

2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09)

Full-scale Methodology Report

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NOVEMBER 2013

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November 2013

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This report was prepared for NCES under Contract No. ED-05-CO-0033 with RTI International. Mention of trade names, commercial products, or organizations does not imply endorsement by the U.S. Government.

Suggested Citation

Wine, J., Janson, N., Siegel, P., Bennett, C. (2013). *2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09)Full-scale Methodology Report* (NCES 2014-041). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Retrieved [date] from <http://nces.ed.gov/pubsearch>.

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Executive Summary

The 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09), conducted for the U.S. Department of Education's National Center for Education Statistics (NCES), collected information primarily about students' education and employment in the first year following receipt of their bachelor's degree.

This report describes the methodology and findings of the B&B:08/09 data collection, which included a student interview, a transcript data collection, and an administrative data records match.

Sample Design

The target population¹ for the B&B:08/09 study was students who completed degree requirements for a bachelor's degree between July 1, 2007 and June 30, 2008, and who were awarded their bachelor's degree by June 30, 2009, from a postsecondary institution in the United States or Puerto Rico. All sampled students were initially identified as potential bachelor's degree recipients in the 2008 National Postsecondary Student Aid Study (NPSAS:08).

At the conclusion of the B&B:08/09 data collection, the B&B:08 cohort included 17,160 eligible sample members. Of this sample, 15,050 were considered interview respondents, 16,070 were considered transcript respondents, and 14,010 were considered combined interview and transcript respondents.

Student Interview

The B&B:08/09 student interview was designed as a single web-based instrument to be used for web, telephone, and field respondents. Several methodological features were embedded in the instrument to minimize mode effects, such as extensive help text on every form, warnings to alert sample members when a response fell outside a predetermined range of likely responses, and conversion text to encourage responses to critical items when sample members did not provide a response.

This follow-up interview for the B&B:08 cohort captured respondent information from the time period of July 2008 through June 2009 and included seven sections: Eligibility, Undergraduate Education, Postbaccalaureate Education/Training, Postbaccalaureate Employment, Kindergarten–12th Grade (K–12) Teaching, Student Background, and Locating. The interview was administered in one of three modes: web, telephone, or field. An abbreviated Spanish interview was also provided.

The data collection design for B&B:08/09 involved several stages. The initial process of locating sample members involved batch-locating activities to update sample members' address and telephone information from several sources. In addition, sample members and their parents were sent an initial mailing to collect updated contact information.

Once the initial round of locating was completed, sample members were sent information regarding study participation, and the data collection period began. Data collection was conducted in three phases. Sample members who completed interviews during the early response phase (first phase) and the nonresponse conversion phase (last phase) were offered an incentive of \$30. Sample

¹ The target population consists of all students or institutions in the survey population, and is the population to which inferences are made.

members who completed interviews during the production (middle phase) were not offered an incentive. Base-year nonrespondents were offered \$50 to complete the interview in the early response and nonresponse conversion phases.

Of the 17,170 sample members included in the B&B:08/09 student interview data collection, 16,050 (93 percent) were successfully located, and 15,090 either partially or fully completed an interview. The response rate was 88 percent among the eligible sample and was 94 percent among those sample members who were successfully located. The majority of completed interviews (12,240) were obtained in web mode, wherein respondents accessed and completed the interview online.

The B&B:08/09 interview took approximately 28 minutes to complete. On average, web respondents completed the interview in 26.6 minutes, telephone respondents completed the interview in 33.5 minutes, and field respondents completed the interview in 31.1 minutes.

An evaluation of the quality of the data provided by the B&B:08/09 student interview showed that methodological features, such as help text and conversion text built into the instrument and training and supervision of interviewing staff, aided in the successful administration of the interview.

Data collection quality control procedures for the student interview included frequent monitoring of telephone interviewers, a help desk that tracked and resolved difficulties encountered by sample members attempting to complete the web interview, and quality circle meetings and a debriefing for interviewers and tracers. Feedback from these procedures provided useful information for consideration when planning future administrations of B&B.

Transcripts

Postsecondary transcripts were collected as part of B&B:08/09. Transcripts were requested from the institution where B&B sample members completed their bachelor's degree requirements during the 2007–08 academic year (their NPSAS institution), and if this institution had any transcripts for any transfer schools previously attended, the transfer transcripts were requested, as well. To ease burden on participating institutions, the B&B:08/09 transcript collection was combined with the transcript collection for the 2004/09 Beginning Postsecondary Student (BPS:04/09) Longitudinal Study. Together, these transcript collections are referred to as the 2009 Postsecondary Education Transcript Study (PETS:09).

Multiple transcript submission methods were available to institutions, including several secure electronic methods, fax, and FedEx. Information and instructions were available on a study website and institution contacting staff members were also available to assist institution staff with transcript submissions and questions about the study. Transcripts were requested from 1,100 postsecondary institutions attended by sample members that were reported by sample members in the B&B:08/09 interviews. Of these institutions, 1,020 (93 percent) provided transcripts for the cohort.

Transcript data were collected via a keying and coding process that made use of a specially designed keying and coding system (KCS) and a staff of trained keyer/coders. The KCS was divided into sections based upon the categories of data found on transcripts, including case information, schools and terms, academics, tests, degrees and majors, and courses. A PETS coder was developed for the coding of courses by combining the 2010 NCES Classification of Instructional Programs and the 2003 College Course Map.

Keying and coding of the NPSAS institution transcript was performed for 16,070 sample members. When a sample member's transcript showed courses from another institution these courses were entered into the student's transcript data file only when these credits were accepted by the bachelor's degree-awarding institution. A series of quality control procedures were put in place for keying and coding, including key-rekey and expert coder procedures to assess interrater reliability and upcoding procedures for uncodeable data and data entered as "other, specify." Kappa statistics were calculated to assess interrater reliability for multiple transcript data elements and all indicated substantial agreement between coders.

File Preparation

The data files for B&B:08/09 contain student-level data collected from student interviews and transcripts, government databases, and administrative databases. These files are available as a set of restricted research files fully documented by an electronic codebook and through the NCES online application PowerStats, which also contains variable documentation. The editing and documentation processes for each file are described in this report.

Analysis Weights

Student interview respondents for B&B:08/09 were sample members with a B&B:08/09 completed, partial, or abbreviated interview. Student transcript respondents were sample members who had a transcript provided by the NPSAS:08 institutions. Combined student interview and transcript respondents were both interview and transcript respondents. Weights were constructed for use in the analysis of these three types of respondents. The three analysis weights were derived from the NPSAS:08 weight, and they were adjusted for subsampling, nonresponse, and calibration to Integrated Postsecondary Education Data System Completions totals and to sums of the NPSAS:08 weights for the B&B cohort.

Variance Estimation

The B&B:08/09 sample was obtained using a complex sample design that included stratification and clustering, and special techniques were needed for variance estimates. Variables were constructed and provided on the data file for bootstrap variance estimation and for Taylor series variance estimation.

Foreword

This report describes and evaluates the methods and procedures used in B&B:08/09. B&B:08/09 is the first follow-up interview for the cohort of bachelor's degree recipients identified in NPSAS:08. Transcripts were also collected from the institution where B&B sample members completed their bachelor's degree requirements. Together, the student interview and transcript data collections represent a significant and rich data source on this cohort of bachelor's degree recipients.

We hope that the information provided in this report will be useful to interested readers. Additional information about B&B:08/09 is available on the Web at nces.ed.gov/surveys/b&b/.

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Acknowledgments

The authors are greatly indebted to the students who generously participated in the survey. Their willingness to take the time to share their information and experiences made B&B:08/09 a success.

We gratefully acknowledge the assistance of the staff members of NCES for their guidance and review in conducting the study and in preparing this document. Special thanks is also extended to the project staff members of RTI International and MPR Associates, Inc. (recently acquired by RTI).

*RTI International is a trade name of Research Triangle Institute.

Contents

Executive Summary	iii
Foreword	vii
Acknowledgments	ix
List of Tables	xv
List of Figures	xvii
Chapter 1. Overview	1
1.1 Background and Objectives of B&B	1
1.2 Schedule and Products of B&B:08/09	2
Chapter 2. Sampling	5
2.1 Respondent Universe	5
2.1.1 Institution Universe for NPSAS:08	5
2.1.2 Student Universe for NPSAS:08	5
2.2 Base-Year Study (NPSAS:08)	6
2.2.1 Institution Sample for NPSAS:08	6
2.2.2 Student Sample for NPSAS:08	7
2.3 First Follow-up Study (B&B:08/09)	11
2.4 B&B:08 Cohort	14
Chapter 3. Student Interview Design, Data Collection, Outcomes, and Evaluation	15
3.1 Student Interview Design and Systems	15
3.1.1 Student Interview Design	15
3.1.2 Data Collection Systems	18
3.2 Student Interview Data Collection	20
3.2.1 Training of Interview Data Collection Staff	20
3.2.2 Study Website	22
3.2.3 Locating and Contacting Sample Members	23
3.2.4 Interviewing	27
3.2.5 Other Procedures to Maximize Locating and Interview Response	30
3.3 Data Collection Quality Control	31
3.3.1 Interview Monitoring	31
3.3.2 Help Desk	32
3.3.3 Quality Circle Meetings	32
3.3.4 Debriefing	33
3.4 Student Interview Data Collection Outcomes	34
3.4.1 Student Interview Response Rates	34
3.4.2 Interview Timing Burden	42
3.4.3 Telephone Interviewer Hours	45
3.4.4 Number of Calls to Sample Members	45
3.5 Evaluation of Student Interview Items	46
3.5.1 Instrument Coders	46
3.5.2 Help Text	47

3.5.3	Conversion Text.....	48
3.5.4	Item Nonresponse	51
3.6	Student Interview Conclusions	54
Chapter 4.	Transcript Data Collection, Outcomes, and Evaluation.....	57
4.1	Transcript Data Collection and Response Rates.....	57
4.1.1	Transcript Control System.....	57
4.1.2	Training of Institution Contactor (IC) Staff.....	57
4.1.3	Transcript Collection Procedures	58
4.1.4	Institution Website.....	59
4.1.5	Transcript Collection Response Rates	62
4.2	Transcript Keying and Coding.....	63
4.2.1	Transcript Keying and Coding Procedures	63
4.2.2	Training of Transcript Keyer/Coder Staff.....	66
4.2.3	Transcript Keying and Coding Outcomes.....	67
4.2.4	Evaluation of Transcript Keying and Coding.....	67
4.2.5	Timing of Transcript Keying and Coding.....	73
4.3	Transcript Data Collection Conclusions	73
Chapter 5.	Postdata Collection Data File Processing Activities	75
5.1	Administrative Record Matching.....	75
5.1.1	Central Processing System	75
5.1.2	National Student Loan Data System	76
5.1.3	National Student Clearinghouse.....	76
5.2	B&B:08/09 Main Study Data Files	77
5.3	Transcript Data Files	78
5.4	Data Editing.....	79
5.5	Data Perturbation	81
5.6	Statistical Imputations	81
5.7	Composite and Derived Variable Construction.....	83
Chapter 6.	Weighting and Variance Estimation	85
6.1	Analysis Weights	85
6.1.1	Analysis Weight for Cases With Student Interview Data.....	85
6.1.2	Analysis Weight for Cases With Transcript Data.....	96
6.1.3	Analysis Weight for Cases With Both Student Interview and Transcript Data	103
6.2	Variance Estimation	110
6.2.1	Taylor Series.....	110
6.2.2	Bootstrap Replicate Weights	111
6.3	Overall Weighted and Unweighted Response Rates	112
6.4	Accuracy of Estimates.....	114
6.4.1	Measures of Precision: Standard Errors and Design Effects	114
6.4.2	Measure of Bias	115

References.....	123
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Appendixes

- A. NPSAS:08 Institution and Student Sampling Details
- B. Technical Review Panel
- C. Data Elements for Student Interview
- D. Facsimile of Full-scale Instrument
- E. Interviewer Training Agenda and Training Manual Contents
- F. Notification Material for Student Interview Data Collection
- G. Training Agendas for Transcript Data Collection
- H. Notification Material for Transcript Data Collection
- I. Data Elements for Keying and Coding System
- J. Imputation Rates
- K. Analysis Variables
- L. Design Effects
- M. Nonresponse Bias Analysis

List of Tables

1.	Schedule of major activities: 2008–13	3
2.	NPSAS:08 sampled and eligible institutions and enrollment list participation rates, by institution characteristics: 2007–08	7
3.	NPSAS:08 sampled and eligible students and response rates, by institution characteristics: 2007–08	10
4.	Distribution of the NPSAS:08 sample members potentially eligible for B&B:08 cohort, by source of potential eligibility: 2009	11
5.	Transcript status of the B&B:08 cohort with bachelor’s degree confirmed in the NPSAS:08 interview	12
6.	Eligible sample and subsample sizes of the NPSAS:08 potential bachelor’s degree recipients without a NPSAS:08 interview	13
7.	Sampled students, by institution control: 2009	13
8.	B&B:08/09 training of data collection staff: 2009	21
9.	Batch processing record match rates, by tracing source: 2009	26
10.	Cases requiring intensive tracing, by base-year response status and institution type: 2009	27
11.	Help desk requests, by type of incident reported: 2009	32
12.	Locating and participation rates, by base-year response status and NPSAS institution type: 2009	35
13.	Completed interviews, by base-year response status and interview type: 2009	36
14.	Number of cases and completed interviews within each phase of data collection: 2009	37
15.	Located and interview completion rates, by source of address update: 2009	38
16.	Located and interviewed rates of cases requiring intensive tracing, by intensive tracing method: 2009	38
17.	Located and interviewed response rates, by other locating methods: 2009	39
18.	Located and completed field interview cases, by base-year response status and institution type: 2009	41
19.	Average time in minutes to complete interview section, by mode of administration: 2009	43
20.	Average time to complete interview, by employment status: 2009	43
21.	Average time to complete interview, by teacher status: 2009	44
22.	Average time in minutes to complete abbreviated interview, by interview section and mode of administration: 2009	44
23.	Average number of calls, by response status: 2009	45
24.	Summary of recoding results, by coding system and administration mode: 2009	47
25.	Summary of upcoding results, by coding system and administration mode: 2009	47

List of Tables

26.	Interview questions with highest rates of help text access, by administration mode: 2009	48
27.	Conversion rates for critical items, by mode of administration: 2009.....	50
28.	Interview items with highest nonresponse rates, by mode of administration: 2009	53
29.	Eligible institution participation, by institution type: 2009	62
30.	Institution transmission mode for transcript data: 2009	63
31.	Student-level transcript collection results: 2009.....	63
32.	Upcoding of “other, specify” data: 2009	72
33.	Average minutes per transcript, by institution type: 2009.....	73
34.	Central Processing System matching results, by academic year: 2008–10	75
35.	National Student Loan Data System matching results, by loan and grant type: 2009	76
36.	National Student Clearinghouse StudentTracker matching results: 2009.....	76
37.	Description of missing data codes: 2009	80
38.	Weight adjustment factors for refusal for the B&B:08/09 student interview weight: 2009	88
39.	Weight adjustment factors for nonresponse for the B&B:08/09 student interview weight: 2009	91
40.	Control totals, weight adjustment factors, and sum of weights for eligible cases for the B&B:08/09 student interview weight raking: 2009.....	94
41.	Weight distribution and unequal weighting effects for the B&B:08/09 student interview weight, by institution control: 2009.....	95
42.	Weight adjustment factors for nonresponse for the B&B:08/09 student transcript weight: 2009.....	98
43.	Control totals and weight adjustment factors for the B&B:08/09 student transcript weight raking: 2009.....	101
44.	Weight distribution and unequal weighting effects for the B&B:08/09 student transcript weight, by institution control: 2009	102
45.	Weight adjustment factors for nonresponse for the B&B:08/09 combined student interview and transcript weight: 2009.....	105
46.	Control totals and weight adjustment factors for the B&B:08/09 combined student interview and transcript weight raking: 2009.....	108
47.	Weight distribution and unequal weighting effects for the B&B:08/09 combined student interview and transcript weight, by institution control: 2009	109
48.	Unweighted and weighted NPSAS:08 institution response rates and B&B:08/09 student interview, transcript, and combined interview and transcript response rates, by institution control: 2009.....	113
49.	Summary of components of the B&B:08/09 analysis weights: 2009	119
50.	Summary of student interview nonresponse bias analysis, by type of institution: 2009	120

List of Figures

1.	Chronology of B&B: 1993–2012	2
2.	Interview sections and topics: 2009	16
3.	B&B:08/09 website home page: 2009.....	23
4.	Locating methods: 2009	24
5.	Data collection phases: 2009.....	28
6.	Overall locating and interviewing results: 2009	34
7.	Distribution of completed interviews, by mode of administration: 2009	36
8.	Percentage of completed interviews, by data collection phase: 2009	37
9.	Early response rates for base-year nonrespondents who were prompted: 2009	39
10.	Institution website home page: 2009	61
11.	Keying and coding system sections: 2009.....	64
12.	CIP code diagram: 2009	65
13.	Course codes layout in the KCS coders: 2009	66
14.	Course coding results: 2009	67
15.	Rekey kappa values by transcript section: 2009	68
16.	Expert coding results, kappa by level of specificity: 2009.....	70
17.	Major/field of study upcoding: 2009.....	71
18.	Institution IPEDS upcoding: 2009	71
19.	Receiver operating characteristics (ROC) curve for B&B:08/09 interview response propensity: 2009	96
20.	Receiver operating characteristics (ROC) curve for B&B:08/09 transcript response propensity: 2009	103
21.	Receiver operating characteristics (ROC) curve for B&B:08/09 combined interview and transcript response propensity: 2009	110

Chapter 1. Overview

This report documents the methodological procedures and evaluations of the 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09). RTI, with the assistance of MPR, conducted B&B:08/09 for the National Center for Education Statistics (NCES) of the U.S. Department of Education (Contract No. ED-05-CO-0033).

Chapter 1 describes the background, legislative authorization, and schedule and products of B&B:08/09. Chapter 2 presents the sampling details of the B&B:08 cohort and provides the definition of a B&B:08 cohort study respondent. Chapter 3 describes the development of the student interview and details of the data collection and results, and provides an evaluation of the student interview data quality. Chapter 4 describes the transcript data collection including systems for collecting, recording, and evaluating transcript data. Chapter 5 summarizes the file preparation process for the B&B:08/09 student interview and transcript data collections. Finally, chapter 6 provides information pertaining to the weighting and variance estimation procedures for B&B:08/09. Materials used during the full-scale student interview and transcript data collection are appended to the report and cited in the text where appropriate.

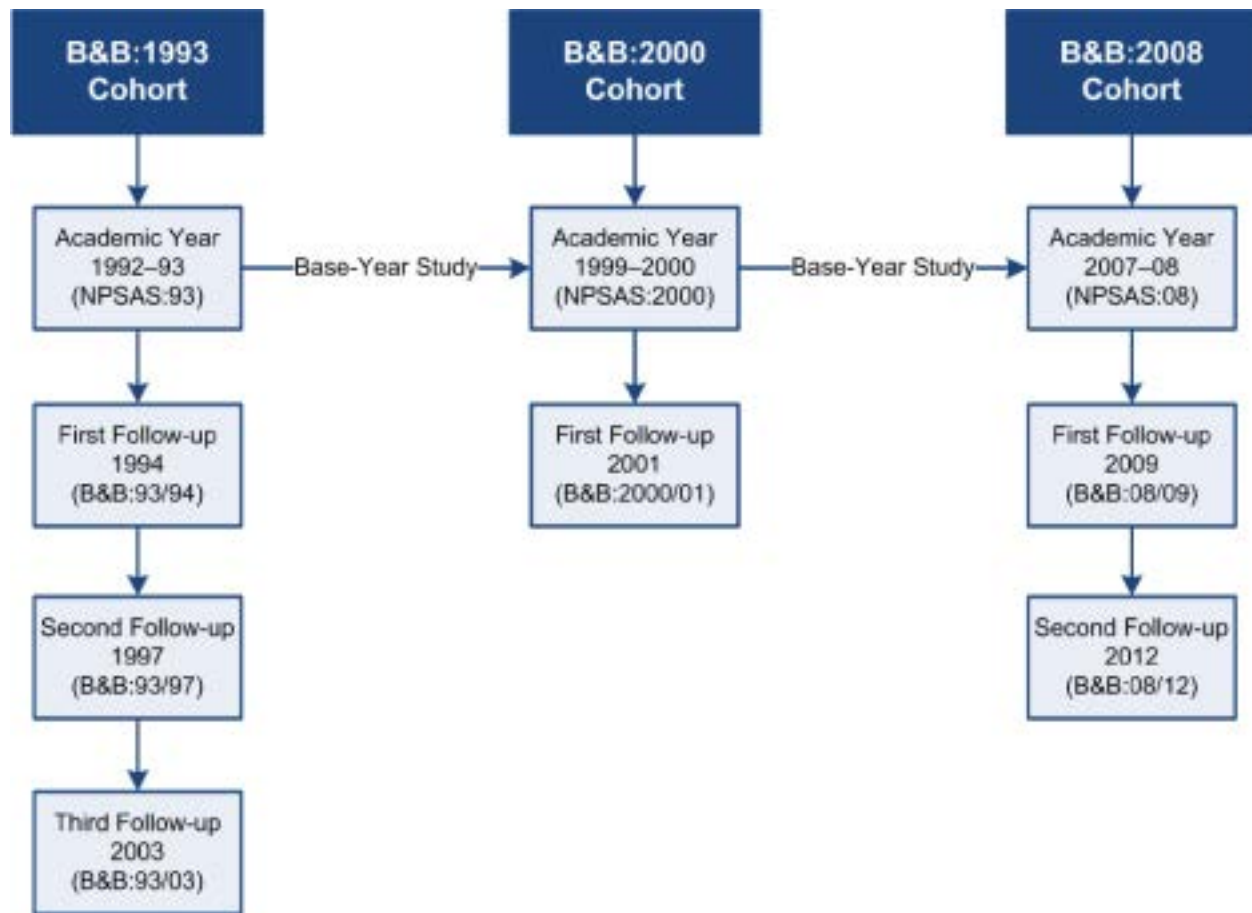
Throughout this document, reported numbers of sample institutions and students have been rounded to ensure the confidentiality of individual student data. As a result, row and column entries in tables may not sum to their respective totals, and reported percentages may differ somewhat from those that would result from these rounded numbers.

1.1 Background and Objectives of B&B

B&B is one of several NCES-sponsored studies developed to address the need for nationally representative data on key postsecondary education issues. These studies explore topics related to postsecondary access, choices, enrollment, persistence, progress, curriculum, attainment, continuation into graduate and professional school, and the benefits of postsecondary education to individuals and to society. B&B is a longitudinal spin-off of the National Postsecondary Student Aid Study (NPSAS), which is authorized by the following legislation:

- the Higher Education Act of 1965, as amended by the Higher Education Opportunity Act of 2008, 20 U.S.C. § 1015(a) (2008);
- the General Education Provisions Act, as amended, 20 U.S.C. §§ 9541 to 9548 (2007);
- the Higher Education Act of 1965, as amended by the Higher Education Amendments of 1986, 20 U.S.C. § 1070 et seq. (2007); and
- the National Education Statistics Act of 1994, as amended, 20 U.S.C. §§ 9541 to 9547 and 9573 (2007).

Once students completing their baccalaureate degrees in the NPSAS academic year are identified, the B&B series follows them to monitor their progress. Figure 1 shows the data collection timeline for the base-year and subsequent B&B follow-up studies.

Figure 1. Chronology of B&B: 1993–2012

NOTE: NPSAS = National Postsecondary Student Aid Study. B&B = Baccalaureate and Beyond Longitudinal Study

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Although the focus and principal content of the B&B student interviews in each of these three cohorts have remained relatively consistent, expert panels and other reviews of the interview have helped to shape and alter questions as needed for relevancy. For the B&B:08 cohort, the first follow-up interview (B&B:08/09) examined students' workforce participation; income and debt repayment; and entry into and persistence through graduate school programs; as well as several issues specifically related to teaching, including teacher preparation, entry into and persistence in the profession, and teacher career paths. B&B also gathers extensive information on bachelor's degree recipients' undergraduate experiences, demographic backgrounds, expectations regarding graduate study and work, and participation in community service. See appendix C for a complete list of the data elements in the B&B:08/09 student interview and appendix D for a facsimile of the instrument.

1.2 Schedule and Products of B&B:08/09

Table 1 summarizes the schedule for B&B:08/09. Electronically documented, restricted-access research files (with associated electronic codebooks [ECBs]) and NCES online application PowerStats for public release have been constructed from data collection and will be made available to a variety of organizations and researchers. In addition to this methodology report, B&B:08/09 has produced a First Look report that provides descriptive information for the B&B:08/09 cohort,

special tabulations on issues of interest to the higher education community (as identified by NCES), and descriptive reports of significant findings for dissemination to a broad audience.

Table 1. Schedule of major activities: 2008–13

Activity	Start date	End date
Student interview		
Finalize student sample	2/9/2009	10/9/2009
Conduct web and telephone student interview data collection	7/7/2009	3/12/2010
Conduct field student interview data collection	12/9/2009	3/12/2010
Process student interview data, construct data files	7/8/2009	10/20/2010
Transcript		
Collect postsecondary catalogues and transcripts	8/1/2008	2/15/2010
Key and code transcripts	11/1/2008	3/23/2010
Process transcript data	2/2/2009	7/30/2010
Create transcript derived variables	12/1/2009	1/31/2012
Data products		
Methodology report	9/9/2009	8/31/2013
First Look report	12/21/2009	7/31/2011
PowerStats	11/4/2010	7/31/2011
Special tabulations	3/1/2010	1/6/2012
Descriptive reports	7/1/2010	3/16/2012

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Chapter 2. Sampling

Identification of the B&B:08/09 sample required a multi-stage process that began with selection of the NPSAS:08 sample of institutions and was followed by selection of students within institutions. The final stage confirmed the B&B:08 cohort eligibility of sample members identified via NPSAS:08 as baccalaureate recipients during the 2007–08 academic year.

2.1 Respondent Universe

To be eligible for inclusion in the B&B:08 cohort, students must have been part of the student universe at an institution included in the NPSAS:08 institution universe. The definitions of the NPSAS:08 institution and student universes are presented below.

2.1.1 Institution Universe for NPSAS:08

The institutions eligible for NPSAS:08 were required meet all criteria for distributing federal Title IV aid during the 2007–08 year, including;

- offering an educational program designed for persons who have completed a high school education;
- offering at least one academic, occupational, or vocational program of study lasting at least 3 months or 300 clock hours;
- offering courses that were open to persons other than the employees or members of the company or group (e.g., union) that administers the institution; and
- being located in the 50 states, the District of Columbia, or Puerto Rico.

Institutions providing only vocational, recreational, or remedial courses or only in-house courses for their own employees were excluded. U.S. service academies were excluded because of their unique funding/tuition base.

These institution eligibility conditions are consistent with previous NPSAS studies, with two exceptions. First, the criterion of being eligible to distribute Title IV aid was implemented beginning with NPSAS:2000,¹ and second, the previous NPSAS studies excluded institutions that offered only correspondence courses. NPSAS:08 included such institutions if they were eligible to distribute Title IV student aid.

2.1.2 Student Universe for NPSAS:08

Students eligible for NPSAS:08 were those who were enrolled in an eligible NPSAS institution, and who satisfied both of the following eligibility requirements:

- they were enrolled in any of the following: (a) an academic program, (b) at least one course for credit that could be applied toward fulfilling the requirements for an academic degree, or (c) 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; and

¹ An indicator of Title IV eligibility has been added to the analysis files from earlier NPSAS studies to facilitate comparable analyses.

- they were not concurrently or solely enrolled in high school, or in a GED or other high school completion program.

2.2 Base-Year Study (NPSAS:08)

The sampling design for the base-year study, NPSAS:08, was a two-stage design in which eligible institutions were selected in the first stage and eligible students, within eligible responding sample institutions, were selected in the second stage. The NPSAS:08 sampling process is described in the following subsection. For detailed information on the NPSAS:08 sample allocation and statistical design formulas, see appendix A.

2.2.1 Institution Sample for NPSAS:08

NPSAS:08 constructed its institution sampling frame from the IPEDS:2004–05 Institutional Characteristics, Fall Enrollment, and Completions files. The institutions on the sampling frame were partitioned into 46 institution strata based on institution level and control, highest level of offering, and proportion of bachelor's degrees awarded in education.² NPSAS:08 also included state-representative undergraduate student samples for four degree-granting institution 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.³

Institutions were selected using Chromy's sequential probability minimum replacement (pmr) sampling algorithm (Chromy 1979), which is similar to systematic sampling. To avoid multiple selections of sample institutions, those with expected frequencies of selection greater than unity (1.00) were selected with certainty (certainty schools). Initially, a sample of about 1,630 institutions was selected in fall 2006 so that these institutions could be notified of their selection early and to allow a separate field test sample to be selected from the remaining institutions on the sampling frame. In summer 2007, the sample was refreshed using the IPEDS:2005–06 Institutional Characteristics, Fall Enrollment, and Completions files to include any newly eligible institutions within the sampling frame to ensure that the sample was representative of the current population. This process added about 10 institutions to the sample. In fall 2007, the decision was made to include state-representative undergraduate student samples for four degree-granting institution sectors (public 4-year; public 2-year; private nonprofit 4-year; and private for-profit 4-year) in the six states listed above. To accomplish this, a supplemental sample was drawn and added to the existing sample. The final NPSAS:08 sample included 1,960 institutions.

The next step of the institution sampling process involved determining the eligibility of the sample institutions. Of the total institution sample ($n = 1,960$), about 1,940 (99 percent) were found to be eligible to participate in NPSAS:08. Of those, approximately 1,730 institutions (a weighted response rate of 90 percent among the eligible sample⁴) provided student enrollment lists for use in the second stage of sampling (i.e., selecting the student sample). Table 2 shows the number of institutions that were sampled, the number of eligible institutions, and the count and unweighted and weighted percentages of institutions providing enrollment lists, by institution characteristics.

² The proportion of bachelor's degrees awarded in education is used to ensure sufficient numbers of sample students receiving a bachelor's degree in education. Such students are an important analysis domain for B&B.

³ These six states were selected based on (1) the size of undergraduate enrollment in the four sectors; (2) prior inclusion in the NPSAS:04 twelve-state sample with high levels of cooperation and participation in that survey; and (3) unique or recently changed tuition and state grant policies that provided opportunities for comparative research and analysis.

⁴ The weight described here is a base weight.

Table 2. NPSAS:08 sampled and eligible institutions and enrollment list participation rates, by institution characteristics: 2007–08

Institution characteristics ¹	Sampled institutions	Eligible institutions	Institutions providing lists		
			Number	Unweighted percent	Weighted percent ²
All institutions	1,960	1,940	1,730	89.0	90.1
Institution level					
Less-than-2-year	130	120	100	82.6	83.2
2-year	570	560	510	89.7	90.7
4-year non-doctorate-granting	700	700	630	89.7	91.9
4-year doctorate-granting	560	560	500	88.8	88.6
Institution control					
Public	960	960	880	91.9	91.2
Private nonprofit	650	640	560	87.4	86.7
Private for-profit	350	340	290	83.6	88.2
Institution type					
Public					
Less-than-2-year	20	20	20	90.9	93.2
2-year	450	450	410	91.7	91.2
4-year non-doctorate-granting	200	200	190	94.4	95.4
4-year doctorate-granting	290	290	260	90.7	89.2
Private nonprofit					
Less-than-4-year	20	20	20	84.2	84.7
4-year non-doctorate-granting	370	370	320	88.2	87.9
4-year doctorate-granting	260	260	230	86.5	85.9
Private for-profit					
Less-than-2-year	100	90	70	80.4	81.0
2-year or more	260	250	210	84.8	90.2

¹ Institution characteristics are based on data from the sampling frame, which was formed from IPEDS:2004–05 and freshened from IPEDS:2005–06.

² The weight described in this column is a base weight.

NOTE: Detail may not sum to totals because of rounding. NPSAS = National Postsecondary Student Aid Study. IPEDS = Integrated Postsecondary Education Data System.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 National Postsecondary Student Aid Study (NPSAS:08).

2.2.2 Student Sample for NPSAS:08

Sample institutions provided lists of their eligible students enrolled during the 2007–08 academic year, and these lists served as the frame for selecting the student sample. Student enrollment lists were sampled on a flow basis, using equal probability stratified systematic sampling. Business majors were undersampled to ensure that the sample did not consist primarily of business majors, while science, technology, engineering, and mathematics (STEM) majors; Science and Mathematics Access to Retain Talent (SMART) grant recipients; and Academic Competitiveness Grant (ACG) recipients were oversampled to allow for sufficient numbers for analysis. There were 20 student strata, as follows:

1. in-state potential baccalaureate recipients who were business majors;
2. out-of state potential baccalaureate recipients who were business majors;

3. in-state potential baccalaureate recipients who were STEM majors and SMART grant recipients;
4. out-of-state potential baccalaureate recipients who were STEM majors and SMART grant recipients;
5. in-state potential baccalaureate recipients who were STEM majors and not SMART grant recipients;
6. out-of-state potential baccalaureate recipients who were STEM majors and not SMART grant recipients;
7. in-state potential baccalaureate recipients in all other majors who were SMART grant recipients;
8. out-of state potential baccalaureate recipients in all other majors who were SMART grant recipients;
9. in-state potential baccalaureate recipients in all other majors who were not SMART grant recipients;
10. out-of state potential baccalaureate recipients in all other majors who were not SMART grant recipients;
11. in-state other undergraduate students who were SMART grant recipients;
12. out-of-state other undergraduate students who were SMART grant recipients;
13. in-state other undergraduate students who were Academic Competitiveness Grant (ACG) recipients;
14. out-of-state other undergraduate students who were ACG grant recipients;
15. in-state other undergraduate students who were not SMART or ACG grant recipients;
16. out-of-state other undergraduate students who were not SMART or ACG grant recipients;
17. masters students;
18. doctoral students;
19. other graduate students; and
20. first-professional students.

For each student sampling stratum, the enrollment list was sampled at a rate designed to provide approximately equal student-level probabilities. To more accurately estimate the overall sample yield, student sampling rates were revised after sufficient lists had been received. The final sample included 137,800 students. Approximately 96 percent of the final sample ($n = 132,800$) was determined to be eligible for NPSAS. On the completion of data collection, 96 percent of the eligible sample ($n = 127,700$) was determined to have sufficient key data to meet the definition of a study respondent. A study respondent was defined as any sample member who was determined to be eligible for the study and, minimally, had valid data from any data source, including an institution record abstraction (computer-assisted data entry [CADE]), the NPSAS:08 student interview, and record matching against several administrative databases (e.g., the U.S. Department of Education's Central Processing System [CPS]) for the following:

- student type (undergraduate or graduate/first professional);
- date of birth or age;
- gender; and
- at least 8 of the following 15 variables:
 - dependency status;
 - marital status;
 - any dependents;
 - income;
 - expected family contribution;
 - degree program;
 - class level;
 - baccalaureate status;
 - months enrolled;
 - tuition;
 - received federal aid;
 - received nonfederal aid;
 - student budget;
 - race; and
 - parent education.

Table 3 shows the number of students sampled, the number of eligible students, and the unweighted and weighted percentages of study respondents, by institution characteristics. See appendix A for more information on the NPSAS:08 institution and student sampling details.

Table 3. NPSAS:08 sampled and eligible students and response rates, by institution characteristics: 2007–08

Institution characteristics ²	Sampled students	Eligible students ³	Study respondents ¹	
			Unweighted percent	Weighted percent ⁴
All students	137,800	132,800	96.2	95.7
Institution level				
Less-than-2-year	8,820	7,950	95.0	96.7
2-year	43,460	40,770	93.3	92.5
4-year non-doctorate-granting	37,930	37,140	97.8	97.6
4-year doctorate-granting	47,590	46,940	97.6	97.6
Institution control				
Public	87,470	84,240	95.3	94.9
Private nonprofit	32,760	31,950	97.7	97.3
Private for-profit	17,570	16,610	97.6	98.5
Institution type				
Public				
Less-than-2-year	1,730	1,480	90.0	88.9
2-year	39,340	37,010	92.8	92.2
4-year non-doctorate-granting	16,120	15,850	98.0	98.1
4-year doctorate-granting	30,280	29,910	97.3	97.4
Private nonprofit				
Less-than-4-year	2,080	1,790	97.0	97.7
4-year non-doctorate-granting	14,200	13,930	97.3	96.8
4-year doctorate-granting	16,480	16,230	98.0	97.8
Private for-profit				
Less-than-2-year	6,610	6,050	96.1	97.6
2-year or more	10,960	10,560	98.5	98.7

¹ A study respondent is defined as any eligible sample member for whom sufficient data were obtained from one or more sources, including student interview, institution records, and the U.S. Department of Education's Central Processing System (CPS).

