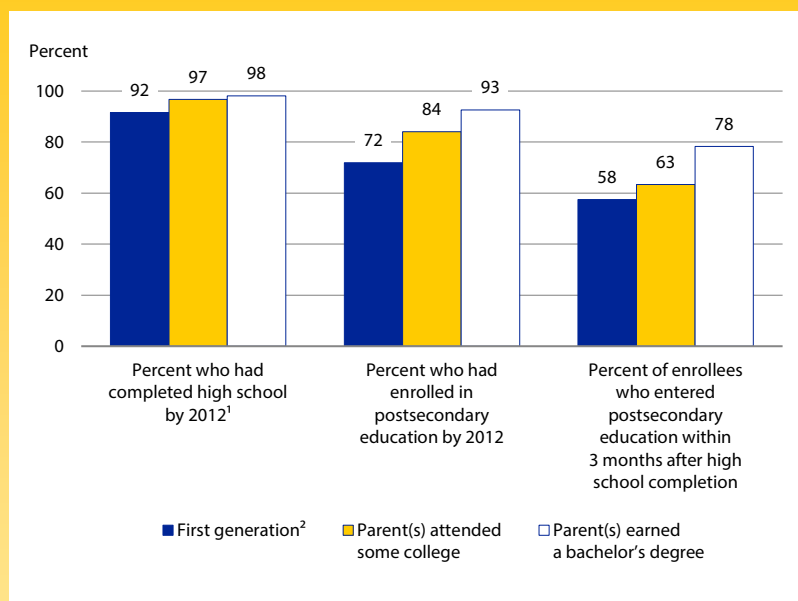
SOURCE: Tables 3, 4, and 5 in Planty, M., Bozick, R., and Ingels, S.J. (2006). *Academic Pathways, Preparation, and Performance—A Descriptive Overview of the Transcripts from the High School Graduating Class of 2003–04* (NCES 2007-316). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved May 24, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007316>.

⁷ An academically focused curriculum includes a minimum of four credits of English; one credit of mathematics higher than algebra II and any two other credits in math; one science credit higher than general biology and any two other credits in science; one credit of social studies in U.S. or world history and any two other credits in social studies; and two credits in a single foreign language.

As of 2012, the vast majority of 2002 high school sophomores had completed high school by earning a regular diploma, passing a General Educational Development (GED) certificate test, or earning another high school equivalency (e.g., a certificate of attendance). The completion rate was lower for students whose parents did not attend college (92 percent), however, than for their counterparts whose parents attended some college or earned a bachelor's degree (97 percent and 98 percent, respectively) (figure 2). Although the majority of 2002 sophomores whose parents did not attend college had enrolled in college by 2012, their enrollment rate (72 percent) was still lower than the rates for their peers whose parents had some college education (84 percent) and those whose parents had earned a bachelor's degree (93 percent). Furthermore, among those who enrolled, proportionally fewer students whose parents were not college educated entered postsecondary education immediately

FIGURE 2.

Percentage of 2002 high school sophomores who had completed high school, and percentage who had enrolled in postsecondary education, by parents' highest level of education: 2012



¹ Includes students who earned a regular high school diploma, a General Educational Development (GED) certificate, or other high school equivalency such as a certificate of attendance.

² First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents' highest education level reflects the highest degree earned by either parent. Estimates may differ from those published in *First-Generation and Continuing-Generation College Students* (NCES 2018-009) because the estimates in the two publications were generated using different analysis weights.

SOURCE: Tables C-2a and C-4a in Chen, X., Lauff, E., Arbeit, C., Henke, R., Skomsvold, P., and Hufford, J. (2017). *Early Millennials: The Sophomore Class of 2002 a Decade Later* (NCES 2017-437). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved October 3, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017437>.

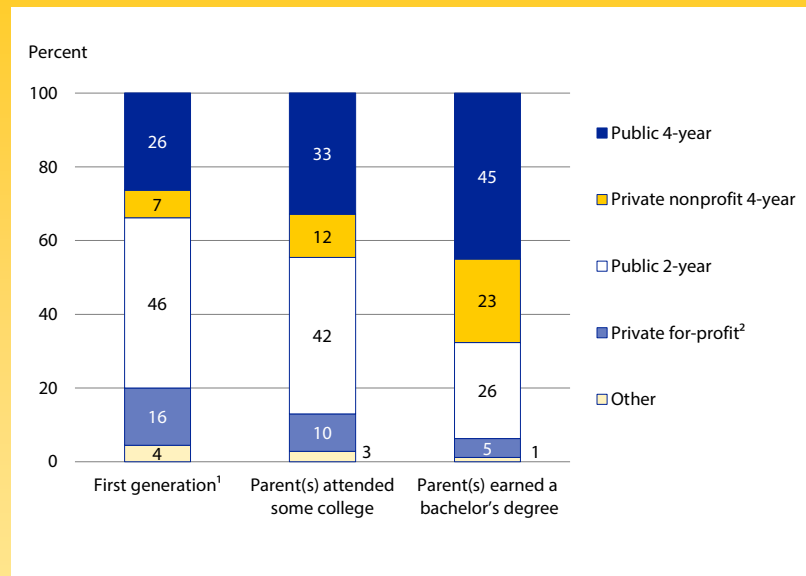
(i.e., within 3 months after high school completion)—58 percent, compared with 63 percent of their peers whose parents had some college education and 78 percent of those whose parents had earned a bachelor's degree.⁸

⁸ These estimates were generated using the panel weight (F3BYPNLWT), which includes base-year and third follow-up respondents, while estimates published in *First-Generation and Continuing-Generation College Students* (NCES 2018-009) were generated using a weight that included the above population plus first follow-up transcript participants (F3BYTSCWT). As a result, estimates may differ by up to 1 percentage point between the two publications.

Among those 2002 high school sophomores who had enrolled in postsecondary education by 2012, 46 percent of students whose parents did not attend college enrolled first in a public 2-year institution, compared with 42 percent of those whose parents had some college education and 26 percent of students whose parents had earned a bachelor's degree (figure 3). Students whose parents did not attend college began in 4-year institutions at a lower rate than their continuing-generation peers; 26 percent began at public 4-year institutions compared with 33 percent of those whose parents attended some college and 45 percent of those whose parents had earned a bachelor's degree, while 7 percent began at private nonprofit 4-year institutions compared with 12 and 23 percent, respectively.

FIGURE 3.

Among 2002 high school sophomores who had enrolled in postsecondary education by 2012, percentage distribution of the level and control of the institution they first attended, by parents' highest level of education: 2012



¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

² Includes private for-profit institutions at all levels.

NOTE: Parents' highest education level reflects the highest degree earned by either parent. Estimates may differ from those published in *First-Generation and Continuing-Generation College Students* (NCES 2018-009) because the estimates in the two publications were generated using different analysis weights.

SOURCE: Table C-5a in Chen, X., Lauff, E., Arbeit, C., Henke, R., Skomsvold, P., and Hufford, J. (2017). *Early Millennials: The Sophomore Class of 2002 a Decade Later* (NCES 2017-437). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved October 3, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017437>.

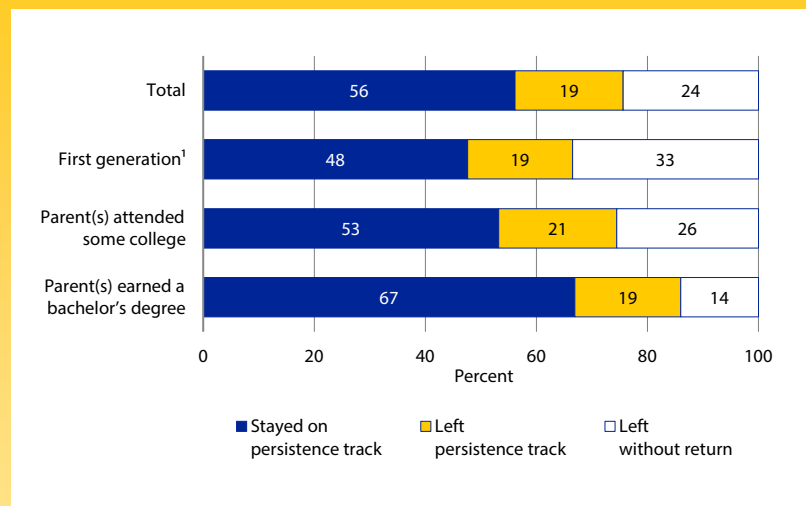
2 Compared with students whose parents attended at least some college, how do first-generation students fare after enrolling in postsecondary education? At what rates do they attain degrees or certificates or remain enrolled?

