Baccalaureate and Beyond (B&B) Longitudinal Study

Website: https://nces.ed.gov/surveys/b&b/
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1. OVERVIEW

The Baccalaureate and Beyond Longitudinal Study (B&B), sponsored by the U.S. Department of Education’s National Center for Education Statistics (NCES), provides information concerning education and work experiences following completion of the bachelor’s degree. It provides both cross-sectional profiles of the enrollment, persistence, and financial aid receipt of bachelor’s degree recipients in their final year of undergraduate education and longitudinal data on their entry into and progress through graduate-level education and the workforce. Special emphasis is placed on those graduates entering public service areas, particularly teaching, and the provision of information on their entry into the job market and career path.

B&B draws the base-year data for its cohorts from the National Postsecondary Student Aid Study (see the NPSAS chapter), a nationally representative sample of all postsecondary students. The first B&B cohort consisted of individuals who received a bachelor’s degree in the 1992–93 academic year; the second cohort was formed from baccalaureate recipients in the 1999–2000 academic year; and, the third cohort consists of graduating seniors from the 2007–08 academic year (B&B:93, B&B:2000, and B&B:08, respectively). B&B expands on the efforts of the former Recent College Graduates Survey to provide unique information on educational and employment-related experiences of these degree recipients over a longer period of time. The 1992–93 cohort was followed three times over a 10-year period, in 1994, 1997, and 2003 (B&B:93/94, B&B:93/97, and B&B:93/03, respectively), so that most respondents who attended graduate or professional schools have completed (or nearly completed) their education and are established in their careers. The 1999–2000 cohort was followed only in 2001 (B&B:2000/01). The 2007–08 cohort was followed for the first time in 2009 (B&B:08/09), with eligible sample members interviewed again in 2012 (B&B:08/12). B&B can help to address issues concerning delayed entry into graduate school, the progress and completion of graduate-level education, and the impact of undergraduate and graduate debt on choices related to career and family.

Purpose

To provide information on (1) the early employment outcomes and career paths of recent graduates, with a special emphasis on new teachers: retention, attrition, delayed entry, and movement within the educational system; and (2) college graduates’ entry into, persistence and progress through, and completion of graduate-level education in the years following receipt of the bachelor’s degree.
Components
B&B consists of base-year data collected from NPSAS: 1992–93 NPSAS for the first B&B cohort; 1999–2000 NPSAS for the second B&B cohort; and 2007–08 NPSAS for the third B&B cohort (NPSAS:93, NPSAS:2000, and NPSAS:08, respectively). NPSAS data are collected in many components, including institutional records from postsecondary institutions, student interviews, and administrative federal financial aid record systems. For the first B&B cohort (consisting of 1992–93 baccalaureate recipients), the first follow-up conducted in 1994 collected data from a student interview as well as from undergraduate college transcripts. The second follow-up conducted in 1997 combined a student interview with department aid application/loan records data. The third follow-up conducted in 2003 collected data on topics related to continuing education, degree attainment, employment, career choice, family formation, and finances. A second B&B cohort, consisting of 1999–2000 baccalaureate recipients, went to the field in 2000, and was followed-up in 2001. The first and only follow-up survey, B&B:2000/01, focused on time to degree completion, participation in postbaccalaureate education and employment, and the activities of newly qualified teachers. A third B&B cohort, consisting of 2007–08 baccalaureate recipients, was followed-up for the first time in 2009, again combining student interviews, undergraduate college transcripts, and other administrative records. The research topics include the relationship between college graduates’ course taking while in college and their subsequent paths into the labor market and/or through graduate school; accumulated educational debt burden of college graduates; and preparations graduates have made for elementary and secondary school teaching, particularly as compared to those of college graduates in other occupations. The second follow-up conducted in 2012 focused on respondents’ postbaccalaureate education and employment four years after these students’ graduation from college.

Base-Year Data (from NPSAS). B&B obtains its base-year information from NPSAS. The NPSAS Student Record Abstraction (institutional records) provides major field of study; type and control of institution; attendance status; tuition and fees; admission test scores; financial aid awards; cost of attendance; student budget information and expected family contribution for aided students; grade point average; age; and date first enrolled. The base-year data also include information from NPSAS Student Interviews regarding educational level; major field of study; financial aid at other schools attended during the year; other sources of financial support; monthly expenses; reasons for selecting the school attended; current marital status; age; race/ethnicity; sex; highest degree expected; employment and income; community service; expectations for employment after graduation; expectations for graduate school; and plans to enter the teaching profession.

For NPSAS:08, parental data previously collected from the Parent Interviews were captured in the Student Interview. These topics include marital status; highest level of education achieved; income; amount of financial support provided to the student; types of financing used to pay student educational expenses; and current employment (including occupation and industry; captured in B&B:08/09). Base year data for this cohort additionally included state-representative undergraduate student samples for four degree-granting institutional sectors (public 4-year; public 2-year; private nonprofit 4-year; and private for-profit 4-year) in six states: California, Georgia, Illinois, Minnesota, New York, and Texas.

B&B First Follow-Up Survey. The first follow-up is conducted one year after the bachelor’s degree is received (e.g., 1994 for the 1992–93 cohort, 2001 for the 1999–2000 cohort, and 2009 for the 2007–08 cohort).