² Institution characteristics are based on data from the sampling frame formed from IPEDS:2004–05 and freshened from IPEDS:2005–06.

³ Sample member eligibility was determined during the student interview or from institution records in the absence of a student interview.

⁴ The weight described in this column is a base weight.

NOTE: Detail may not sum to totals because of rounding. NPSAS = National Postsecondary Student Aid Study. IPEDS = Integrated Postsecondary Education Data System.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 National Postsecondary Student Aid Study (NPSAS:08).

In previous NPSAS studies that derived a B&B cohort, lists of potential baccalaureate recipients were collected with the student list of all enrolled undergraduate and graduate/first-professional students. However, these baccalaureate lists often could not be provided until late in the spring or in the summer when baccalaureate recipients could be positively identified, which negatively affected the data collection schedule. To encourage an earlier receipt of enrollment lists, 4-year institutions were asked to include an indicator (B&B flag) of students who had received or would potentially receive a baccalaureate degree during the NPSAS year (between July 1, 2007, and June 30, 2008).⁵ Institutions were instructed to make this identification before spring graduation. Four-year institutions were also asked to include an indicator of class level for undergraduates (first

⁵ The B&B flag had values of “yes,” “no,” and “don’t know.”

year, second year, third year, fourth year, or fifth year). From NPSAS:2000, it was estimated that about 55 percent of the fourth- and fifth-year students would be baccalaureate recipients during the NPSAS year and that about 7 percent of third-year students would also be baccalaureate recipients. This class-level indicator was used when the B&B flag was not provided for any students. These two indicators were used instead of requesting a separate baccalaureate recipient list.

Because most enrollment lists were received before June 30, and many were received before April, some sample students identified by the institution as baccalaureate candidates were determined during the NPSAS interview not to be baccalaureate recipients (*false positives*). Likewise, some sample students not identified by the institution as baccalaureate candidates were determined during the NPSAS interview to have received baccalaureate degrees (*false negatives*) during the specified timeframe.

2.3 First Follow-up Study (B&B:08/09)

The primary task of the B&B:08/09 sample definition process was to confirm or reject a potential respondent's baccalaureate status.

Individuals eligible for the B&B:08 cohort were those 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 cohort was based primarily on information obtained from the student's transcript. Transcripts were collected prior to the B&B:08/09 interview under the 2009 Postsecondary Education Transcript Study (PETS:09). 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 institution record obtained through NPSAS:08 CADE or the enrollment list provided by the NPSAS:08 institution at the time of student sampling. Also, the transcript and NPSAS:08 interview data were reviewed to determine eligibility for students who confirmed in the NPSAS:08 interview that they received their bachelor's degree but whose transcript did not indicate degree receipt. If such students were deemed to be eligible or eligibility could not definitively be determined, then they were included in the sample. The National Student Clearinghouse (NSC) data on degree completion were used to identify eligible students but could not identify ineligible students with certainty. These data were used for stratification. Table 4 shows the distribution of the 25,050 NPSAS:08 sample members who were potentially eligible for membership in the B&B:08 cohort according to their NPSAS:08 interview, CADE, and/or enrollment list status.

Table 4. Distribution of the NPSAS:08 sample members potentially eligible for B&B:08 cohort, by source of potential eligibility: 2009

Sources of potential eligibility	Number	Percent
Total	25,050	100.0
Bachelor's degree confirmed in NPSAS:08 interview	18,000	71.9
Bachelor's degree confirmed in CADE	4,630	18.5
Listed as potential bachelor's degree recipient	2,420	9.7

NOTE: Detail may not sum to totals because of rounding. NPSAS = National Postsecondary Student Aid Study. B&B = Baccalaureate and Beyond Longitudinal Study. CADE = computer-assisted data entry.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 National Postsecondary Student Aid Study (NPSAS:08), 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Of the 18,000 students who completed the NPSAS:08 interview and were confirmed to be eligible for the B&B:08 cohort, about 84 percent (15,050) had a transcript that confirmed eligibility at the time of sampling, 6 percent (1,060) were ineligible based on transcripts, and 11 percent (1,890) did not have a transcript. Table 5 shows the transcript status of the B&B:08 cohort with baccalaureate receipt confirmed in the NPSAS:08 interview.

Table 5. Transcript status of the B&B:08 cohort with bachelor's degree confirmed in the NPSAS:08 interview

Transcript status	Number	Percent
Total	18,000	100.0
Confirmed B&B:08 eligible	15,050	83.6
Confirmed B&B:08 ineligible	1,060	5.9
No transcript	1,890	10.5

NOTE: Detail may not sum to totals because of rounding. B&B = Baccalaureate and Beyond Longitudinal Study. NPSAS = National Postsecondary Student Aid Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 National Postsecondary Student Aid Study (NPSAS:08) and 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Additionally, transcripts were requested for the 7,050 NPSAS:08 interview nonrespondents who were either confirmed in CADE to be degree candidates or listed by the NPSAS:08 sample institution as bachelor's degree candidates. Approximately 5,150 of these NPSAS:08 nonrespondents were determined to be eligible or eligibility could not be determined for B&B:08/09 based on transcript data. In order to have full population coverage of the B&B:08/09 sample, a subsample of 500 of these 5,150 NPSAS:08 interview nonrespondents was selected. The sample was selected to maximize eligibility. The 5,150 NPSAS:08 interview nonrespondents were stratified based on study respondent, transcript, NSC, and CADE statuses. Within each stratum, the nonrespondents were first sorted by institution sector to ensure the representativeness of the sample and were also sorted by the NPSAS:08 sampling weight within sector. Then, the sample was drawn within each stratum with probabilities proportional to the NPSAS:08 sampling weight. The sampling rates used in each stratum were different in order to maximize response and eligibility rates while also representing the various types of sample members. The B&B:08/09 sample is not intended to be representative at the state level.

Based on the B&B:08/09 field test results, the highest sampling rates were among students who were NPSAS:08 study respondents, were potentially eligible based on NSC or CADE, and were confirmed eligible by the transcript. The next highest sampling rates were among students who were NPSAS:08 study respondents, were potentially eligible based on the enrollment list but not based on NSC or CADE, and were confirmed eligible by the transcript. The third highest sampling rates were among students who were NPSAS:08 study respondents, were potentially eligible based on NSC, CADE, or the enrollment list, but had no transcript, and among students who were not NPSAS:08 study respondents, were potentially eligible based on NSC, CADE, or the enrollment list, and were confirmed eligible by the transcript. The lowest sampling rates were among students who were not NPSAS:08 study respondents, were potentially eligible based on NSC, CADE, or the enrollment list, but had no transcript.⁶ Table 6 shows the distribution of the potential baccalaureate recipients without a NPSAS:08 interview and the subsample. These distributions are based on whether or not

⁶ The number of students who were not NPSAS:08 study respondents, were potentially eligible based on NSC, CADE, or the enrollment list, but had no transcript, was small, so these students were combined into one stratum for sampling purposes.

they were a NPSAS:08 study respondent, were confirmed eligible by the transcript or did not have a transcript, and were confirmed in NSC or CADE as being eligible. Table 7 shows the distribution of the full sample by institution control.

Table 6. Eligible sample and subsample sizes of the NPSAS:08 potential bachelor's degree recipients without a NPSAS:08 interview

NPSAS:08 study respondent	Source of potential eligibility			Potential bachelor's degree recipients		
	Transcript	NSC	CADE ¹	Number eligible	Sample size	Percent of eligible ²
Total	†	†	†	5,150	500	9.7
Yes	Yes	Yes	Yes	1,570	180	11.3
Yes	Yes	Yes	No	350	40	11.3
Yes	Yes	No	Yes	1,510	170	11.3
Yes	Yes	No	No	500	50	9.9
Yes	No	Yes	Yes	120	10	5.1
Yes	No	Yes	No	60	#	5.4
Yes	No	No	Yes	370	20	5.1
Yes	No	No	No	250	10	5.1
No	Yes	Yes	Yes	60	#	5.5
No	Yes	Yes	No	80	#	5.1
No	Yes	No	Yes	80	#	5.3
No	Yes	No	No	120	10	5.2
No	No	Yes	Yes	10	#	#
No	No	Yes	No	20	#	#
No	No	No	Yes	20	#	#
No	No	No	No	50	#	#

Rounds to zero.

† Not applicable.

¹ Students without a NPSAS:08 interview who were not identified as a potential baccalaureate recipient from CADE were identified from the enrollment list.

NOTE: Detail may not sum to totals because of rounding. NPSAS = National Postsecondary Student Aid Study.

NSC = National Student Clearinghouse. CADE = computer-assisted data entry.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2007–08 National Postsecondary Student Aid Study (NPSAS:08) and 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Table 7. Sampled students, by institution control: 2009

Institution control ¹	Sampled students	
	Number	Percent
All students	18,500	100.0
Public	10,810	58.4
Private nonprofit	6,750	36.5
Private for-profit	940	5.1

¹ Institution control is based on data from the sampling frame formed from IPEDS:2004–05 and freshened from IPEDS:2005–06.

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

2.4 B&B:08 Cohort

There were 25,050 NPSAS:08 sample members who were potentially eligible for membership in the B&B:08 cohort according to their NPSAS:08 interview, CADE, and/or enrollment list status. Between the NPSAS:08 data collection and the start of the B&B:08/09 data collection, sample members whose transcripts, NPSAS:08 student interview, or administrative data showed they were ineligible, as well as deceased sample members, were removed from the B&B:08 cohort. At the beginning of the B&B:08/09 data collection 18,500 individuals were included in the B&B:08/09 sample. Prior to the start of B&B:08/09 data collection, 1,320 individuals were found to be ineligible leaving 17,170 eligible individuals in the sample.

At the end of the B&B:08/09 data collection 17,160 eligible sample members remained in the B&B:08 cohort (deceased cases were removed). Of the 17,160 eligible sample members 15,050 were considered B&B:08/09 student interview respondents, 16,070 were considered transcript respondents, and 14,010 were considered combined interview and transcript respondents.⁷

A B&B:08/09 student interview respondent was defined as any sample member who was determined to be eligible for the study, was not deceased at the time of the B&B:08/09 data collection, and had a completed, partial, or abbreviated interview. A student transcript respondent was defined as any sample member who was determined to be eligible for the study, was not deceased at the time of the B&B:08/09 data collection, and had a transcript provided by the NPSAS:08 institution. A combined student interview and transcript respondent was both an interview and a transcript respondent.

⁷ The 15,050 interview respondents exclude 40 cases on which data collection analyses are based in Chapter 3. These 40 cases were sampled as NPSAS interview respondents but they did not have enough data to be NPSAS study respondents.

Chapter 3.

Student Interview Design, Data Collection, Outcomes, and Evaluation

The B&B:08/09 student interview was designed for web, telephone, and field administration and included an abbreviated Spanish interview. Sample members were primarily located using batch address and phone sources and were asked to complete the student interview between July 2009 and March 2010. Analyses and evaluation of data collection from a student interview field test as well as from this full-scale study provided information for consideration when planning future administrations of B&B.

3.1 Student Interview Design and Systems

The B&B:08/09 student interview consisted of seven sections, grouped by topic. B&B:08/09 abbreviated interviews were also offered in English and Spanish; these abbreviated interviews consisted of selected questions from all sections. This section provides the details of the student interview design and systems.

3.1.1 Student Interview Design

The content of the interview was based on previous B&B student interviews created for the B&B:93 and B&B:2000 cohorts, and on a B&B:08/09 student interview field test, building on data elements developed with input from the study's Technical Review Panel (TRP) and from NCES. For a list of TRP members, see appendix B; for a list of the final set of student interview data elements, see appendix C.

The interview consisted of seven sections, grouped by topic. Respondents were guided through each section of the interview according to skip logic that took into account previously provided information from the NPSAS:08 and information recorded as the respondent progressed through the B&B:08/09 interview. Following are descriptions of the seven interview sections.

1. *Eligibility* determined eligibility for the survey based on date of completion of bachelor's degree requirements at the NPSAS institution. In order to continue with the survey, respondents had to indicate that they completed bachelor's degree requirements between July 1, 2007, and June 30, 2008, and that they had been awarded the bachelor's degree from the NPSAS institution by June 30, 2009.
2. *Undergraduate Education* gathered enrollment information on all postsecondary institutions attended prior to receiving the bachelor's degree from the NPSAS institution. This section also captured NPSAS institution major or field of study, enrollment intensity, and academic experiences such as course withdrawals or academic honors. The section concluded with questions about undergraduate financial aid received by respondents and satisfaction with undergraduate education and choice of major.
3. *Postbaccalaureate Education/Training* collected information about the respondent's postbaccalaureate schools including any undergraduate or graduate degrees or certificates received after the NPSAS bachelor's degree, related majors or fields of study, enrollment

- intensity, reasons for attendance, and financial aid received. The section concluded with questions about nondegree coursework and future education plans.
4. *Postbaccalaureate Employment* captured the respondent's current employment status and job characteristics such as job title and duties, earnings, average hours worked per week, benefits, employer industry, and employer's ZIP code. This section also captured information about the relationship of the job to the bachelor's degree field, number of jobs held since graduation, and periods of unemployment.
 5. *Kindergarten–12th Grade (K–12) Teaching* collected K–12 teaching preparation and interest and teacher and content area certifications. This section also collected teaching positions since graduation with the bachelor's degree, names of K–12 schools where the respondent taught, grade levels and subjects taught, experiences in the first teaching job such as participation in a teacher internship or mentor program, satisfaction with teaching and plans for staying in teaching, and awareness of the Teacher Education Assistance for College and Higher Education (TEACH) Grant and teacher loan forgiveness programs.
 6. *Student Background* obtained information about student demographic characteristics, including citizenship, military status, foreign language proficiency, marital status and household composition, annual income and monthly expenses, voting behavior, volunteerism, and disability status.
 7. *Locating* captured contact information for the second follow-up study.

The interview sections and principal topics in each section are summarized in figure 2. For the complete B&B:08/09 full-scale instrument facsimile, see appendix D.

Figure 2. Interview sections and topics: 2009

Section 1. Eligibility Confirmed eligibility for interview	Section 5. Kindergarten–12th-Grade Teaching Teaching preparation and interest Teacher certifications Teaching positions and school names Grade levels and subjects taught Teaching experiences and satisfaction Plans for staying in teaching
Section 2. Undergraduate Education Undergraduate schools and degrees NPSAS school major, enrollment intensity, academic experiences Financial aid Satisfaction with undergraduate education	Section 6. Student Background Citizenship and voting Foreign language proficiency Marital status and household composition Annual income and monthly expenses Civic participation
Section 3. Postbaccalaureate Education/ Training Postbaccalaureate schools and dates Majors or fields of study Financial aid Future education plans	Section 7. Locating Contact information for follow-up study
Section 4. Postbaccalaureate Employment Employment status Occupation title and duties Salary and benefits Employer industry Periods of unemployment	

NOTES: NPSAS = National Postsecondary Student Aid Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

A single instrument was developed to be administered in one of three modes: web, telephone, or field. For telephone and field interviews, the interviewer accessed the web instrument through RTT's case management system.

To minimize mode effects, specific methodological features were incorporated into the instrument to provide web respondents with the assistance normally provided by a trained interviewer:

- help text on every form to define key terms and clarify question intent;
- pop-up messages to correct responses that were out of range or in an incorrect format;
- conversion text to encourage responses to critical items when these items were left unanswered; and
- pop-up messages prompting sample members to provide a response when they left three consecutive questions blank.

Additionally, instructions indicating how each question was to be administered (e.g., whether the response options were to be read aloud, when to probe) were included for telephone and field interviewers on each screen to minimize differences between interviews administered by an interviewer and web interviews.

Coding systems. Assisted coding systems were used in the interview to standardize the collection and coding of the respondent's postsecondary schools attended, major or field of study, occupation, and any elementary or secondary schools where the respondent may have taught. The name or title of each of these items was entered as a text string in each coder and a keyword search conducted on an underlying database returned a list of possible matches. An assisted coding system was not used to code industries, but available industry classifications allowed respondents and interviewers to select an industry classification from among a list of standardized options. Following are descriptions of the individual coding systems and sources:

- The *postsecondary school coder* was developed from the set of institutions contained in the Integrated Postsecondary Education Data System (IPEDS), developed by NCES (<http://nces.ed.gov/ipeds/>). For any schools not listed in the database, respondents were asked to provide the control (e.g., public or private) and level (e.g., 4-year or 2-year) of the school.
- The *major coder* was constructed using the 2010 Classification of Instructional Programs (CIP) taxonomy, also developed by NCES (<http://nces.ed.gov/ipeds/cip2010>). For any majors or fields of study not listed in the database, respondents were asked to provide a general major area and a specific discipline.
- The *occupation coder* was built from the Occupational Information Network Online (O*NET OnLine) database (<http://online.onetcenter.org>). For any occupations not listed in the database, respondents were asked to provide a general area, a specific area, and finally a detailed classification area for the occupation.
- The *industry coder* was based on the North American Industry Classification System (<http://www.census.gov/epcd/www/naics.html>). A text string was collected from the respondent, and then the respondent was asked to choose the category that best described his or her employer's industry. Industry choices were laid out in general categories across the screen. When the respondent selected a category, examples of

businesses within that industry were displayed, allowing the respondent to determine the appropriateness of the industry chosen.

- The *elementary and secondary school coder* (“El/Sec coder”) was used to code any elementary or secondary schools where respondents had taught. The NCES data sources used for schools in the El/Sec coder were the Private School Universe Survey for private schools (<http://nces.ed.gov/surveys/pss/>) and the Common Core of Data for public schools (<http://nces.ed.gov/ccd/>). On the two forms prior to the El/Sec coder, the respondent indicated whether the school was public or private, and then provided the city and state of the school. For schools not identified within the El/Sec coder, the entered text string was retained, and respondents were asked to supply the school type (public, private, etc.); the names of the school’s district, county, or both; and the lowest and highest grade levels that were taught at the school.

Spanish interview. A Spanish abbreviated interview was developed for primarily Spanish-speaking sample members. The Spanish abbreviated interview comprised the same questions as the English abbreviated interview, which included selected questions from all sections. The Spanish interview was made available to respondents in web mode. This mode of administration required the translation into Spanish of not only question wording and response options, but also of all the specific methodological features incorporated into the instrument to provide web respondents with the assistance normally provided by a trained bilingual interviewer (i.e., help text, pop-up messages to correct responses that were out of range or in an incorrect format, conversion text, and general error messages). The two coders in the Spanish abbreviated instrument, the major coder and the occupation coder, were not translated; however, instructions were provided in Spanish to both respondents and bilingual interviewers explaining that they should choose a major or occupation code in English, if possible, or instead enter a text string in Spanish and not attempt the coding of the major or occupation.

3.1.2 Data Collection Systems

This section describes the data collection systems used for the B&B:08/09 data collection, including the Hatteras Survey Engine and Survey Editor (RTI’s proprietary web-based interviewing software), the Instrument Development and Documentation System (IDADS), and the Integrated Management System (IMS).

Hatteras Survey Engine and Survey Editor. The B&B:08/09 survey instrument was created with Hatteras, a web-based system in which project staff developed, reviewed, tested, modified, and communicated changes to specifications and code for the instrument. All information relating to the instrument was stored in an SQL Server database and was made accessible through web browser interfaces. Hatteras provided specification, programming, and testing interfaces for the B&B instrument as follows.

- *Specifications.* Hatteras provided the tools and user interface for developing interview specifications. Specification content included wording at the form, question, item, and response option levels; help text content; item-level data documentation; and form-level question administration documentation. Specific capabilities of the Hatteras system allowed instrument designers to import any relevant specifications used in prior studies, create skip logic and item documentation, and search a library of survey items. Instrument designers were also able to take advantage of a comprehensive comment

tracking system to communicate and test necessary instrument changes with programmers.

A web interface provided access for project staff at MPR and at NCES to test and comment on the instrument throughout development.

- *Programming code.* For simple instrument questions and items, Hatteras automatically translated specifications into web page scripts when the web page was accessed. For questions involving complex routing, multiple question wording or response option conditions, or nonstandard page layout or behavior, programmers entered custom programming code—HTML, JavaScript, and C#.NET script—into the Hatteras custom code interface. This code was stored in the SQL Server database, together with the instrument specifications for compilation by the survey execution engine.
- *Instrument testing and execution.* The Hatteras system’s survey execution engine allowed immediate testing of specification and code content on a test link. The execution engine also automatically handled such web instrument functions as backing up and moving forward, recording instrument timing data, displaying critical-item wording, validating user input, displaying conditional instructions based on interview mode (web, telephone, or field) and linking to context-specific help text.
- *Survey sites and data transfer—web/telephone.* For web and telephone data collection, the Hatteras survey execution system was installed on NCES surveys web server farm and SQL Server database. Web respondents accessed the survey directly by web browser after logging in with a user ID and password. RTP’s telephone interviewers accessed the same NCES web survey site by means of a web browser process launched from an RTI Case Management System (CATI-CMS).⁸ All connections to the NCES web interview were secured with Secure Sockets Layer (SSL) encryption. Automated processes transferred data between RTP’s local database and the NCES database via a secure, encrypted connection.
- *Survey sites and data transfer—field.* For field interviews, the Hatteras survey execution system was installed on local web and database servers on laptop computers. Field interviewers accessed the laptop-based survey by logging in through three independent levels of security, including a whole-disk encryption outer level. Interview control and response data were transferred between RTI and field laptops via secure, encrypted automated connections.

IDADS. The web-based IDADS documentation module contained the finalized version of all instrument items, their screen wording, and variable and value labels. Also included were the more technical descriptions of items such as variable types (alpha or numeric), to whom the item was administered, and frequency distributions for response categories based on completed interview data. The documentation module was used to generate the instrument facsimiles and the deliverable ECB input files.

IMS. All aspects of the study were controlled using an IMS, a comprehensive set of desktop tools designed to give project staff and NCES access to a centralized, easily accessible repository for

⁸ The Computer-Assisted Telephone Interviewing Case Management System (CATI-CMS) is the system that assigns cases to be called and provides telephone interviewers with the appropriate screens and scripts to be used during the contacting and locating phase of CATI.

project data and documents. The B&B:08/09 IMS consisted of several components: the management module, the Receipt Control System (RCS) module, and the instrumentation module.

- *Management module.* The management module of the IMS included tools and information to assist project staff and the NCES project officer in managing data collection. All management information pertinent to the study was located there, accessible via the Web, and protected by SSL encryption and a password-protected login. The IMS contained the current project schedule, monthly progress reports, daily data collection reports and status reports (generated by the RCS described below), project plans and specifications, project deliverables, instrument specifications, a link to the Hatteras system, staff contacts, the project bibliography, and a document archive.
- *RCS.* The RCS is an integrated set of systems that was used to control and monitor all activities related to data collection, including tracing and locating. Through the RCS, project staff were able to perform tracing and data management operations, track case statuses, identify problems early, and implement solutions effectively. The RCS's locator data were used for a number of daily tasks related to sample maintenance. Specifically, mailout systems produced paper mailings and e-mailings to sample members, the query system enabled administrators to review the locator information and status for a particular case, and the mail return system enabled project staff to update the locator database as mailings or address update sheets were returned or forwarding information was received. The RCS also interacted with the computer-assisted telephone interviewing (CATI) system, sending locator data between the two systems as necessary.
- *Instrumentation module.* The instrumentation module managed development of the multimode web data collection instrument within Hatteras. Developing the instrument with Hatteras ensured that all variables were linked to their item and screen wordings and were thoroughly documented.

3.2 Student Interview Data Collection

The B&B:08/09 interview data collection involved training data collection staff and locating, contacting, and interviewing sample members. Each of these procedures is detailed in this section.

3.2.1 Training of Interview Data Collection Staff

Members of the data collection staff included quality control supervisors (QCS), help desk agents (HDAs), telephone interviewers, field interviewers, and intensive-tracing staff. Prior to beginning work on B&B, all data collection staff completed a comprehensive training program. Topics covered in training programs included a review of confidentiality requirements, an overview of B&B:08/09, frequently asked questions, and administrative procedures for case management as well as hands-on practice. All training programs were designed to maximize active participation of the trainees. The training schedule and number of data collection staff trained are presented in table 8. The specific roles and duties of data collection staff are summarized in the following subsections, along with a description of the training program (see appendix E for training materials).

Table 8. B&B:08/09 training of data collection staff: 2009

Staff trained	Time period	Number of staff trained
Quality control supervisors	July 1, 2009	15
Help desk agents	July 6–7, 2009	9
Telephone interviewers	August 10–12 and September 8–10, 2009	24
Intensive-tracing staff	September 10 and January 8, 2009	14
Field staff	December 1–2, 2009	18

NOTE: B&B = Baccalaureate and Beyond Longitudinal Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

QCS provided support and guidance for the telephone interviewers, monitored interviewer production, and helped troubleshoot problems. They attended B&B project supervisor training and also participated in telephone interviewer project training. Training included an overview of B&B:08/09, conversational interviewing techniques expected of interviewing staff, problem resolution, case review, an explanation of project-specific reports, and other specific project procedures and protocols. The quality control supervisors were also provided with a supervisor manual to be used as a reference throughout the course of data collection.

HDAs. A staff of help desk agents assisted sample members who had questions or problems while completing web interviews. Help desk agents were certified telephone interviewers specially trained to unlock cases, reissue passwords, record and track calls to the study help line via the help desk application, and effectively respond to callers' questions. During the early response period, help desk agents also made prompting calls to NPSAS:08 interview nonrespondents and completed telephone interviews with sample members who preferred a telephone to a web interview. Help desk training materials included a project telephone interviewer manual with a help desk supplement and various project handouts.

Telephone interviewers. Telephone interviewers were responsible for gaining cooperation from and conducting interviews with sample members, averting and converting interview refusals, and addressing the concerns of reluctant sample members. Telephone interviewers received 12 hours of training that included an overview of the study, an in-depth review of the interview instrument, hands-on practice administering the telephone interview, review of appropriate conversational interviewing techniques, and practice with the CATI-CMS. At the conclusion of training, all telephone interviewers were certified by successfully conducting mock telephone interviews and by providing satisfactory responses to the study's frequently asked questions. Telephone interviewer training materials included a telephone interview manual and multiple project handouts.

Field interviewers. Field interviewers conducted interviews, either in person or by telephone, with sample members residing in 17 selected geographic clusters in the U.S. and Puerto Rico. Field interviewers were required to attend a 4 hour training session held via teleconference.⁹ Each field interviewer was required to complete a home study exercise prior to the teleconference training. Field interviewers, all of whom had recently completed an in-depth classroom training on field data collection techniques for their work on BPS:04/09, received additional training on the field case management system, coding, management of the case assignment folders, and proper care

⁹ All field interviewers trained to work on B&B:08/09 had recently completed work on BPS:04/09, a study with similar procedures; therefore, the B&B:08/09 training included only content specific to this study.

and use of the B&B laptops. Field interviewers were also required to conduct successful certification mock interviews and multiple other certification exercises with their field supervisor over the phone before they were permitted to begin work. Field interviewer training materials included a field interviewer manual and additional handouts and forms used to document all field procedures and expectations of work.

Tracing staff. Tracing staff (tracers) used intensive measures (described in section 3.2.3) to locate sample members designated as lacking good telephone contacting information. Tracers attended a comprehensive 16-hour training session that was led by RTI tracing managers within RTI's Call Center Services (CCS) and covered all tracing procedures. Tracers also received 2 hours of project-specific training. They received an overview of B&B, a review of the FAQs, background information on the B&B sample, and the tracing techniques best suited to locating B&B sample members.

Additional trainings. Selected staff received additional training modules, such as refusal-conversion training, and Spanish interview training (for certified bilingual staff). Additionally, quality circle meetings were routinely conducted as an extension of the training program for continual quality improvement. Data collection staff were given the opportunity to ask questions in meetings and as needs were identified, additional training topics were highlighted and addressed in subsequent meetings. After each meeting, quality circle notes were posted on the call center's project website and on the project IMS.

3.2.2 Study Website

B&B:08/09 sample members were provided a link to the B&B website prior to the start of data collection. The website provided general information about the B&B set of studies, including details about the study sponsor and contractors, how the data are used, answers to frequently asked questions, confidentiality assurances, and selected findings from earlier studies. The website also provided contact information for the study help desk and project staff at RTI, as well as links to the main NCES and RTI websites. Sample members were able to log in to the secure portion of the website to provide updated contact information and complete the student interview once it became available.

Designed according to NCES web policies, the B&B:08/09 website used a three-tier security approach to protect all data collected. The first tier of security included secure log-ins, with a unique study ID and strong password provided to sample members prior to the start of data collection. The second tier of security protected any data entered on the website with SSL technology, allowing only encrypted data to be transmitted over the Internet. The third tier of security stored any collected data in a secured SQL Server database located on a server machine that was physically separate from the Web server. Figure 3 shows the home page for the B&B:08/09 website.

Figure 3. B&B:08/09 website home page: 2009

BACCALAUREATE AND BEYOND LONGITUDINAL STUDY

ies NATIONAL CENTER for EDUCATION STATISTICS
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OMB Clearance No.: 1850-0729
Expiration Date: 02/28/2011
[Burden Statement](#)

Welcome to the Baccalaureate and Beyond Longitudinal Study Website!

Beginning in summer 2009, the Baccalaureate and Beyond Longitudinal Study (B&B) will survey more than 17,000 bachelor's degree recipients from 1,100 U.S. colleges and universities to better understand the experience of graduates one year after earning a bachelor's degree. The survey will collect information about respondents' experiences in the workforce; experiences in and plans for graduate school; earnings and expenses; family status; participation in civic activities and personal and professional goals. Data collected from B&B will help educators, researchers and policymakers at the local, state and national levels better understand the experiences of recent college graduates and what can be done to help them.

To access the B&B interview online, enter your study ID number and password, which are printed on the letter that was recently mailed to you or included in an e-mail message you may have received. **We recommend that you use Internet Explorer, Firefox, or Netscape as your browser to complete the web version, and you will need to temporarily disable any pop-up blockers you have enabled.** For instructions on how to temporarily disable your pop-up blocker, click [here](#). We thank you in advance for your participation.

Study ID Number:

Password: (case-sensitive)

[Forgot Password?](#)

If you'd prefer to be contacted by a trained interviewer from RTI International, please [click here](#).

You can obtain additional information about the B&B study by using the links at the left side of this page. If you need additional assistance, send an e-mail to bbmail@rti.org or call the Help Desk toll-free at 1-877-262-4440.

VERISIGN SECURED

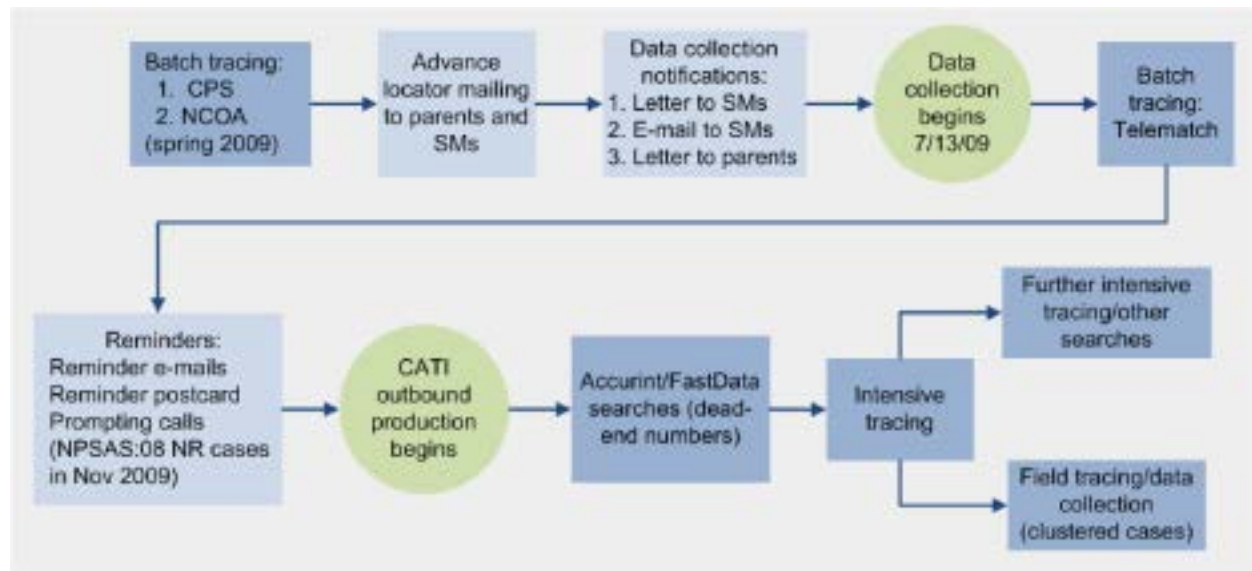
National Center for Education Statistics, Institute of Education Sciences
U.S. Department of Education
1990 K Street, NW, Washington, DC 20006 USA

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

3.2.3 Locating and Contacting Sample Members

Several locating methods were used to find and collect up-to-date contact information for the B&B:08/09 sample (figure 4). Batch searches of national databases and prenotification address update mailings were conducted prior to the start of data collection. After the start of data collection and for those sample members not yet found, follow-up locating methods were employed, including CATI locating, intensive tracing, and field tracing.

Figure 4. Locating methods: 2009



NOTE: NCOA = National Change of Address. CPS = Central Processing System. SM = sample member. NPSAS = National Postsecondary Student Aid Study. NR = nonresponse. CATI = computer-assisted telephone interviewing.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Batch tracing. Before mailing activities began, batch database searches were conducted to update sample member contact information. These searches used the CPS and the U.S. Postal Service (USPS) National Change of Address databases. The information obtained from these sources was compared with the information previously available from the NPSAS:08 locator database to identify any new contact information. Then, just prior to the start of outbound telephone interviewing, all sample member addresses and telephone numbers were sent to Telematch, a computerized residential telephone number service with the not-yet-published numbers of new movers, to obtain any telephone number updates.

Mailings. In May 2009, about 7 weeks before the start of B&B:08/09 data collection, a mailing was sent to the parents of base-year respondent sample members younger than 26 years old, to gain their assistance with providing up-to-date contact information for these sample members. This mailing included a study brochure, a letter with detailed information about B&B:08/09 signed by the associate commissioner of NCES, an address update sheet, and a business reply envelope. (Parents of base-year nonrespondent sample members younger than 26 years old received their version of the letter in October 2009.)

The final step in the predata collection locating and contacting effort occurred in June 2009, approximately 4 weeks before the start of data collection, with a similar address update mailing going to sample members (using any updated contact information provided by parents, if applicable). The mailing contained a letter notifying sample members of the upcoming B&B:08/09 data collection, the study brochure, an address update sheet, and a business reply envelope. Sample members were asked to update their address information on the address update sheet and return it in the postage-paid envelope. They also had the option of entering the information using the online form available on the B&B study website. The address update sheet and online form included a space prompting sample members to indicate a preference for being notified by text message of the start of data collection.

B&B data collection started on July 13, 2009, with the mailing of a data collection announcement to base-year respondents by USPS first-class mail in a 9 x 12 inch B&B envelope. Base-year nonrespondents received their mailing in November, also by USPS first-class mail in a 9 x 12 inch B&B envelope. The mailing to all sample members included a study brochure and a letter that announced the start of data collection. The letter, signed by both the B&B project director and the NCES project officer, included a \$5 bill and informed sample members of the additional cash incentive for completing the interview by the early incentive deadline specified in the letter, provided the study website and sample member's user ID and password for accessing the web interview, and provided the study's toll-free help desk number and e-mail address. The same day, an e-mail containing information comparable to that in the data collection announcement letter was sent to sample members.

As soon as a parent address was available, a letter was also mailed to parents of all base-year respondent sample members younger than 26 years old explaining the importance of the study and asking parents to encourage sample members to participate. The letter was sent to parents of all base-year nonrespondent sample members younger than 26 years old in October 2009.