As noted above, first-generation students enroll in postsecondary education at lower rates than their continuing-generation peers do. In addition, among those who do enroll in postsecondary education, first-generation and continuing-generation students display different patterns of persistence and degree or certificate attainment.

Data from BPS:04/09, the longitudinal study following a cohort of 2003–04 first-time beginning postsecondary students over 6 years, show that first-generation students lag behind their continuing-generation peers on a variety of measures of persistence and attainment. The persistence track is a measure of a student’s progress toward a credential. In this report, the persistence track is measured 3 years after the initial postsecondary enrollment and uses three categories: stayed on persistence track; left persistence track; and left without return. Students who stayed on the persistence track attained a credential from the original institution or one of the same level or were still enrolled at the original institution or one of the same level without a stopout (an enrollment break

FIGURE 4.

Percentage distribution of 2003–04 beginning postsecondary students’ status on the persistence track after 3 years, by parents’ highest level of education: 2006



¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents’ highest education level reflects the highest degree earned by either parent. Students who stayed on the persistence track attained a credential from the original institution or one of the same level, or were still enrolled at the original institution or one of the same level without a stopout (an enrollment break of more than 4 months) by 2006. Those who left the persistence track had transferred to a lower level institution or stopped out but were still enrolled in 2006, while students who left without return had not attained a credential and were no longer enrolled in 2006. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09).

of more than 4 months) by 2006.⁹ Those who left the persistence track had transferred to a lower level institution (e.g., from a 4-year to a 2-year institution) or stopped out but were enrolled in 2006, while students who left without return had not attained a credential

and were not enrolled in 2006. Figure 4 shows that 3 years after beginning college, proportionally fewer first-generation students stayed on the persistence track (48 percent) than did their continuing-generation peers whose parents had attended

⁹ This would include, for example, students who began in 2003–04 at a 2-year institution and either completed an award or were still enrolled at a 2-year institution, whether the original institution or another 2-year institution, in 2006.

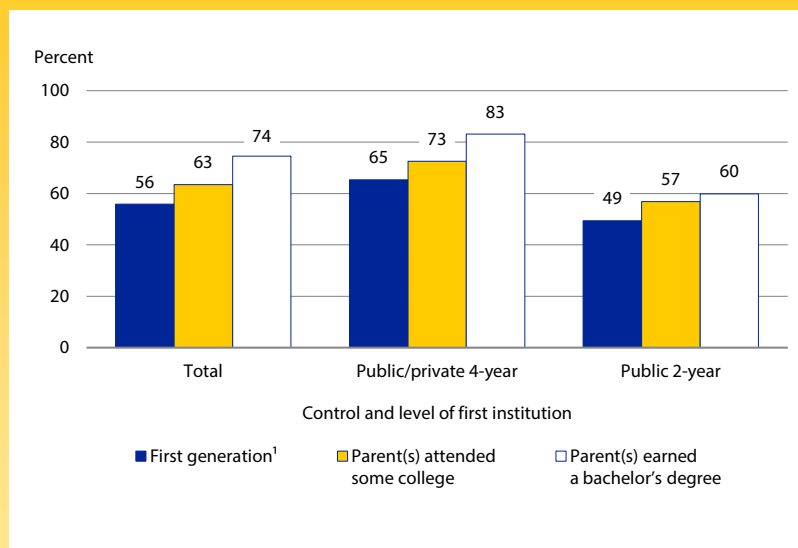
college (53 percent) or had earned a bachelor's degree (67 percent). In addition, proportionally more first-generation than continuing-generation students had left postsecondary education without earning a postsecondary credential and had not returned by 2006 (33 percent vs. 26 and 14 percent).

Upon entering postsecondary education in 2003–04, a smaller proportion (23 percent) of 4-year enrollees were first-generation students, compared with 77 percent who were continuing-generation students (Berkner and Choy 2008). The reverse was true among public 2-year enrollees, however: 42 percent were first-generation students compared with 29 percent each of students whose parents had attended or completed college.

Within 6 years of beginning postsecondary education in 2003–04, relatively fewer first-generation students had earned a credential or remained enrolled (56 percent) compared with their continuing-

FIGURE 5.

Percentage of 2003–04 beginning postsecondary students who had attained a degree or were still enrolled 6 years after entering postsecondary education, by parents' highest level of education and control and level of first institution: 2009



¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents' highest education level reflects the highest degree earned by either parent. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09).

generation counterparts whose parents had some college education (63 percent) or a bachelor's degree (74 percent) (figure 5). This pattern held for students who first enrolled at

a public or private 4-year college or university (65 percent vs. 73 and 83 percent) or a public 2-year college (49 percent vs. 57 and 60 percent).

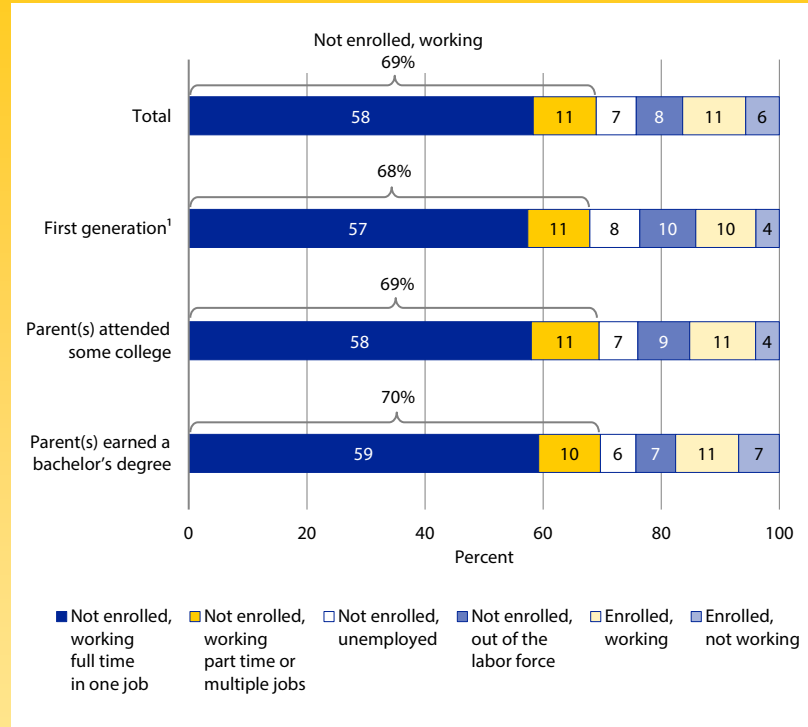
3 Among bachelor's degree recipients, how do first-generation students fare compared with their continuing-generation peers in the labor market or further postsecondary enrollment?

Employment

Figure 6 provides a snapshot of 2007–08 bachelor's degree recipients' labor market participation 4 years after graduating from college. The majority of graduates were working and not enrolled in school, most in one full-time job. For example, among first-generation graduates,¹⁰ 68 percent were working but not enrolled; a proportion not statistically different from that of the other two groups: 69 percent of graduates whose parents had some college education and 70 percent of those whose parents had a bachelor's degree. Similarly, the rates of full-time employment at a single job were not statistically different among the three groups (57–59 percent). Another 10–11 percent of these groups were enrolled in school and working.

FIGURE 6.