In the Student Interview portion of the survey, recent graduates provide information regarding employment after degree completion; job search activities; expectations for and entry into teaching (if applicable); teacher certification status (if applicable); job training and responsibilities; expectations/entry into graduate school; enrollment after degree; financial aid; loan repayment/status; income; family formation and responsibilities; and participation in community service. As part of the first follow-up of both the 1992–93 B&B and 2007–08 B&B cohorts, an undergraduate transcript study component collected transcripts providing information on undergraduate coursework; institutions attended; grades; credits attempted and earned; and academic honors earned, with transcript information being reported by the institutions.

The 2007–08 B&B cohort pulled from several additional sources: 1) the National Student Clearinghouse (NSC), which is a central repository and single point of contact for the collection of postsecondary enrollment, degree, and certificate records from participating postsecondary institutions; 2) student enrollment and achievement data collected from postsecondary institutions as part of the 2009 Postsecondary Education Transcript Study (PETS:09); 3) the National Student Loan Data System; 4) the Central Processing System (FASFA data); and 5) institutional- and course-level catalog data collected from postsecondary institution materials as part of PETS:09.

B&B Second Follow-Up Survey. The second follow-up of the 1992–93 B&B cohort was conducted in 1997, four years after the bachelor’s degree was received. Participants provided information in the Student Interview regarding their employment history; postgraduate enrollment history; job search strategies at degree completion; career progress; current status in graduate school; nonfederal aid received; additional job training; entry into/persistence in/resignation
from teaching career; teacher certification status; teacher career path; income; family formation and responsibilities; and participation in community service. The second follow-up of the 1992–93 B&B cohort also included a Department Aid Application/Loan Records component to collect information on the types and amounts of federal financial aid received, total federal debt accrued, and students’ loan repayment status. One of the goals of B&B is to understand the effect that education-related debt has on graduates’ choices concerning their careers and further schooling. The second follow-up for the 2007–08 cohort, conducted in 2012, examined bachelor’s degree recipients’ labor market experiences and postbaccalaureate education through the fourth year after graduation.

**B&B Third Follow-Up Survey.** The 1992–93 cohort was followed for a third time in 2003. This final interview, which was conducted 10 years following degree completion, allowed further study of the issues already addressed by the preceding follow-up studies. The 2003 interview covered topics related to continuing education, degree attainment, employment, career choice, family formation, and finances. Additionally, respondents were asked to reflect on the value that their undergraduate education and any other education obtained since receiving the bachelor’s degree added to their lives now. It also contained a separate set of questions directed at new entrants into the teacher pipeline, as well as those who were continuing in or who had left teaching since the last interview. A 10-year third and final follow-up for the 2007–08 cohort is planned for 2018.

**Periodicity**
The three B&B cohorts each have their own follow-up schedule, as described above. B&B cohorts alternate with Beginning Postsecondary Students (BPS) Longitudinal Study cohorts in using NPSAS surveys as their base. Hence, the next B&B cohort is scheduled to be drawn from the 2016 NPSAS sample.

**Data availability**

**2. USES OF DATA**
B&B covers many topics of interest to policymakers, educators, and researchers. For example, B&B allows analysis of the participation and progress of recent degree completers in the workforce, relationship of employment to degree, income and the ability to repay debt, and willingness to enter public service-related fields. B&B also allows analysis of issues related to access into and choice of graduate education programs. Here the emphasis is on the ability, ease, and timing of entrance into graduate school, and attendance/employment patterns, progress, and completion timing once entered.

The unique features of B&B allow it to be used to address issues related to undergraduate education as well as postbaccalaureate experiences. This information has been used to investigate the relationship between undergraduate debt burden and early labor force experiences, and between undergraduate academic experiences and entry into teaching. These and other relationships can be investigated both in the short term and over longer periods of time.

Because B&B places special emphasis on new teachers at the elementary and secondary levels, it can be used to address many issues related to teacher preparation, entry into the profession (e.g., timing, ease of entry), persistence in or defection from teaching, and career movement within the education system.

Major issues that B&B attempts to address include:

- length of time following receipt of degree after which college graduates enter the workforce;
- type of job which graduates obtain, compared with major field of undergraduate study;
- length of time to complete degree;
- length of time to obtain a job related to respondents’ field of study;
- extent to which jobs obtained relate to educational level attained by respondent;
- extent to which level of debt incurred to pay for education influences decisions concerning graduate school, employment, and family formation;
- extent to which level of debt incurred influences decisions to enter public service professions;
- rates of graduate school enrollment, retention, and completion;
- extent to which delaying graduate school enrollment influences respondent’s access to and progression through advanced degree programs;
- factors influencing the decision to enroll in graduate education;
- extent to which attaining an advanced degree influences short-term and long-term earnings;
➢ number of graduates qualified to teach (teacher pipeline);
➢ extent to which degree level/profession influences rate of advancement; and
➢ extent to which respondents change jobs or careers.

3. KEY CONCEPTS

Some of the concepts and terms used in the B&B data collection and analysis are defined below. (See also 2008–09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09): A First Look at Recent College Graduates.)

Dependency Status. If a student is considered financially dependent, the parents’ assets and income are considered in determining aid eligibility. If the student is financially independent, only the student’s assets are considered, regardless of the relationship between student and parent.