Additional mailings included a postcard reminder sent about 10 days after the data collection announcement and two additional e-mail reminders to encourage early interview response. Once outbound telephone interview efforts began and throughout data collection, periodic mailings and e-mails went to interview nonrespondents throughout the course of data collection (for student interview data collection notification materials, see appendix F).

CATI locating and preintensive tracing. Telephone interviewers made prompting calls to base-year nonrespondents during the early response period of data collection. These calls, described in more detail in section 3.4.1, helped identify cases that required further tracing in addition to encouraging early response. Once outbound telephone interviewing began, telephone interviewers conducted limited tracing and locating activities as needed. The telephone number believed to be the best known number for contacting the sample member was attempted first. If the sample member could not be reached at that number after several attempts, any other numbers associated with the sample member, including parent and other contacts, were called. If the sample member could not be located, the case was designated for FastData and Accurant batch services which provided an automated search for matching phone numbers to sample members using combinations of address, name, and Social Security number (SSN). Cases for which neither FastData nor Accurant Batch generated new telephone numbers were sent for intensive interactive tracing by RTI's Tracing Operations (TOPS).

Overall, for B&B:08/09 data collection, the batch matching successfully confirmed contact information or provided new contact information for 20,070 records. The most records, 8,300, were matched through Telematch. While the fewest records, 570, were matched through FastData, this data source combined with Accurant minimized the number of cases requiring more costly intensive tracing. Table 9 shows the match rates for each tracing source.

Table 9. Batch processing record match rates, by tracing source: 2009

Tracing source	Number of records sent	Number of records matched	Percent matched
Total	48,130	20,070	41.7
CPS	16,640	5,080	30.5
NCOA	17,150	4,680	27.3
Telematch	11,270	8,300	73.6
FastData	1,570	570	36.3
Accurint	1,500	1,440	95.7

NOTE: Detail may not sum to totals because of rounding. CPS = Central Processing System. NCOA = National Change of Address.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Intensive tracing. The most difficult locating cases were traced at TOPS using a two-tiered strategy and a number of sources. TOPS-1, the first tier, identified sample members with SSNs available to trace through consumer databases (FastData's SSN search and Experian) that contain current address and telephone listings of consumers with credit histories. If a search generated a new telephone number for the sample member, tracers attempted to confirm the information by speaking with the sample member or with someone else who could verify the information. If the telephone number was confirmed, the case was sent back to CATI for telephone interviewing. This first level of effort minimized the time that cases were in tracing and unavailable for CATI efforts. Cases still not located and that were not in a field cluster underwent a more intensive level of tracing in TOPS-2. TOPS-2 included calls to other possible sources of information, including, for example, directory assistance, alumni offices, and contacts with neighbors or landlords. Whenever any of these sources provided information that indicated a sample member was not available for the study (e.g., deceased, incarcerated, or out of the country), no further contact efforts were made.

Overall, about 7 percent of eligible sample members required intensive tracing (table 10). Thirty-three percent of the NPSAS:08 interview nonrespondents required intensive tracing, compared with 6 percent of NPSAS:08 interview respondents ($\chi^2 = 12.15, p < .001$). Nine percent of sample members at private, for-profit, 2-year-or-more NPSAS institutions required intensive tracing, compared with 6 percent of sample members whose NPSAS institutions were private, nonprofit 4-year doctorate-granting schools ($\chi^2 = 3.02, p < .001$).

Table 10. Cases requiring intensive tracing, by base-year response status and institution type: 2009

Base-year response status and institution type	Total	Cases requiring intensive tracing	
		Number	Percent
Total	17,170	1,210	7.1
Base-year response status			
NPSAS:08 respondent	16,720	1,060	6.3
NPSAS:08 nonrespondent	460	150	33.3
Institution type			
Public			
2-year	#	#	#
4-year non-doctorate-granting	2,590	200	7.7
4-year doctorate-granting	7,320	520	7.1
Private nonprofit			
4-year non-doctorate-granting	3,170	210	6.7
4-year doctorate-granting	3,200	200	6.3
Private for-profit			
2-year-or-more	900	80	9.2

Rounds to zero.

NOTE: Detail may not sum to totals because of rounding. NPSAS = National Postsecondary Student Aid Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Field tracing. Any cases not located after TOPS-1 intensive tracing and thought to be in one of the 17 selected geographical field clusters were designated for field tracing instead of TOPS-2. Information provided to field interviewers included all address and telephone information available for an assigned case, the results of TOPS-1 intensive tracing efforts, and the details of all call attempts made by telephone interviewers. In addition to these tracing resources, field interviewers had access to contacts within the community, such as post office mail carriers or local public records that could provide additional information. Many field interviewers also had the added advantage of calling from telephones with local area codes familiar to sample members, increasing the likelihood that sample members would respond to the telephone calls.

3.2.4 Interviewing

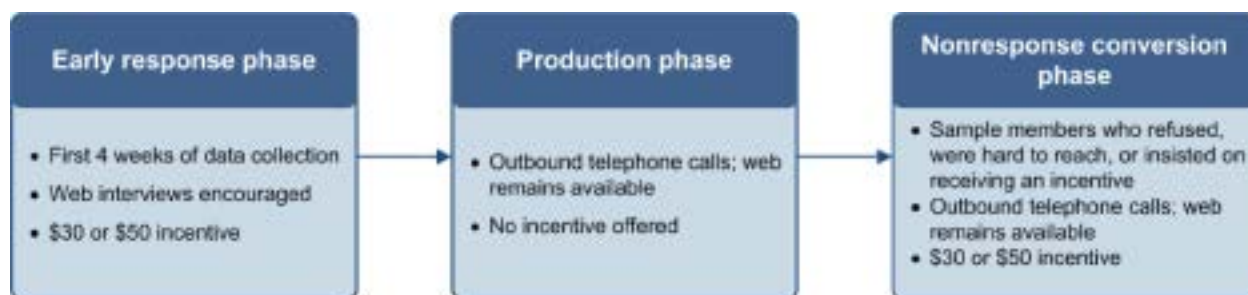
Data collection for the B&B:08/09 interview consisted of three phases (figure 5):

1. *Early response phase.* This phase began with the start of data collection in July 2009 for base-year respondents and lasted approximately 4 weeks. Data collection began in waves, based on the early incentive expiration date assigned to each case. The early response phase for base-year nonrespondents began in November 2009. Base-year respondents who completed the interview during their early response phase received an incentive of \$30; base-year nonrespondents received a \$50 incentive.¹⁰

¹⁰ Base-year nonrespondents received telephone prompting calls during the early response phase to remind them of their inclusion in the study and to encourage their participation.

2. *Production phase.* During this phase, which only applied to base-year respondents, interviewers called to encourage sample members to complete the interview by telephone or on the Web. No incentive was offered during this phase.
3. *Nonresponse conversion phase.* Cases in this phase belonged to one of the following groups: interview refusal by the sample member or a sample member contact, *hard-to-reach*,¹¹ not locatable after intensive tracing, *insist-pay*,¹² base-year nonrespondents who did not complete during the early response phase, and field cases that did not fit into one of the preceding groups. Base-year respondents who completed the interview during the nonresponse conversion phase were offered a \$30 incentive and base-year nonrespondents were offered a \$50 incentive. Data collection ended in March 2010.

Figure 5. Data collection phases: 2009



SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Sample members could complete the interview on the Web or by telephone throughout the data collection period. The interview screens in the telephone and field interviews were identical to those in the web interviews, except that interviewer instructions on how to administer each question were visible at the top of each screen for telephone and field interviews. Following are details of the administration of the interview through the various modes.

Web interviews. Sample members were informed of the web interview in the data collection announcement mailing. During the early response period (the first 4 weeks of data collection), only web interviews were completed unless sample members initiated a telephone interview by calling the help desk or sending an e-mail asking to be called. Reminder mailings and e-mails were sent throughout the production and nonresponse conversion phases of data collection to encourage sample members to complete the interview online. The website was accessible 24 hours a day, 7 days a week, throughout the data collection period, providing sample members with the option to complete the interview online at any time.

Help desk operations. The help desk for B&B:08/09 opened on July 14, 2009, in anticipation of the first respondent calls after the data collection announcement mailing. Help desk staff were available to assist sample members who had questions or problems accessing and completing the web interview. A toll-free help line was established to accept incoming help desk calls. If technical difficulties prevented sample members from completing the web interview, help desk agents—also trained to conduct telephone interviews—encouraged sample members to complete a telephone interview.

¹¹ *Hard-to-reach* cases were those that were called at least 15 times (8 times for base-year nonrespondents) and yielded minimal or no contact with the sample member.

¹² *Insist-pay* cases were those in which sample members completed the interview during the production phase but insisted on receiving the incentive amount offered during the early response phase.

A help desk application was created to document incoming calls from sample members and other contacts. Specifically, the help desk application included the following:

- information needed to verify the sample member's identity;
- login information needed by the sample member to access the web interview;
- a means to update sample member contact information, as needed;
- functionality to unlock cases and send an e-mail containing the website and study login information to the sample member;
- systematic documentation of each call;
- a means for tracking calls that could not be resolved immediately; and
- a record of the CATI-CMS events, which also included prior help desk events.

The help desk application provided project staff with the resolution status of all help desk events and reports on the type and frequency of problems experienced by sample members.

Telephone interviews. Telephone follow-up locating and interviewing began on August 13, 2009, after the 4-week early response period ended for the group of cases with the first early response incentive expiration date. Telephone interviewing procedures included attempts to locate, gain cooperation from, and interview sample members who had not yet completed the interview. Interviewers encouraged sample members to complete the interview by telephone; however, sample members could still complete the interview on the Web, if that was their preference. Sample members who did express a preference to complete a web interview were called back 5 days later for follow-up if the interview had not yet been completed.

The CATI-CMS included an automated call scheduler that assigned cases to interviewers by case priority, time of day, day of week, existence of previously scheduled appointments, and type of case. Case assignment was designed to maximize the likelihood of contacting and interviewing sample members and cases were assigned to various queues accordingly. For example, the CMS included queues for new cases that had not been called, Spanish-language cases, initial refusals,¹³ and various appointment queues. In addition, available telephone numbers for each case were automatically prioritized for the interviewers. As new roster lines¹⁴ were added—as a result of CATI tracing, other tracing efforts, and information from other sources such as respondent e-mails or help desk call-ins—available telephone numbers were re-prioritized based on the new information.

Some cases required special treatment. For cases with sample members or contacts who spoke only Spanish, bilingual interviewers were available to administer a Spanish interview (see section 3.1.1 for details regarding the Spanish interview). To gain cooperation from those sample members who initially refused to participate (including contacts who acted as *gatekeepers* to the sample member), interviewers were trained in refusal-conversion techniques. As the end of data collection approached, all telephone interviewers were trained to administer the abbreviated English-language interview to reluctant sample members.

Field interviews. Field data collection activities began approximately 5 months after the start of outbound telephone interviewing, during the nonresponse conversion phase of data

¹³ An initial refusal was an interviewer's first indication that the sample member did not wish to participate in an interview. Interviewers typically followed-up on initial refusals in attempts to convert sample members into interview respondents.

¹⁴A roster line represented a unique telephone number to call in CATI.

collection. Using the last known address for each case, RTP's Geographic Information System program conducted an analysis of the B&B:08/09 sample to identify the 17 geographic areas with the highest density of sample members residing within a 100-mile radius of the cluster center. On the basis of this analysis, 16 field interviewers were hired. An Integrated Field Management System provided reports that helped project staff manage the progress of the field interviewing effort. Once assigned to the field, cases were excluded from further outbound efforts from the call center, but could still be completed on the Web or by telephone if sample members called the help desk to complete the interview. See section 3.4.1 Student Interview Response Rates for results of field, telephone, and web interviews.

3.2.5 Other Procedures to Maximize Locating and Interview Response

Throughout data collection the B&B project team continued to work with TOPS and other available resources to evaluate additional tracing efforts that could benefit B&B data collection. In addition to the locating sources and methods already described, B&B:08/09 used several other procedures to maximize locating and interview response.

Other locating methods. Other locating methods used to find sample members included:

- *Experian credit header search.* In January 2010, an Experian credit header search was conducted to obtain phone numbers and addresses associated with sample members according to their credit histories. This search, conducted for sample members who had not yet been located or were located but not reached for several weeks, provided a relatively low-cost alternative to other intensive tracing methods.
- *Additional in-house tracing of field cases.* Field cases that resulted in dead-end information were sent back through TOPS for additional leads. Cases for which additional leads were identified through this special tracing effort were returned to the field, and those for which no new information was found were closed. The results of this special tracing effort are described in more detail in section 3.4.1.

Other contacting methods. Text messaging, social networking (Facebook and MySpace), and an informational video were additional methods used to contact sample members and encourage interview completion.

- *Text messages.* Some sample members were contacted by Short Message Service technology, or text messaging. A text message reminder to complete the B&B:08/09 interview was sent during the early response data collection period to those sample members who had requested on their address update sheet that a text message be sent. The text message mentioned the B&B interview and included the help desk number, the early incentive expiration date, and the incentive amount available. The text messages were sent via e-mail addresses that were based on the sample member's phone number and their service provider.
- *Social networking.* Two popular social networking sites, Facebook and MySpace, were used to generate new leads for and make contact with sample members who were difficult to locate. B&B:08 cohort information on record—such as postsecondary institutions attended, city/state networks and e-mail addresses—was used to search for sample members on Facebook or MySpace. Once the targeted individual was believed to be found, a message describing B&B and the incentive being offered, as well as reminding the individual of any past participation in the study, was sent through internal messaging

on the social networking site. Although the message included the study website and help desk telephone number, no personally identifying information (such as login information) was included; this information could only be provided to a sample member who visited the study website or contacted the help desk and verified his or her identity. Efforts to contact sample members by Facebook were ceased because of restrictions on the number of messages sent to individuals. When few B&B messages were opened by sample members contacted through MySpace, the use of social networking sites was abandoned in favor of the other, more promising locating and contacting methods.

- *YouTube video.* Near the end of B&B:08/09 data collection, RTI developed a brief video designed to encourage participation of sample members who had not yet completed the interview. This video was posted to YouTube, a website popular with the age group that makes up most of the B&B:08/09 sample. The video provided information about the study, including confidentiality procedures. The video also mentioned the incentive amount being offered.¹⁵ Sample members who had not yet completed the interview were sent an e-mail on January 25, 2010, with a link to the video. Mention of the video, along with a shortened web page address that redirected visitors to the video's web page, was also included in a mailing sent on February 11, 2010. Before posting the video, project staff adjusted the account and video settings including turning off features to prevent sample members from identifying one another.

3.3 Data Collection Quality Control

A number of quality control procedures were implemented throughout the course of the B&B:08/09 student interview data collection. These procedures included frequent interview monitoring of telephone interviewers, a help desk that tracked and resolved difficulties encountered by sample members attempting to complete the web interview, quality circle feedback meetings, and help desk agent and interviewer debriefings at the conclusion of the study.

3.3.1 Interview Monitoring

Regular monitoring of telephone interviews during B&B:08/09 data collection was conducted to meet the following important data quality objectives:

- Identification of problem items in the interview;
- Reduction in the number of interviewer errors;
- Improvement in interviewer performance through reinforcement of effective strategies; and
- Assessment of the quality of the data collected.

QCS and project staff monitored live and recorded interviews throughout data collection, using remote monitoring telephones and computer equipment. To guarantee an accurate reflection of data collection activities, QCS monitored day, evening, and weekend shift interviewers. In addition, each week QCS and interview project staff monitored one live interview session and one recorded interview session. The live session allowed for monitoring of calls and interviews in progress, including remotely viewing interviewers' computer screens as they progressed through the

¹⁵ Because two different incentive amounts were being offered based on base-year response status, two versions of the video were created so that the correct incentive offer was mentioned to each sample member.

interview and listening to interviews in real time, while the session with recorded interviews allowed only listening to the interview but guaranteed an opportunity to hear complete interviews. QCS and interview project staff recorded observations on standardized monitoring forms that covered such topics as interviewer professionalism, question administration, and knowledge of the instrument. After each monitoring session, interviewers received feedback based on observations from the session. Issues and trends identified during monitoring were frequently incorporated into quality circle meetings to improve the quality of telephone interviews.

3.3.2 Help Desk

A help desk, described in Section 3.2.4, was available to sample members. To gain a better understanding of the problems encountered by sample members, HDAs used a web-based application to record each help desk incident that occurred during data collection. For each incident, an HDA confirmed contact information for the sample member, noted the source (e.g., incoming telephone call, voice mail, or email; request from the study website), recorded the type of problem, provided a description of the problem and resolution, and indicated the incident status (pending or resolved). If the problem was not resolved immediately, the HDA scheduled a follow-up appointment.

Table 11 provides a summary of help desk incidents encountered during B&B:08/09 data collection. HDAs handled a total of 460 help desk incidents. The most common type of incident was from sample members requesting their study ID, password, or both (68 percent). Pop-up blocker issues were the second most common category (13 percent).

Table 11. Help desk requests, by type of incident reported: 2009

Type of incident reported	Help desk incidents	
	Number	Percent
Total	460	100.0
Study ID/password request	320	68.4
Pop-up blocker issues	60	13.4
Browser settings/computer	20	4.5
Website down/unavailable	10	2.2
Questions about the study	10	2.2
Questionnaire content	10	1.7
Routing/skip problems	10	1.5
Program error call-in	#	0.6
Other incidents, not classifiable	30	5.4

Rounds to zero.

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

3.3.3 Quality Circle Meetings

Quality circle meetings were essential as part of a feedback loop for ensuring that project staff, CCS, and telephone interviewers were communicating on a regular basis about the goals of the study and addressing challenges encountered along the way. These meetings provided a forum for discussing elements of the instrument design and interview cooperation tactics, motivating the group toward the goals of the study, and acquiring feedback on data collection issues. Weekly quality circle

meetings for telephone staff were held at the call center, while quality circle meetings for the field staff were held via conference call. Issues discussed at the quality circle meetings were added to weekly quality circle notes, which all interviewers were required to access electronically. The quality circle notes included counts of interview completions to date, separate sections for general data collection issues and issues specific to the survey instrument, and project staff responses to questions from interviewers.

Throughout the study, a variety of issues were addressed at the quality circle meetings that reinforced specific content from training and contributed to prompt problem solving. Some of the issues covered in quality circle meetings included the following:

- clarification of questions and item responses and reinforcement of positive interviewing techniques;
- methods of gaining cooperation from sample members and *gatekeepers* (e.g., parents and roommates);
- problem sheets submitted by interviewers during interviews;
- the importance of interviewers providing and reviewing detailed case comments;
- data security protocols; and
- study progress and general morale boosting.

B&B:08/09 used an interactive, activity-based quality circle meeting format. In the new meeting structure, interviewers participated in training activities intended to make meetings more engaging and to improve the quality of data collected from telephone interviews. Debriefing of interviewers showed that they generally enjoyed the new quality circle meeting format and often attributed improvements in their interview times and knowledge to these training activities.

3.3.4 Debriefing

At the conclusion of the B&B:08/09 data collection, project staff held debriefing meetings with interviewers and HDAs. In the debriefings, interviewers were asked their opinions on the effectiveness of interviewer training; the success of the various techniques for tracing, locating, and gaining sample member cooperation; and any difficulties associated with administering the student interview. Interviewer feedback on their experience conducting the B&B student interview was typically positive, and interviewers provided several useful recommendations for future data collections.

Interviewers suggested that future trainings could include spending more time on techniques for converting sample member refusals to participate in the student interview and for gaining cooperation from *gatekeepers*. Regarding student interview administration, interviewers indicated that the new quality circle meeting format, which included varied training activities, was beneficial because it allowed for increased communication between interviewers and project staff and because activities were interesting as well as informative. Interviewers suggested that for future studies, quality circle meetings continue to focus on the difficulties associated with administering interviewer coders, particularly the occupation and industry coders. Interviewers also noted that quality circle meetings were a useful time to work on improving interviewing skills such as keeping sample members engaged during interviews.

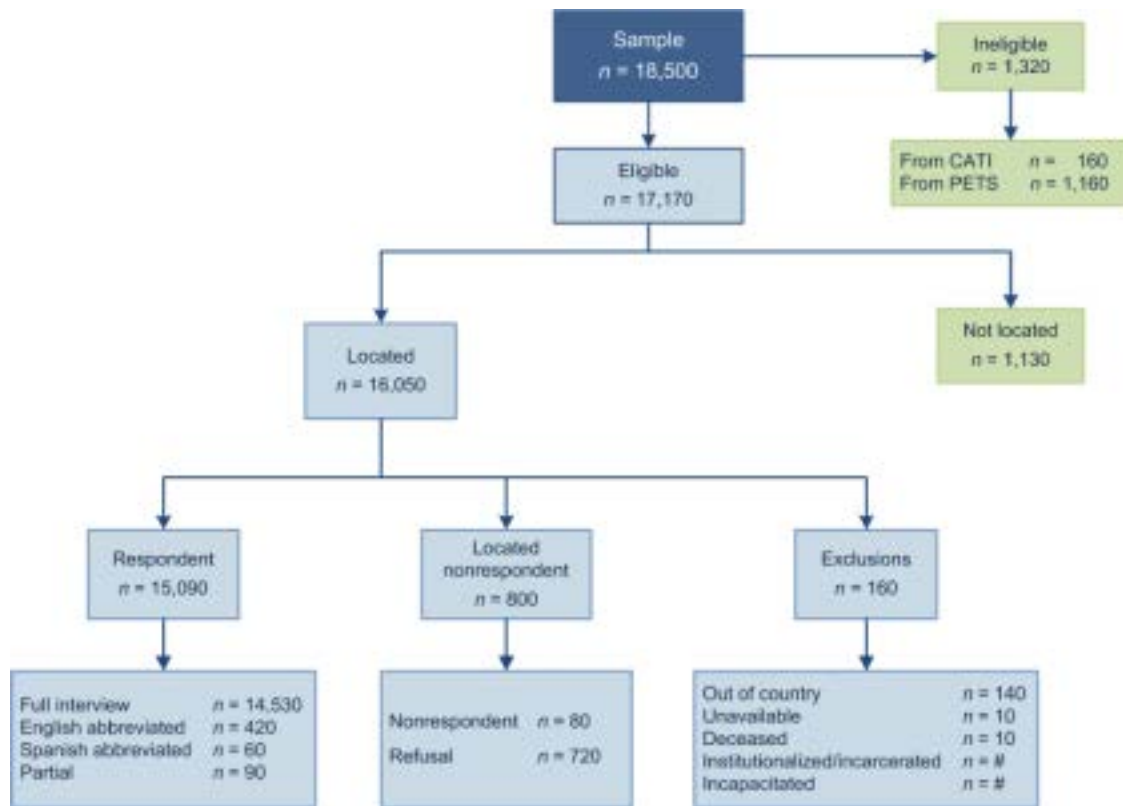
3.4 Student Interview Data Collection Outcomes

This section provides the results of the B&B:08/09 student interview data collection. Details of the overall student interview response rate of 88 percent are included, and a description of the success of various locating methods is also provided. A timing analysis shows that the student interview, on average, took about 28 minutes to complete.

3.4.1 Student Interview Response Rates

B&B:08/09 interviews were conducted from July 13, 2009 to March 12, 2010. Of the 17,170 eligible sample members in the B&B:08 cohort, 16,050 (93 percent) were successfully located and asked to complete the B&B:08/09 interview, while 15,090 (88 percent) did complete a full interview, an English or Spanish abbreviated interview, or a partial interview.¹⁶ The overall locating and interviewing results for the B&B:08/09 interview data collection effort, including sample members who were determined ineligible and those located but later considered exclusions for reasons such as being incapacitated or deceased, are presented in figure 6.

Figure 6. Overall locating and interviewing results: 2009



Rounds to zero.

NOTE: Detail may not sum to totals because of rounding. PETS = Postsecondary Education Transcript Study. CATI = computer-assisted telephone interviewing.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

¹⁶ A partial interview was any B&B:08/09 interview where the respondent completed at least through the second section (Undergraduate Education) of the interview, but did not complete the interview.

Response rates by base-year status and institution type. NPSAS:08 interview respondents were located and completed the B&B:08/09 interview at a higher rate than NPSAS:08 interview nonrespondents.¹⁷ NPSAS:08 interview respondents had a locate rate of 94 percent, while 72 percent of NPSAS:08 nonrespondents were located. Of all NPSAS:08 respondents, 89 percent completed the B&B:08/09 interview, while 49 percent of NPSAS:08 nonrespondents completed the B&B:08/09 interview.

Overall locate rates for the B&B:08/09 interview, based on the institution type of the sample member's base-year interview (NPSAS) school,¹⁸ ranged from 90 percent (private, for-profit 2-year or more schools) to 94 percent (public 4-year doctorate-granting schools, private, nonprofit 4-year non-doctorate-granting schools and private, nonprofit 4-year doctorate-granting schools). Overall response rates for the B&B:08/09 interview, by NPSAS institution type, ranged from 85 percent (private, for-profit 2-year or more schools) to 89 percent (private, nonprofit 4-year non-doctorate-granting schools). Locating and participation results by NPSAS:08 respondent status and NPSAS institution type are presented in table 12.

Table 12. Locating and participation rates, by base-year response status and NPSAS institution type: 2009

Base-year response status and institution type	Eligible sample	Located		Interviewed		
		Number	Percent of total	Number	Percent of located	Percent of total
Total	17,170	16,050	93.4	15,090	94.0	87.9
Base-year response status						
NPSAS:08 respondent	16,720	15,720	94.0	14,870	94.6	88.9
NPSAS:08 nonrespondent	460	330	71.6	220	68.2	48.8
Institution type						
Public						
2-year	#	#	50.0	#	100.0	50.0
4-year non-doctorate-granting	2,590	2,410	92.9	2,260	93.8	87.1
4-year doctorate-granting	7,320	6,870	93.8	6,450	93.9	88.1
Private nonprofit						
4-year non-doctorate-granting	3,170	2,980	94.0	2,810	94.5	88.8
4-year doctorate-granting	3,200	2,990	93.6	2,810	93.9	87.9
Private for-profit, 2-year or more						
	900	810	90.0	770	94.9	85.4

Rounds to zero.

NOTE: Detail may not sum to totals because of rounding. NPSAS = National Postsecondary Student Aid Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Response rates by base-year status and interview type. About 96 percent of all B&B:08/09 interview respondents completed the full interview, about 3 percent completed an English or Spanish abbreviated interview, and less than 1 percent completed a partial interview. NPSAS:08 interview respondents completed a full interview at a higher rate (97 percent) than NPSAS:08 interview nonrespondents (63 percent). Thirty-five percent of NPSAS:08 interview

¹⁷ A *completed* interview is a full interview, an English or Spanish abbreviated interview, or a partial interview.

¹⁸ Locate and response rate results include only institution sectors with more than 5 eligible sample members.

nonrespondents completed an English abbreviated interview, compared with 2 percent of NPSAS:08 interview respondents. Table 13 provides detail on the number and percent of completed B&B:08/09 interviews by base-year response status and interview type.

Table 13. Completed interviews, by base-year response status and interview type: 2009

Base-year response status	Total	NPSAS:08 respondents		NPSAS:08 nonrespondents	
		Number	Percent	Number	Percent
Total	15,090	14,870	100.0	220	100.0
Full	14,530	14,390	96.8	140	63.2
English abbreviated	420	340	2.3	80	35.0
Spanish abbreviated	60	60	0.4	#	#
Partial Interview	90	80	0.5	#	1.8

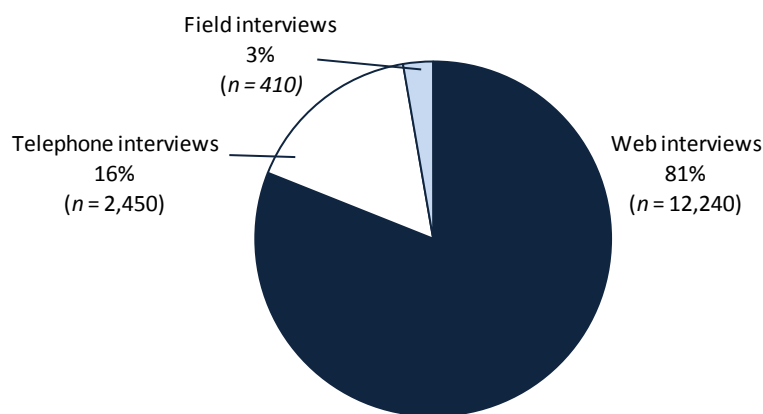
Rounds to zero.

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Interview outcomes by mode. B&B:08/09 interviews were completed in one of three modes: web, telephone, or field. Figure 7 shows that most (81 percent) interviews were completed on the Web, 16 percent of interviews were completed by telephone, and 3 percent were completed in field interviewing.

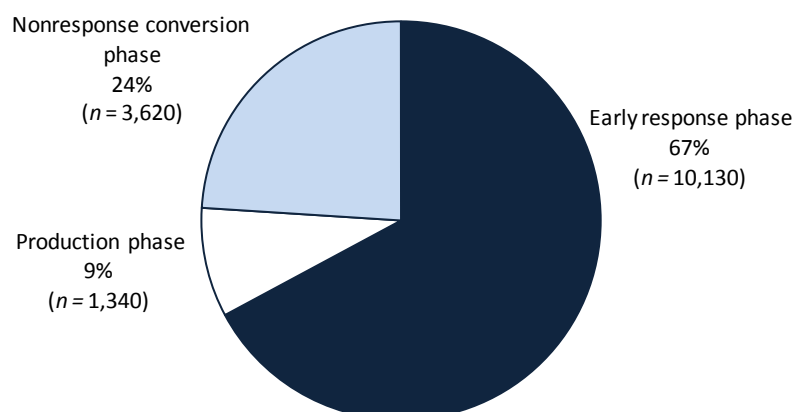
Figure 7. Distribution of completed interviews, by mode of administration: 2009



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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Response by phase of data collection. Two-thirds (67 percent) of all completed B&B:08/09 interviews and over three-fourths (80 percent) of web interviews were completed during the early response phase. Approximately 9 percent of all interviews were completed during the production phase, and the remaining 24 percent were completed during the nonresponse conversion phase. Response, by phase of data collection, is shown in figure 8.

Figure 8. Percentage of completed interviews, by data collection phase: 2009

NOTE: Partial interviews were not included because partially completed interviews could be resumed by sample members through the end of data collection.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

The *early response phase* of data collection yielded a 59 percent response rate for the eligible sample of 17,170. In this phase, base-year respondents received \$30 to complete the student interview while base-year nonrespondents received \$50 to complete the interview. In the next phase of data collection, the *production phase*, no incentive was offered. Of the 7,040 eligible sample members remaining in the production phase, 19 percent completed the interview. In the final phase of data collection, the *nonresponse conversion phase*, 64 percent of the remaining 5,700 eligible sample members completed the interview. Sample members who completed the interview in this last phase of data collection received either \$30 if they were base-year respondents, or \$50 if they were not. Table 14 provides the number of completed interviews in each data collection phase and the percent of the eligible sample in each phase that completed interviews.

Table 14. Number of cases and completed interviews within each phase of data collection: 2009

Data collection phase (incentive)	Number of cases	Completed interviews	
		Number	Percent of cases
Total	17,170	15,090	87.9
Early response phase (\$30/\$50)	17,170	10,130	59.0
Production phase (\$0)	7,040	1,340	19.0
Nonresponse conversion phase (\$30/\$50)	5,700	3,620	63.5

NOTE: Partial interviews were not included because partial status could not be assigned until the end of data collection. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Locate and response rates by source of address update. Address updates for the B&B:08 cohort were received from 6,780 eligible sample members in response to the parent initial contact mailing (for sample members younger than age 26), the student advance notification mailing, or through the B&B website. If an address update was received, the sample member was located almost 100 percent of the time and the sample member then completed the B&B:08/09 interview 98 percent of the time. Parents and students responded equally to the parent mailing and advance notification mailing (each mailing yielded a 26 percent update). Student address updates through the

B&B website constituted about 18 percent of the updates. The parent reminder letter sent on November 30, 2009 elicited a website address update from about 1 percent of those sent the letter. Locating and interviewing outcomes of cases for whom an address update was provided are shown in table 15.

Table 15. Located and interview completion rates, by source of address update: 2009

Source of address update	Number that provided an update	Located		Interviewed	
		Number	Percent	Number	Percent
Total	6,780	6,730	99.2	6,660	98.2
Parent mailing	2,260	2,230	98.9	2,200	97.6
Advance notification mailing	3,290	3,260	99.2	3,230	98.4
B&B student website reply	1,210	1,210	99.9	1,200	99.5
B&B parent website reply	30	30	91.2	30	85.3

NOTE: Parent website replies are in response to a parent reminder mailing sent on November 20, 2009. Detail may not sum to totals because of rounding. B&B = Baccalaureate and Beyond Longitudinal Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Response rates by intensive tracing. Among the cases assigned to intensive tracing, TOPS-1 and TOPS-2, approximately 77 percent were located. Of those cases located through intensive tracing, about 45.8 percent completed the B&B:08/09 interview (table 16). About 19 percent of the cases assigned to intensive tracing required TOPS-2 tracing.

Table 16. Located and interviewed rates of cases requiring intensive tracing, by intensive tracing method: 2009

Intensive tracing status	Total	Located in TOPS		Interviewed	
		Number	Percent of total	Number	Percent of located
Total	1,210	930	77.1	430	45.8
TOPS-1	1,210	870	72.2	400	46.1
TOPS-2 ¹	240	130	53.6	40	30.2

¹ TOPS-2 cases are a subset of TOPS-1 cases that require additional intensive tracing efforts.

NOTE: Table includes only eligible cases. Detail may not sum to totals because of rounding. TOPS = tracing operations.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Response rates by other locating methods. Although no quantifiable locating or interviewing outcomes were achieved through the use of social networking sites, nearly three-fourths (72 percent) of the cases sent through the Experian credit header searches or that were field cases receiving additional tracing were located. Eighteen percent of these located cases completed the interview. Results of these other locating methods are summarized in table 17.

Table 17. Located and interviewed response rates, by other locating methods: 2009

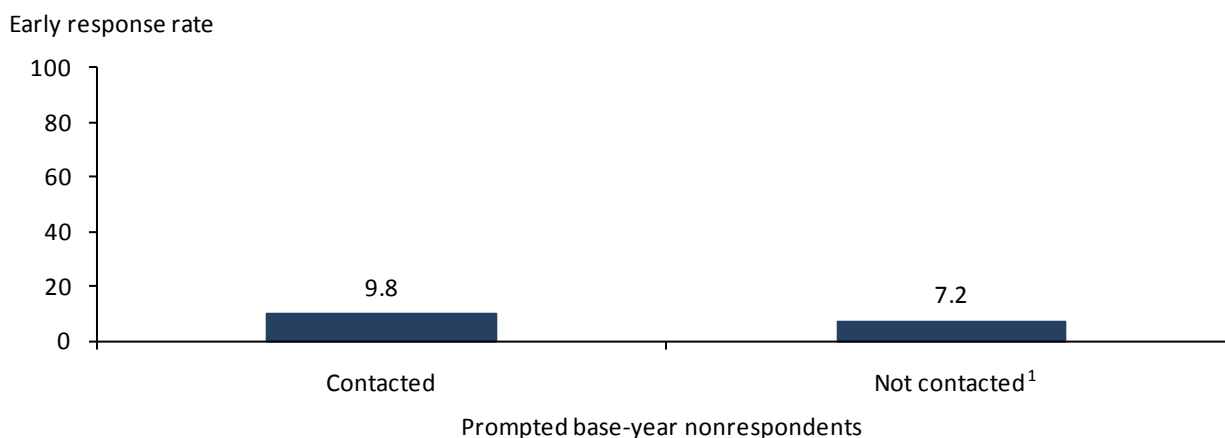
Locating method	Cases traced	Located		Interviewed	
		Number	Percent of traced	Number	Percent of located
Total	90	70	71.7	10	18.2
Experian credit header searches	50	30	58.3	10	17.9
Tracing of field dead-ended cases	40	40	86.4	10	18.4

NOTE: Table excludes cases determined to be ineligible. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Of the 80 eligible sample members who received an early text message notifying them that data collection had begun, 96 percent completed the interview. These were sample members who had requested a text notification reminder of the start of data collection on their address updates.