Percentage distribution of 2007–08 bachelor's degree recipients' labor market participation and degree enrollment, by parents' highest level of education: 2012



¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Postbachelor's degree enrollment includes enrollment in programs that award undergraduate certificates, associate's or bachelor's degrees, postbaccalaureate certificates, master's degrees, doctoral degrees, and professional degrees. Parents' highest education level reflects the highest degree earned by either parent. Full-time/part-time employment status is based on respondent report; those who were not working but looking for work are defined as unemployed; and those who were not working and not looking for work are defined as out of the labor force. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

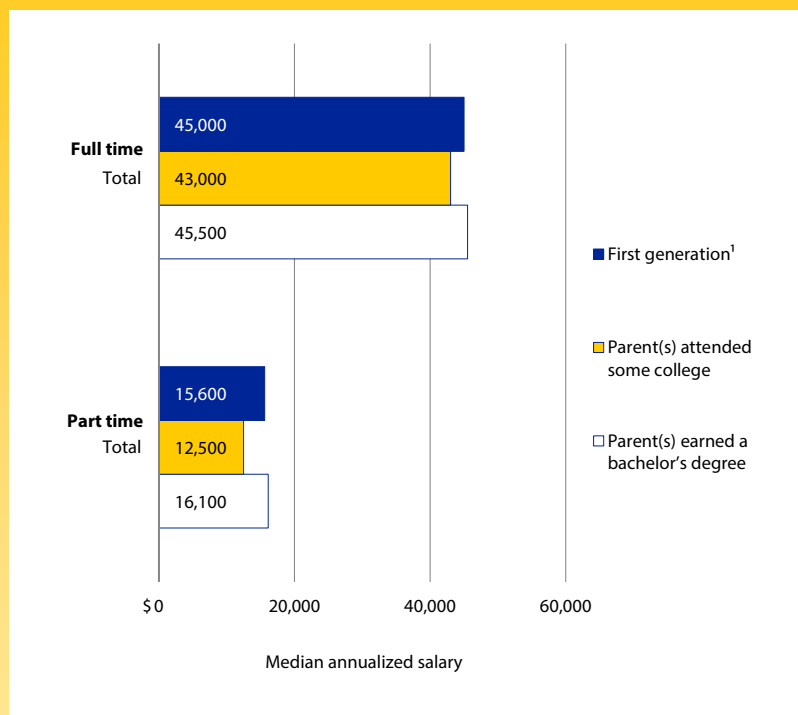
SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

¹⁰ This section uses "first-generation graduates" to refer to first-generation students who completed a bachelor's degree in 2007–08; as in the prior section, first-generation status is based on parents' education (i.e., no college attendance), regardless of the student's degree attainment.

Among graduates who had not enrolled in school between the 2007–08 bachelor’s degree and the B&B:08/12 interview and had held a primary job,¹¹ the median annualized salaries were not statistically different between first-generation graduates and their continuing-generation peers (figure 7). This was true among both full-time (\$43,000–\$45,500) and part-time workers (\$12,500–\$16,100).

FIGURE 7.

Among 2007–08 bachelor’s degree recipients who had not enrolled in a degree program since earning their bachelor’s degree and had a primary job, median annualized salary for their primary job, by parents’ highest level of education and work intensity: 2012



¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents’ highest education level reflects the highest degree earned by either parent. Full time is defined as working 35 or more hours per week, and part time is defined as working less than 35 hours per week. The primary job is the job held currently or most recently, as of the time of the second follow-up interview, at which the respondent had worked for more than 3 months. Excludes the 6.8 percent of graduates who were not employed in any one job for more than 3 months since receiving their bachelor’s degree. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

¹¹ The primary job is the job held currently or most recently, as of the time of the second follow-up interview, at which the respondent had worked for more than 3 months. This excludes the 6.8 percent of graduates who were not employed in any one job for more than 3 months since receiving their bachelor’s degree.

Graduate Enrollment

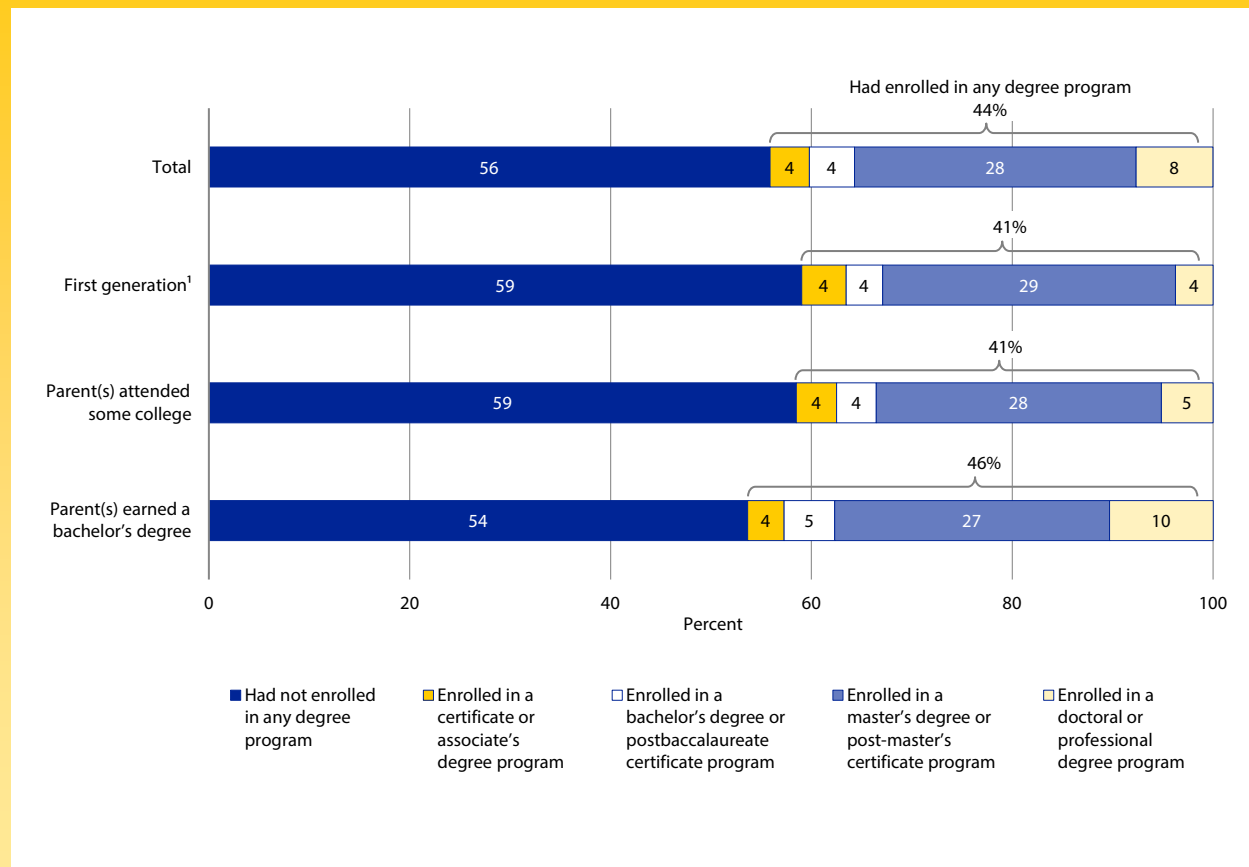
Within 4 years after earning their bachelor's degree in 2007–08, some 41 percent of both first-generation graduates and graduates whose parents attended some college had

enrolled in a postsecondary degree program, proportionally fewer than the 46 percent of those whose parents held a bachelor's degree (figure 8). A smaller proportion of first-generation graduates (4 percent) and those whose

parents had some college (5 percent) had enrolled in doctoral or professional programs than had their counterparts whose parents had earned a bachelor's degree (10 percent).

FIGURE 8.