Eligible Institution. To be eligible for NPSAS base-year (1992–93, 1999–2000, 2008–09) selection, institutions were required to: offer an educational program designed for persons who have completed secondary education; offer an academic, occupational, or vocational program of study; offer courses that were open to persons other than the employees or members of the company or group (e.g., union) that administers the institution; offer at least one program requiring at least three months or 300 clock hours of instruction; and be located in the 50 states, the District of Columbia, or Puerto Rico. Beginning in 2001, the definition was revised to include only institutions that were U.S. Department of Education Title IV participating institutions, institutions that were open to the public, and institutions that were not U.S. service academies. This includes public, private nonprofit, and private for-profit sector institutions at every level: less-than-2-year, 2-year, 4-year, and graduate-only institutions, with offered programs ranging from certificates to advanced degrees.

Eligible Student. Students eligible for B&B cohorts are students who were enrolled in an eligible institution and also 1) enrolled in an academic program for which at least one course for credit that could be applied toward fulfilling the requirements for an academic degree, or an occupational or vocational program that required at least 3 months or 300 clock hours of instruction to receive a degree, certificate, or other formal award; 2) not concurrently or solely enrolled in high school, or in a General Educational Development (GED) or other high school completion program; and 3) had completed the requirements to graduate with a bachelor’s degree anytime between July 2007 and June 2008.

Institution Respondent. Any base-year (1992–93, 1999–2000, 2007–08) NPSAS sample institution, selected using Chromy’s sequential probability minimum replacement (PMR) sampling algorithm, for which a sufficiently completed student enrollment list was received. Students from these institutions were then eligible for the NPSAS base-year interview and possibly for the subsequent B&B cohort.

Status in “Teacher Pipeline”. A portion of the student interview focuses on the respondent’s teaching experiences and plans. Respondents who taught were classified as having taught 1) with certification, 2) with student teaching experience, 3) without training, or 4) with training unknown. Respondents who did not teach were classified as 1) certified, 2) having student taught, 3) having applied for teaching jobs, 4) having considered teaching, or 5) having no interest in or taken no action toward teaching.

Study Respondent. Eligible students who were selected (from the eligible, selected institution enrollment lists) for the B&B cohort, and who had valid data.

4. SURVEY DESIGN

Target Population
All postsecondary students in the 50 states, the District of Columbia, and Puerto Rico who completed a bachelor’s degree in the 1992–93 academic year, spanning July 1, 1992, to June 30, 1993 (first B&B cohort); in the 1999–2000 academic year, spanning July 1, 1999, to June 30, 2000 (second B&B cohort) or in the 2007–08 academic year, spanning July 1, 2007, to June 30, 2008 (third B&B cohort). Students from U.S. Service Academies are excluded because they are not part of NPSAS, from which B&B draws its samples.

Sample Design
Members of the B&B cohort are identified during the NPSAS year that serves as the base year for the longitudinal study: NPSAS:93 for the first B&B cohort, NPSAS:2000 for the second B&B cohort, and NPSAS:08 for the third B&B cohort. (See the NPSAS chapter for a description of the NPSAS sample design.) The B&B cohorts consist of students who were eligible to be part of the NPSAS cohort and have been identified as baccalaureate degree recipients. The B&B:93 and B&B:08 cohorts also consist of those NPSAS:93 and NPSAS:08 nonrespondents, respectively, who are potentially eligible for B&B, based on the NPSAS enrollment lists. The NPSAS sampling design is a multi-stage process in which eligible institutions are selected first and then eligible students are selected from the eligible participating institutions.

Eligible Institutions The institution-level stratified sampling frames for NPSAS:93, NPSAS:2000, and NPSAS:08 were constructed from the Integrated Postsecondary Education Data System (IPEDS) file. For NPSAS:08, the sampling frame was constructed from the...
were individuals who completed requirements for a bachelor’s degree from a NPSAS:08-eligible institution between July 1, 2007, and June 30, 2008, and were awarded their baccalaureate degree by the institution from which they were sampled no later than June 30, 2009. Eligibility for the B&B:08 full-scale cohort prior to the B&B:08/09 interview was based primarily on information obtained from the student’s transcript. Lacking a transcript, eligibility was based on responses provided during the NPSAS:08 student interview. Without either the transcript or the interview, eligibility was based on the student’s institutional record obtained through NPSAS:08 computer-assisted data entry (CADE) or the enrollment list provided by the NPSAS:08 institution at the time of student sampling. The National Student Clearinghouse (NSC) data on degree completion were used to identify eligible students.

First Follow-Up Survey. About 16,320 baccalaureate degree recipients were identified for inclusion in the B&B:93 cohort from institutionally-provided lists of students who were eligible for graduation or who indicated in the CATI interview that they had graduated in the 1992–93 academic year. All 11,810 of the identified students who completed the NPSAS:93 interview were retained for the B&B:93/94 sample. Also retained were 370 student nonrespondents for whom NPSAS parent data were available that indicated that the student received the bachelor’s degree during 1992–93. Additionally, a 10 percent subsample of the remaining eligible cases with at least some data was included. It became apparent during data collection that many of the nonrespondents and potentially eligible cases were actually ineligible. Because of the costs associated with the ineligible students, only a subsample of the nonrespondents and potentially eligible students was selected, reducing the sample size to 12,480 in B&B:93/94.

The respondent universe for the B&B:2000/01 follow-up survey consisted of all students who attended postsecondary educational institutions between July 1, 1999, and June 30, 2000, in the United States and Puerto Rico, and who received or expected to receive bachelor’s degrees during this time frame. Approximately 11,700 confirmed and potentially eligible bachelor’s degree recipients were identified for participation in the B&B:2000/01 follow-up survey. Of these, about 70 were determined during the follow-up survey to be ineligible. 760 were not located, and about 190 were considered “exclusions”.