Prompting response rates. Base-year nonrespondents were selected to receive prompting calls to complete the web interview during the early response phase of data collection. Of the 460 eligible base-year nonrespondent cases, 380 cases (82 percent) were flagged for prompting. (The remaining 80 cases were not prompted because of either missing/invalid telephone numbers or because a B&B:08/09 interview was completed prior to the start of prompting.) Prompting calls began 8 days after the start of data collection, and 260 cases were successfully prompted. For those successfully prompted, there was not a significant difference between the response rate during the early response phase of data collection for sample members who were contacted (spoken to directly) in a prompting call (10 percent), compared with sample members who were not contacted (not spoken to directly; 7 percent). The response rates during the early response phase of data collection for base-year nonrespondents who were contacted when prompted versus those who were not contacted when prompted are compared in figure 9.

Figure 9. Early response rates for base-year nonrespondents who were prompted: 2009

¹ A sample member was considered *not contacted* when someone other than the sample member was reached or the call was directed to an answering machine or voicemail.

NOTE: Counts include only eligible cases that were considered successfully prompted (spoke with someone or left an answering machine message). Excludes ineligible cases, cases completed before prompting began, cases without a phone number, and cases unsuccessfully prompted due to no answer or a dead-end number.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Response rates for field cases. Beginning about 5 months into data collection, cases identified as difficult to locate but believed to reside in a selected field cluster were assigned to field data collection. Of the 920 eligible cases assigned, 68 percent were located and 60 percent completed the interview in one of the three available modes (web, telephone, or field). Of the completed cases assigned to the field, 150 (26 percent) were actually completed by web, or by telephone through the call center, instead of through field efforts.

Results by base-year response status and NPSAS institution type are also presented for these cases. Nearly 62 percent of base-year respondent cases assigned to the field completed the interview compared with 42 percent of base-year nonrespondent cases assigned to the field.

Response rates among eligible cases assigned to the field also varied by sample members' NPSAS institution type. The largest number of cases assigned to the field for any one institution type, 370 cases, was for sample members whose NPSAS institution was a public 4-year doctorate-granting institution; these cases yielded a response rate of 59 percent. Only 70 cases were assigned to the field for sample members from private, for-profit, 2-year-or-more schools; these cases yielded a response rate of 62 percent. Table 18 shows locate and response rates among the field cases.

Table 18. Located and completed field interview cases, by base-year response status and institution type: 2009

Base-year response status and institution type	Number assigned to field	Located		Number completed interviews			Percent completed interviews		
		Number	Percent	Field	Web or help desk	All modes	Field	Web or help desk	All modes
Total	920	630	67.8	410	150	550	44.3	15.7	60.0
Base-year response status									
NPSAS:08 respondent	840	580	69.3	380	140	520	45.6	16.2	61.8
NPSAS:08 nonrespondent	80	40	52.4	30	10	40	31.0	10.7	41.7
Institution type									
Public									
4-year non-doctorate-granting	150	110	69.9	70	20	90	44.4	15.0	59.5
4-year doctorate-granting	370	250	67.1	170	50	220	45.5	13.9	59.4
Private nonprofit									
4-year non-doctorate-granting	160	110	64.0	60	30	90	36.6	20.7	57.3
4-year doctorate-granting	170	120	70.9	80	30	110	48.5	15.2	63.6
Private for-profit, 2-year or more	70	50	68.2	30	10	40	45.5	16.7	62.1

NOTE: Sample members were still able to complete the web interview or call the help desk to complete a telephone interview once a case was sent to the field. Detail may not sum to totals because of rounding. NPSAS = National Postsecondary Student Aid Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

3.4.2 Interview Timing Burden

Several analyses for the B&B:08/09 interview assessed the timing burden on respondents completing the interview. These analyses included computation of the overall average time it took respondents to complete the interview and the time it took respondents to complete the interview based on mode of administration (web, telephone or field), as well as analysis of whether particular respondent characteristics, such as employment or teacher status, were related to interview timing burden.

To calculate the time it took to complete the interview, two time stamps were embedded on each form (web screen) of the interview. A start timer recorded the clock time on the respondent's or interviewer's computer when each form was first displayed. An end timer recorded the clock time on the respondent's or the interviewer's computer when the *Next* button on each form was clicked. From the two time stamp variables, an on-screen time and a transit time were calculated. The on-screen time was calculated by subtracting the start time from the end time for each form that the respondent saw. The transit time was calculated by subtracting the end time of the preceding form from the start time of the next form. Total on-screen time and total transit time were calculated for all respondents by summing all of the on-screen times for each screen received and summing all of the transit times for each respondent. Total instrument time was then calculated by summing a respondent's total on-screen and total transit times.

The timing analysis included only cases that completed the full-scale interview in one session. Partially completed interviews and those interviews completed in multiple sessions (i.e., those cases that logged out from an incomplete interview and later resumed their interviews) were excluded from the analysis.

The average overall interview time was calculated by summing the respondents' interview completion times and dividing the result by the total number of respondents. On average, the B&B:08/09 interview took 27.7 minutes to complete. Web interviews took 26.6 minutes to complete, field interviews took 31.1 minutes to complete, and telephone interviews took 33.5 minutes to complete.

Average section completion times were 1.4 minutes for the Front End (introductory section), 1.1 minutes for Eligibility, 7.2 minutes for Undergraduate Education, 2.2 minutes for Postbaccalaureate Education/Training, 6.8 minutes for Postbaccalaureate Employment, 3.6 minutes for Kindergarten-12th Grade Teaching, and 3.8 minutes for Student Background. On average, all sections took the longest in telephone mode. Table 19 shows the average interview time overall, for each section, by mode of administration.

Table 19. Average time in minutes to complete interview section, by mode of administration: 2009

Interview section	All respondents		Mode of administration					
			Web		Telephone		Field	
	Number of cases	Average time	Number of cases	Average time	Number of cases	Average time	Number of cases	Average time
Total interview	12,090	27.7	10,140	26.6	1,750	33.5	200	31.1
Front End	12,090	1.4	10,140	1.0	1,750	3.8	†	†
Eligibility	12,090	1.1	10,140	1.1	1,750	1.2	200	1.0
Undergraduate Education	12,090	7.2	10,140	6.9	1,750	9.1	200	7.2
Postbaccalaureate Education/Training	12,090	2.2	10,140	2.2	1,750	2.4	200	1.9
Postbaccalaureate Employment	9,750	6.8	8,140	6.6	1,440	7.7	170	7.2
K–12 Teaching	3,700	3.6	3,030	3.3	600	4.7	70	4.1
Student Background	12,090	3.8	10,140	4.7	1,750	6.1	200	5.6

† Not applicable.

NOTE: Interview times are presented only for completed interviews; partial interviews and multisession completions were excluded. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond (B&B:08/09).

Interview time by interview path. The time it took respondents to complete the B&B:08/09 interview varied by whether respondents had any postbaccalaureate employment, and by whether they had taught since receiving their bachelor's degree.

The Postbaccalaureate Employment section focused on the job(s) held in the year after completing a bachelor's degree. This section collected information regarding current job duties, benefits and requirements, and periods of unemployment, if applicable. On average, the Postbaccalaureate Employment section took 5.8 minutes to complete. Table 20 shows that respondents who were employed spent longer in the employment section (6.8 minutes) compared to those respondents who were not employed (1.7 minutes).

Table 20. Average time to complete interview, by employment status: 2009

Employment status	Number of respondents	Average time (minutes)
Total	12,090	5.8
Not employed	2,340	1.7
Employed	9,750	6.8

NOTE: Interview times are presented only for completed interviews; partial interviews and multisession completions were excluded. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

The K-12 Teaching section collected information about the respondent's experiences with or interest in teaching kindergarten through the 12th grade. Table 21 shows respondents who had never been a teacher and were not planning or preparing to become a teacher took an average of 0.4 minutes to complete the section. Respondents who were current or former teachers, or who were either considering or preparing for teaching, took 3.6 minutes. The latter group is divided even

further between current teachers (6.5 minutes), former teachers (5.1 minutes), respondents preparing to become teachers (2 minutes), and respondents considering becoming teachers (1.5 minutes).

Table 21. Average time to complete interview, by teacher status: 2009

Teacher status	Number of respondents	Average time (minutes)
Total	12,090	1.4
Not a teacher and not planning or preparing to teach	8,390	0.4
Currently, formerly, preparing to, or considering teaching	3,700	3.6
Currently teaching	920	6.5
Formerly teaching	730	5.1
Preparing to teach	950	2.0
Considering teaching	1,100	1.5

NOTE: Interview times are presented only for completed interviews; partial interviews and multisession completions are excluded. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Timing of abbreviated interview. The abbreviated version of the B&B:08/09 interview included the Front End, Eligibility section, and questions from the other sections of the interview. Table 22 shows that, on average, the B&B:08/09 abbreviated interview took 13.6 minutes. Overall, web abbreviated interviews took 11.8 minutes and were significantly shorter than telephone abbreviated interviews, at 16.9 minutes ($t(313) = -7.38, p < .001$). Telephone interviews were significantly longer than field interviews at 12.5 ($t(212) = 5.08, p < .001$).

Table 22. Average time in minutes to complete abbreviated interview, by interview section and mode of administration: 2009

Interview section	All respondents		Mode of administration					
			Web		Telephone		Field	
	Number of cases	Average time	Number of cases	Average time	Number of cases	Average time	Number of cases	Average time
Total interview	400	13.6	190	11.8	130	16.9	80	12.5
Front End	400	2.2	190	1.4	130	4.8	†	†
Eligibility	400	1.3	190	1.4	130	1.4	80	0.8
Undergraduate Education	400	1.6	190	1.4	130	1.8	80	1.8
Postbaccalaureate Education/Training	400	0.4	190	0.3	130	0.4	80	0.3
Postbaccalaureate Employment	400	2.2	190	2.6	130	1.8	80	2.2
K-12 Teaching	400	0.2	190	0.2	130	0.2	80	0.2
Student Background	400	0.2	190	0.2	130	0.1	80	0.2

† Not applicable.

NOTE: Interview times are presented only for completed abbreviated interviews; partial interviews and multisession completions were excluded. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

3.4.3 Telephone Interviewer Hours

During the course of B&B:08/09 data collection, 9,291 telephone interviewer hours were logged, for an average of 3.79 hours spent by telephone interview staff per completed or partial telephone interview. Because, on average, telephone interviews took 33.5 minutes to administer, most of the telephone interviewer hours were spent on case management activities. These activities included locating and contacting sample members, prompting sample members to complete interviews, reviewing call history, scheduling callbacks, entering detailed comments and suggestions to assist with reaching and interviewing sample members, and responding to incoming help desk calls. Near the end of data collection, telephone interviewers also spent about two weeks intensively reviewing nonrespondent cases to identify the most appropriate next step for each case.

3.4.4 Number of Calls to Sample Members

On average, nine calls were made per B&B:08/09 sample member during the interviewing period, except for in the early response phase when no outbound calls were made to sample members. The average number of calls per sample member varied according to B&B:08/09 response status, base-year response status, mode of administration, and phase of data collection. Cases that completed a B&B:08/09 interview received an average of 6 calls, while nonrespondents received an average of 32 calls during the interviewing period. Base-year respondents received 9 fewer calls, on average, than base-year nonrespondents (9 and 18, respectively) ($t(478) = 10.98$, $p < .001$).

There were also call count differences depending on mode of interview administration. Overall, respondents who completed interviews over the telephone required more calls than respondents who completed interviews over the web, an average of 14 calls, compared with 3 calls ($t(2,898) = 33.50$, $p < .001$). However, when early response phase interview completes were excluded, web respondents required more calls than telephone respondents, an average of 17 calls, compared with 14 calls ($t(4,836) = 8.91$, $p < .001$). The average number of telephone calls is shown in table 23.

Table 23. Average number of calls, by response status: 2009

Response status	Eligible cases	Number of calls	Average number of calls
Total	17,170	153,700	9.0
Base-year response status			
NPSAS:08 respondent	16,720	145,700	8.7
NPSAS:08 nonrespondent	460	8,010	17.5
B&B:08/09 response status			
Respondents	15,090	86,230	5.7
Web interviews	12,240	42,070	3.4
Excluding early response	2,410	42,040	17.4
Telephone interviews	2,450	33,380	13.7
Field interviews	410	10,780	26.4
Nonrespondent or exclusion	2,080	67,470	32.4

NOTE: Detail may not sum to totals because of rounding. NPSAS = National Postsecondary Student Aid Study.

B&B = Baccalaureate and Beyond Longitudinal Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

3.5 Evaluation of Student Interview Items

An evaluation of the B&B:08/09 student interview items included analyses of the data collected in the instrument coders and a review of help text access rates, success rates for conversion text, and item nonresponse.

3.5.1 Instrument Coders

Assisted coding systems were used to standardize the collection of data on, and code, any postsecondary schools attended, major or field of study, occupation, and any elementary or secondary schools where the respondent may have taught. Text strings were collected from the respondent, and then a keyword search of an underlying database was conducted, allowing the respondent to select the best option from a list of possible options returned. An assisted coding system was not used to code industries, but available industry classifications allowed respondents and interviewers to select an industry classification from among a list of standardized options (for a detailed description of each coder, see section 3.1.1).

Recoding. Ten percent of the major, occupation, and industry codes chosen in the student interviews were randomly selected to be reviewed by expert coding staff for *recoding*.¹⁹ Expert coders assessed the accuracy of codes chosen in the interview based on the text string provided by the respondent. Across modes of administration and across coders, expert coding staff generally agreed with the codes chosen for text strings in the interview. Overall, expert coders agreed with major, occupation, and industry codes chosen in the student interview 90 percent of the time, recoded codes chosen to a new value 7 percent of the time, and were unable to choose a code based on too vague a text string about 3 percent of the time.

Only the industry coder showed significant differences in recode rates between modes of administration. Expert coders agreed with industry codes chosen by web respondents 79 percent of the time and with those chosen by interviewers 90 percent of the time ($\chi^2 = 4.24, p < .001$). Expert coders recoded industry codes chosen by web respondents 17 percent of the time, and recoded those chosen by telephone and field interviewers 7 percent of the time ($\chi^2 = 4.65, p < .001$). Industry text strings provided by web respondents and were too vague to code 4 percent of the time, as were industry text string provided by interviewers. Table 24 shows the rate of recoded values—same as original code, recoded to different value, or text string too vague to code—chosen by the expert coders for the major, occupation, and industry codes in the interview.

¹⁹ Recoding of institution codes selected in the postsecondary and elementary and secondary school coders was not done because text strings provided by respondents would presumably have directly matched school name codes chosen. In the major, occupation, and industry coders, text strings provided by respondents and standardized names of codes in the database were often not direct matches.

Table 24. Summary of recoding results, by coding system and administration mode: 2009

Coding system	Percent of recoded values					
	Recoded same as original		Recoded to different value		Text string too vague to code	
	Web	Telephone and field	Web	Telephone and field	Web	Telephone and field
Major	98.2	97.0	1.0	1.4	0.8	1.6
Occupation	91.2	89.7	5.7	7.2	3.1	3.1
Industry	78.9	89.6	17.3	6.6	3.8	3.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Upcoding. Project staff chose an appropriate code for any text strings provided by respondents or interviewers for which a code was not selected in the IPEDS, major, occupation, industry, and elementary/secondary school coders. Text strings from web interviews generally required more upcoding than text strings from telephone and field interviews because interviewers received special training on coders. Results of the upcoding process are shown in table 25.

Table 25. Summary of upcoding results, by coding system and administration mode: 2009

Coding system	Percent upcoded		
	Overall	Web	Telephone and field
IPEDS Institutions	9.1	10.4	4.0
Major	3.5	4.1	0.9
Occupation	3.6	4.3	0.9
Industry	3.8	4.8	0.1
Elementary/secondary schools	8.6	9.3	5.8

NOTE: IPEDS = Integrated Postsecondary Education Data System.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

3.5.2 Help Text

Respondents or interviewers were able to click on a help button provided on each B&B:08/09 interview screen for both general instrument and question-specific help. The general instrument help provided answers to FAQs about web browser settings and response types (i.e., how to respond using a check box, dropdown box, or radio button). The question-specific help provided definitions of key terms and phrases used in question wording and response options and provided any other explanations thought to help clarify and standardize the meaning of questions for respondents.

The number of times that respondents or interviewers clicked the help button on each screen relative to the number of respondents who were administered the question determined the rate of help text access for that screen. The screen-level rate of help text access was analyzed overall and by mode of interview administration to identify screens that may have been problematic for users. For forms administered to at least 50 respondents, the overall mean rate of help text hits per screen was less than 1 percent. Help text was accessed 2 percent of the time during interviews by telephone and field, compared with 1 percent of the time by web respondents ($\chi^2 = 13.30, p < .001$).

The interview question asking respondents for their employer's primary industry (item name RDINDCD) had the highest overall rate of help text access, at 4 percent. The help text for this question was accessed 16 percent of the time by telephone and field interviewers, compared with 1 percent of the time by web respondents ($\chi^2 = 30.99, p < .001$). It is worth noting here that interviewers were encouraged as part of their training to refer to the help text on this item when respondents showed hesitation in understanding the term "industry."

Table 26 shows the three interview questions administered to at least 50 respondents and for which help text was accessed at a rate of at least 2 percent.

Table 26. Interview questions with highest rates of help text access, by administration mode: 2009

Item	Variable label	Overall		Web		Telephone and field	
		Number administered to	Percent of help text access	Number administered to	Percent of help text access	Number administered to	Percent of help text access
RBNTPAY	Reason not currently repaying undergraduate loans	4,140	2.1	3,290	0.1	840	9.7
RDEMPOTH	Reason not working for pay	1,580	2.5	1,260	0.6	330	10.1
RDINDCD	Industry: coder	9,480	3.5	7,700	0.7	1,780	15.6

NOTE: Table is based on the rates of help text access for interviewer screens administered to a minimum of 50 respondents and in which help text was accessed at an overall rate of at least 2 percent. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

3.5.3 Conversion Text

Fifteen questions in the interview were considered *critical*; that is, responses to these questions were especially important to the study and high rates of missing data on these questions would impact the quality of these data. When respondents did not provide an answer to these questions and the *Next* button was clicked on the interview screen, then conversion language (or *conversion text*) appeared above the question to encourage a response. Interviewers were asked to read conversion text to respondents and then to reread the interview question. The conversion text attempted to relay the importance of that particular question to the study and emphasized the confidential nature of responses. Some critical questions also displayed a *don't know* response option for respondents once the conversion text was triggered.

Dividing the total number of responses to the critical questions after the conversion text was displayed by the total number of cases where the conversion text was triggered provided a conversion rate for the questions that was attributed to the conversion text. Overall, conversion text was triggered in the student interview approximately 1170 times throughout data collection. Eighty-five percent, or 1000, of these cases were converted to a response after the conversion text was displayed. The web interviews accounted for 980 of the 1170 cases where conversion text was triggered and 880 of the 1000 converted cases. The remaining 190 cases where conversion text was triggered were in telephone and field interviews, of which 120 were converted. The rate of conversion as measured by the triggering of conversion text was 90 percent in web interviews, compared with 63 percent in telephone and field interviews ($\chi^2 = 9.75, p < .001$). There was not a

way to measure conversion to a response by telephone and field interviewers before conversion text was triggered.

Conversion text was triggered more than 100 times for three interview questions. The *occupation coder* (RDOCC1) triggered conversion text in 340 cases and yielded a conversion rate of 96 percent. Web cases were converted at a rate of 96 percent, compared with telephone and field cases, which were converted at a rate of 67 percent ($\chi^2 = 2.69, p < .01$). *Monthly rent or mortgage payment amount* (RFMTGAMT) triggered conversion text in 310 cases, with a conversion rate of 69 percent. Web cases were converted at a rate of 81 percent, compared with telephone and field cases, which were converted at a rate of 39 percent ($\chi^2 = 7.09, p < .001$). *Amount owed for undergraduate loans* (RBUGOWE) triggered conversion text in 120 cases, and produced a conversion rate of 84 percent with no significant mode difference. Table 27 displays the rates of conversion for all 15 items in the interview with conversion text. Conversion rates were examined overall and by mode.

Table 27. Conversion rates for critical items, by mode of administration: 2009

Item	Item description	Number of cases	Number converted	Total percent converted	Percent converted to a valid response	Percent converted to a "don't know"
Total						
RBRPYAMT	Monthly undergraduate loan payment	50	40	78.3	32.6	45.7
RBUGLN	Took out undergraduate loans	30	30	92.9	85.7	7.1
RBUGOWE	Amount owed for undergraduate loans	120	100	83.8	49.6	34.2
RCFINAID	Postbaccalaureate financial aid type	20	20	87.5	62.5	25.0
RCPSTGRD	Enrolled in any school since earning bachelor's degree	40	40	90.7	90.7	†
RDCURHRS	Hours worked weekly	30	20	96.0	72.0	24.0
RDJSTAT	Working for pay	50	50	92.0	92.0	†
RDOCC1	Occupation coder	340	330	96.2	96.2	†
RDSEARCH	Looking for a job	40	40	85.4	85.4	†
RECONSID	Currently considering career in teaching at the K-12 level	60	50	92.7	72.7	20.0
RECURCRT	Certified to teach at the K-12 level	10	10	91.7	91.7	†
REEVRTCH	Taught grades K-12 since graduating from NPSAS	40	30	91.9	91.9	†
REJBTP01	Type of K-12 teaching position 1	10	10	90.9	90.9	†
REPREPAR	Prepared for a teaching career at the K-12 level	30	30	86.7	86.7	#
RFMTGAMT	Monthly rent or mortgage payment amount	310	210	68.9	54.4	14.4
Web						
RBRPYAMT	Monthly undergraduate loan payment	30	30	87.9	27.3	60.6
RBUGLN	Took out undergraduate loans	20	20	95.0	85.0	10.0
RBUGOWE	Amount owed for undergraduate loans	80	70	86.4	56.8	29.6
RCFINAID	Postbaccalaureate financial aid type	20	20	90.5	66.7	23.8
RCPSTGRD	Enrolled in any school since earning bachelor's degree	40	40	89.7	89.7	†
RDCURHRS	Hours worked weekly	20	20	100.0	70.0	30.0
RDJSTAT	Working for pay	40	40	90.5	90.5	†
RDOCC1	Occupation coder	340	330	96.5	96.5	†
RDSEARCH	Looking for a job	40	30	83.8	83.8	†
RECONSID	Currently considering career in teaching at the K-12 level	50	50	92.0	72.0	20.0
RECURCRT	Certified to teach at the K-12 level	10	10	90.9	90.9	†
REEVRTCH	Taught grades K-12 since graduating from NPSAS	30	30	89.7	89.7	†
REJBTP01	Type of K-12 teaching position 1	10	10	90.9	90.9	†
REPREPAR	Prepared for a teaching career at the K-12 level	20	20	82.6	82.6	#
RFMTGAMT	Monthly rent or mortgage payment amount	220	180	80.7	61.9	18.8

See notes at end of table.

Table 27. Conversion rates for critical items, by mode of administration: 2009—Continued

Item	Item description	Number of cases	Number converted	Total percent converted	Percent converted to a valid response	Percent converted to a “don’t know”
Telephone and field						
RBRPYAMT	Monthly undergraduate loan payment	10	10	53.8	46.2	7.7
RBUGLN	Took out undergraduate loans	10	10	87.5	87.5	#
RBUGOWE	Amount owed for undergraduate loans	40	30	77.8	33.3	44.4
RCFINAID	Postbaccalaureate financial aid type	#	#	66.7	33.3	33.3
RCPSTGRD	Enrolled in any school since earning bachelor’s degree	#	#	100.0	100.0	†
RDCURHRS	Hours worked weekly	10	#	80.0	80.0	#
RDJSTAT	Working for pay	10	10	100.0	100.0	†
RDOCC1	Occupation coder	#	#	66.7	66.7	†
RDSEARCH	Looking for a job	#	#	100.0	100.0	†
RECONSID	Currently considering career in teaching at the K-12 level	10	10	100.0	80.0	20.0
RECURCRT	Certified to teach at the K-12 level	#	#	100.0	100.0	†
REEVRTCH	Taught grades K-12 since graduating from NPSAS	10	10	100.0	100.0	†
REJBTP01	Type of K-12 teaching position 1	#	#	#	#	†
REPREPAR	Prepared for a teaching career at the K-12 level	10	10	100.0	100.0	#
RFMTGAMT	Monthly rent or mortgage payment amount	90	30	39.1	35.6	3.4

† Not applicable.

Rounds to zero.

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

3.5.4 Item Nonresponse

Rate of nonresponse was a data quality measure used to identify troublesome interview items and better understand the experiences of sample members in completing the interview. Total nonresponse rates were calculated for items with missing data (including *don’t know* responses) that were administered to at least 100 respondents. Overall, the item-level nonresponse analysis yielded 36 items out of 1,358 interview items with more than 5 percent missing data.²⁰

Items on coders returned relatively high rates of nonresponse²¹. The item with the highest rate of nonresponse, (RES DST01), was the district name on the elementary/secondary school coder. Of the 210 respondents who received this item, approximately 67 percent did not provide a text string for their elementary/secondary school’s district. Approximately 13 percent of respondents did not enter a text string for their original major in the major coder item (RBORGMAJ), 18 percent of respondents did not enter a text string for their job duties in the occupation coder item (RDJB DY), and 19 percent did not enter a text string for their employer’s industry in the industry coder item

²⁰ Partial and abbreviated interview completions and missing data for interview nonrespondents were excluded from this analysis. For interview items with multiple iterations, this analysis will evaluate the first iteration only.

²¹ Results of item nonresponse in this section apply only to the respondents to the B&B:08/09 interview and are not weighed by the B&B analysis weight. Chapter 6 provides additional details on the item nonresponse, the potential bias due to item nonresponse, and the impact of the item imputation which was used to fill in missing data and to reduce item nonresponse bias.

(RDIND). In addition, there were several income questions among those items with nonresponse rates greater than 5 percent. Approximately 42 percent of respondents did not provide an estimate of their spouses income on *spouse's income estimate for 2008* (RFINSRA), and 30 percent did not provide an amount for their private student loan debt on *amount borrowed in private undergraduate loans* (RBUGPRIV).

Item-level nonresponse rates were also examined by mode of administration. There were significant differences between the web mode and interviewer (telephone and field) modes in the nonresponse rates of 16 interview items. Notably, the following income items showed higher rates of nonresponse among telephone and field respondents than among web respondents: *income in 2008* (RFINCOM; $\chi^2 = 12.89, p < .001$); *spouse's income in 2008* (RFINCSP; $\chi^2 = 8.41, p < .001$); and *not married to spouse in 2008* (RFSPNOT; $\chi^2 = 9.05, p < .001$).

In contrast, the following items on coders showed higher rates of nonresponse among web respondents than among telephone and field respondents: *NPSAS original major: string* (RBORGMAJ; $\chi^2 = 4.65, p < .001$); *NPSAS primary major: string* (RBNPMAJ; $\chi^2 = 6.33, p < .001$); *NPSAS second major: string* (RBNPMJ2; $\chi^2 = 4.05, p < .001$); *postbaccalaureate degree 1 primary major: string* (RCMAJ01; $\chi^2 = 10.48, p < .001$); *industry: coder* (RDINDCD; $\chi^2 = 11.56, p < .001$); *[REJBTP01] school: lowest grade level offered* (RESGLO01; $\chi^2 = 2.17, p < .05$); and *[REJBTP01] school: highest grade level offered* (RESGHI01; $\chi^2 = 2.23, p < .05$).

Table 28 summarizes the item-level nonresponse for items administered to at least 100 respondents with a rate of at least 5 percent missing.

Table 28. Interview items with highest nonresponse rates, by mode of administration: 2009

Item	Item description	Mode of administration					
		Overall		Web		Telephone and field	
		Number adminis-tered to	Percent missing	Number adminis-tered to	Percent missing	Number adminis-tered to	Percent missing
Undergraduate Education							
RBSTER01	Stopout reason: primarily enrolled at different school	1,510	5.7	1,200	6	310	4
RBSTSC01	Stopout reason: to enroll at different school	1,510	5.7	1,200	6	310	4
RBSTAC01	Stopout reason: academic problems	1,510	5.7	1,200	6	310	4
RBSTTO01	Stopout reason: needed time off from studying	1,510	5.7	1,200	6	310	4
RBSTMI01	Stopout reason: conflicts with job/military	1,510	5.7	1,200	6	310	4
RBSTWK01	Stopout reason: work for financial reasons	1,530	6.8	1,210	8	310	4
RBSTFI01	Stopout reason: other financial reasons	1,510	5.7	1,200	6	310	4
RBSTFM01	Stopout reason: change in family status	1,510	5.7	1,200	6	310	4
RBSTPR01	Stopout reason: personal reasons	1,510	5.7	1,200	6	310	4
RBSTOT01	Stopout reason: other reasons	1,510	5.7	1,200	6	310	4
RBUGPRIV	Amount borrowed in private undergraduate loans	3,240	29.6	2,730	33	510	10
RBORGMAJ	NPSAS original major: string	650	12.6	510	16	150	1
RBNPMAJ	NPSAS primary major: string	1,290	11.9	1,050	15	240	#
RBNPMJ2	NPSAS second major: string	580	15.8	490	19	100	2
Postbaccalaureate Education/Training							
RCMAJ01	Postbaccalaureate degree one primary major: string	5,240	11.3	4,400	13	840	1
Postbaccalaureate Employment							
RDJBDY	Job duties	11,800	17.9	9,690	22	2,110	1
RDIND	Industry: string	11,800	18.8	9,690	22	2,110	5
RDINDCD	Industry: coder	9,180	11.9	7,580	14	1,600	3
K-12 Teaching							
RESCH01	[REJBTP01] school: name	210	12.4	160	11	50	17
RESCIT01	[REJBTP01] school: city	210	9.6	160	9	50	13
RESTAT01	[REJBTP01] school: state	210	5.7	160	6	50	4
RESTYP01	[REJBTP01] school: type	210	17.7	160	19	50	13
RES DST01	[REJBTP01] school: district	210	66.5	160	68	50	62
RESCNT01	[REJBTP01] school: county	210	64.6	160	68	50	53
RESGLO01	[REJBTP01] school: lowest grade level offered	210	36.8	160	41	50	23
RESGHI01	[REJBTP01] school: highest grade level offered	210	34.9	160	39	50	21
REJBOS01	Other school-related income while in [REJBTP01] position	1,340	6.2	1,070	7	270	4
REOSAM01	Time frame for other school-related income in [REJBTP01] position	390	22.3	310	25	90	13

See notes at end of table.

Table 28. Interview items with highest nonresponse rates, by mode of administration: 2009—Continued

Item	Item description	Mode of administration					
		Overall		Web		Telephone and field	
		Number administered to	Percent missing	Number administered to	Percent missing	Number administered to	Percent missing
REOTAM01	Time frame for additional income while in [REJBTP01] position	350	15.3	270	17	80	9
REMOVE	Plan to move into nonteaching job in K-12 education	4,520	35.7	3,620	42	900	10
Student Background							
RFINCOM	Income in 2008	14,490	5.3	11,930	4	2,560	11
RFINEST	Income in 2008: estimate	770	21.0	500	22	270	19
RFINCSP	Spouse's income in 2008	3,210	6.1	2,580	4	630	13
RFSPNOT	Not married to spouse in 2008	3,630	5.4	2,970	4	660	13
RFINSRA	Spouse's income in 2008: estimate	200	41.5	110	38	80	47

Rounds to zero.

NOTE: This table only includes those items that were administered to at least 100 respondents. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

3.6 Student Interview Conclusions

B&B:08/09 interviews were conducted from July 13, 2009 to March 12, 2010. Of the 17,170 eligible sample members included in the B&B:08/09 student interview data collection, 16,050, or 93 percent, were successfully located. Successful locating methods included batch searches, such as Telematch and CPS, and address update information provided by both sample members and their parents. Overall, about 7 percent of sample members required intensive tracing. Locating methods attempted during the B&B:08/09 interview included text message reminders and the use of social networking sites.

Of the 17,170 sample members included in the B&B:08/09 student interview data collection, 15,090, or 88 percent, completed a full, abbreviated (English or Spanish), or partial interview. About 96 percent of all B&B:08/09 interview respondents completed the full interview. Eighty-one percent of interviews were completed on the Web, 16 percent of interviews were completed by telephone, and 3 percent were completed in field interviewing. Eighty-nine percent of base-year respondents completed the B&B:08/09 interview, compared with 49 percent of base-year nonrespondents. Two-thirds (67 percent) of all completed B&B:08/09 interviews and over three-fourths (80 percent) of web interviews were completed during the early response phase. Base-year respondents received \$30 if they completed the interview in either the early response or nonresponse conversion phase. Base-year nonrespondents received \$50 to complete the interview.

On average, the B&B:08/09 interview took 28 minutes to complete. On average, telephone interviews took the longest to complete and the Undergraduate Education section in the interview took the longest to complete.

An evaluation of the quality of the data provided by the B&B:08/09 student interview showed that methodological features built into the instrument as well as training and supervision of interviewing staff aided in the successful administration of the interview. The design of assisted coding systems in the instrument and the training of interviewers on coders appeared successful.

Overall, expert coders agreed with major, occupation, and industry codes chosen in the interview 90 percent of the time. The appearance of help text and conversion text in the instrument also appeared to improve question response. Help text was accessed significantly more often during interviews by telephone and field interviewers than by web respondents. It should be noted that interviewers had been encouraged to use help text, as needed, as this feature of the instrument was emphasized during telephone interviewer training. Eighty-five percent of the cases where conversion text was triggered in the interview were converted to a response after the conversion text was displayed. Overall, the item-level nonresponse analysis yielded 36 items out of 1,358 interview items with more than 5 percent missing data.

Debriefing of tracers and field interviewers at the end of data collection indicated that frequent monitoring of telephone interviewers, a help desk that tracked and resolved difficulties encountered by sample members attempting to complete the web interview, and quality circle training and feedback meetings were useful as data collection quality control (QC) procedures. Most interviewers indicated that they felt they had all the tools necessary to successfully administer the B&B:08/09 student interview.

Chapter 4.

Transcript Data Collection, Outcomes, and Evaluation

B&B:08/09 collected postsecondary transcripts for the B&B:08 cohort as an official record of sample members' academic experiences, including courses taken and performance in these courses. To ease burden on participating institutions, the B&B:08/09 transcript collection was combined with the transcript collection for BPS:04/09 under PETS:09. This chapter provides an overview of the B&B:08/09 portion of the transcript collection and will describe the processes and systems developed for collecting transcripts. It will also report on transcript keying and coding activities and the data and process evaluation procedures introduced to assure data quality.

4.1 Transcript Data Collection and Response Rates

A Transcript Control System (TCS) was designed to manage the transcript and other institution data requested from the institutions attended by the B&B:08 cohort. Institution contactors (ICs) served as liaisons to institutions that provided the requested materials through a variety of possible submission methods, including a study website. Transcripts were received for a total of 17,430 students. The details of transcript data collection and response rates are included in this section.

4.1.1 Transcript Control System

The integrated, web-based TCS supported each step of the B&B:08/09 transcript collection, including project management, communications, and tracking. The TCS comprised several transcript management systems: the *Institution Contacting System* was used to store and access data on students and track efforts to obtain their transcripts; the *Data Receipt System* managed data received on sample members, including transcripts and catalogs for the institutions attended; and the *Keying and Coding System* (KCS) facilitated the efficient and secure capture of data from student transcripts. See section 4.2 for a detailed discussion of the development and use of the KCS. Transcript control system data were stored in SQL databases accessible for use in reporting, documenting and delivering transcript data.

4.1.2 Training of Institution Contactor (IC) Staff

Institution contacting staff consisted of eight ICs and two QCS who were responsible for staff supervision. Prior to the start of transcript data collection, the ICs were trained over a 2-day period on transcript and catalog collection, gaining cooperation, and problem resolution. Training included information on B&B and a review of confidentiality regulations. Activities focused on guidelines for interactions with institution staff, gaining cooperation, collection of catalogs and transcripts, and collection and receipt systems. During the transcript collection period, staff were briefed on their progress, asked questions, and discussed issues at weekly quality circle meetings. The IC training agenda is included in appendix G.