Percentage distribution of 2007–08 bachelor's degree recipients' highest degree enrollment after the bachelor's degree, by parents' highest level of education: 2012



¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents' highest education level reflects the highest degree earned by either parent. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

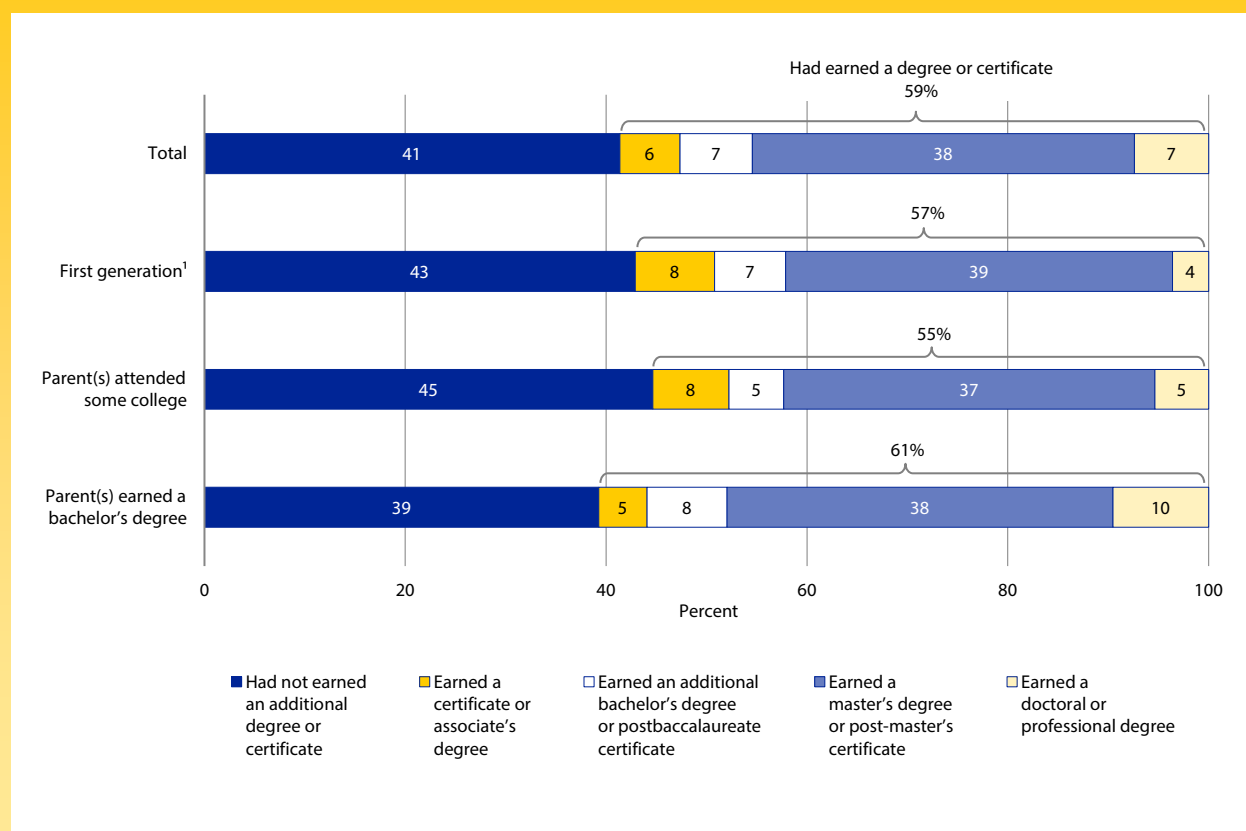
Among graduates who had enrolled after completing the 2007–08 bachelor’s degree, 59 percent had earned an additional degree or certificate by 2012 (figure 9). No statistically significant difference was found between first-generation and continuing-generation graduates in terms of earning an additional bachelor’s degree or a master’s degree.

Some differences in additional degree attainment as of 2012 between first-generation graduates and their counterparts whose parents had earned a bachelor’s degree were apparent at the subbaccalaureate and doctoral/professional degree levels, where proportionally more first-generation graduates than graduates whose parents had a bachelor’s degree

had earned a subbaccalaureate award (8 percent vs. 5 percent). The opposite was true for doctoral or professional degrees (4 percent vs. 10 percent). No statistically significant difference was observed between first-generation graduates and those whose parents had enrolled in but not completed college, however.

FIGURE 9.

Among 2007–08 bachelor’s degree recipients who had enrolled in a degree program since earning their bachelor’s degree, percentage distribution of their highest postbachelor’s degree attainment, by parents’ highest level of education: 2012



¹First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents' highest education level reflects the highest degree earned by either parent. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

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<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2005171>

First-Generation Students: Undergraduates Whose Parents Never Enrolled in Postsecondary Education (NCES 98-082).
<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=98082>

Mapping the Road to College: First-Generation Students' Math Track, Planning Strategies, and Context of Support (NCES 2000-153).
<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000153>

Students Whose Parents Did Not Go to College: Postsecondary Access, Persistence, and Attainment (NCES 2001-126).
<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2001126>

TECHNICAL NOTES

The estimates provided in this Statistics in Brief are based on data collected through the third follow-up of the Education Longitudinal Study of 2002 (ELS:2002), the second follow-up of the 2004 Beginning Postsecondary Students Longitudinal Study (BPS:04/09), and the second follow-up of the 2008 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

ELS:2002

ELS:2002 is the fourth in the National Center for Education Statistics (NCES) series of secondary school longitudinal studies that also includes the National Longitudinal Study of the High School Class of 1972 (NLS:72), High School and Beyond (HS&B), the National Education Longitudinal Study of 1988 (NELS:88), and the High School Longitudinal Study of 2009 (HSL:09). ELS:2002 includes information on the transitions of high school students to further education, the labor force, and family formation. Data for ELS:2002 were collected from multiple sources, including paper and web surveys, telephone- and computer-assisted interviews, high school and postsecondary transcripts, achievement tests, and administrative records.

The ELS:2002 data collection began in the spring term of the 2001–02 school year. Over the next 10 years, these students were surveyed in three follow-ups: in 2004 (when most were seniors in high school¹²); in 2006 (approximately 2 years after the sample’s modal high school

graduation date); and in 2012 (when the majority of the sample was approximately 26 years old).¹³ See exhibit 1 for more details on the ELS:2002 data collections.

For more information on the ELS:2002 methodology, see the following: *Education Longitudinal Study of 2002 (ELS:2002) Third Follow-Up Data File Documentation* (NCES 2014-364). <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014364>.

The ELS:2002 estimates in this report were first published in two NCES reports: *Academic Pathways, Preparation, and Performance—A Descriptive Overview of the Transcripts from the High School Graduating Class of 2003–04* (Planty, Bozick, and Ingels 2006) and *Early Millennials: The Sophomore Class of 2002 a Decade Later* (Chen et al. 2017). The first report provides data on high school coursetaking, while the second report provides data on students’ transition to postsecondary education.

Exhibit 1. Selected statistics on the Education Longitudinal Study of 2002 (ELS:2002) third follow-up data collection

Statistic	ELS:2002 third follow-up
Target population	High school sophomores in 2002 or high school seniors in 2004
Target population size	3 million
Sampling frame (schools)	Preliminary 1999–2000 Common Core of Data (CCD) and provisional 1999–2000 Private School Survey (PSS) files
Number of eligible schools (ELS:2002)	1,220
Number of participating schools (ELS:2002)	750
Percent of eligible schools that participated (unweighted)	61.6
Percent of eligible schools that participated (weighted)	67.8
Number of eligible sample members (high school transcript)	16,400
Transcript response rate (unweighted)	91.1
Transcript response rate (weighted)	90.7
Number of eligible sample members (ELS:2002 third follow-up)	15,700
ELS:2002 third follow-up response rate (unweighted)	84.3
ELS:2002 third follow-up response rate (weighted)	83.8

SOURCE: Ingels, S.J., Pratt, D.J., Wilson, D., Burns, L.J., Currivan, D., Rogers, J.E., and Hubbard-Bednasz, S. (2007). *Education Longitudinal Study of 2002: Base-Year to Second Follow-up Data File Documentation* (NCES 2008-347). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved May 24, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2008347>.

Ingels, S.J., Pratt, D.J., Alexander, C.P., Jewell, D.M., Lauff, E., Mattox, T.L., and Wilson, D. (2014). *Education Longitudinal Study of 2002 (ELS: 2002) Third Follow-up Data File Documentation* (NCES 2014-364). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved May 24, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014364>.