Second Follow-Up Survey. B&B:93/94 included a transcript component, which was used to determine eligibility of the base-year nonrespondents for the B&B:93/97 follow up.
After data collection was complete for the first follow-up, additional ineligible cases were found in the cohort based on information obtained from the transcript data. Sample members were retained for follow-up in later rounds if they were found to be eligible in either the CATI or the transcript component. In total, 11,190 cases were retained for the second follow-up. The B&B:08/12 sample consisted of all B&B:08/09 eligible respondents and all B&B:08/09 nonrespondents, resulting in a sample size of 17,160. Among them, 17,110 students were determined to be eligible.

**Third Follow-Up Survey.** All B&B:93/97 respondents were included in the B&B:93/03 sample. However, because it is more difficult and expensive to locate and interview prior nonrespondents, a subsample of only about one-third of B&B:93/97 nonrespondents was included. After removing cases identified as deceased, the starting sample for B&B:93/03 was 10,440.

**Data Collection and Processing**

B&B surveyed its first cohort of 1992–93 bachelor’s degree recipients (B&B:93/94 in 1994, approximately one year after graduation, and again, B&B:93/97, in 1997.). Both of these follow-up surveys were administered by the National Opinion Research Center (NORC) at the University of Chicago. The third follow-up (B&B:93/03) was conducted in 2003 by Research Triangle Institute (RTI). The first follow-up of the 1999–2000 cohort (NPSAS:2000, B&B:2000/01) was conducted in 2001 by RTI. B&B:2000/01 was the only planned follow-up of this cohort. The first follow-up of the third cohort (NPSAS:08, B&B:08/09) was conducted in 2009 by RTI. The second follow-up of the third cohort (B&B:08/12) was conducted in 2012 by RTI with the assistance of MPR Associates, Inc.

**Reference dates.** In the first follow-up of the 1992–93 cohort, respondents were asked to provide their current enrollment status, employment status, and marital status as of April 1994. Similarly, respondents to the second and third follow-ups reported their status as of April 1997 and April 2003. For the follow-up of the 2000–01 cohort, respondents were asked to provide their current enrollment status, employment status, and marital status as of April 2001. Reference dates for the first follow-up of the B&B:08/09 study were August 2008 to February 2009. In the second follow-up (i.e., B&B:08/12), respondents were asked to provide a complete employment history beginning from the date they completed their bachelor’s degree requirements. This depth of information on bachelor’s degree recipients’ employment and job search activities is new to the B&B series of studies. Reference dates for the second follow-up of the B&B:08/12 study were August 24, 2012 to April 15, 2013.

**Data collection.** Data are collected through student interviews and college transcripts.

**Student interview.** The first follow-up student interview (B&B:93/94) was administered between June and December 1994. Sample members were initially mailed a letter containing information about the survey and a toll-free number they could call to schedule interviews. Computer-assisted telephone interviewing (CATI) began approximately one week later and was conducted in two waves. Wave 1 consisted of students who were respondents in the 1992–93 NPSAS or for whom parent data were available. Wave 2 consisted of students who were nonrespondents in the 1992–93 NPSAS and for whom no parent data were available. NPSAS respondents who were identified as potentially eligible for B&B during the NPSAS data processing phase were also included in Wave 2.

Telephone interviewing continued for a period of 16 weeks. All cases still pending after this time were sent to field interviewers to gather in-person information. After the maximum number of calls, attempts to contact the sample member by telephone were terminated and the case was sent to field interviewers as a candidate for refusal conversion. Letters were sent to sample members addressing the specific reasons for their refusal (too busy, not interested, confidentiality issues, etc.), and a final phone interview was attempted.

The data collection procedures for the first (and only) follow-up of the B&B:00/01 cohort were similar to those for the B&B:93/94 first cohort, consisted almost exclusively of CATI interviews, and concluded with refusal conversion procedures to gain cooperation from telephone nonrespondents.

For the first follow-up of the third B&B cohort, student interview data was collected directly from sampled students via web, telephone, and field interviews.

Data collection for the second follow-up (B&B:93/97) took place from April through December of 1997. Respondents were interviewed using one of two computer-assisted-interviewing (CAI) systems. The majority of interviews were conducted by telephone interviewers located at a central facility using a CATI system. These interviews were completed between April and July of 1997. The remaining cases were completed by field interviewers using a computer-assisted personal interviewing (CAPI) and case management system (CMS) that was loaded into their individual laptop computers. Most of these interviews were also conducted by telephone but some were administered in person, with the major activities being: interviewing, locating, and refusal conversion.

As with previous B&B studies, the second follow up of the third cohort (B&B:08/12) included a multimode student
interview component that collected information on students’ education and employment since graduation.

The third follow-up interview (B&B:93/03) started in February 2003. For the first time, respondents were offered the opportunity to conduct their own interview via the Internet. A single, web-based interview was designed and programmed for use as a self-administered interview, a telephone interview, or an in-person interview. In addition, a website was developed to launch the self-administered interview, to provide additional study information, and to collect updated student locating information. Respondent incentives were also offered at several points of data collection. The major activities of follow-up non-

respondent telephone interviewing and refusal conversion were also conducted for this follow-up.