4.1.3 Transcript Collection Procedures

Transcripts were requested from the 1,100 institutions where B&B sample members completed their bachelor's degree requirements during the 2007–08 academic year (their NPSAS institution). A complete transcript was requested from this institution for each student.

Beginning in late October 2008, a transcript request packet was sent to the director of the institution research office at each institution. In the absence of an office of institution research, packets were sent to the registrar's office. The packet contained notification materials for transcript data collection (see appendix H), including the following:

- a letter introducing PETS:09;
- an introductory letter from NCES;
- a letter of endorsement from the American Association of Collegiate Registrars and Admission Officers;
- a list of other endorsing agencies;
- information regarding how to log on to the study's secure website;
- descriptions of and instructions for the various methods of providing transcripts; and
- excerpts from the Family Educational Rights and Privacy Act that illustrated the transcript collection's compliance with the legislation.

Follow-up calls by trained ICs were placed 2 days after the initial mailing to ensure receipt of the packet and to answer any questions about the study. Prompting calls were made and reminder e-mails sent, as needed, from November 2008 through July 2009.

Transcript submission. Institutions were provided the following seven options for submitting transcripts:

1. *File upload to the study website.* Institutions were asked to submit electronic transcript files, preferably in an extensible markup language (XML) or electronic data interchange (EDI) format that conformed to the Postsecondary Electronic Standards Council standard. If the transcript data were not already in one of the two preferred formats, the institution was asked to convert the files before loading, or to prepare files using the file specifications provided on the study website. The transcript files were submitted directly to the secure study website. The latest technology systems were incorporated into the transcript website application to ensure strict adherence to NCES confidentiality guidelines. The web server included an SSL encryption certificate and was configured to force encrypted data transmission over the Internet. All of the data entry modules on the site were password protected, and the user was automatically logged out of the system after 20 minutes of inactivity. Just as with all the submission methods, once the transcript files were received, they were immediately moved to a secure project folder accessible only to a subset of project staff.
2. *Submission of electronic transcripts by secure file transfer protocol (FTP) server.* Transcript files could be submitted using an FTP server, which ensures an encrypted control session. As with the file upload, it was preferable for files to be submitted using an XML or EDI format, but files could be submitted in virtually any file layout. After being copied to the secure project folder, the files were immediately deleted from the FTP server.

3. *Submission of transcripts via eSCRIP-SAFE™.* eSCRIP-SAFE™ is a third-party vendor that receives and electronically converts transcripts to PDF files, then stores them on a secure server. Institutions registered with this service send data by secure internet connection to the eSCRIP-SAFE™ server, where they can be downloaded only by a designated user. The electronic transcript files downloaded by project staff from eSCRIP-SAFE™ were saved only to the secure project folder.
4. *Submission of transcript files as encrypted attachments to e-mail.* Electronic transcript files could be emailed as attachments to the project e-mail account. Guidelines on encryption and creating strong passwords for transcript attachments were provided to the institutions. Encrypted transcript files were moved to the secure project folder and deleted from the e-mail folder immediately.
5. *Submission of transcript files through a dedicated server at the University of Texas at Austin.* A dedicated server at the University of Texas at Austin, developed to allow transcript exchange among registered institutions, was provided as an option to institutions submitting transcripts to the study. The server supported both XML and EDI formats.
6. *Submission of transcripts via secure electronic fax.* Transcripts were also accepted via secure electronic fax. To safeguard against information being misdirected or intercepted by individuals to whom access was not intended or authorized, RTI protocol only allowed for transcripts to be sent to an e-fax server housed in a secured data center at RTI. The transcript data were stored on the server as portable document files (PDFs). To ensure confidentiality, institutions were asked to send a test fax with nonsensitive data and to use a specific fax cover sheet from the project website that included a confidentiality statement. After being received and copied to the secure project folder, transcript files were deleted from the e-fax server.
7. *Submission of transcripts via FedEx.* Transcripts were also accepted via FedEx. To safeguard confidentiality, institution staff were instructed to redact any personally identifiable information from the transcript including student name, address, date of birth, and SSN (if present). Paper transcripts were kept in a locked file cabinet in RTI's secure data receipt facility, to which only a limited number of B&B:08/09 transcript staff had access. After the paper transcripts were scanned and stored electronically, they were shredded.

In addition to transcripts, other information from each institution was needed for keying and coding. Institutions were asked to provide academic calendar and grading system information on the study website. If course catalogs could not be obtained separately through institution websites or through CollegeSource Online, a resource for over 50,000 postsecondary institution catalogs, they were requested from institutions.

Transcripts and course catalogs received were inventoried, assigned unique identifiers, reviewed for any problems with legibility and completeness, and logged each day in the data receipt system. Project staff used daily monitoring reports to review problem transcripts and ICs assisted with resolving transcript problems directly with institutions.

4.1.4 Institution Website

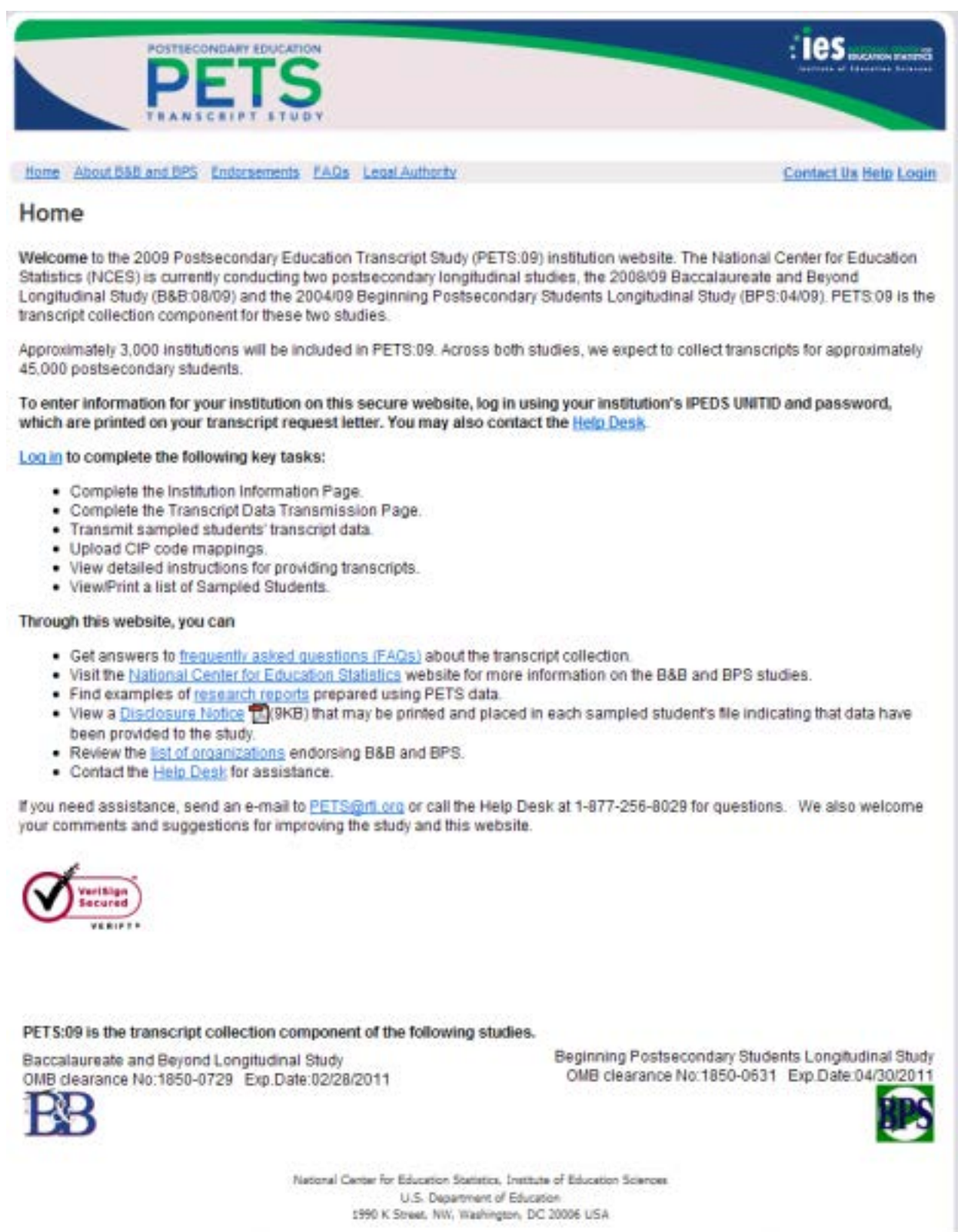
The PETS:09 website (figure 10) was the portal used to collect institution data and transcripts. The website contained information about PETS, including research topics, the transcript collection, how transcript data would be used, answers to frequently asked questions, and

confidentiality assurances. Contact information for the transcript data collection help desk and project staff at RTI, as well as links to the main NCES and RTI websites, were also included on the home page. From the secure portion of the website, institutions could view the list of their sampled students, view detailed instructions for providing transcript data, and upload data.

Various systems were incorporated into the website application to ensure strict adherence to NCES confidentiality guidelines, including the following:

- an SSL Certificate ensured secure data transmission over the Internet,
- all data entry modules were password protected,
- users were automatically logged out of the system after 20 minutes of inactivity, and
- files uploaded to the secure website were immediately moved to a secure project folder accessible only to a subset of project staff.

Figure 10. Institution website home page: 2009



SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

4.1.5 Transcript Collection Response Rates

Institution-level participation. Of 1,300 institutions in the transcript sample, 85 percent were determined to be eligible (i.e., they were confirmed as awarding bachelor's degrees during the NPSAS:08 academic year). Of these 1,100 eligible institutions, 1,020 (93 percent) provided transcripts for the sampled students. Across the institution types represented, participation in the transcript collection ranged from 79 percent at the public 2-year institutions to 95 percent at the public 4-year non-doctorate-granting institutions. (The private nonprofit 2-year or less institutions demonstrated 100 percent participation but with a very small number of institutions.) The most common reasons cited by institutions for not participating included lacking the available staff to fulfill the request for transcripts and the timing of the transcript request. Table 29 provides institution participation rates by institution type.

Table 29. Eligible institution participation, by institution type: 2009

Institution type	Eligible institutions	Participating institutions ¹	
		Number	Percent
Total	1,100	1,020	92.7
Public			
2-year	20	20	79.2
4-year non-doctorate-granting	190	180	95.1
4-year doctorate-granting	250	230	93.6
Private nonprofit			
2-year or less	#	#	100.0
4-year non-doctorate-granting	320	290	92.1
4-year doctorate-granting	200	190	94.1
Private for-profit			
2-year or more	120	110	89.3

Rounds to zero.

¹ An institution was considered a participant if it provided a transcript for at least one student.

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008 National Postsecondary Student Aid Study (NPSAS:08) and 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Transcript submission method outcomes. Table 30 presents the distribution of transmission methods selected by the institutions. Providing transcripts via secure fax was the choice of the majority of the institutions: 61 percent of the institutions used the secure fax option. This was the most convenient option for most institutions that routinely generate and send out hard-copy transcripts. The next most common method was to upload transcripts via the institution website, accounting for about 20 percent of institutions. About 8 percent of institutions sent transcripts via FedEx and 6 percent sent transcripts as encrypted attachments via e-mail. The less common methods included secure FTP, used by 4 percent of institutions, and the dedicated server at the University of Texas at Austin and eSCRIP-SAFE™ which were used by 1 percent or less of institutions.

Table 30. Institution transmission mode for transcript data: 2009

Transmission mode	Institutions	
	Number	Percent
Total	1020	100.0
Electronic fax	620	61.1
Upload to study website	210	20.3
FedEx	90	8.4
E-mail	60	5.6
Secure FTP	40	3.8
eSCRIP-SAFE™	10	0.6
University of Texas server	#	0.2

Rounds to zero.

NOTE: Detail may not sum to totals because of rounding. FTP = file transfer protocol.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008 National Postsecondary Student Aid Study (NPSAS:08) and 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Student-level transcript collection. The transcript sample comprised 18,500 students. As seen in table 31, a transcript, or information indicating that a student was ineligible, was received for 17,430 (94 percent) students.

Table 31. Student-level transcript collection results: 2009

Transcript collection results	Transcript sample	
	Number	Percent
Total	18,500	100.0
Received	17,430	94.2
Did not receive	1,070	5.8

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008 National Postsecondary Student Aid Study (NPSAS:08) and 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

4.2 Transcript Keying and Coding

Keying and coding of transcripts was completed using a data entry application. Several quality control activities evaluated the various types of data collected (e.g. courses, major/field of study). This section will describe keying and coding procedures as well as outcomes.

4.2.1 Transcript Keying and Coding Procedures

Transcript keying and coding was performed by a team of specially trained data entry (keyer/coder) staff using a web-based data entry application. Work was evaluated using several quality control activities designed for various types of data collected (e.g., courses, major/field of study). The keying and coding sections (figure 11) collected the following transcript information (for a full list of keyed and coded transcript data elements, see appendix I):

- *Case information.* Preliminary transcript information including student name, address, and high school graduation date.

- *Schools and terms.* Names of the transcript school and any transfer institutions reported on the transcript, terms attended at these schools, and attempted and accepted transfer credits.
- *Academics.* Academic honors awarded (e.g., Dean's or President's List) and any probations, by term.
- *Tests.* Institution exams (e.g., competency and placement exams) or externally administered exams (e.g., SAT and GRE), and related scores.
- *Degrees and majors.* Degree programs attempted or earned, such as a bachelor's or associate's degree, degree receipt dates, and honors awarded at graduation such as *cum laude*. The specific majors or fields of study for each degree were coded in this section.
- *Courses.* Key data on courses listed on transcripts, including the terms in which the courses were taken, course numbers and names, and grades and credit or clock hours earned. In this section, each course was also coded for standardization.

Figure 11. Keying and coding system sections: 2009

Case information	Schools and terms
Student name	School name, city, state
Address	Attendance dates by term
High school graduation date	Transfer credits attempted and accepted
Academics	Tests
Honors	Exam type
Probations	Date taken
Degrees and majors	Courses
Program (e.g., BA, AA)	Course number
Degree name	Course name
Date received	Course code
Graduation honors	Course credits
Major 1, 2; Minor 1, 2; Concentration	Grade

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

To help ensure the quality of data keyed and coded, specific features were incorporated into the KCS. For example, the KCS provided links to institution course catalogs for easy reference; limited ranges and the types of characters input for fields such as dates and exam scores; and required that postsecondary institutions, majors, and courses be coded using specially designed coders.

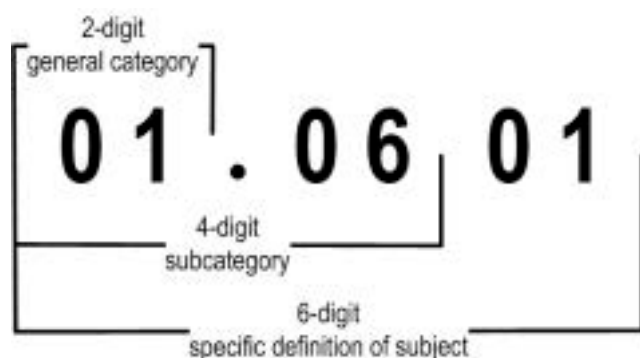
KCS coding systems. The school and major or field of study coders incorporated into the KCS were assisted coders identical to those used in the B&B:08/09 student interview instrument. The school coder used the set of institutions contained in IPEDS, developed by NCES (<http://nces.ed.gov/IPEDS/>). The major or field of study coder was based on the CIP taxonomy developed by NCES (<http://nces.ed.gov/ipeds/cipcode>). CIP codes not associated with postsecondary majors or fields of study were removed from this coder, including codes for basic

skills and developmental education, citizenship activities, health-related knowledge and skills, interpersonal and social skills, leisure and recreational activities, personal awareness and self-improvement, and high school/secondary diplomas and certificates.

The KCS course coder was similar to the KCS school and major or field of study coders, with the addition of certain search features. When a text string with the course title was entered, a keyword search based on the course title was conducted on the underlying database allowing the keyer/coder staff person to select the best option from a list of possible course options returned. If the course title did not adequately capture the description of the course in the institution catalog, keyer/coders could search the course coder database using keywords found in the course description in the institution course catalog or they could do searches by broad categories and by database codes. The KCS also included a feature for entering problem sheets for particular schools or transcripts. Problem sheets were categorized and routed to supervising staff for resolution.

Development of the KCS course coder. The underlying database for the course coder in the KCS included 2,119 course codes and code definitions. Course codes were developed by integrating selected courses from the College Course Map taxonomy (CCM) (Adelman 2004) into the 2010 CIP taxonomy from NCES. PETS codes were represented by six digits in keeping with the CIP taxonomy: the first two digits indicated the most general category; the first four digits narrowed the focus to a subcategory; and the complete 6-digit code provided the most specific definition of the subject. Figure 12 provides a visual representation of the structure of CIP codes.

Figure 12. CIP code diagram: 2009



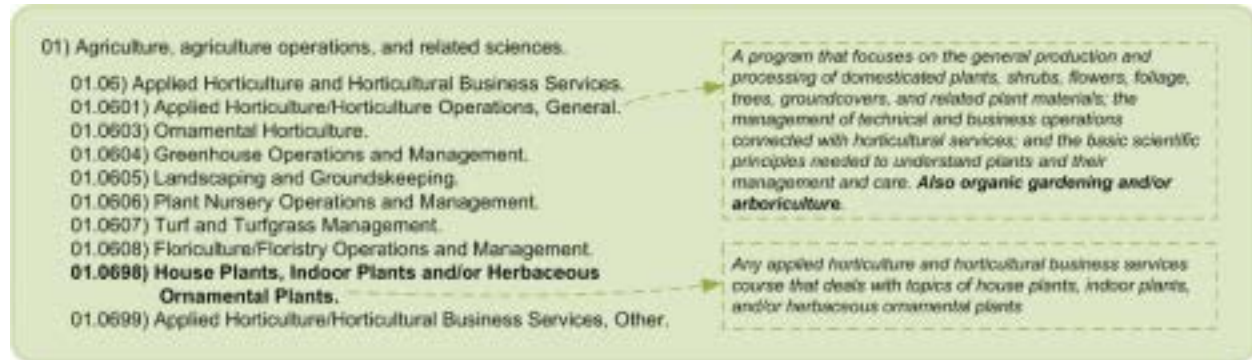
NOTE: CIP = Classification of Instructional Programs.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Course codes in the CCM taxonomy, which used the same 6-digit structure as the then-current CIP, were developed through extensive transcript analysis and with input from expert advisors, including postsecondary faculty familiar with the fields of study. To create a comprehensive course coder for PETS:09, content from the CCM was incorporated into the 2010 CIP in two ways: (1) course codes found in the CCM without equivalents in the CIP were added as new codes, and (2) CCM codes with equivalent CIP codes were reviewed and, when additional details or examples were found, they were added to the CIP definitions. The first method resulted in the addition of 352 unique CCM course codes to the KCS course coder. These additions were placed alongside related topics in the 2-digit category and 4-digit subcategory structure common to both the CCM and CIP taxonomies. To make these additions easily identifiable, the last two digits in their codes used a unique numbering scheme, starting with 98 and descending as needed. An example can be seen in code 01.0698 in figure 13.

The second method for integrating the CCM and the 2010 CIP resulted in adding content to the definitions of 316 CIP codes. The additional text increased the likelihood of identifying appropriate course codes using the keyword searchable KCS course coder. In instances where a CIP code was elaborated, the CCM content was placed at the end of the CIP definition. Finally, in addition to content from the CCM, 47 *general* and *other* codes were added to the KCS course coder using KCS course coder fifth and sixth digit values of “00” for *general* and “99” for *other*, when these codes were not already present in the CIP. Figure 13 illustrates a representative set of codes in the KCS course coder.

Figure 13. Course codes layout in the KCS coders: 2009



NOTE: Bold text represents content and codes added from Adelman's College Course Map (CCM). KCS = keying and coding system.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Transcript courses were originally coded using the available draft of the 2010 CIP. The database for the course coder in the KCS was updated when the final version of the 2010 CIP was released in July 2009. Compared to the draft version, the final 2010 CIP included 80 new codes, 21 codes with different code numbers, and two codes that were deleted from the draft. For the 80 new codes in the final 2010 CIP, courses on transcripts previously coded with similar codes from the draft 2010 CIP were reviewed by keyer/coder staff to determine if they fit better into the new CIP codes. There were 17,778 courses previously coded with draft 2010 CIP codes that were updated to the final 2010 CIP codes. There were just three courses previously coded with deleted CIP codes from the draft 2010 CIP which, when reviewed, were assigned to similar, related codes in the final version of the 2010 CIP.

4.2.2 Training of Transcript Keyer/Coder Staff

Over the course of three separate 5-day trainings, beginning in January 2009, 71 keyer/coder staff were trained to use the KCS. The keyer/coder staff were supervised by five QCS who were responsible for administrative and management issues, as well as quality review of keyed and coded transcripts and keying and coding, as needed.

Each training session began with background on B&B:08/09, review of confidentiality regulations, fingerprinting, and signing of notarized affidavits. These activities were followed by an overview and discussion of the different types of transcript formats and key data elements to be located and entered into the KCS. Presentations on keying and coding fundamentals were followed by problem-solving exercises and practice sessions. The fifth day of training consisted primarily of supervised keying and coding practice using actual transcripts, followed by a practicum exam on

which all trainees were required to obtain 90 percent or better proficiency for certification. The training agenda for transcript data collection is included in appendix G.

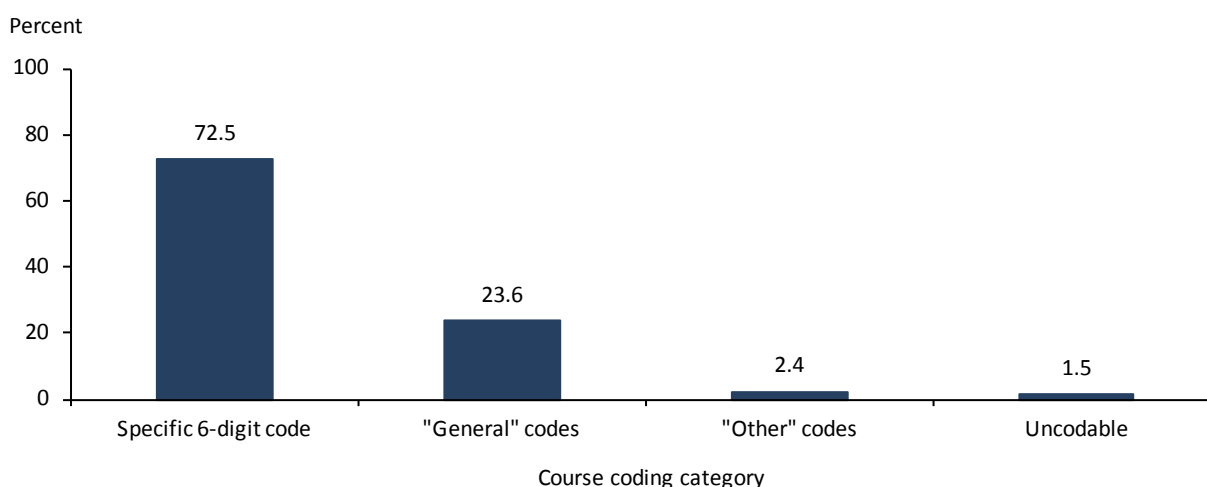
In conjunction with the above trainings and because of the wide variation in transcript layouts and information provided by the institutions, quality circle meetings were held weekly for the first 8 months of keying/coding. During the meetings, QCS and a group of keyer/coders were briefed on production and performance measures and were invited to ask questions or raise concerns. Topics discussed ranged from the use of specific CIP codes, to keying of the more problematic data elements. As the project progressed, the frequency of the quality circle meetings was adjusted to biweekly.

Often as a result of feedback during quality circle meetings, additional narrowly focused trainings were held as needed for specific topics, such as entering multiple transcripts for sample members, coding of electronic transcripts, and the use of problem sheets to record issues or questions with transcripts.

4.2.3 Transcript Keying and Coding Outcomes

Keying and coding was performed on 16,070 transcripts, with one transcript per student. These transcripts included a total of 741,450 courses, 28,090 terms, and 17,180 degrees. Of the 741,450 courses coded, 73 percent were coded with a specific *6-digit* code. *General* codes were selected for 24 percent of the courses coded and were typically chosen for the many introductory level courses, while *other* codes were selected for 2 percent of the courses when no more specific code matches in the KCS course coder were found for a course on a transcript. *Uncodeable* courses accounted for 2 percent of all courses, often due to unclear course titles or inadequate information on course content. The results of course coding are shown in figure 14.

Figure 14. Course coding results: 2009



SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

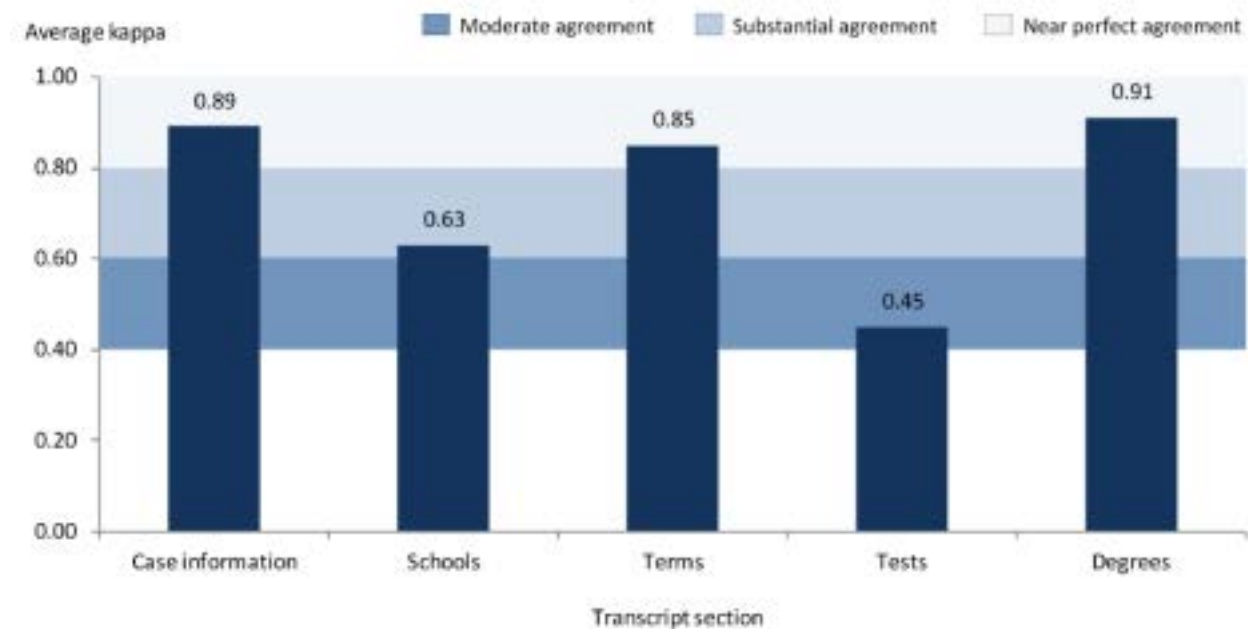
4.2.4 Evaluation of Transcript Keying and Coding

Multiple evaluation steps were taken to ensure the quality of transcript data entered into the KCS. These activities included rekeying a sample of data elements, expert coding a sample of course

and major/field of study coding, and upcoding of text strings for institutions or other transcript data elements that could not be coded initially.

Rekeying. To evaluate the reliability of transcript data keyed into the KCS, approximately 10 percent (1,600) of the transcripts were randomly selected to be rekeyed. A subset of transcript data elements were rekeyed by quality control supervisors, which took approximately 10 to 15 minutes per transcript, depending on the number of the selected data elements found on the transcript (e.g., the number of terms attended). Figure 15 shows agreement rates for the rekeying activity, organized by keying and coding section. For both rekeying and recoding activities, the Cohen's kappa statistic was used to assess inter-rater reliability between the original coder and quality control supervisors, or expert coders. Cohen's kappa measures the proportion of agreement between raters, above what would be expected by chance. Landis and Koch (1977) proposed that kappa scores of 0.81-1.00 be considered “near-perfect agreement,” 0.61-0.80 “substantial agreement,” and 0.41-0.60 “moderate agreement.”²² All of the rekeyed items have at least moderate agreement, with case information, terms, and degrees all within the range of near perfect agreement.

Figure 15. Rekey kappa values by transcript section: 2009



SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Data collected in the test section of the KCS (exam name, date taken, and score), however, had a noticeably lower value for kappa (0.45) than other data elements. Further investigation into test data on transcripts revealed that of the 1,020 institutions that provided transcripts, only 28 schools included Advanced Placement (AP) tests with scores on their transcripts. Instead, tests, particularly exams for which course credit was awarded, were often included on transcripts in a format more similar to courses (e.g., “AP biology, 3.0 credits”). Due to the low interrater reliability

²² Although Landis and Koch’s classification scheme is commonly used as a benchmark for kappa scores, there is debate regarding its utility and the appropriateness of kappa classification schemes, in general. See Gwet (2010), Sim and Wright (2005) and Fleiss (1981) for detailed discussions of criticisms and alternative classifications.

score and frequency with which test data were found on transcripts, this category of data were determined to be unreliable and will not be included in B&B data file because its presence on postsecondary transcripts was determined to be unreliable.

Expert coding. Expert coding was performed on 71,820 courses, both to evaluate the reliability of coded data and to create feedback opportunities to improve data quality. Expert coding used more experienced (expert) staff, all of whom held at least a bachelor's degree and who also performed coding in the field test study, to recode a subsample of coded courses and to provide feedback to keyer/coders on course code selection. Expert coding was performed from the beginning of the keying and coding process and continued until its conclusion so that keyer/coder staff could receive feedback on their performance and additional training needs could be addressed promptly.

Initially, the expert coding process included two steps. In expert coding 1 (EC1), expert coder staff reviewed course information and selected a code, which was then compared to the keyer/coder's choice. In cases where the keyer/coder and expert coder selections did not match, expert coding 2 (EC2) was performed to assess the reliability of EC1. EC2, in addition to being performed on all cases where EC1 and keyer/coder choices did not match, was also performed on a 15 percent random sample of codes where the EC1 and keyer/coder agreed.

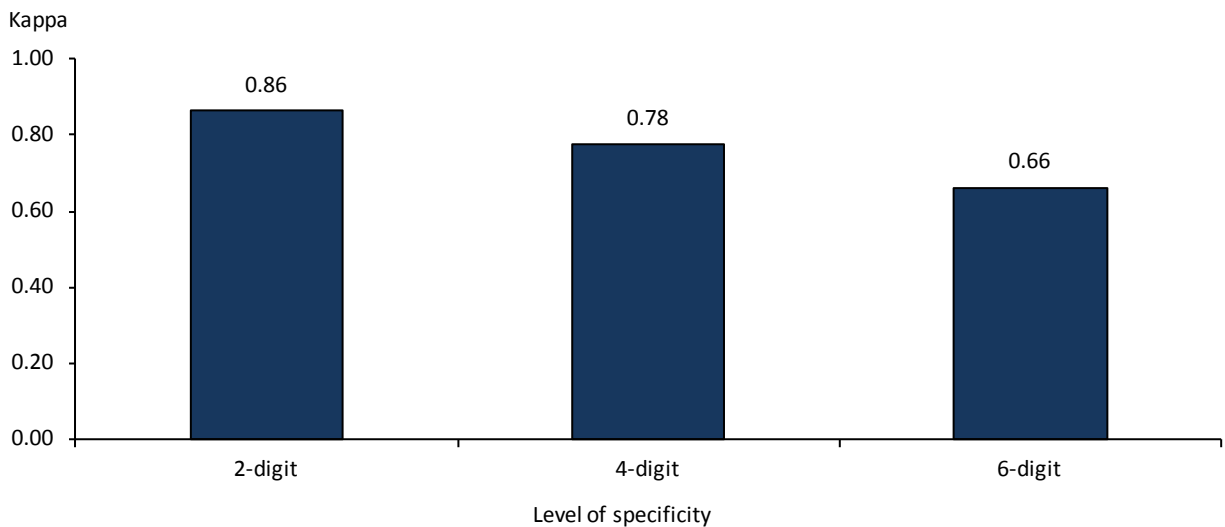
EC2 was performed as a review of the quality of the EC1 staff and included review of course information and deciding upon the EC1 choice, the keyer/coder choice, or an entirely different code—to avoid potential bias, the EC2 could not identify which selection was made by the EC1 or keyer/coder. EC2 review of keyer/coder EC1 disagreements added reliability to the EC1 code selections upon which keyer/coder feedback was developed. EC2 was performed by the same project staff responsible for keyer/coder training and course code development.

Based upon a sample of 3,350 disagreements between keyer/coder and EC1, EC2 agreed with EC1 in 60 percent of the cases, with the keyer/coder in 32 percent of the cases, and selected a different code (neither the EC1 nor the keyer/coder's choice) in 9 percent of the cases. The EC2 staff agreed with expert coder choices significantly more than the keyer/coder choices: $\chi^2(1, N = 3,350) = 308.22, p < 0.01$.

As with keying and coding, expert coding was performed in batches by school. Courses were not expert coded until all of a school's transcripts had been keyed and coded. For both EC1 and EC2, expert coders reviewed course number and name and had access to course catalogs to make coding decisions.

For the purpose of reviewing keyer/coder work and providing feedback, expert coding was performed on both random and cluster samples of courses. EC1 was performed on a random 10 percent sample of all courses from each school. For schools with fewer than 10 total courses, all courses were expert coded. Cluster sampling was used to select courses coded with *other* codes (e.g., 26.0299, biochemistry, biophysics and molecular biology, other). Courses coded as *needs review* or *uncodeable* were also reviewed in expert coding.

Interrater reliability for course coding was assessed using 5,000 courses randomly selected for calculating agreement statistics. The kappa statistic was used to assess interrater reliability between the original coder and expert coders. Expert coding results are shown in figure 16. Agreement rates are shown at three levels of specificity: 2-digit, 4-digit, and 6-digit. At the 2-digit level, the kappa statistic indicates near-perfect agreement between keyer/coder and expert coder. At both the 4- and 6-digit levels, the kappa statistic indicates substantial agreement.

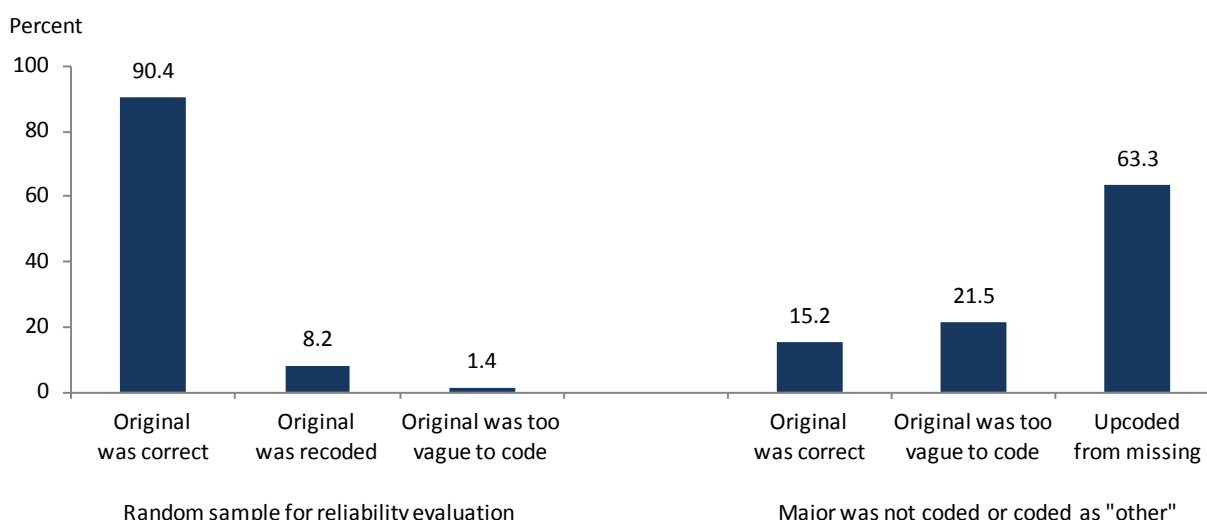
Figure 16. Expert coding results, kappa by level of specificity: 2009

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Review of “other” course codes. For the first six months of keying, courses coded using the “other” category in the PETS:09 coder were reviewed by expert coders with the goal of minimizing the use of the category. Keyer/coder training emphasized that “other” codes should be reserved for courses that fit within a 4-digit subject area but for which more specific 6-digit codes in that series were not appropriate. “Other” was not intended for coding problematic courses or those for which additional analysis would result in a more accurate code. Expert coders provided direct feedback to keyer/coders on cases for which there were more appropriate coding choices.