¹² The sample was refreshed to represent spring-term 12th-graders in 2004.

¹³ The ELS:2002 third follow-up data collection began in July 2012 and continued until early February 2013. For brevity, this report refers to students’ current status “as of 2012,” although some students were interviewed in 2013.

BPS:04/09

Each of the BPS studies, of which BPS:04/09 is the third, follows a cohort of beginning postsecondary students for 5 (BPS:90/94) or 6 (BPS:96/01) years, tracking their persistence through postsecondary education, their program completion, and their transition into the labor force. BPS:04/09 focused on the cohort who enrolled in postsecondary education for the first time in 2003–04. Students provided data via the Web or by telephone during the base-year study for BPS:04/09, the 2003–04 National Postsecondary Student Aid Study (NPSAS:04), and during the follow-up studies in 2006 and 2009. Data were also collected from the sampled students' academic institutions and from other relevant databases, including U.S. Department of Education records on federal student financial aid applications and federal student loan and grant programs. Students' transcripts were collected in 2009 as part of the Postsecondary Education Transcript Study, creating a record of academic enrollment that included information on their coursetaking,

credit accumulation, academic performance, and degree or certificate completion within the first 6 years of their postsecondary enrollment.

Exhibit 2 provides detailed information about the BPS:04/09 data collection.

For more information on the BPS:04/09 methodology, see the following:

2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09) Full-Scale Methodology Report (NCES 2012-246).
<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2012246>

Exhibit 2. Selected statistics on the 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09) data collections

Statistic	BPS:04/09
Target population	First-time beginning postsecondary students in 2003–04
Target population size	4 million
Sampling frame (institutions)	2000–01 and 2001–02 IPEDS IC ¹ and Fall Enrollment files
Number of sampled institutions (NPSAS:04 ²)	1,670
Number of eligible institutions (NPSAS:04)	1,630
Number of participating institutions (NPSAS:04)	1,360
Percent of eligible institutions that provided student enrollment lists (unweighted)	83.5
Percent of eligible institutions that provided student enrollment lists (weighted)	80.0
Number of eligible students (BPS:04/09)	18,500
BPS:04/09 study response rate (unweighted)	90.0
BPS:04/09 study response rate (weighted)	89.2
BPS:04/09 interview response rate (unweighted)	81.8
BPS:04/09 interview response rate (weighted)	80.2

¹ The 2000–01 and 2001–02 Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics (IC) and Fall Enrollment files were used to construct the institution sampling frame.

² The 2003–04 National Postsecondary Student Aid Study (NPSAS:04) was the base-year study for BPS:04/09. SOURCE: Wine, J., Janson, N., and Wheelless, S. (2011). *2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09) Methodology Report* (NCES 2012-246). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved May 24, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2012246>.

B&B:08/12

Each of the B&B studies follows a cohort of bachelor's degree recipients, studying their undergraduate and graduate enrollment, employment, education debt repayment, and family formation experiences after graduation. B&B:08/12 is the third B&B study, following B&B:93/03 and B&B:2000/01. B&B:08/12 focused on the cohort who completed their bachelor's degrees during the 2007–08 academic year. In the B&B:08/12 base-year study, the 2007–08 NPSAS (NPSAS:08), and in the 2009 and 2012 follow-up studies, students provided data through web-based instruments administered over the Internet or by telephone.¹⁴ As with BPS:04/09, data were also collected from the institutions attended by sampled students and from other relevant databases, including several U.S. Department of Education records. Students' transcripts were collected from the bachelor's degree-granting institution in 2009.

See exhibit 3 for detailed information on the B&B:08/12 data collection.

For more information on the B&B:08/12 methodology, see the following:

2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12) Data File Documentation (NCES 2015-141). <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2015141>

¹⁴ The B&B:08/12 data collection began in August 2012 and continued until April 2013. For brevity, this report refers to graduates' current status "as of 2012," although some graduates were interviewed in 2013.

Exhibit 3. Selected statistics on the 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12) data collections

Statistic	B&B:08/12
Target population	Bachelor's degree recipients in 2007–08
Target population size	1.6 million
Sampling frame (institutions)	2004–05 and 2005–06 IPEDS IC, ¹ Fall Enrollment, and Completion files
Number of sampled institutions (NPSAS:08 ²)	1,960
Number of eligible institutions (NPSAS:08)	1,940
Number of participating institutions (NPSAS:08)	1,730
Percent of eligible institutions that provided student enrollment lists (unweighted)	89.0
Percent of eligible institutions that provided student enrollment lists (weighted)	90.1
Number of sampled students (B&B:08/12)	17,160
Number of eligible students (B&B:08/12)	17,110
B&B:08/12 interview response rate (unweighted)	85.1
B&B:08/12 interview response rate (bookend weighted)	77.1
B&B:08/12 interview response rate (panel weighted)	68.2

¹ The 2004–05 and 2005–06 Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics (IC), Fall Enrollment, and Completion files were used to construct the institution sampling frame.

² The 2007–08 National Postsecondary Student Aid Study (NPSAS:08) was the base-year study for B&B:08/12.

NOTE: The bookend weight includes NPSAS:08 study respondents who completed a B&B:08/12 interview. The panel weight includes NPSAS:08 study respondents who completed both a B&B:08/09 and a B&B:08/12 interview.

SOURCE: Cominole, M., Shepherd, B., and Siegel, P. (2015). *2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12) Data File Documentation* (NCES 2015-141). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved May 24, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2015141>.

Disclosure Risk and Weighting

To protect the confidentiality of NCES data that contain information about specific individuals and to minimize disclosure risks, all three datasets used in this report were subject to perturbation (swapping) procedures. In addition, all estimates were weighted to adjust for the unequal probability of selection into the sample and for nonresponse.

Sources of Error in Estimates

Two broad categories of error occur in estimates generated from surveys: sampling and nonsampling errors. Sampling errors occur when observations are based on samples rather than on entire populations. The standard error of a sample statistic is a measure of the variation due to sampling and indicates the precision of the statistic. The complex sampling

design used in ELS:2002, NPSAS:04, and NPSAS:08 must be taken into account when calculating variance estimates such as standard errors. NCES’s online PowerStats, which generated the estimates in this Statistics in Brief, uses the balanced repeated replication method to adjust variance estimation for the complex sample design.

Nonsampling errors can be attributed to several sources: incomplete information about all respondents (e.g., some students or institutions refused to participate, or students participated but answered only certain items); differences among respondents in question interpretation; inability or unwillingness to give correct information; mistakes in recording or coding data; and other errors of collecting, processing, and imputing missing data. More information on sampling and nonsampling error is available in each study’s methodology report or data file documentation report.

Bias in Estimates

NCES Statistical Standard 4-4-1 states that “[a]ny survey stage of data collection with a unit or item response rate less than 85 percent must be evaluated for the potential magnitude of nonresponse bias before the data or any analysis using the data may be released” (Seastrom 2014). Unit nonresponse causes bias in survey estimates when the outcomes of respondents

VARIABLES USED

The variables used in this Statistics in Brief are listed below. Visit the NCES DataLab website <https://nces.ed.gov/datalab> to view detailed information on question wording for variables coming directly from an interview, how variables were constructed, and their sources. Information is available through DataLab’s analysis applications—PowerStats, QuickStats, and TrendStats—and from downloadable codebooks available for each dataset through DataLab. The program files that generated the statistics presented in this Statistics in Brief can be found at <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2018421>.