Transcript component. In addition to data gathered from sample members, the cohorts include a transcript component that is intended to capture student-level course taking and grades for eligible sample members. At the first follow up for B&B:93/94 and B&B:08/09, transcripts were requested from the NPSAS schools from which B&B selected sample members had graduated. In addition to student transcripts, schools are asked to provide a course catalog and information on their grading and credit-granting systems and their school term. Follow-Up for nonresponding schools was also conducted. The transcript information is then carried through for future follow-ups of that cohort.

Editing. Various edit checks, including CATI edits, have been used in processing B&B data; however, they have not been documented in B&B methodology reports for the base year and first two follow-ups of the B&B:93 cohort.

The coding and editing procedures for the B&B:93 cohort’s third follow-up (B&B:93/03) fell into two categories: (1) online coding and editing performed during data collection and (2) post-data collection editing. All data collection for B&B:93/03 used one major system—a web instrument—that included edit checks to ensure that the data collected were within valid ranges. Both during and after data collection, edit checks were performed on the B&B:93/03 data file to confirm that the intended skip patterns were implemented during the interview. Special codes were added after data collection, as needed, to indicate the reason for missing data. In addition, skip-pattern relationships in the database were examined by methodically running cross-

tabulations between gate items and their associated nested items.

For the B&B:2000/01 data, the coding and editing procedures fell under the same two categories as above. During data collection, online coding and editing were performed, requiring CATI range and consistency checks.

After data collection, edit checks were performed to verify that the database reflected appropriate skip patterns.

The B&B: 08/09 and the B&B:08/12 data were both edited using procedures developed and implemented for previous studies sponsored by NCES as described above.

Estimation Methods

Weighting is used in B&B to adjust for sampling and unit nonresponse. Imputation is used to estimate baseline weights from NPSAS when these data are missing and to estimate values when the value is missing; however, no imputation was performed on data collected in the first and second follow-ups of B&B:93.

Weighting. For the first B&B cohort’s first follow-up, the final weights were calculated by modifying baseline weights in NPSAS:93 to adjust for nonresponse in the B&B:93/94 survey and for tighter eligibility criteria in the B&B sample. For details, see Sampling Design and Weighting Report for the 1993 National Postsecondary Student Aid Study.

After verifying sample eligibility against transcript data, B&B sample members were stratified according to institutional type and student type. These strata reflected the categories used in NPSAS:93, with some modifications. NPSAS:93 categorized schools into 22 institutional strata based on highest degree offered, control (public or private), for-profit status, and the number of degrees the institution awarded in the field of education (with schools subsequently designated “high ed” or “low ed”). An adjusted weight was calculated for each case by multiplying the NPSAS base weight by the ratio of the sum of degrees awarded to the sum of the base weights for the appropriate institutional stratum. This weight became the B&B base weight. Nonresponse weight adjustments were also created based on institutional stratum and student type.

Final weights for the second follow-up (B&B:93/97) were calculated using a two-step process and the institution- and student-type strata. First, the base weight calculated for the B&B:93/94 sample was adjusted for non-response to the B&B:93/97 survey. Next, the panel weight was calculated for respondents who participated in all three of the B&B surveys (NPSAS:93, B&B:93/94, and B&B:93/97).

The base weights for the third follow-up (B&B:93/03) were calculated adjusting for the subsample of nonresponding students from B&B:93/97 that were included in the B&B:93/03 survey. The cross-sectional weights for the third follow-up were developed by analyzing interview respondents, using three steps for nonresponse adjustment: inability to locate the student, refusal to be interviewed, and other noninterview adjustments. All nonresponse adjustments were fitted using RTI’s proprietary generalized exponential modeling (GEM) procedure. To detect
important interactions for the logistic models, a Chi-squared automatic interaction detection (CHAID) analysis was performed on the predictor variables. In addition, a longitudinal weight was constructed for analyzing students who participated in all four interviews—NPSAS:93, B&B:93/94, B&B:93/97, and B&B:93/03. This weight was constructed by applying an additional nonresponse adjustment to the final B&B:93/03 cross-sectional weight. As for the other models, CHAID was used to determine the interaction segments, and GEM was used to determine the adjustment factor.

For the second B&B cohort’s first follow-up (B&B:00/01), weights were obtained in the following manner: the sample design included the first two stages of NPSAS:2000 sample design and an additional B&B:2000/01-specific stage in which a subsample was selected from confirmed and potential baccalaureate recipients identified at the end of the NPSAS:2000 sample. All confirmed baccalaureate recipients were selected into the B&B:2000/01 sample, while nonresponder potential baccalaureate recipients were randomly selected according to probabilities based on a measure of size, which was the estimate of the NPSAS:2000 study weight at the time of sample selection. Once the B&B:2000/01 sample had been selected, initial weights were obtained by adjusting the NPSAS:2000 study weights for both the B&B subsample design and the presence of study-ineligible individuals in the B&B sampling frame. Similar to the first cohort, obtaining the final weights involved using CHAID to determine the interaction segments and GEM to determine the adjustment factor.