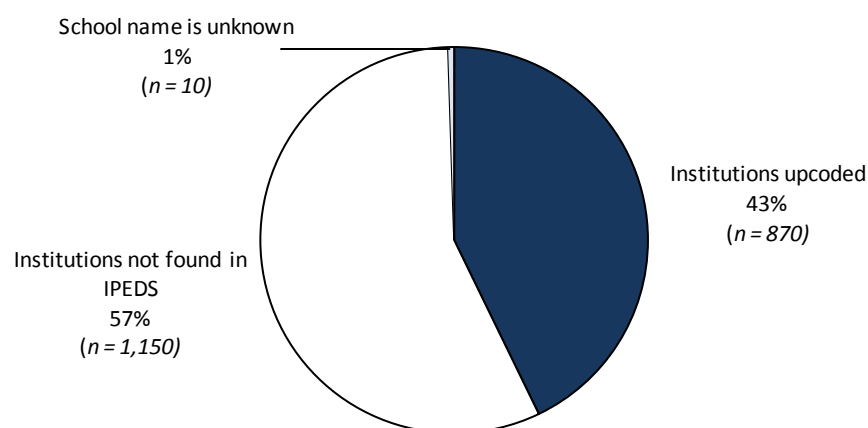
In addition to the expert coding performed, “other” codes were also reviewed to determine if additional codes should be added to the PETS coder. The PETS course taxonomy included 231 courses with an “other” designation, such as 31.0599, “Health and Physical Education/Fitness, Other,” or 23.9999, “English Language and Literature/Letters, Other.” A review of the courses coded as “other” was undertaken to determine if there were common subjects within the codes that would merit introduction of new codes. The median number of uses of “other” for all course codes was 132. This median was used as the threshold for adding a new code: if 132 instances of the same subject could be identified within the courses coded using the “other” code, a new code would be added. However, a review of “other” codes did not identify any subjects that met this threshold, so no new codes were added.

Upcoding and reliability recoding for major/field of study. Text strings for 158 entries for field of study that were not coded by keyer/coders were later reviewed by project staff to determine if an appropriate code could be identified. In addition to this upcoding activity, a random sample of 2,745 coded majors was also included in this process as a key-rekey step to evaluate the reliability of the field of study data. The results are shown in figure 17. For the randomly selected cases, the coder and recoder agreed in 90 percent of the cases. For the uncoded majors, project staff was able to identify a major code in 63 percent of the cases. In 22 percent of the uncoded cases, data on the transcripts were too vague to identify an appropriate code and, in 15 percent of cases, the original code selection was correct.

Figure 17. Major/field of study upcoding: 2009

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Upcoding for institutions and variables with “other, specify” options. Uncoded text strings for institutions were reviewed by project staff to determine if an appropriate code could be identified. This task was performed on 2,020 cases by staff with greater familiarity with postsecondary institutions and with additional resources for researching school names and locations. The results of this institution upcoding are shown in figure 18. In 57 percent of the cases, the institution could not be identified in IPEDS, and thus remained uncodeable. Analysts were able to code 43 percent of the previously uncodeable institutions while for less than 1 percent of cases, the school name could not be identified at all.

Figure 18. Institution IPEDS upcoding: 2009

NOTE: Detail may not sum to totals because of rounding. IPEDS = Integrated Postsecondary Education Data System.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

In addition to institutions, transcript data elements with “other, specify” options included:

- noncourse credits awarded (e.g., course credit for Advanced Placement tests),
- tests (e.g., SAT),
- term honors (e.g., Dean’s List),
- term probations (e.g., academic probation),
- degree programs (e.g., associate’s),
- grades (e.g., R),
- bachelor’s degree types (e.g., Bachelor of Education), and
- degree honors (e.g., with distinction).

All items coded as “other, specify” were reviewed by analysts to determine if the text strings could fit into existing choices or if there were common strings that merited addition of a new choice. For example, Bachelor of Education was not included in a drop-down menu for bachelor type, therefore it was entered as a text string under “Other, specify.” When the value appeared repeatedly as a text string, it was assigned as a category and upcoded accordingly. Table 32 shows the results of “other, specify” upcoding. The total number of cases is shown for each data element along with the number and percent that were upcoded.

Table 32. Upcoding of “other, specify” data: 2009

Data elements with “other, specify” option	Number of “other, specify” cases	Number upcoded	Percent upcoded
Noncourse credits awarded	6,870	5,720	83.3
Tests	2,440	1,080	44.2
Term honors	31,640	21,730	68.7
Term probations	8,350	3,420	40.9
Degree programs	10	10	50.0
Grades	52,860	35,750	67.6
Bachelor's degree types	840	640	75.3
Degree honors	320	230	73.4

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond (B&B:08/09)

Keyer/Coder Staff Debriefing. Near the conclusion of keying and coding, a debriefing focus group was held with seven keyer/coders who had collectively keyed and coded more than 10,000 transcripts. Two participants had also performed duties as QCS. Focus group participants agreed that the keyer/coder training had been helpful and prepared them for the task. They also found quality circle notes and meetings to be useful. The keying and coding system facilitated entry of transcript data, although some data elements in the system were not commonly found on transcripts, such as “transfer credits for grade point average” and “state basic skills tests.”

Regarding course coding, focus group participants found the search features of the KCS to be useful, but certain course subjects were difficult to code, such as engineering and computer courses, as well as some education courses, when it was difficult to discern whether the course was

about learning the topic itself or learning about how to teach the topic. Finally, focus group participants indicated that identifying remedial courses was sometimes difficult, for instance when the course description sounded like it could be remedial but without stating so explicitly. In such cases, keyer/coders were sometimes able to confirm a course was remedial by noting a grade greater than an F with no credits awarded.

4.2.5 Timing of Transcript Keying and Coding

Transcript keying and coding was conducted from January 19, 2009, to June 11, 2010. On average each transcript took 88 minutes to key and code. The time to complete keying and coding varied by institution sector, ranging from a 75 minute average for transcripts from private, for-profit 2 years or more institutions, to 98 minutes for transcripts from private, nonprofit, 4-year non-doctorate granting institutions (table 33).

Table 33. Average minutes per transcript, by institution type: 2009

Institution type	Number of transcripts	Average minutes/transcript
Total	7,250	88.03
Public		
2-year ¹		
4-year non-doctorate-granting	1,000	83.46
4-year doctorate-granting	3,200	86.13
Private nonprofit		
2-year or less		
4-year non-doctorate-granting	1,250	98.42
4-year doctorate-granting	1,450	89.51
Private for-profit		
2-year or more ¹	350	75.25

¹ Institution offered a 4-year degree during the sample member's enrollment.

NOTE: Only transcripts completed in less than 4 hours were used in calculation of average minutes/transcript. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond (B&B:08/09).

4.3 Transcript Data Collection Conclusions

A transcript collection was conducted for B&B:08/09 as part of PETS:09. Institution contacting staff were trained to facilitate the data collection process, using a transcript control system to aid institution representatives in the submission of transcripts. A PETS:09 website was also developed to aid institutions in the submission of transcripts, providing instructions for several secure electronic transmission methods, fax, and FedEx. Data receipt staff completed initial processing and quality review of the transcript data and institution contacting staff communicated with staff at postsecondary institutions to resolve any missing data or problems.

Transcript keying and coding was performed using a specially designed keying and coding system that was divided into sections for the entry of data for case information, schools and terms, academics, tests, degrees and majors, and courses. A postdata collection debriefing of keyer/coder staff indicated the system was effective for transcript data entry. The PETS coder, created by

merging 2010 CIP and 2003 CCM, provided a detailed code taxonomy for the coding of courses by subject.

The 5-day keyer/coder training and ongoing feedback offered through quality circle meetings prepared staff to reliably perform keying and coding tasks. All staff passed the proficiency test at the conclusion of training, and the results of the keying and course coding interrater reliability assessments indicate substantial agreement between keyer/coders and expert coders. Recoding of the random sample of major/field of study data further supported the reliability of the data.

Upcoding was performed on all uncoded institutions and additional data elements where “other, specify” options were available, such as noncourse credit awarded, tests, honors, probations, and degree programs. Upcoding added greater detail to data collected. Courses coded with “other” codes were reviewed for common subjects, but none were found in great enough numbers to add new course codes.

Chapter 5.

Postdata Collection Data File Processing Activities

The data files for B&B:08/09 contain student-level data collected from administrative databases, student interviews, and transcripts. These data are available to users in two ways. A set of restricted research files, fully documented, are available to restricted data licensees on a CD from NCES. Tables and regression analyses can be run by any user through the NCES online application PowerStats, which also contains variable documentation. PowerStats is available online via the DataLab site at <http://nces.ed.gov/datalab/index.aspx>. This chapter describes each file and details the editing and documentation processes applied to each.

5.1 Administrative Record Matching

In addition to the student interview, data collection for B&B:08/09 included record matching to the CPS, the National Student Loan Data System (NSLDS), and the NSC StudentTracker database. This section provides a discussion of the observed match rates for these three databases.

5.1.1 Central Processing System

The CPS contains data provided to the U.S. Department of Education by students and their families when they complete the Free Application for Federal Student Aid (FAFSA). Successful record matching to CPS can occur only for sample members who were federal student financial aid applicants for the years requested. Matching for B&B:08/09 was to CPS data for the 2008–09 and 2009–10 financial aid years, using a sample member's SSN concatenated with the first two letters of the last name as the *CPS ID*. The percentage of sample members who matched to CPS for the 2008–09 academic year was about 24 percent. For 2009–10, the rate was approximately 23 percent. As expected, 2009–10 match rates were lower than those for 2008–09 because fewer members of the B&B:08 cohort continued to be enrolled in postsecondary education and to apply for federal aid. Table 34 shows the CPS matching results.

Table 34. Central Processing System matching results, by academic year: 2008–10

CPS matching results	Academic year			
	2008–09		2009–10	
	Number	Percent	Number	Percent
Total	18,500	100.0	18,500	100.0
Matched	4,400	23.8	4,150	22.4
Did not match	14,100	76.2	14,340	77.5

NOTE: Detail may not sum to totals because of rounding. CPS = Central Processing System.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond (B&B:08/09).

5.1.2 National Student Loan Data System

NSLDS matching was performed by the NSLDS contractor at the request of the U.S. Department of Education, using names, SSNs and dates of birth provided by RTI. Successful matching to NSLDS could occur only for sample members who were awarded federal loans, Pell Grants, TEACH Grants, SMART Grants, or ACGs. NSLDS files are historical, so information about a student's receipt of such loans and grants was available not only for the current academic year but also for any applicable prior years. Consequently, historical match rates reported for the B&B:08/09 sample members do not necessarily reflect only the 2009–10 academic year. The federal loan match rate was about 75 percent and the match rate for Pell Grants was about 52 percent. The number of sample members matching to the data system for ACGs or SMART Grants was about 19 percent, while the match rate for TEACH Grants was less than 1 percent. This is not surprising, given that less than 15 percent of our respondents reported in the interview that they were currently teaching or had taught since graduating. Table 35 summarizes the match rates observed for the B&B:08/09 sample members.

Table 35. National Student Loan Data System matching results, by loan and grant type: 2009

NSLDS matching results	Federal loan		Pell Grant		ACG or SMART		TEACH	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	18,500	100.0	18,500	100.0	18,500	100.0	18,500	100.0
Matched	13,800	74.6	9,550	51.6	3,440	18.6	30	0.2
Did not match	4,690	25.4	8,950	48.4	15,060	81.4	18,470	99.9

NOTE: Detail may not sum to totals because of rounding. ACG = Academic Competitiveness Grant. NSLDS = National Student Loan Data System. SMART = Science and Mathematics Access to Retain Talent. TEACH = Teacher Education Assistance for College and Higher Education.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond (B&B:08/09).

5.1.3 National Student Clearinghouse

In addition to the CPS and NSLDS file matching, the B&B:08/09 sample was matched to the NSC StudentTracker database, which provides information on postsecondary enrollment, degree, and certificate records on behalf of participating postsecondary institutions. In order to perform the match, RTI supplied SSNs, names, and dates of birth for sample members to the NSC. Overall, a record match for a student's enrollment at any NSC-participating institution was obtained for about 94 percent of the B&B:08/09 sample. Match results in table 36 are based on enrollment and degree records from all participating institutions for the 2002–03 academic year through the 2008–09 academic year.

Table 36. National Student Clearinghouse StudentTracker matching results: 2009

Matching to the NSC	Number	Percent
Total	18,500	100.0
Matched	17,450	94.4
Did not match	1,050	5.6

NOTE: Detail may not sum to totals because of rounding. NSC = National Student Clearinghouse.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond (B&B:08/09).

5.2 B&B:08/09 Main Study Data Files

The primary analysis file, from which PowerStats was constructed, contains data for 15,050 respondents. The first data release was adjudicated and approved for public release July 20, 2011. The primary analysis file contains over 400 variables, developed from multiple sources. Throughout the data collection period, data were processed and examined for QC purposes. Editing of student data began shortly after the start of web data collection, when procedures and programs for this purpose were first developed. Anomalous values were investigated and resolved, where appropriate, through the use of data corrections and logical recodes. Interim files were delivered to the NCES for review throughout the data collection period.

The restricted-use CD for B&B:08/09 contains the following files, each of which can be linked by the student's study ID:²³

- *B&B:08/09 analysis file.* Contains analytic variables derived from all B&B data sources and selected direct student interview variables available as of the initial release of B&B:08/09 PowerStats.
- *B&B:08/09 student data file.* Contains student interview data collected from 15,050 respondents. Topics include eligibility, undergraduate and graduate education, employment, teaching and background.
- *B&B:08/09 undergraduate institution data file.* Contains undergraduate institution and degree data obtained from the B&B:08/09 student interview for all respondents. It is a student-level file; however, a student can have more than one record in the file. There is a separate record for each degree obtained from each postsecondary institution that the student attended between the time they graduated from high school and the time they graduated with their bachelor's degree (the maximum number of reported institutions for any one respondent was seven).
- *B&B:08/09 graduate institution data file.* Contains postbaccalaureate institution and degree data obtained from the B&B:08/09 student interview for all respondents. It is a student-level file; however, a student can have more than one record in the file. There is a separate record for each degree obtained from each postsecondary institution that the student attended since earning their bachelor's degree.
- *B&B:08/09 coding data file.* Contains major/field of study, industry, and occupation strings collected in the B&B student interview and the associated codes.
- *CPS data files.* Contains data received from the CPS for the eligible sample members who matched to the financial aid application files.
2007–08: file contains about 10,490 respondents matched
2008–09: file contains about 4,400 respondents matched
2009–10: file contains about 4,150 respondents matched
- *NSLDS loan data file.* Contains raw loan-level data received from the NSLDS for the 13,800 respondents who were awarded loans through 2009–10. This is a history file with separate records for each transaction in the loan files; therefore, there can be multiple records per case spanning several academic years.

²³ The restricted files are available to researchers who have applied for and received authorization from NCES to access the restricted ECB. Researchers may obtain authorization by contacting the NCES Data Security Office.

- *Pell data file.* Contains raw grant-level data received from the NSLDS for the 9,550 respondents who were awarded Pell grants through 2009–10. This is a history file with separate records for each transaction in the Pell system; therefore, there can be multiple records per case.
- *ACG/SMART data file.* Contains raw grant-level data received from the NSLDS for the 3,440 respondents who were awarded ACGs or SMART Grants through 2009–10. This is a history file with separate records for each transaction in the database; therefore, there can be multiple records per case.
- *Teacher data file.* Contains raw grant-level data received from the NSLDS for the 30 respondents who were awarded TEACH Grants through 2009–10. This is a history file with separate records for each transaction in the database; therefore, there can be multiple records per case.
- *ACT data file.* Contains data received from ACT for the 5,390 respondents who matched to the 2001–02 through 2006–07 ACT files.
- *CCD data file.* The CCD file contains the most recent Common Core of Data records (from the 2008–09 academic year) for schools whose NCES ID's were reported by B&B:08/09 respondents as schools in which they worked.
- *PSS data file.* The PSS file contains the most recent Private School Survey records (from the 2007–08 academic year) for schools whose NCES ID's were reported by B&B:08/09 respondents as schools in which they worked.
- *NPSAS:08 file.* Contains the base-year data included in the NPSAS:08 ECB.
- *B&B:08/09 weights file.* Contains all of the analysis weights created for B&B:08/09, including transcripts. There is a separate record for each study respondent.²⁴

5.3 Transcript Data Files

The data files for the B&B:08/09 transcript component contain the data included on each transcript that was entered via the KCS, as well as approximately 315 composite variables derived from that data. Many of the student-level derived variables are available through PowerStats.²⁵ The following files, which contain records for the 16,070 transcript component respondents, were produced for the restricted CD:

- *Transcript analysis file.* Contains student-level analytic variables derived from transcript data, and selected direct transcript variables.
- *Institution data file.* Contains institution-level data obtained from the student transcripts with a record for each sampled NPSAS institution that sent transcripts and also for transfer institutions noted on those transcripts. This is a file of institutions only; it does not contain a student ID or transcript ID. Each record includes institution control, level, location, credit/clock hour uses, calendar system, grading system, and units required to

²⁴ See Chapter 6 for a full description of the B&B:08/09 study weights.

²⁵ A set of restricted research files fully documented through an ECB are available to restricted data licensees from the National Center for Education Statistics (NCES). Tables and regression analyses can be run by any user through NCES's online application PowerStats, which also contains variable documentation. PowerStats is available online via the DataLab site at <http://nces.ed.gov/datalab/index.aspx>.

be designated full-time. This file also contains some institution-level derived variables such as institution selectivity and the percentage of faculty members who are full-time.

- *Student schools data file.* Contains a record pertaining to a single pairing of student and school. There could be multiple records per student if a student's NPSAS institution transcript listed credits that were granted by another institution and transferred to the NPSAS institution. Each record contains student ID, school IPEDS ID, date student first attended institution, transfer credits attempted/accepted at institution, and transfer credits for grade point average. Records pertaining to the NPSAS institution also contain cumulative transcript totals and high school graduation date. This file also contains some student/school derived variables such as the proportion of terms enrolled full time and the ratio of credits earned to credit required for degree.
- *Degree data file.* Contains degree-level data with a record for each degree obtained or attempted at any institution, as listed on the NPSAS institution's transcript. Each record includes degree and program data such as type of degree, degree date, and degree honors received. It also includes majors, minors, concentrations and their respective 2010 CIP codes. This file also contains some degree-level derived variables such as condensed field of study categories.
- *Courses data file.* Contains course-level data with a record for each course taken that was included on the NPSAS institution's transcript as well as transfer courses listed on the transcript. Each record includes course name, course number, grade, credits earned, quality points, Postsecondary Education Transcript Study course code, and course attributes. This file also contains course-level derived variables that normalize other variables. The normalization process allows for all values of the variable in question to be placed on the same scale so that they are comparable across students and institutions. This file contains normalized variables for grade, potential credit, earned credit, and quality points.
- *Terms data file.* Contains a record pertaining to a single pairing of student and term for all institutions. Each record contains the IPEDS ID of the institution, transcript ID, term name, start and end dates, and honors/probation indicators. This file also contains some term-level derived variables such as total earned credits, term grade point average, and enrollment status.

5.4 Data Editing

The B&B:08/09 data, including data from the transcript component, were edited using procedures developed and implemented for previous studies sponsored by NCES, including the base-year study, NPSAS:08. Following data collection, the information collected in the student instrument and in transcripts was subjected to various QC checks and examinations. For example, in the student interview these checks were conducted to confirm that the collected data reflected appropriate item routing (*skip patterns*). Another evaluation involved examination of all variables with missing data and substitution of specific values to indicate the reason for the missing data. For example, in the student interview data, an item may not have been applicable to particular students, a respondent may not have known the answer to the question, or a respondent may have skipped the item entirely (table 37).

Table 37. Description of missing data codes: 2009

Missing data code	Description
-1	Don't know
-3	Not applicable
-6	Value out of range
-8	Item was not reached due to an error
-9	Data missing ¹

¹ Includes items not administered in the abbreviated interview.

SOURCE: U.S. Department of Education, National Center for Education Statistics. 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Skip-pattern relationships in the interview database were examined by methodically cross-tabulating gate items and their associated nested items. In many instances, gate-nest relationships spanned multiple levels within the interview: Items nested within a gate question may themselves have been gate items for additional items. Consequently, validating the gate-nest relationships often required several iterations and many multi-way cross-tabulations to ensure the proper data were captured. Gate-nest relationships were also preserved and edited appropriately in the transcript data files; however, fewer of these relationships exist in those data.

The data cleaning and editing process for the B&B:08/09 data files involved a multistage process that consisted of the following:

1. Blank or missing data were replaced with -9 for all variables in the interview and transcript databases. A one-way frequency distribution of every variable was reviewed to confirm that no missing or blank values remained. These same one-way frequencies revealed any out-of-range, or *outlier*, values, which were replaced with a -6 value (e.g., hourly wages of \$0.10, rather than \$10.00). Creating SAS formats from expected values and the associated value labels also revealed any categorical outliers. Descriptive statistics were produced for all continuous variables. All values that were less than zero were temporarily recoded to *missing*, and the minimum, median, maximum, and mean values were examined to assess reasonableness of responses; anomalous data patterns were investigated and corrected, as necessary. For transcripts, missing data were also replaced with a -9 (e.g., if high school graduation date did not appear on the transcript) and one-way frequencies were reviewed for any *outlier* values and also given a -6 value (e.g., credit hours of 100 per course, rather than 3).
2. Legitimate skips were identified through the use of interview source code and flowcharts. Gate-nest relationships were defined to replace -9s (*data missing*, *reason unknown*) with -3s (*not applicable*), as appropriate. Two-way cross-tabulations between each gate-nest combination were evaluated; high numbers of nonreplaced -9 codes were investigated to ensure skip-pattern integrity. Nested values were further checked to reveal instances in which the legitimate skip code overwrote valid data, which typically occurred if a respondent answered a gate question and the appropriate nested items but then reverted to change the value of the gate to one that opened on an alternate path of nested items. Because responses to the first nested items remained in the database, they required editing. For transcripts, gate-nest relationships were limited; however, -3 values were set for inapplicable items.

For example, if a transcript indicated that the student was still working on the degree, then a -3 value was given to the *degree date* variable.

3. Variables were formatted (e.g., dates were formatted as YYYYMM), and time units were standardized for items that collected amounts of time in multiple units. In addition, any new codes assigned by expert coders reviewing IPEDS, elementary and secondary school, industry, occupation, and major codes from the interview (including those strings that could not be coded during the interview) were merged back with the interview data files. Similarly, any new codes assigned by the expert coder reviewing the IPEDS, major, minor, concentration and other specify strings from the transcript data were merged back with the transcript data files. Also at this stage, logical recodes were performed when the value of missing items could be determined from answers to previous questions or preloaded values. For example, if a student was not currently repaying education loans, then the monthly payment amount was recoded to \$0. For transcripts, missing IPEDS, major, and course codes were reviewed by expert coders.

Concurrently with data cleaning, documentation was developed for both interview and transcript data to detail question text, response options, logical recoding, and the “applies to” text for each delivered variable (for documentation information, see the student interview facsimile in appendix D).

5.5 Data Perturbation

To protect the confidentiality of NCES data that contain information about specific individuals and to minimize disclosure risks, B&B:08/09 data were subject to perturbation procedures. Perturbation procedures, which have been approved by the NCES Disclosure Review Board, preserve the central tendency estimates but may result in slight increases in nonsampling errors.

All respondents were given a positive probability of being selected for swapping. Perturbation was carried out under specific targeted, but undisclosed, swap rates. In data swapping, the values of the variables being swapped are exchanged between carefully selected pairs of records: a target record and a donor record. Swapping variables were selected from all questionnaire items.

Because perturbation of the B&B:08/09 data could have changed the relationships between data items, an extensive data quality check was carried out to assess and limit the impact of swapping on these relationships. For example, a set of correlations for a variety of variables was evaluated pre- and posttreatment to verify that the swapping did not greatly affect the associations.

5.6 Statistical Imputations

All variables from the student interview data and the derived variables in PowerStats with missing data were imputed. Imputed data are available in both PowerStats and the restricted derived data file. Derived variables obtained from student transcript data and the variables included in the remaining restricted files were not imputed. The variables were split into six batches to facilitate and expedite imputation, and a consistent imputation methodology was employed for each batch. Some

of the B&B respondents had missing NPSAS data,²⁶ so these NPSAS variables were imputed first. These NPSAS variables were then used as part of the imputation process for the B&B variables.

The general imputation methodology consisted of three steps. The first step, if applicable, was logical or deterministic imputation. That is, if the imputed value could be deduced from the logical relationships with other variables, then that information was used to deterministically impute the value for the recipient. The next step was the use of a tree-based methodology, or in a few cases a response propensity model, to create imputation classes. The final step used hot deck²⁷ imputation to stochastically impute missing values from donors within the identified imputation classes.

Variables requiring imputation were imputed sequentially. However, some variables that were related substantively or had similar levels of missing response were grouped together into blocks, and the variables within a block were imputed simultaneously. The order in which variables, or blocks of variables, were imputed was primarily based on the level of missing data. The variables with lower levels of missing data were imputed before the variables with higher levels of missing data. When a variable was selected for imputation based on its level of missing data, three specific pieces of information were evaluated. First, logical consistency was checked to make sure that any known relationships were maintained throughout the imputation process. Second, the pattern of missing data were evaluated to determine whether other variables should be included to create a block of variables requiring imputation. Finally, the imputation class variables and sorting variables were identified.

All stochastic imputations used a tree-based methodology to create imputation classes and the weighted sequential hot-deck (WSHD) methodology (Cox 1980; Iannacchione 1982) within imputation classes to replace missing values. The imputation classes were formed using nonparametric classification trees (Breiman et al. 1984). The nonparametric classification trees formed imputation classes from a prediction model based on the observations with valid values for the variable requiring imputation. The nonparametric classification tree recursively split the cases into homogenous groups, which were used to define the imputation classes. The observations with missing values for the variable to be imputed were assigned their imputation class based on the same variables used in the tree splits.

The WSHD methodology replaced missing data with valid data from a donor record within an imputation class. The WSHD methodology also incorporated sorting within imputation class for additional control and uses the sample weight of each record in the donor selection process. The imputation classes in the application of the WSHD methodology were formed by identifying variables related to the variable requiring imputation. Data were sorted within each imputation class to increase the chance of obtaining a close match between donor and recipient. Within each imputation class, the hot-deck process searched for donors sequentially, starting with the recipient and progressing up and down the sorted file to find the set of eligible donors from which a random selection of a donor was made. The process was weighted since it incorporated the sample weight of each record in the search and selection routine, using the methodology described in Cox (1980).

Imputation diagnostics consisted of four checks: number of times a donor was used, overall imputation checks, imputation checks by class variables, and multivariate consistency checks. The check for the number of times a donor was used was to ensure that donors were used a reasonable

²⁶ Some NPSAS data were missing for some B&B respondents because they did not respond to NPSAS but did respond to B&B, were identified in NPSAS as graduate students, or were not identified in NPSAS as potential B&B cases.

²⁷ The term *hot deck* refers to the fact that the set of potential donors comes from the same data set. In contrast, *cold deck* imputation refers to the fact that the donors come from an external data set or source.

number of times. Using a donor too many times might indicate that an imputation class had too few donors, and the class needed to be enlarged. The overall imputation checks compared the distributions, weighted and unweighted, for each level of the imputed variable before and after imputation. Differences of 5 percent or more were flagged and examined to see if changes should be made to the imputation specification. The imputation checks by class variables compared the distributions, weighted and unweighted, for each level of the imputed variable in the defined imputation classes before and after the imputation. Differences of 5 percent or more were flagged for further review. Finally, multivariate consistency checks ensured that relationships between variables were maintained and that any special instructions for the imputation were implemented properly.

If any of the four aforementioned diagnostic checks indicated a problem, i.e., a donor was used too many times, substantial deviation from the weighted sums, or any identified inconsistencies, the imputation process was revised and rerun. Some results of the imputation process are provided in Appendix J, which presents the percentage missing for each variable subject to imputation, as well as pre- and postimputation distributions for all of these variables. Appendix M shows that approximately 13 percent of the variables with a response rate less than 85 percent showed statistically significant estimated bias between the pre- and postimputation means and distributions (see section 6.4.2 for more details).

5.7 Composite and Derived Variable Construction

Analysts created the main study analytic variables by examining the data available for each student from the various data sources, prioritizing the data sources on an item-by-item basis, and reconciling discrepancies within and between sources. In some cases, the derived or composite variables were created by simple assignment of a value from the available source with the highest priority. In other cases, interview items were recoded or otherwise summarized to create a derived variable. Similar procedures were used for transcript analytic variables using only data from transcripts and institutions providing transcripts. Details about the creation of each variable appear in the variable descriptions contained in the ECB and PowerStats. For a listing of the set of analysis variables derived for B&B:08/09, see appendix K.

Chapter 6.

Weighting and Variance Estimation

This chapter provides information pertaining to the weighting procedures for B&B:08/09. The development of statistical analysis weights for the B&B:08/09 sample is discussed in section 6.1. Analysis procedures that can be used to produce design-unbiased estimates of sampling variances are discussed in section 6.2, including variances computed using Taylor series and bootstrap replication techniques. Section 6.2 also describes how the Taylor series strata and primary sampling unit (PSU) variables were constructed, and how the bootstrap replicate weights were constructed. Section 6.3 gives weighted and unweighted response rates. Section 6.4 discusses the accuracy of B&B:08/09 estimates for precision and the potential for nonresponse bias.

6.1 Analysis Weights

The weights for analyzing the B&B:08/09 data were derived from the NPSAS:08 weight, because the B&B:08/09 sample members are a subset of the NPSAS:08 sample. As described in chapter 2, a stratified sample of 500 NPSAS:08 student interview nonrespondents was selected with probabilities proportional to their NPSAS:08 sampling weight. The weight for these cases was adjusted for the subsampling. Three weights were developed for analyzing data from the B&B:08/09 data collection. One weight was developed for analyzing sample members who responded to the B&B:08/09 interview. A second weight was developed for analyzing cases with transcript data. A third weight was developed for analyzing cases with both interview and transcript data. The weights were adjusted for nonresponse and were also raked to IPEDS and NPSAS:08 control totals. This section describes the steps that were followed in order to develop each weight.

6.1.1 Analysis Weight for Cases With Student Interview Data

A B&B:08/09 respondent is someone who has a completed, partial, or abbreviated interview. The B&B:08/09 sample consisted of 18,500 students. At the conclusion of the B&B:08/09 data collection, 15,050 students were initially determined to be eligible respondents, 2,120 were nonrespondents, 1,320 were ineligible, and 10 were deceased.

The *2007–08 National Postsecondary Student Aid Study (NPSAS:08) Full-scale Methodology Report* (Cominole et al. 2010) (hereinafter referred to as the NPSAS:08 Full-scale Methodology Report) describes the development of the NPSAS study weight. The statistical analysis weight compensated for the unequal probability of selection of institutions and students in the NPSAS:08 sample. The weight also adjusted for multiplicity at the institution and student levels, unknown student eligibility, nonresponse, and poststratification. The institution weight was computed and then used as a component of the student weight. A weight was computed for NPSAS:08 respondents as the product of the following 10 weight components:

1. institution sampling weight (WT1);
2. institution multiplicity adjustment (WT2);
3. institution poststratification adjustment (WT3);
4. institution nonresponse adjustment (WT4);
5. student sampling weight (WT5);

6. student multiplicity adjustment (WT6);
7. student unknown eligibility adjustment (WT7);
8. student not located adjustment (WT8);
9. student other nonresponse adjustment (WT9); and
10. student poststratification adjustment (WT10).

The B&B:08/09 sample contains both NPSAS study respondents and nonrespondents. Therefore, the B&B:08/09 base weight was formed as the product of the first seven of these adjustment factors.

The subsample of 500 NPSAS:08 student interview nonrespondents was selected with probabilities proportional to the NPSAS:08 student weight. The B&B:08/09 base weight was multiplied by the inverse of this selection probability for the subsampled cases to obtain the weight for cases in the sample.

An adjustment was made for interview nonresponse using a model-based constrained logistic weighting procedure. The weights were then calibrated to IPEDS and weight sums from NPSAS:08, which had been calibrated to IPEDS and external control totals as described in the NPSAS:08 Full-scale Methodology Report.²⁸ The procedure WTADJUST in SUDAAN (RTI, 2008) was used to implement the nonresponse and calibration adjustments. This weighting methodology is described by Folsom and Singh (2000).

The adjustment for nonresponse was performed in multiple steps because the predictors of response propensity are potentially different for interview refusals and other nonrespondents. Using multiple steps of nonresponse adjustment can achieve greater reduction in nonresponse bias than a single-step adjustment.

The first stage of adjustment for interview nonresponse was an adjustment for refusal. The refusal adjustment model included the 17,160 eligible cases who were not deceased; the response (nonrefusal) indicator was set to 1 for the 16,450 interview respondents and other nonrespondents and to 0 for the 720 cases who were interview refusals. Independent variables were chosen that were considered to be predictive of response status and were nonmissing for interview respondents, refusals, and other nonrespondents. Variables for the model include the frame and survey design variables that were used for the NPSAS:08 weight adjustments and other data known for both the respondents and nonrespondents. Candidate predictor variables include:

- institution control;
- region;
- institution enrollment from IPEDS file (categorical);
- Pell Grant receipt (yes/no);
- Pell Grant amount (categorical);
- Stafford Loan receipt (yes/no);

²⁸ Calibration in this chapter generally refers to adjusting the weights to weight sums, and poststratification generally refers to adjusting the weights to external totals. However, these terms are sometimes used interchangeably when referring to both types of adjustments at the same time.

- Stafford Loan amount (categorical);
- Parent Loan for Undergraduate Students (PLUS) amount (categorical);
- federal aid receipt (yes/no);
- institution aid receipt (yes/no);
- state aid receipt (yes/no);
- any aid receipt (yes/no);
- SSN indicator (yes/no);
- NPSAS response status (three levels);
- number of times answering machine was encountered (three levels);
- in field cluster area (yes/no);
- count of phone numbers we have for a student;
- count of e-mail addresses we have for a student; and
- count of mailing addresses we have for a student.

Variables initially included in the nonresponse modeling included all of the candidate predictor variables as well as certain important interaction terms. To detect important interactions for the nonresponse model, a Chi-squared automatic interaction detection (CHAID) analysis was performed on the predictor variables. The CHAID analysis divided the data into segments that differed with respect to the response variable. The segmentation process first divided the sample into groups based on categories of the most significant predictor of response. It then split each of these groups into smaller subgroups based on other predictor variables. It also merged categories of a variable that were found to be nonsignificant. CHAID was run for up to three segments, resulting in the identification of two-way and three-way interactions. Variables that made up the CHAID interaction terms were NPSAS response status, number of times an answering machine was encountered, whether the student was in a field cluster area, counts of phone numbers and e-mail addresses we have for a student, Stafford Loan receipt, and PLUS amount. This initial model did not converge, but as many variables as possible were retained in the model.

Table 38 presents the predictor variables used in the model to adjust the weight for refusals and the average weight adjustment factors resulting from these variables. The refusal weight adjustment factors have the following characteristics:

- minimum: 1.00;
- median: 1.02; and
- maximum: 2.17.