Data source/label	Variable name
ELS:2002	
Completed high school by 2012	F3HSSTAT
Earned any AP/IB credits in high school	F1RAPIB
Enrolled in postsecondary education by 2012	F3EDSTAT
Entered postsecondary education within 3 months after high school completion	F3HS2PS1
Level and control of first postsecondary institution	F3PS1SEC
Parents’ highest level of education	F1PARED
Took calculus as their highest math course in high school	F1RMAPIP
Took trigonometry, statistics, or precalculus as their highest math course in high school	F1RMAPIP
Took an academically focused curriculum in high school	F1RACADC
BPS:04/09	
Control and level of first institution	FSECTOR
Parents’ highest level of education	PAREduc
Persistence and attainment status	PROUT6
Persistence track status	PTXTY3Y
B&B:08/12	
Annualized salary for primary job	B2CJSAL
Highest degree enrollment after the bachelor’s degree	B2HIENR
Highest postbachelor’s degree attainment	B2HIDEG
Labor market participation and degree enrollment	B2LFP12
Parents’ highest level of education	PAREduc
Work intensity in primary job	B2CJHRS

and nonrespondents are different. This means that nonresponse bias analysis could be required at any of three levels for the three datasets used in this report: institutions, study respondents, or items.

ELS:2002

The school-level response rate was below 85 percent for ELS:2002 (68 percent), and a nonresponse bias analysis was performed in the

base year. The analysis found that the remaining bias, after weighting and other nonresponse adjustments, rounded to zero (Ingels et al. 2004). The transcript response weight was above 85 percent, however, and therefore no item-level nonresponse bias analyses were needed for the data in figure 1 of this report. The third follow-up response rate was also below 85 percent (84 percent), so unit nonresponse bias analyses were performed at the interview level. After weighting and other adjustments for nonresponse, the remaining bias at the interview level rounded to zero (Ingels et al. 2014). None of the variables used in figures 2 or 3 of this report had item response rates below 85 percent; thus, no item-level nonresponse bias analyses were required. For detailed information on nonresponse bias analysis and an overview of the survey methodology for ELS:2002, see *Education Longitudinal Study of 2002: Base Year Data File User's Manual* (<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2004405>) and *Education Longitudinal Study of 2002 Third Follow-up Data File Documentation* (<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014364>).

BPS:04/09

For BPS:04/09, the weighted institution response rate for all institutions, as shown in exhibit 2, was 80 percent. The response rate varied by institution control and level, ranging

from 70 percent for public 4-year non-doctorate-granting institutions to 93 percent for private nonprofit 4-year non-doctorate-granting institutions. Before weight adjustments, 6 percent of the variable categories were significantly biased for all institutions. After weight adjustments, the percentage of categories with significant bias rounded to zero.

As shown in exhibit 2, the weighted study respondent response rate was 89 percent. Consequently, nonresponse bias analysis was not needed at the study respondent level. The weighted student interview response rate, however, was 80 percent, and therefore nonresponse bias analysis was required. Interview respondents and nonrespondents were compared on 16 variables, and these comparisons were made for both the entire sample and within the institutional strata. Before adjustments, bias was significant for more than two-thirds of the 16 variables' categories. After weight adjustments, the bias was significant for less than 6 percent of the variables' categories and was reduced across all types of institutions.

Not all interview respondents, however, completed all items in the survey. After variables were constructed from item-level responses, statisticians computed variable response rates, taking into account the response rates of all the component items. No BPS:04/09 variables used in this report had

response rates below 85 percent, and therefore no nonresponse bias analysis was required at the variable level.

For detailed information on nonresponse bias analysis and an overview of the survey methodology for BPS:04/09, see appendix M of the report *2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09) Full-Scale Methodology Report* (<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2012246>).

B&B:08/12

As shown in exhibit 3, the institutional response rate for NPSAS:08 was 90 percent, therefore, nonresponse bias analysis was not required at that level.

The weighted interview response rates for B&B:08/12, however, were below 85 percent (68 and 77 percent). Therefore, nonresponse bias analyses were conducted at the interview level to estimate the level of bias due to nonresponse between that observed with the base weight and that observed after nonresponse adjustments were made in each of the three weights developed for the study. Using the panel weight (WTE000), before adjustments, bias was significant for 45 percent of the variable categories. After weight adjustments, the bias was significant for less than 7 percent of the variable categories and was reduced across public and private nonprofit institutions. Both before and

after weighting adjustments, about 3 percent of variables were significantly biased among for-profit institutions.

One B&B:08/12 variable used in the analyses for this Statistics in Brief required nonresponse bias analysis: PAREDUC (84.9 percent). The nonresponse bias analysis conducted for this variable determined whether respondents and nonrespondents differed on the following characteristics: institution control, region, and total enrollment; whether the student was a federal aid recipient, was a state aid recipient, was a recipient of any aid, was a Pell Grant recipient, or borrowed a Direct Loan; and the amount, if any, of a student's Pell Grant, Direct Loan, or PLUS Loan. Differences between respondents and nonrespondents on this variable were tested for statistical significance at the 5-percent level.

Respondents differed from nonrespondents on 21 percent of the characteristics analyzed, indicating that there may be bias in this estimate (exhibit 4). Any bias due to nonresponse, however, is based upon responses

prior to stochastic imputation in which missing data were replaced with valid data from the records of donor cases that matched the recipients on selected variables related to demographic, enrollment, institution, and financial aid characteristics (Krotki, Black, and Creel 2005). The potential for bias in the estimate may be reduced by imputation.

Because imputation procedures are designed specifically to identify donors with similar characteristics to those with missing data, the imputation is assumed to reduce bias. While the level of item-level bias before imputation is measurable, the same measurement cannot be made after imputation. Although the magnitude of any change in item-level bias cannot be determined, the item estimates before and after imputation were compared to determine whether the imputation changed the biased estimate as an indication of a possible reduction in bias.

For this categorical variable, the estimated difference was computed

for each of the categories as the percentage of students in that category before imputation minus the percentage of students in that category after imputation. These estimated differences were tested for statistical significance at the 5-percent level. A significant difference in the item means after imputation implies a reduction in bias due to imputation. A nonsignificant difference suggests that imputation may not have reduced bias, that the sample size was too small to detect a significant difference, or that there was little bias to be reduced. A statistical test of the differences between the means before and after imputation for this variable was significant, indicating that the nonresponse bias was reduced through imputation.

For more detailed information on nonresponse bias analysis and an overview of the survey methodology for B&B:08/12, see *2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12) Data File Documentation* (NCES 2015-141) (<https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2015141>).

Exhibit 4. Bias analysis results

Variable label	Preimputation				Percent difference in means or average percent difference across all categories pre- and postimputation
	Response rate	Median percent relative bias across characteristics	Percent of characteristics with significant bias	Characteristic with greatest significant bias	
Parents' highest level of education	84.9	3.25	21.05	Received any state aid	0.06*

* Indicates statistically significant difference at $p < .05$.

NOTE: Relative bias is computed by dividing a variable's estimated bias for a given characteristic by the variable's mean. Bias is defined as significant if its difference from zero is statistically significant at $p < .05$.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

Statistical Procedures

Estimates of percentages were generated to the ten-thousandths place (four digits to the right of the decimal place), then rounded to the nearest tenth in tables and to the nearest whole number in figures (Seastrom 2014). Applying these rounding rules occasionally results in apparent inconsistencies between tables and figures. For example, an estimate of 10.4834 rounds to 10.5 in a table, but 10 in a figure.

Unrounded estimates were used for all statistical tests. Comparisons of means and proportions were tested using Student's *t* statistic. Differences between estimates were tested against the probability of a Type I error¹⁵ or significance level. The statistical significance of each comparison was determined by calculating the Student's *t* value for the difference between each pair of means or proportions and comparing the

t value with published tables of significance levels for two-tailed hypothesis testing. Student's *t* values were computed to test differences between independent estimates using the following formula:

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

where E_1 and E_2 are the estimates to be compared, and se_1 and se_2 are their corresponding standard errors.

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

respondents would produce a large (and thus possibly statistically significant) *t* statistic.

A second hazard in reporting statistical tests is the possibility that one can report a "false positive" or Type I error. Statistical tests are designed to limit the risk of this type of error using a value denoted by alpha. The alpha level of .05 was selected for findings in this Statistics in Brief and ensures that a difference of a certain magnitude or larger would be produced when there was no actual difference between the quantities in the underlying population no more than 1 time out of 20.¹⁶ When analysts test hypotheses that show alpha values at the .05 level or smaller, they reject the null hypothesis that there is no difference between the two quantities. Failing to reject a null hypothesis (i.e., detect a difference), however, does not imply the values are the same or equivalent.