Weight adjustments for the first follow-up of the third B&B cohort (B&B:08/09), again compensate for the unequal probability of selection of institutions and students in the NPSAS:08 sample. The weights also adjust for multiplicity at the institutional and student levels and unknown student eligibility for NPSAS:08. Because the students in the B&B:08/09 sample are a subset of the NPSAS:08 sample, the B&B:08/09 weights were derived from the NPSAS:08 weights. The B&B:08/09 base weight is the product of the seven NPSAS:08 weight components (institution sampling weight, multiplicity adjustment, post stratification adjustment, and nonresponse adjustment, and student sampling weight, multiplicity adjustment, and unknown eligibility adjustment). The B&B:08/12 base weight is the product of the same seven NPSAS:08 weight components.

Three weights were developed for analyzing data from the B&B:08/12 data collection. A bookend weight was developed for analyzing NPSAS items in combination with items directly from or derived from the B&B:08/12 interview. A panel weight was developed for analyzing NPSAS items in combination with items directly from or derived from both the B&B:08/09 interview and the B&B:08/12 interview. A panel transcript weight was developed for analyzing items from all three interviews and transcripts. All weights were adjusted for nonresponse and were also adjusted to Integrated Postsecondary Education Data System (IPEDS) and NPSAS:08 control totals. A cross-sectional weight was not included because analysis of the B&B:08/12 interview items would almost always be analyzed along with NPSAS:08 items, especially demographic items.

Imputation. The sample for the first B&B cohort (B&B:93) included 23 eligible cases in which the baseline weight from the 1992–93 NPSAS was equal to zero. Weights for these cases were imputed using the average of all nonzero baseline weights within the same institution at which the baccalaureate degree was attained. There was no other imputation of data items in the base-year and first two follow-ups of B&B:93. In the third follow-up (B&B:93/03), key variables to be used in cross-sectional estimates were imputed using weighted sequential hot deck imputation, with imputation classes being developed using a CHAID). Imputation was performed on several preloaded variables, and CHAID analysis was also conducted for B&B:2000/01; however most adjustments were handled through weighting, using GEM.

For the third cohort (B&B:08/09), all variables with missing data were imputed either singly or as part of a vector, (i.e., simultaneously imputed). The imputation procedures employed a three-step process for each variable, or vector of variables, with missing values. In the first step, missing values were deterministically, or logically, imputed. In the second step, imputation classes were created based on a prediction model or response propensity model, as appropriate, for the variable with missing data. Imputations were then processed independently within each class. In the third step, missing values were stochastically, or randomly, imputed using a weighted sequential hot deck process, whereby missing data from recipient cases were replaced with valid data from donor cases from the same imputation class.

Variables with the lowest levels of missingness were imputed first, using variables that did not have any missing data in the construction of the imputation classes. Next, variables with increasing levels of missingness were imputed using variables that did not have any missing data and previously imputed variables in the construction of imputation classes. The order in which variables were imputed was also determined by the substantive nature of the variables. NPSAS:08 variables were imputed first and were used to impute B&B:08/09 variables. The majority of variables with missing data were imputed sequentially, but depending on the levels and patterns of missing data, some variables requiring imputation were imputed simultaneously. For all variables, the imputation classes
were determined using subject matter expertise and a tree-based methodology. The tree-based methodology identifies variables associated with the variable that is being imputed. This step produced a number of imputation classes that contain sets of donors that were used to impute missing values belonging to recipients in that class. Next, the imputation classes were input to a weighted sequential hot deck procedure in SAS.

The B&B:08/12 study improved the quality of the imputation procedure as described above for the B&B:08/09 study by combining and implementing it with the cyclic n-partition hot deck technique. This technique begins by identifying and replacing initial imputations for each missing variable (ordered from least to most missingness), based upon variables with complete responses and any imputed variables as possible predictors to form the imputation classes, within which the weighted sequential hot deck was used. The result was a complete dataset containing the variable/vector of variables being reimputed and variables related to the development of imputation classes. Then, in each of n iterations, imputed data in each variable (ordered from least to most missingness) were erased and a new response was imputed based upon the otherwise complete dataset.

5. DATA QUALITY AND COMPARABILITY

Sampling Error
Taylor Series approximations and Balanced Repeated Replication (BRR) were examined as measures of sampling precision/error. For the first cohort, Taylor Series was chosen for estimates of sampling variance and were then used to calculate design effects as an added measure of sample design efficiency. For the second cohort, both methods were utilized. For the third cohort, Taylor series linearization and bootstrap replication were used.

Nonsampling Error
The majority of nonsampling errors in B&B can be attributed to nonresponse. Other sources of nonsampling error include coding and data entry errors, misspecification of composite variables, and inaccurate imputations.

Coverage error. The B&B sample is drawn from NPSAS. Consequently, any coverage error in the NPSAS sample will be reflected in B&B. (Refer to the NPSAS chapter for coverage issues in NPSAS.)

Nonresponse error. Overall response rates were generally high for the follow-up surveys. Unit and item nonresponse data are broken down below.

Unit nonresponse. Table B&B-1 presents weighted response rates for the B&B surveys at the institutional and student levels. The institutional response rate provides the percentage of institutions that provided sufficient data to select the student-level sample. The rate of population coverage varies by type of institution: the rate is higher for public institutions than for private institutions, and higher for institutions offering a master’s or doctoral degree than for those offering a bachelor’s or less or a first-professional degree.

The student-level response rate is the percentage of respondents who completed interviews out of the number of eligible students.