Table 38. Weight adjustment factors for refusal for the B&B:08/09 student interview weight: 2009

Model predictor variables	Number of nonrefusal respondents	Weighted response rate	Average weight adjustment factor
Total	16,450	92.78	1.05
Institution control			
Public	9,480	92.62	1.05
Private nonprofit	6,110	92.76	1.05
Private for-profit	860	95.14	1.02
Institution Region ¹			
New England	840	92.27	1.05
Mideast	2,910	91.83	1.05
Great Lakes	2,570	93.76	1.04
Plains	2,070	91.37	1.06
Southeast	3,790	93.50	1.04
Southwest	1,330	91.33	1.06
Rocky Mountains	760	96.19	1.02
Far West	1,950	92.53	1.05
Outlying areas	220	94.25	1.04
NPSAS:08 institution enrollment size			
4,743 or less	4,160	93.03	1.05
4,744 to 13,042	4,080	93.52	1.04
13,043 to 27,210	4,150	92.96	1.04
27,211 or more	4,050	91.94	1.05
Pell Grant amount received			
None	9,950	92.63	1.05
\$1,580 or less	1,660	93.30	1.04
\$1,581 to \$2,695	1,660	92.95	1.04
\$2,696 to \$4,310	1,520	93.79	1.04
\$4,311 or more	1,660	92.88	1.05
Stafford Loan amount received			
None	7,330	91.99	1.05
\$4,410 or less	2,340	93.05	1.04
\$4,411 to \$5,500	4,310	94.62	1.04
\$5,501 to \$6,500	270	83.50	1.16
\$6,501 or more	2,200	93.43	1.04
PLUS amount received			
None	15,440	93.02	1.04
\$5,000 or less	260	91.69	1.08
\$5,001 to \$9,396	250	87.51	1.08
9,397 to \$14,000	250	80.95	1.18
\$14,001 or more	250	97.74	1.01
Federal aid recipient			
Yes	11,230	93.61	1.04
No	5,220	91.68	1.06
Institution aid recipient			
Yes	8,410	94.74	1.04
No	8,040	91.49	1.06

See notes at end of table.

Table 38. Weight adjustment factors for refusal for the B&B:08/09 student interview weight: 2009—Continued

Model predictor variables	Number of nonrefusal respondents	Weighted response rate	Average weight adjustment factor
State aid recipient			
Yes	6,580	93.91	1.04
No	9,870	92.35	1.05
Any aid recipient			
Yes	14,000	93.83	1.04
No	2,450	89.67	1.07
Preloaded Social Security number			
Yes	15,930	92.83	1.05
No	520	91.72	1.07
NPSAS08 response status			
Interview respondent	16,080	95.57	1.04
Interview nonrespondent and study respondent	360	82.59	1.22
Interview and study nonrespondent	20	97.35	1.03
Count of answering machine encounters			
0	11,010	97.67	1.02
1 or 2	940	89.39	1.07
More than 2	4,500	86.08	1.11
Count of phone numbers			
0	200	95.18	1.03
1	5,390	91.01	1.06
2	6,960	93.50	1.04
More than 2	3,910	94.04	1.04
Count of e-mail addresses			
0	60	89.79	1.11
1	2,450	86.89	1.10
2	7,490	92.85	1.05
More than 2	6,450	97.23	1.02
Count of mailing addresses			
0	180	92.73	1.06
1	7,040	91.18	1.06
2	5,490	93.42	1.04
More than 2	3,740	94.98	1.03
In field cluster			
Yes	11,220	93.44	1.04
No	5,230	91.34	1.06

¹ New England = Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont; Mideast = Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania; Great Lakes = Illinois, Indiana, Michigan, Ohio, Wisconsin; Plains = Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota; Southeast = Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia; Southwest = Arizona, New Mexico, Oklahoma, Texas; Rocky Mountains = Colorado, Idaho, Montana, Utah, Wyoming; Far West = California, Nevada, Oregon, Washington; Outlying Areas = Alaska, Hawaii, and Puerto Rico. Alaska and Hawaii were reclassified from the West to the outlying areas for the purposes of NPSAS.

NOTE: Categories were formed from continuous variables based on quartiles. Detail may not sum to totals because of rounding. B&B = Baccalaureate and Beyond Longitudinal Study. PLUS = Parent Loan for Undergraduate Students. NPSAS = National Postsecondary Student Aid Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

The second stage of adjustment for interview nonresponse was an adjustment for other interview nonresponse, given that the student did not refuse. The other nonresponse adjustment model included the 16,450 interview respondents and other nonrespondents; the response (nonrefusal) indicator was set to 1 for the 15,050 interview respondents and to 0 for the 1,400 cases who were other nonrespondents. Candidate predictor variables were the same as those listed above for the first nonresponse adjustment model. As in the refusal adjustment, a CHAID analysis was performed on the predictor variables to detect important interactions. Variables that made up the CHAID interaction terms were NPSAS response status, number of times an answering machine was encountered, whether the student was in a field cluster area, and counts of phone numbers, e-mail addresses, and mailing addresses we have for a student. This initial model also did not converge, but as many variables as possible were retained in the model.

Table 39 shows the predictor variables used in the model to adjust the weight for other nonrespondents and the average weight adjustment factors resulting from these variables. The other nonresponse weight adjustment factors have the following characteristics:

- minimum: 1.00;
- median: 1.03; and
- maximum: 4.49.

Table 39. Weight adjustment factors for nonresponse for the B&B:08/09 student interview weight: 2009

Model predictor variables	Number of respondents	Weighted response rate	Average weight adjustment factor
Total	15,050	83.18	1.04
Institution control			
Public	8,680	84.16	1.04
Private nonprofit	5,610	82.83	1.04
Private for-profit	760	71.75	1.02
Institution Region ¹			
New England	760	80.76	1.04
Mideast	2,590	80.01	1.04
Great Lakes	2,380	85.81	1.04
Plains	1,920	82.90	1.05
Southeast	3,450	82.73	1.04
Southwest	1,220	82.60	1.05
Rocky Mountains	720	84.89	1.02
Far West	1,800	86.17	1.05
Outlying areas	210	87.81	1.04
NPSAS:08 institution enrollment size			
4,743 or less	3,820	82.88	1.04
4,744 to 13,042	3,710	83.59	1.04
13,043 to 27,210	3,790	81.20	1.04
27,211 or more	3,730	84.83	1.05
Pell Grant amount received			
None	9,030	82.49	1.04
\$1,580 or less	1,550	85.29	1.03
\$1,581 to \$2,695	1,530	81.67	1.04
\$2,696 to \$4,310	1,420	89.69	1.04
\$4,311 or more	1,530	85.27	1.04
Stafford Loan amount received			
None	6,660	81.29	1.05
\$4,410 or less	2,150	83.02	1.03
\$4,411 to \$5,500	4,020	87.91	1.03
\$5,501 to \$6,500	250	84.27	1.14
\$6,501 or more	1,970	82.34	1.04
PLUS amount received			
None	14,120	82.97	1.04
\$5,000 or less	230	84.00	1.07
\$5,001 to \$9,396	240	85.63	1.07
9,397 to \$14,000	230	88.46	1.16
\$14,001 or more	230	85.69	1.01
Federal aid recipient			
Yes	10,380	85.59	1.04
No	4,670	79.98	1.05

See notes at end of table.

Table 39. Weight adjustment factors for nonresponse for the B&B:08/09 student interview weight: 2009—Continued

Model predictor variables	Number of respondents	Weighted response rate	Average weight adjustment factor
Institution aid recipient			
Yes	7,840	87.76	1.03
No	7,210	80.18	1.05
State aid recipient			
Yes	6,160	89.64	1.04
No	8,890	80.75	1.04
Any aid recipient			
Yes	12,910	86.06	1.04
No	2,140	74.64	1.06
Preloaded Social Security number			
Yes	14,610	84.06	1.04
No	440	66.77	1.06
NPSAS08 response status			
Interview respondent	14,830	90.91	1.04
Interview nonrespondent and study respondent	210	59.02	1.20
Interview and study nonrespondent	10	49.38	1.03
Count of answering machine encounters			
0	10,820	95.73	1.02
1 or 2	870	86.50	1.07
More than 2	3,360	63.37	1.10
Count of e-mail addresses			
0	30	35.25	1.10
1	2,010	67.76	1.08
2	6,840	85.98	1.05
More than 2	6,160	92.59	1.02
Count of mailing addresses			
0	100	30.03	1.05
1	6,520	85.58	1.05
2	5,150	89.63	1.04
More than 2	3,280	75.17	1.02
In field cluster			
Yes	10,300	84.84	1.03
No	4,750	79.59	1.06

¹ New England = Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont; Mideast = Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania; Great Lakes = Illinois, Indiana, Michigan, Ohio, Wisconsin; Plains = Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota; Southeast = Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia; Southwest = Arizona, New Mexico, Oklahoma, Texas; Rocky Mountains = Colorado, Idaho, Montana, Utah, Wyoming; Far West = California, Nevada, Oregon, Washington; Outlying Areas = Alaska, Hawaii, and Puerto Rico. Alaska and Hawaii were reclassified from the West to the outlying areas for the purposes of NPSAS.

NOTE: Categories were formed from continuous variables based on quartiles. Detail may not sum to totals because of rounding. B&B = Baccalaureate and Beyond Longitudinal Study. PLUS = Parent Loan for Undergraduate Students. NPSAS = National Postsecondary Student Aid Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

To ensure population coverage and consistency with NPSAS:08, the B&B:08/09 interview weights were further adjusted to control totals. Variables used to define the control totals were similar to those used for the poststratification adjustments for NPSAS:08. The control totals for the B&B:08/09 weights were obtained using the weighted sums from NPSAS:08 (using the NPSAS:08 study weights) for these variables for the full B&B cohort (including ineligible and deceased students). The following variables were used in defining control totals from NPSAS:08 weight sums:

- number of Stafford Loan recipients by institution control;²⁹
- total amount of Pell Grants awarded;³⁰ and
- amount of PLUS grants awarded by institution control.

Additionally, control totals were formed from IPEDS counts of bachelor's degree recipients for institution control, gender, and major. The following variables were used in defining control totals from IPEDS:

- fall 2007 recipients of baccalaureate degree by gender;
- fall 2007 recipients of baccalaureate degree by institution control; and
- fall 2007 recipients of baccalaureate degree by major (12 categories).

The control totals from NPSAS include cases who became ineligible or were deceased. Because of this, the ineligible and deceased cases were included in the calibration adjustment to the NPSAS totals but not the IPEDS totals. After the adjustment, the ineligible and deceased cases were dropped from the file; the sum of the final weights estimates the number of the NPSAS:08 population who were eligible for B&B and were still alive at the time of the B&B:08/09 interview.

As part of the calibration process, students with extreme (outlier) weights had different bounds on their adjustment factors to accomplish weight trimming and smoothing in the same step as calibration. Extreme weights were identified as weights greater than the median weight + 3 times the interquartile range or less than the median weight - 3 times the interquartile range. Weight values outside of these bounds were trimmed to the bounds.

Table 40 shows the variables used for the calibration, the values of the control totals, and the average weight adjustment factors for each variable. The last column of table 3 shows the sum of the weights after removing the cases who were ineligible or deceased at the time of the B&B:08/09 data collection. Statistics for the weight adjustment factors are the following

- minimum: 0.05;
- median: 1.62; and
- maximum: 9.32.

The response adjusted, calibrated interview weight is the variable WTA000 on the data file.

²⁹ NPSAS:08 weights were controlled to total Stafford Loan amounts disbursed in addition to the number of Stafford Loan recipients, but the B&B calibration model would not converge with both of these included.

³⁰ The calibration model would not converge with amount of Pell Grants awarded by institution control, so total amount of Pell Grants awarded was used instead.

Table 40. Control totals, weight adjustment factors, and sum of weights for eligible cases for the B&B:08/09 student interview weight raking: 2009

Variables	Control totals	Average weight adjustment factor	Sum of final weights for eligible cases
Total	2,039,160	1.57	1,662,275
Stafford Loan recipient, by institution control			
Public	513,663	1.27	416,513
Private nonprofit	319,657	1.41	277,369
Private for-profit	54,938	2.91	50,902
Pell Grant amount received, by institution control			
Public	764,974,721	1.18	584,454,763
Private nonprofit	364,027,732	1.35	308,179,423
Private for-profit	45,583,888	2.32	41,430,025
PLUS loan amount received, by institution control			
Public	517,118,255	1.28	434,887,912
Private nonprofit	703,318,945	1.48	636,823,947
Private for-profit	22,037,735	2.20	21,594,336
Interview respondent			
Total	1,662,275	1.57	1,662,275
Institution control			
Public	1,044,858	1.44	1,044,858
Private nonprofit	540,683	1.60	540,683
Private for-profit	76,734	2.82	76,734
Gender			
Male	707,336	1.58	707,336
Female	954,939	1.56	954,695
Major			
Missing/unknown	377	0.80	1,576
Liberal arts	263,613	2.09	263,613
Psychology/history	262,980	1.82	262,980
Biology	173,648	0.82	85,308
Physical sciences	23,288	1.50	23,288
Mathematics and statistics	17,241	1.72	17,241
Computer and information sciences	39,701	1.86	39,701
Engineering	85,482	1.38	85,482
Education	110,402	1.56	110,402
Business	356,282	1.96	356,282
Health professions	113,736	1.82	113,736
Social sciences	11,963	2.30	11,963
Agricultural sciences	203,562	1.81	203,562

NOTE: Ineligible cases are included in the "Control total" column but are not included in the "Sum of final weights for eligible cases" column and as a result the two columns are not always identical. B&B = Baccalaureate and Beyond Longitudinal Study.

PLUS = Parent Loan for Undergraduate Students.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Table 41 summarizes the weight distributions and the variance inflation due to unequal weighting by institution control. The median student interview weight ranges from 25 for students

whose base-year institution was private for-profit to 82 for students whose base-year institution was public. The mean student interview weight ranges from 96 for students whose base-year institution was private nonprofit to 120 for students whose base-year institution was public. The unequal weighting effect overall is 2.41, and ranges from 2.33 for students whose base-year institution was public to 3.12 for students whose base-year institution was private for-profit.

Table 41. Weight distribution and unequal weighting effects for the B&B:08/09 student interview weight, by institution control: 2009

Institution control	Minimum	First quartile	Median	Third quartile	Maximum	Mean	Unequal weighting effect
Total	0.50	13.69	66.42	154.43	774.57	110.46	2.41
Public	0.54	15.32	82.12	165.97	774.57	120.44	2.33
Private nonprofit	0.66	14.51	55.18	132.89	651.12	96.36	2.41
Private for-profit	0.50	6.04	25.46	122.91	561.50	100.70	3.12

NOTE: B&B = Baccalaureate and Beyond Longitudinal Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

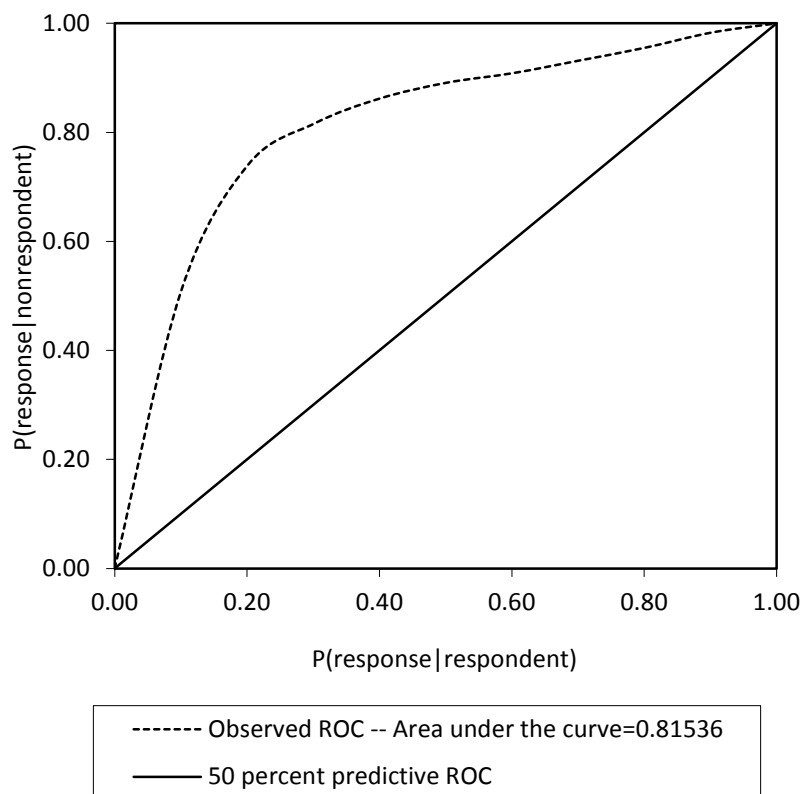
To assess the overall predictive ability of the nonresponse model, a Receiver Operating Characteristic (ROC) curve was used (Hanley and McNeil 1982). The ROC provides a measure of how well the model correctly classified individuals of known response type. For a more detailed example of the use of the ROC curve in nonresponse modeling, see Iannacchione (2003). The ROC curve was developed by calculating, for any specified probability, c , two proportions:

- the proportion of respondents with a predicted probability of response greater than c ; and
- the proportion of nonrespondents with a predicted probability of response greater than c .

The predicted probability of response for each student was the predicted response probability from the weight adjustment model. The plot of the first probability against the second, for c ranging from 0 to 1, resulted in the ROC curve shown in figure 1. The area under the curve measures the probability that a randomly chosen pair of observations—one respondent and one nonrespondent—will be correctly ranked. The probability of a correct pairwise ranking is the same quantity that is estimated by the nonparametric Wilcoxon statistic. The null hypothesis associated with the Wilcoxon statistic is that the variable is not a useful discriminator between the respondent and nonrespondent populations. This corresponds to the null hypothesis that the predicted response probability of a respondent is just as likely to be smaller than the predicted response probability of a nonrespondent as it is to be greater. Thus, if the null hypothesis is true, the ROC curve will be a diagonal line that reflects the equally likely chance of making a correct or incorrect decision, and the area under the curve will be 0.5. If the null hypothesis is not true, the ROC curve will rise above the diagonal and the area under the curve will be significantly greater than 0.5. Figure 19 shows that the area under the ROC curve is 0.82 such that 82 percent of the time (or more than 8 of 10 pairings), the predicted probabilities give the correct classification. The ROC area of 0.82 equals the value of the Wilcoxon test statistic; based on this result we reject the null hypothesis of no predictive ability ($p < 0.05$). This level of discrimination implies that the variables used in the model are highly informative, but not definite predictors of a sample student's overall response propensity. The

predicted probabilities of response (\hat{p}) were obtained as the product of the predicted response probabilities obtained at both of the nonresponse adjustment steps. Note that for the second step (other nonresponse adjustment), predicted probabilities were not directly available for students who had already been dropped from the model because, in the previous step, they refused. For these students, their predicted probability was set equal to the mean of the predicted probabilities of students still in the model.

Figure 19. Receiver operating characteristics (ROC) curve for B&B:08/09 interview response propensity: 2009



SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

6.1.2 Analysis Weight for Cases With Transcript Data

A weight was also constructed for analyzing the cases with transcript data. Of the 17,170 students who were eligible for B&B:08/09, 10 were deceased, 16,070 had a transcript from the NPSAS school, and the remaining 1,090 were considered nonrespondents for this weight.

As with the weight described in section 6.1.1, the base weight was formed as the product of the first seven of the NPSAS:08 weight adjustment factors. An adjustment was made for nonresponse using a model-based constrained logistic weighting procedure, then the weights were calibrated to the sums of the B&B:08/09 interview weights for eligible cases. The procedure WTADJUST in SUDAAN was used to implement the nonresponse and calibration adjustments.

The first adjustment was for nonresponse, that is, not having transcript data.³¹ The adjustment model included the 17,160 eligible cases who were not deceased, with the response indicator set to 1 for the 16,070 cases with transcript data and set to 0 for the 1,090 cases who were nondeceased transcript nonrespondents. Predictor variables were chosen if considered to be predictive of response status and were nonmissing for both transcript respondents and nonrespondents. Variables used in the nonresponse adjustment models for NPSAS were also included. Candidate predictor variables included a subset of the variables that were used for the interview weight (see section 6.1.1):

- institution control;
- region;
- institution enrollment from IPEDS file (categorical);
- Pell Grant receipt (yes/no);
- Pell Grant amount (categorical);
- Stafford Loan receipt (yes/no);
- Stafford Loan amount (categorical);
- PLUS amount (categorical);
- federal aid receipt (yes/no);
- institution aid receipt (yes/no);
- state aid receipt (yes/no); and
- any aid receipt (yes/no).

Variables initially included in the nonresponse modeling included all of the candidate predictor variables as well as certain important interaction terms identified using CHAID. CHAID was run for up to three segments, resulting in the identification of two-way and three-way interactions. Variables that made up the CHAID interaction terms for the student transcript weight adjustment included all of the above variables except for federal aid receipt and Pell Grant amount. This initial model did not converge, but as many variables as possible were retained in the model.

Table 42 shows the predictor variables used in the model to adjust the weight and the average weight adjustment factors resulting from these variables. The nonresponse weight adjustment factors have the following characteristics:

- minimum: 1.00;
- median: 1.06; and
- maximum: 2.27.

³¹ Only one nonresponse adjustment was done for the transcript weight as opposed to two for the interview weight.

Table 42. Weight adjustment factors for nonresponse for the B&B:08/09 student transcript weight: 2009

Model predictor variables	Number of respondents	Weighted response rate	Average weight adjustment factor
Total	16,070	81.65	1.08
Institution control			
Public	9,360	81.03	1.07
Private nonprofit	5,860	81.76	1.10
Private for-profit	860	90.22	1.04
Institution Region ¹			
New England	850	80.84	1.08
Mideast	2,840	81.42	1.09
Great Lakes	2,480	84.12	1.07
Plains	2,100	87.30	1.02
Southeast	3,570	79.16	1.12
Southwest	1,360	84.75	1.04
Rocky Mountains	780	87.47	1.04
Far West	1,860	76.54	1.09
Outlying areas	230	80.52	1.14
NPSAS:08 institution enrollment size			
4,743 or less	4,030	81.96	1.09
4,744 to 13,042	3,980	77.05	1.10
13,043 to 27,117	4,000	80.27	1.09
27,118 or more	4,070	85.95	1.04
Pell Grant amount received			
None	9,780	81.36	1.09
\$1,580 or less	1,620	85.77	1.07
\$1,581 to \$2,695	1,620	84.13	1.07
\$2,696 to \$4,310	1,470	82.31	1.04
\$4,311 or more	1,580	77.84	1.09
Stafford Loan amount received			
None	7,240	81.43	1.07
\$4,415 or less	2,280	83.62	1.07
\$4,416 to \$5,500	4,160	85.32	1.07
\$5,501 to \$6,500	260	74.98	1.15
\$6,501 or more	2,130	75.54	1.12
PLUS amount received			
None	15,080	81.49	1.08
\$5,000 or less	250	82.61	1.12
\$5,001 to \$9,396	250	80.70	1.15
9,397 to \$14,000	250	86.20	1.07
\$14,001 or more	250	86.12	1.06
Federal aid recipient			
Yes	10,870	81.80	1.08
No	5,200	81.45	1.08
Institution aid recipient			
Yes	8,120	84.74	1.07
No	7,960	79.70	1.09

See notes at end of table.

Table 42. Weight adjustment factors for nonresponse for the B&B:08/09 student transcript weight: 2009—Continued

Model predictor variables	Number of respondents	Weighted response rate	Average weight adjustment factor
State aid recipient			
Yes	6,360	82.89	1.07
No	9,710	81.19	1.09
Any aid recipient			
Yes	13,590	82.21	1.08
No	2,490	80.06	1.09
CHAID segments			
Institution enrollment less than or equal to 4,743; Stafford Loan amount less than or equal to \$4,415; any aid recipient	10	90.26	1.08
In Mideast region; institution enrollment less than or equal to 4,743; Stafford Loan amount greater than \$4,415 and less than or equal to \$5,500	290	84.82	1.10
In Great Lakes region; institution enrollment less than or equal to 4,743; Stafford Loan amount greater than \$4,415 and less than or equal to \$5,500	210	93.85	1.03
In Plains region; institution enrollment less than or equal to 4,743; Stafford Loan amount greater than \$4,415 and less than or equal to \$5,500	250	88.92	1.03
Institution enrollment less than or equal to 4,743; Stafford Loan amount greater than \$5,500 and less than or equal to \$6,500	70	53.72	1.41
Public institution; institution enrollment greater than or equal to 4,743 and less than or equal to 13,042; Any aid recipient	1,730	78.67	1.09
Private for-profit; institution enrollment greater than or equal to 4,743 and less than or equal to 13,042; Stafford Loan amount less than or equal to \$4,415	50	98.57	1.01
Private for-profit; institution enrollment greater than or equal to 4,743 and less than or equal to 13,042; Stafford Loan amount greater than \$4,415 and less than or equal to \$6,500	40	98.18	1.00
Private for-profit; institution enrollment greater than or equal to 4,743 and less than or equal to 13,042; Stafford Loan amount greater than \$6,500	50	54.80	1.17
In New England region; institution enrollment greater than 13,042 and less than or equal to 27,117; Stafford Loan recipient	70	62.01	1.47
In Mideast region; institution enrollment greater than 13,042 and less than or equal to 27,117; Pell Grant recipient	310	89.24	1.02
Public institution; in Great Lakes region; institution enrollment greater than 13,042 and less than or equal to 27,117	380	72.58	1.21

¹ New England = Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont; Mideast = Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania; Great Lakes = Illinois, Indiana, Michigan, Ohio, Wisconsin; Plains = Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota; Southeast = Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia; Southwest = Arizona, New Mexico, Oklahoma, Texas; Rocky Mountains = Colorado, Idaho, Montana, Utah, Wyoming; Far West = California, Nevada, Oregon, Washington; Outlying Areas = Alaska, Hawaii, and Puerto Rico. Alaska and Hawaii were reclassified from the West to the outlying areas for the purposes of NPSAS.

NOTE: Categories were formed from continuous variables based on quartiles. Detail may not sum to totals because of rounding. B&B = Baccalaureate and Beyond Longitudinal Study. CHAID = chi-square automatic interaction detection; PLUS = Parent Loan for Undergraduate Students.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

To ensure population coverage and consistency with the B&B:08/09 interview weight, the NPSAS:08 weight, and IPEDS, the B&B:08/09 transcript weight was adjusted to control totals determined by the B&B:08/09 interview weight sums. Cases which were deceased were not included in either the control totals or in the cases included in the adjustment. This adjustment was also implemented using the SUDAAN WTADJUST procedure. Variables used to define the control totals were the same as those used for the poststratification coverage adjustments for the B&B:08/09 interview weight, which are listed in section 6.1.1. The control totals for the B&B:08/09 transcript weights were established by the weighted sums from the B&B:08/09 interview weights.

As part of the calibration process, students with extreme (outlier) weights had different bounds on their adjustment factors to accomplish weight trimming and smoothing in the same step as calibration. Extreme weights were identified as weights greater than the median weight + 3 times the interquartile range or less than the median weight - 3 times the interquartile range. Weight values outside of these bounds were trimmed to the bounds.

Table 43 gives the variables used for the calibration, the values of the control totals, and the average weight adjustment factors for each variable. Statistics for the weight adjustment factors are the following:

- Minimum: 0.08;
- Median: 1.52; and
- Maximum: 9.45.

The response adjusted, calibrated transcript weight is the variable WTB000 on the data file.

Table 43. Control totals and weight adjustment factors for the B&B:08/09 student transcript weight raking: 2009

Variables	Control totals	Average weight adjustment factor
Total	1,662,275	1.48
Stafford Loan recipient, by institution control		
Public	416,513	1.21
Private nonprofit	277,369	1.34
Private for-profit	50,902	2.92
Pell Grant amount received, by institution control		
Public	584,454,763	1.13
Private nonprofit	308,179,423	1.26
Private for-profit	41,430,025	2.33
PLUS loan amount received, by institution control		
Public	434,887,912	1.25
Private nonprofit	636,823,947	1.39
Private for-profit	21,594,336	3.01
Institution control		
Public	1,044,858	1.36
Private nonprofit	540,683	1.48
Private for-profit	76,734	2.79
Gender		
Male	707,336	1.48
Female	954,939	1.48
Major		
Missing/unknown	377	0.78
Liberal arts	263,613	1.95
Psychology/history	262,980	1.74
Biology	173,648	0.78
Physical sciences	23,288	1.35
Mathematics and statistics	17,241	1.65
Computer and information sciences	39,701	1.74
Engineering	85,482	1.35
Education	110,402	1.46
Business	356,282	1.79
Health professions	113,736	1.72
Social sciences	11,963	1.97
Agricultural sciences	203,562	1.70

NOTE: B&B = Baccalaureate and Beyond Longitudinal Study. PLUS = Parent Loan for Undergraduate Students.
 SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Table 44 summarizes the weight distributions and the variance inflation due to unequal weighting by institution control. The median transcript weight ranges from 22 for students whose

base-year institution was private for-profit to 77 for students whose base-year institution was public. The mean transcript weight ranges from 89 for students whose base-year institution was private for-profit to 112 for students whose base-year institution was public. The unequal weighting effect overall is 2.36, and ranges from 2.28 for students whose base-year institution was public to 3.17 for students whose base-year institution was private for-profit.

Table 44. Weight distribution and unequal weighting effects for the B&B:08/09 student transcript weight, by institution control: 2009

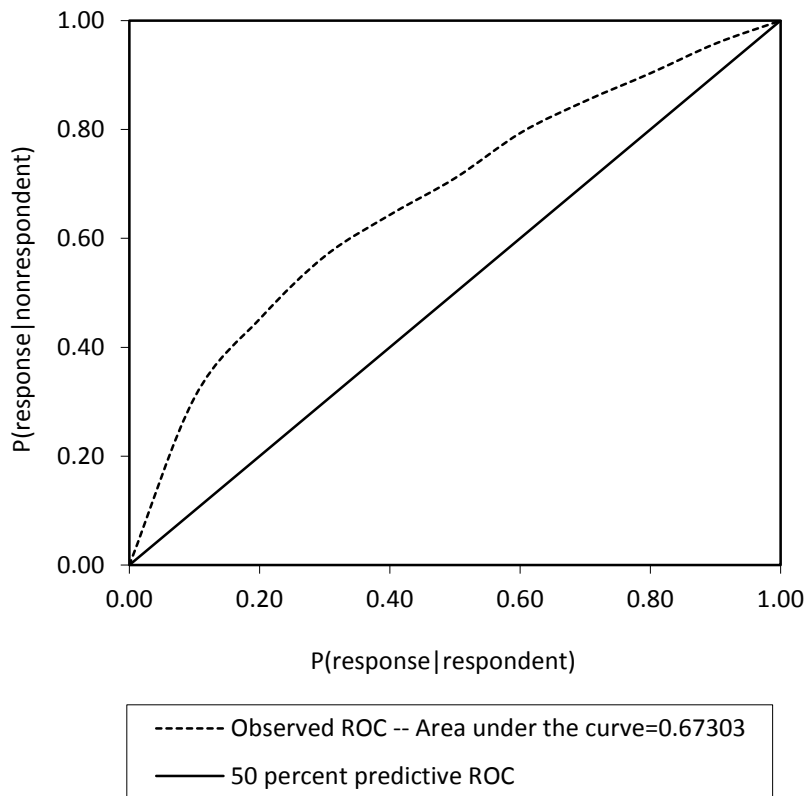
Institution control	Minimum	First quartile	Median	Third quartile	Maximum	Mean	Unequal weighting effect
Total	0.53	13.93	63.17	144.09	705.08	103.42	2.36
Public	0.53	15.67	76.97	151.47	705.08	111.69	2.28
Private nonprofit	0.65	14.25	52.55	129.42	585.48	92.27	2.37
Private for-profit	1.01	5.77	22.03	110.25	533.69	89.43	3.17

NOTE: B&B = Baccalaureate and Beyond Longitudinal Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

To assess the overall predictive ability of the nonresponse model, an ROC curve was again used to provide a measure of how well the model correctly classified individuals of known response type. The plot of the first probability against the second (that is, the proportion of respondents with a predicted probability of response greater than c versus the proportion of nonrespondents with a predicted probability of response greater than c) for c ranging from 0 to 1, resulted in the ROC curve shown in figure 20. The area under the ROC curve is 0.67, such that 67 percent of the time (or almost 7 of 10 pairings), the predicted probabilities give the correct classification. The ROC area of 0.67 equals the value of the Wilcoxon test statistic; based on this result we reject the null hypothesis of no predictive ability ($p < 0.05$). This level of discrimination implies that the variables used in the model are highly informative but not definite predictors of a sample student's transcript response propensity.

Figure 20. Receiver operating characteristics (ROC) curve for B&B:08/09 transcript response propensity: 2009



SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

6.1.3 Analysis Weight for Cases With Both Student Interview and Transcript Data

A weight was also constructed for analyzing the cases with both student interview and transcript data. Of the 17,070 students who were eligible for both the interview and transcripts,³² 10 were deceased, 14,010 had both a student interview and a transcript from the NPSAS school, and the remaining 3,040 were considered nonrespondents for this weight.

As with the weights described in sections 6.1.1 and 6.1.2, the base weight was formed as the product of the first seven of the NPSAS:08 weight adjustment factors. An adjustment was made for nonresponse using a model-based constrained logistic weighting procedure, then the weights were calibrated to the sums of the B&B:08/09 interview weights for eligible cases. The procedure WTADJUST in SUDAAN was used to implement the nonresponse and calibration adjustments.

The first adjustment was for nonresponse, that is, not having interview or transcript data.³³ The adjustment model included the 17,060 eligible cases who were not deceased, with the response indicator set to 1 for the 14,010 cases with transcript data and set to 0 for the 3,040 cases who were nondeceased interview and transcript nonrespondents. Predictor variables were chosen if considered

³² The number of students eligible for both the interview and transcripts differs from the number of students eligible for the interview or the transcripts due to perturbation (see section 5.5).

³³ Only one nonresponse adjustment was done for the combined interview and transcript weight as opposed to two for the interview weight.

to be predictive of response status and were nonmissing for both interview and transcript respondents and nonrespondents. Variables used in the nonresponse adjustment models for NPSAS were also included. Candidate predictor variables included the same set of variables that was used for the interview weight (see section 6.1.1).

Variables initially included in the nonresponse modeling included all of the candidate predictor variables as well as certain important interaction terms identified using CHAID. CHAID was run for up to three segments, resulting in the identification of two-way and three-way interactions. Variables that made up the CHAID interaction terms for the combined student interview and transcript weight adjustment were NPSAS response status, number of times an answering machine was encountered, whether the student was in a field cluster area, and counts of phone numbers and e-mail addresses we have for a student. This initial model did not converge, but as many variables as possible were retained in the model.

Table 45 shows the predictor variables used in the model to adjust the weight and the average weight adjustment factors resulting from these variables. The nonresponse weight adjustment factors have the following characteristics:

- minimum: 1.01;
- median: 1.14; and
- maximum: 5.18.

Table 45. Weight adjustment factors for nonresponse for the B&B:08/09 combined student interview and transcript weight: 2009

Model predictor variables	Number of respondents	Weighted response rate	Average weight adjustment factor
Total	14,010	62.97	1.31
Institution control			
Public	8,150	62.85	1.29
Private nonprofit	5,140	63.09	1.33
Private for-profit	730	63.90	1.40
Institution Region ¹			
New England	730	61.96	1.26
Mideast	2,390	59.96	1.37
Great Lakes	2,200	69.66	1.24
Plains	1,860	65.00	1.29
Southeast	3,100	60.79	1.38
Southwest	1,180	65.03	1.33
Rocky Mountains	710	71.66	1.23
Far West	1,620	57.84	1.27
Outlying areas	210	66.71	1.18
NPSAS:08 institution enrollment size			
4,760 or fewer	3,540	63.38	1.34
4,761 to 13,042	3,410	59.43	1.34
13,043 to 27,210	3,500	61.05	1.32
27,211 or more	3,560	66.90	1.24
Pell Grant amount received			
None	8,430	62.75	1.33
\$1,580 or less	1,450	68.22	1.22
\$1,581 to \$2,695	1,410	61.52	1.36
\$2,696 to \$4,310	1,320	64.77	1.22
\$4,311 or more	1,400	60.10	1.31
Stafford Loan amount received			
None	6,250	61.66	1.32
\$4,400 or less	2,010	64.11	1.28
\$4,401 to \$5,500	3,730	70.82	1.24
\$5,501 to \$6,417	230	54.51	1.51
\$6,418 or more	1,810	55.27	1.42
PLUS amount received			
None	13,150	62.84	1.31
\$5,000 or less	220	64.55	1.36
\$5,001 to \$9,396	220	64.47	1.36
9,397 to \$14,000	220	62.76	1.37
\$14,001 or more	210	67.31	1.20
Federal aid recipient			
Yes	9,620	64.40	1.29
No	4,390	61.09	1.36
Institution aid recipient			
Yes	7,270	70.80	1.24
No	6,740	58.08	1.38

See notes at end of table.