¹⁵ A Type I error occurs when one concludes that a difference observed in a sample reflects a true difference in the population from which the sample was drawn, when no such difference is present.

¹⁶ No adjustments were made for multiple comparisons.

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APPENDIX A. DATA TABLES

Table A-1. Estimates for figure 1: Percentage of 2003–04 high school graduates who took an academically focused curriculum, earned credits for Advanced Placement (AP) or International Baccalaureate (IB) courses, and highest level math courses taken, by parents' highest level of education

Characteristic	First generation ¹	Parent(s) attended some college	Parent(s) earned a bachelor's degree
Percent who took an academically focused curriculum in high school ²	15.6	19.3	37.0
Percent who earned any AP/IB credits in high school	17.6	22.2	43.6
Percent who took trigonometry/statistics/precalculus as their highest math course in high school	27.3	34.7	42.5
Percent who took calculus as their highest math course in high school	7.3	8.6	22.0

¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

² An academically focused curriculum includes a minimum of four credits of English; one credit of mathematics higher than algebra II and any two other credits in math; one science credit higher than general biology and any two other credits in science; one credit of social studies in U.S. or world history and any two other credits in social studies; and two credits in a single foreign language.

NOTE: Parents' highest education level reflects the highest degree earned by either parent.

SOURCE: Tables 3, 4, and 5 in Planty, M., Bozick, R., and Ingels, S.J. (2006). *Academic Pathways, Preparation, and Performance—A Descriptive Overview of the Transcripts from the High School Graduating Class of 2003–04* (NCES 2007-316). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved May 24, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007316>.

Table A-2. Estimates for figure 2: Percentage of 2002 high school sophomores who had completed high school, and percentage who had enrolled in postsecondary education, by parents' highest level of education: 2012

Characteristic	First generation ¹	Parent(s) attended some college	Parent(s) earned a bachelor's degree
Percent who had completed high school by 2012 ²	91.6	96.7	98.1
Percent who had enrolled in postsecondary education by 2012	72.0	84.0	92.7
Percent of enrollees who entered postsecondary education within 3 months after high school graduation	57.5	63.3	78.3

¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

² Includes students who earned a regular high school diploma, a General Educational Development (GED) certificate, or other high school equivalency such as a certificate of attendance.

NOTE: Parents' highest education level reflects the highest degree earned by either parent. Estimates may differ from those published in *First-Generation and Continuing-Generation College Students* (NCES 2018-009) because the estimates in the two publications were generated using different analysis weights.

SOURCE: Tables C-2a and C-4a in Chen, X., Lauff, E., Arbeit, C., Henke, R., Skomsvold, P., and Hufford, J. (2017). *Early Millennials: The Sophomore Class of 2002 a Decade Later* (NCES 2017-437). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved October 3, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017437>.

Table A-3. Estimates for figure 3: Among 2002 high school sophomores who had enrolled in postsecondary education by 2012, percentage distribution of the level and control of the institution they first attended, by parents' highest level of education: 2012

Level and control of first postsecondary institution	First generation ¹	Parent(s) attended some college	Parent(s) earned a bachelor's degree
Public 4-year	26.4	32.9	45.0
Private nonprofit 4-year	7.4	11.8	22.7
Public 2-year	46.2	42.4	26.0
Private for-profit ²	15.5	10.2	5.1
Other	4.4	2.8	1.2

¹First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

²Includes private for-profit institutions at all levels.

NOTE: Parents' highest education level reflects the highest degree earned by either parent. Estimates may differ from those published in *First-Generation and Continuing-Generation College Students* (NCES 2018-009) because the estimates in the two publications were generated using different analysis weights.

SOURCE: Table C-5a in Chen, X., Lauff, E., Arbeit, C., Henke, R., Skomsvold, P., and Hufford, J. (2017). *Early Millennials: The Sophomore Class of 2002 a Decade Later* (NCES 2017-437). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved October 3, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017437>.

Table A-4. Estimates for figure 4: Percentage distribution of 2003–04 beginning postsecondary students' status on the persistence track after 3 years, by parents' highest level of education: 2006

Parents' highest level of education	Stayed on persistence track	Left persistence track	Left without return
Total	56.2	19.5	24.3
First generation ¹	47.6	18.9	33.5
Parent(s) attended some college	53.2	21.2	25.5
Parent(s) earned a bachelor's degree	66.9	19.1	14.0

¹First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents' highest education level reflects the highest degree earned by either parent. Students who stayed on the persistence track attained a credential from the original institution or one of the same level, or were still enrolled at the original institution or one of the same level without a stopout (an enrollment break of more than 4 months) by 2006. Those who left the persistence track had transferred to a lower level institution or stopped out but were still enrolled in 2006, while students who left without return had not attained a credential and were no longer enrolled in 2006. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09).

Table A-5. Estimates for figure 5: Percentage of 2003–04 beginning postsecondary students who had attained a degree or were still enrolled 6 years after entering postsecondary education, by parents' highest level of education and control and level of first institution: 2009

Control and level of first institution	First generation ¹	Parent(s) attended some college	Parent(s) earned a bachelor's degree
Total	55.8	63.4	74.5
Public/private 4-year	65.3	72.5	83.1
Public 2-year	49.4	56.8	59.9

¹First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents' highest education level reflects the highest degree earned by either parent. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09).

Table A-6. Estimates for figure 6: Percentage distribution of 2007–08 bachelor’s degree recipients’ labor market participation and degree enrollment, by parents’ highest level of education: 2012

Parents’ highest level of education	Total	Not enrolled, working		Not enrolled, unemployed	Not enrolled, out of the labor force	Enrolled, working	Enrolled, not working
		Not enrolled, working full time in one job	Not enrolled, working part time or multiple jobs				
Total	69.0	58.3	10.7	6.7	7.9	10.7	5.7
First generation ¹	67.9	57.4	10.5	8.4	9.5	10.2	4.0
Parent(s) attended some college	69.5	58.0	11.5	6.6	8.8	11.2	4.0
Parent(s) earned a bachelor’s degree	69.7	59.2	10.5	6.0	6.8	10.7	6.9

¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Postbachelor’s degree enrollment includes enrollment in programs that award undergraduate certificates, associate’s or bachelor’s degrees, postbaccalaureate certificates, master’s degrees, doctoral degrees, and professional degrees. Parents’ highest education level reflects the highest degree earned by either parent. Full-time/part-time employment status is based on respondent report; those who were not working but looking for work are defined as unemployed; and those who were not working and not looking for work are defined as out of the labor force. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

Table A-7. Estimates for figure 7: Among 2007–08 bachelor’s degree recipients who had not enrolled in a degree program since earning their bachelor’s degree and had a primary job, median annualized salary for their primary job, by parents’ highest level of education and work intensity: 2012

Work intensity	First generation ¹	Parent(s) attended some college	Parent(s) earned a bachelor’s degree
Full time			
Total	\$45,000	\$43,000	\$45,500
Part time			
Total	15,600	12,500	16,100

¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents’ highest education level reflects the highest degree earned by either parent. Full time is defined as working 35 or more hours per week, and part time is defined as working less than 35 hours per week. The primary job is the job held currently or most recently, as of the time of the second follow-up interview, at which the respondent had worked for more than 3 months. Excludes the 6.8 percent of graduates who were not employed in any one job for more than 3 months since receiving their bachelor’s degree. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

Table A-8. Estimates for figure 8: Percentage distribution of 2007–08 bachelor’s degree recipients’ highest degree enrollment after the bachelor’s degree, by parents’ highest level of education: 2012

Parents’ highest level of education	Had not enrolled in any degree program	Had enrolled in any degree program				
		Total	Certificate or associate’s degree program	Bachelor’s degree or postbaccalaureate certificate program	Master’s degree or post-master’s certificate program	Doctoral or professional degree program
Total	55.9	44.1	3.9	4.5	28.0	7.7
First generation ¹	59.0	41.0	4.4	3.6	29.2	3.7
Parent(s) attended some college	58.5	41.5	4.0	3.9	28.4	5.2
Parent(s) earned a bachelor’s degree	53.6	46.4	3.6	5.0	27.4	10.3

¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents’ highest education level reflects the highest degree earned by either parent. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

Table A-9. Estimates for figure 9: Among 2007–08 bachelor’s degree recipients who had enrolled in a degree program since earning their bachelor’s degree, percentage distribution of their highest postbachelor’s degree attainment, by parents’ highest level of education: 2012

Parents’ highest level of education	Had not earned an additional degree or certificate	Had earned any degree or certificate				
		Total	Certificate or associate’s degree	Additional bachelor’s degree or post-baccalaureate certificate	Master’s degree or post-master’s certificate	Doctoral or professional degree
Total	41.4	58.6	6.0	7.2	38.1	7.4
First generation ¹	42.9	57.1	7.9	7.1	38.5	3.6
Parent(s) attended some college	44.6	55.4	7.6	5.4	37.0	5.3
Parent(s) earned a bachelor’s degree	39.3	60.7	4.8	8.0	38.4	9.5

¹ First generation includes students who had enrolled in college whose parents did not participate in any postsecondary education.

NOTE: Parents’ highest education level reflects the highest degree earned by either parent. Estimates include students enrolled in Title IV eligible postsecondary institutions in the 50 states, the District of Columbia, and Puerto Rico. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

APPENDIX B. STANDARD ERROR TABLES

Table B-1. Standard errors for table A-1 and figure 1: Percentage of 2003–04 high school graduates who took an academically focused curriculum, earned credits for Advanced Placement (AP) or International Baccalaureate (IB) courses, and highest level math courses taken, by parents' highest level of education

Characteristic	First generation	Parent(s) attended some college	Parent(s) earned a bachelor's degree
Percent who took an academically focused curriculum in high school	0.88	0.98	1.20
Percent who earned any AP/IB credits in high school	1.03	0.94	1.22
Percent who took trigonometry/statistics/precalculus as their highest math course in high school	1.06	1.13	1.10
Percent who took calculus as their highest math course in high school	0.66	0.57	0.89

SOURCE: Tables B-3, B-4, and B-5 in Planty, M., Bozick, R., and Ingels, S.J. (2006). *Academic Pathways, Preparation, and Performance—A Descriptive Overview of the Transcripts from the High School Graduating Class of 2003–04* (NCES 2007-316). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved May 24, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007316>.

Table B-2. Standard errors for table A-2 and figure 2: Percentage of 2002 high school sophomores who had completed high school, and percentage who had enrolled in postsecondary education, by parents' highest level of education: 2012

Characteristic	First generation	Parent(s) attended some college	Parent(s) earned a bachelor's degree
Percent who had completed high school by 2012	0.92	0.61	0.45
Percent who had enrolled in postsecondary education by 2012	0.99	0.69	0.55
Percent of enrollees who entered postsecondary education within 3 months after high school graduation	1.37	1.18	0.96

SOURCE: Tables C-2b and C-4b in Chen, X., Lauff, E., Arbeit, C., Henke, R., Skomsvold, P., and Hufford, J. (2017). *Early Millennials: The Sophomore Class of 2002 a Decade Later* (NCES 2017-437). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved October 3, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017437>.

Table B-3. Standard errors for table A-3 and figure 3: Among 2002 high school sophomores who had enrolled in postsecondary education by 2012, percentage distribution of the level and control of the institution they first attended, by parents' highest level of education: 2012

Level and control of first postsecondary institution	First generation	Parent(s) attended some college	Parent(s) earned a bachelor's degree
Public 4-year	1.10	1.07	1.07
Private nonprofit 4-year	0.64	0.65	0.97
Public 2-year	1.48	1.25	1.02
Private for-profit	1.03	0.64	0.44
Other	0.57	0.36	0.21

SOURCE: Table C-5b in Chen, X., Lauff, E., Arbeit, C., Henke, R., Skomsvold, P., and Hufford, J. (2017). *Early Millennials: The Sophomore Class of 2002 a Decade Later* (NCES 2017-437). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved October 3, 2017, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017437>.

Table B-4. Standard errors for table A-4 and figure 4: Percentage distribution of 2003–04 beginning postsecondary students' status on the persistence track after 3 years, by parents' highest level of education: 2006

Parents' highest level of education	Stayed on persistence track	Left persistence track	Left without return
Total	0.75	0.50	0.64
First generation	1.03	0.85	1.12
Parent(s) attended some college	1.33	1.01	1.19
Parent(s) earned a bachelor's degree	1.07	0.84	0.89

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09).

Table B-5. Standard errors for table A-5 and figure 5: Percentage of 2003–04 beginning postsecondary students who had attained a degree or were still enrolled 6 years after entering postsecondary education, by parents' highest level of education and control and level of first institution: 2009

Control and level of first institution	First generation	Parent(s) attended some college	Parent(s) earned a bachelor's degree
Total	1.09	1.34	1.00
Public/private 4-year	1.98	1.84	1.00
Public 2-year	1.65	2.10	2.32

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09).

Table B-6. Standard errors for table A-6 and figure 6: Percentage distribution of 2007–08 bachelor's degree recipients' labor market participation and degree enrollment, by parents' highest level of education: 2012

Parents' highest level of education	Total	Not enrolled, working		Not enrolled, unemployed	Not enrolled, out of the labor force	Enrolled, working	Enrolled, not working
		Not enrolled, working full time in one job	Not enrolled, working part time or multiple jobs				
Total	0.59	0.63	0.37	0.34	0.36	0.37	0.31
First generation	1.23	1.32	0.86	0.79	0.84	0.88	0.44
Parent(s) attended some college	1.24	1.32	0.88	0.73	0.75	0.90	0.54
Parent(s) earned a bachelor's degree	0.83	0.87	0.46	0.39	0.44	0.51	0.47

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

Table B-7. Standard errors for table A-7 and figure 7: Among 2007–08 bachelor’s degree recipients who had not enrolled in a degree program since earning their bachelor’s degree and had a primary job, median annualized salary for their primary job, by parents’ highest level of education and work intensity: 2012

Work intensity	First generation	Parent(s) attended some college	Parent(s) earned a bachelor’s degree
Full time			
Total	\$1,060	\$1,170	\$890
Part time			
Total	1,230	1,310	820

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

Table B-8. Standard errors for table A-8 and figure 8: Percentage distribution of 2007–08 bachelor’s degree recipients’ highest degree enrollment after the bachelor’s degree, by parents’ highest level of education: 2012

Parents’ highest level of education	Had not enrolled in any degree program	Had enrolled in any degree program				
		Total	Certificate or associate’s degree program	Bachelor’s degree or postbaccalaureate certificate program	Master’s degree or post-master’s certificate program	Doctoral or professional degree program
Total	0.63	0.63	0.27	0.25	0.55	0.31
First generation	1.55	1.55	0.61	0.53	1.47	0.51
Parent(s) attended some college	1.24	1.24	0.48	0.54	1.10	0.55
Parent(s) earned a bachelor’s degree	0.94	0.94	0.37	0.37	0.76	0.48

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

Table B-9. Standard errors for table A-9 and figure 9: Among 2007–08 bachelor’s degree recipients who had enrolled in a degree program since earning their bachelor’s degree, percentage distribution of their highest postbachelor’s degree attainment, by parents’ highest level of education: 2012

Parents’ highest level of education	Had not earned an additional degree or certificate	Had earned any degree or certificate				
		Total	Certificate or associate’s degree	Additional bachelor’s degree or post-baccalaureate certificate	Master’s degree or post-master’s certificate	Doctoral or professional degree
Total	0.97	0.97	0.47	0.50	0.93	0.48
First generation	2.06	2.06	1.24	1.18	2.02	0.80
Parent(s) attended some college	2.08	2.08	1.04	0.98	1.84	0.95
Parent(s) earned a bachelor’s degree	1.28	1.28	0.54	0.73	1.22	0.69

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12).

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