Of the 12,480 cases originally included in the first B&B sample, B&B:93/94, 1,520 were determined during the interview process to be ineligible or out of scope (primarily because their date of graduation fell outside the July 1–June 30 window). A total of 10,960 cases were considered to be eligible during the interviewing period of the first B&B follow-up, and interviews were completed with 10,080 of these respondents, representing a 92 percent unweighted response rate. Response rates were even higher for transcript collection. In all, 630 of 640 eligible schools complied with the request for transcripts, providing transcripts for 10,970 students.

In the second follow-up, of the 11,200 cases identified as eligible B&B sample members, 30 were found to be out of scope or ineligible. Interviews were completed with 10,100 of the in-scope cases, for a final unweighted response rate of 90 percent. While response rates were similar across many demographic subgroups, some distinctive differences exist. Response rates (unweighted) decreased slightly with age (93 percent of those under 26 compared to 90 percent of those over 30 participated), but participation among males and females was approximately equal. Response rates (unweighted) were also similar among Whites, Blacks, and American Indians (ranging from 90 percent to 92 percent), but substantially lower for Asians/Pacific Islanders (only 82 percent) and those identifying themselves as “other” (74 percent).

In the third follow-up, about 50 individuals from the starting sample of 10,440 were determined to be either study ineligible or deceased. Of the B&B:93/03 sample members who were eligible to participate, 8,970 were interviewed, for an overall weighted response rate of 83 percent.

In the second B&B cohort’s only follow-up (B&B:2000/01), there were nearly 11,630 eligible sample members and about 10,030 were located and interviewed in the follow-up survey. This gave a weighted student level response rate of 82 percent.

For the third B&B cohort (B&B:08/09) first-year follow-up, approximately 15,050 students interviewed of the eligible sample of 17,160. This gave a weighted response rate of 78
percent. In the second follow-up, of the 17,160 cases identified as eligible B&B sample members, about 30 students were found to be ineligible and approximately 20 were deceased, reducing the eligible sample size to about 17,110. Of the 17,110 eligible sample members, 13,490 were interviewed, for an overall weighted response rate of 68 percent.

Table B&B-1 summarizes the weighted unit-level (student-level) and overall-level (institution-level) response rates across B&B administrations.

**Item nonresponse.** For the B&B:93/94, of the more than 1,000 variables included in the final dataset for the first cohort, 68 contain a response rate of less than 90 percent. The highest nonresponse rate was for items involving recollection of test scores and dates. Respondents also had difficulty recalling detailed information about undergraduate loans and loan payments when they had more than three loans. The two primary sections of the survey, concerning postbaccalaureate education and employment, had very low rates of nonresponse.

For the second cohort, one of the goals of B&B:00/01 was to reduce the item nonresponse, which results from respondents declining to answer the question, or responding that they could not give an accurate answer. Of the approximately 1,800 variables included in the final data set, there were nearly 50 items with nonresponse rates over ten percent. Almost half of these items, however, can be accounted for by the fact that only five or fewer respondents were asked the question. Items involving knowledge of specific dates, such as those for emigration, employment, and school attendance were found to have substantial rates of nonresponse; the largest type of nonresponse for these items are the “don’t know” responses. High levels of “don’t know” responses were also evident in the items regarding the respondent’s education loans and loans of the respondent’s spouse.

Refusal to answer income and salary questions continued, as in the first follow-up, to be among a significant proportion of the nonresponse items. More specifically, these items included questions concerning academic year base salary of teaching jobs, as well as income from jobs and other sources. These items had a high percentage of refusal responses. Items involving spouse’s income, in addition to high refusal responses, had a moderate percentage of “don’t know” responses. “Don’t know” responses also accounted for the majority of the nonresponse in items concerning spousal education debt, reflecting what seems to be an overall lack of respondent knowledge of spouse or partner income and debt. In comparison to the findings of nonresponse in the first follow-up, there has been a reduction in the number of items with significant nonresponse. Although still high, the refusal rate of income and salary items has decreased from the first follow-up.

A student is considered to be an item respondent for an analysis variable if the student has data for that variable from any source, including logical edits. For the 15,050 responding students in the third cohort, B&B:08/09, the weighted item response rates ranged from 81 percent to 100 percent. The weighted item response rates by sector of institutions ranged from 67 percent to 100 percent. In the third cohort, B&B:08/09, 149 of the 368 interview items had a weighted item response rate less than 85 percent. Nine of the 202 student transcript items also had a weighted response rate less than 85 percent. A nonresponse bias analysis was conducted for items with a weighted response rate less than 85 percent. The possibility of estimating the degree of bias depends on having some variables that reflect key characteristics of respondents and for which there are little or no missing data. The variables that were used are known for the respondents and nonrespondents. Across the interview items, the percentage of variables with statistically significant bias ranged from 3 percent to 98 percent, and for transcript items, the percentage of variables with statistically significant bias ranged from 5 percent to 40 percent. The before- and after-imputation item estimates were compared to determine whether the imputation significantly changed the biased estimates, thus suggesting a reduction in bias. The difference between the pre-and postimputation estimates was statistically significant for 13 percent of the interview variables and variable categories. Imputation was not performed for the items obtained from student transcript data.

For B&B:08/12, the item-level nonresponse analysis yielded 38 out of 602 interview items with more than 15 percent missing data. The interview items with the overall highest observed nonresponse rates were *Estimated federal student loan monthly payment, Estimated private student loan interest rate, and Job 1: level of education industry*. There were significant differences in nonresponse rates between the web and telephone modes for 26 of the 38 interview items. All 26 items had a higher rate of nonresponse among web interviews.