Table 45. Weight adjustment factors for nonresponse for the B&B:08/09 combined student interview and transcript weight: 2009—Continued

Model predictor variables	Number of respondents	Weighted response rate	Average weight adjustment factor
State aid recipient			
Yes	5,730	69.47	1.24
No	8,290	60.57	1.36
Any aid recipient			
Yes	12,000	65.64	1.28
No	2,020	55.26	1.47
Preloaded Social Security number			
Yes	13,590	64.11	1.30
No	420	52.62	1.53
NPSAS08 response status			
Interview respondent	13,820	71.60	1.30
Interview nonrespondent and study respondent	190	36.77	1.67
Interview and study nonrespondent	10	43.42	2.07
Count of answering machine encounters			
0	10,070	72.48	1.14
1 or 2	820	68.20	1.29
More than 2	3,130	47.31	1.87
Count of phone numbers			
0	90	23.32	1.52
1	4,610	61.54	1.35
2	6,000	65.76	1.28
More than 2	3,320	68.81	1.31
Count of e-mail addresses			
0	30	19.79	1.77
1	1,870	44.86	1.79
2	6,350	65.22	1.31
More than 2	5,770	78.04	1.15
Count of mailing addresses			
0	90	24.02	1.55
1	6,040	61.92	1.33
2	4,830	71.09	1.21
More than 2	3,060	60.48	1.42
In field cluster			
Yes	9,570	65.41	1.26
No	4,450	59.48	1.41

¹ New England = Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont; Mideast = Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania; Great Lakes = Illinois, Indiana, Michigan, Ohio, Wisconsin; Plains = Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota; Southeast = Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia; Southwest = Arizona, New Mexico, Oklahoma, Texas; Rocky Mountains = Colorado, Idaho, Montana, Utah, Wyoming; Far West = California, Nevada, Oregon, Washington; Outlying Areas = Alaska, Hawaii, and Puerto Rico. Alaska and Hawaii were reclassified from the West to the outlying areas for the purposes of NPSAS.

NOTE: Detail may not sum to totals because of rounding. Categories were formed from continuous variables based on quartiles. B&B = Baccalaureate and Beyond Longitudinal Study. PLUS = Parent Loan for Undergraduate Students. NPSAS = National Postsecondary Student Aid Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

To ensure population coverage and consistency with the B&B:08/09 interview weight, the NPSAS:08 weight and IPEDS, the B&B:08/09 combined interview and transcript weight was adjusted to control totals determined by the B&B:08/09 interview weight sums. Cases which were deceased were not included in either the control totals or in the cases included in the adjustment. This adjustment was also implemented using the SUDAAN WTADJUST procedure. Variables used to define the control totals were the same as those used for the poststratification coverage adjustments for the B&B:08/09 interview weight, which are listed in section 6.1.1. The control totals for the B&B:08/09 transcript weights were established by the weighted sums from the B&B:08/09 interview weights.

As part of the calibration process, students with extreme (outlier) weights had different bounds on their adjustment factors to accomplish weight trimming and smoothing in the same step as calibration. Extreme weights were identified as weights greater than the median weight + 3 times the interquartile range or less than the median weight - 3 times the interquartile range. Weight values outside of these bounds were trimmed to the bounds.

Table 46 gives the variables used for the calibration, the values of the control totals, and the average weight adjustment factors for each variable. Statistics for the weight adjustment factors are the following:

- Minimum: 0.05;
- Median: 1.55; and
- Maximum: 7.67.

The response adjusted, calibrated combined interview and transcript weight is the variable WTC000 on the data file.

Table 46. Control totals and weight adjustment factors for the B&B:08/09 combined student interview and transcript weight raking: 2009

	Control totals	Average weight adjustment factor
Total	1,662,275	1.50
Stafford Loan recipient, by institution control		
Public	416,513	1.23
Private nonprofit	277,369	1.35
Private for-profit	50,902	2.80
Pell grant amount received, by institution control		
Public	584,454,763	1.16
Private nonprofit	308,179,423	1.28
Private for-profit	41,430,025	2.22
PLUS loan amount received, by institution control		
Public	434,887,912	1.24
Private nonprofit	636,823,947	1.44
Private for-profit	21,594,336	2.59
Institution control		
Public	1,044,858	1.40
Private nonprofit	540,683	1.51
Private for-profit	76,734	2.70
Gender		
Male	707,336	1.53
Female	954,939	1.49
Major		
Missing/unknown	377	0.80
Liberal arts	263,613	1.97
Psychology/history	262,980	1.74
Biology	173,648	0.79
Physical sciences	23,288	1.43
Mathematics and statistics	17,241	1.62
Computer and information sciences	39,701	1.79
Engineering	85,482	1.42
Education	110,402	1.45
Business	356,282	1.89
Health professions	113,736	1.73
Social sciences	11,963	2.25
Agricultural sciences	203,562	1.73

NOTE: B&B = Baccalaureate and Beyond Longitudinal Study. PLUS = Parent Loan for Undergraduate Students.
 SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Table 47 summarizes the weight distributions and the variance inflation due to unequal weighting by institution control. The median combined interview and transcript weight ranges from

24 for students whose base-year institution was private for-profit to 86 for students whose base-year institution was public. The mean combined interview and transcript weight ranges from 105 for students whose base-year institution was private nonprofit or private for-profit to 128 for students whose base-year institution was public. The unequal weighting effect overall is 2.43, and ranges from 2.34 for students whose base-year institution was public to 3.14 for students whose base-year institution was private for-profit.

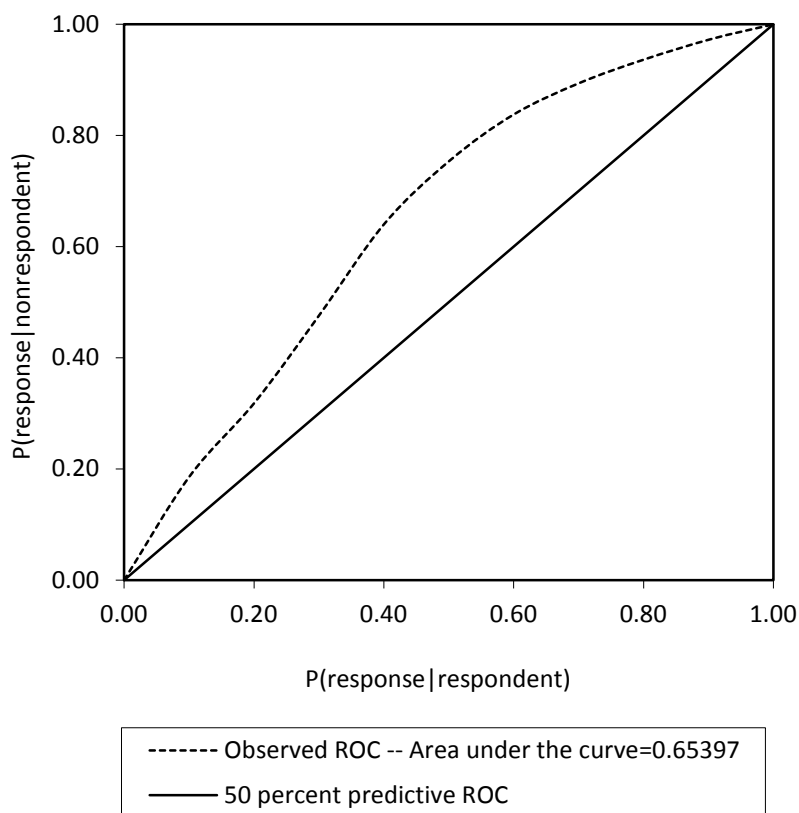
Table 47. Weight distribution and unequal weighting effects for the B&B:08/09 combined student interview and transcript weight, by institution control: 2009

Institution control	Minimum	First quartile	Median	Third quartile	Maximum	Mean	Unequal weighting effect
Total	0.53	14.38	70.52	162.08	782.09	118.62	2.43
Public	0.53	16.22	86.20	171.62	782.09	128.27	2.34
Private nonprofit	0.65	15.11	57.66	142.49	693.01	105.21	2.44
Private for-profit	1.15	6.17	23.98	137.02	600.12	105.26	3.14

NOTE: B&B = Baccalaureate and Beyond Longitudinal Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

To assess the overall predictive ability of the nonresponse model, an ROC curve was again used to provide a measure of how well the model correctly classified individuals of known response type. The plot of the first probability against the second (that is, the proportion of respondents with a predicted probability of response greater than c versus the proportion of nonrespondents with a predicted probability of response greater than c) for c ranging from 0 to 1, resulted in the ROC curve shown in figure 21. The area under the ROC curve is 0.65, such that 65 percent of the time (or more than 6 of 10 pairings), the predicted probabilities give the correct classification. The ROC area of 0.65 equals the value of the Wilcoxon test statistic; based on this result we reject the null hypothesis of no predictive ability ($p < 0.05$). This level of discrimination implies that the variables used in the model are highly informative but not definite predictors of a sample student's response propensity.

Figure 21. Receiver operating characteristics (ROC) curve for B&B:08/09 combined interview and transcript response propensity: 2009

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

6.2 Variance Estimation

For probability-based sample surveys, most estimates are nonlinear statistics. For example, a mean or proportion, which is expressed as

$$\bar{m} = \frac{\sum_i w_i x_i}{\sum_i w_i y_i}$$

is nonlinear because the denominator is a survey estimate of the (unknown) population total. In this situation, the variances of the estimates cannot be expressed in closed form. Two procedures for estimating variances of survey statistics are the Taylor series linearization procedure and the bootstrap replication procedure. Variables to use for both of these variance estimation procedures are available on the B&B:08/09 data files. The analysis strata and replicates created for the Taylor series procedure are discussed in section 6.2.1, and section 6.2.2 discusses the replicate weights created for the bootstrap procedure.

6.2.1 Taylor Series

The Taylor series variance estimation procedure is a well-known technique used to estimate the variances of nonlinear statistics. The procedure takes the first-order Taylor series approximation

of the nonlinear statistic and then substitutes the linear representation into the appropriate variance formula based on the sample design. Woodruff (1971) presented the mathematical formulation of this procedure.

For stratified multistage surveys, the Taylor series procedure requires variance estimation strata and variance estimation PSUs, also called replicates, defined from the sampling strata and PSUs used in the first stage of sampling. Because B&B:08/09 is a follow-up study of NPSAS:08, the variance estimation strata and PSUs for B&B:08/09 were derived from the variance estimation strata and PSUs that were developed for NPSAS:08. The steps in the construction of the NPSAS:08 stratum and PSU variables are described in chapter 6 of the NPSAS:08 Full-scale Methodology Report (Cominole et al. 2010).

The variance estimation formulas require at least two PSUs in each stratum. The NPSAS:08 variance estimation strata and PSUs were examined for the B&B:08/09 sample, and strata with only one PSU were combined with other strata to obtain at least two PSUs. The following three rules were used: variance estimation strata were combined with other variance estimation strata within the original NPSAS:08 sampling strata, certainty schools were combined with other certainty schools, and noncertainty schools were combined with other noncertainty schools. In addition, the original sort order that was used for constructing the NPSAS:08 variance estimation strata and PSUs was used. If the stratum was the first in the sorted list, then it was combined with the next stratum in the list. The single PSU then became an additional PSU in the new variance estimation stratum. The resulting variance estimation strata and PSUs for B&B:08/09 are the variables ANALSTR and ANALPSU. Note that these strata and PSUs were formed such that they are applicable to use with any of the three analysis weights described in section 6.1.

The procedure described above may overestimate the variance because it does not always account for the finite population correction (FPC) at the institution stage of sampling. The Taylor series procedure can account for the FPC if the secondary sampling units (SSUs) and PSU counts are considered in addition to the analysis strata and analysis PSUs. An alternate variance estimation method using replicate weights to account for the FPC is also provided for users of the B&B:08/09 data, as described below.

6.2.2 Bootstrap Replicate Weights

The variance estimation strategy that was chosen for B&B:08/09 is the same as that used for NPSAS:08 and satisfies the following requirements:

- recognition of variance reduction due to stratification at all stages of sampling;
- recognition of effects of unequal weighting;
- recognition of possible increased variance due to sample clustering;
- recognition of effects of weight adjustments for nonresponse and for calibration of selected total estimates to known external totals or weight sums;
- satisfactory properties for estimating variances of nonlinear statistics and quantiles (such as the median) as well as for linear statistics;
- ability to apply finite population corrections at the institution stage of sampling and reflect the reduction in variance due to the high sampling rates in some first-stage sampling strata; and

- ability to test hypotheses about students based on normal distribution theory by ignoring the finite population corrections at the student level of sampling.

The Flyer-Kott methodology was used to develop a vector of bootstrap sample weights that was added to the analysis file. These weights are zero for units not selected in a particular bootstrap sample; weights for other units are inflated for the bootstrap subsampling. The initial analytic weights for the complete sample are also included for the purposes of computing the desired estimates. The vector of replicate weights allows for computing additional estimates for the sole purpose of estimating a variance. Assuming B sets of replicate weights, the variance of any estimate, $\hat{\theta}$, can be estimated by replicating the estimation procedure for each replicate and computing a simple variance of the replicate estimates, as follows:

$$\text{var}(\hat{\theta}) = \frac{\sum_{b=1}^B (\hat{\theta}_b^* - \hat{\theta})^2}{B},$$

where $\hat{\theta}_b^*$ is the estimate based on the b -th replicate weight and B is the total number of sets of replicate weights. Once the replicate weights are provided, this estimate can be produced by most survey software packages (e.g., SUDAAN [RTI International 2008] computes this estimate by invoking the DESIGN=BRR option).

The number of replicate weights was set at 200 for NPSAS:08 based on work that showed that this number of replicates has desirable properties for variance estimation in regression analyses. For the 200 replicate weights included on the weights file, both the nonresponse adjustment and calibration process were repeated so that the variance of survey estimates would include the variability due to the weight adjustments. For some of the replicates, not all of the control totals could be met because of model convergence problems, i.e. there was no solution to satisfy all model equations simultaneously. The analysis and replicate weights that are available on the weights file for B&B:08/09 are the following:

Type of respondents	Analysis weight	Replicate weights
Interview respondents	WTA000	WTA001–WTA200
Transcript respondents	WTB000	WTB001–WTB200
Interview and transcript respondents	WTC000	WTC001–WTC200

6.3 Overall Weighted and Unweighted Response Rates

The overall B&B:08/09 response rate is an estimate of the proportion of the study population directly represented by the respondents. Because the B&B:08/09 study includes a subsample of NPSAS:08 nonrespondents, the overall B&B:08/09 response rate is the product of the NPSAS:08 institution-level response rate times the B&B:08/09 student-level response rate. Therefore, the overall B&B:08/09 response rates can only be estimated directly for defined institution characteristics.

Table 48 gives the unweighted and weighted NPSAS:08 base-year institution and B&B:08/09 student response rate components by institution control. Only the weighted response rates can be interpreted as estimates of the proportion of the B&B:08/09 population that is directly represented by the respondents. The types of student respondents included in table 48 are the following:

- B&B:08/09 interview respondents;
- B&B:08/09 transcript respondents (i.e., cases with any transcript data); and
- B&B:08/09 interview and transcript respondents (i.e., cases with both interview and transcript data).

Table 48. Unweighted and weighted NPSAS:08 institution response rates and B&B:08/09 student interview, transcript, and combined interview and transcript response rates, by institution control: 2009

Institution control (base year)	Institution response rate		Eligible sample size	Respon- dents	Response rate		Overall response rate	
	Un- weighted	Weighted			Un- weighted	Weighted	Un- weighted	Weighted
B&B:08/09 interview respondents								
Total	89.0	90.1	17,160	15,050	87.7	78.3	78.0	70.5
Public	91.9	91.2	9,910	8,680	87.5	79.1	80.5	72.1
Private nonprofit	87.4	86.7	6,360	5,610	88.2	77.9	77.1	67.5
Private for-profit	83.6	88.2	890	760	85.5	69.6	71.5	61.4
B&B:08/09 transcript respondents								
Total	89.0	90.1	17,160	16,070	93.6	92.3	83.3	83.1
Public	91.9	91.2	9,910	9,360	94.4	93.0	86.8	84.8
Private nonprofit	87.4	86.7	6,360	5,860	92.1	90.4	80.5	78.4
Private for-profit	83.6	88.2	890	860	96.3	96.3	80.5	85.0
B&B:08/09 combined interview and transcript respondents								
Total	89.0	90.1	17,060	14,010	82.2	73.1	73.1	65.8
Public	91.9	91.2	9,840	8,150	82.8	74.4	76.1	67.8
Private nonprofit	87.4	86.7	6,330	5,140	81.2	71.2	71.0	61.8
Private for-profit	83.6	88.2	890	730	82.1	68.3	68.6	60.2

NOTE: Detail may not sum to totals because of rounding. Base-year institution response rates were obtained from the 2007–08 National Postsecondary Student Aid Study (NPSAS:08) Methodology Report (Cominole et al. 2010, table 9, p. 50). Overall response rates are the product of the NPSAS:08 and B&B:08/09 response rates. The eligible student counts for the combined interview and transcript differ from the counts for the student interview and the student transcript due to perturbation. B&B = Baccalaureate and Beyond Longitudinal Study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

The institution-level response rates shown in table 42 are the percentage of institutions that provided sufficient data to select the NPSAS:08 student-level sample; these rates are presented and discussed in the NPSAS:08 Full-scale Methodology Report (Cominole et al. 2010, table 9, p.50).

Table 48 shows that approximately 78 percent of the eligible sample responded to the B&B:08/09 interview. The rate varied from 70 percent to 79 percent, by type of institution. The overall weighted response rate, incorporating the NPSAS:08 base-year institution response rate, was 71 percent. The interview analysis weight described in section 6.1.1 (WTA000) was developed to compensate for the potentially biasing effects of interview nonresponse.

Table 48 also provides weighted response rates for the transcript data collection component. Overall, a transcript was collected from 92 percent of the eligible students. This varied, by type of institution, from 90 percent to 96 percent. An analysis weight (the weight variable WTB000) was developed for analyzing students with transcript data.

Overall, 73 percent of the sample were respondents to both the interview and the transcript data collection. This rate varied, by type of institution, from 68 percent to 74 percent. The weight variable WTC000 was developed for analyzing students with both interview and transcript data.

Section 6.4.2 analyzes the potential bias due to unit nonresponse and the effect the weight adjustments had in reducing the bias.

6.4 Accuracy of Estimates

The accuracy of survey statistics is affected by both random and nonrandom errors. Random errors reduce the precision of survey estimates, while nonrandom errors result in bias (i.e., estimates that do not converge to the true population parameter as the sample size increases without limit).

The sources of error in a survey are often dichotomized as sampling and nonsampling errors. *Sampling error* refers to the error that occurs because the survey is based on a sample of population members rather than the entire population. All other types of errors are *nonsampling errors*, including survey nonresponse (because of inability to contact sampling members, their refusal to participate in the study, etc.) and measurement errors, such as the errors that occur because the intent of survey questions was not clear to the respondent, because the respondent had insufficient knowledge to answer correctly, or because the data were not captured correctly (e.g., because of recording, editing, or data entry errors).

The sampling errors are primarily random errors for well-designed surveys such as NPSAS:08 and B&B:08/09. However, nonrandom errors can occur if the sampling frame does not provide complete coverage of the target population. The B&B:08/09 survey instrument and data collection procedures were subjected to thorough development and testing to minimize nonsampling errors, because these errors are difficult to quantify and are likely to be nonrandom errors.

In this section sampling errors and design effects for some B&B:08/09 estimates are presented for a variety of domains; these sampling errors and design effects are computed using the analysis weights that were constructed for analyzing the B&B:08/09 student and transcript data.

Next, the results of analyses comparing B&B:08/09 nonrespondents and respondents using characteristics known for both nonrespondents and respondents are presented. An analysis of nonresponse bias is presented at both the student level and the item level.

6.4.1 Measures of Precision: Standard Errors and Design Effects

The survey design effect for a statistic is defined as the ratio of the design-based variance estimate divided by the variance estimate that would have been obtained from a simple random sample of the same size. The design effect is often used to measure the effects that sample design features have on the precision of survey estimates. For example, stratification tends to decrease the variance, but multistage sampling and unequal sampling rates usually increase the variance. Weight adjustments for nonresponse (performed to reduce nonresponse bias) and calibration often increase the variance because they can increase the weight variation. Because of these factors, estimates from

most complex multistage sampling designs such as B&B:08/09 have design effects greater than 1.0. That is, the design-based variance is larger than the simple random sample variance.

Specifically, the survey design effect for a given estimate, $\hat{\theta}$, is defined as

$$Deff(\hat{\theta}) = \frac{Var_{design}(\hat{\theta})}{Var_{srs}(\hat{\theta})}.$$

The square root of the design effect can also be expressed as the ratio of the standard errors, or

$$Deft(\hat{\theta}) = \frac{SE_{design}(\hat{\theta})}{SE_{srs}(\hat{\theta})}.$$

In appendix L, design effect estimates are presented for important survey domains to summarize the effects of stratification, multistage sampling, unequal probabilities of selection, and the weight adjustments. These design effects were estimated for interview and transcript data using SUDAAN and the bootstrap variance estimation procedure described in section 6.2.2. If an analysis of B&B:08/09 data must be performed without using one of the software packages for analysis of complex survey data, the design effect tables in appendix L can be used to make approximate adjustments to the standard errors of survey statistics computed using the standard software packages that assume simple random sampling designs. However, one cannot be confident about the actual design-based standard errors without performing the analysis with one of the software packages specifically designed for analysis of data from complex sample surveys.

Large design effects imply large standard errors and relatively poor precision. Small design effects imply small standard errors and good precision. In general terms, a design effect under 2.0 is low, 2.0 to 3.0 is moderate, and above 3.0 is high. Moderate and high design effects often occur in complex surveys such as B&B:08/09, and the design effects in appendix L are consistent with those in past B&B studies. Unequal weighting causes large design effects and is often as a result of nonresponse and poststratification adjustments. However, in B&B:08/09 (as in NPSAS:08), the unequal weighting is also due to the sample design, different sampling rates between institution strata, different sampling rates between student strata, and subsampling of the nonrespondents that were included in B&B:08/09.

6.4.2 Measure of Bias

The bias in an estimated mean based on respondents, \bar{y}_R , is the difference between this mean and the target parameter, π , that is, the mean that would be estimated if a complete census of the target population was conducted and everyone responded. This bias can be expressed as follows, where $E(\bar{y}_R)$ is the expected value of the mean based on respondents over repeated samples:

$$B(\bar{y}_R) = E(\bar{y}_R) - \pi.$$

The estimated mean based on nonrespondents, \bar{y}_{NR} , can be computed if data for the particular variable are available for most of the nonrespondents. The true target parameter, π , can be estimated for these variables as follows:

$$\hat{\pi} = (1 - \eta)\bar{y}_R + \eta\bar{y}_{NR},$$

where η is the weighted unit (or item) nonresponse rate. For the variables that are from the frame, rather than from the sample, π can be estimated without sampling error. The bias can then be estimated as follows:

$$\hat{B}(\bar{y}_R) = \bar{y}_R - \hat{\pi}$$

or, equivalently,

$$\hat{B}(\bar{y}_R) = \eta(\bar{y}_R - \bar{y}_{NR}).$$

This formula shows that the estimate of the nonresponse bias is the difference between the mean for respondents and nonrespondents multiplied by the weighted nonresponse rate.

Nonresponse bias analysis was conducted when the response rate at any level (institutions, students, items) was below 85 percent.³⁴ Institution nonresponse bias was performed as a part of NPSAS:08 and is described in the NPSAS:08 Full-scale Methodology Report (Cominole et al. 2010). A student nonresponse bias analysis was performed for the interview and the combined interview and transcript, and an item nonresponse bias analysis was also performed for both the interview and transcript data. The remainder of this section summarizes the unit and item nonresponse bias analyses that were conducted for B&B:08/09.

Unit nonresponse bias analysis. Unit nonresponse bias analyses were conducted for the following sets of respondents:

- B&B:08/09 interview respondents versus the full set of cases eligible for B&B:08/09 (interview respondents and interview nonrespondents), before and after the weight adjustment that resulted in the B&B:08/09 interview weight (WTA000);
- B&B:08/09 interview respondents versus B&B:08/09 interview nonrespondents, before the weight adjustment that resulted in the B&B:08/09 interview weight (WTA000);
- Interview and transcript respondents versus the full set of cases eligible for B&B:08/09 (interview and transcript respondents and interview and transcript nonrespondents), before and after the combined interview and transcript weight adjustment that resulted in the B&B:08/09 student transcript weight WTC000; and
- Interview and transcript respondents versus interview and transcript nonrespondents, before the combined interview and transcript weight adjustment that resulted in the B&B:08/09 student transcript weight WTC000.

The *NCES Statistical Standards* (NCES 2003) requires a bias analysis for any stage of a sample with a response rate less than 85 percent. From table 48, the weighted B&B:08/09 transcript response rate was greater than 85 percent overall and by control. Therefore, a unit-level nonresponse bias analysis was not necessary for transcripts.

Tables in appendix M give the bias estimates as a result of the analyses listed above. The nonresponse bias was estimated for variables obtained from the sampling frame and from the NPSAS:08 data collection that are known for both respondents and nonrespondents. In all of the tables, the bias was estimated as follows. First, the percentage distribution was obtained for the respondents using the weight before and after weight adjustments. Next, the percentage distribution

³⁴ See *NCES Statistical Standards* (U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics 2003) for a discussion of nonresponse bias analysis.

was obtained for the overall sample using the B&B:08/09 base weight (described above). Then, the bias was estimated as the difference in the percentages. Statistical tests of the bias were also computed using Taylor series estimates of the standard errors, and the tables in appendix M indicate when the bias is statistically different from zero.

It is also informative to compare the distributions of the respondents and nonrespondents before weight adjustments, and the tables in appendix M include columns that give the weighted distributions of respondents and nonrespondents. From the above formulas, the bias prior to the weight adjustment can also be obtained as the nonresponse rate multiplied by the difference between respondents and nonrespondents. When the bias before the weight adjustment is statistically significant, the differences between the respondent and nonrespondent distributions are almost always statistically significant. Similarly, when the differences between the respondent and nonrespondent distributions are statistically significant, the bias is also statistically significant. When one is statistically significant but not the other, the p-values are very close to 0.05. The p-values are not identical because of the sampling error associated with the nonresponse rate. The results of the statistical tests are provided in appendix M for comparing the respondent and nonrespondent percentages.

The variables that were used in the analyses for all sample members are the following:

- institution control;
- region;
- institution enrollment from IPEDS file (categorical);
- Pell Grant receipt (yes/no);
- Stafford Loan receipt (yes/no);
- federal aid receipt (yes/no);
- institution aid receipt (yes/no);
- state aid receipt (yes/no); and
- any aid receipt (yes/no).

The variables that were used in the analyses for sample members who were federally aided during NPSAS:08 are the following:

- Pell Grant amount (categorical);
- Stafford Loan amount (categorical); and
- PLUS amount (categorical).

The nonresponse bias was estimated for the above variables and tested to determine if the bias was significant at the 5 percent level. The tests are reported to be statistically significant if the *p* value is less than .05. Relative bias was also estimated and computed as the bias divided by the estimate of the full sample. Results are given in appendix M for all institutions combined and by institution control.

Table 49 summarizes the results of the bias analysis for interview respondents before and after weight adjustments overall and by institution control. From table 48, the weighted B&B:08/09

interview response rate was less than 85 percent overall and for each of the three institution controls. This summary shows the estimated relative bias prior to the weight adjustment using the B&B:08/09 base weight or, equivalently, compared the B&B:08/09 interview respondents and interview nonrespondents. The summary also shows the estimated relative bias after the weight adjustments using the B&B:08/09 interview weight WTA000 or, equivalently, compared the B&B:08/09 interview respondents and the full sample. Tables in appendix M provide the detailed bias estimates for the interview bias analyses.

As shown in table 49, some significant bias remains after the student interview weight adjustments. Significant bias was reduced after the nonresponse weighting adjustments for the variables known for respondents and nonrespondents. However, the calibration adjustment to IPEDS and NPSAS:08 totals caused some significant bias to reappear. The calibration was necessary to match the baccalaureate counts in B&B:08/09 to known IPEDS counts and NPSAS:08 weighted estimates of federal aid receipt and to get the B&B:08/09 weights and estimates more in line with the NPSAS:08 weights and estimates for the B&B:08/09 students.

Table 49. Summary of components of the B&B:08/09 analysis weights: 2009

Weight component	Purpose
All weights	
NPSAS:08 adjustments	
Institution sampling weight	Account for the institution's probability of selection
Institution multiplicity adjustment	Adjust the weights for institutions that had multiple chances of selection
Institution poststratification adjustment	Adjust the institution weights to match population enrollment totals to ensure population coverage
Institution nonresponse adjustment	Adjust the institution weights to compensate for nonresponding institutions
Student sampling weight	Account for the student's probability of selection
Student multiplicity adjustment	Adjust the weights for students who attended more than one institution
Student unknown eligibility adjustment	Adjust the weights of nonresponding NPSAS:08 students with unknown eligibility
B&B:08/09 adjustments	
Student subsampling adjustment	Adjust the weights of the subset of NPSAS:08 interview nonrespondents who were included in the B&B:08/09 sample
Student interview analysis weight	
Interview nonresponse adjustment	Adjust the weights to compensate for B&B:08/09 students who did not respond to the interview
Interview poststratification adjustment	Adjust the student weights to match NPSAS:08 weight sums and known population totals from IPEDS to ensure population coverage. Includes trimming and smoothing of the weights to reduce unequal weighting.
Student transcript analysis weight	
Transcript nonresponse adjustment	Adjust the weights to compensate for B&B:08/09 students for whom a transcript was not collected
Transcript poststratification adjustment	Adjust the student weights to match NPSAS:08 weight sums and known population totals from IPEDS to ensure population coverage. Includes trimming and smoothing of the weights to reduce unequal weighting.
Combined student interview and transcript analysis weight	
Transcript nonresponse adjustment	Adjust the weights to compensate for B&B:08/09 students who did not respond to the interview and for whom a transcript was not collected
Transcript poststratification adjustment	Adjust the student weights to match NPSAS:08 weight sums and known population totals from IPEDS to ensure population coverage. Includes trimming and smoothing of the weights to reduce unequal weighting.

NOTE: All adjustments in the student interview, student transcript, and combined weights are B&B:08/09 adjustments.

B&B = Baccalaureate and Beyond Longitudinal Study. NPSAS = National Postsecondary Student Aid Study. IPEDS = Integrated Postsecondary Education Data System.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09).

Table 50 summarizes the results of the bias analysis for students who were both interview and transcript respondents before and after weight adjustments overall and by institution control. From table 48, the weighted B&B:08/09 interview response rate was less than 85 percent overall and for each of the three institution controls. This summary shows the estimated relative bias prior to the weight adjustment using the B&B:08/09 base weight or, equivalently, compared the B&B:08/09 interview and transcript respondents and interview and transcript nonrespondents. The summary also shows the estimated relative bias after the weight adjustments using the B&B:08/09 combined interview and transcript weight WTC000 or, equivalently, compared the B&B:08/09 interview and

transcript respondents and the full sample. Tables in appendix M provide the detailed bias estimates for the combined interview and transcript bias analyses.

Table 50 shows some reduction of significant bias but significant bias still remains. Similar to the student interview bias analysis, the calibration causes significant bias to reappear after the nonresponse adjustments.

Table 50. Summary of student interview nonresponse bias analysis, by type of institution: 2009

Nonresponse bias statistics	Overall	Public	Private nonprofit	Private for-profit
Before weight adjustments				
Mean estimated relative bias	3.90	4.56	6.00	10.73
Median estimated relative bias	3.14	3.95	4.60	6.79
Percent of variable categories significantly biased	27.50	32.43	38.89	8.11
After weight adjustments				
Mean estimated relative bias	4.81	6.98	8.87	36.71
Median estimated relative bias	3.78	5.26	8.20	24.09
Percent of variable categories significantly biased	42.50	40.54	36.11	21.62

NOTE: Nonresponse bias analysis for selected variables was conducted for the three types of institutions with a weighted response rate less than 85 percent.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2008/09 Baccalaureate and Beyond (B&B:08/09).

Item nonresponse bias analysis. When item response rates were less than 85 percent, the NCES Statistical Standards required that a nonresponse bias analysis be conducted. This analysis was conducted on the data items collected in the B&B:08/09 interview based on interview respondents and for variables derived from student transcript data collection. As shown in the equation below, item response rates (RRI) are calculated as the ratio of the number of respondents for whom an in-scope response was obtained (I^x for item x) to the number of respondents who are asked to answer that item. The number asked to answer an item is the number of unit-level respondents (I) minus the number of respondents with a valid skip for item x (V^x). When an abbreviated questionnaire is used to convert refusals, the eliminated questions are treated as item nonresponse (NCES 2003):

$$RRI^x = I^x \div (I - V^x).$$

Item response rates were computed using nonimputed data. Valid skips were later logically imputed to the follow-up items after the gate question was imputed (but these imputed skips count as missing for computing the response rate). Table J-1 in appendix J lists the items from the B&B:08/09 interview along with the number of cases who were eligible to answer each item, and the weighted item response rates and nonresponse rates. The B&B:08/09 interview weight (WTA000) was used to calculate the response rates. The nonresponse rate was also the same as the percentage of cases for which the item was imputed. As mentioned earlier, cases who did not respond to a gate item were treated as missing for the items within the gate. Of the 368 items listed in table J-1, 149 had an item response rate less than 85 percent.

Table J-4 lists the derived variables from the transcript data along with the number of eligible cases and the weighted item response rates and nonresponse rates. The B&B:08/09 student

transcript analysis weight (WTB000) was used to calculate the response rates. Of the 202 variables, all but nine had a response rate greater than 85 percent.

A nonresponse bias analysis was conducted for items with a weighted response rate less than 85 percent for all B&B:08/09 interview respondents, and for derived transcript variables with weighted response rates 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 is little or no missing data. The variables that were used (from the bulleted list above) are known for all B&B:08/09 interview respondents. These variables are important to the study and are related to many of the items being analyzed for low item response rates. For the items with a weighted response rate less than 85 percent, the nonresponse bias prior to imputation was estimated for each of these characteristics that are known for respondents.

Table M-9 in appendix M illustrates the estimated bias (prior to item imputation) for one item (B1ADMSUP – Teacher satisfaction: Administrative support) for B&B:08/09 interview respondents. Similar computations were performed and tabulations were produced for each of the items. Table M-10 summarizes the results of the item nonresponse bias analysis for each of the items from the student interview, and gives the mean and median relative bias and the percentage of the variable categories with statistically significant bias. Across the items, the percentage of variables with statistically significant bias ranged from 3 percent to 98 percent. Table M-11 gives the same analysis for the derived transcript items that have a weighted item response rate less than 85 percent.

Item imputation was used to fill in missing data for B&B:08/09 interview respondents and nonrespondents, as described in chapter 5. Item imputation was expected to reduce the bias due to item nonresponse, and was used instead of a separate weight adjustment for nonresponse for each item. All of the questionnaire items that are listed in table J-1 were imputed using the imputation process described in chapter 5.

A by-product of imputation was the reduction or elimination of item-level nonresponse bias. While item-level bias before imputation was measurable, after imputation it was not. As a result, how well an imputation procedure worked in reducing bias could not be directly evaluated. Instead, 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. Weighted estimates were computed using the nonimputed data (including only those cases who responded to the item) and also using the imputed data (including cases who responded to the item and also cases with imputed data for the item). Table J-2 gives the means before and after imputation for the continuous variables, and table J-3 gives the distributions before and after imputation for the categorical variables. These tables also give the difference between the preimputation and postimputation estimates. The difference between the pre- and postimputation estimates was statistically significant for 13 percent of the variables and variable categories (see table M-10). This suggests that imputation was only slightly successful in reducing the bias due to item nonresponse.

Imputation was not performed for the items obtained from student transcript data. A weight, adjusted for students without any transcript data, was computed. Most of the variables that were derived from the transcript data have high item response rates (table J-4).

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