**Measurement error.** Several sources of measurement error are addressed by B&B studies, including respondent error and interviewer error. The use of CATI and CAPI technology helps to eliminate the respondent error due to incorrect branching that often exists with self-administered questionnaires.

**Respondent error.** Several weeks after the first follow-up interview of the 1992–93 cohort (B&B:93/94), a group of 100 respondents was contacted again for a reinterview. These respondents were asked a subset of the items included in the initial interview to help assess the quality of these
data. The results indicate that the questions elicited similar information in both interviews. Ninety-two percent of respondents gave consistent responses when asked if they had taken any courses for credit since graduating from college. Among the 8 percent with inconsistent responses, most had a short enrollment spell that they mentioned in the initial interview but not in the re-interview.

Ninety-six percent of respondents gave consistent information in both interviews when asked whether they had worked since graduation. Almost three-quarters of respondents gave the same number in both interviews when asked about the number of jobs they held since graduation; 26 percent gave inconsistent responses. Upon scrutiny, many of these discrepancies resulted from jobs held around the time of graduation that were reported in just one of the interviews. Although respondents were asked to include jobs that began before graduation if they ended after graduation, confusion over whether to include such jobs accounted for many of the inconsistencies noted in the re-interview.

For the third follow-up of the first cohort, percent agreement rates for the re-interview ranged from 71 to 97 percent. No specific information is available for the second and third B&B cohorts with regard to re-interviews.

**Interviewer error.** The monitoring procedure for statistical quality control used in B&B extends the traditional monitoring criteria (which focus specifically on interviewer performance) to an evaluation of the data collection process in its entirety. This improved monitoring system randomly selects active work stations and segments of time to be monitored, determines what behaviors will be monitored and precisely how they will be coded, and allows for real-time performance audits, thereby improving the timeliness and applicability of corrective feedback and enhancing data quality. Results for the first follow-up of the 1992–93 B&B cohort revealed a low rate of interviewer error. Results for the second follow-up of the first B&B cohort were also low—typically below one percent. For the third follow-up, two aspects of interviewer performance were evaluated: (1) correct delivery of questions (error in delivery) and (2) accurate keying of the response (error in data entry). Among the 10,640 items observed, only 115 delivery errors and 66 data entry errors were observed.

For the second cohort, error rates remained within acceptable limits, typically below 1 percent. Among the 14,592 items observed, there were 141 total CATI question delivery errors and 91 total data entry errors. This resulted in overall error rates of less than 1 percent for both question delivery (0.94 percent) and data entry (0.6 percent). For the third cohort, no additional or specific information was available with regard to delivery and data entry errors.

Quality control procedures were also established for field interviewing for the first follow-up of the first cohort. The first two interviewer-administered completed questionnaires were sent to a field manager for editing. These cases were edited, logged, and reported weekly, and appropriate feedback was given to the interviewer. An additional percentage of these cases, whether administered over the phone or in person, were validated by field managers. When deemed necessary, the field managers continued to edit additional cases to monitor data quality. The need for additional monitoring was based on the field manager’s subjective judgment of the interviewer’s skill level. As with the edited cases, validated cases were logged and reported weekly. For the second follow-up, respondents were interviewed using one of two computer-assisted-interviewing (CAI) systems. The majority of interviews were conducted by telephone interviewers located at a central facility using CATI. Quality control procedures for this follow-up included random monitoring of CATI interviewers; verification of coding accuracy; daily production statistics; frequency and time stamp review; and random re-interviews.

The B&B:2000/01 follow-up study had one major data collection system: CATI. The CATI system included edit checks to ensure that data collected were within valid ranges. To the extent feasible, this system incorporated across-item consistency edits. While more extensive consistency checks would have been technically possible, use of such edits was limited to prevent excessive respondent burden. Additional post-data-collection checks were also conducted to confirm that the database reflected appropriate skip-pattern relationships and different types of missing data. For the third B&B cohort, no additional information was available pertaining to edits.

**Cross-Year Comparisons** Comparison of results with prior rounds of B&B requires compensation for two changes in the design of the base-year NPSAS survey over time. First, prior to NPSAS:04, institutions that only offered correspondence courses were not eligible for NPSAS. NPSAS:04 included such institutions if they were eligible to distribute Title IV student aid. Second, for NPSAS:2000, the survey was restricted for the first time to institutions participating in Title IV student aid programs. According to the NPSAS:96 Data Analysis System (DAS), only about one percent of sampled undergraduates were attending an institution not eligible to participate in Title IV aid programs. When students attending non-Title IV-eligible institutions were excluded from the NPSAS:96 sample, the percentage of undergraduates who received financial aid increased by less than one percent. This small change primarily affects comparisons of students enrolled in less-than-2-year and private for-profit institutions. For more detailed information, see the 2008–09 Baccalaureate and Beyond Longitudinal Study.
Table B&B–1. Weighted response rates for selected B&B surveys, by data collection wave: Various years, 1992–2012

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<th>2nd follow-up</th>
<th>3rd follow-up</th>
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<td>2007–2008 cohort</td>
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</tr>
</tbody>
</table>

—Not available
†Not applicable
¹Student interview response rates.
²Unweighted response rate.


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7. METHODOLOGY AND EVALUATION REPORTS

General


Survey Design


Data Quality and Comparability